APPENDIX C: AUDIO MAGNETIC PROBE AM1DV3 S/N 3036 CALIBRATION DOCUMENT

Schmid & Partner Engineering AG

s p e a g

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Client **Nokia Salo TCC**

Certificate of test and configuration

Item	**AM1DV3** Audio Magnetic 1D Field Probe
Type No	SP AM1 001 BA
Series No	**3036**
Manufacturer / Origin	Schmid & Partner Engineering AG, Zürich, Switzerland

Description of the item
The Audio Magnetic Field Probe is a fully shielded magnetic field probe for the frequency range from 100 Hz to 20 kHz. The pickup coil is compliant with the dimensional requirements of [1]. The probe includes a symmetric 20dB low noise amplifier for the signal available at the shielded 3 pin connector at the side. Power is supplied via the same connector (phantom power supply) and monitored via the LED near the connector. The 7 pin connector at the end of the probe does not carry any signals, but determines the angle of the sensor when mounted on the DAE. The probe supports mechanical detection of the surface. The single sensor in the probe is arranged in a tilt angle allowing measurement of 3 orthogonal field components when rotating the probe by 120° around its axis. It is aligned with the perpendicular component of the field, if the probe axis is tilted 35.3° above the measurement plane, using the connector rotation and Sensor angle stated below.
The probe is fully RF shielded when operated with the matching signal cable (shielded) and allows measurement of audio magnetic fields in the close vicinity of RF emitting wireless devices according to [1] without additional shielding.

Handling of the item
The probe is manufactured from stainless steel. In order to maintain the performance and calibration of the probe, it must not be opened. The probe is designed for operation in air and shall not be exposed to humidity or liquids. For proper operation of the surface detection and emergency stop functions in the DASY4 system, the probe must be operated with the special probe cup provided (larger diameter). Verify that the probe can slide in the probe cup rubber smoothly.

Functional test, configuration data and sensitivity
The probe configuration data were evaluated after a functional test including noise level and RF immunity. Connector rotation, sensor angle and sensitivity are specific for this probe.

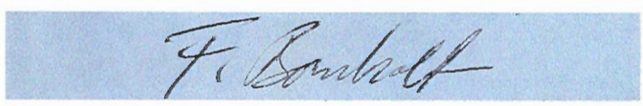
DASY4 configuration data for the probe

Configuration item	Condition	Configuration Data	Dimension
Overall length	mounted on DAE in DASY4 system	296	mm
Tip diameter	at the cylindrical part	6	mm
Sensor offset	center of sensor, from tip	3	mm
Connector rotation	Evaluated in homogeneous 1 kHz magnetic field generated with AMCC Helmholtz Calibration Coil	**-5.0**	°
Sensor angle		**1.31**	°
Sensitivity	at 1 kHz	**0.007364**	V / (A/m)

Standards [1] ANSI-C63.19-2006

Test date 16.02.2007 MM / FB

Issue date 16.02.2007

Signature 

APPENDIX D: R&S CMU200 CALIBRATION DOCUMENT

ROHDE & SCHWARZ

Kalibrierschein
Calibration Certificate

Nummer 11-967532/507
Number

Gegenstand *Object*	Universal Radio Communication Tester
Hersteller *Manufacturer*	ROHDE & SCHWARZ
Typ *Type*	CMU 200
Sach-Nr. *Ident. No.*	1100.0008.82
Serien-Nr. *Serial No.*	101111
Auftraggeber *Customer*	NOKIA MOBILE PHONES TCC Salo Joensuunkatu 7E Fin - 24101 Salo , Finland
Kunden-Referenz *Customer reference*	Service Contract
Ort u. Datum d. Kalibrierung *Place and date of calibration*	Salo, 2005-07-19
Umfang der Kalibrierung *Scope of calibration*	Standardkalibrierung *standard calibration*
Eingangsprüfung *Performance on receipt*	innerhalb der Toleranz *in tolerance*
Kalibrierergebnis *Result of calibration*	innerhalb der Toleranz *in tolerance*
Umfang des Kalibrierscheins *Extent of the certificate*	44 Seiten *44 pages*

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95 % im zugeordneten Werteintervall (Erweiterte Messunsicherheit mit k = 2).
Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).
Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S-Laboratorien.
Grundsätze und Verfahren der Kalibrierung entsprechen ISO/IEC 17025. Das Bestätigungssystem für die verwendeten Messmittel entspricht DIN ISO 10012-1. Das angewandte Qualitätsmanagement-System ist zertifiziert nach DIN EN ISO 9001.
Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents, that the named item is tested and measured against defined specifications. Measurement results are located usually in the corresponding interval with a probability of approx. 95 % coverage factor k = 2).
Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/ DKD or other national/international standards, which realize the physical units of measurement according to the International System of Units (SI). In all cases where no national standards are available, measurements are referenced to standards of the R&S laboratories.
Principles and methods of calibration correspond with ISO / IEC 17025. The metrological confirmation system for the measuring equipment used is in compliance with DIN ISO 10012-1. The applied quality system is certified to DIN EN ISO 9001.
This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.
The user is obliged to have the object recalibrated at appropriate intervals.

Ausstellungsdatum *Date of issue*	Laborleitung *Head of laboratory*	Bearbeiter *Person responsible*
2005-07-19	gez. Wessels	gez. Heppekausen

Dieser Kalibrierschein ist maschinell unterschrieben gem. Qualitätssicherungshandbuch Kap. 7.3
This calibration certificate is automatically signed according to quality handbook chapt. 7.3

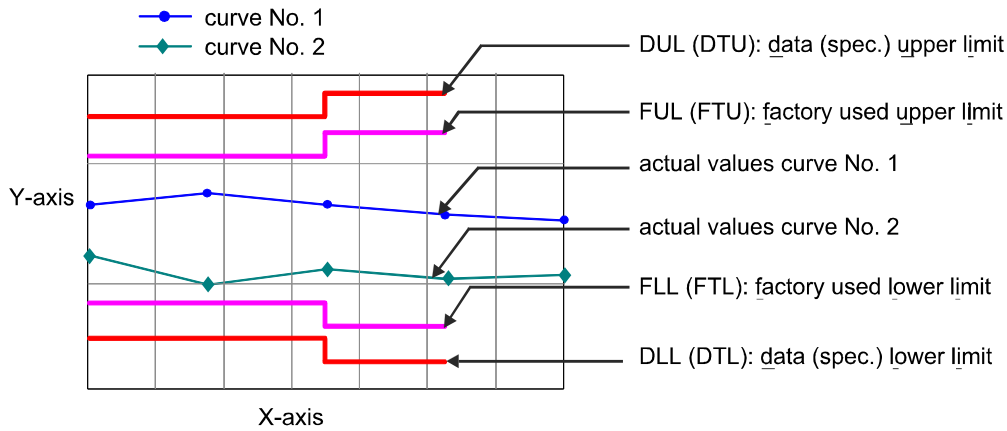
ROHDE & SCHWARZ GmbH & Co. KG · Dienstleistungszentrum Köln · Graf-Zeppelin-Str. 18 · D - 51147 Köln
Postfach 98 02 60 · D - 51130 Köln · Telefon (02203) 49-0 · Telefax (02203) 49-51364

Conventions used in this report

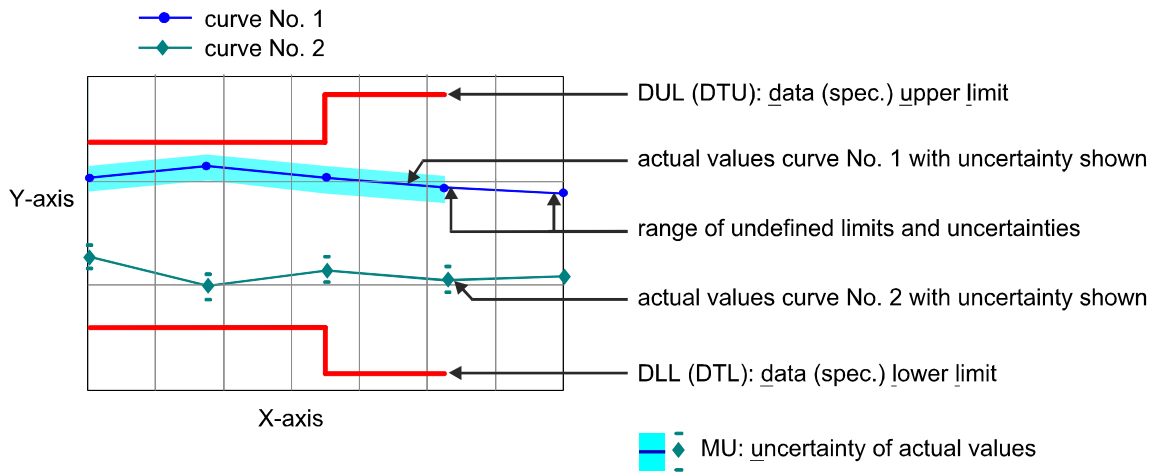
Explanation of the measurement uncertainty in charts.

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



The following abbreviations are used in this report

{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	data specification limit
FL	factory limit
UGB	Uncertainty guard band: Measuring uncertainty violates the data sheet tolerance

Table of contents

Kalibrieranweisung *Calibration instruction*	Test Instruction 3.05 / 2004-03-15	**Eingangsdatum** *Date of receipt*	2005-07-19
Umgebungstemperatur *Ambient temperature*	(23 ± 3) °C	**Rel. Luftfeuchte** *Relative humidity*	(40 ± 20) %
Firmware-Version *Firmware version*	3.52	**Kalibrierintervall** *Customers due interval*	12 Monate *12 months*
Optionen *Options*	CMU-B12, CMU-B21, CMU-B41, CMU-B53, CMU-B83		

Verwendete Gebrauchsnormale
Working Standards used

Gegenstand *Object*	**Typ** *Type*	**Serien-Nr.** *Serial No.*	**Kalibrierschein Nr.** *Certificate No.*	**Kalibr. bis** *Cal. due*
Spectrum Analyzer	FSIQ 26	832296/012	8206-DKD-K-00201-04-10	2005-10
Modulation Analyzer	FMB	842544/010	8344-DKD-K-00201-04-11	2005-11
Signal Generator	SMHU 58	830207/014	8313-DKD-K-00201-04-11	2005-11
Signal Generator	SMIQ 06	100895	8130-DKD-K-00201-04-09	2005-09
RF Step Attenuator	RSG	826025/005	9075-DKD-K-00201-05-07	2006-07
Powermeter	NRVD	834131/012	8750-DKD-K-00201-05-03	2006-03
Powersensor	NRV-Z51	834519/013	8357-DKD-K-00201-04-12	2005-12
Powersensor	NRV-Z4	848628/027	8343-DKD-K-00201-04-11	2005-11
Power Splitter	1870A/5628	6105	1008663	2005-10
RMS-Voltmeter	URE3	892952/017	8755-DKD-K-00201-05-03	2006-03
SWR Bridge	ZRC	827875/010	7970-DKD-K-00201-04-07	2005-07
Frequenz Standard	SYS2000	0536	8988-DKD-K-00201-05-06	2006-06

Anmerkungen
Notes

2. Identification

Identification

Rohde&Schwarz,CMU 200-1100.0008.02,101111,V3.52

System Info

Hardware Options:	Status:
B11/12	B12
B21	available
B41	available
B53	available
B83	V2.35 (Var. 02)
PCMCIA	available
U65V02	available

Software Options:	Status:
K21	V3.52 available
K22	V3.52 available
K23	V3.52 available
K24	V3.52 available
K27	V3.52 available
K28	V3.52 available
K29	V3.52 available
K42	V3.52 available
K43	V3.52 available
K53	V3.51 available
K84	V3.52 available
K85	V3.52 available

Hardware Equipment:	Status:
CPU(FMR)	FMR5
CPU	AMD K6-III
Memory	128 MB

Firmware Versions:	Status:
uP1	V8.10 15.10.03

3. EEPROM Status

REF:		FE:	
PARTNUMBER:	1100.2600.02	PARTNUMBER:	1100.3042.02
HWCODE:	0	HWCODE:	5
PRODUCTINDEX:	04.08	PRODUCTINDEX:	06.24
SN:	100663/002	SN:	100372/002
PRODUCTDATE:	2002-02-08	PRODUCTDATE:	2002-02-19
READCODE:	0	READCODE:	0
TESTINSTRUCTION:	04.02	TESTINSTRUCTION:	06.19
NAME:	REF	NAME:	FE
DIG:		IQIF:	
PARTNUMBER:	1100.1804.02		
HWCODE:	2		
PRODUCTINDEX:	04.10		
SN:	100509/002		
PRODUCTDATE:	2002-02-12		
READCODE:	0		
TESTINSTRUCTION:	04.02		
NAME:	DIG		
AUC:		AUC_2:	
PARTNUMBER:	1100.2500.02		
HWCODE:	0		
PRODUCTINDEX:	04.05		
SN:	100586/002		
PRODUCTDATE:	2002-02-14		
READCODE:	0		
TESTINSTRUCTION:	04.05		
NAME:	AUC		
ADC:		ADC_2:	
PARTNUMBER:	1100.2200.02		
HWCODE:	1		
PRODUCTINDEX:	04.05		
SN:	101102/002		
PRODUCTDATE:	2001-11-12		
READCODE:	0		
TESTINSTRUCTION:	04.01		
NAME:	ADC		
RXTX:		RXTX_2:	
PARTNUMBER:	1135.6702.02		
HWCODE:	15		
PRODUCTINDEX:	01.16		
SN:	100553/002		
PRODUCTDATE:	2002-01-08		
READCODE:	0		
TESTINSTRUCTION:	01.09		
NAME:	RXTX		
COR:		COR_2:	
PARTNUMBER:	1100.1604.02		
HWCODE:	0		
PRODUCTINDEX:	03.02		
SN:	788876/349		
PRODUCTDATE:	2001-08-24		
READCODE:	17		
TESTINSTRUCTION:	00.00		
NAME:	COR		
AUXTX:			

4. Selftest Measurements

Selftest FE

FE eeprom access tested --- OK !

No.	Part	DLL	DUL	Actual
1	M 10V HF Switch	-12.155	-9.282	-10.876 V
2	M 8V HF Switch	-7.900	-6.900	-7.343 V
3	M 5V AD Converter	-5.200	-4.700	-4.903 V
4	+3.3V Logic Voltage	+3.000	+3.600	+3.324 V
5	+0.25V Reference	+0.256	+0.278	+0.265 V
6	+5.0V Reference	+4.850	+5.050	+4.906 V
7	Diode 16V	+22.600	+24.600	+23.268 V
8	SW-Corr	+0.000	+80.000	+40.300 Deg C
9	Temperature Fan	+0.000	+80.000	+38.400 Deg C
11	Multiplexer	-0.010	+0.010	-0.001 V
12	Multiplexer	+4.780	+5.100	+4.908 V
13	Peak Detector	-0.010	+0.010	-0.001 V
14	Peak Detector	+4.780	+5.100	+4.909 V
15	Peak Detector	+4.780	+5.100	+4.909 V
16	S/H Voltage	-0.010	+0.010	+0.003 V
17	S/H Voltage	+4.727	+5.147	+4.918 V
18	Power Adc	-0.005	+0.005	+0.001 V
19	Power Adc	+1.187	+1.287	+1.232 V
20	Threshold	-0.030	-0.010	-0.023 V
21	Threshold	+0.570	+0.610	+0.586 V

Selftest REF

REF eeprom access tested --- OK !

No.	Part	DLL	DUL	Actual
1	GND	-0.002	+0.002	+0.000 V
2	NETCLK1TUNE	+0.280	+0.380	+0.334 V
3	NETCLK1TUNE	+2.350	+2.850	+2.692 V
4	NETCLK2TUNE	+0.280	+0.380	+0.335 V
5	NETCLK2TUNE	+2.350	+2.850	+2.741 V
6	110.8MTUNE	+1.800	+3.000	+2.375 V
7	110.8MLEV	+0.050	+0.130	+0.086 V
8	3.3VSUPPLY	+3.130	+3.470	+3.326 V
9	5.0VREF	+4.990	+5.010	+5.000 V
10	TEMPERATURE	+0.000	+70.000	+40.400 Deg C

Selftest DIG

DIG eeprom access tested --- OK !

No.	Part	DLL	DUL	Actual
1	NETCLK1	+0.360	+0.562	+0.460 V
2	NETCLK1	+0.760	+1.180	+0.942 V
3	NETCLK2	+0.376	+0.587	+0.481 V
4	NETCLK2	+0.760	+1.180	+0.986 V
5	REFERENCE CLOCK	+1.320	+2.060	+1.657 V
6	TEMPERATURE	+0.000	+70.000	+35.600 Deg C
7	REGULATED VOLTAGE	-0.350	-0.200	-0.289 V

Selftest RXTX 1

No.	Part	DLL	DUL	Actual
1	DIAG+28V	+25.024	+28.840	+27.185 V
2	DIAG+12V	+10.900	+12.200	+11.710 V
3	DIAG-8V	-5.500	-4.500	-4.911 V
4	DIAG+5V	+4.750	+5.252	+5.015 V
5	DIAG+3.3V	+3.200	+3.465	+3.327 V
6	DIAG-5V	-5.400	-4.600	-4.888 V
7	DIAG-12V	-12.500	-10.800	-11.458 V
8	DIAG+0.8V	-0.100	+0.100	+0.000 V
10	5VREF	+4.900	+5.100	+5.000 V
9	VTEMP_BM (TX-RF)	+0.000	+70.000	+39.900 Deg C
23	VTEMP_BO (TX-IF)	+0.000	+70.000	+43.300 Deg C
30	VTEMP_AM (RX-RF)	+0.000	+70.000	+37.400 Deg C
32	VTEMP_AO (RX-IF)	+0.000	+70.000	+43.000 Deg C
48	TRIPLDIAG	-0.100	+0.100	-0.040 V
29	LO0TUNEDIAG	+3.000	+20.000	+7.527 V
28	LO0LEVDIAG	-0.400	+0.000	-0.223 V
53	LO0LEVDIAG	+0.050	+0.500	+0.308 V
20	LO2TUNEDIAG	+0.500	+24.000	+10.967 V
21	LO2LEVDIAG	-0.300	-0.100	-0.240 V
47	LO2LEVDIAG	+0.100	+0.400	+0.196 V
17	TXLO1TUNEDIAG	+3.800	+7.800	+6.367 V
43	TXLO1TUNEDIAG	+15.000	+24.000	+18.444 V
44	TXLO1TUNEDIAG	+15.000	+22.000	+19.225 V
45	TXLO1TUNEDIAG	+3.600	+9.600	+6.077 V
24	TXLO1LEVDIAG	-0.200	+1.100	+0.610 V
19	TXLO3TUNEDIAG	+6.000	+12.500	+8.703 V
18	TXLO3LEVDIAG	-0.400	-0.150	-0.260 V
46	TXLO3LEVDIAG	+0.200	+1.500	+1.144 V
14	VGAINTX	+1.100	+1.300	+1.204 V
11	VFILTTX (Notch)	-0.287	+1.620	+0.501 V
54	VFILTTX (Notch)	+0.497	+0.554	+0.536 V
33	VFILTTX (Notch)	+0.518	+0.583	+0.557 V
34	VFILTTX (Notch)	+0.568	+0.632	+0.612 V
35	VFILTTX (Notch)	+0.652	+0.747	+0.710 V
36	VFILTTX (Notch)	+0.819	+0.976	+0.898 V
37	VFILTTX (Notch)	+1.153	+1.436	+1.294 V
38	VFILTTX (Notch)	+1.822	+2.353	+2.094 V
39	VFILTTX (Notch)	+3.161	+4.191	+3.674 V
40	VFILTTX (Notch)	+5.841	+7.861	+6.798 V
41	VFILTTX (Notch)	+11.191	+15.211	+13.123 V
42	VFILTTX (Notch)	+21.871	+29.871	+25.696 V
25	RXLO1TUNEDIAG	+4.000	+9.000	+6.882 V
49	RXLO1TUNEDIAG	+15.000	+24.000	+18.830 V
50	RXLO1TUNEDIAG	+17.000	+22.000	+19.298 V
51	RXLO1TUNEDIAG	+3.000	+9.000	+5.706 V
31	RXLO1LEVDIAG	-0.180	+1.600	+0.572 V
27	RXLO3TUNEDIAG	+4.000	+10.000	+6.214 V
26	RXLO3LEVDIAG	-0.400	-0.150	-0.263 V
52	RXLO3LEVDIAG	+0.730	+1.790	+1.263 V
13	VGAINRX	+1.100	+1.300	+1.200 V
12	TRESHOLD	+1.100	+1.300	+1.205 V
15	POW	-0.300	+2.500	+0.781 V
16	POWIF3	-0.300	+2.500	+1.415 V

5. Reference Frequencies

REFOUT1

DUT Settings	Input Signal at REFIN	Signal at DUT REFOUT1 50 Ohm	Actual	MU
mode int. ref.	-	DLL Level 1.4 Vpp	2.87 Vpp	0.05 V
mode ext. ref.	52MHz/16dBm	DLL Level 1.4 Vpp	1.68 Vpp	0.05 V
mode ext. ref.	1MHz/16dBm	DLL Level 1.4 Vpp	3.09 Vpp	0.05 V

REFOUT2

DUT Settings	Output Signal at REFOUT2	Signal at DUT REFOUT2 50 Ohm	Actual	MU
mode ext. ref.	10.000 MHz	DLL Level 1.00 Vpp	1.52 Vpp	0.05 V

6. Frequency Accuracy

Frequency Accuracy with Aging

OCXO Option B12

DUT Settings: Reference INT, RF3OUT, Level = 0dBm, unmodulated
Aging of 10 month(s)

Frequency /MHz	Drift /Hz	Aging /Hz	DL /Hz Aging+Drift	Error /Hz	MU /Hz
2200	11.0	64.2	75.2	-6.6	0.1

7. VSWR (functional test)

Connector

RF1	PASS
RF2	PASS
RF3OUT	PASS
RF4IN	PASS

8. TX Generator: Frequency Settling Time

DUT Settings: Level = 0dBm at RFOUT3
F1 = Start Freq., F2 = Stop Freq., Ramping off, Hopping on

F1 /MHz	F2 /MHz	DUL /us		Actual /us	MU /us
100.0	200.0	400	<1 kHz	271	13
1800.0	1900.0	400	<1 kHz	217	13
2200.0	2100.0	400	<1 kHz	251	13
100.0	2200.0	400	<1 kHz	323	13
2000.0	100.0	400	<1 kHz	271	13

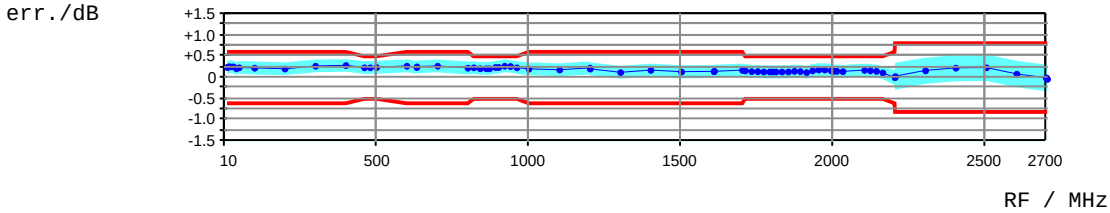
9. TX Generator: Level Settling Time

DUT Settings: Output RF3OUT, RF Frequency 1 GHz, Ramping on, Hopping off

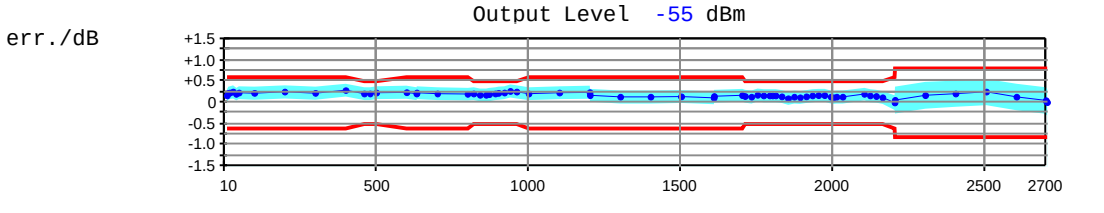
Level	DUL /us		Actual /us	MU /us
+10dBm	4.00	<0.5 dB	3.2	0.1
-20dBm	4.00	<0.5 dB	3.2	0.1
-50dBm	4.00	<0.5 dB	3.2	0.1

10. TX Generator: Level Error RF1

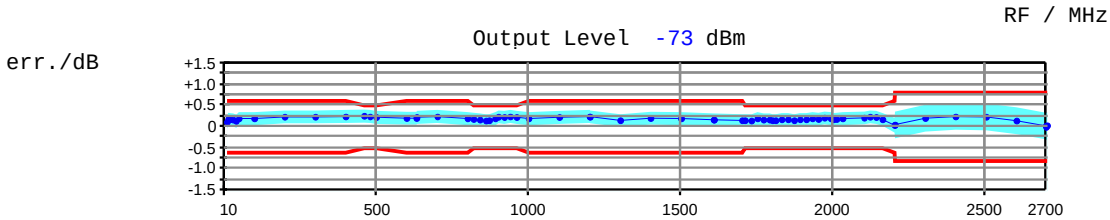
Output Level -33 dBm



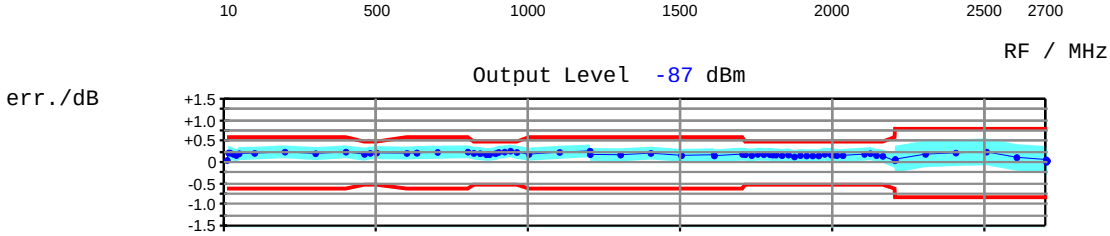
Output Level -55 dBm



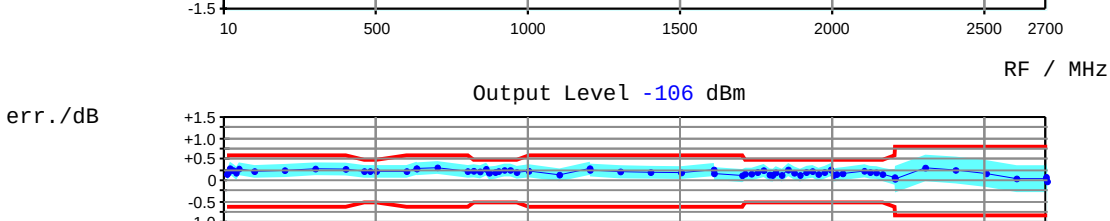
Output Level -73 dBm



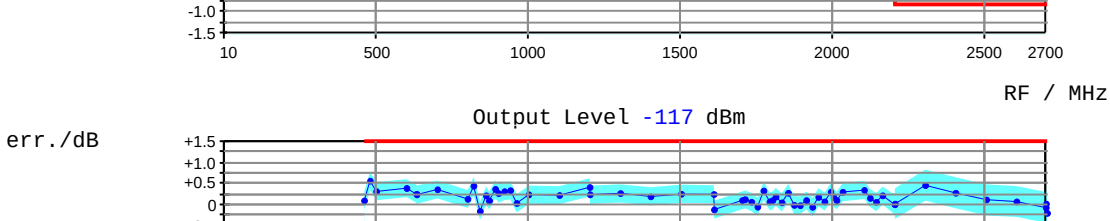
Output Level -87 dBm



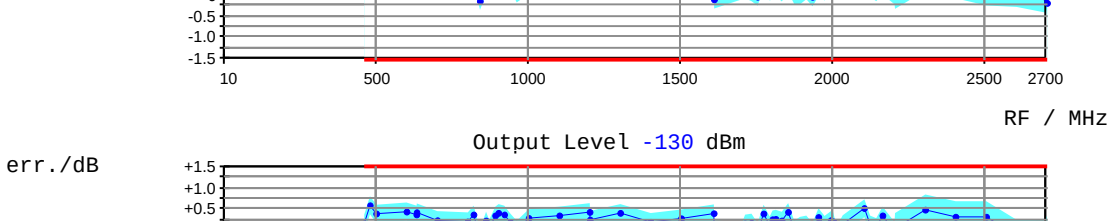
Output Level -106 dBm



Output Level -117 dBm

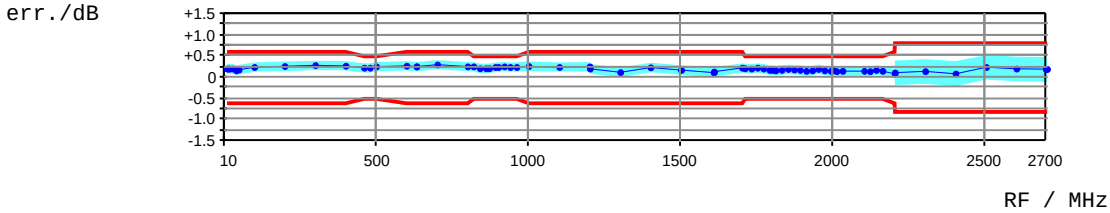


Output Level -130 dBm

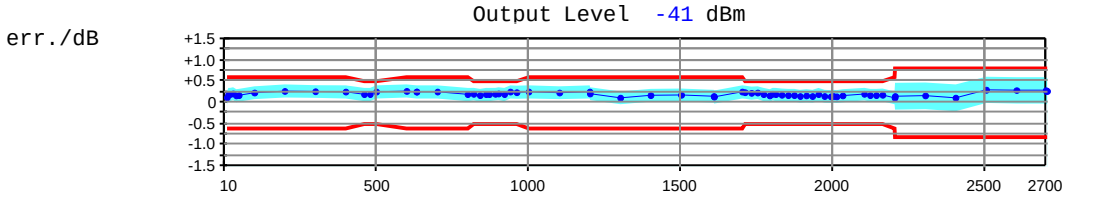


11. TX Generator: Level Error RF2

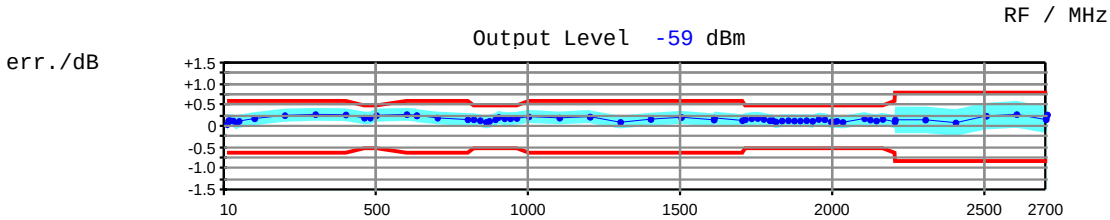
Output Level -16 dBm



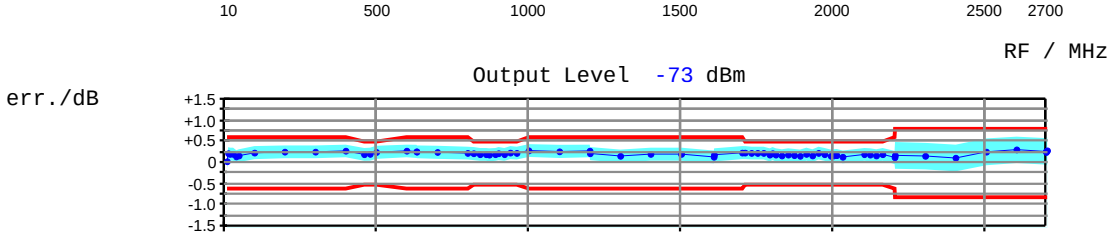
Output Level -41 dBm



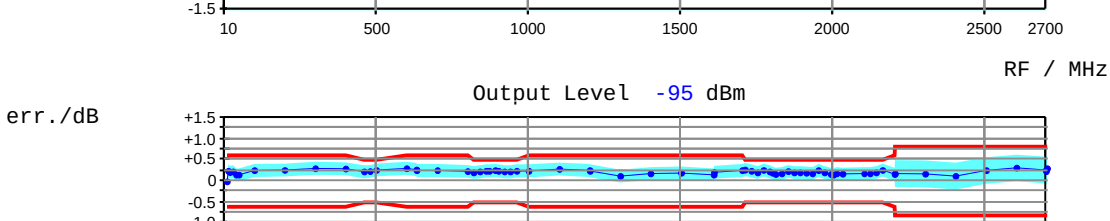
Output Level -59 dBm



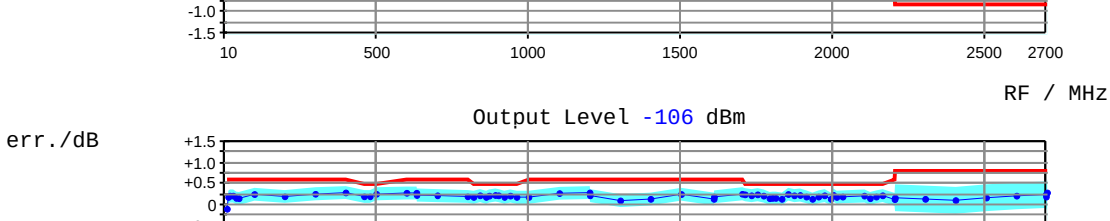
Output Level -73 dBm



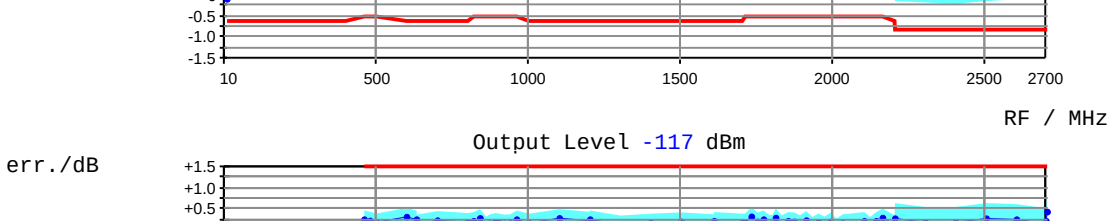
Output Level -95 dBm



Output Level -106 dBm

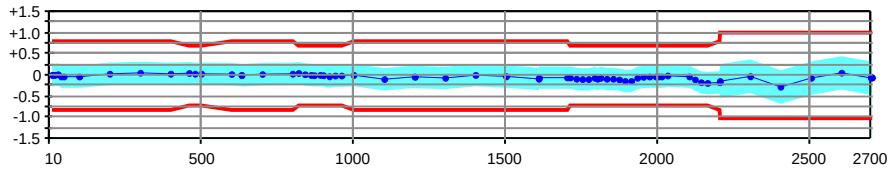


Output Level -117 dBm

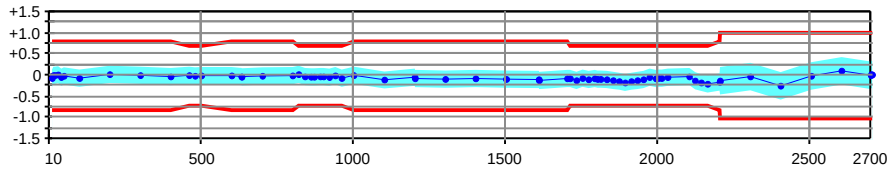


12. TX Generator: Level Error RF3OUT

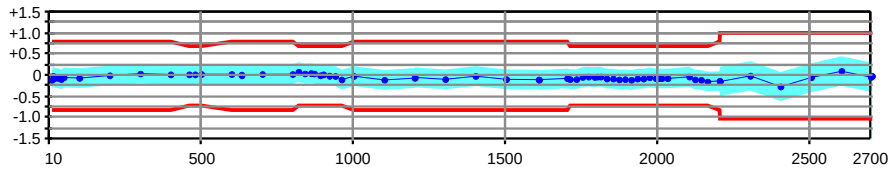
Output Level 5 dBm



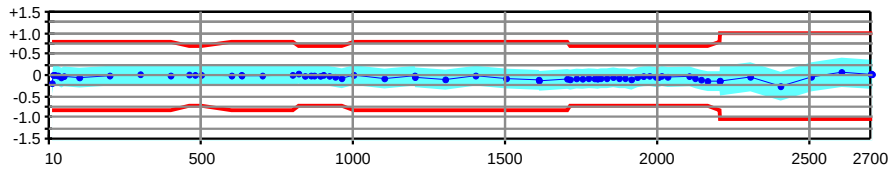
Output Level -18 dBm



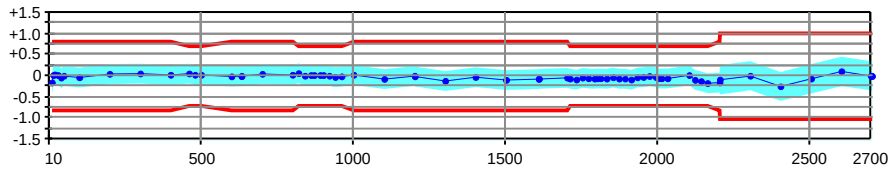
Output Level -36 dBm



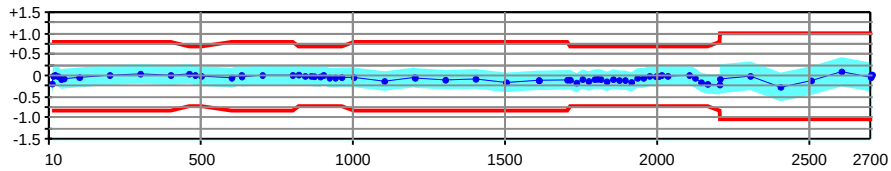
Output Level -50 dBm



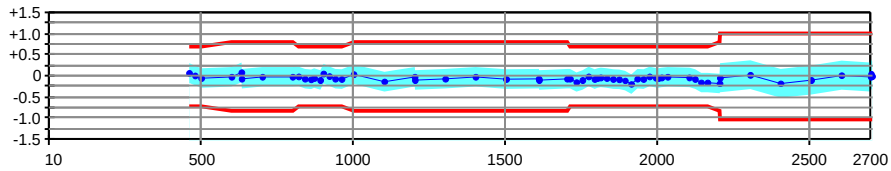
Output Level -72 dBm



Output Level -80 dBm

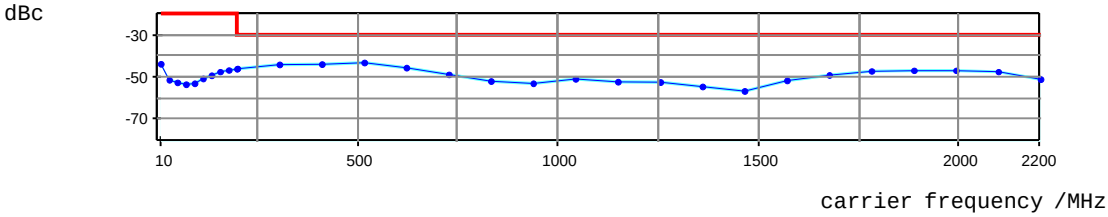


Output Level -90 dBm

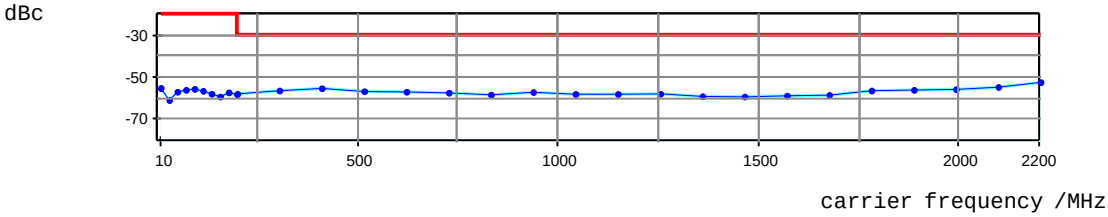


13. TX Generator: Harmonics

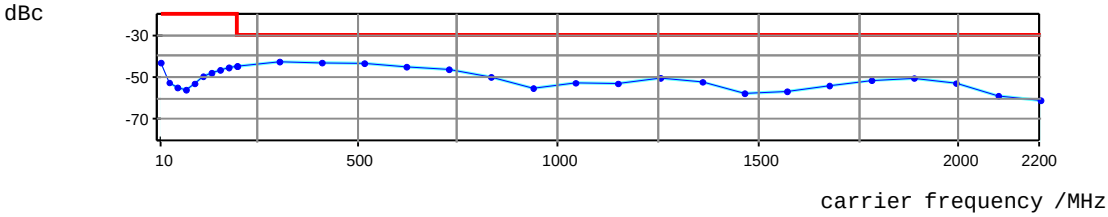
2nd Harmonics of Carrier Frequency RF1 at Level -27 dBm



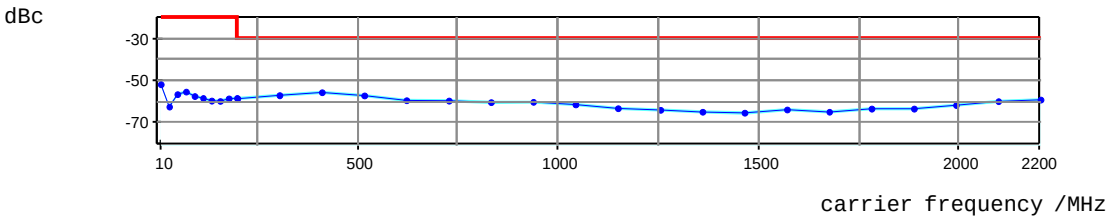
3rd Harmonics of Carrier Frequency RF1 at Level -27 dBm



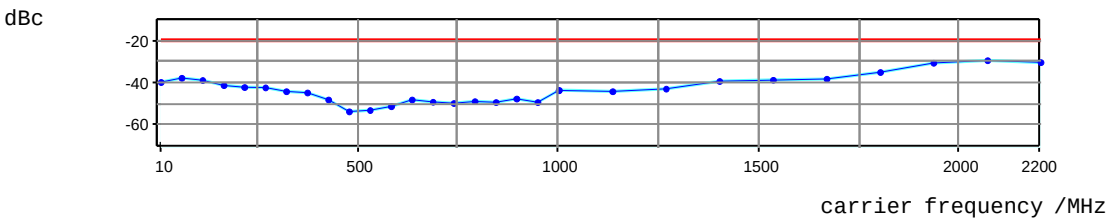
2nd Harmonics of Carrier Frequency RF2 at Level -10 dBm



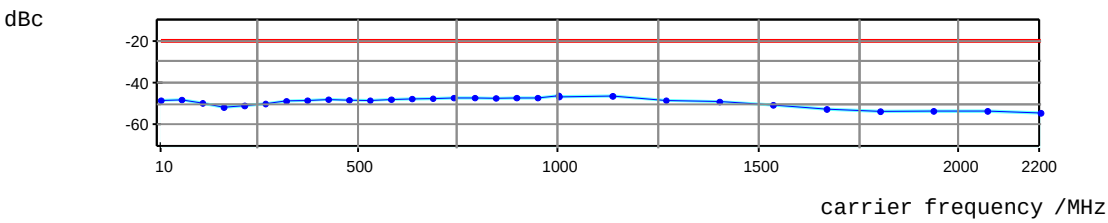
3rd Harmonics of Carrier Frequency RF2 at Level -10 dBm



2nd Harmonics of Carrier Frequency RF3OUT at Level +10 dBm



3rd Harmonics of Carrier Frequency RF3OUT at Level +10 dBm



14. TX Generator: Nonharmonics

Inband Spurious

Conn.	Level /dBm	DUT Freq. /MHz	Carrier Distance /kHz	Note	DUL /dBc	Actual /dBc	MU /dB
RF3OUT	0	460.9	±(5.. 500)	GSM 450	-40.0	-67.5	0.8
RF3OUT	0	489.3	±(5.. 500)	GSM 480	-40.0	-68.1	0.8
RF3OUT	0	869.5	±(5..1000)	GSM 850, IS136, CDMA, AMPS	-40.0	-68.6	0.8
RF3OUT	0	960.5	±(5.. 500)	GSM 900	-40.0	-68.2	0.8
RF3OUT	0	1880.5	±(5.. 500)	GSM 1800	-40.0	-62.6	0.8
RF3OUT	0	1930.5	±(5..1000)	GSM 1900, IS136, CDMA	-40.0	-66.4	0.8
RF3OUT	0	1900.5	±(5..2500)	WCDMA	-40.0	-53.9	0.8
RF3OUT	0	2010.5	±(5..2500)	WCDMA	-40.0	-54.7	0.8
RF3OUT	0	2110.5	±(5..2500)	WCDMA	-40.0	-54.2	0.8

Fixed Spurious

Conn.	Level /dBm	DUT Freq. /MHz	Search Freq. /MHz	Note	DUL /dBc	Actual /dBc	MU /dB
RF3OUT	-20	14.35	13.85	IF3TX	-40.0	-65.7	0.8
RF3OUT	-20	37.4333	36.9333	110.8/3	-40.0	-64.2	0.8
RF3OUT	-20	42.05	41.55	3*13.85	-40.0	-65.1	0.8
RF3OUT	-20	111.3	110.8	110.8	-40.0	-65.4	0.8
RF3OUT	-20	222.1	221.6	2*110.8	-40.0	-66.3	0.8
RF3OUT	-20	332.9	332.4	3*110.8	-40.0	-66.7	0.8
RF3OUT	-20	501.87	501.37	LO3TX	-40.0	-66.5	0.8
RF3OUT	0	1330.1	1329.6	LO2	-40.0	-67.4	0.8
RF3OUT	0	1300	2142.08	LO1TX	-40.0	-69.9	0.8
RF3OUT	0	2200	3042.08	LO1TX	-40.0	-69.0	1.7
RF3OUT	10	100	86.15	LO1TX-LO2-LO3TX	-40.0	-75.7	0.8
RF3OUT	10	100	113.85	LO1TX-LO2-LO3TX+2*IF3TX	-40.0	-61.1	0.8
RF3OUT	10	100	1917.12	LO1TX	-40.0	-71.5	0.8
RF3OUT	10	900	917.12	LO1TX-2*RF	-40.0	-65.9	0.8
RF3OUT	10	1199	618.12	LO1TX-2*RF	-40.0	-63.7	0.8
RF3OUT	10	1199	1817.12	IF1 high TX	-40.0	-71.0	0.8
RF3OUT	10	1201	842.08	IF1 low TX	-40.0	-72.3	0.8
RF3OUT	10	1201	1684.16	2*IF1 low TX	-40.0	-72.1	0.8
RF3OUT	10	1201	2043.08	LO1 TX	-40.0	-72.1	0.8
RF3OUT	10	1201	2885.16	LO1TX+IF1 low TX	-40.0	-56.9	1.7
RF3OUT	10	1700	2542.08	LO1TX	-40.0	-70.8	1.7
RF3OUT	10	1800	1684.16	2*IF low TX	-40.0	-58.8	0.8
RF3OUT	10	1800	2642.08	LO1TX	-40.0	-68.6	1.7
RF3OUT	10	1900	1057.92	LO1TX-2*IF1 low TX	-40.0	-62.1	0.8
RF3OUT	10	1900	1684.16	2*IF1 low TX	-40.0	-60.5	0.8
RF3OUT	10	1900	2742.08	LO1TX	-40.0	-67.9	1.7
RF3OUT	10	2199	842.08	IF1 low TX	-40.0	-68.8	0.8
RF3OUT	10	2199	1356.92	LO1TX-2*IF1 low TX	-40.0	-51.1	0.8
RF3OUT	10	2199	1684.16	2*IF1 low TX	-40.0	-57.1	0.8
RF3OUT	10	2199	3041.08	LO1TX	-40.0	-70.0	1.7

15. TX Generator: SSB Phase Noise

DUT Settings: Level 0dBm, Baseband Filter 300 kHz, RF3OUT

RF /MHz	Carrier Distance /kHz	DUL / dBc/Hz	Actual / dBc/Hz	MU /dB
100	20	-100.0	-105.9	1.6
100	250	-110.0	-118.0	1.6
100	400	-110.0	-119.1	1.6
100	1990	-110.0	-122.6	1.6
945	20	-100.0	-109.8	1.6
945	250	-110.0	-118.0	1.6
945	400	-110.0	-119.2	1.6
945	1990	-110.0	-121.1	1.6
1850	20	-100.0	-110.2	1.6
1850	250	-110.0	-119.2	1.6
1850	400	-110.0	-120.3	1.6
1850	1990	-110.0	-123.0	1.6
2200	20	-100.0	-107.5	1.6
2200	250	-110.0	-117.2	1.6
2200	400	-110.0	-118.1	1.6
2200	1990	-110.0	-123.2	1.6

16. TX Generator: Residual FM/AM

Residual FM

DUT Settings: RF1, Level = -27 dBm

Filter	RF /MHz	DUL	Actual	MU
30Hz .. 15kHz	1000	50.0 Hz rms	2.1 Hz rms	{a}
30Hz .. 15kHz	1000	200.0 Hz peak	8.1 Hz peak	{a}
CCITT	1000	5.0 Hz rms	1.6 Hz rms	{a}
30Hz .. 15kHz	2000	50.0 Hz rms	2.1 Hz rms	{a}
30Hz .. 15kHz	2000	200.0 Hz peak	8.5 Hz peak	{a}
CCITT	2000	5.0 Hz rms	1.6 Hz rms	{a}

Residual AM

DUT Settings: RF1, Level = -27 dBm

Filter	RF /MHz	DUL	Actual	MU
CCITT	500	0.020 % rms	0.009% rms	{a}
CCITT	1000	0.020 % rms	0.011% rms	{a}
CCITT	1500	0.020 % rms	0.012% rms	{a}
CCITT	2200	0.020 % rms	0.012% rms	{a}

17. TX Generator: Carrier / Sideband Suppression, max. Distortion

DUT Settings: RF3OUT, Level 0 dBm, Baseband Filter 300 kHz

RF /MHz	Mod. Freq. /kHz		DUL /dBc	Actual /dBc	MU /dB
1000	10	Carrier Suppression	-40.0	-55.2	0.2
1000	-20	Carrier Suppression	-40.0	-55.3	0.2
1000	20	Carrier Suppression	-40.0	-55.2	0.2
1000	30	Carrier Suppression	-40.0	-55.0	0.2
1000	60	Carrier Suppression	-40.0	-54.5	0.2
1000	100	Carrier Suppression	-40.0	-54.2	0.2
1000	135	Carrier Suppression	-40.0	-54.1	0.2
1000	-135	Carrier Suppression	-40.0	-53.7	0.2

18. TX Generator: Frequency Modulation

FM Deviation Accuracy

The following measurements are done only for firmware versions >= 3.50

CMU Settings: RF3OUT, +5 dBm, 2150 MHz

Rated FM Frequency /kHz	Rated FM Deviation /kHz	Actual FM Deviation /kHz	DL /%	Actual /%	MU /%
50.0	432.685	431.887	5.0	-0.2	0.1

FM Deviation and FM Distortion

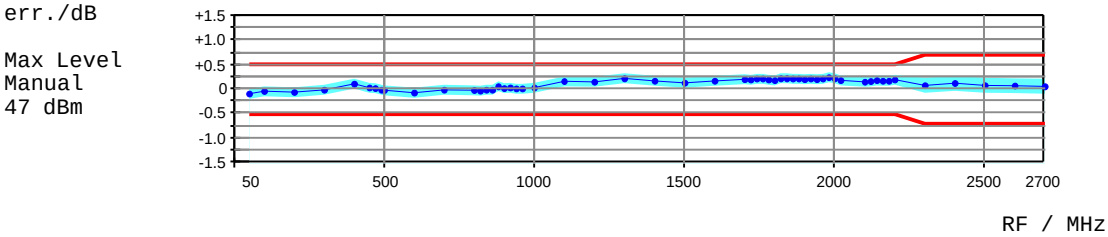
The following measurements are done only for firmware versions >= 3.50

CMU Settings: RF3OUT, +5 dBm, 2150 MHz

Rated FM Frequency /kHz	Rated FM Deviation /kHz	Measurement	DL /%	Actual /%	MU /%
1.0	10.0	FM Deviation	5.0	1.3	0.3
1.0	10.0	FM Distortion	2.0	0.3	0.5
1.0	80.0	FM Deviation	5.0	0.5	0.3
1.0	80.0	FM Distortion	2.0	0.2	0.5

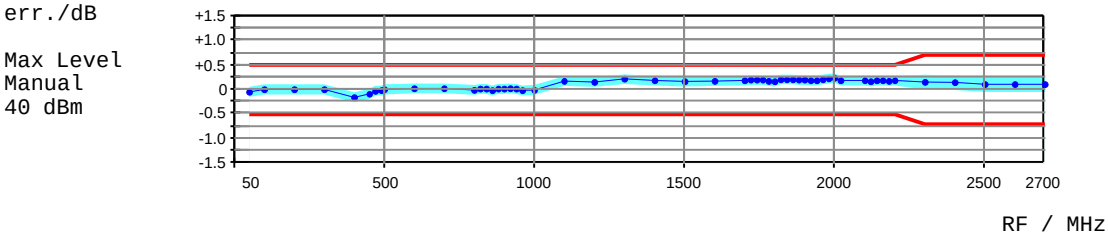
19. RX Analyzer: Power Meter RF1 (frequency-selective)

Input Level: 50MHz..(35dBm)..800MHz..(47 dBm)..2GHz..(35 dBm)..2.7GHz *)



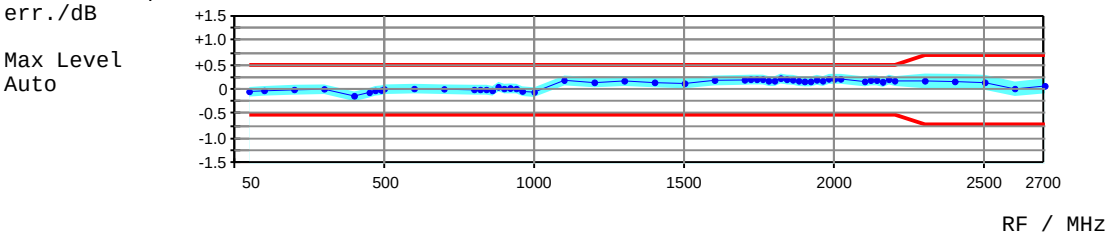
*) not measured if option CMU-B95, CMU-B96 or CRTU-B9 is installed

Input Level: 50MHz..(35dBm)..800MHz..(40 dBm)..2GHz..(35 dBm)..2.7GHz *)

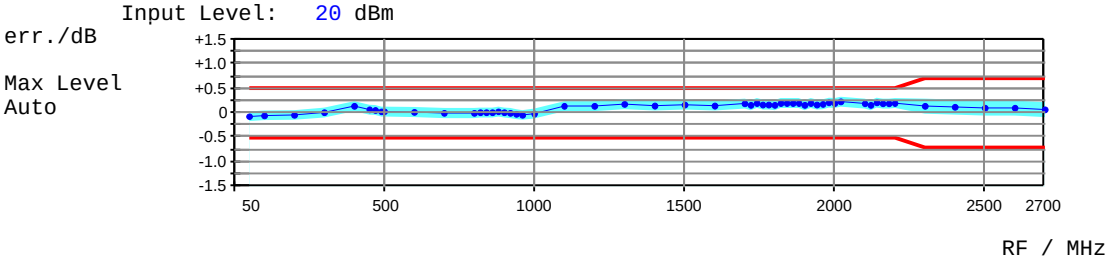


*) not measured if option CMU-B95, CMU-B96 or CRTU-B9 is installed

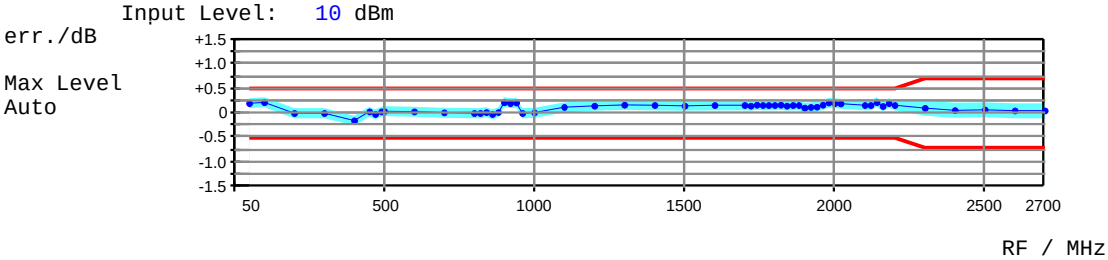
Input Level: 33 dBm



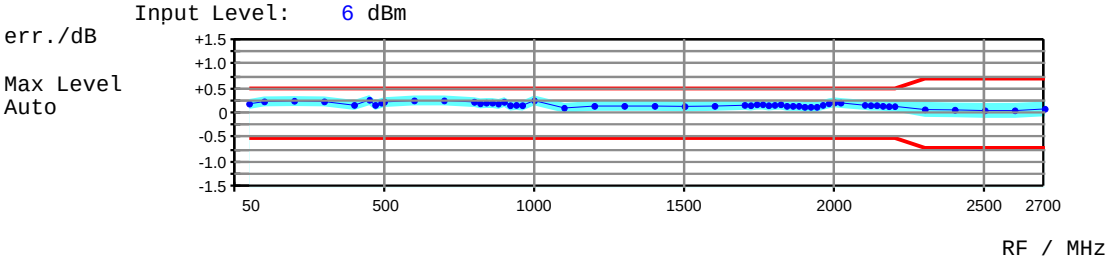
Input Level: 20 dBm



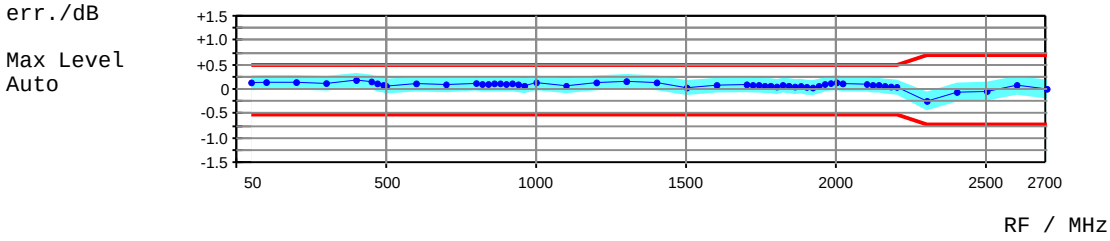
Input Level: 10 dBm



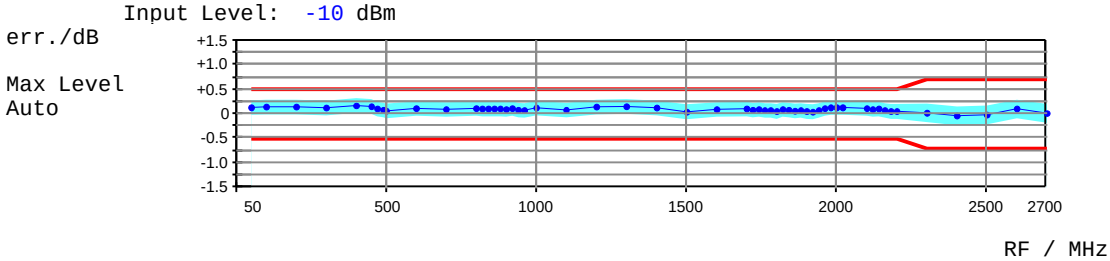
Input Level: 6 dBm



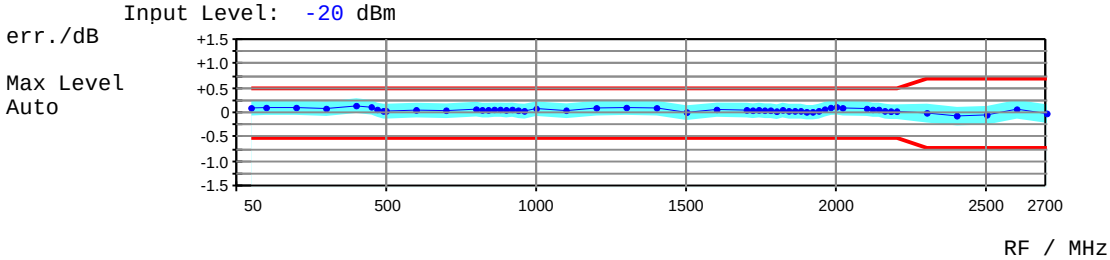
Input Level: 0 dBm



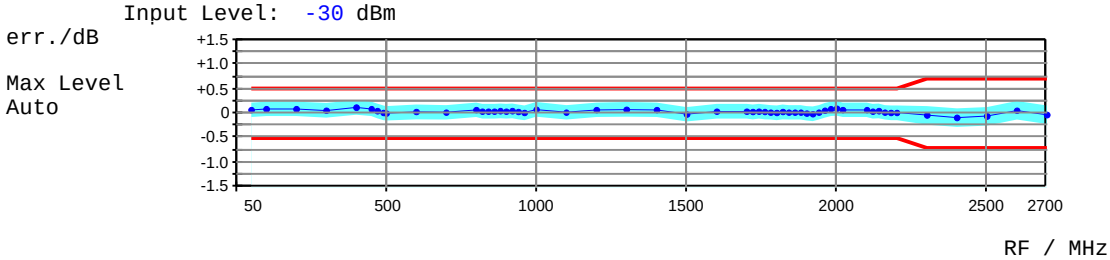
Input Level: -10 dBm



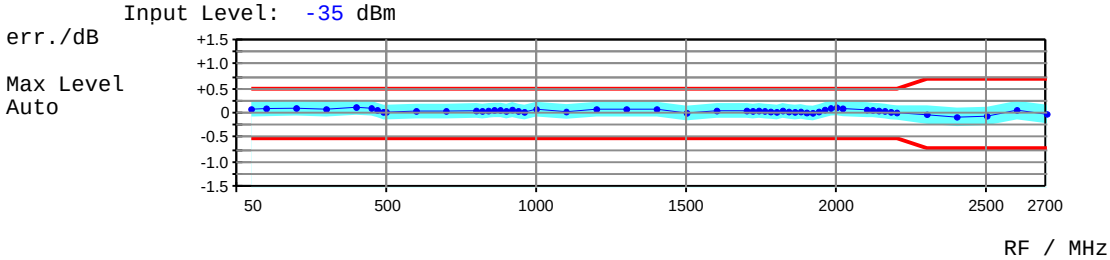
Input Level: -20 dBm



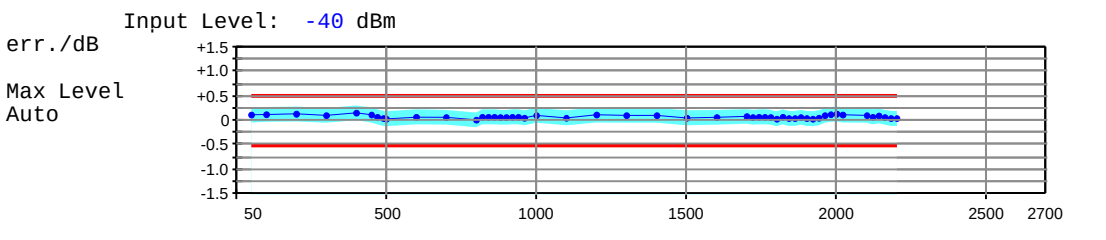
Input Level: -30 dBm



Input Level: -35 dBm

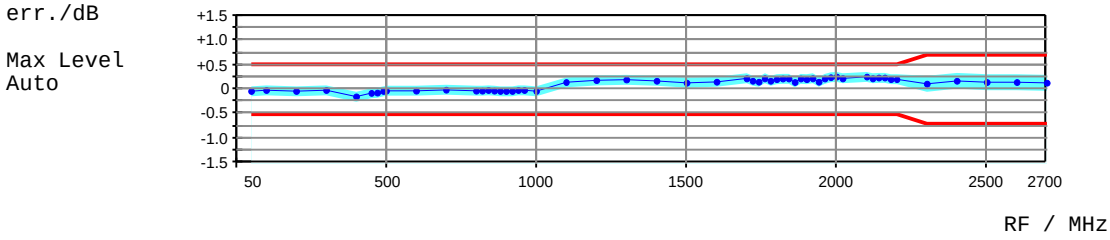


Input Level: -40 dBm

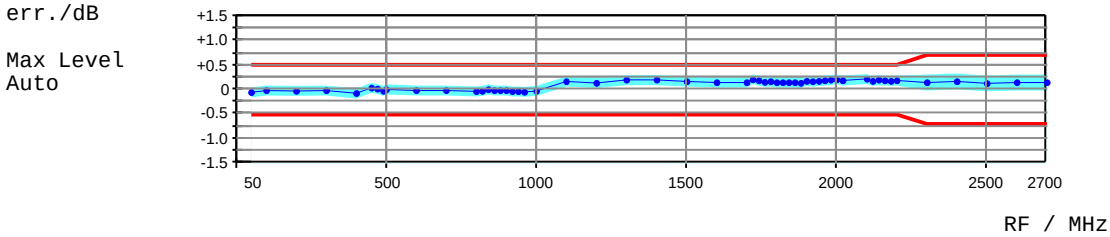


20. RX Analyzer: Power Meter RF2 (frequency-selective)

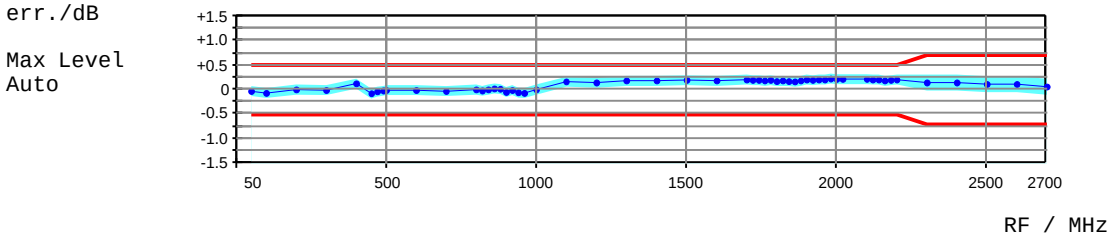
Input Level: 33 dBm



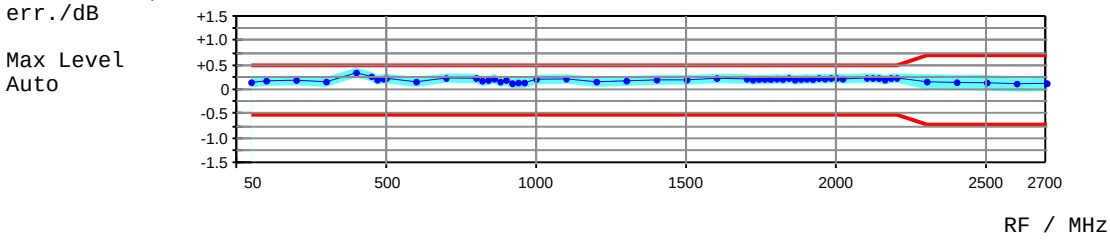
Input Level: 26 dBm



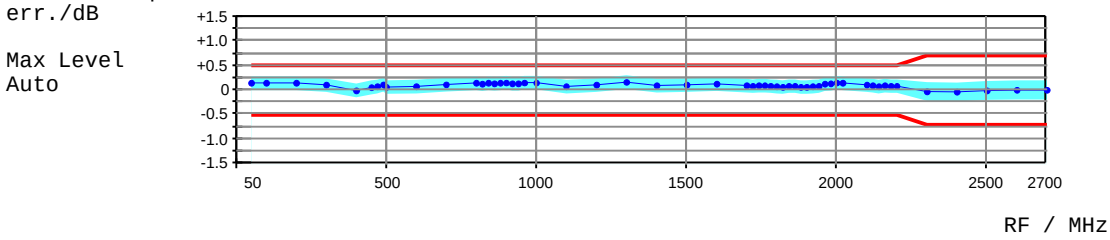
Input Level: 19 dBm



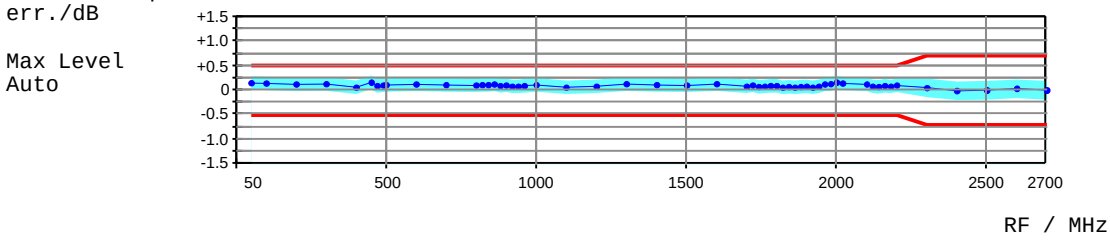
Input Level: 6 dBm



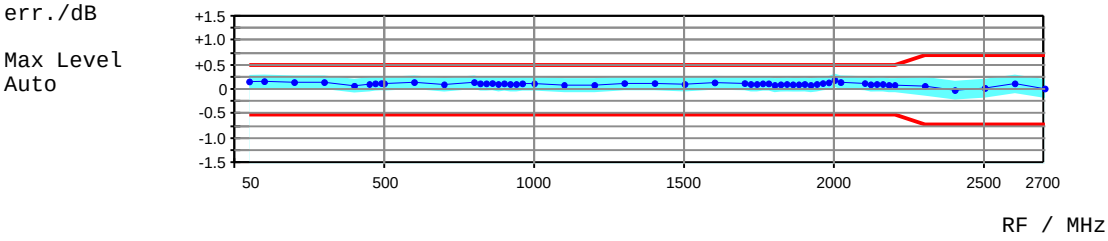
Input Level: -4 dBm



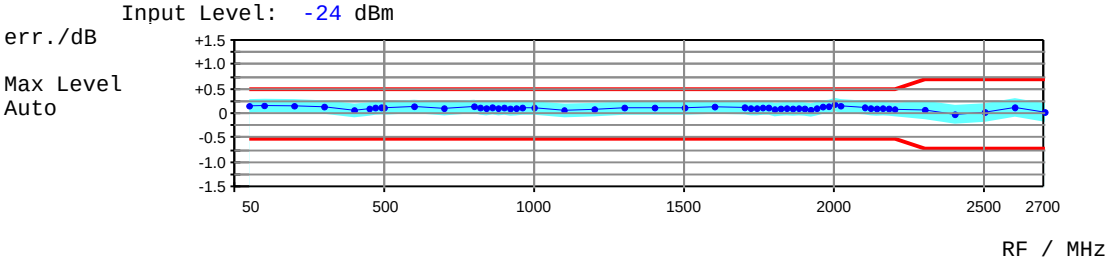
Input Level: -8 dBm



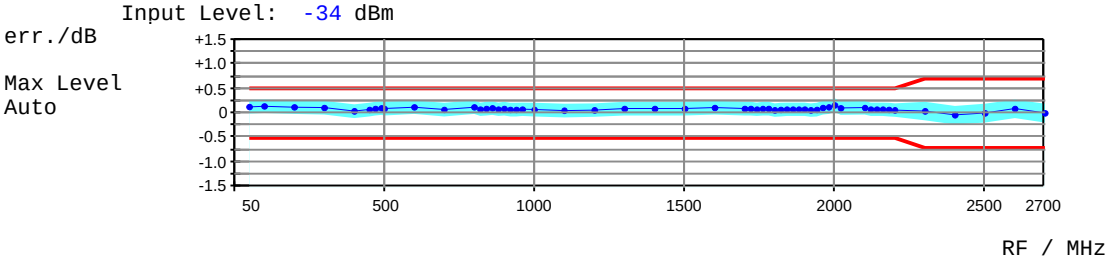
Input Level: -14 dBm



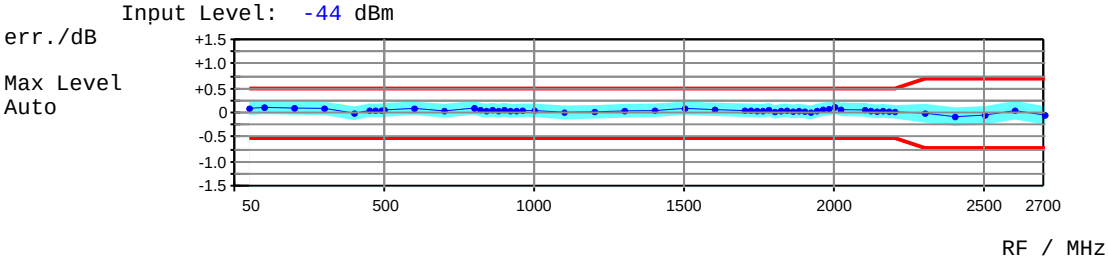
Input Level: -24 dBm



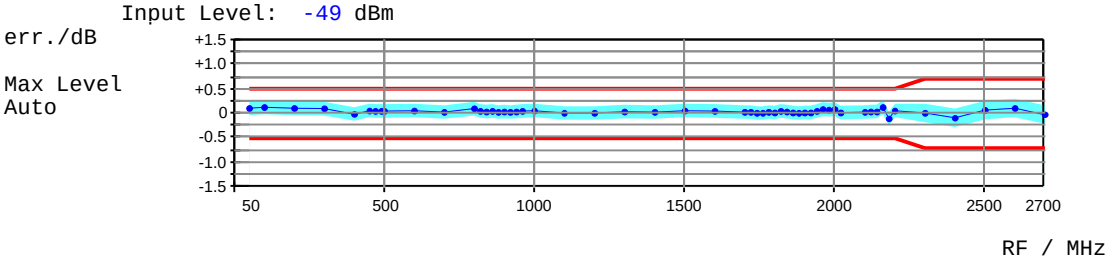
Input Level: -34 dBm



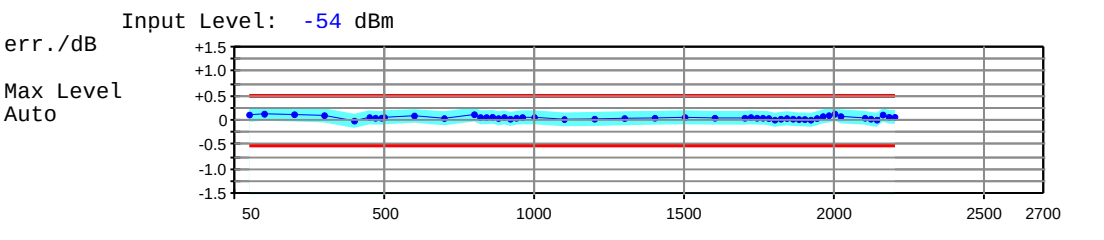
Input Level: -44 dBm



Input Level: -49 dBm

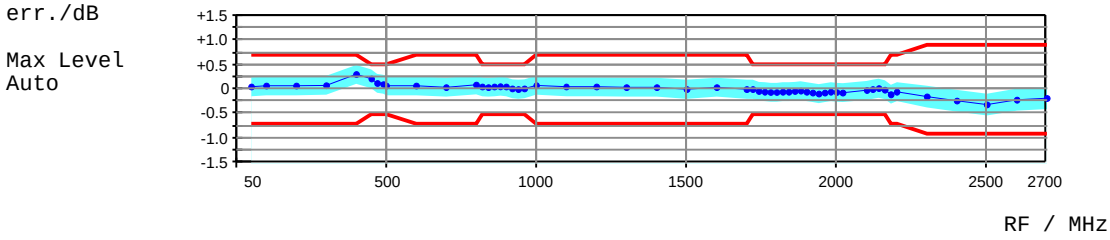


Input Level: -54 dBm

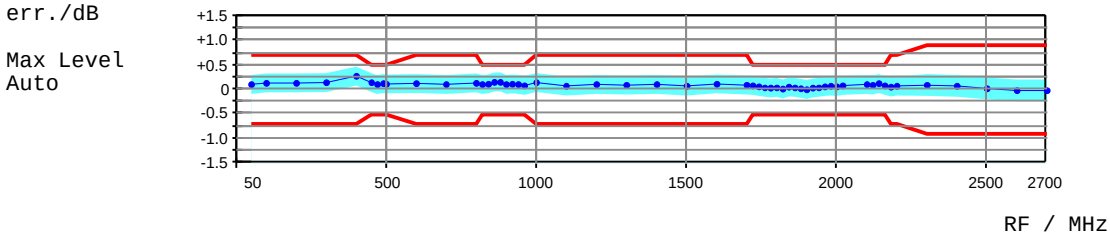


21. RX Analyzer: Power Meter RF4IN (frequency-selective)

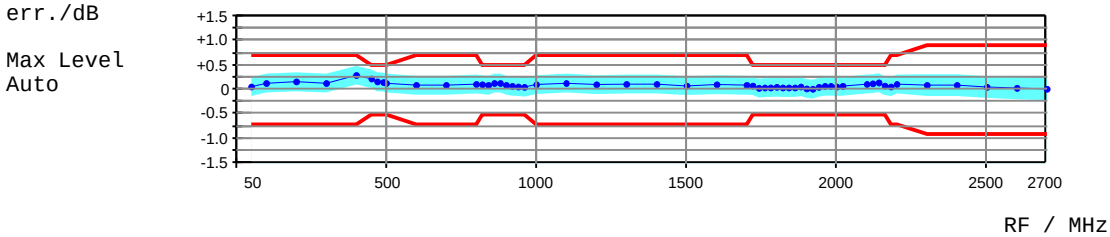
Input Level: 0 dBm



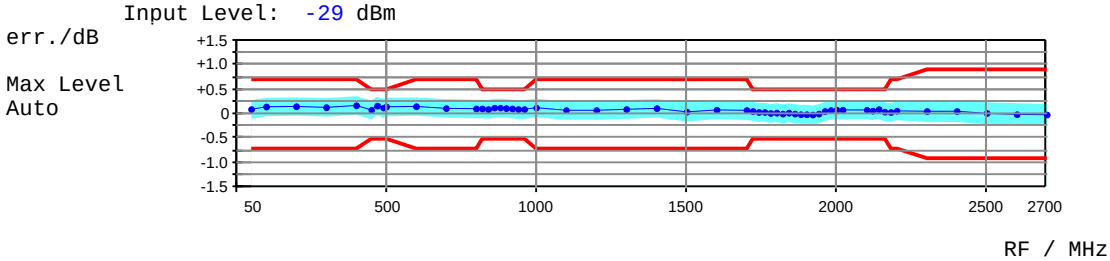
Input Level: -6 dBm



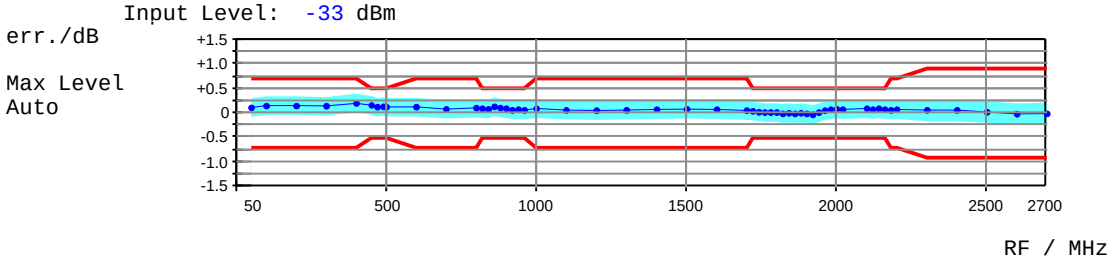
Input Level: -19 dBm



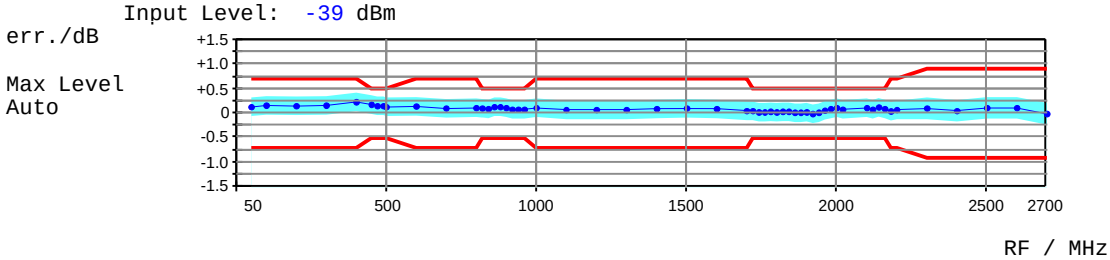
Input Level: -29 dBm



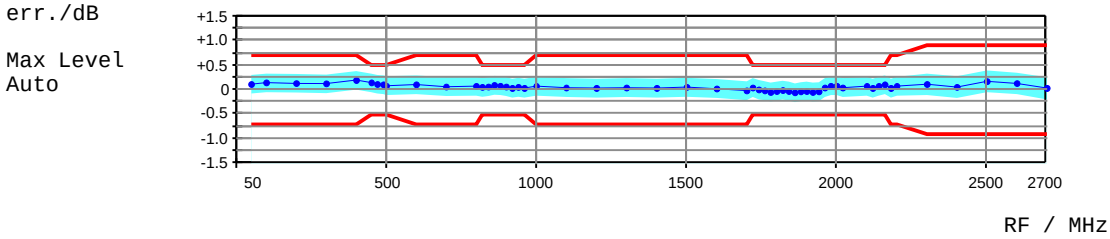
Input Level: -33 dBm



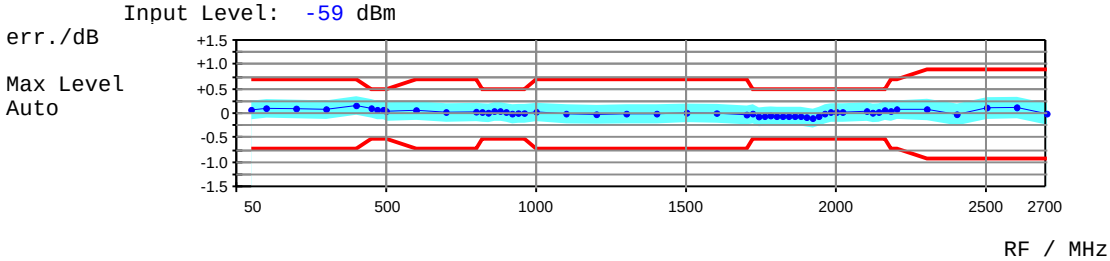
Input Level: -39 dBm



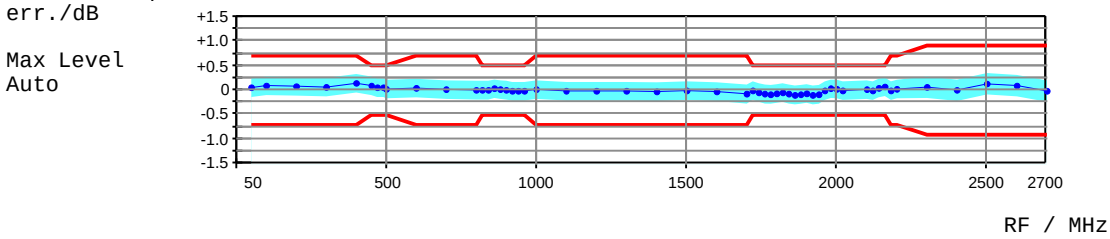
Input Level: -49 dBm



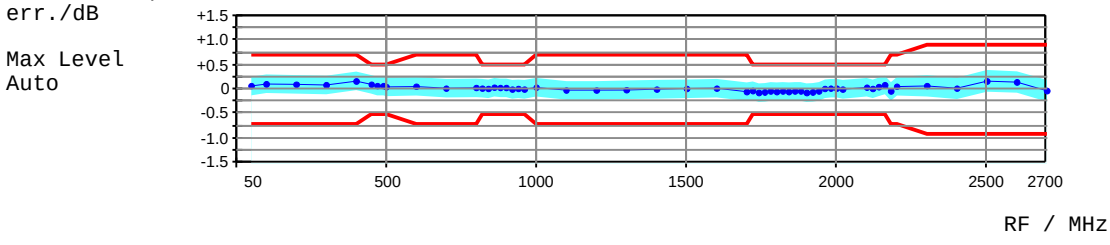
Input Level: -59 dBm



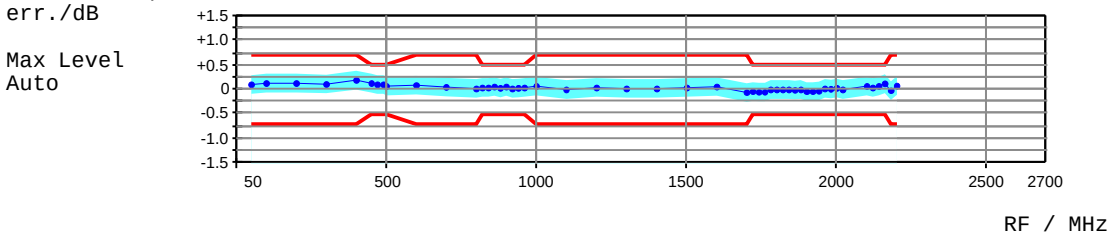
Input Level: -69 dBm



Input Level: -74 dBm

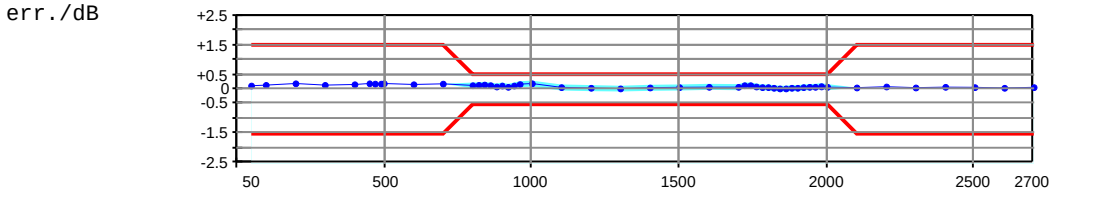


Input Level: -80 dBm



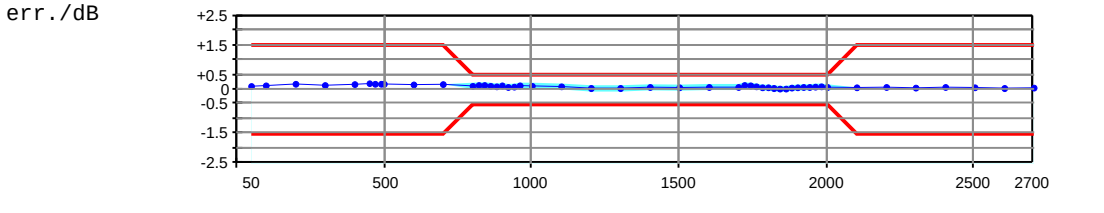
22. RX Analyzer: Power Meter RF1 (wideband)

Input Level: 50MHz..(35dBm)..800MHz..(47 dBm)..2GHz..(35 dBm)..2.7GHz *)



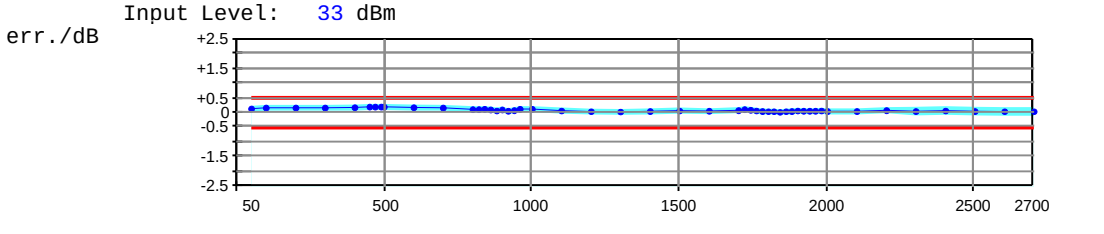
*) not measured if option CMU-B95, CMU-B96 or CRTU-B9 is installed

Input Level: 50MHz..(35dBm)..800MHz..(40 dBm)..2GHz..(35 dBm)..2.7GHz *)

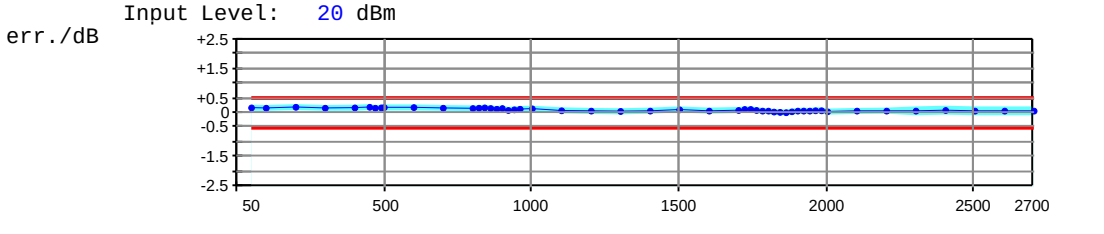


*) not measured if option CMU-B95, CMU-B96 or CRTU-B9 is installed

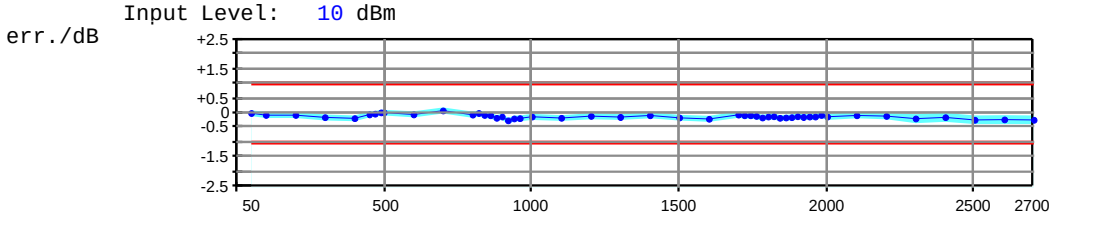
Input Level: 33 dBm



Input Level: 20 dBm

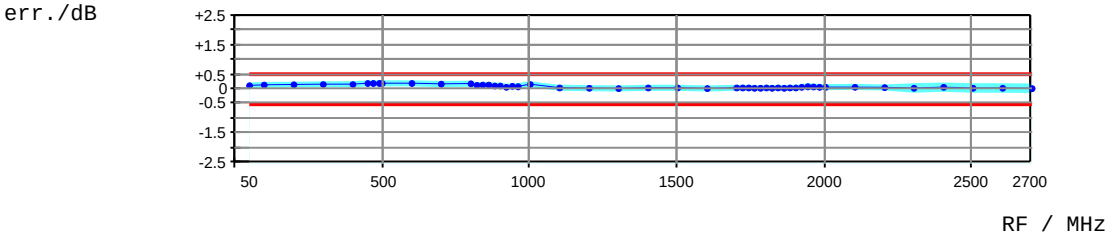


Input Level: 10 dBm

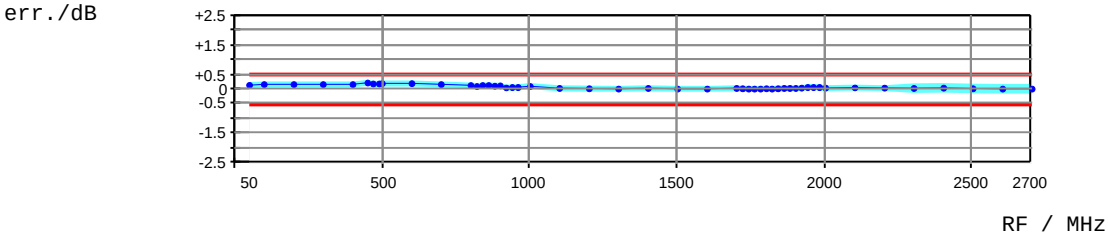


23. RX Analyzer: Power Meter RF2 (wideband)

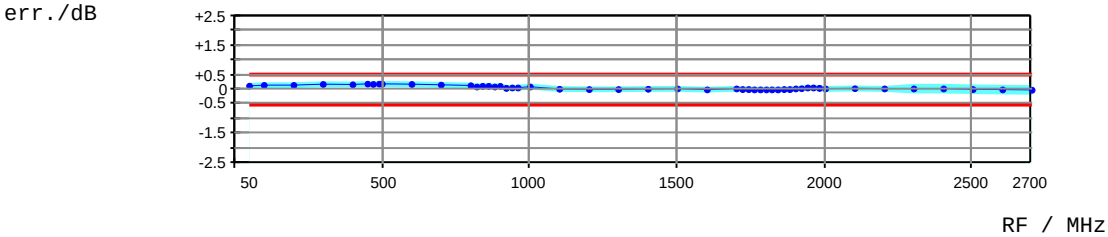
Input Level: 33 dBm



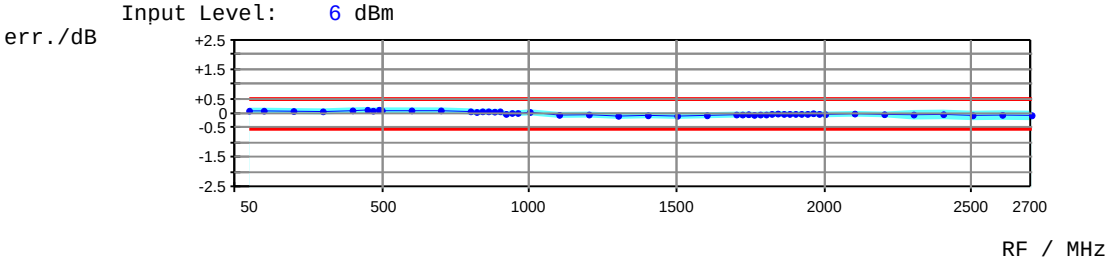
Input Level: 26 dBm



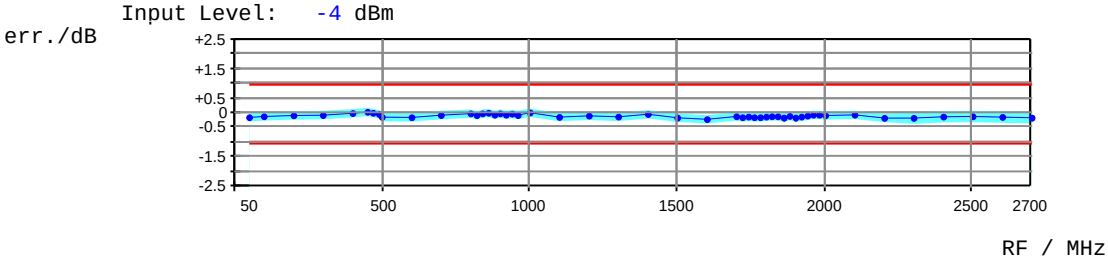
Input Level: 19 dBm



Input Level: 6 dBm

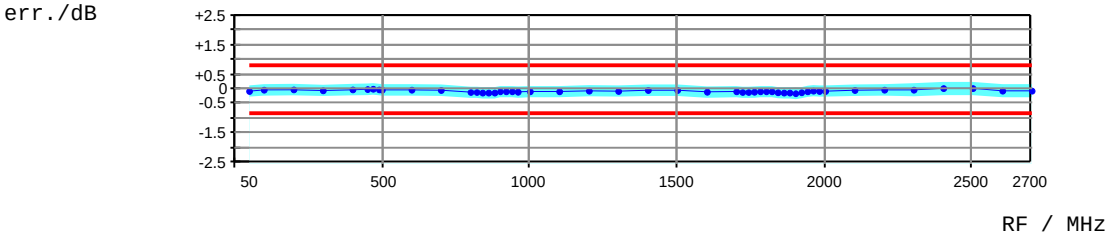


Input Level: -4 dBm

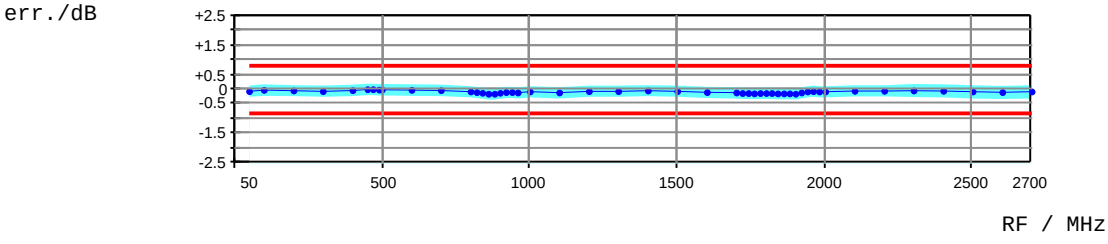


24. RX Analyzer: Power Meter RF4IN (wideband)

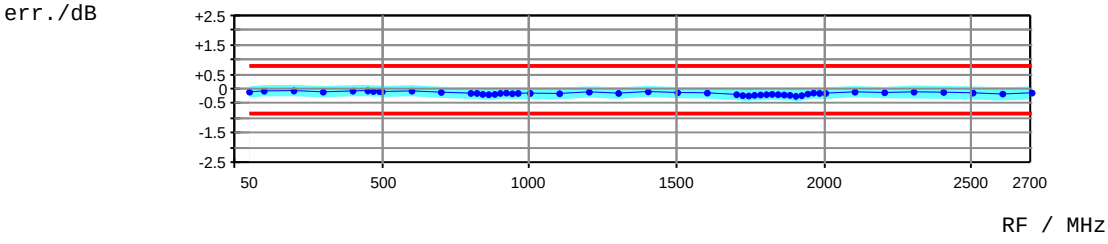
Input Level: 0 dBm



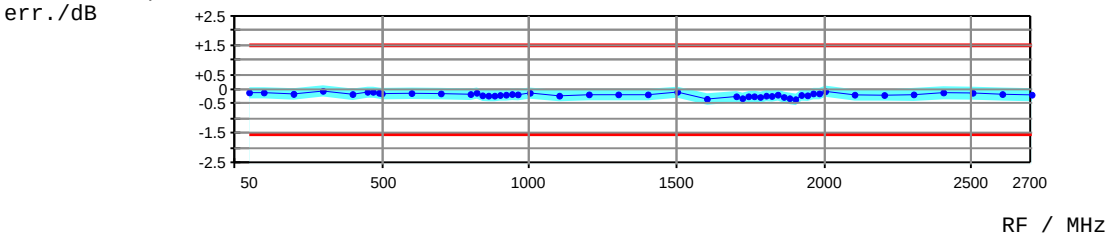
Input Level: -6 dBm



Input Level: -19 dBm



Input Level: -29 dBm



25. RX Analyzer: Harmonics

Harmonics RF2

DUT Settings: MODE NORMAL

Note	Connector and Level /dBm	Freq. in /MHz	Freq. DUT /MHz	DUL /dBc	Actual /dBc	MU /dB
2*RF	RF2 / 0	50	100	-30	-45.8	0.8
2*RF	RF2 / 0	600	1200	-30	-50.1	0.8
2*RF	RF2 / 0	625	1250	-30	-50.7	0.8
2*RF	RF2 / 0	1100	2200	-30	-49.5	0.8
3*RF	RF2 / 0	50	150	-30	-63.0	0.8
3*RF	RF2 / 0	400	1200	-30	-55.6	0.8
3*RF	RF2 / 0	420	1260	-30	-78.9	0.8
3*RF	RF2 / 0	730	2190	-30	-67.3	0.8

Harmonics RF4IN

DUT Settings: MODE NORMAL

Note	Connector and Level /dBm	Freq. in /MHz	Freq. DUT /MHz	DUL /dBc	Actual /dBc	MU /dB
2*RF	RF4IN/ -2	50	100	-20	-33.3	0.8
2*RF	RF4IN/ -2	600	1200	-20	-34.7	0.8
2*RF	RF4IN/ -2	625	1250	-20	-34.3	0.8
2*RF	RF4IN/ -2	1100	2200	-20	-45.4	0.8
3*RF	RF4IN/ -2	50	150	-20	-48.0	0.8
3*RF	RF4IN/ -2	400	1200	-20	-47.2	0.8
3*RF	RF4IN/ -2	420	1260	-20	-45.9	0.8
3*RF	RF4IN/ -2	730	2190	-20	-47.7	0.8

26. RX Analyzer: Spurious Response / Image Rejection

Spurious Response / Image Rejection RF2

DUT setting: MODE LOW DISTORTION

Note	Connector and Level /dBm	Freq. in /MHz	Freq. DUT /MHz	DUL /dBc	Actual /dBc	MU /dB
Image 2nd mix	RF2 / 0	1876.03	903	-50	-82.6	0.8
Image 3rd mix	RF2 / 0	881.6	903	-50	-82.8	0.8
IF1lowRX	RF2 / 0	843.085	200	-50	-82.8	0.8
IF1lowRX/2	RF2 / 0	421.5425	200	-50	-83.3	0.8
IF1highRX/2	RF2 / 0	908.0575	300	-50	-81.5	0.8
IF1highRX/3	RF2 / 0	605.3716667	300	-50	-82.9	0.8
IF1highRX/4	RF2 / 0	454.02875	300	-50	-82.9	0.8
IF3 Subharmonic	RF2 / 0	500	505.35	-50	-82.0	0.8
2*LO1RX-2*RF	RF2 / 0	968.0575	60	-50	-71.5	0.8
2*LO1RX-2*RF	RF2 / 0	1200	291.9425	-50	-78.1	0.8
2*LO1RX-3*RF	RF2 / 0	645.3716667	60	-50	-83.0	0.8
2*LO1RX-3*RF	RF2 / 0	1200	891.9425	-50	-83.0	0.8
2*LO1RX-1*RF	RF2 / 0	1936.115	60	-50	-66.4	0.8
2*LO1RX-1*RF	RF2 / 0	2200	191.9425	-50	-71.9	0.8
Image 2nd mix	RF2 / 0	1226.97	2200	-50	-80.6	0.8
Image 3rd mix	RF2 / 0	1821.4	1800	-50	-82.4	0.8
Image LO1RX	RF2 / 0	2936.17	1250	-50	-64.8	0.8
IF1lowRX	RF2 / 0	843.085	2200	-45	-59.5	0.8
IF1lowRX/2	RF2 / 0	421.5425	2200	-50	-82.1	0.8
IF1lowRX/3	RF2 / 0	281.0283333	2200	-50	-81.7	0.8
IF1highRX	RF2 / 0	1816.115	2200	-50	-79.6	0.8
IF1highRX/2	RF2 / 0	908.0575	2200	-50	-83.9	0.8
IF1highRX/3	RF2 / 0	605.3716667	2200	-50	-82.8	0.8
2*LO1RX-2*RF	RF2 / 0	1671.5425	1250	-50	-82.7	0.8
2*LO1RX-2*RF	RF2 / 0	2200	1778.4575	-50	-80.6	0.8
3*LO1RX-3*RF	RF2 / 0	1812.056667	1250	-50	-83.0	0.8
3*LO1RX-4*RF	RF2 / 0	1681.5425	1680	-50	-83.3	0.8
2*RF-1*LO1RX	RF2 / 0	1468.085	1250	-50	-80.0	0.8
2*RF-1*LO1RX	RF2 / 0	1683.085	1680	-50	-80.9	0.8
2*RF-1*LO1RX	RF2 / 0	1943.085	2200	-50	-78.7	0.8
3*RF-1*LO1RX	RF2 / 0	978.7233333	1250	-50	-82.0	0.8
3*RF-1*LO1RX	RF2 / 0	1295.39	2200	-50	-81.4	0.8
4*RF-LO1RX	RF2 / 0	1210.843333	1210.743333	-50	-73.6	0.8
4*RF-2*LO1RX	RF2 / 0	1262.31375	1260	-50	-81.2	0.8

Spurious Response / Image Rejection RF4IN

DUT setting: MODE LOW DISTORTION

Note	Connector and Level /dBm	Freq. in /MHz	Freq. DUT /MHz	DUL /dBc	Actual /dBc	MU /dB
2*LO1RX-2*RF	RF4IN/ -2	968.0575	60	-50	-71.3	0.8
2*LO1RX-2*RF	RF4IN/ -2	1200	291.9425	-50	-77.6	0.8
2*LO1RX-3*RF	RF4IN/ -2	645.3716667	60	-50	-82.8	0.8
2*LO1RX-3*RF	RF4IN/ -2	1200	891.9425	-50	-83.1	0.8
2*LO1RX-1*RF	RF4IN/ -2	1936.115	60	-50	-67.3	0.8
2*LO1RX-1*RF	RF4IN/ -2	2200	191.9425	-50	-72.7	0.8
2*LO1RX-2*RF	RF4IN/ -2	1671.5425	1250	-50	-83.1	0.8
2*LO1RX-2*RF	RF4IN/ -2	2200	1778.4575	-50	-82.2	0.8
3*LO1RX-3*RF	RF4IN/ -2	1812.056667	1250	-50	-83.5	0.8
3*LO1RX-4*RF	RF4IN/ -2	1681.5425	1680	-50	-83.2	0.8
2*RF-1*LO1RX	RF4IN/ -2	1468.085	1250	-50	-80.9	0.8
2*RF-1*LO1RX	RF4IN/ -2	1683.085	1680	-50	-81.2	0.8
2*RF-1*LO1RX	RF4IN/ -2	1943.085	2200	-50	-78.6	0.8
3*RF-1*LO1RX	RF4IN/ -2	978.7233333	1250	-50	-83.6	0.8
3*RF-1*LO1RX	RF4IN/ -2	1295.39	2200	-50	-83.3	0.8
4*RF-1*LO1RX	RF4IN/ -2	1210.843333	1210.743333	-50	-74.4	0.8
4*RF-1*LO1RX	RF4IN/ -2	1262.31375	1260	-50	-82.9	0.8

27. RX Analyzer: SSB Phase Noise

DUT Settings: RF2, Level 10 dBm, BW 1 KHz

DUT Freq. /MHz	Distance from Carrier /kHz	DUL / dBc/Hz	Actual / dBc/Hz	MU /dB
100.0	+20	-100.0	-106.6	0.8
100.0	+250	-110.0	-119.2	0.8
100.0	+400	-118.0	-124.2	0.8
100.0	+1990	-118.0	-131.5	0.8
945.0	+20	-100.0	-108.9	0.8
945.0	+250	-110.0	-120.6	0.8
945.0	+400	-118.0	-127.4	0.8
945.0	+1990	-118.0	-131.8	0.8
1850.0	-20	-100.0	-109.4	0.8
1850.0	-250	-110.0	-121.0	0.8
1850.0	-400	-118.0	-125.8	0.8
1850.0	-1990	-118.0	-131.9	0.8
2200.0	-20	-100.0	-108.3	0.8
2200.0	-250	-110.0	-119.4	0.8
2200.0	-400	-118.0	-123.3	0.8
2200.0	-1990	-118.0	-131.3	0.8

28. RX Analyzer: Residual FM/AM

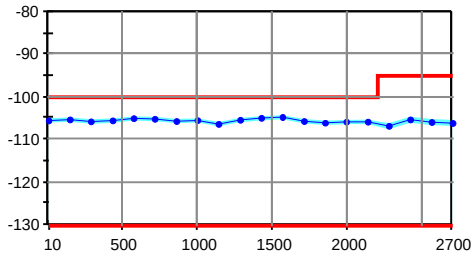
DUT Settings: RF4IN

Demod.	RF /MHz	Level /dBm	Filter	DUL	Actual	MU
FM	500	-2	30Hz ... 15kHz	50.0 Hz	1.6 Hz rms	{a}
FM	500	-2	30Hz ... 15kHz	200.0 Hz	6.4 Hz peak	{a}
FM	500	-2	CCITT	5.0 Hz	1.5 Hz rms	{a}
AM	500	-2	CCITT	0.020%	0.006% rms	{a}
FM	500	-37	30Hz ... 15kHz	50.0 Hz	9.6 Hz rms	{a}
FM	500	-37	30Hz ... 15kHz	200.0 Hz	41.8 Hz peak	{a}
FM	500	-37	CCITT	5.0 Hz	1.5 Hz rms	{a}
AM	500	-37	CCITT	0.020%	0.007% rms	{a}
FM	900	-2	30Hz ... 15kHz	50.0 Hz	10.3 Hz rms	{a}
FM	900	-2	30Hz ... 15kHz	200.0 Hz	43.4 Hz peak	{a}
FM	900	-2	CCITT	5.0 Hz	1.5 Hz rms	{a}
AM	900	-2	CCITT	0.020%	0.006% rms	{a}
FM	900	-37	30Hz ... 15kHz	50.0 Hz	10.4 Hz rms	{a}
FM	900	-37	30Hz ... 15kHz	200.0 Hz	43.2 Hz peak	{a}
FM	900	-37	CCITT	5.0 Hz	1.5 Hz rms	{a}
AM	900	-37	CCITT	0.020%	0.007% rms	{a}
FM	1900	-2	30Hz ... 15kHz	50.0 Hz	10.7 Hz rms	{a}
FM	1900	-2	30Hz ... 15kHz	200.0 Hz	47.4 Hz peak	{a}
FM	1900	-2	CCITT	5.0 Hz	1.7 Hz rms	{a}
AM	1900	-2	CCITT	0.020%	0.006% rms	{a}
FM	1900	-37	30Hz ... 15kHz	50.0 Hz	10.8 Hz rms	{a}
FM	1900	-37	30Hz ... 15kHz	200.0 Hz	49.7 Hz peak	{a}
FM	1900	-37	CCITT	5.0 Hz	1.6 Hz rms	{a}
AM	1900	-37	CCITT	0.020%	0.007% rms	{a}
FM	2100	-2	30Hz ... 15kHz	50.0 Hz	10.5 Hz rms	{a}
FM	2500	-2	30Hz ... 15kHz	50.0 Hz	16.8 Hz rms	{a}
FM	2500	-2	30Hz ... 15kHz	200.0 Hz	66.8 Hz peak	{a}
FM	2500	-2	CCITT	10.0 Hz	5.4 Hz rms	{a}
AM	2500	-2	CCITT	0.020%	0.006% rms	{a}
FM	2500	-37	30Hz ... 15kHz	50.0 Hz	16.7 Hz rms	{a}
FM	2500	-37	30Hz ... 15kHz	200.0 Hz	71.6 Hz peak	{a}
FM	2500	-37	CCITT	10.0 Hz	5.5 Hz rms	{a}
AM	2500	-37	CCITT	0.020%	0.008% rms	{a}

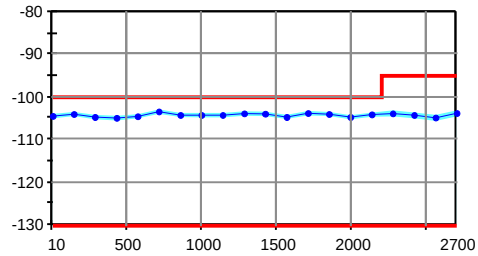
29. RX Analyzer: Dynamic / Average Noise Level

DUT Settings: low noise mode, autorange off
measument value /dB = abs. value referred to reference level

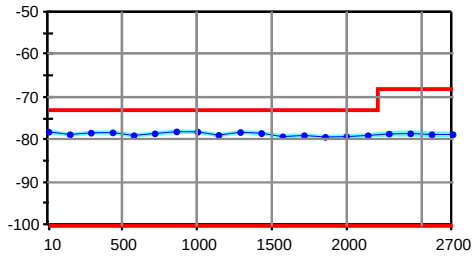
RF1, max. level = 47 dBm
/dB BW = 1 kHz



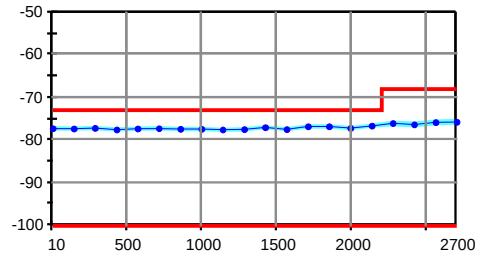
RF1, max. level = 10 dBm
/dB BW = 1 kHz



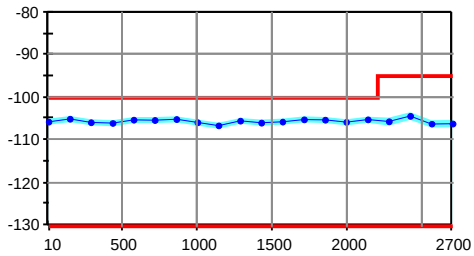
RF2, max. level = 33 dBm
/dB BW = 500 kHz



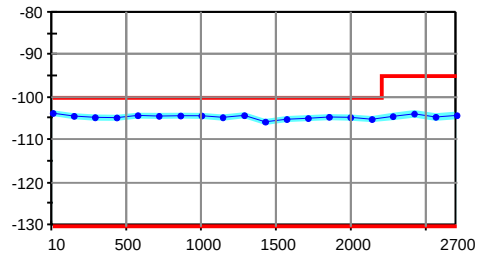
RF2, max. level = -4 dBm
/dB BW = 500 kHz



RF4IN, max. level = 0 dBm
/dB BW = 1 kHz



RF4IN, max. level = -22 dBm
/dB BW = 1 kHz



30. TX Generator: GSM Modulation

Status: K20 disabled
Status: K21 V3.52 available
Status: K22 V3.52 available
Status: K23 V3.52 available
Status: K24 V3.52 available

If column actual is blank, corresponding option is not installed

DUT settings: RF3OUT, level 10dBm, GSM Non-Signaling
Training Sequence: GSM0
Bit Modulation: PRBS
Transmission: Burst

	freq. /MHz	worst case measurement of 10 bursts	DL	actual	MU
K20 GSM400	460.0	phase error peak	4.00°	°	{a}
	460.0	phase error rms	1.00°	°	{a}
	460.0	frequency error	15.0 Hz	Hz	0.1Hz
	496.0	phase error peak	4.00°	°	{a}
	496.0	phase error rms	1.00°	°	{a}
	496.0	frequency error	15.0 Hz	Hz	0.1Hz
K21 GSM900	921.0	phase error peak	4.00°	-1.33°	{a}
	921.0	phase error rms	1.00°	+0.31°	{a}
	921.0	frequency error	15.0 Hz	+3.6 Hz	0.1Hz
	960.0	phase error peak	4.00°	-1.32°	{a}
	960.0	phase error rms	1.00°	+0.32°	{a}
	960.0	frequency error	15.0 Hz	+2.8 Hz	0.1Hz
K22 GSM1800	1805.0	phase error peak	4.00°	-1.93°	{a}
	1805.0	phase error rms	1.00°	+0.36°	{a}
	1805.0	frequency error	15.0 Hz	+6.4 Hz	0.1Hz
	1880.0	phase error peak	4.00°	-1.75°	{a}
	1880.0	phase error rms	1.00°	+0.39°	{a}
	1880.0	frequency error	15.0 Hz	+5.3 Hz	0.1Hz
K23 GSM1900	1930.0	phase error peak	4.00°	-2.02°	{a}
	1930.0	phase error rms	1.00°	+0.36°	{a}
	1930.0	frequency error	15.0 Hz	+6.0 Hz	0.1Hz
	1990.0	phase error peak	4.00°	-2.00°	{a}
	1990.0	phase error rms	1.00°	+0.39°	{a}
	1990.0	frequency error	15.0 Hz	+7.1 Hz	0.1Hz
K24 GSM850	869.0	phase error peak	4.00°	-1.24°	{a}
	869.0	phase error rms	1.00°	+0.32°	{a}
	869.0	frequency error	15.0 Hz	+2.5 Hz	0.1Hz
	894.0	phase error peak	4.00°	-1.33°	{a}
	894.0	phase error rms	1.00°	+0.32°	{a}
	894.0	frequency error	15.0 Hz	+2.3 Hz	0.1Hz

31. RX Analyzer: GSM Demodulation

```
Status: K20   disabled
Status: K21   V3.52 available
Status: K22   V3.52 available
Status: K23   V3.52 available
Status: K24   V3.52 available

If column actual is blank, corresponding option is not installed

DUT settings: GSM Non-Signaling
              Training Sequence: GSM0
              Trigger Source:    IF Power
              Trigger Level:     Medium
```

	input	freq. /MHz	level /dBm	worst case measurement of 100 bursts	DL	actual	MU
K20 GSM400	RF2	450.0	+5	phase error peak	2.00°	°	{a}
	RF2	450.0	+5	phase error rms	0.60°	°	{a}
	RF2	450.0	+5	frequency error	10.0 Hz	Hz	0.1Hz
	RF2	486.0	-14	phase error peak	2.00°	°	{a}
	RF2	486.0	-14	phase error rms	0.60°	°	{a}
	RF2	486.0	-14	frequency error	10.0 Hz	Hz	0.1Hz
K21 GSM900	RF2	876.0	+5	phase error peak	2.00°	-0.82°	{a}
	RF2	876.0	+5	phase error rms	0.60°	+0.22°	{a}
	RF2	876.0	+5	frequency error	10.0 Hz	+4.7 Hz	0.1Hz
	RF2	915.0	-14	phase error peak	2.00°	+0.97°	{a}
	RF2	915.0	-14	phase error rms	0.60°	+0.24°	{a}
	RF2	915.0	-14	frequency error	10.0 Hz	-4.7 Hz	0.1Hz
K22 GSM1800	RF2	1710.0	+5	phase error peak	2.00°	-0.69°	{a}
	RF2	1710.0	+5	phase error rms	0.60°	+0.22°	{a}
	RF2	1710.0	+5	frequency error	10.0 Hz	-5.5 Hz	0.1Hz
	RF2	1785.0	-14	phase error peak	2.00°	-0.65°	{a}
	RF2	1785.0	-14	phase error rms	0.60°	+0.21°	{a}
	RF2	1785.0	-14	frequency error	10.0 Hz	-4.2 Hz	0.1Hz
K23 GSM1900	RF2	1850.0	+5	phase error peak	2.00°	-0.79°	{a}
	RF2	1850.0	+5	phase error rms	0.60°	+0.24°	{a}
	RF2	1850.0	+5	frequency error	10.0 Hz	-4.5 Hz	0.1Hz
	RF2	1910.0	-14	phase error peak	2.00°	-0.72°	{a}
	RF2	1910.0	-14	phase error rms	0.60°	+0.22°	{a}
	RF2	1910.0	-14	frequency error	10.0 Hz	-4.4 Hz	0.1Hz
K24 GSM850	RF2	824.0	+5	phase error peak	2.00°	+0.74°	{a}
	RF2	824.0	+5	phase error rms	0.60°	+0.23°	{a}
	RF2	824.0	+5	frequency error	10.0 Hz	+5.1 Hz	0.1Hz
	RF2	849.0	-14	phase error peak	2.00°	-0.74°	{a}
	RF2	849.0	-14	phase error rms	0.60°	+0.20°	{a}
	RF2	849.0	-14	frequency error	10.0 Hz	-4.7 Hz	0.1Hz

32. TX Generator: GSM/EDGE Modulation

Status: K20 disabled
Status: K21 V3.52 available
Status: K22 V3.52 available
Status: K23 V3.52 available
Status: K24 V3.52 available

If column actual is blank, corresponding option is not installed

DUT settings: RF3OUT, level 0dBm, 8PSK PRBS, TSC0

	freq. /MHz	worst case measurement of 50 bursts	DL		actual	MU
K20 GSM400	460.0	EVM rms	2.00%		%	{a}
	496.0	EVM rms	2.00%		%	{a}
K21 GSM900	921.0	EVM rms	2.00%		+0.75%	{a}
	960.0	EVM rms	2.00%		+0.78%	{a}
K22 GSM1800	1805.0	EVM rms	2.00%		+0.73%	{a}
	1880.0	EVM rms	2.00%		+0.73%	{a}
K23 GSM1900	1930.0	EVM rms	2.00%		+0.72%	{a}
	1990.0	EVM rms	2.00%		+0.76%	{a}
K24 GSM850	869.0	EVM rms	2.00%		+0.74%	{a}
	894.0	EVM rms	2.00%		+0.81%	{a}

33. RX Analyzer: GSM/EDGE Demodulation

```
Status: K20   disabled
Status: K21   V3.52 available
Status: K22   V3.52 available
Status: K23   V3.52 available
Status: K24   V3.52 available

If column actual is blank, corresponding option is not installed

DUT settings: Training Sequence: TSC0 / PN15
              Trigger Source:    IF Power
              Trigger Level:     Medium
```

	input	freq. /MHz	level /dBm	worst case measurement of 200 bursts	DL		actual	MU
K20 GSM400	RF2	450.0	+5	EVM rms	1.00%		%	{a}
	RF2	450.0	+5	frequency err.	10.0 Hz		Hz	0.1 Hz
	RF2	486.0	-14	EVM rms	1.00%		%	{a}
	RF2	486.0	-14	frequency err.	10.0 Hz		Hz	0.1 Hz
K21 GSM900	RF2	876.0	+5	EVM rms	1.00%		+0.67%	{a}
	RF2	876.0	+5	frequency err.	10.0 Hz		+2.7 Hz	0.1 Hz
	RF2	915.0	-14	EVM rms	1.00%		+0.66%	{a}
	RF2	915.0	-14	frequency err.	10.0 Hz		+2.3 Hz	0.1 Hz
K22 GSM1800	RF2	1710.0	+5	EVM rms	1.00%		+0.76%	{a}
	RF2	1710.0	+5	frequency err.	10.0 Hz		-2.6 Hz	0.1 Hz
	RF2	1785.0	-14	EVM rms	1.00%		+0.67%	{a}
	RF2	1785.0	-14	frequency err.	10.0 Hz		-2.9 Hz	0.1 Hz
K23 GSM1900	RF2	1850.0	+5	EVM rms	1.00%		+0.83%	{a}
	RF2	1850.0	+5	frequency err.	10.0 Hz		+3.0 Hz	0.1 Hz
	RF2	1910.0	-14	EVM rms	1.00%		+0.69%	{a}
	RF2	1910.0	-14	frequency err.	10.0 Hz		+3.0 Hz	0.1 Hz
K24 GSM850	RF2	824.0	+5	EVM rms	1.00%		+0.68%	{a}
	RF2	824.0	+5	frequency err.	10.0 Hz		+2.2 Hz	0.1 Hz
	RF2	849.0	-14	EVM rms	1.00%		+0.65%	{a}
	RF2	849.0	-14	frequency err.	10.0 Hz		-1.9 Hz	0.1 Hz

34. TX Generator: TDMA (IS136) Modulation

Status: K27 V3.52 available
Status: K28 V3.52 available

Level Accuracy

If column actual is blank, corresponding option is not installed

DUT settings: 0 dBm, PRBS, RF3OUT

	freq. /MHz	DL /dB	actual /dB	MU /dB
IS136 800 (K27)	880.02	0.8	0.0	0.2
IS136 1900 (K28)	1950.06	0.8	0.1	0.2

Error Vector Magnitude RMS

DUT settings: 0dBm, PRBS, RF3OUT

	freq. /MHz	DUL /%	actual /%	MU /%
IS136 800 (K27)	880.02	2.0	1.4	{a}
IS136 1900 (K28)	1950.06	2.0	1.6	{a}

35. RX Analyzer: TDMA (IS136) Demodulation

Status: K27 V3.52 available
Status: K28 V3.52 available

Error Vector Magnitude

If column actual is blank, corresponding option is not installed

DUT settings: +10 dBm exp. power, low distortion, RF2

	freq. /MHz	DUL /%	actual /%	MU
IS136 800 (K27)	835.02	4.0	2.0 peak	{a}
	835.02	2.0	1.0 rms	{a}
IS136 1900 (K28)	1870.02	4.0	2.8 peak	{a}
	1870.02	2.0	1.3 rms	{a}

36. TX Generator: AMPS Modulation

Status: K29 V3.52 available

FM Distortion (SINAD)

DUT settings: RF2, 880.02 MHz, -20 dBm, AF 1000 Hz, deviation 8000 Hz, SAT/ST off
Analyzer settings: FM demodulation, 880.02 MHz, -15 dBm, LP 30 Hz, HP 15 kHz

DLL /dB	actual /dB	MU /dB
40.0	50.6	1.5

Residual FM

DUT settings: RF2, 880.02 MHz, -20 dBm, AF 1000 Hz, deviation 0 Hz, SAT/ST off
Analyzer settings: FM demodulation, 880.02 MHz, -15 dBm, HP 30 Hz, LP 3 kHz

DUL /Hz	actual /Hz	MU /Hz
10.0	2.5 rms	{a}

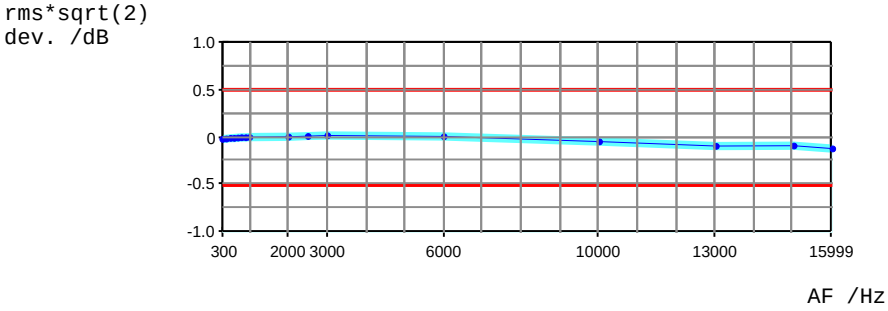
Deviation Accuracy

DUT settings: RF2, 880.02 MHz, -20 dBm, AF 1000 Hz, rated dev. 5520 Hz, SAT/ST off
Analyzer settings: 880.02 MHz, -15 dBm, span 10 kHz

	DLL	DUL	actual	MU
actual deviation	5410 Hz	5630 Hz	5513 Hz	3.0 Hz

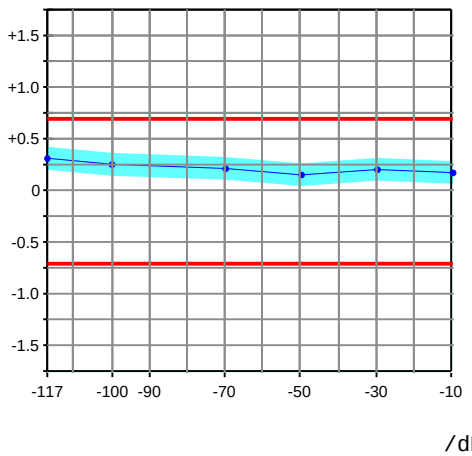
Deviation Frequency Response

DUT settings: RF2, 880.02 MHz, -20 dBm, AF 1000 Hz, deviation 8000 Hz, SAT/ST off
Analyzer settings: FM demodulation, 880.02 MHz, -15 dBm, HP none, LP none



Level Accuracy (AMPS Level Absolute)

DUT settings: RF2, 880.02 MHz, -10 dBm



37. RX Analyzer: AMPS Demodulation

Status: K29 V3.52 available

Residual FM

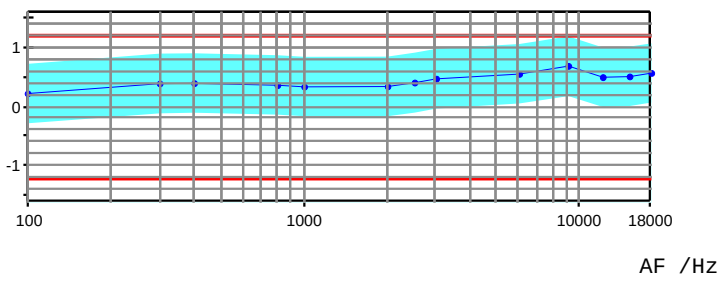
```
DUT settings:       835.02 MHz, -10 dBm exp. power, RF2
                    Filters De-emphasis, Expandor and Weighting OFF
Generator settings: 835.02 MHz, -15 dBm, modulation off

filter                 DUL    actual                          MU
                       /Hz    /Hz                             /Hz

BP07  300 Hz.. 3 kHz    5      1.6 rms                           {a}
BP17    6 Hz..20 kHz   18      7.6 rms                           {a}
```

Deviation Accuracy

```
DUT settings:       835.02 MHz, -10 dBm, modulation band pass BP17 6 Hz..20 kHz, RF2
                    Filters De-emphasis, Expandor and Weighting OFF
Generator settings: 835.02 MHz, -15 dBm, AF 1000 Hz, modulation 8650 Hz
```

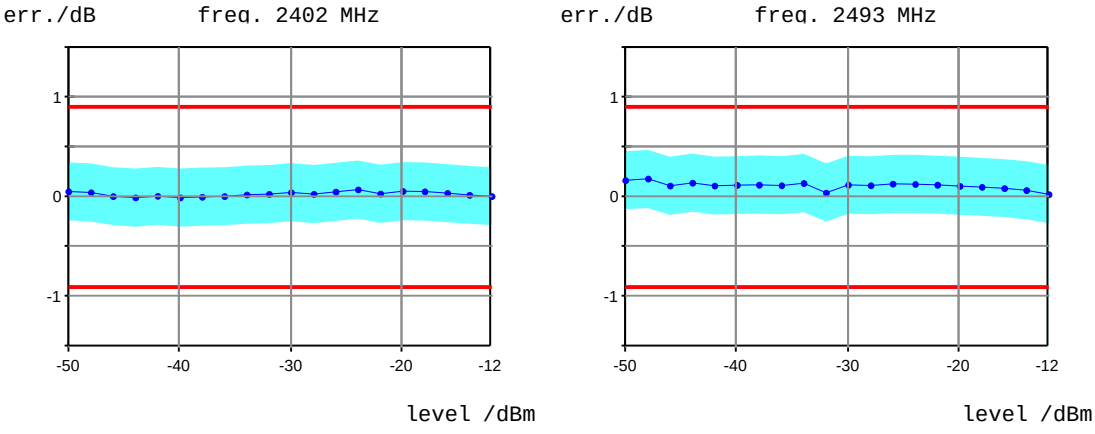


38. TX Generator: Bluetooth Modulation

Status: K53 V3.51 available

Level Accuracy

DUT settings: GFSK modulated BT signal with periodically repeated Bluetooth packet containing access code + header + payload, output RF2



Level Difference to CW-Signal

output at	freq. /MHz	nom. level /dBm	abs.meas. CW level /dBm	abs.meas. BT level /dBm	DL /dB		MU for abs. meas. /dB
RF2	2402	-12.0	-11.89	-11.99	-12.0	0.90	0.29
RF2	2402	-22.0	-21.87	-21.97	-22.0	0.90	0.29
RF2	2402	-24.0	-23.84	-23.93	-24.0	0.90	0.29
RF2	2402	-26.0	-25.85	-25.95	-26.0	0.90	0.29
RF2	2402	-28.0	-27.87	-27.97	-28.0	0.90	0.29
RF2	2402	-30.0	-29.86	-29.95	-30.0	0.90	0.29
RF2	2402	-32.0	-31.87	-31.97	-32.0	0.90	0.29
RF2	2402	-34.0	-33.88	-33.98	-34.0	0.90	0.29
RF2	2402	-36.0	-35.89	-35.99	-36.0	0.90	0.29
RF2	2402	-38.0	-37.88	-38.00	-38.0	0.90	0.29
RF2	2402	-40.0	-39.90	-40.01	-40.0	0.90	0.29
RF2	2402	-42.0	-41.88	-41.99	-42.0	0.90	0.29
RF2	2402	-44.0	-43.90	-44.01	-44.0	0.90	0.29
RF2	2402	-46.0	-45.89	-45.99	-46.0	0.90	0.29
RF2	2402	-48.0	-47.87	-47.96	-48.0	0.90	0.29
RF2	2402	-50.0	-49.88	-49.94	-50.0	0.90	0.29
RF2	2493	-12.0	-11.86	-11.97	-12.0	0.90	0.29
RF2	2493	-22.0	-21.79	-21.88	-22.0	0.90	0.29
RF2	2493	-24.0	-23.78	-23.87	-24.0	0.90	0.29
RF2	2493	-26.0	-25.77	-25.87	-26.0	0.90	0.29
RF2	2493	-28.0	-27.78	-27.88	-28.0	0.90	0.29
RF2	2493	-30.0	-29.80	-29.88	-30.0	0.90	0.29
RF2	2493	-32.0	-31.85	-31.96	-32.0	0.90	0.29
RF2	2493	-34.0	-33.76	-33.86	-34.0	0.90	0.29
RF2	2493	-36.0	-35.78	-35.88	-36.0	0.90	0.29
RF2	2493	-38.0	-37.77	-37.88	-38.0	0.90	0.29
RF2	2493	-40.0	-39.79	-39.88	-40.0	0.90	0.29
RF2	2493	-42.0	-41.78	-41.89	-42.0	0.90	0.29
RF2	2493	-44.0	-43.76	-43.86	-44.0	0.90	0.29
RF2	2493	-46.0	-45.79	-45.89	-46.0	0.90	0.29
RF2	2493	-48.0	-47.75	-47.82	-48.0	0.90	0.29
RF2	2493	-50.0	-49.74	-49.83	-50.0	0.90	0.29

Frequency Deviation Accuracy

DUT settings: GFSK modulated BT signal with periodically repeated Bluetooth packet containing access code + header + payload.

Note: A deviation of 160kHz for pattern 11110000 corresponds to the data sheet value 0.32 for the modulation index.

output at	freq. channel /MHz	level /dBm	pattern	deviation	DL	actual error / %	MU
RF2	2450 48	-20	11110000	160.00 kHz	5 %	-0.2	2.0 %

39. RX Analyzer: Bluetooth Demodulation

Status: K53 V3.51 available

Level Error

DUT settings: trigger source = IF POWER, trigger level = LOW, tx-pattern = 1010, DH1, poll period= 2, length of test seq.= 27 byte

input at	max. level setting /dBm	input level /dBm	freq. channel /MHz	DL /dB	level error /dB	MU /dB
RF1IN	+5.0	+4.0	2402 0	0.70	-0.25	0.19
RF1IN	+5.0	0.0	2402 0	0.70	-0.23	0.19
RF1IN	+5.0	-0.1	2402 0	0.70	-0.24	0.19
RF1IN	+5.0	-0.2	2402 0	0.70	-0.23	0.19
RF1IN	+5.0	-0.3	2402 0	0.70	-0.22	0.19
RF1IN	+5.0	-10.0	2402 0	0.70	-0.23	0.19
RF1IN	+5.0	-15.0	2402 0	0.70	-0.23	0.19
RF2IN	-14.0	-15.0	2402 0	0.70	0.11	0.19
RF2IN	-14.0	-15.1	2402 0	0.70	0.21	0.19
RF2IN	-14.0	-15.2	2402 0	0.70	0.20	0.19
RF2IN	-14.0	-20.0	2402 0	0.70	0.10	0.19
RF2IN	-14.0	-30.0	2402 0	0.70	0.07	0.19
RF2IN	-14.0	-34.0	2402 0	0.70	0.12	0.19
RF4IN	-32.0	-33.0	2402 0	0.90	0.11	0.22
RF4IN	-32.0	-42.0	2402 0	0.90	0.11	0.22
RF4IN	-32.0	-45.0	2402 0	0.90	0.05	0.22

Leakage Power (dynamic range)

DUT settings: BW = 3MHz

input at	max. level setting /dBm	input level /dBm	freq. channel /MHz	DUL /dBm	leakage power /dBm	MU /dB
RF1IN	+5.0	+4.0	2402 0	-50.00	-62.10	0.25
RF1IN	+5.0	0.0	2402 0	-50.00	-62.08	0.25
RF1IN	+5.0	-0.1	2402 0	-50.00	-62.06	0.25
RF1IN	+5.0	-0.2	2402 0	-50.00	-62.20	0.25
RF1IN	+5.0	-0.3	2402 0	-50.00	-62.05	0.25
RF1IN	+5.0	-10.0	2402 0	-50.00	-62.12	0.25
RF1IN	+5.0	-15.0	2402 0	-50.00	-62.27	0.25
RF2IN	-14.0	-15.0	2402 0	-69.00	-77.96	0.25
RF2IN	-14.0	-15.1	2402 0	-69.00	-77.84	0.25
RF2IN	-14.0	-15.2	2402 0	-69.00	-78.00	0.25
RF2IN	-14.0	-20.0	2402 0	-69.00	-77.90	0.25
RF2IN	-14.0	-30.0	2402 0	-69.00	-77.89	0.25
RF2IN	-14.0	-34.0	2402 0	-69.00	-77.89	0.25
RF4IN	-32.0	-33.0	2402 0	-87.00	-97.99	0.25
RF4IN	-32.0	-42.0	2402 0	-87.00	-98.00	0.25
RF4IN	-32.0	-45.0	2402 0	-87.00	-98.11	0.25

Frequency Offset Error in Preamble and Deviation Error in Payload

```
Tolerance: frequency offset error in preample      <= 2kHz
           frequency deviation error in payload    <= 4% for pattern 10101010
                                                   <= 2% for pattern 11110000

DUT settings: trigger source = IF POWER, trigger level = MID,
              DH1, poll period= 2, length of test seq.= 27 byte,
              max. level setting = -14dBm, channel = 0, input RF2IN
Input signal: B*T= 0.5, symbol rate = 1Mbit/s, frequency 2402MHz; IQ-Filter = 2.5MHz
```

input signal level /dBm	freq. offset /kHz	FM dev. /kHz	pattern	measurement	ex-pected result /kHz	DL	actual value	actual uncert. worst case of 10 meas	MU
-15.0	25	160	10101010	freq.offset	25	2.0kHz	+25.618kHz	+0.618kHz	0.001kHz
-15.0	25	160	10101010	freq.dev.	141.05	4.0%	+141.72 kHz	+0.48 %	{a}
-15.0	25	160	10101010	freq.drift	0	2.0kHz	+0.790kHz	+0.790kHz	0.001kHz
-15.0	0	160	11110000	freq.offset	0	2.0kHz	+0.735kHz	+0.735kHz	0.001kHz
-15.0	0	160	11110000	freq.dev.	160	2.0%	+159.82 kHz	-0.11 %	{a}
-24.0	0	100	11110000	freq.offset	0	2.0kHz	+0.403kHz	+0.403kHz	0.001kHz
-24.0	0	160	11110000	freq.offset	0	2.0kHz	+0.593kHz	+0.593kHz	0.001kHz
-24.0	0	160	11110000	freq.dev.	160	2.0%	+160.33 kHz	+0.20 %	{a}
-24.0	0	200	11110000	freq.dev.	200	2.0%	+200.35 kHz	+0.18 %	{a}

40. TX Generator: CDMA2000 Modulation

Status: K83 disabled
Status: K84 V3.52 available
Status: K85 V3.52 available
Status: K86 disabled

Level Accuracy (CDMA Level absolute)

If column actual is blank, corresponding option is not installed

CMU settings: CDMA power = -16dBm, traffic level = -14dB, paging level = -12dB,
sync. level = -16dB , pilot level = -7dB, OCNS level = AUTO,
RF2

	freq. channel		rated	DL	actual	MU
	/MHz		/dBm	/dB	error /dB	/dB
450	460.000	1	-16	0.5		0.11
(K83)	493.480	2016	-16	0.5		0.11
Cellular	870.030	1	-16	0.5	0.14	0.11
(K84)	893.310	777	-16	0.5	0.12	0.11
PCS	1930.050	1	-16	0.5	0.01	0.11
(K85)	1989.950	1199	-16	0.5	0.03	0.11
IMT-2000	2110.000	0	-16	0.5		0.11
(K86)	2169.950	1199	-16	0.5		0.11

Waveform Quality

If column actual is blank, corresponding option is not installed

CMU settings: traffic level = off, paging level = off,
sync. level = off, pilot level = -7dB, OCNS level = off

	freq. channel		CDMA power /dBm	out-put	measurement	DLL	actual	MU
450 (K83)	460.000	1	-7	3	rho factor	0.985		0.001 {a}
	493.480	2016	-7	3	rho fact. carr.suppression	0.985 35 dB	dB	0.001 {a}
Cellular (K84)	870.030	1	-7	3	rho factor	0.985	0.989	0.001 {a}
	893.310	777	-7	3	rho factor carr.suppression	0.985 35 dB	44.7 dB	0.001 {a}
PCS (K85)	1930.050	1	-7	3	rho factor	0.985	0.987	0.001 {a}
	1989.950	1199	-7	3	rho factor carr.suppression	0.985 35 dB	44.3 dB	0.001 {a}
IMT-2000 (K86)	2110.000	0	-7	3	rho factor	0.985	0.990	0.001 {a}
	2169.950	1199	-7	3	rho factor carr.suppression	0.985 35 dB	45.4 dB	0.001 {a}
							0.989	
							47.9 dB	

41. RX Analyzer: CDMA2000 Demodulation

Status: K83 disabled
Status: K84 V3.52 available
Status: K85 V3.52 available
Status: K86 disabled

Demodulation for RC1,2 (O-QPSK)

If column actual is blank, corresponding option is not installed

CMU settings: RF2, mode manual, inp. lev. = -10 dBm, max. lev. = input lev. + 6dB

	freq. /MHz		DLL	DUL	actual	MU
450 (K83)	450.000 / 1 483.480 / 2016	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	dB dB	0.14 dB 0.14 dB
Cellular (K84)	825.030 / 1 848.310 / 777	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	0.19 dB 0.17 dB	0.14 dB 0.14 dB
PCS (K85)	1850.050 / 1 1909.950 / 1199	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	0.04 dB 0.13 dB	0.14 dB 0.14 dB
IMT-2000 (K86)	1920.000 / 0 1979.950 / 1199	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	dB dB	0.14 dB 0.14 dB

Demodulation for RC3,4 (HPSK)

If column actual is blank, corresponding option is not installed

CMU settings: RF2, mode manual, inp. lev. = -10 dBm, max. lev. = input lev. + 6dB

	freq. /MHz		DLL	DUL	actual	MU
450 (K83)	450.000 / 1 483.480 / 2016	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	dB dB	0.14 dB 0.14 dB
Cellular (K84)	825.030 / 1 848.310 / 777	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	0.15 dB 0.17 dB	0.14 dB 0.14 dB
PCS (K85)	1850.050 / 1 1909.950 / 1199	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	0.03 dB 0.19 dB	0.14 dB 0.14 dB
IMT-2000 (K86)	1920.000 / 0 1979.950 / 1199	MSPower MSPower	-0.5 dB -0.5 dB	+0.5 dB +0.5 dB	dB dB	0.14 dB 0.14 dB

42. Audio Generator (CMU-B41)

Status: B41 available

Measurement with audio analyzer UPL

Imax

setting UPL/UPD Ri = 300 Ohm

freq.	setting level rms	measurement output	param.	DLL /mA peak	result /mA peak	MU /mA
20000 Hz	5000 mV	AFOUT	Imax	20.00	23.32	0.06
20000 Hz	5000 mV	AUX2	Imax	20.00	23.23	0.06

Output Impedance

freq.	setting level	measurement Ch.	param.	DUL /Ohm	result /Ohm	MU /Ohm
20000 Hz	5000 mV	AFOUT	RI	4.00	3.36	0.02
20000 Hz	5000 mV	AUX2	RI	4.00	3.23	0.02

Level & THD+N & THD

setting UPL Ri = 200 kOhm / UPD Ri = 20 kOhm, measurement bandwidth 22 kHz

freq.	setting level	measurement output	param.	DL /%	result /%	MU /%
20 Hz	100 mV	AFOUT	THD+N	0.050	0.018	0.002
20 Hz	100 mV	AFOUT	THD	0.025	0.006	0.001
1000 Hz	100 mV	AFOUT	LEVEL	1.50	-0.01	0.39
1000 Hz	100 mV	AFOUT	THD+N	0.050	0.016	0.002
1000 Hz	100 mV	AFOUT	THD	0.025	0.002	0.001
10000 Hz	100 mV	AFOUT	LEVEL	1.50	+0.26	0.39
10000 Hz	100 mV	AFOUT	THD+N	0.050	0.017	0.002
10000 Hz	100 mV	AFOUT	THD	0.025	0.000	0.001
20 Hz	5000 mV	AFOUT	THD+N	0.050	0.002	0.002
20 Hz	5000 mV	AFOUT	THD	0.025	0.001	0.001
1000 Hz	5000 mV	AFOUT	LEVEL	1.50	-0.17	0.39
1000 Hz	5000 mV	AFOUT	THD+N	0.050	0.002	0.002
1000 Hz	5000 mV	AFOUT	THD	0.025	0.001	0.001
10000 Hz	5000 mV	AFOUT	LEVEL	1.50	+0.01	0.39
10000 Hz	5000 mV	AFOUT	THD+N	0.050	0.002	0.002
10000 Hz	5000 mV	AFOUT	THD	0.025	0.001	0.001
20 Hz	100 mV	AUX2	THD+N	0.050	0.019	0.002
20 Hz	100 mV	AUX2	THD	0.025	0.007	0.001
1000 Hz	100 mV	AUX2	LEVEL	1.50	-0.06	0.39
1000 Hz	100 mV	AUX2	THD+N	0.050	0.017	0.002
1000 Hz	100 mV	AUX2	THD	0.025	0.002	0.001
10000 Hz	100 mV	AUX2	LEVEL	1.50	+0.04	0.39
10000 Hz	100 mV	AUX2	THD+N	0.050	0.019	0.002
10000 Hz	100 mV	AUX2	THD	0.025	0.000	0.001
20 Hz	5000 mV	AUX2	THD+N	0.05	0.002	0.001
20 Hz	5000 mV	AUX2	THD	0.025	0.001	0.001
1000 Hz	5000 mV	AUX2	LEVEL	1.50	-0.22	0.39
1000 Hz	5000 mV	AUX2	THD+N	0.050	0.002	0.002
1000 Hz	5000 mV	AUX2	THD	0.025	0.001	0.001
10000 Hz	5000 mV	AUX2	LEVEL	1.50	-0.21	0.39
10000 Hz	5000 mV	AUX2	THD+N	0.050	0.002	0.002
10000 Hz	5000 mV	AUX2	THD	0.025	0.002	0.001

43. Audio Analyzer (CMU-B41)

Status: B41 available

Measurement with audio analyzer UPL

Frequency Response

setting freq.	setting level	measurement output	measurement param.	DL /%	level error /%	MU /%
50 Hz	2000 mV	AFIN	LEVEL	1.000	-0.229	0.410
1000 Hz	2000 mV	AFIN	LEVEL	1.000	+0.006	0.410
10000 Hz	2000 mV	AFIN	LEVEL	1.000	-0.035	0.410
50 Hz	2000 mV	AUX1	LEVEL	1.000	-0.234	0.410
1000 Hz	2000 mV	AUX1	LEVEL	1.000	+0.001	0.410
10000 Hz	2000 mV	AUX1	LEVEL	1.000	-0.043	0.410

Linearity

setting freq.	setting level	measurement input	measurement param.	DL /%	level error /%	
20000 Hz	20 mV	AFIN	LEVEL	1.000	+0.063	0.410
20000 Hz	2000 mV	AFIN	LEVEL	1.000	-0.007	0.410
20000 Hz	20000 mV	AFIN	LEVEL	2.000	+0.021	0.410
20000 Hz	20 mV	AUX1	LEVEL	1.000	+0.076	0.410
20000 Hz	2000 mV	AUX1	LEVEL	1.000	-0.014	0.410
20000 Hz	20000 mV	AUX1	LEVEL	2.000	+0.055	0.410

Inherent Distortion

setting freq.	setting level	measurement input	measurement param.	DL /%	THD+N /%	MU /%
100 Hz	2000 mV	AFIN	THD+N	0.050	0.010	0.001
1000 Hz	2000 mV	AFIN	THD+N	0.050	0.004	0.001
10000 Hz	2000 mV	AFIN	THD+N	0.050	0.003	0.001
5000 Hz	100 mV	AFIN	THD+N	0.050	0.031	0.001
5000 Hz	2000 mV	AFIN	THD+N	0.050	0.004	0.001
5000 Hz	20000 mV	AFIN	THD+N	0.050	0.006	0.001
100 Hz	2000 mV	AUX1	THD+N	0.050	0.007	0.001
1000 Hz	2000 mV	AUX1	THD+N	0.050	0.003	0.001
10000 Hz	2000 mV	AUX1	THD+N	0.050	0.004	0.001
5000 Hz	100 mV	AUX1	THD+N	0.050	0.024	0.001
5000 Hz	2000 mV	AUX1	THD+N	0.050	0.004	0.001
5000 Hz	20000 mV	AUX1	THD+N	0.050	0.007	0.001

APPENDIX E: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

835MHz dipole CD835V3, SN: 1004
1880MHz dipole CD1880V3, SN: 1003
See the next 5+4 pages.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Nokia Salo TCC**

Certificate No: CD1880V3-1003_Feb07

CALIBRATION CERTIFICATE

Object	CD1880V3 - SN: 1003
Calibration procedure(s)	QA CAL-20.v4 Calibration procedure for dipoles in air
Calibration date:	February 12, 2007
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
DAE4	SN: 660	1-Mar-06 (SPEAG, No. DAE4-660_Mar06)	Calibration, Mar-07
Probe ER3DV6	SN: 2336	27-Dec-06 (SPEAG, No. ER3-2336_Dec06)	Calibration, Dec-07
Probe H3DV6	SN: 6065	27-Dec-06 (SPEAG, No. H3-6065-Dec06)	Calibration, Dec-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB43310788	12-Aug-03 (SPEAG, in house check Oct-06)	In house check: Oct-07
Power sensor HP 8481A	MY41093312	10-Aug-03 (SPEAG, in house check Oct-06)	In house check: Oct-08
Power sensor HP 8481A	MY41093315	10-Aug-03 (SPEAG, in house check Oct-06)	In house check: Oct-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07
RF generator R&S SMT06	SN: 100005	26-Jul-04 (SPEAG, in house check Nov-05)	In house check: Nov-07

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	Fin Bomholt	Technical Director	

Issued: February 14, 2007

1 Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7 B53
DASY PP Version	SEMCAD	V1.8 B172
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 90 mm
Frequency	**1880 MHz** ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured	100 mW forward power	**0.452 A/m**

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW forward power	130.9 V/m
Maximum measured above low end	100 mW forward power	126.7 V/m
Averaged maximum above arm	100 mW forward power	**128.8 V/m**

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	**Return Loss**	**Impedance**
1710 MHz	19.0 dB	(49.8 + j11.3) Ohm
1880 MHz	**19.9 dB**	**(53.7 + j9.9) Ohm**
1900 MHz	19.8 dB	(56.3 + j9.0) Ohm
1950 MHz	23.7 dB	(57.0 – j0.7) Ohm
2000 MHz	26.2 dB	(45.4 + j0.7) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

3.3.2 DASY4 H-Field Result

Date/Time: 2/12/2007 4:55:48 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1003

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section

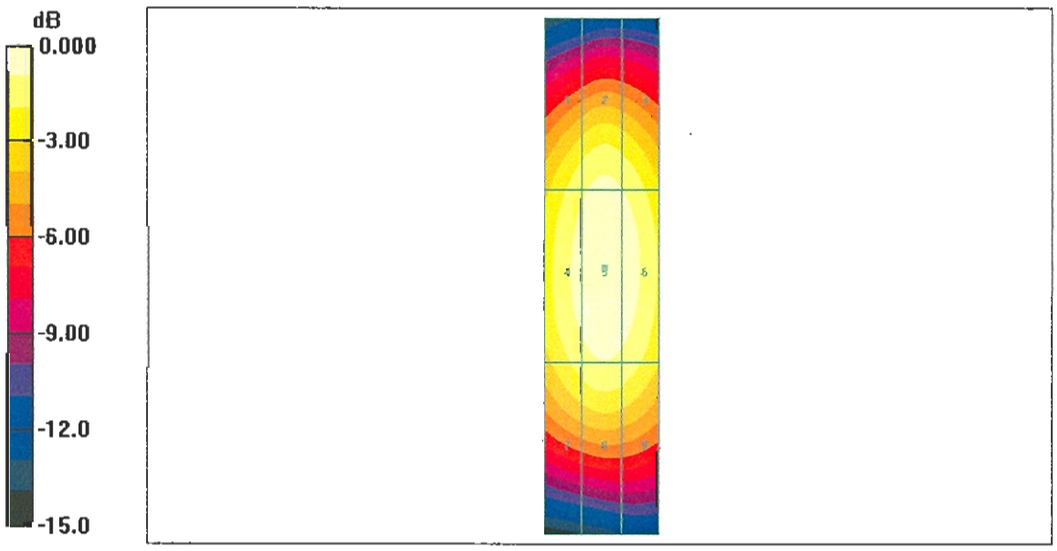
DASY4 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 12/27/2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 3/1/2006
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.452 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.476 A/m; Power Drift = 0.007 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.392**	Grid 2 **0.419**	Grid 3 **0.404**
Grid 4 **0.425**	Grid **5** **0.452**	Grid 6 **0.437**
Grid 7 **0.378**	Grid 8 **0.401**	Grid 9 **0.388**



0 dB = 0.452A/m

3.3.3 DASY4 E-Field Result

Date/Time: 2/12/2007 2:59:33 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1003

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section

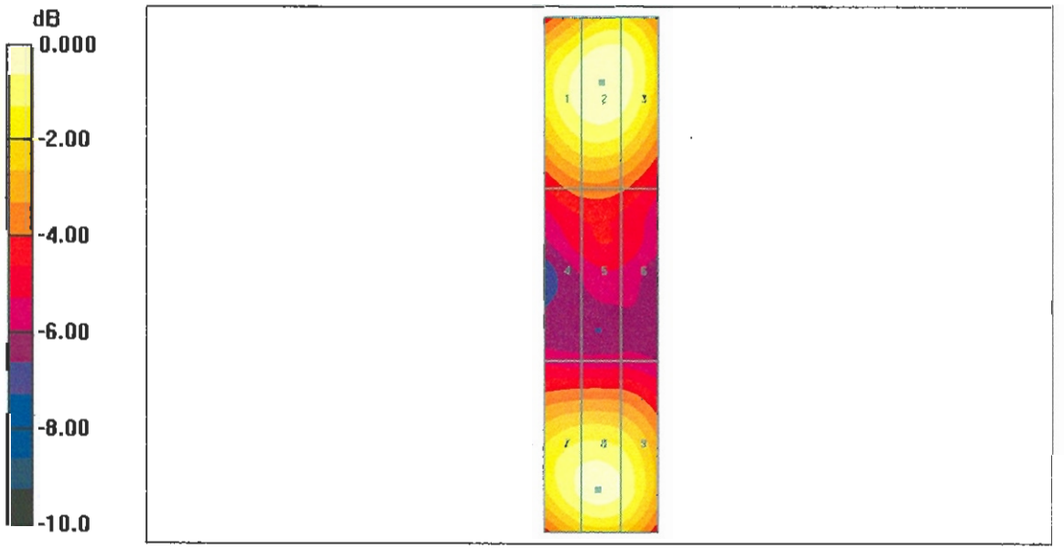
DASY4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 12/27/2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 3/1/2006
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 130.9 V/m
Probe Modulation Factor = 1.00
Reference Value = 139.0 V/m; Power Drift = 0.015 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **126.8**	Grid 2 **130.9**	Grid 3 **127.9**
Grid 4 **86.2**	Grid 5 **87.1**	Grid 6 **84.0**
Grid 7 **123.9**	Grid 8 **126.7**	Grid 9 **121.4**



0 dB = 130.9V/m

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Nokia Salo TCC**

Certificate No: CD835V3-1004_Feb07

CALIBRATION CERTIFICATE

Object	CD835V3 - SN: 1004
Calibration procedure(s)	QA CAL-20.v4 Calibration procedure for dipoles in air
Calibration date:	February 13, 2007
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
DAE4	SN: 660	1-Mar-06 (SPEAG, No. DAE4-660_Mar06)	Calibration, Mar-07
Probe ER3DV6	SN: 2336	27-Dec-06 (SPEAG, No. ER3-2336_Dec06)	Calibration, Dec-07
Probe H3DV6	SN: 6065	27-Dec-06 (SPEAG, No. H3-6065-Dec06)	Calibration, Dec-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB43310788	12-Aug-03 (SPEAG, in house check Oct-06)	In house check: Oct-07
Power sensor HP 8481A	MY41093312	10-Aug-03 (SPEAG, in house check Oct-06)	In house check: Oct-08
Power sensor HP 8481A	MY41093315	10-Aug-03 (SPEAG, in house check Oct-06)	In house check: Oct-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07
RF generator R&S SMT06	SN: 100005	26-Jul-04 (SPEAG, in house check Nov-05)	In house check: Nov-07

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Fin Bomholt	Technical Director	

Issued: March 6, 2007

1 Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7 B53
DASY PP Version	SEMCAD	V1.8 B172
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 180 mm
Frequency	**835 MHz** ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.07 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	**interpolated maximum**
Maximum measured	100 mW forward power	**0.452 A/m**

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW forward power	161.7 V/m
Maximum measured above low end	100 mW forward power	158.3 V/m
Averaged maximum above arm	100 mW forward power	**160.0 V/m**

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	**Return Loss**	**Impedance**
800 MHz	16.8 dB	(42.5 – j11.2) Ohm
835 MHz	**26.1 dB**	**(52.9 + j4.2) Ohm**
900 MHz	15.6 dB	(57.3 – j16.4) Ohm
950 MHz	24.7 dB	(45.3 + j2.9) Ohm
960 MHz	19.1 dB	(51.7 + j11.2) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

3.3.2 DASY4 H-Field Result

Date/Time: 2/13/2007 10:40:13 AM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1004

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section

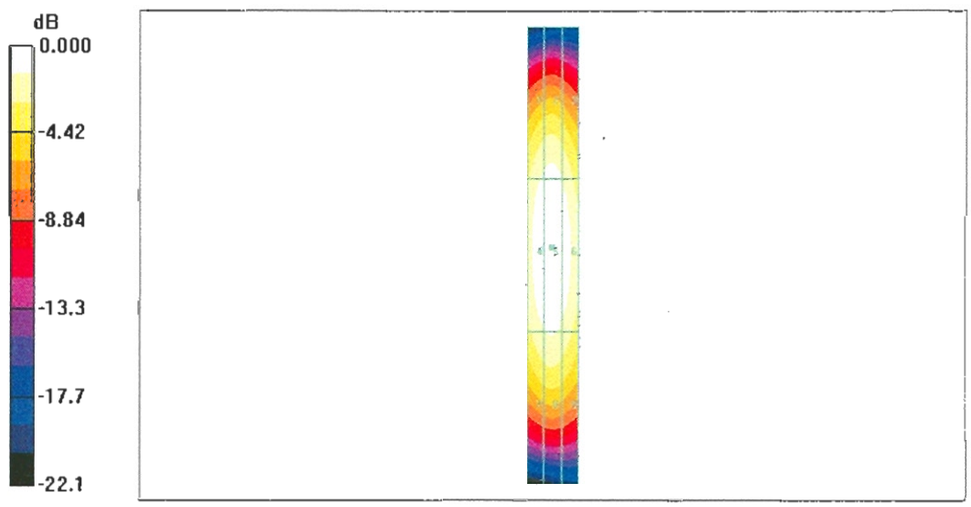
DASY4 Configuration:

- Probe: H3DV6 - SN6065: : Calibrated: 12/27/2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660: Calibrated: 3/1/2006
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.452 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.479 A/m; Power Drift = 0.012 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.393**	Grid 2 **0.408**	Grid 3 **0.380**
Grid 4 **0.436**	Grid 5 **0.452**	Grid 6 **0.425**
Grid 7 **0.374**	Grid 8 **0.387**	Grid 9 **0.365**



0 dB = 0.452A/m

3.3.3 DASY4 E-Field Result

Date/Time: 2/13/2007 2:25:30 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1004

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section

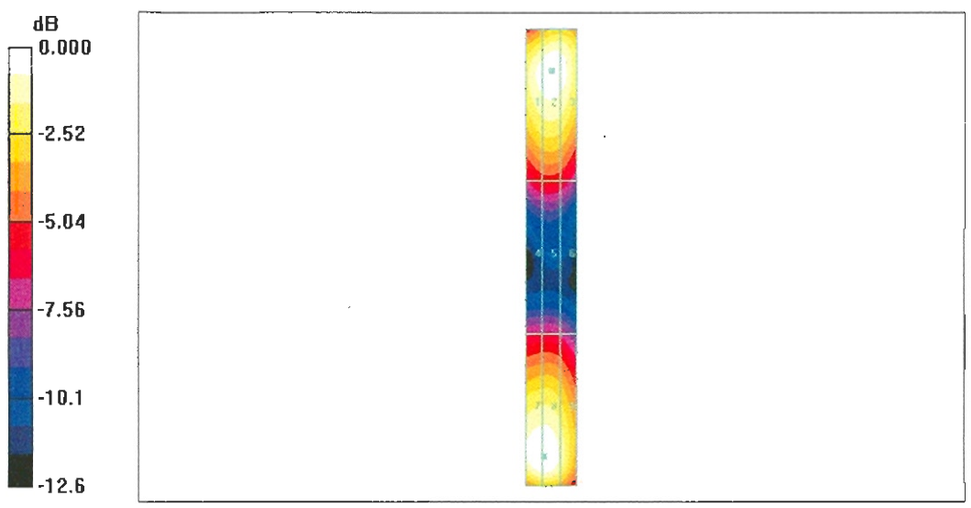
DASY4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 12/27/2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 3/1/2006
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 161.7 V/m
Probe Modulation Factor = 1.00
Reference Value = 107.2 V/m; Power Drift = 0.001 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **153.2**	Grid 2 **158.3**	Grid 3 **154.4**
Grid 4 **84.7**	Grid 5 **85.8**	Grid 6 **82.6**
Grid 7 **161.6**	Grid 8 **161.7**	Grid 9 **143.5**



0 dB = 161.7V/m