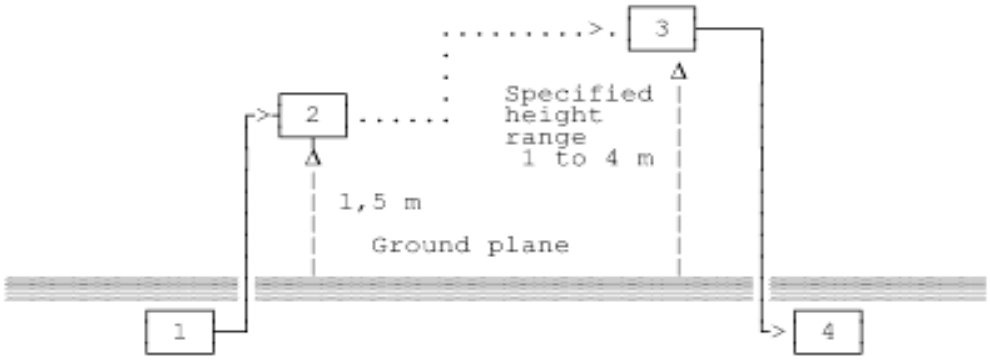
Substitution RF power measurement at ETS Dr Genz GmbH

General:
The applied substitution method follows ANSI/TIA/EIA-603, ANSI/TIA/EIA-102.CAAA or the appropriate ETSI rules respectively.
The actual signal generated by the EUT can be determined by means of a substitution measurement in which a known signal source replaces the device to be measured.



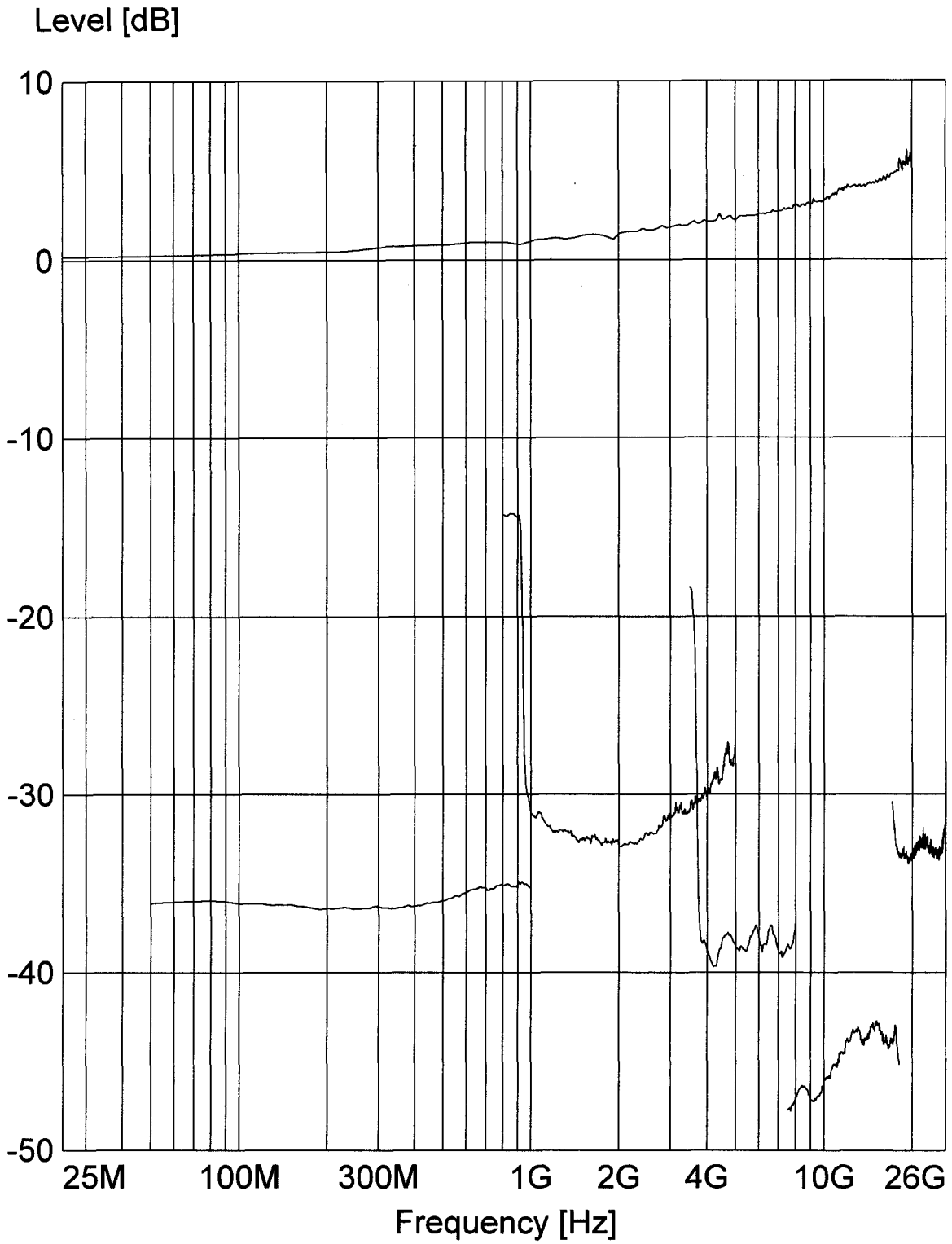
1) Signal generator;
2) Substitution antenna;
3) Test antenna;
4) Spectrum analyzer or selective voltmeter.

The substitution antenna replaces the transmitter antenna at the same position and in vertical polarization. The frequency of the signal generator shall be adjusted to the measurement frequency. The test antenna shall be raised or lowered, if necessary, to ensure that the maximum signal is still received. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the measurement receiver.
If a fully anechoic chamber is used as test site in order to provide free space conditions there is no need to change the height of the antenna.
The measurement will be repeated in horizontal position.

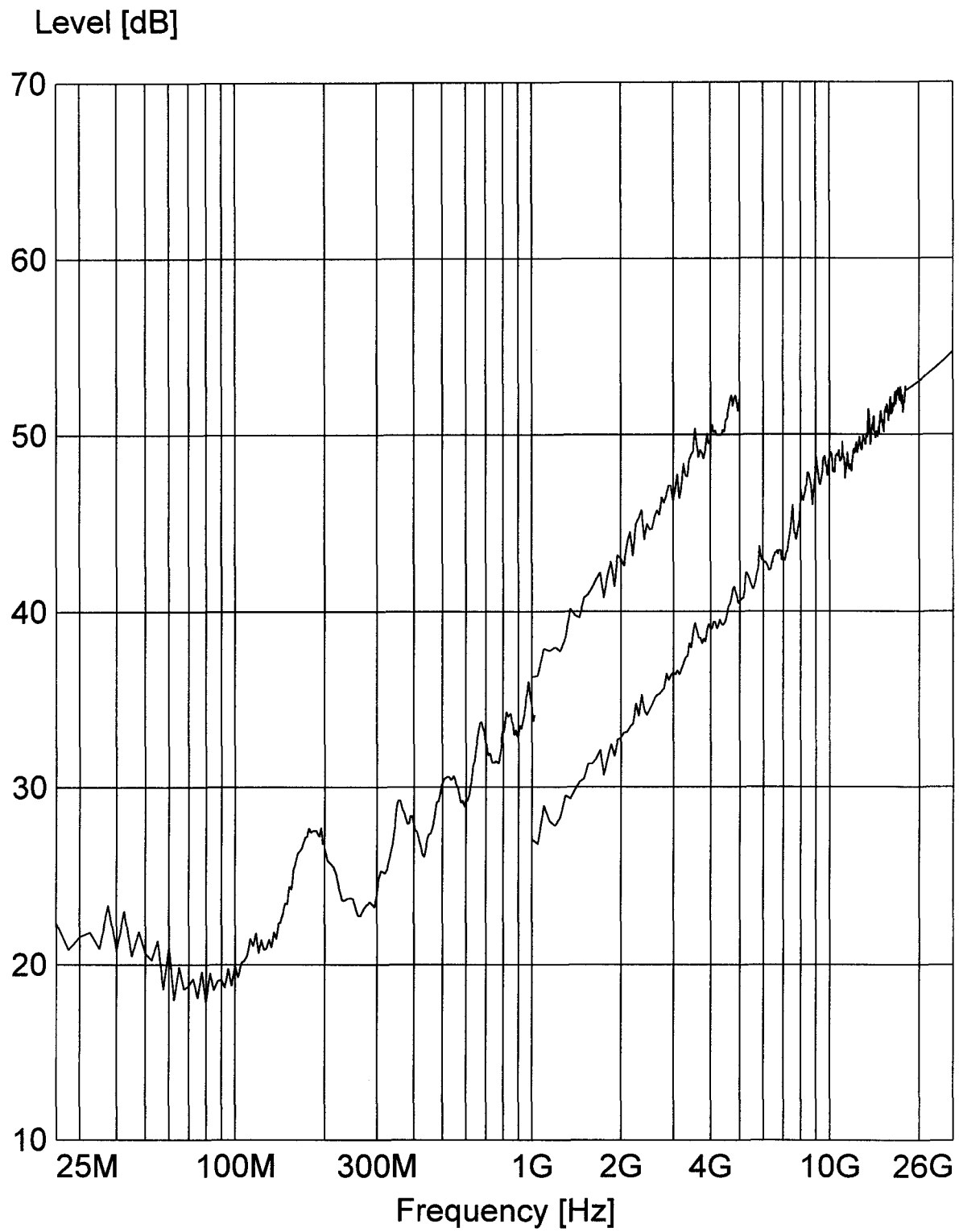
Calibration:
In order to make this kind of measurement more effective and to avoid subjective measurement faults, ETS has installed automatic computer controlled measurement procedures.
With the above described substitution method a test site is calibrated over the full frequency range which is used in suitable frequency steps. For a certain power level on the substitution antenna the received power over the whole frequency range is documented. All necessary antenna gains, cable losses, filter losses and amplifications of preamplifiers are taken in consideration. The summary of this calibration measurement performs a transducer factor that is related to the considered test site and a certain measurement distance. Differences of the radiated power levels of different test samples are determined by internal attenuation of the measurement receiver. The proper function of such test site will be maintained by short term plausibility checks and periodical re-calibration.

Testing:
Now the test sample will be put on the table at the defined position and the radiated power will be received and documented by the measurement receiver.
On test sites with ground plane the measurement antenna will be lowered and raised to maximum values at significant frequencies.
For peak power measurements the sample is turned by the turntable over 360 degree in order to find the direction with the maximum radiation or to document the max. reading with the MAXHOLD function during the rotation.
For average power measurement according standards as ANSI/TIA/EIA-603 the sample is measured in every 45-degree position of the turntable and the average value over this 8 single results will come to the final result.

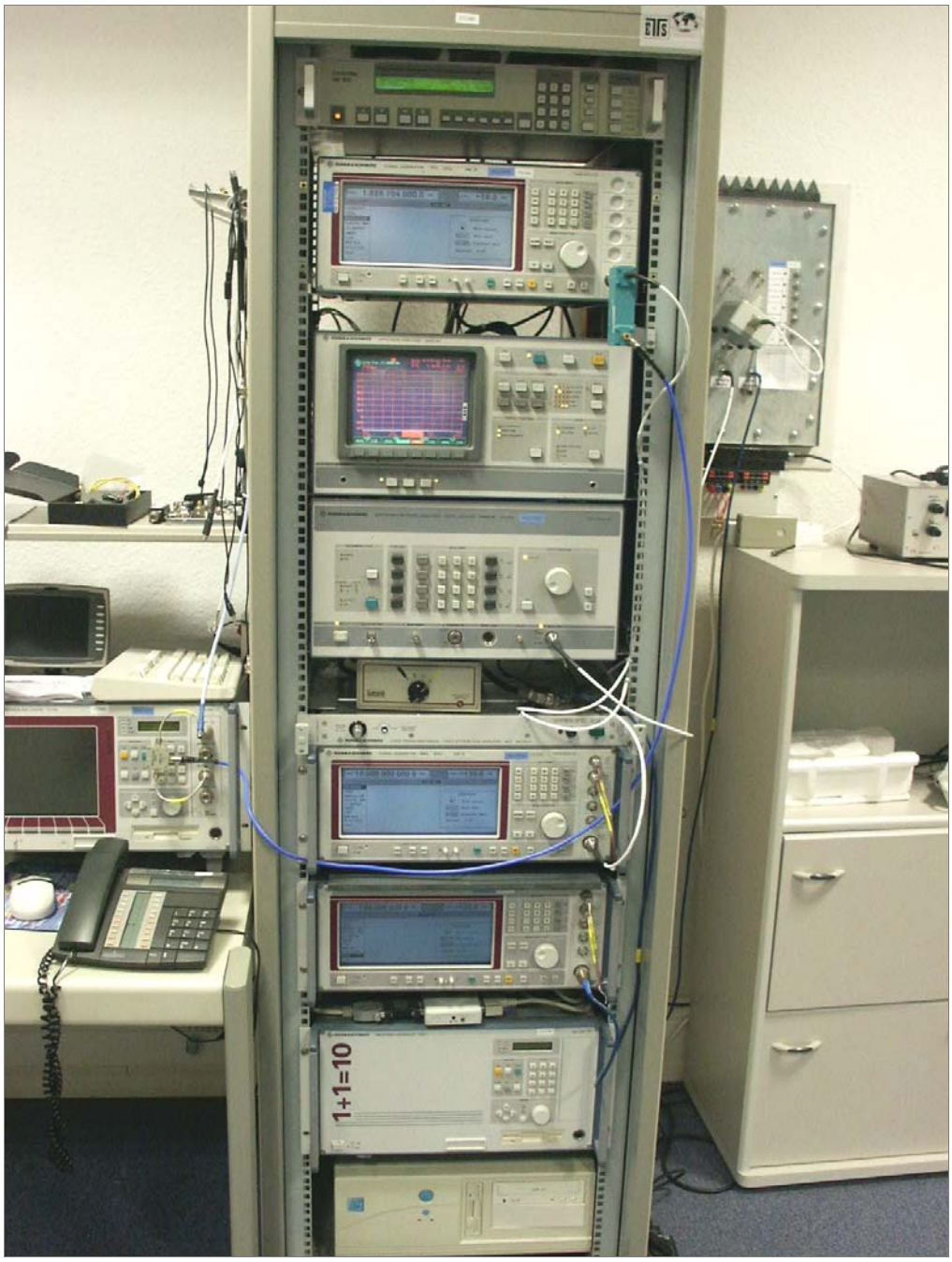
For JOB 1222GC2; QPBWM1080D peak power measurements were done.
In order to control the procedure above the test software ESK-1 of the test equipment manufacturer Rohde & Schwarz is used.
Please find enclosed diagram samples of real site transducers and pictures of used equipment.



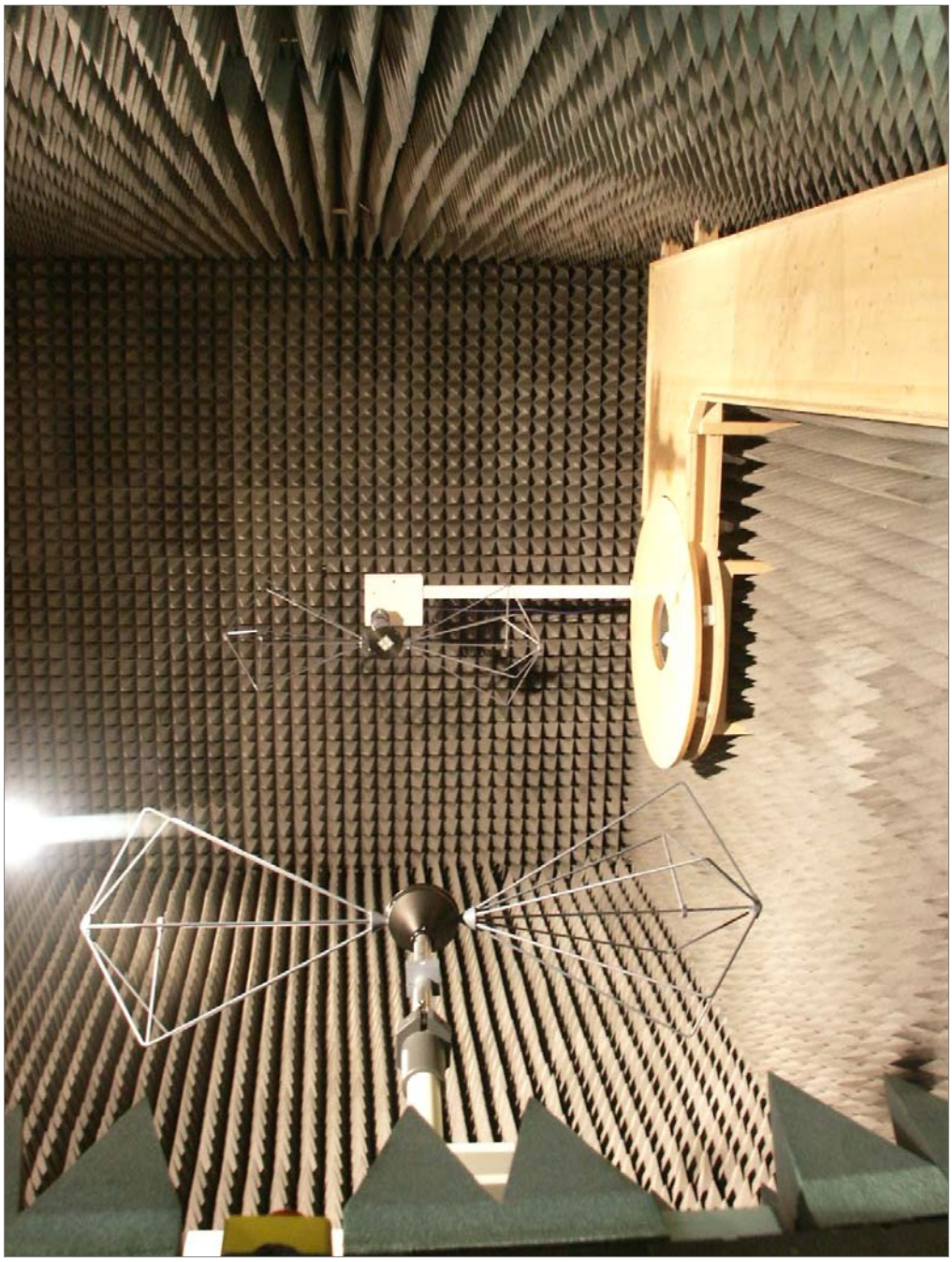
—— XTS matrix_direkt	Matrix-Eingang bis Hallenwand.
—— XTS matrix_0,05_1G	DECT- Matrix 0.05-1GHz
—— XTS matrix_1-4G	DECT- Matrix 0.8-5GHz
—— XTS matrix_4-8G	DECT- Matrix 3,5-8GHz
—— XTS matrix_8-18G	8-18GHz ohne Zusätze
—— XTS matrix_18-26G	18-26GHz ohne Zusätze



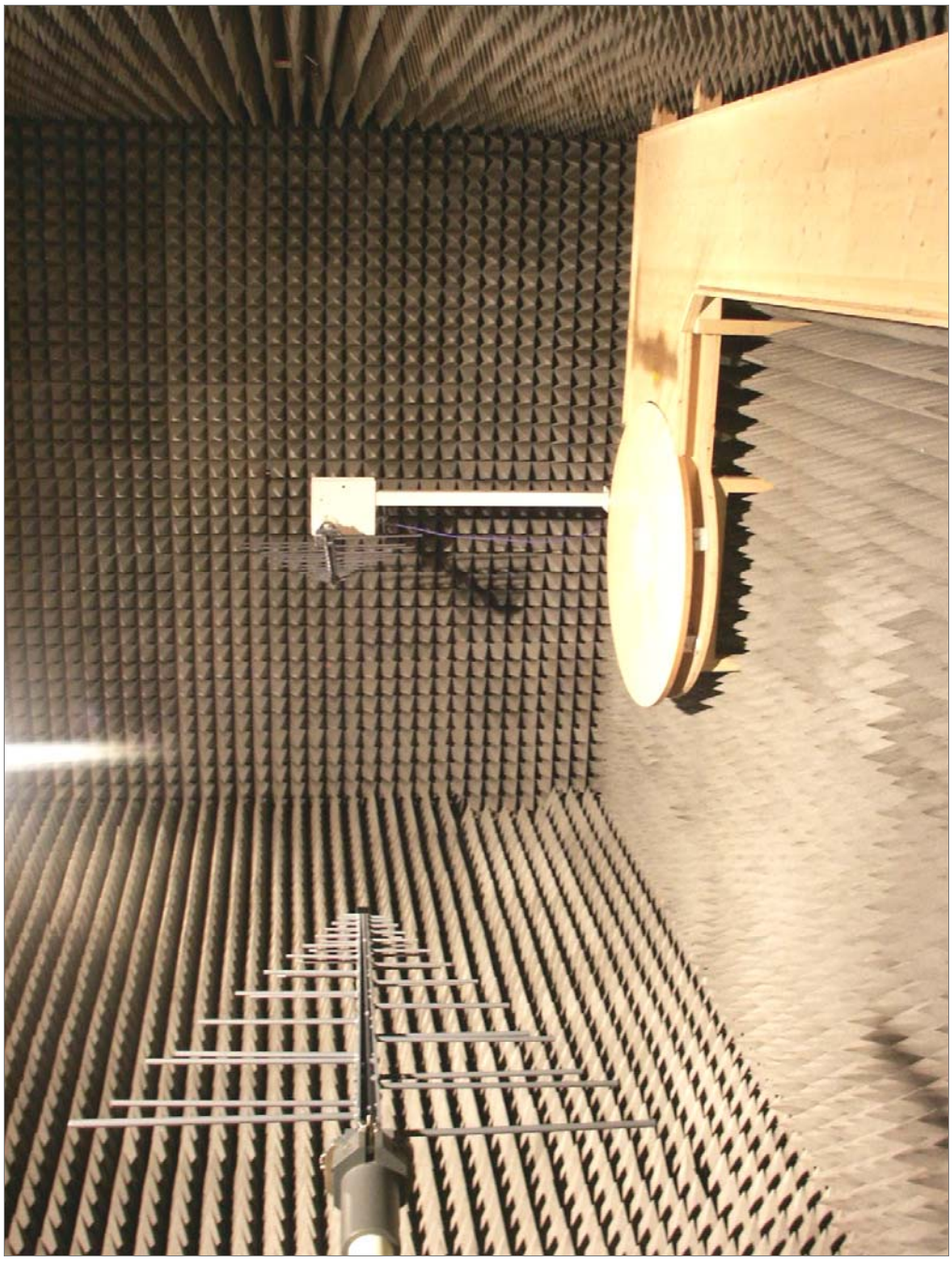
—— XTS	FD_200MHz_v	25-200MHz 3m direkt
—— XTS	FD_1000MHz_v	200-1000MHz 3m direkt
—— XTS	FD_4GHz_v	0.8-5GHz 3m direkt
—— XTS	FD_1-8GHz_v	1-8GHz 1m direkt
—— XTS	FD_8-18GHz_v	8-18GHz 1m direkt
—— XTS	FD_18-26GHz_v	18-26GHz 1m direkt


1+1=10

-ETS- DR. GENZ GMBH STORKOWER STRASSE 38c,D-15526 REICHENWALDE B. BERLIN
TELEPHONE +49-33631-888 00 TELEFAX +49-33631-888 660



-ETS- DR. GENZ GMBH STORKOWER STRASSE 38c,D-15526 REICHENWALDE B. BERLIN
TELEPHONE +49-33631-888 00 TELEFAX +49-33631-888 660



-ETS- DR. GENZ GMBH STORKOWER STRASSE 38c,D-15526 REICHENWALDE B. BERLIN
TELEPHONE +49-33631-888 00 TELEFAX +49-33631-888 660