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DECT-2020 New Radio (NR); Conformance Test Specification; Part 1: Radio Transmission and Reception

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Contents

Intellectual Property Rights	8
Foreword.....	8
Modal verbs terminology.....	8
1 Scope	9
2 References	9
2.1 Normative references	9
2.2 Informative references.....	9
3 Definition of terms, symbols and abbreviations.....	10
3.1 Terms.....	10
3.2 Symbols.....	10
3.3 Abbreviations	11
4 Common test environment	12
4.1 Environmental conditions.....	12
4.1.1 General.....	12
4.1.2 Temperature.....	12
4.1.3 Voltage.....	12
4.1.4 Vibration.....	13
4.2 Common requirements for test equipment	13
4.2.1 General.....	13
4.2.2 Functional requirements	13
4.3 Reference test conditions.....	13
4.3.1 Introduction.....	13
4.3.2 Test frequencies and test bandwidths.....	14
4.3.3 Radio conditions	14
4.3.3.1 Normal propagation condition	14
4.3.4 Transmission packet parameters	14
4.3.4.1 Antennas	14
4.3.4.2 Transmission configuration.....	14
4.3.4.2.1 Transmission packet structure	14
4.3.4.2.2 Physical control channel.....	14
4.3.4.2.3 Physical data channel	14
4.3.5 Signal levels.....	14
4.3.5.1 EUT signal levels.....	14
4.3.5.2 SS signal levels	15
4.3.6 Initial conditions	15
5 Exceptions	15
5.1 General	15
5.2 Transmission without STF cover sequence	15
6 RF tests.....	15
6.1 Transmitter tests	15
6.1.1 Transmit power	15
6.1.1.1 Maximum output power	15
6.1.1.1.1 Test purpose	15
6.1.1.1.2 Test applicability	15
6.1.1.1.3 Test description	16
6.1.1.1.4 Test requirement.....	16
6.1.1.2 Transmit absolute power tolerance	16
6.1.1.2.1 Test purpose	16
6.1.1.2.2 Test applicability	16
6.1.1.2.3 Test description	17
6.1.1.2.4 Test requirement.....	17
6.1.1.3 Transmit OFF power	17
6.1.1.3.1 Test purpose	17

6.1.1.3.2	Test applicability	17
6.1.1.3.3	Test description	18
6.1.1.3.4	Test requirement	18
6.1.1.4	Transmit ON/OFF time mask	18
6.1.1.4.1	Test purpose	18
6.1.1.4.2	Test applicability	18
6.1.1.4.3	Test description	18
6.1.1.4.4	Test requirement	19
6.1.2	Transmit signal quality	19
6.1.2.1	Centre frequency	19
6.1.2.1.1	Test purpose	19
6.1.2.1.2	Test applicability	19
6.1.2.1.3	Test description	20
6.1.2.1.4	Test requirement	20
6.1.2.2	Carrier leakage	20
6.1.2.2.1	Test purpose	20
6.1.2.2.2	Test applicability	20
6.1.2.2.3	Test description	21
6.1.2.2.4	Test requirement	21
6.1.2.3	Error vector magnitude	21
6.1.2.3.1	Test purpose	21
6.1.2.3.2	Test applicability	22
6.1.2.3.3	Test description	22
6.1.2.3.4	Test requirement	22
6.1.2.4	Transmitter spectrum flatness	22
6.1.2.4.1	Test purpose	22
6.1.2.4.2	Test applicability	23
6.1.2.4.3	Test description	23
6.1.2.4.4	Test requirement	23
6.1.3	Spectrum emissions	24
6.1.3.1	Occupied bandwidth	24
6.1.3.1.1	Test purpose	24
6.1.3.1.2	Test applicability	24
6.1.3.1.3	Test description	24
6.1.3.1.4	Test requirement	25
6.1.3.2	Out of band emissions	25
6.1.3.2.1	Test purpose	25
6.1.3.2.2	Test applicability	25
6.1.3.2.3	Test description	25
6.1.3.2.4	Test requirement	26
6.1.3.3	Adjacent channel leakage ratio	27
6.1.3.3.1	Test purpose	27
6.1.3.3.2	Test applicability	27
6.1.3.3.3	Test description	27
6.1.3.3.4	Test requirement	27
6.1.3.4	Spurious emissions	28
6.1.3.4.1	Test purpose	28
6.1.3.4.2	Test applicability	28
6.1.3.4.3	Test description	28
6.1.3.4.4	Test requirement	28
6.2	Receiver tests	29
6.2.1	Receiver dynamic range and selectivity	29
6.2.1.1	Sensitivity	29
6.2.1.1.1	Test purpose	29
6.2.1.1.2	Test applicability	29
6.2.1.1.3	Test description	29
6.2.1.1.4	Test requirement	30
6.2.1.2	Maximum input level	30
6.2.1.2.1	Test purpose	30
6.2.1.2.2	Test applicability	30
6.2.1.2.3	Test description	30
6.2.1.2.4	Test requirement	31

6.2.1.3	Adjacent channel selectivity.....	31
6.2.1.3.1	Test purpose	31
6.2.1.3.2	Test applicability	31
6.2.1.3.3	Test description	31
6.2.1.3.4	Test requirement	32
6.2.2	Blocking characteristics	32
6.2.2.1	In-band blocking	32
6.2.2.1.1	Test purpose	32
6.2.2.1.2	Test applicability	32
6.2.2.1.3	Test description	32
6.2.2.1.4	Test requirement	33
6.2.2.2	Out of band blocking.....	33
6.2.2.2.1	Test purpose	33
6.2.2.2.2	Test applicability	34
6.2.2.2.3	Test description	34
6.2.2.2.4	Test requirement	34
6.2.2.3	Spurious response	35
6.2.2.3.1	Test purpose	35
6.2.2.3.2	Test applicability	35
6.2.2.3.3	Test description	35
6.2.2.3.4	Test requirement	36
6.2.3	Intermodulation characteristics	36
6.2.3.1	Wide band intermodulation	36
6.2.3.1.1	Test purpose	36
6.2.3.1.2	Test applicability	36
6.2.3.1.3	Test description	36
6.2.3.1.4	Test requirement	37
6.2.4	Spectrum emissions	37
6.2.4.1	Spurious emissions.....	37
6.2.4.1.1	Test purpose	37
6.2.4.1.2	Test applicability	37
6.2.4.1.3	Test description	38
6.2.4.1.4	Test requirement	38
6.2.5	Receiver measurements	38
6.2.5.1	RSSI-1 measurement.....	38
6.2.5.1.1	Test purpose	38
6.2.5.1.2	Test applicability	39
6.2.5.1.3	Test description	39
6.2.5.1.4	Test requirement	39
6.2.5.2	RSSI-2 measurement.....	40
6.2.5.2.1	Test purpose	40
6.2.5.2.2	Test applicability	40
6.2.5.2.3	Test description	40
6.2.5.2.4	Test requirement	40
6.2.5.3	SNR measurement.....	41
6.2.5.3.1	Test purpose	41
6.2.5.3.2	Test applicability	41
6.2.5.3.3	Test description	41
6.2.5.3.4	Test requirement	41

Annex A (informative): Test System.....42

A.1 Introduction.....42

Annex B (normative): Receiver testing pass/fail limits.....47

B.1 Statistical testing of receiver characteristics.....47

B.1.1 Description

B.1.2 Mapping the throughput to error ratio

B.1.2.1 Defining throughput and bitrate.....47

B.1.2.2 Mapping the ACK/NACK to error ratio

B.1.2.3 Mapping the received packet count to error ratio

B.1.3 Design of the test.....48

B.1.4	Numerical definition of the pass-fail limits	48
B.1.5	Pass-Fail decision rules	49
B.2	No loss of transmission testing of receiver characteristics.....	50
B.2.1	Description	50
B.2.2	Pass-Fail decision rules	50
Annex C (normative):	Measurement uncertainties and test tolerances	51
C.1	Acceptable uncertainty of Test System	51
C.1.1	Measurement of test environment	51
C.1.2	Measurement of transmitter.....	51
C.1.3	Measurement of receiver	52
C.2	Interpretation of measurement results	53
Annex D (normative):	Test sites and arrangements for radiated measurements.....	54
D.1	Introduction	54
D.2	Radiation test sites.....	54
D.2.1	Open Area Test Site (OATS)	54
D.2.2	Semi Anechoic Room (SAR)	55
D.2.3	Fully Anechoic Room (FAR)	56
D.2.4	Measurement Distance	57
D.3	Antennas.....	58
D.3.1	Introduction	58
D.3.2	Measurement antenna.....	58
D.3.3	Substitution antenna	58
D.4	Test fixture	58
D.4.1	Introduction	58
D.4.2	Description of the test fixture.....	58
D.4.3	Using the test fixture for relative measurements	59
D.5	Guidance on the use of radiation test sites	59
D.5.1	Introduction	59
D.5.2	Power supplies for the battery powered EUT.....	59
D.5.3	Site preparation	60
D.6	Coupling of signals.....	60
D.6.1	General	60
D.6.2	Data Signals.....	60
Annex E (normative):	Procedures for radiated measurements	61
E.1	Introduction	61
E.2	Radiated measurements in an OATS or SAR.....	61
E.3	Radiated measurements in a FAR	62
E.4	Substitution measurement	62
Annex F (normative):	EUT special conformance test functions.....	63
F.1	General description.....	63
F.1.1	Introduction	63
F.1.2	Test standby mode.....	63
F.1.3	Security protection of test control messages	63
F.1.4	Protocol implementation extra information for testing.....	63
F.2	Test standby mode procedures	64
F.2.1	General	64
F.2.2	Connection establishment procedure.....	64
F.2.3	Test control procedure	64
F.3	EUT test modes	65

F.3.1	General description.....	65
F.3.1.1	Overview	65
F.3.1.2	EUT measurement mode	65
F.3.1.3	EUT loop mode.....	65
F.3.2	Common transmission parameters.....	65
F.4	EUT measurement mode procedures	66
F.4.1	General	66
F.4.2	Measurement mode activation.....	66
F.4.3	Measurement mode A (RSSI-1)	66
F.4.3.1	Measurement mode A operation	66
F.4.3.2	Measurement mode A reporting	66
F.4.4	Measurement mode B (packet reception).....	66
F.4.4.1	Measurement mode B operation	66
F.4.4.2	Measurement mode B reporting.....	67
F.5	EUT loop mode procedures.....	67
F.5.1	General	67
F.5.2	Loop mode activation.....	67
F.5.3	Transmit loop mode operation.....	67
F.5.4	Receive loop mode operation	68
F.6	Test protocol messages.....	69
F.6.1	General	69
F.6.1.1	Message structure	69
F.6.1.2	Message codes	69
F.6.2	Test control messages.....	69
F.6.2.1	TEST_CONTROL_BEACON.....	69
F.6.2.2	TEST_CONTROL_CONNECT	70
F.6.2.3	TEST_CONTROL_CONNECT_COMPLETE	70
F.6.3	Measurement control messages.....	70
F.6.3.1	ACTIVATE_MEASUREMENT_MODE	70
F.6.3.2	ACTIVATE_MEASUREMENT_MODE_COMPLETE	70
F.6.3.3	DEACTIVATE_MEASUREMENT_MODE	71
F.6.4	Measurement report messages.....	71
F.6.4.1	REPORT_MEASUREMENT_MODE_A	71
F.6.4.2	REPORT_MEASUREMENT_MODE_B	71
F.6.5	Loop control messages	71
F.6.5.1	ACTIVATE_TX_LOOP_MODE.....	71
F.6.5.2	ACTIVATE_TX_LOOP_MODE_COMPLETE	72
F.6.5.3	ACTIVATE_RX_LOOP_MODE.....	72
F.6.5.4	ACTIVATE_RX_LOOP_MODE_COMPLETE	73
F.6.5.5	DEACTIVATE_LOOP_MODE	73
F.6.6	Loop report messages.....	74
F.6.6.1	REPORT_TX_LOOP_MODE.....	74
F.6.6.2	REPORT_RX_LOOP_MODE	74
F.6.7	Loop action messages.....	74
F.6.7.1	General.....	74
F.6.7.2	TX_LOOP_MODE_DATA.....	74
F.6.7.3	RX_LOOP_MODE_DATA.....	75
F.6.7.4	RX_LOOP_MODE_DATA_RESPONSE.....	75
Annex G (normative):	Radio ICS pro forma for DECT-2020 NR Equipment.....	76
G.0	The right to copy	76
G.1	Introduction	76
G.2	Pro forma tables	77
G.2.1	Baseline Implementation Capabilities	77
G.2.2	PHY Implementation Capabilities.....	78
Annex H (informative):	Change history	81
History		82

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Digital Enhanced Cordless Telecommunications (DECT).

The present document is part 2 of a multi-part deliverable covering the conformance test specifications of DECT-2020 New Radio (NR); Conformance Test Specification, as identified below:

Part 1: "Radio Transmission and Reception";

Part 2: "Radio Protocols".

Modal verbs terminology

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1 Scope

The present document is one of the parts of the radio conformance test specification for DECT-2020 New Radio (NR) radio device.

The present document specifies radio device radio transmission and reception conformance testing based on [2] and [3]. Further, the present document defines the test conditions, test configurations, and requirement for testing functions and a test system, to be used for radio transmission and reception conformance testing.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

- [1] [ETSI TS 103 636-2](#): "DECT-2020 New Radio (NR); Part 2: Radio reception and transmission requirements".
- [2] [ETSI TS 103 636-3](#): "DECT-2020 New Radio (NR); Part 3: Physical layer".
- [3] [ETSI TS 103 636-4](#): "DECT-2020 New Radio (NR); Part 4: MAC layer".
- [4] [ETSI TS 104 047-2](#): "DECT-2020 New Radio (NR); Conformance Test Specification; Part 2: Radio Protocols".
- [5] [IEC 60068-2-1](#): "Environmental testing - Part 2-1: Tests - Test A: Cold".
- [6] [IEC 60068-2-2](#): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".

2.2 Informative references

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The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

- [i.1] ETSI ETR 273-1-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties; Part 1: Uncertainties in the measurement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes".
- [i.2] ETSI TR 100 028-1 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".

- [i.3] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.4] ETSI TR 102 273-2 (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 2: Anechoic chamber".
- [i.5] ETSI TR 102 273-3 (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 3: Anechoic chamber with a ground plane".
- [i.6] ETSI TR 102 273-4 (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 4: Open area test site".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

Equipment Under Test (EUT): RD under test

Fixed Termination (FT): operational mode of RD where RD initiates coordinates local radio resources, provides information how other RDs may connect and communicate with it

operating channel: single continuous part of radio spectrum with a defined bandwidth where RDs transmits and/or receives

Portable Termination (PT): operational mode of RD where RD selects another RD, which is in FT mode, for association

Radio Device (RD): device with radio transmission and reception capability, which can operate in FT mode, PT mode or FT/PT mode.

resource: variable length time unit defined in subslot(s) or slot(s) in single operating channel that RD is using for transmission or reception of physical layer packet

System Simulator (SS): device or system, that can generate RD test signals and EUT control signalling and analysing EUT signalling responses on one or more RF channels, in order to create the required test environment for the EUT

NOTE: See more details in Annex A.

Test System (TS): combination of devices brought together into a system for the purpose of making one or more measurements on a EUT in accordance with the test case requirements

NOTE: See more details in Annex A.

3.2 Symbols

B_N	Nominal channel bandwidth as specified in ETSI TS 103 636-2 [1]
B_T	Transmission bandwidth as specified in ETSI TS 103 636-2 [1]
B_O	Occupied channel bandwidth as specified in ETSI TS 103 636-2 [1]
CW	Continuous Wave
F_{BL}	Frequency band low edge
F_{BH}	Frequency band high edge
f_i	Interfering signal frequency

N_{occ}	Number of occupied subcarriers for given Fourier transform scaling factor as specified in ETSI TS 103 636-3 [2]
N_{sym}	Number of OFDM symbols
RD _{FT}	RD operating in FT mode
RD _{PT}	RD operating in PT mode
RD _{FT,PT}	RD operating in both FT and PT mode

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACK	Acknowledgement
ACS	Adjacent Channel Selectivity
AWGN	Additive White Gaussian Noise
BPSK	Binary Phase Shift Keying
BW	Bandwidth
CRC	Cyclic Redundancy Check
CW	Continuous Wave
e.i.r.p.	effective isotropic radiated power
e.r.p.	effective radiated power
EFTA	European Free Trade Association
EUT	Equipment Under Test
FAR	Fully Anechoic Room
FT	Fixed Termination
HARQ	Hybrid Automatic Repeat Request
LPDA	Logarithmic Periodic Dipole Antennas
NACK	Negative Acknowledgement
NF	Noise Figure
NR	New Radio
OATS	Open Area Test Site
OOB	Out Of Band
PER	Packet Error Rate
PT	Portable Termination
QPSK	Quadrature Phase-Shift Keying
RBW	Resolution Bandwidth
RD	Radio Device
RF	Radio Frequency
RMS	Root Mean Square
RSSI-1	Radio Signal Strength Indicator 1
RSSI-2	Radio Signal Strength Indicator 2
SAR	Semi Anechoic Room
SNR	Signal to Noise Ratio
SS	System Simulator
TBS	Transport Block Size
TH	Temperature High
TL	Temperature Low
TS	Test System
VBW	Video Bandwidth
VH	Voltage High
VL	Voltage Low
VSWR	Voltage Standing Wave Ratio

4 Common test environment

4.1 Environmental conditions

4.1.1 General

The requirements in this clause apply to all types of RD(s). Physical layer radio conformance testing is based on specific testing software which enables EUT and SS to communicate over the air and configure physical layer to desired operating mode enabling both conducted and radiated testing modes. Therefore, testing software is only used for physical layer conformance testing purposes and it is not for devices (EUT) intended use.

4.1.2 Temperature

The normative reference for this requirement is ETSI TS 103 636-2 [1], clause C.2.

The RD shall fulfil all the requirements in the full temperature range of:

Table 4.1.2-1: Temperature Test Environment

+15 °C to +35 °C	for normal conditions (with relative humidity up to 75 %)
-10 °C to +55 °C	for extreme conditions (see IEC 60068-2-1 [5] and IEC 60068-2-2 [6])

Outside this temperature range the RD, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the RD exceed the maximum transmission power level of the transmission band for extreme operation defined in ETSI TS 103 636-2 [1].

Some tests are performed also in extreme temperature conditions. These test conditions are denoted as TL (temperature low, -10 °C) and TH (temperature high, +55 °C).

4.1.3 Voltage

The normative reference for this requirement is ETSI TS 103 636-2 [1], clause C.3.

The RD shall fulfil all the requirements in the full voltage range, i.e. the voltage range between the extreme voltages.

The manufacturer shall declare the lower (VL) and higher extreme (VH) voltages and the approximate shutdown voltage. For the equipment that can be operated from one or more of the power sources listed below, the lower extreme voltage shall not be higher, and the higher extreme voltage shall not be lower than that specified below.

Table 4.1.3-1: Voltage Test Environment

Power source	Lower extreme voltage	Higher extreme voltage	Normal conditions voltage
AC mains	0,9 × nominal	1,1 × nominal	nominal
Regulated lead acid battery	0,9 × nominal	1,3 × nominal	1,1 × nominal
Non regulated batteries:			
Lithium	0,95 × nominal	1,1 × nominal	1,1 × nominal
Mercury/nickel & cadmium	0,90 × nominal		nominal
Other	0,85 × nominal		nominal

Outside this voltage range the RD if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the RD exceed the transmitted levels as defined in ETSI TS 103 636-2 [1] for extreme operation.

In particular, the RD shall inhibit all RF transmissions when the power supply voltage is below the manufacturer declared shutdown voltage.

Some tests are performed also in extreme voltage conditions. These test conditions are denoted as VL (lower extreme voltage) and VH (higher extreme voltage).

4.1.4 Vibration

The normative reference for this requirement is ETSI TS 103 636-2 [1], clause C.4.

The RD shall fulfil all requirements during vibration defined in Table 4.1.4-1.

Table 4.1.4-1: Vibration

Frequency	ASD (Acceleration Spectral Density) random vibration
5 Hz to 20 Hz	0,96 m ² /s ³
20 Hz to 500 Hz	0,96 m ² /s ³ at 20 Hz, thereafter -3 dB/Octave

Outside this vibration range the radio device, if powered on, shall not make ineffective use of the radio frequency spectrum.

4.2 Common requirements for test equipment

4.2.1 General

RD radio conformance testing can be categorized into 2 distinct areas:

- Radio Transmission, clause 6.1
- Radio Reception, clause 6.2

The Test System (TS) required for each category of testing may or not be different, depending on the supplier of the test equipment. However, there will be some generic requirements of the test equipment that are essential for these two categories of test, and these are specified in this clause. TS is defined in Annex A.

TS shall use the same number of Tx antennas for all parts of the tests, initial condition and test procedure, as specified in the minimum requirement.

Physical layer conformance testing is based on Equipment Under Test (EUT) applying a specific testing software or a test mode within a software which enables EUT and SS to communicate over the air and configure physical layer to desired operating mode enabling both conducted and radiated testing modes for testing purposes.

The Minimum Requirements defined in each test make no allowance for Measurement Uncertainty. Therefore, Test Tolerances are used to relax the Minimum Requirements. The Test Tolerance for each test and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex C.

4.2.2 Functional requirements

The Test System (TS) shall provide (for the mode(s) supported) the following minimum functionality for the specific test:

- To select and support appropriate radio configuration from TS towards EUT
- To set the appropriate transmission power levels
- To set-up and support appropriate reverse radio configuration from the EUT to the TS

4.3 Reference test conditions

4.3.1 Introduction

This clause contains the reference test conditions which apply to all test cases unless otherwise specified.

4.3.2 Test frequencies and test bandwidths

The test frequencies are based on the ETSI TS 103 636-2 [1] frequency bands and channel raster.

The frequencies to be tested are the lowest and highest frequency channels of each operating band supported by the EUT. Each operating band supported by the EUT shall be tested.

All nominal bandwidths supported by the EUT on the given band shall be tested. If EUT supports multiple numerologies for given nominal bandwidth, all numerologies according to ETSI TS 103 636-3 [2], clause 4.3, shall be tested.

Actual test configurations are specified case by case and stated in test case itself as the initial conditions.

4.3.3 Radio conditions

4.3.3.1 Normal propagation condition

In normal propagation condition the downlink connection between the System Simulator (SS) and the EUT is without Additive White Gaussian Noise (AWGN) and has no fading or multipath effects.

The uplink connection between the EUT and SS is without AWGN and has no fading or multipath effects.

4.3.4 Transmission packet parameters

4.3.4.1 Antennas

If the EUT has one Rx antenna, the downlink signal is applied to it.

If the EUT has more than one Rx antenna, the same downlink signal is applied to each one. All EUT Rx antennas shall be connected unless otherwise stated in the test case.

4.3.4.2 Transmission configuration

4.3.4.2.1 Transmission packet structure

Transmission packet, ETSI TS 103 636-3 [2], clause 5.1, for the purposes of testing shall consist of a data packet with two sub-slots unless otherwise specified in a test case.

4.3.4.2.2 Physical control channel

Physical layer control field shall consist of ETSI TS 103 636-4 [3], clause 6.2.1 of type 2, format 0 appropriately encoded and mapped to PCC as specified in ETSI TS 103 636-3 [2], clause 7.5.

4.3.4.2.3 Physical data channel

The Physical Data SDU consists of test protocol messages specified in clause F.6 and zero or random data generated from PN15 sequence as specified in clause F.6 appropriately encoded and mapped to PDC as specified in ETSI TS 103 636-3 [2], clause 7.6.

4.3.5 Signal levels

4.3.5.1 EUT signal levels

The received power at EUT Rx antenna connector $-70 \text{ dBm} + 10\log_{10}(B_N/1,728 \text{ MHz})$ shall be used unless otherwise specified in a test case.

4.3.5.2 SS signal levels

The received power at SS Rx antenna connector $-70 \text{ dBm} + 10\log_{10}(B_N/1,728 \text{ MHz})$ shall be used unless otherwise specified in a test case.

4.3.6 Initial conditions

Initial conditions are described for each of the test cases. Initial conditions are a set of test configurations the EUT needs to be tested in and the steps for the SS to take with the EUT to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, channel bandwidths and physical channel configurations(s) based on EUT operating bands specified in manufacturers declaration. All these configurations shall be tested with applicable test parameters for each channel bandwidth.

5 Exceptions

5.1 General

This clause defines possible exceptions for specific needs of the test cases defined clause 6 of the present document.

5.2 Transmission without STF cover sequence

In the case of Test System or SS being incapable synchronization and analysis of EUT transmit signal with STF cover sequence as specified in ETSI TS 103 636-3 [2], clause 6.3.7, only for the purpose of testing, EUT may have capability of transmission without STF cover sequence. Test cases where transmission without cover sequence may be enabled are indicated within the test cases defined in clause 6.1. When test systems are supporting cover sequence, this exception shall not be used.

NOTE: As DECT-2020 NR is relatively new radio standard this exception is allowed when test equipment can synchronize to periodic synchronization signal but cannot synchronize to periodic synchronization signal with a cover sequence. This is the likely scenario when test equipment is capable of generic OFDM signal analysis but does not have DECT-2020 NR specific extensions.

6 RF tests

6.1 Transmitter tests

6.1.1 Transmit power

6.1.1.1 Maximum output power

6.1.1.1.1 Test purpose

To verify that the error of the EUT maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

6.1.1.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.1.1.3 Test description

6.1.1.1.3.1 Initial conditions

Table 6.1.1.1.3.1-1: Initial conditions for EUT maximum output power

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	Maximum transmission power supported, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation specifying 23 dBm transmission power to be used by the EUT.

6.1.1.1.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS. EUT shall use maximum transmission power allowed by the RD power class supported by the EUT.
- 2) TS measures the mean power of the EUT transmission within the nominal bandwidth B_N . Only the active transmission part of the transmission packet without any transient periods is used in the measurement.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.1.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.2.1 and test tolerance in Table C.1.2-1 of the present document. The following RD power classes defines the maximum output power for any nominal bandwidth B_N .

Table 6.1.1.1.4-1: Maximum output power requirement

RD power class	Test limit	Test Tolerance
Class I	23 dBm	Table C.1.2-1
Class II	21 dBm	
Class III	19 dBm	
Class IV	10 dBm	

6.1.1.2 Transmit absolute power tolerance

6.1.1.2.1 Test purpose

To verify that the error of the EUT output power does not exceed the range prescribed by the output power tolerance.

6.1.1.2.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.1.2.3 Test description

6.1.1.2.3.1 Initial conditions

Table 6.1.1.2.3.1-1: Initial conditions for transmit absolute power tolerance tests

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	All transmit powers defined in ETSI TS 103 636-4 [3], Table 6.2.1-3a or 6.2.1-3b according to the EUT power class, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation.

6.1.1.2.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the mean power of the EUT transmission within the nominal bandwidth B_N . Only the active transmission part of the transmission packet without any transient periods is used in the measurement.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.1.2.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.3.1 and test tolerance in Table C.1.2-1 of the present document.

Table 6.1.1.2.4-1: Transmit absolute power tolerance requirement

Power level	Tolerance	Tolerance on extreme conditions	Test Tolerance
≥ 0 dBm	$\pm 2,0$ dB	$\pm 3,0$ dB	Table C.1.2-1
< 0 dBm	$\pm 3,0$ dB	$\pm 4,0$ dB	

6.1.1.3 Transmit OFF power

6.1.1.3.1 Test purpose

To verify that the EUT transmit OFF power is lower than the value specified in the test requirement.

6.1.1.3.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.1.3.3 Test description

This test is covered by clause 6.1.1.4 Transmit ON/OFF time mask.

6.1.1.3.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.3.4 and test tolerance in Table C.1.2-1 of the present document.

Table 6.1.1.3.4-1: Transmit OFF power requirement

Test high limit	Test Tolerance
−50 dBm	Table C.1.2-1

6.1.1.4 Transmit ON/OFF time mask

6.1.1.4.1 Test purpose

To verify that the ON/OFF time mask meets the ramping time allowed for the EUT between transmit OFF power and transmit ON power.

6.1.1.4.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.1.4.3 Test description

6.1.1.4.3.1 Initial conditions

Table 6.1.1.4.3.1-1: Initial conditions for transmit on/off time mask

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	Maximum transmission power supported, Table G.2.1-3
Modulation and coding schemes	MCS1

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation.

6.1.1.4.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the mean power before and after the EUT transmission packet within the nominal bandwidth B_N . Only the non-active transmission part of the transmission packet without any transient periods is used in the measurement as depicted in Figure 6.1.1.4.4-1.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.1.4.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.3.5 and test tolerance in Table C.1.2-1 of the present document. The OFF-power measurement period is defined as a duration of at least one slot before and after of transmission excluding any transient periods. The TX ON/OFF transient period length shall be no longer than Guard Interval (GI) defined in ETSI TS 103 636-2 [1] and in ETSI TS 103 636-3 [2], clause 5.2.1.

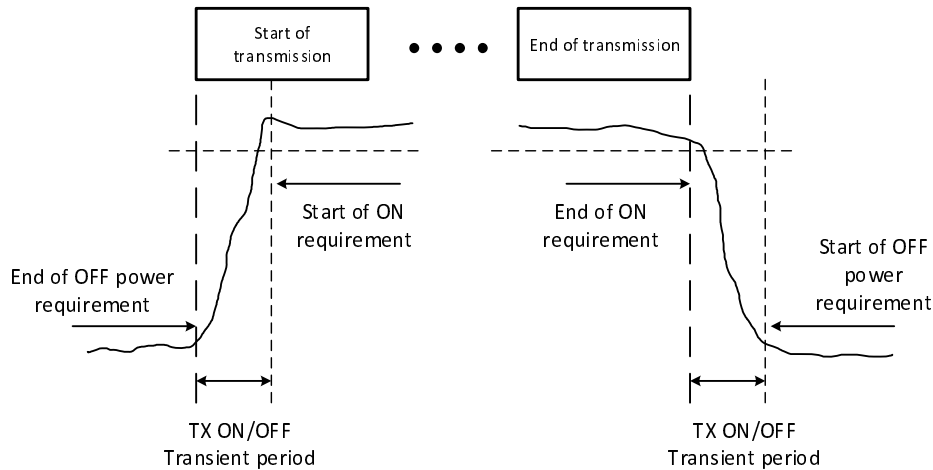


Figure 6.1.1.4.4-1: Transmit ON/OFF time mask

Table 6.1.1.4.4-1: Transmit OFF power requirement

Test limit	Test Tolerance
-50 dBm	Table C.1.2-1

6.1.2 Transmit signal quality

6.1.2.1 Centre frequency

6.1.2.1.1 Test purpose

To verify the ability of the transmitter to generate modulated carrier frequency with lower error than specified in test requirement.

6.1.2.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.2.1.3 Test description

6.1.2.1.3.1 Initial conditions

Table 6.1.2.1.3.1-1: Initial conditions for carrier centre frequency test

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	All transmit powers defined in ETSI TS 103 636-4 [3], Table 6.2.1-3a or 6.2.1-3b according to the EUT power class, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation. The SS may set the EUT to transmit without cover sequence according to clause 5.2.

6.1.2.1.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the centre frequency of the EUT transmission.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.2.1.4 Test requirement

Normative minimum requirement is specified in ETSI TS 103 636-2 [1], clause 6.4.1 and test tolerance in Table C.1.2-1 of the present document for any single transmitted packet.

Table 6.1.2.1.4-1: Centre frequency requirement

Test limit	Test Tolerance
±10 ppm	Table C.1.2-1

6.1.2.2 Carrier leakage

6.1.2.2.1 Test purpose

To verify the EUT transmitter modulation quality in terms of carrier leakage.

Carrier leakage expresses itself as unmodulated sine wave with the carrier frequency. It is an interference of approximately constant amplitude and independent of the amplitude of the wanted signal. Carrier leakage interferes with the centre sub carriers of the EUT, especially, when their amplitude is small.

6.1.2.2.2 Test applicability

This test case applies to all types of DECT-2020 NR release 2 RD and forward.

6.1.2.2.3 Test description

6.1.2.2.3.1 Initial conditions

Table 6.1.2.2.3.1-1: Initial conditions for carrier leakage tests

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	All transmit powers defined in ETSI TS 103 636-4 [3], Table 6.2.1-3a or 6.2.1-3b according to the EUT power class, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation. The SS may set the EUT to transmit without cover sequence according to clause 5.2.

6.1.2.2.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the carrier leakage of the EUT transmission against the limit in Table 6.1.2.2.4-1.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.2.2.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.4.4 and test tolerance in Table C.1.2-1 of the present document.

Table 6.1.2.2.4-1: Carrier leakage requirement

Parameters	Relative limit (dBc)	Test Tolerance
$0 \text{ dBm} \leq \text{Output power}$	-25	Table C.1.2-1
$-30 \text{ dBm} \leq \text{Output power} < 0 \text{ dBm}$	-20	
$-40 \text{ dBm} \leq \text{Output power} < -30 \text{ dBm}$	-10	

6.1.2.3 Error vector magnitude

6.1.2.3.1 Test purpose

To verify the EUT transmitter modulation quality in terms of error vector magnitude.

The Error Vector Magnitude (EVM) is a measure of the difference between the ideal reference waveform and the measured waveform. The EVM result is defined after the receiver FFT as the square root of the ratio of the mean error vector power to the mean reference power expressed as a percentage as specified in ETSI TS 103 636-2 [1], clause 6.4.2.

6.1.2.3.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.2.3.3 Test description

6.1.2.3.3.1 Initial conditions

Table 6.1.2.3.3.1-1: Initial conditions for EVM tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	All transmit powers defined in ETSI TS 103 636-4 [3], Table 6.2.1-3a or 6.2.1-3b according to the EUT power class, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation. The SS may set the EUT to transmit without cover sequence according to clause 5.2.

6.1.2.3.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the EVM of the EUT transmission according to ETSI TS 103 636-2 [1], clause 6.4.2 against the limit in Table 6.1.2.3.4-1.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.2.3.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.4.2 and test tolerance in Table C.1.2-1 of the present document. Minimum requirement is defined for RMS average of basic EVM measurements of 20 consecutive 2 subslot packet transmissions with at least two subslot guard interval in between them.

Table 6.1.2.3.4-1: Error Vector Magnitude (%) requirement

Modulation	Test limit	Test Tolerance
QPSK or BPSK	17,5 %	Table C.1.2-1
16-QAM	12,5 %	
64-QAM	8 %	

6.1.2.4 Transmitter spectrum flatness

6.1.2.4.1 Test purpose

Test purpose is to verify the EUT transmitter modulation quality in terms of transmit passband spectral flatness.

The zero-forcing equalizer correction applied in the EVM measurement process measures transmitter spectrum flatness, and it is defined in terms of the maximum peak-to-peak (p-p) ripple of the equalizer coefficients (dB) across the transmission bandwidth B_T .

The transmitter spectrum flatness requirement does not limit the correction applied to the signal in the EVM measurement process but for the EVM result to be valid, the equalizer correction that was applied shall meet the EVM equalizer spectrum flatness minimum requirements.

6.1.2.4.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.2.4.3 Test description

6.1.2.4.3.1 Initial conditions

Table 6.1.2.4.3.1-1: Initial conditions for transmitter spectral flatness

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	All transmit powers defined in ETSI TS 103 636-4 [3], Table 6.2.1-3a or 6.2.1-3b according to the EUT power class, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation. The SS may set the EUT to transmit without cover sequence according to clause 5.2.

6.1.2.4.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the transmitter spectrum flatness against the requirement in Table 6.1.2.4.4-1.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.2.4.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.4.3 and the test tolerance is defined in Table C.1.2-1 of the present document.

Table 6.1.2.4.4-1: Transmitter spectrum flatness requirement

Test limit	Test Tolerance
4 dB (peak-to-peak)	Table C.1.2-1

6.1.3 Spectrum emissions

6.1.3.1 Occupied bandwidth

6.1.3.1.1 Test purpose

To verify the EUT transmitter occupied channel bandwidth B_O relative to nominal bandwidth B_N for all bandwidth configurations is within specific limits.

6.1.3.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.3.1.3 Test description

6.1.3.1.3.1 Initial conditions

Table 6.1.3.1.3.1-1: Initial conditions for occupied bandwidth tests

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	Maximum transmission power supported by the EUT, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation.

6.1.3.1.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the occupied bandwidth in steps a) to e) against the limit defined in Table 6.1.3.1.4-1:
 - a) Measure the power spectrum distribution within two times or more range over the requirement for Occupied Bandwidth specification centring on the current carrier frequency. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyser filter). Other methods to measure the power spectrum distribution are allowed. Only the active transmission part of the transmission packet without any transient periods is used in the measurement.
 - b) Calculate the total power within the range of all frequencies measured in 'a)' and save this value as "Total Power".
 - c) Sum up the power upward from the lower boundary of the measured frequency range in 'a)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Lower Frequency".

- d) Sum up the power downward from the upper boundary of the measured frequency range in 'a)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Upper Frequency".
 - e) Calculate the difference ("Upper Frequency" - "Lower Frequency" = "Occupied Bandwidth") between two limit frequencies obtained in 'd)' and 'c)'.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.3.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clauses 6.5.2 and 5.3.2. Occupied channel bandwidth B_O is a measure of the bandwidth containing 99 % of the total integrated mean power of the transmitted spectrum on the assigned channel. Occupied channel bandwidth shall not exceed nominal bandwidth.

Table 6.1.3.1.4-1: Occupied channel bandwidth limits requirement

Nominal channel bandwidth	Test limit
B_N	$B_O < B_N$

6.1.3.2 Out of band emissions

6.1.3.2.1 Test purpose

To verify that the power of any EUT emission shall not exceed specified level for the specified channel bandwidth.

6.1.3.2.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.3.2.3 Test description

6.1.3.2.3.1 Initial conditions

Table 6.1.3.2.3.1-1: Initial conditions for out of band emission tests

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	Maximum transmission power supported by the EUT, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation.

6.1.3.2.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.

- 2) TS measures the spectrum emission mask compliance according to Tables 6.1.3.2.4-1 and 6.1.3.2.4-2. The active transmission part of the transmission packet including the transient periods is used in the measurement.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.3.2.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.5.3. Test measurement uncertainty is defined in Table C.1.2-1 of the present document.

The spectrum emission mask applies to frequencies Δf_{oob} starting from the $\pm$ edge (from $F_c + B_N/2$ or from $F_c - B_N/2$) of the assigned channel. For frequencies offset greater than Δf_{oob} as specified in ETSI TS 103 636-2 [1], Table 6.5.3-2, the spurious requirements in ETSI TS 103 636-2 [1], clause 6.5.4 are applicable.

- F_c is the carrier centre frequency.
- B_N is the nominal channel bandwidth.
- B_T is the transmission bandwidth.
- B_G is the guard band ($B_N - B_T$) between the closest subcarriers of the adjacent channels.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2.

Table 6.1.3.2.4-1: Spectrum emission mask requirement for 30 kHz measurement bandwidth

Δf_{oob}		Limit (dBm)	Test Tolerance	Measurement bandwidth (MBW)
$B_G/2 \geq 1\text{ MHz}$	$B_G/2 < 1\text{ MHz}$			
-	0 to $B_G/2$	$-10 - 10\log_{10}(B_N/1,728)$	Table C.1.2-1	30 kHz
-	-0 to $-B_G/2$	$-10 - 10\log_{10}(B_N/1,728)$		30 kHz
0 to 1 MHz	$B_G/2$ to 1 MHz	$-21 - 10\log_{10}(B_N/1,728)$		30 kHz
0 to -1 MHz	$-B_G/2$ to -1 MHz	$-21 - 10\log_{10}(B_N/1,728)$		30 kHz
NOTE 1: The first centre frequency for a 30 kHz measurement filter is at $\Delta f_{oob} = 0,015\text{ MHz}$, which is $B_N/2 + 0,015\text{ MHz}$ from the carrier centre frequency.				
NOTE 2: The first centre frequency for a 30 kHz measurement filter in the range from $B_G/2$ to 1 MHz is at $\Delta f_{oob} = B_G/2 + 0,015\text{ MHz}$, which is $B_N/2 + B_G/2 + 0,015\text{ MHz}$ from the carrier centre frequency.				
NOTE 3: Symmetrically similarly as in note 1 and note 2 in negative Δf_{oob} frequencies.				

Table 6.1.3.2.4-2: Spectrum emission mask requirement for 1MHz measurement bandwidth

Δf_{oob}	Limit (dBm)		Test Tolerance	Measurement bandwidth (MBW)
	$B_N \leq 6,912 \text{ MHz}$	$B_N > 6,912 \text{ MHz}$		
1 MHz to B_N	-10	$-10 - 10\log_{10}(B_N/6,912)$	Table C.1.2-1	1 MHz
-1 MHz to $-B_N$	-10	$-10 - 10\log_{10}(B_N/6,912)$		1 MHz
B_N to $2B_N$	-25	$-25 - 10\log_{10}(B_N/6,912)$		1 MHz
$-B_N$ to $-2B_N$	-25	$-25 - 10\log_{10}(B_N/6,912)$		1 MHz
NOTE 1: The first centre frequency for a 1 MHz measurement filter in the range 1 MHz to B_N is at $\Delta f_{oob} = 1,5 \text{ MHz}$.				
NOTE 2: The first centre frequency for a 1 MHz measurement filter in the range B_N to $2B_N$ at $\Delta f_{oob} = B_N + 0,5 \text{ MHz}$.				
NOTE 3: Symmetrically similarly as in note 1 and note 2 in negative Δf_{oob} frequencies.				

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth to obtain the equivalent noise bandwidth of the measurement bandwidth.

6.1.3.3 Adjacent channel leakage ratio

6.1.3.3.1 Test purpose

To verify that EUT transmitter does not cause unacceptable interference to adjacent channels in terms of Adjacent Channel Leakage power Ratio (ACLR).

6.1.3.3.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.3.3.3 Test description

6.1.3.3.3.1 Initial conditions

Table 6.1.3.3.3.1-1: Initial conditions for ACLR tests

Environment as specified in clause 4.1	Normal, TL/ML, TL/VH, TH/ML, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	Maximum transmission power supported by the EUT, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation.

6.1.3.3.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the ACLR compliance according to Table 6.1.3.3.4-1. The active transmission part of the transmission packet including the transient periods is used in the measurement:
 - a) ACLR is measured with a square window on the transmission bandwidth B_T of the adjacent channel. A DFT of the transmission signal is taken and the mean energy of the appropriate bins used to calculate the adjacent channel powers and compared to the mean energy of the appropriate bins on the transmission bandwidth B_T of the desired transmission channel. ACLR is measured independently both on the on both lower and upper side adjacent channels.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.3.3.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clauses 6.5.5. Test measurement uncertainty is defined in Table C.1.2-1 of the present document.

Table 6.1.3.3.4-1: Adjacent channel leakage ratio requirement

Limit (dBc)	Test Tolerance
-30.0	Table C.1.2-1

6.1.3.4 Spurious emissions

6.1.3.4.1 Test purpose

To verify that the EUT transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions.

6.1.3.4.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.1.3.4.3 Test description

6.1.3.4.3.1 Initial conditions

Table 6.1.3.4.3.1-1: Initial conditions for transmitter spurious emissions tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length and maximum packet length supported by the EUT, Table G.2.2-6
Transmit powers	Maximum transmission power supported by the EUT, Table G.2.1-3
Modulation and coding schemes	All MCS supported, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.3 Transmit loop mode operation.

6.1.3.4.3.2 Test procedure

- 1) The EUT periodically transmits packets to the SS.
- 2) TS measures the spurious emissions. The active transmission part of the transmission packet including the transient periods is used in the measurement:
 - a) Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 6.1.3.4.4-1. The centre frequency of the filter shall be stepped in contiguous steps according measurement bandwidth. The measured power shall be verified for each step.
- 3) When specified transmission duration expires EUT sends loop report.

6.1.3.4.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 6.5.4. Test measurement uncertainty is defined in Table C.1.2-1 of the present document.

Table 6.1.3.4.4-1: Transmitter spurious emissions requirement

Frequency Range	Maximum Level	Test Tolerance	Measurement bandwidth (MBW)
$9 \text{ kHz} \leq f < 150 \text{ kHz}$	-36 dBm	Table C.1.2-1	1 kHz
$150 \text{ kHz} \leq f < 30 \text{ MHz}$	-36 dBm		10 kHz
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	-36 dBm		100 kHz
$1 \text{ GHz} \leq f < 12,75 \text{ GHz}$	-30 dBm		1 MHz
$12,75 \text{ GHz} \leq f < 5^{\text{th}}$ harmonic of the upper frequency edge in GHz	-30 dBm		1 MHz

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2.

6.2 Receiver tests

6.2.1 Receiver dynamic range and selectivity

6.2.1.1 Sensitivity

6.2.1.1.1 Test purpose

To verify the EUT's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise.

6.2.1.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.1.1.3 Test description

6.2.1.1.3.1 Initial conditions

Table 6.2.1.1.3.1-1: Initial conditions for sensitivity testing

Environment as specified in clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.1.1.3.2 Test procedure

- 1) The SS periodically transmits packets.

- 2) The EUT receives packets and responds to the SS.
- 3) SS decreases the received signal strength for the EUT to REFSENS value defined in Table 6.2.1.1.4-1.
- 4) SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 5) SS deactivates clause F.5.4 Receive loop.

6.2.1.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.2 and test tolerance in Table C.1.3-1.

Table 6.2.1.1.4-1: Receiver sensitivity requirement

Bands	REFSENS	Test Tolerance
1 - 12 and 22	$-99,7 - 10\log_{10}(B_N/1,728)$ dBm	Table C.1.3-1
13 - 15, 20 and 21	$-97,7 - 10\log_{10}(B_N/1,728)$ dBm	
16 - 19	$-95,7 - 10\log_{10}(B_N/1,728)$ dBm	

6.2.1.2 Maximum input level

6.2.1.2.1 Test purpose

To verify the EUT's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise with maximum input signal at the EUT antenna port.

6.2.1.2.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.1.2.3 Test description

6.2.1.2.3.1 Initial conditions

Table 6.2.1.2.3.1-1: Initial conditions to maximum input level tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.1.2.3.2 Test procedure

- 1) The SS periodically transmits packets.
- 2) The EUT receives packets and responds to the SS.

- 3) Increase the received signal strength for the EUT to the value defined in Table 6.2.1.2.4-1.
- 4) The SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 5) SS deactivates clause F.5.4 Receive loop.

6.2.1.2.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.3 and test tolerance in Table C.1.3-1.

Table 6.2.1.2.4-1: Maximum input level requirement

Limit	Test Tolerance
−20 dBm	Table C.1.3-1

6.2.1.3 Adjacent channel selectivity

6.2.1.3.1 Test purpose

To verify the EUT's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel, under conditions of ideal propagation and no added noise, thus Adjacent Channel Selectivity (ACS).

6.2.1.3.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.1.3.3 Test description

6.2.1.3.3.1 Initial conditions

Table 6.2.1.3.3.1-1: Initial conditions for ACS tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-6.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) Adjacent channel interference signal shall have identical signal characteristics (e.g. transmission bandwidth B_T , subcarrier width and Fourier transform size) as wanted signal. Interference signal shall have QPSK modulated random data on all occupied subcarriers and the transmit signal shall be transmit pulse-shaped with square root raised cosine filter with roll-off 0,125 as defined in ETSI TS 103 636-2 [1].
- 6) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.1.3.3.2 Test procedure

Test procedure is conducted independently both on the lower and upper side adjacent channels:

- 1) The SS periodically transmits packets.
- 2) The EUT receives packets and responds to the SS.
- 3) Set the desired signal strength for the EUT to the value of Table 6.2.1.3.4-1.
- 4) Increase the adjacent channel interferer signal strength for the EUT to the value defined in Table 6.2.1.3.4-1.
- 5) The SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 6) SS deactivates clause F.5.4 Receive loop.

6.2.1.3.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.4 and test tolerance in Table C.1.3-1.

- B_N is the nominal channel bandwidth.
- REFSSENS is defined in Table 6.2.1.1.4-1.

Table 6.2.1.3.4-1: Adjacent channel selectivity requirement

RX parameter	Value	Test Tolerance
Desired signal input level	REFSENS + 14 dB	Table C.1.3-1
Interferer power	REFSENS + 39 dB	
Interferer bandwidth	B_N	
Interferer frequency offset	$\pm B_N$	
NOTE: The interferer offset is from own signal centre frequency to interferer centre frequency.		

6.2.2 Blocking characteristics

6.2.2.1 In-band blocking

6.2.2.1.1 Test purpose

To verify the EUT's ability to receive data with an unwanted interfering signal falling into the range from 15 MHz below to 15 MHz above the RD receive band, at which the relative throughput shall meet or exceed the requirement for the specified measurement channels.

6.2.2.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.2.1.3 Test description

6.2.2.1.3.1 Initial conditions

Table 6.2.2.1.3.1-1: Initial conditions for in-band blocking tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-6.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.2.1.3.2 Test procedure

Test procedure is conducted independently for all interferer integer frequency offsets M for which maximum interference offset defined in Table 6.2.2.1.4-1 applies:

- 1) The SS periodically transmits packets.
- 2) The EUT receives packets and responds to the SS.
- 3) Set the desired signal strength for the EUT to the value of Table 6.2.2.1.4-1.
- 4) Increase the interferer signal strength for the EUT to the value defined in Table 6.2.2.1.4-1.
- 5) The SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 6) SS deactivates clause F.5.4 Receive loop.

6.2.2.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.5.2 and test tolerance in Table C.1.3-1:

- B_N is the nominal channel bandwidth.
- F_{BL} Frequency of band low edge.
- F_{BH} Frequency of band high edge.
- REFSSENS is defined in Table 6.2.1.1.4-1.

Table 6.2.2.1.4-1: In-band blocking requirement

RX parameter	Value	Test Tolerance
Desired signal input level	REFSENS + 6 dB	Table C.1.3-1
Interferer power	REFSENS + 52 dB	
Interferer bandwidth	B_N	
Interferer frequency offset	$\pm M \times B_N, M \geq 2$	
Maximum interferer frequency offset	$F_{BL} - 15 \text{ MHz} + B_N/2$, and $F_{BH} + 15 \text{ MHz} - B_N/2$	
NOTE 1: The interferer signal characteristic is same as the wanted signal modulated with data.		
NOTE 2: The interferer offset is from own signal centre frequency to interferer centre frequency.		

6.2.2.2 Out of band blocking

6.2.2.2.1 Test purpose

To verify the EUT's ability to receive data with an unwanted CW interfering signal falling more than 15 MHz below or above the RD receive band, at which a given average throughput shall meet or exceed the requirement for the specified measurement channels.

6.2.2.2.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.2.2.3 Test description

6.2.2.2.3.1 Initial conditions

Table 6.2.2.2.3.1-1: Initial conditions for out of band blocking tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	One frequency chosen arbitrarily from low or high range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A-6.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.2.2.3.2 Test procedure

Test procedure is conducted for the blocker frequency ranges defined in Table 6.2.3.1.4-1 with CW interferer frequency step size of 1 MHz:

- 1) The SS periodically transmits packets.
- 2) The EUT receives packets and responds to the SS.
- 3) Set the desired signal strength for the EUT to the value of Table 6.2.2.2.4-1.
- 4) Increase the CW interferer signal strength for the EUT to the value defined in Table 6.2.2.2.4-1.
- 5) The SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 6) SS deactivates clause F.5.4 Receive loop.

6.2.2.2.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.5.3 and test tolerance in Table C.1.3-1:

- B_N is the nominal channel bandwidth
- F_{BL} Frequency of band low edge
- F_{BH} Frequency of band high edge
- f_i is the interferer frequency
- REFSENS is defined in Table 6.2.1.1.4-1

It is allowed to have a number of spurious response exceptions. These number of exceptions is a maximum of 24 or $8 \times \frac{B_N}{1,728}$ MHz, whatever is greater depending on the nominal channel bandwidth B_N . For these exceptions the requirement of ETSI TS 103 636-2 [1], clause 7.6 and spurious response conformance test of clause 6.2.2.3 applicable.

Table 6.2.2.2.4-1: Out of band blocking requirement

	Range 1	Range 2	Range 3
Desired signal input level	REFSENS + 6 dB	REFSENS + 6 dB	REFSENS + 6 dB
Interferer frequency	$F_{BL} - 15 \text{ MHz}$ to $F_{BL} - 60 \text{ MHz}$	$F_{BL} - 60 \text{ MHz}$ to $F_{BL} - 85 \text{ MHz}$	$F_{BL} - 85 \text{ MHz}$ to 1 MHz
	$F_{BH} + 15 \text{ MHz}$ to $F_{BH} + 60 \text{ MHz}$	$F_{BH} + 60 \text{ MHz}$ to $F_{BH} + 85 \text{ MHz}$	$F_{BH} + 85 \text{ MHz}$ to 12, 75 GHz
Interferer power	-44 dBm	-30 dBm	-15 dBm
Test Tolerance	Table C.1.3-1	Table C.1.3-1	Table C.1.3-1

6.2.2.3 Spurious response

6.2.2.3.1 Test purpose

To verify the EUT's ability to receive data without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out of band blocking limit as specified in clause 6.2.2.2 is not met.

6.2.2.3.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.2.3.3 Test description

6.2.2.3.3.1 Initial conditions

Table 6.2.2.3.3.1-1: Initial conditions for receive spurious response tests

Environment as specified in clause 4.1	Same as for clause 6.2.2.2
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Same as for clause 6.2.2.2
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-6.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.2.3.3.2 Test procedure

Test procedure is conducted for the blocker frequency ranges defined in Table 6.2.3.1.4-1 with CW blocker signal step size of 1 MHz:

- 1) The SS periodically transmits packets.
- 2) The EUT receives packets and responds to the SS.
- 3) Set the desired signal strength for the EUT to the value of Table 6.2.2.2.4-1.
- 4) Increase the CW interferer signal strength for the EUT to the value defined in Table 6.2.2.2.4-1.

- 5) The SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 6) SS deactivates clause F.5.4 Receive loop.

6.2.2.3.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.6 and test tolerance in Table C.1.3-1.

- B_N is the nominal channel bandwidth.
- f_i is the interferer frequency

Table 6.2.2.3.4-1: Spurious response requirement

		Test Tolerance
Desired signal input level	REFSENS + 6 dB	Table C.1.3-1
Interferer frequency	Spurious response frequencies detected in test of clause 6.2.2.2	
Interferer power	-44 dBm	

6.2.3 Intermodulation characteristics

6.2.3.1 Wide band intermodulation

6.2.3.1.1 Test purpose

To verify the EUT's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal, under conditions of ideal propagation and no added noise.

6.2.3.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.3.1.3 Test description

6.2.3.1.3.1 Initial conditions

Table 6.2.3.1.3.1-1: Initial conditions for wideband intermodulation tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A Figure A.1-6.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.

- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.

6.2.3.1.3.2 Test procedure

- 1) The SS periodically transmits packets.
- 2) The EUT receives packets and responds to the SS.
- 3) Set the desired signal strength for the EUT to the value of Table 6.2.3.1.4-1.
- 4) Increase the CW interferer signal strength for the EUT to the value defined in Table 6.2.3.1.4-1.
- 5) Increase the modulated interferer signal strength for the EUT to the value defined in Table 6.2.3.1.4-1.
- 6) The SS observes the ACK/NACK feedback from the EUT and measures the test pass/fail criteria according to Annex B.
- 7) SS deactivates clause F.5.4 Receive loop.

6.2.3.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.8 and test tolerance in Table C.1.3-1:

- B_N is the nominal channel bandwidth.
- f_i^1 is the frequency of interferer 1, i.e. CW interferer.
- f_i^2 is the frequency of interferer 2, i.e. modulated interferer.
- P_i^1 is the power of interferer 1, i.e. CW interferer.
- P_i^2 is the power of interferer 2, i.e. modulated interferer.

Table 6.2.3.1.4-1: Wideband intermodulation requirement

RX parameter	Value	Test Tolerance
Desired signal input level	REFSENS + 6 dB	Table C.1.3-1
Interferer 1 (CW) power P_i^1	-46 dBm	
Interferer 2 (modulated) power P_i^2	-46 dBm	
Interferer 2 (modulated) bandwidth	B_N	
Interferer 1 (CW) frequency f_i^1	$\pm 2B_N$	
Interferer 2 (modulated) frequency f_i^2	$2 \times f_i^1$	
NOTE 1: The modulated interferer signal characteristic is same as the wanted signal modulated with data.		
NOTE 2: The interferer offset is from own signal centre frequency to interferer centre frequency.		

6.2.4 Spectrum emissions

6.2.4.1 Spurious emissions

6.2.4.1.1 Test purpose

To verify that the EUT does not cause unacceptable interference to other channels or other systems in terms of spurious emissions generated or amplified by the EUT receiver that appear at the EUT antenna connector.

6.2.4.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.4.1.3 Test description

6.2.4.1.3.1 Initial conditions

Table 6.2.4.1.3.1-1: Initial conditions for receiver spurious emissions

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Lowest, Highest
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.4.4 Measurement Mode B.

6.2.4.1.3.2 Test procedure

Measure the power with a measurement filter of bandwidths and centre frequencies according to Table 6.2.4.1.4-1 by repeating the steps 1-4 below. The centre frequency of the filter shall be stepped in contiguous steps according to measurement bandwidth:

- 1) Set measurement filter centre frequency.
- 2) The SS periodically transmits packets.
- 3) Measure the EUT spurious emissions. The emissions shall be measured during the period where the receiver is active.
- 4) SS deactivates clause F.4.4 Measurement Mode B.

6.2.4.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.7 and test tolerance in Table C.1.3-1.

Table 6.2.4.1.4-1: Receiver spurious emissions requirement

Frequency band	Measurement bandwidth (MBW)	Maximum level	Test Tolerance
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz	-57 dBm	Table C.1.3-1
$1 \text{ GHz} \leq f \leq 12,75 \text{ GHz}$	1 MHz	-47 dBm	

6.2.5 Receiver measurements

6.2.5.1 RSSI-1 measurement

6.2.5.1.1 Test purpose

To verify the accuracy of EUT's RSSI-1 measurement.

6.2.5.1.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.5.1.3 Test description

6.2.5.1.3.1 Initial conditions

Table 6.2.5.1.3.1-1: Initial conditions for RSSI1 measurements

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Continuous transmission of any packet length greater than two subslots, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2
Test received signal strength	From REFSSENS to REFSSENS + 70 dB with 1 dB steps

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-6.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) Set the EUT to clause F.4.3 Measurement Mode A.
- 6) Set the received signal strength according to Table 6.2.5.1.3.1-1.

6.2.5.1.3.2 Test procedure

- 1) The SS continuously transmits packets without any guard interval between the packets.
- 2) The EUT measures RSSI-1.
- 3) SS deactivates clause F.4.3 Measurement Mode A.

6.2.5.1.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.7 and test tolerance in Table C.1.3-1. The SNR value reported in REPORT_MEASUREMENT_MODE_A shall be compared against accuracy requirement. Factor in the noise floor contribution, the EUT declared typical Noise Figure, to the measurement result between $REFSENS < RSSI-1 \leq REFSSENS + 10 \text{ dB}$:

- REFSSENS is defined in Table 6.2.1.1.4-1.

Table 6.2.5.1.4-1: RSSI-1 measurement accuracy requirement

RSSI-1 measured power/dBm	Accuracy in normal conditions	Test Tolerance
$REFSENS < RSSI-1 \leq REFSSENS + 10 \text{ dB}$	$\pm 5,5 \text{ dB}$	Table C.1.3-1
$REFSENS + 10 \text{ dB} < RSSI-1 \leq REFSSENS + 60 \text{ dB}$	$\pm 3,5 \text{ dB}$	
$REFSENS + 60 \text{ dB} < RSSI-1 \leq REFSSENS + 70 \text{ dB}$	$\pm 5,5 \text{ dB}$	

6.2.5.2 RSSI-2 measurement

6.2.5.2.1 Test purpose

To verify the accuracy of EUT's RSSI-2 measurement.

6.2.5.2.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.5.2.3 Test description

6.2.5.2.3.1 Initial conditions

Table 6.2.5.2.3.1-1: Initial conditions for RSSI-2 measurement

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2
Test received signal strength	From REFSENS to REFSENS + 70 dB with 1 dB steps

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.
- 6) Signal levels are set according to Table 6.2.5.2.3.1-1.

6.2.5.2.3.2 Test procedure

- 1) The SS periodically transmits packets.
- 2) The EUT receives packet and responds to the SS with RSSI-2 measurement report on each of the packets.
- 3) SS deactivates clause F.5.4 Receive loop.

6.2.5.2.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.7 and test tolerance in Table C.1.3-1. The RSSI-2 value reported in REPORT_RX_LOOP_MODE shall be compared against accuracy requirement:

- REFSENS is defined in Table 6.2.1.1.4-1.

Table 6.2.5.2.4-1: RSSI-2 measurement accuracy requirement

RSSI-1 measured power/dBm	Accuracy in normal conditions	Test Tolerance
$\text{REFSENS} < \text{RSSI-2} \leq \text{REFSENS} + 10 \text{ dB}$	$\pm 4 \text{ dB}$	Table C.1.3-1
$\text{REFSENS} + 10 \text{ dB} < \text{RSSI-2} \leq \text{REFSENS} + 60 \text{ dB}$	$\pm 2 \text{ dB}$	
$\text{REFSENS} + 60 \text{ dB} < \text{RSSI-2} \leq \text{REFSENS} + 70 \text{ dB}$	$\pm 4 \text{ dB}$	

6.2.5.3 SNR measurement

6.3.5.3.1 Test purpose

To verify the accuracy of EUT's SNR measurement.

6.2.5.3.2 Test applicability

This test case applies to all types of DECT-2020 NR release 1 RD and forward.

6.2.5.3.3 Test description

6.2.5.3.3.1 Initial conditions

Table 6.2.5.3.3.1-1: Initial conditions for SNR measurement tests

Environment as specified in clause 4.1	Normal
Operating bands	All operating bands supported, Table G.2.1-1
Carrier frequencies within operating band as specified in clause 4.3.2	Mid-range
Bandwidths and numerologies as specified in clause 4.3.2	All numerologies supported, Table G.2.2-1
Packet lengths	Two subslot packet length, Table G.2.2-6
Modulation and coding schemes	MCS1, Table G.2.2-2
Test SNR range	From 5 dB to 25 dB with 1 dB steps. Apply White Gaussian Noise to achieve required SNR for Signal RSSI defined in the next row.
Signal RSSI at EUT antenna connector	$-60 \text{ dBm} + 10\log_{10}(B_N/1,728 \text{ MHz})$, where B_N is the nominal channel bandwidth

- 1) Connect the SS to the EUT antenna connectors as shown in Annex A, Figure A.1-5.
- 2) Radio conditions are set according to clause 4.3.3.
- 3) Transmission packet parameters are set according to clause 4.3.4.
- 4) Signal levels are set according to clause 4.3.5.
- 5) The SS sets the EUT to clause F.5.4 Receive loop mode operation.
- 6) Signal levels are set according to Table 6.2.5.3.3.1-1.

6.2.5.3.3.2 Test procedure

- 1) The SS periodically transmits packets.
- 2) The EUT receives packet and responds to the SS with SNR measurement report on each of the packets.
- 3) SS deactivates clause F.5.4 Receive loop.

6.2.5.3.4 Test requirement

Normative requirement is specified in ETSI TS 103 636-2 [1], clause 7.7 and test tolerance in Table C.1.3-1. The SNR value reported in REPORT_RX_LOOP_MODE shall be compared against accuracy requirement.

Table 6.2.5.3.4-1: SNR measurement accuracy requirement

SNR range	Accuracy in normal conditions	Test Tolerance
5 dB < SNR ≤ 25 dB	±3 dB	Table C.1.3-1

Annex A (informative): Test System

A.1 Introduction

System Simulator (SS): A device or system, that is capable of generating simulated RD signalling and analysing EUT signalling responses on one or more RF channels, in order to create the required test environment for the EUT. It will also include the following capabilities:

- 1) Calibrated adjustment of transmission power level to match the received signal strength requirement for given test.
- 2) Measurement of throughput.
- 3) Measurement of signalling timing and delays.
- 4) Ability to simulate DECT-2020 NR signalling.

Test System (TS): A combination of devices brought together into a system for the purpose of making one or more measurements on a EUT in accordance with the test case requirements. A test system may include one or more System Simulators if additional signalling is required for the test case.

NOTE 1: The above terms are logical definitions to be used for the test methods description used in the present document. In practice, real devices or systems called 'System Simulators' may also include additional measurement capabilities or may only support those features required for the test cases they are designed to perform.

NOTE 2: Components in the connection diagrams:
The components in the connection diagrams represent ideal components. They are intended to display the wanted signal flow. They do not mandate real implementations.

NOTE 3: An abstract test system for transmitter and receiver testing are depicted in Figures A.1-4, A.1-5 and A.1-6. An example realization of such test system is depicted in Figure A.1-10. In this figure a vector signal generator is used as a calibrated transmitter for the receiver testing. A companion device transmits the test commands of Annex F and receives the responses of EUT and delivers them to the test controller. A signal analyser can be used for transmission signal quality analysis. By replacing wired antenna connections with wireless transmissions between SS, EUT and signal analyser the same principle can be applied for radiated measurements. In another realization of the test system a dedicated system tester can encapsulate the complete test system.

Connection: Each connection is displayed as a one- or two-sided arrow, showing the intended signal flow. In some cases, for some tests, some connections shown may not be necessary.

Circulator: The signal, entering one port, is conducted to the adjacent port, indicated by the arrow. The attenuation among the above-mentioned ports is ideally 0 and the isolation among the other ports is ideally ∞ .



Figure A.1-1: Circulator symbol

Equipment Under Test (EUT): A RD under test.

Splitter: A splitter has one input and 2 or more outputs. The signal at the input is equally divided to the outputs. The attenuation from input to the outputs is ideally 0 and the isolation between the outputs is ideally ∞ .



Figure A.1-2: Splitter symbol

Combiner: A combiner has one output and 2 or more inputs. The signals at the inputs are conducted to the output, all with the same, ideally 0 attenuation. The isolation between the inputs is ideally ∞ .



Figure A.1-3: Combiner symbol

Switch: Contacts a sink (or source) alternatively to two or more sources (or sinks).

Interference generator: Source or more sources capable of producing interference signal of desired characteristics in order to create the required test environment for the EUT. Co-channel and adjacent channel interferences are with similar signal characteristics as desired signal has, but with frequency offset as needed. Blocker signal is Continuous Wave (CW) signal at suitable frequency offset. Wideband interference is white noise. Transmission power levels of interference generators should be calibrated and individually adjustable for the test system to create desired input signal characteristics for the EUT.

Fader: The fader has one input and one output. The MIMO fading channel is represented by several single faders (e.g. 8 in case of a MIMO antenna configuration 4x2). The correlation among the faders is described in ETSI TS 103 636 2 [1]. In some cases, for some tests, diagrams with fader(s) are referenced when no fading is required; in this case the fader(s) is omitted.

Attenuator: Programmable or fixed signal attenuator

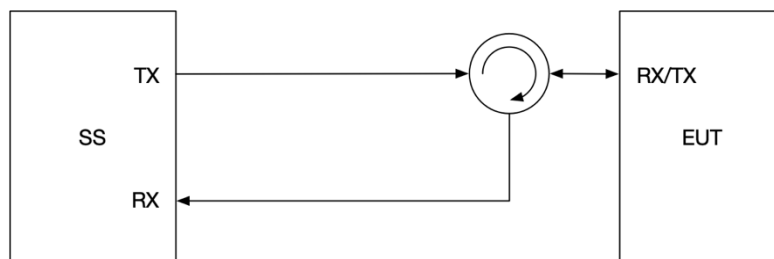


Figure A.1-4: Basic connection for RX and TX tests

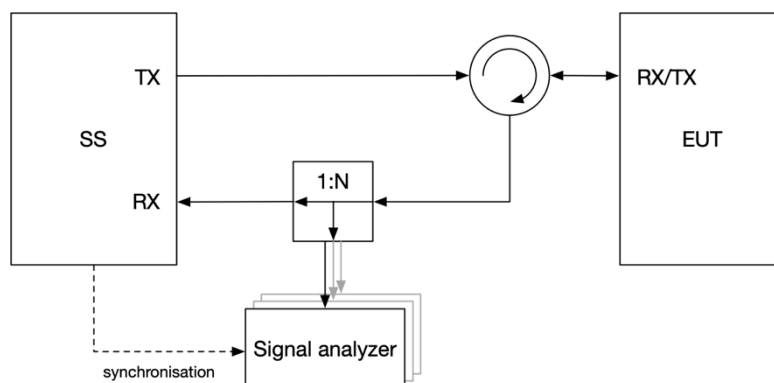
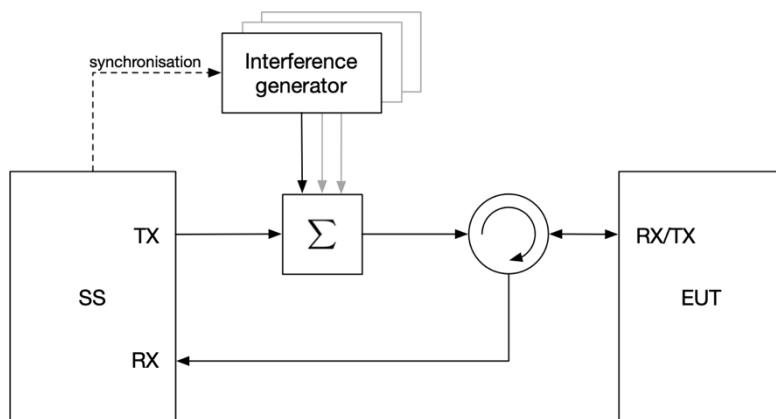
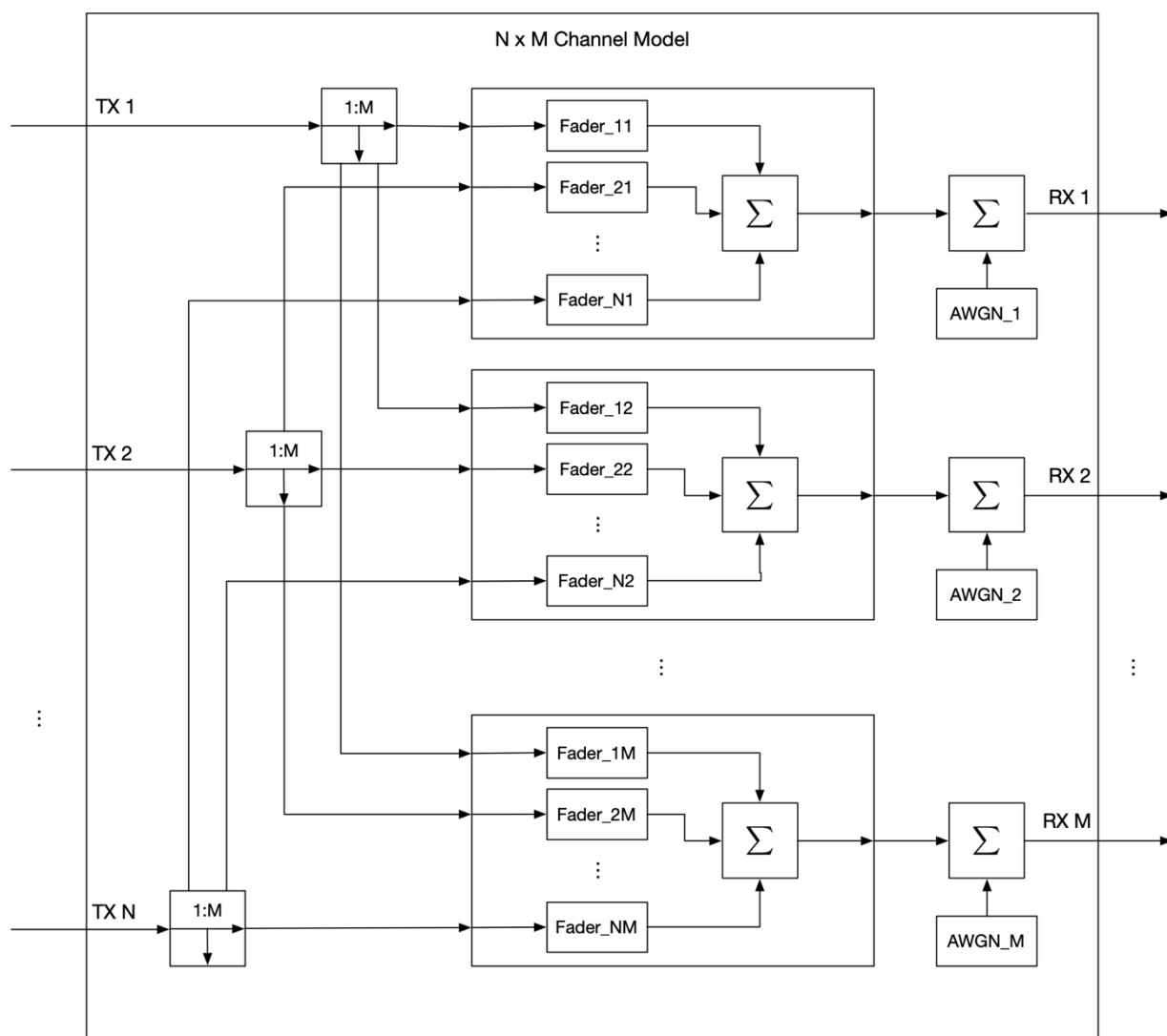


Figure A.1-5: Connection for transmitter tests with additional spectrum analyser, vector signal analyser or power sensor



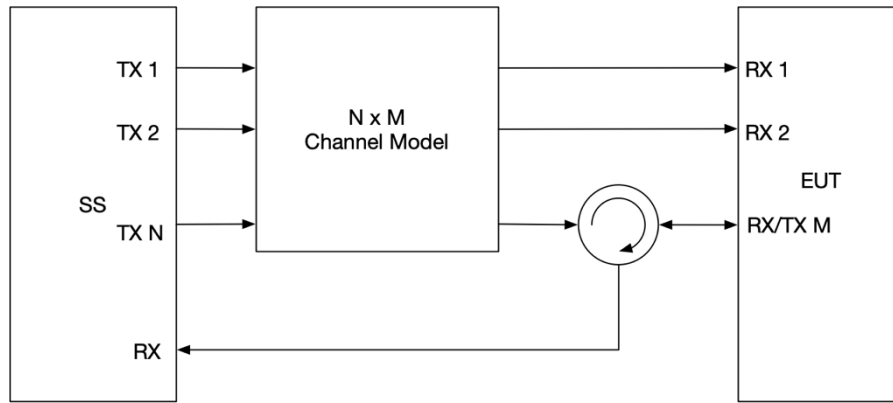
NOTE: Test setup can have more than one interference generator, and the interference generators may be of different type, such as co-channel interference, adjacent channel interference, CW or wideband interference.

Figure A.1-6: Connection for receiver tests with interference



NOTE: Each of the N transmitter outputs are split into M. For each of the M receiver inputs the N inputs are faded and added together. White Gaussian noise is added for each receiver antenna separately.

Figure A.1-7: Generic N x M Fading Channel Model



NOTE: It is equivalent to use any of the EUT antennas in reverse direction. Transmit diversity and single antenna transmission as in Figure A.1-9 are subsets of this generic configuration.

Figure A.1-8: Receiver testing connection N x M Fading channel

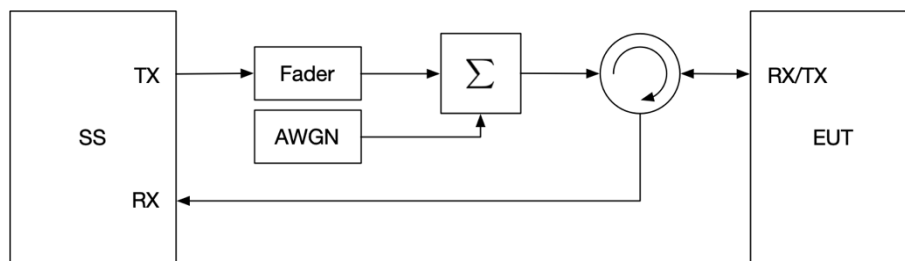


Figure A.1-9: Fading channel connection for single antenna receiver testing

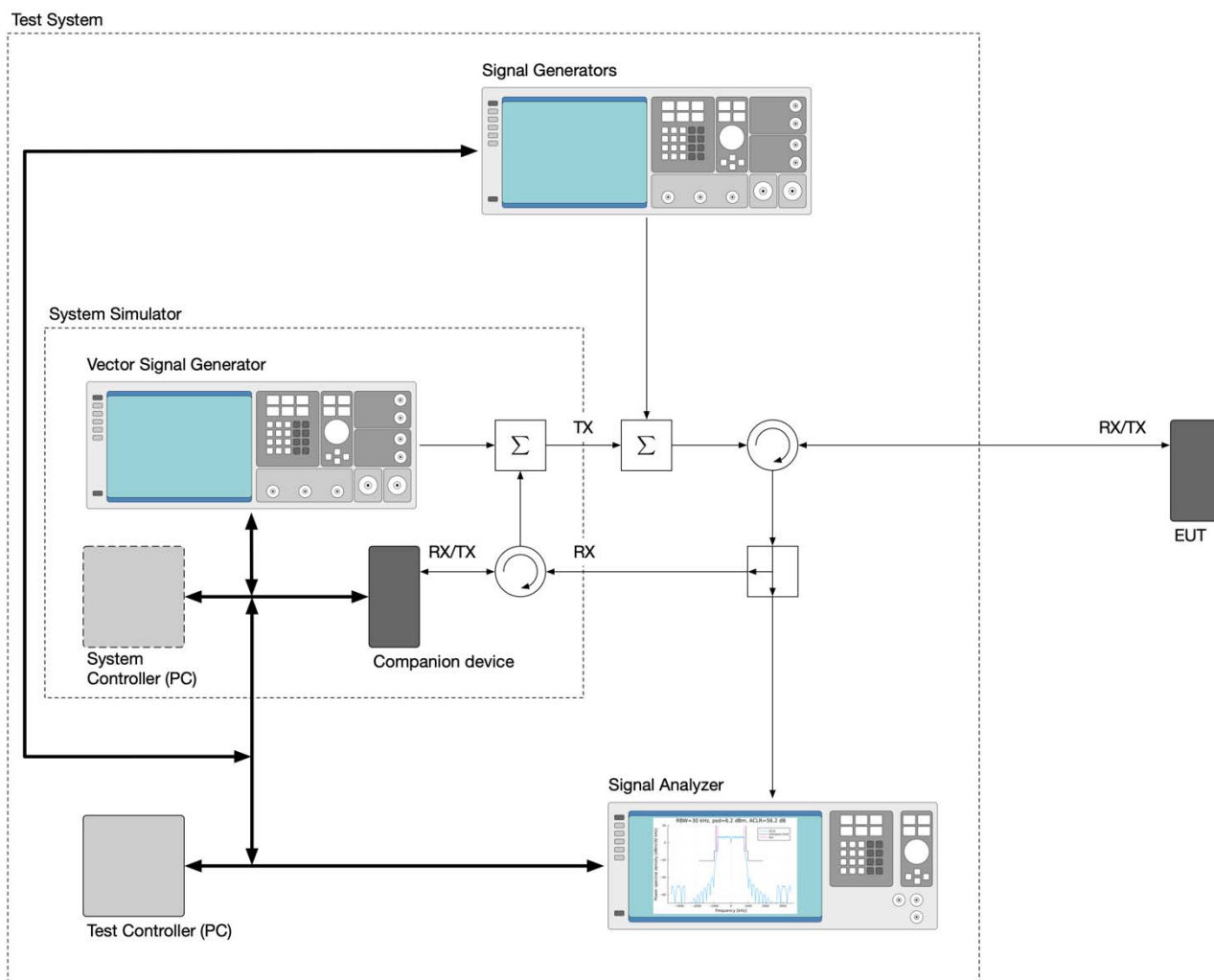


Figure A.1-10: An example realization of transmitter and receiver test setups of Figures A-4, A-5 and A-6

Annex B (normative): Receiver testing pass/fail limits

B.1 Statistical testing of receiver characteristics

B.1.1 Description

The test of receiver characteristics is twofold:

- 1) A signal or a combination of signals is offered to the RX port(s) of the EUT.
- 2) The ability of the EUT to demodulate/decode this signal is verified by measuring the throughput.

The maximum achievable throughput shall be verified in good signal conditions.

The signal conditions shall be set at least to a value of the test limit, where the minimum requirement is to reach > 90 % of the maximum throughput supported by the EUT.

B.1.2 Mapping the throughput to error ratio

B.1.2.1 Defining throughput and bitrate

The measured information bit throughput is defined as the sum of the information bit payloads successfully received during the test interval, divided by the duration of the test interval (in seconds).

The physical bitrate performance can be observed by deducting the detected physical layer payload packet errors from the total amount of the physical layer packets transmitted during the observation time.

$$\text{Bitrate} = \text{Maximum averaged throughput} - \text{Error Rate (ER)} \times \text{Maximum averaged throughput}$$

B.1.2.2 Mapping the ACK/NACK to error ratio

In measurement practice the EUT indicates successfully received information bit payload by signalling an ACK to the SS. If payload is received, but damaged and cannot be decoded, the EUT signals a NACK.

The time in the measurement interval is composed of successfully received subframes (ACK), unsuccessfully received subframes (NACK).

The pass-fail decision is done by observing:

- the number of NACKs;
- the number of ACKs.

The measured physical layer Error Rate (ER) is calculated:

$$ER = \frac{NACK}{ACK + NACK}$$

Where:

- *NACK = not successfully received physical layer payload packet; and*
- *ACK = successfully received physical layer payload packet.*

B.1.2.3 Mapping the received packet count to error ratio

The EUT records successfully received information bit payload packets and is able to report the number of successfully received packets within the measurement interval.

The measured physical layer Error Rate (ER) is calculated:

$$ER = \frac{TRANSMITTED\ PACKETS - SUCCESSFULLY\ RECEIVED\ PACKETS}{TRANSMITTED\ PACKETS}$$

The following examples of methods are provided for information:

- Method 1: Obtain the raw data bits received by the EUT and compare them with the sent ones to determine whether packet reception was successful.
- Method 2: Read out EUT-internal CRC based counter of correctly received packets.
- Method 3: Read out the physical layer Error Rate (ER) measurement of the EUT.

B.1.3 Design of the test

The test is defined by the following parameters:

- 1) Limit of the Error Rate (ER) = 0,10 (Throughput limit = 90 %)
- 2) Confidence level C = 99 % and reliability R = 90 %

B.1.4 Numerical definition of the pass-fail limits

Using Bayes success-run theorem the required sample size n_S is based on the confidence level $C = 0,99$ and reliability $R = 0,90$ with a maximum number of failures n_e allowed is given by:

$$n_S = \frac{0,5 \times X_{2(n_e+1)}^2 (1-C)}{1-R},$$

where $X_{2(n_e+1)}^2 (1 - C)$ is a Chi-square value for given confidence level C and $2(n_e + 1)$ degrees of freedom.

Table B.1.4-1 has pass-fail limits given by the equation above tabulated.

Table B.1.4-1: Pass-Fail limits

n_e	n_s	n_e	n_s	n_e	n_s	n_e	n_s
0	47	30	455	60	807	90	1 147
1	67	31	467	61	818	91	1 158
2	85	32	479	62	830	92	1 169
3	101	33	491	63	841	93	1 181
4	117	34	503	64	853	94	1 192
5	132	35	515	65	864	95	1 203
6	146	36	527	66	875	96	1 214
7	160	37	538	67	887	97	1 225
8	175	38	550	68	898	98	1 237
9	188	39	562	69	910	99	1 248
10	202	40	574	70	921	100	1 259
11	215	41	586	71	932	101	1 270
12	229	42	598	72	944	102	1 281
13	242	43	609	73	955	103	1 292
14	255	44	621	74	967	104	1 303
15	268	45	633	75	978	105	1 315
16	281	46	645	76	989	106	1 326
17	294	47	656	77	1 001	107	1 337
18	306	48	668	78	1 012	108	1 348
19	319	49	680	79	1 023	109	1 359
20	332	50	691	80	1 034	110	1 370
21	344	51	703	81	1 046	111	1 381
22	357	52	714	82	1 057	112	1 392
23	369	53	726	83	1 068	113	1 403
24	381	54	738	84	1 080	114	1 415
25	394	55	749	85	1 091	115	1 426
26	406	56	761	86	1 102	116	1 437
27	418	57	772	87	1 113	117	1 448
28	430	58	784	88	1 125	118	1 459
29	442	59	795	89	1 136	119	1 470

B.1.5 Pass-Fail decision rules

The pass-fail decision rules apply for a single test, comprising one component in the test vector:

- having observed 0 errors, pass the test at 47+ samples;
- having observed 1 error, pass the test at 67+ samples;
- ...
- having observed 118 errors, pass the test at 1 459+ samples;
- having observed 119 errors, pass the test at 1 470+ samples;
- having observed more than 119 errors, fail the test;
- where x+ means: x or more.

NOTE 1: An ideal EUT passes after 47 samples. The maximum test time is 1 470 samples.

NOTE 2: It is allowed to deviate from the early decision concept by postponing the decision (pass-fail or continue). Postponing the decision to or beyond the end of Table F.1 requires a pass-fail decision against the test limit: pass for the EUT with $ER < 0,10$, otherwise fail.

NOTE 3: Each sample is a received data packet including CRC.

B.2 No loss of transmission testing of receiver characteristics

B.2.1 Description

This criterion is only for equipment that does not support receiver statistical testing of clause F.1.

The test of receiver characteristics is three-fold:

- 1) Test system has a bidirectional link setup between EUT and SS.
- 2) A signal or a combination of signals is offered to the RX port(s) of the EUT.
- 3) The ability of the EUT to demodulate/decode this signal is verified by verifying transmissions from the EUT to the SS.

Wireless transmission is lost when in a bidirectional test setup EUT stops transmissions after it has lost the capability of receiving transmissions from SS.

No loss of transmission shall be verified in good signal conditions.

Signal conditions shall be set at least to a value of the test limit where the no loss of transmission is verified.

B.2.2 Pass-Fail decision rules

No loss of transmission shall be verified at least over a period of 60 seconds.

NOTE: Pass-Fail decision rule of no loss of transmission testing compared to receiver statistical testing of clause F.1 may lead to significant increase in test durations.

Annex C (normative): Measurement uncertainties and test tolerances

C.1 Acceptable uncertainty of Test System

C.1.1 Measurement of test environment

The measurement accuracy of the RD test environments defined in clause 4.1 of the present document, test environments shall be as specified in Table C.1.1-1.

Table C.1.1-1: Test environment measurement accuracy

Parameter	Accuracy
Radio frequency	±5 Hz
Relative Humidity	±5 %
Temperature	±2 °C
DC Voltage	±1 %
AC Voltage	±1,5 %
Vibration	±10 %
Vibration frequency	±0,1 Hz

The above values shall apply unless the test environment is otherwise controlled and the specification for the control of the test environment specifies the uncertainty for the parameter.

C.1.2 Measurement of transmitter

Table C.1.2-1: Measurement uncertainty in transmitter measurements

Test	Maximum Test System Uncertainty	Note
6.1.1.1 Maximum output power	±0,7 dB, $f \leq 3$ GHz ±1,0 dB, $3 \text{ GHz} < f \leq 4,2$ GHz ±1,3 dB, $4,2 \text{ GHz} < f \leq 6$ GHz	
6.1.1.2 Transmit absolute power tolerance	±0,7 dB, $f \leq 3$ GHz ±1,0 dB, $3 \text{ GHz} < f \leq 4,2$ GHz ±1,3 dB, $4,2 \text{ GHz} < f \leq 6$ GHz	
6.1.1.3 Transmit OFF power	±1,5 dB, $f \leq 3$ GHz ±1,8 dB, $3 \text{ GHz} < f \leq 4,2$ GHz ±2,0 dB, $4,2 \text{ GHz} < f \leq 6$ GHz	
6.1.1.4 Transmit ON/OFF time mask	±1,5 dB, $f \leq 3$ GHz ±1,8 dB, $3 \text{ GHz} < f \leq 4,2$ GHz ±2,0 dB, $4,2 \text{ GHz} < f \leq 6$ GHz	
6.1.2.1 Centre frequency	±15 Hz	
6.1.2.2 Carrier leakage	±0,8 dB	
6.1.2.3 Error vector magnitude	±2,5 %	
6.1.2.4 Transmitter spectrum flatness	±1,5 dB	
6.1.3.1 Occupied bandwidth		
6.1.3.2 Out of band emissions	±1,5 dB, $f \leq 3$ GHz ±1,8 dB, $3 \text{ GHz} < f \leq 4,2$ GHz ±2,0 dB, $4,2 \text{ GHz} < f \leq 6$ GHz	
6.1.3.3 Adjacent channel leakage ratio	±0,8 dB	
6.1.3.4 Spurious emissions	±2,0 dB, $9 \text{ kHz} < f \leq 4$ GHz ±4,0 dB, $4 \text{ GHz} < f \leq 19$ GHz	

C.1.3 Measurement of receiver

Table C.1.3-1: Measurement uncertainty in receiver measurements

Test	Maximum Test System Uncertainty	Note
6.2.1.1 Sensitivity	$\pm 0,7 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,0 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 1,3 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	
6.2.1.2 Maximum input level	$\pm 0,7 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,0 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 1,3 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	
6.2.1.3 Adjacent channel selectivity	$\pm 1,1 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,5 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 2,2 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	Overall, ACS uncertainty comprises three quantities: 1) Wanted signal level error 2) Interferer signal level error 3) Additional impact of interferer ACLR Items 1 and 2 are assumed to be uncorrelated so can be root sum squared to provide the ratio error of the two signals. The interferer ACLR effect is systematic and is added arithmetically.
6.2.2.1 In-band blocking	$\pm 1,4 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,8 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 2,5 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	Overall blocking uncertainty can have these contributions: 1) Wanted signal level error 2) Interferer signal level error 3) Interferer ACLR 4) Interferer broadband noise Items 1 and 2 are assumed to be uncorrelated so can be root sum squared to provide the ratio error of the two signals. The Interferer ACLR or Broadband noise effect is systematic and is added arithmetically.
6.2.2.2 Out of band blocking	Wanted signal $f \leq 3 \text{ GHz}$: $\pm 1,3 \text{ dB}, 1 \text{ MHz} < f_{\text{interferer}} \leq 3 \text{ GHz}$ $\pm 3,2 \text{ dB}, 3 \text{ GHz} < f_{\text{interferer}} \leq 12,75 \text{ GHz}$ Wanted signal $3 \text{ GHz} < f \leq 4,2 \text{ GHz}$: $\pm 1,5 \text{ dB}, 1 \text{ MHz} < f_{\text{interferer}} \leq 3 \text{ GHz}$ $\pm 3,3 \text{ dB}, 3 \text{ GHz} < f_{\text{interferer}} \leq 12,75 \text{ GHz}$ Wanted signal $4,2 \text{ GHz} < f \leq 6 \text{ GHz}$: $\pm 1,9 \text{ dB}, 1 \text{ MHz} < f_{\text{interferer}} \leq 3 \text{ GHz}$ $\pm 3,5 \text{ dB}, 3 \text{ GHz} < f_{\text{interferer}} \leq 12,75 \text{ GHz}$	Out of band blocking, using CW interferer: • $f \leq 3,0 \text{ GHz}$ • Wanted signal level $\pm 0,7 \text{ dB}$ • $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$ • Wanted signal level $\pm 1,0 \text{ dB}$ Interferer signal level: • $\pm 1,0 \text{ dB}$ up to 3 GHz • $\pm 3,0 \text{ dB}$ up to $12,75 \text{ GHz}$ • Interferer ACLR not applicable • Impact of interferer Broadband noise $0,1 \text{ dB}$.
6.2.2.3 Spurious response	Same as clause 6.2.2.2	

Test	Maximum Test System Uncertainty	Note
6.2.3.1 Wide band intermodulation	$\pm 1,4 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 2,6 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 3,8 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	Overall intermodulation uncertainty comprises three quantities: 1) Wanted signal level error 2) CW Interferer level error 3) Modulated Interferer level error Effect of interferer ACLR has not been included as modulated interferer has larger frequency offset The effect of the closer CW signal has twice the effect. Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared to provide the combined effect of the three signals.
6.2.4.1 Spurious emissions	$\pm 2,0 \text{ dB}, 30 \text{ MHz} < f \leq 4 \text{ GHz}$ $\pm 4,0 \text{ dB}, 4 \text{ GHz} < f \leq 19 \text{ GHz}$	
6.2.5.1 RSSI-1 measurement	$\pm 0,7 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,0 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 1,3 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	
6.2.5.2 RSSI-2 measurement	$\pm 0,7 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,0 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 1,3 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	
6.2.5.3 SNR measurement	$\pm 0,7 \text{ dB}, f \leq 3 \text{ GHz}$ $\pm 1,0 \text{ dB}, 3 \text{ GHz} < f \leq 4,2 \text{ GHz}$ $\pm 1,3 \text{ dB}, 4,2 \text{ GHz} < f \leq 6 \text{ GHz}$	

C.2 Interpretation of measurement results

The Test Requirements in the present document have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances (TT) defined in clause C.1. The measurement results returned by the Test System are compared - without any modification - against the Test Requirements as defined by either the "Never fail a good DUT" principle for Test Tolerance equal measurement uncertainty (TT = MU) or "Shared Risk" principle for Test Tolerance equal to 0 (TT = 0).

The "Never fail a good DUT" and the "Shared Risk" principles are defined in ETSI ETR 273-1-2 [i.1], clause 6.5.

The actual measurement uncertainty of the Test System for the measurement of each parameter shall be included in the test report.

The recorded value for the Test System uncertainty shall be, for each measurement, equal to or lower than the appropriate figure in clause C.1 of the present document.

If the Test System for a test is known to have a measurement uncertainty greater than that specified in clause C.1, it is still permitted to use this apparatus provided that an adjustment is made value as follows:

Any additional uncertainty in the Test System over and above that specified in clause C.1 shall be used to tighten the Test Requirement, making the test harder to pass. For some tests, for example receiver tests, this may require modification of stimulus signals. This procedure will ensure that a Test System not compliant with clause C.1 does not increase the chance of passing a device under test where that device would otherwise have failed the test if a Test System compliant with clause C.1 had been used.

Annex D (normative): Test sites and arrangements for radiated measurements

D.1 Introduction

This annex describes the use of test sites (including antennas) to perform radiated measurements in accordance with the present document.

In addition, the present annex describes the use of a test fixture to perform conducted (relative) measurements on equipment with integral antennas. It also defines the interference signal to be used in the adaptivity tests.

Subsequently the following items will be described:

- Open Area Test Site (OATS).
- Semi Anechoic Room (SAR).
- Fully Anechoic Room (FAR).
- Test fixture for relative measurements.

The first three are generally referred to as free field test sites. Both absolute and relative measurements can be performed on these sites. They will be described in clause D.2. Clause D.3 describes the antennas used in these test sites.

Where absolute measurements are to be carried out, the chamber should be verified. A detailed verification procedure is described in clause 6 of ETSI TR 102 273-4 [i.6] for the OATS, in clause 6 of ETSI TR 102 273-3 [i.5] for the SAR, and in clause 6 of ETSI TR 102 273-2 [i.4] for the FAR.

Information for calculating the measurement uncertainty of measurements on one of these test sites can be found in ETSI TR 100 028-1 [i.2], ETSI TR 100 028-2 [i.3], ETSI TR 102 273-2 [i.4], ETSI TR 102 273-3 [i.5] and ETSI TR 102 273-4 [i.6].

D.2 Radiation test sites

D.2.1 Open Area Test Site (OATS)

An Open Area Test Site comprises a turntable at one end and an antenna mast of variable height at the other end above a ground plane which, in the ideal case, is perfectly conducting and of infinite extent. In practice, while good conductivity can be achieved, the ground plane size has to be limited. A typical Open Area Test Site is shown in Figure D.2.1-1.

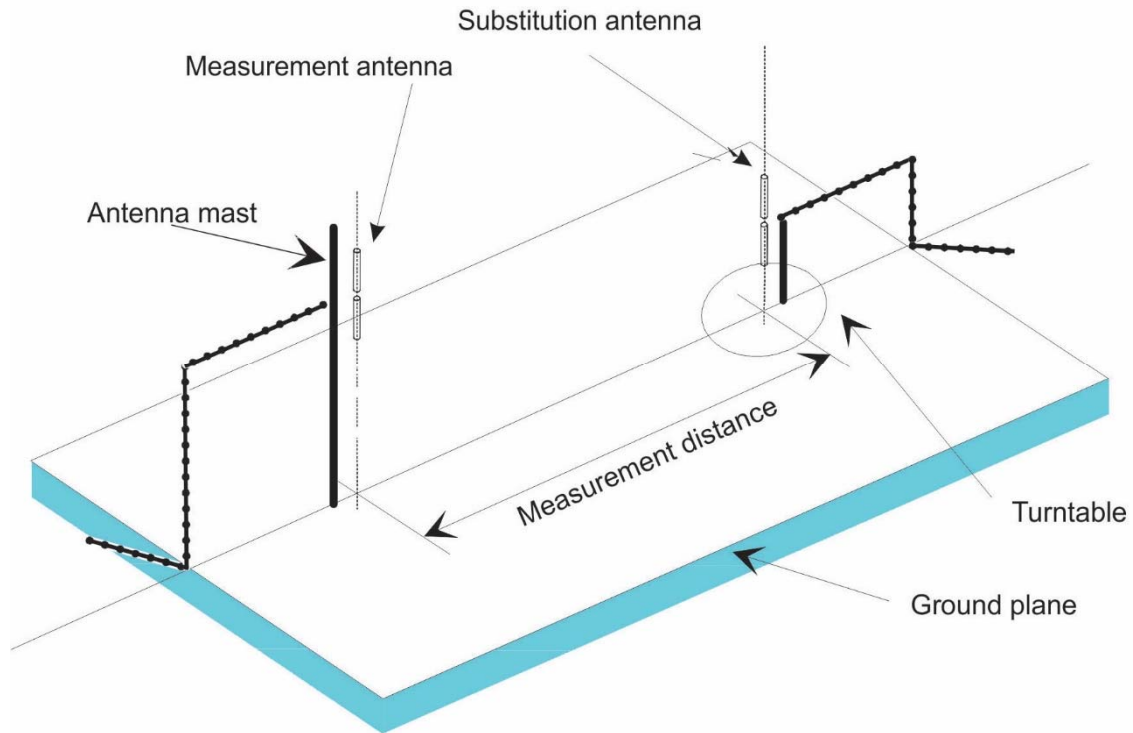


Figure D.2.1-1: A typical Open Area Test Site

The ground plane creates a wanted reflection path, such that the signal received by the receiving antenna is the sum of the signals received from the direct and reflected transmission paths. The phasing of these two signals creates a unique received level for each height of the transmitting antenna (or EUT) and the receiving antenna above the ground plane.

The antenna mast provides a variable height facility (from 1 m to 4 m) so that the position of the measurement antenna can be optimized for maximum coupled signal between antennas or between an EUT and the measurement antenna.

A turntable is capable of rotation through 360° in the horizontal plane and it is used to support the test sample (EUT) at a height of usually 1,5 m above the ground plane.

The measurement distance and minimum chamber dimensions can be found in clause D.2.4. The distance used in actual measurements shall be recorded with the test results.

Further information on Open Area Test Sites can be found in ETSI TR 102 273-4 [i.7].

D.2.2 Semi Anechoic Room (SAR)

A Semi Anechoic Room - or anechoic chamber with a conductive ground plane - is an enclosure, usually shielded, whose internal walls and ceiling are covered with radio absorbing material. The floor, which is metallic, is not covered by absorbing material and forms the ground plane. The chamber usually contains an antenna mast at one end and a turntable at the other end.

A typical anechoic chamber with a conductive ground plane is shown in Figure D.2.2-1.

This type of test chamber attempts to simulate an ideal Open Area Test Site, whose primary characteristic is a perfectly conducting ground plane of infinite extent.

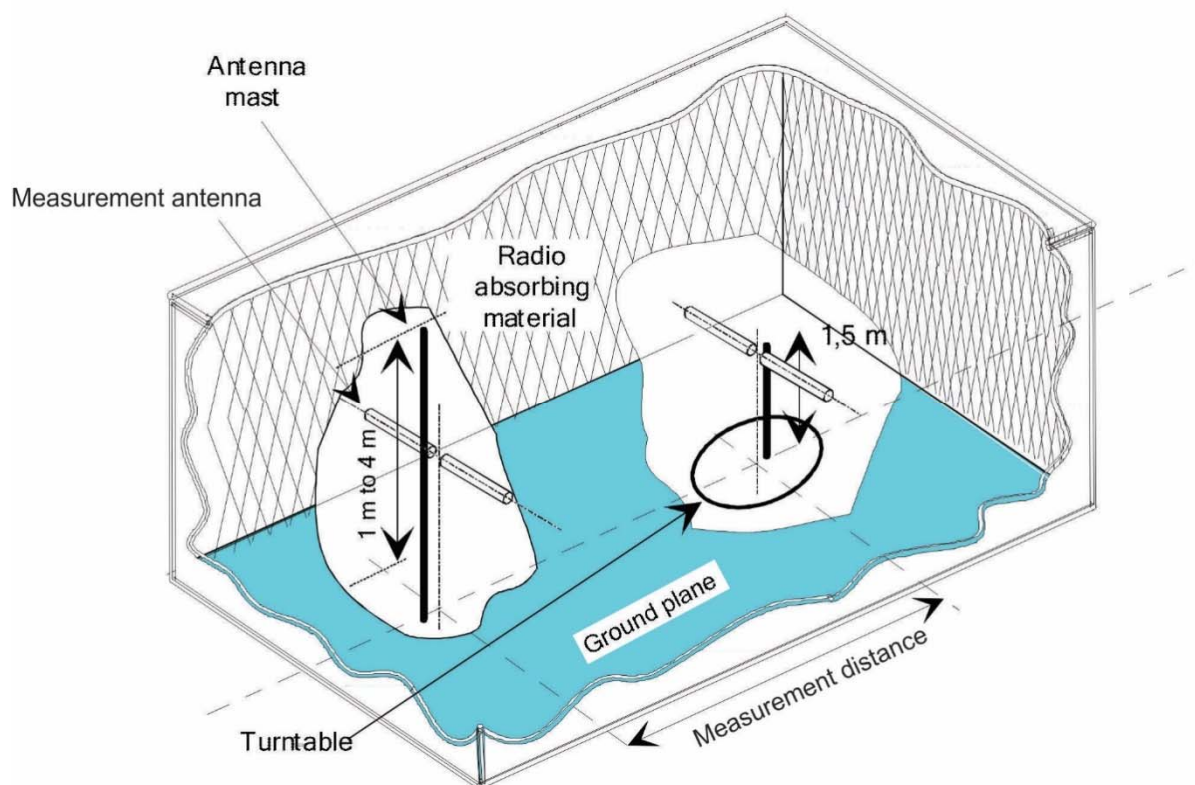


Figure D.2.2-1: A typical Semi Anechoic Room

In this facility the ground plane creates a wanted reflection path, such that the signal received by the receiving antenna is the sum of the signals received from the direct and reflected transmission paths. The phasing of these two signals creates a unique received level for each height of the transmitting antenna (or EUT) and the receiving antenna above the ground plane.

The antenna mast provides a variable height facility (from 1 m to 4 m) so that the position of the measurement antenna can be optimized for maximum coupled signal between antennas or between an EUT and the measurement antenna.

A turntable is capable of rotation through 360° in the horizontal plane and it is used to support the test sample (EUT) at a height of usually 1,5 m above the ground plane.

The measurement distance and minimum chamber dimensions can be found in clause D.2.4. The distance used in actual measurements shall be recorded with the test results.

Further information on Semi Anechoic Rooms can be found in ETSI TR 102 273-3 [i.6].

D.2.3 Fully Anechoic Room (FAR)

A Fully Anechoic Room is an enclosure, usually shielded, whose internal walls, floor and ceiling are covered with radio absorbing material. The chamber usually contains an antenna support at one end and a turntable at the other end.

A typical Fully Anechoic Room is shown in Figure D.2.3-1.

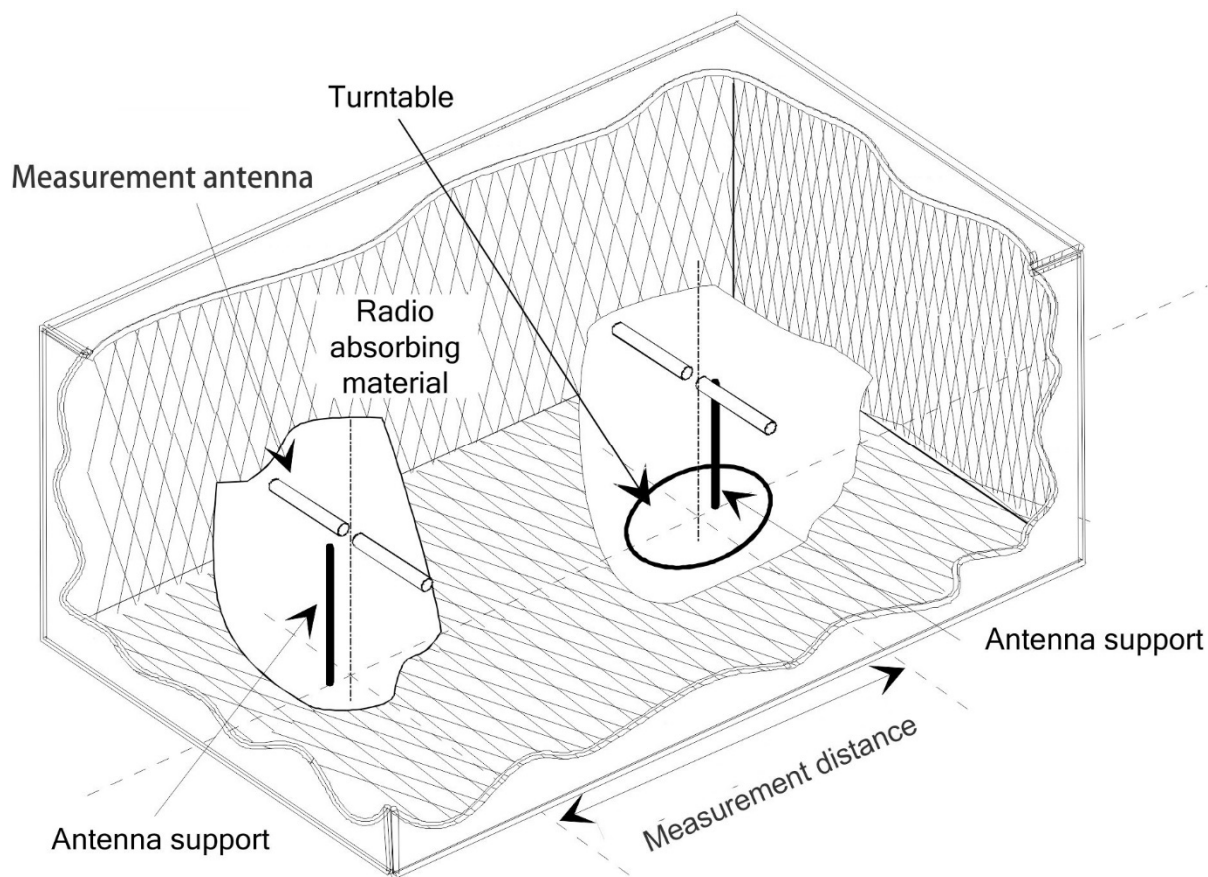


Figure D.2.3-1: A typical Fully Anechoic Room

The chamber shielding and radio absorbing material provide a controlled environment for testing purposes. This type of test chamber attempts to simulate free space conditions.

The shielding provides a test space, with reduced levels of interference from ambient signals and other outside effects, whilst the radio absorbing material minimizes unwanted reflections from the walls and ceiling which can influence the measurements. The shielding should be sufficient to eliminate interference from the external environment that would mask any signals that have to be measured.

A turntable is capable of rotation through 360° in the horizontal plane and it is used to support the EUT at a height of usually 1 m above the absorbing material.

The measurement distance and minimum chamber dimensions can be found in clause D.2.4. The distance used in actual measurements shall be recorded with the test results.

Further information on Fully Anechoic Rooms can be found in ETSI TR 102 273-2 [i.5].

D.2.4 Measurement Distance

The measurement distance should be chosen in order to measure the EUT at far-field conditions. The minimum measurement distance between the equipment and the measurement antenna should be λ or $r_m \geq \frac{D^2}{\lambda}$ whichever is the greater:

λ = wavelength in m

r_m = minimum measurement distance between EUT and measurement antenna in m

D = largest dimension of physical aperture of the largest antenna in the measurement setup, in m

$\frac{D^2}{\lambda}$ = distance between outer boundary of radiated near field (Fresnel region) and inner boundary of the radiated far-field (Fraunhofer region) in m, also known as Rayleigh distance

For those measurements, where these conditions cannot be fulfilled and where the measurement distance would result in measurements in the near field (e.g. while measuring spurious emissions), this should be noted in the test report and the additional measurement uncertainty should be incorporated into the results.

D.3 Antennas

D.3.1 Introduction

Antennas are needed for the radiated measurements on the three test sites described in clause D.2. Depending on its use, the antenna will be designated as "measurement antenna" or "substitution antenna".

D.3.2 Measurement antenna

The measurement antenna is used to determine the field from the EUT and from the substitution antenna. When the test site is used for the measurement of receiver characteristics, the antenna is used as the transmitting device.

The measurement antenna should be mounted on a support capable of allowing the antenna to be used in either horizontal or vertical polarization. Additionally, on an OATS or SAR, the height of the centre of the antenna above the ground should be variable over the specified range (usually 1 m to 4 m).

In the frequency band 30 MHz to 1 000 MHz, biconical or Logarithmic Periodic Dipole Antennas (LPDA) are recommended. Above 1 GHz, horn antennas or logarithmic periodic dipole antennas are recommended.

D.3.3 Substitution antenna

The substitution antenna shall be used to replace the equipment under test in substitution measurements.

The substitution antenna shall be suitable for the frequency range and the return loss of the antenna shall be taken into account when calculating the measurement uncertainty.

The reference point of the substitution antenna shall coincide with the volume centre of the EUT when its antenna is internal, or the point where an external antenna is connected to the EUT.

The distance between the lower extremity of the antenna and the ground shall be at least 30 cm.

The substitution antenna shall be calibrated. For below 1 GHz, the calibration is relative to a half wave dipole, while above 1 GHz, an isotropic radiator is the reference.

D.4 Test fixture

D.4.1 Introduction

Conducted measurements may be applied to equipment provided with a (temporary) antenna connector, e.g. by means of a spectrum analyser.

In the case of integral antenna equipment with no external (temporary) antenna connector(s) provided, a test fixture can be used to allow relative measurements to be performed at the extremes of temperature.

D.4.2 Description of the test fixture

The test fixture shall provide a means of coupling to the radio frequency output(s) of the EUT.

The impedance of the external connection to the test fixture shall be 50 Ω at the working frequencies of the equipment.

The performance characteristics of this test fixture under normal and extreme conditions shall be such that:

- a) the coupling loss shall be limited to ensure a sufficient dynamic range of the setup;
- b) the variation of coupling loss with frequency shall not cause errors exceeding ± 2 dB;
- c) the coupling device shall not include any non-linear elements.

D.4.3 Using the test fixture for relative measurements

The different steps below describe the principle for performing relative measurements for those requirements where testing needs to be repeated at the extremes of the temperature.

- Step 1:** Perform the measurement under normal conditions on a test site for radiated measurements as described in clause D.2. This will result in an absolute value for the requirement being tested. This value shall be recorded.
- Step 2:** Put the equipment with the test fixture in the temperature chamber. Perform the same measurement at normal conditions in this environment and normalize the measuring equipment to get the same reading as before in step 1.
- Step 3:** Ensure that the RF coupling accuracy remains within the range specified in clause D.4.2, item b).
- Step 4:** Change the temperature in the temperature chamber and perform the measurement again. Due to the normalization done in step 2, the result will be the value for this requirement at the extreme condition.

D.5 Guidance on the use of radiation test sites

D.5.1 Introduction

This clause details procedures, test equipment arrangements and verification that should be carried out before any of the radiated test are undertaken. These schemes are common to all types of test sites described in clause E.2.

Where necessary, a mounting bracket of minimal size should be available for mounting the EUT on the turntable. This bracket should be made from low conductivity, low relative permittivity (i.e. $\frac{\epsilon}{\epsilon_0} < 1,5$ material(s) such as expanded polystyrene, balsawood, etc.

D.5.2 Power supplies for the battery powered EUT

All tests should be performed using power supplies wherever possible, including tests on EUT designed for battery only use. For battery powered equipment, power leads should be connected to the EUT's supply terminals (and monitored with a digital voltmeter) but the battery should remain present, electrically isolated from the rest of the equipment, possibly by putting tape over its contacts.

The presence of these power cables can, however, affect the measured performance of the EUT. For this reason, they should be made to be "transparent" as far as the testing is concerned. This can be achieved by routing them away from the EUT and down to the either the screen, ground plane or facility wall (as appropriate) by the shortest possible paths.

Precautions should be taken to minimize pick-up on these leads (e.g. the leads could be twisted together, loaded with ferrite beads at 0,15 m spacing or otherwise loaded).

D.5.3 Site preparation

The cables to the measuring and substitution antenna should be routed horizontally away from the testing area for a minimum of 2 m (unless, in the case both types of anechoic chamber, a back wall is reached) and then allowed to drop vertically and out through either the ground plane or screen (as appropriate) to the test equipment. Precautions should be taken to minimize pick up on these leads (e.g. dressing with ferrite beads, or other loading). The cables, their routing and dressing should be identical to the verification set-up.

NOTE: For ground reflection test sites (i.e. anechoic chambers with ground planes and Open Area Test Sites) which incorporate a cable drum with the antenna mast, the 2 m requirement may be impossible to comply with.

Calibration data for all items of test equipment should be available and valid. For test, substitution and measuring antennas, the data should include gain relative to an isotropic radiator (or antenna factor) for the frequency of test. Also, the VSWR of the substitution and measuring antennas should be known.

The calibration data on all cables and attenuators should include insertion loss and VSWR throughout the entire frequency range of the tests. All VSWR and insertion loss figures should be recorded in the logbook results sheet for the specific test.

Where correction factors/tables are required, these should be immediately available.

For all items of test equipment, the maximum errors they exhibit should be known along with the distribution of the error, e.g.:

- cable loss: $\pm 0,5$ dB with a rectangular distribution;
- measuring receiver: 1,0 dB (standard deviation) signal level accuracy with a Gaussian error distribution.

At the start of measurements, system checks should be made on the items of test equipment used on the test site.

D.6 Coupling of signals

D.6.1 General

The presence of leads in the radiated field may cause a disturbance of that field and lead to additional measurement uncertainty. These disturbances can be minimized by using suitable coupling methods, offering signal isolation and minimum field disturbance (e.g. optical coupling).

D.6.2 Data Signals

Isolation can be provided by the use of optical, ultrasonic or infra-red means. Field disturbance can be minimized by using a suitable fibre optic connection. Ultrasonic or infra-red radiated connections require suitable measures for the minimization of ambient noise.

Annex E (normative): Procedures for radiated measurements

E.1 Introduction

The present annex gives the general procedures for radiated measurements using the test sites and arrangements described in Annex D.

Preferably, radiated measurements shall be performed in a FAR, see clause E.3. Radiated measurements in an OATS or SAR are described in clause E.2.

E.2 Radiated measurements in an OATS or SAR

Radiated measurements shall be performed with the aid of a measurement antenna and a substitution antenna, in test sites described in Annex D. The measurement set-up shall be calibrated according to the procedure defined in the present annex. The EUT and the measurement antenna shall be oriented such as to obtain the maximum emitted power level. This position shall be recorded in the measurement report:

- a) The measurement antenna (device 2 in Figure E.2-1) shall be oriented initially for vertical polarization unless otherwise stated and the EUT (device 1 in Figure E.1) shall be placed on the support in its standard position and switched on.
- b) The measurement equipment (device 3 in Figure E.2-1) shall be connected to the measurement antenna and set-up according to the specifications of the test.

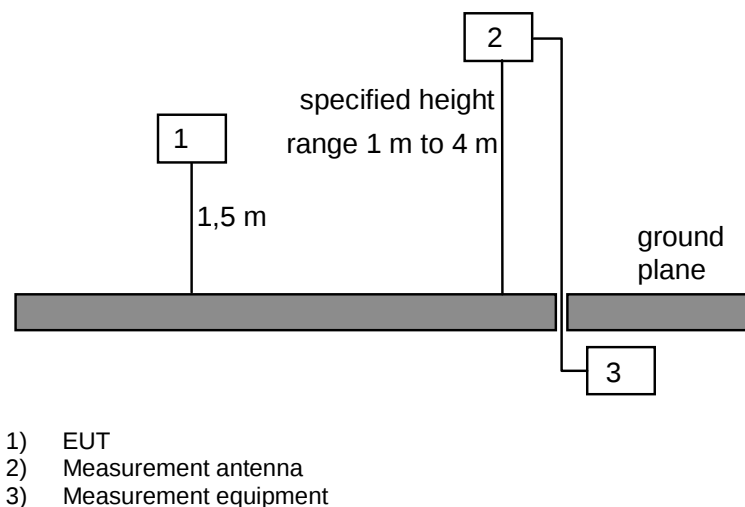


Figure E.2-1: Measurement arrangement

- c) The EUT shall be rotated through 360° in a horizontal plane until a higher maximum signal is received.
- d) The measurement antenna shall be raised or lowered again through the specified height range until a maximum is obtained. This level shall be recorded. This maximum may be a lower value than the value obtainable at heights outside the specified limits.
- e) This measurement procedure in step c) and step d) above shall be repeated for horizontal polarization.

E.3 Radiated measurements in a FAR

For radiated measurements using a FAR, the procedure is identical to the one described in clause D.2, except that the height scan in step d) is omitted.

E.4 Substitution measurement

To determine the absolute measurement value a substitution measurement is performed. The following steps have to be performed:

- 1) Replacing the EUT with the substitution antenna that is depicted as device 1 in Figure E.2-1. The substitution antenna shall have vertical polarization.
- 2) Connect a signal generator to the substitution antenna, and adjust it to the measurement frequency.
- 3) If an OATS or a SAR is used, the measurement antenna height shall be varied within the range provided in Figure E.2-1 to ensure that the maximum signal is received.
- 4) Subsequently, the power of the signal generator is adjusted until the same level is obtained again at the measurement equipment.
- 5) The radiated power is equal to the power supplied by the signal generator, increased with the substitution antenna gain minus the cable losses (values in dB).
- 6) This measurement procedure described in step 2) to step 5) above shall be repeated with horizontal polarization for the substitution antenna.

For test sites with a fixed setup of the measurement antenna(s) and a reproducible positioning of the EUT, correction values from a verified site calibration can be used alternatively.

Annex F (normative): EUT special conformance test functions

F.1 General description

F.1.1 Introduction

The EUT provides a set of functions in support of conformance testing. The functions are only accessible in test standby mode of the EUT, see clause F.1.2.

The SS performs activation and deactivation of the conformance test functions in the EUT by sending test control messages. The messages can be used to:

- 1) Select EUT test loop function.
- 2) Select EUT measurement mode function.

F.1.2 Test standby mode

Accessibility to test control messages is controlled by some means of mechanical interlocking method, manual switching, (e.g. dip-switch, jumper, prom, key-pad code, UART command) or by manufacturer's secure and proprietary over-the-air control test mode control mechanism, as designated by the manufacturer to prevent accidental execution of these messages in a DECT-2020 NR user environment.

For testing physical layer functionality, the device can support only the EUT special conformance testing functions without the full DECT-2020 NR MAC, DLC and CVG layers functionality which conformance test setups are defined in ETSI TS 104 047-2 [4].

When the EUT has been configured into a mode whereby the test messages are accessible, the EUT is said to be in the test standby mode.

F.1.3 Security protection of test control messages

Test control messages are only used in controlled test environment while the EUT is in test standby mode. No security protection of test control messages is used.

F.1.4 Protocol implementation extra information for testing

A statement made by the manufacturer which contains or references all of the information related to the EUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the EUT.

This shall include:

- the method by which the equipment can be switched into the test standby mode. This mode is described in clause F.1.2;
- the test control channel supported by the EUT, given as an absolute channel frequency number as defined in ETSI TS 103 636-2 [1].

F.2 Test standby mode procedures

F.2.1 General

In test standby mode the EUT first finds the SS and then awaits control messages from the SS.

F.2.2 Connection establishment procedure

The EUT may be capable of operating on several operating bands. To establish communication with the SS the EUT finds the SS.

During the connection establishment procedure, the SS shall:

- transmit a TEST_CONTROL_BEACON message every 10 ms on the test control channel;
- activate reception latest 1 ms after each beacon transmission on the test control channel. The reception shall last for the rest of the 10ms frame until transmission of next TEST_CONTROL_BEACON;
- if TEST_CONTROL_CONNECT message is received:
 - send TEST_CONTROL_CONNECT_COMPLETE message on the test control channel;
 - enter the test control procedure.

During the connection establishment procedure, the EUT shall:

- receive packets on the test control channel;
- if TEST_CONTROL_BEACON is received:
 - send TEST_CONTROL_CONNECT message on the test control channel;
- if TEST_CONTROL_CONNECT_COMPLETE is received:
 - enter the test control procedure.

F.2.3 Test control procedure

During test control procedure the SS controls the EUT on the test control channel. The details of these procedures are described in the individual test procedures.

Unless otherwise described in a test procedure, all radio operations happen on the test control channel during the test control procedure.

Additionally, the SS shall:

- transmit a TEST_CONTROL_BEACON message every 1 second unless a test case is being run;
- if communication with the EUT has been lost:
 - enter the connection establishment procedure.

The EUT shall:

- receive packets from SS;
- perform test mode specific actions based on the received packets. The modes are defined in clause F.3;
- if no packets have been received from the SS in 5 seconds:
 - enter the connection establishment procedure.

F.3 EUT test modes

F.3.1 General description

F.3.1.1 Overview

The EUT test modes provide access to isolated functions of the EUT via the radio interface without introducing wherever possible new physical interfaces just for the reason of conformance testing. The test modes are divided into measurement mode and loop mode.

F.3.1.2 EUT measurement mode

The measurement mode is activated by transmitting `ACTIVATE_MEASUREMENT_MODE` message to the EUT.

The measurement mode can be operated in different modes:

- EUT measurement mode A;
- EUT measurement mode B.

In measurement mode A the EUT performs RSSI-1 measurements on the test channel.

In measurement mode B the EUT receives and decodes packets from the SS, and measures RSSI-2, and SNR.

F.3.1.3 EUT loop mode

The loop mode is activated by transmitting `ACTIVATE_TX_LOOP_MODE` or `ACTIVATE_RX_LOOP_MODE` message to the EUT.

The loop mode can be operated in different modes:

- EUT Transmit loop mode.
- EUT Receive loop mode.

In EUT Transmit loop mode EUT transmits packets with random PHY Data SDU for TS to analyse the transmitter performance.

In EUT Receive loop mode EUT receives and decodes packets from the SS, and measures RSSI-2 and SNR, and transmits an acknowledgement, measurement results and data back to the SS for each packet.

F.3.2 Common transmission parameters

Unless otherwise specified in a test case:

- all test control messages shall be transmitted with a transmission power guaranteeing that messages are received correctly without needing to explicitly acknowledge messages or perform retransmissions;
- all test control messages shall use MCS 1;
- the short network ID used by the SS in the `TEST_CONTROL_BEACON` shall be used as the short network ID of all transmitted messages;
- the 24 MSB bits of the network ID is transmitted in `TEST_CONTROL_BEACON`;
- the transmitter identity used by the SS in the `TEST_CONTROL_BEACON` shall be used as the short RD ID of the SS;
- the transmitter identity used by the EUT in the `TEST_CONTROL_CONNECT` message shall be used as the short RD ID of the EUT;

- for the test control messages HARQ shall not be used.

F.4 EUT measurement mode procedures

F.4.1 General

The EUT measurement mode procedures are intended for setting the EUT into a measurement mode where the SS sends a number of packets to the EUT, and the EUT performs measurements over the packets and reports a measurement summary at the end of the measurement mode procedure.

F.4.2 Measurement mode activation

The SS requests the EUT to activate a measurement mode by transmitting an `ACTIVATE_MEASUREMENT_MODE` message.

Upon receiving the `ACTIVATE_MEASUREMENT_MODE` the EUT shall:

- send `ACTIVATE_MEASUREMENT_MODE_COMPLETE` message;
- activate measurement mode indicated by `MEASUREMENT_MODE` field of the received message.

Once a measurement mode has been activated, the EUT shall:

- perform all transmission and reception on the `MEASUREMENT_CHANNEL` indicated in the `ACTIVATE_MEASUREMENT_MODE` message.

F.4.3 Measurement mode A (RSSI-1)

F.4.3.1 Measurement mode A operation

In measurement mode A the EUT shall:

- continuously receive packets and measure RSSI-1 on the `MEASUREMENT_CHANNEL` starting at the time `MEASUREMENT_START_TIME`;
- if `DEACTIVATE_MEASUREMENT_MODE` packet is received:
 - send `REPORT_MEASUREMENT_MODE_A` message;
 - return to test standby mode.

F.4.3.2 Measurement mode A reporting

The EUT shall report the last measured RSSI-1 value.

F.4.4 Measurement mode B (packet reception)

F.4.4.1 Measurement mode B operation

In measurement mode B the SS shall:

- keep its transmission characteristics such as in RSSI signal level or interference level constant between consecutive transmissions.

In measurement mode B the EUT shall:

- continuously receive packets on the MEASUREMENT_CHANNEL starting at the time MEASUREMENT_START_TIME;
- for each received packet:
 - packet measure per-packet RSSI-2_{PACKET} and SNR_{PACKET};
 - calculate average RSSI-2 and average SNR as specified in ETSI TS 103 636-2 [1];
 - if the received packet is DEACTIVATE_MEASUREMENT_MODE:
 - send REPORT_MEASUREMENT_MODE_B message;
 - return to test standby mode.

F.4.4.2 Measurement mode B reporting

The EUT shall report:

- received_packet_count, the total number of packets received during the measurement period;
- average_rssi_2, as specified in ETSI TS 103 636-2 [1];
- average_snr, as specified in ETSI TS 103 636-2 [1].

F.5 EUT loop mode procedures

F.5.1 General

The EUT loop mode is intended for:

- DECT-2020 NR RF receiver and transmitter testing to receive and transmit DECT-2020 NR packets with controlled transmission characteristics.

F.5.2 Loop mode activation

The SS requests the EUT to activate a loop mode by transmitting an appropriate ACTIVATE_TX_LOOP_MODE or ACTIVATE_RX_LOOP_MODE message.

Upon receiving the ACTIVATE_{TX/RX}_LOOP_MODE the EUT shall:

- send ACTIVATE_{TX/RX}_LOOP_MODE_COMPLETE message;
- activate the loop mode indicated by loop_mode_type field of the received message.

Once a loop mode has been activated, the EUT shall:

- perform all packet receptions or transmissions on the loop_channel indicated in the ACTIVATE_{TX/RX}_LOOP_MODE message.

F.5.3 Transmit loop mode operation

In Transmit loop mode TS shall:

- receive packets sent by the EUT;
- analyse EUT transmitter performance.

In Transmit loop mode EUT shall:

- continuously transmit and count the transmitted packets on loop_channel starting at loop_start_delay from the reception of ACTIVATE_TX_LOOP_MODE message with loop_period interval between packets until loop_duration has expired according to the configuration set by the SS in ACTIVATE_TX_LOOP_MODE message;
- transmit REPORT_TX_LOOP_MODE after expiration of loop_duration before returning to test standby mode.

F.5.4 Receive loop mode operation

In Receive loop mode the SS shall:

- continuously send packets to EUT, and expect ACK/NACK response for each packet;
- analyse EUT receiver performance based on received ACK/NACK responses, considering also the missing responses.

In Receive loop mode the EUT shall:

- continuously receive packets on the loop_channel starting at loop_start_delay from the reception of the ACTIVATE_TX_LOOP message; and
 - demodulate and decode received packets;
 - count the correctly received packets;
 - measure the per packet RSSI-2 and SNR;
- if the received packet is RX_LOOP_MODE_DATA:
 - prepare a response message:
 - use packet configuration and transmission power specified in ACTIVATE_RX_LOOP_MODE message;
 - if transmission power exceeds the EUT device class capabilities, use the largest transmission power its device class capabilities allow;
 - indicate ACK/NACK feedback in the PCC of the response packet according to PDC decoding result;
 - fill in fields of RX_LOOP_MODE_DATA_RESPONSE:
 - set the rssi-2 and snr fields;
 - fill the data field;
 - send the RX_LOOP_MODE_DATA_RESPONSE message after the time indicated by loop_response_delay;
- else if the received packet is DEACTIVATE_LOOP_MODE:
 - send REPORT_LOOP_MODE message;
 - deactivate the loop mode and return to test standby mode.

F.6 Test protocol messages

F.6.1 General

F.6.1.1 Message structure

Unless otherwise specified for a message, all test protocol messages have Physical Layer Control Field: Type 2, Header Format: 001 as defined in clause 6.2 of ETSI TS 103 636-4 [3], encoded according to ETSI TS 103 636-3 [2], clause 7.5, and mapped onto PCC.

PHY Data SDU contains message's fields indicate the fields' octet(s) appended either with all zero or random PN15 data to the transport block size specified in ETSI TS 103 636-3 [2], clause 5.3. PHY Data SDU is encoded according to ETSI TS 103 636-3 [2], clause 7.6 and mapped into PDC.

Transmission order is as specified in ETSI TS 103 636-4 [3], clause 4.6.

F.6.1.2 Message codes

Table F.6.1.2-1 lists the message codes.

Table F.6.1.2-1: Message codes

Value	Message
0x00	Reserved
0x01	TEST_CONTROL_BEACON
0x02	TEST_CONTROL_CONNECT
0x03	TEST_CONTROL_CONNECT_COMPLETE
0x04	ACTIVATE_MEASUREMENT_MODE
0x05	ACTIVATE_MEASUREMENT_MODE_COMPLETE
0x06	DEACTIVATE_MEASUREMENT_MODE
0x07	ACTIVATE_TX_LOOP_MODE
0x08	ACTIVATE_TX_LOOP_MODE_COMPLETE
0x09	ACTIVATE_RX_LOOP_MODE
0x0A	ACTIVATE_RX_LOOP_MODE_COMPLETE
0x0B	DEACTIVATE_LOOP_MODE
0x0C to 0x0F	Reserved
0x10	REPORT_MEASUREMENT_MODE_A
0x11	REPORT_MEASUREMENT_MODE_B
0x12	REPORT_TX_LOOP_MODE
0x13	REPORT_RX_LOOP_MODE
0x13 to 0x1F	Reserved
0x20	TX_LOOP_MODE_DATA
0x21	RX_LOOP_MODE_DATA
0x22	RX_LOOP_MODE_DATA_RESPONSE

F.6.2 Test control messages

F.6.2.1 TEST_CONTROL_BEACON

The message is a half-slot packet with Physical Layer Control Field: Type 1, Header Format: 000, as defined in ETSI TS 103 636-4 [3], clause 6.2.

PHY Data SDU for this message is described in Table F.6.2.1-1.

Table F.6.2.1-1: TEST_CONTROL_BEACON message

Field	Octet	Description
message_code	0	Message code, set to TEST_CONTROL_BEACON
network ID	1..3	First 24 bits of the Network ID, EUT shall use this network ID for scrambling code initialization as specified in ETSI TS 103 636-3 [2], clause 7.6.6.
data	4...(TBS-1)	Set to zero

F.6.2.2 TEST_CONTROL_CONNECT

PHY Data SDU for this message is described in Table F.6.2.2-1.

Table F.6.2.2-1: TEST_CONTROL_CONNECT message

Field	Octet	Description
message_code	0	Message code, set to TEST_CONTROL_CONNECT
data	1...(TBS-1)	Set to zero

F.6.2.3 TEST_CONTROL_CONNECT_COMPLETE

PHY Data SDU for this message is described in Table F.6.2.3-1.

Table F.6.2.3-1: TEST_CONTROL_CONNECT_COMPLETE message

Field	Octet	Description
message_code	0	Message code, set to TEST_CONTROL_CONNECT_COMPLETE
status	1	Request status, values: 0: success 1: failure 2-255: reserved
data	2...(TBS-1)	Set to zero

F.6.3 Measurement control messages

F.6.3.1 ACTIVATE_MEASUREMENT_MODE

PHY Data SDU for this message is described in Table F.6.3.1-1.

Table F.6.3.1-1: ACTIVATE_MEASUREMENT_MODE message

Field	Octet	Description
message_code	0	Message code, set to ACTIVATE_MEASUREMENT_MODE
measurement_mode	1	Measurement mode, values: 0: measurement mode A 1: measurement mode B 2-255: reserved
measurement_channel	2...3	Channel on which the measurement is to take place. Value: absolute channel frequency number as defined in ETSI TS 103 636-2 [1].
measurement_start_time	4	Measurement start time in subslots as delta to the STF of the ACTIVATE_MEASUREMENT_MODE message.
data	5...(TBS-1)	Set to zero

F.6.3.2 ACTIVATE_MEASUREMENT_MODE_COMPLETE

PHY Data SDU for this message is described in Table F.6.3.2-1.

Table F.6.3.2-1: ACTIVATE_MEASUREMENT_MODE_COMPLETE message

Field	Octet	Description
message_code	0	Message code, set to ACTIVATE_MEASUREMENT_MODE_COMPLETE
status	1	Request status, values: 0: success 1: failure 2-255: reserved
data	2...(TBS-1)	Set to zero

F.6.3.3 DEACTIVATE_MEASUREMENT_MODE

PHY Data SDU for this message is described in Table F.6.3.3-1.

Table F.6.3.3-1: DEACTIVATE_MEASUREMENT_MODE message

Field	Octet	Description
message_code	0	Message code, set to DEACTIVATE_MEASUREMENT_MODE
data	1...(TBS-1)	Set to zero

F.6.4 Measurement report messages

F.6.4.1 REPORT_MEASUREMENT_MODE_A

PHY Data SDU for this message is described in Table F.6.4.1-1.

Table F.6.4.1-1: REPORT_MEASUREMENT_MODE_A message

Field	Octet	Description
message_code	0	Message code, set to REPORT_MEASUREMENT_MODE_A
average_rssi_1	1	Averaged RSSI-1. Value: RSSI-1 measurement reported value as defined in ETSI TS 103 636-2 [1].
data	2...(TBS-1)	Set to zero

F.6.4.2 REPORT_MEASUREMENT_MODE_B

PHY Data SDU for this message is described in Table F.6.4.2-1.

Table F.6.4.2-1: REPORT_MEASUREMENT_MODE_A message

Field	Octet	Description
message_code	0	Message code, set to REPORT_MEASUREMENT_MODE_A
average_rssi_2	1	RSSI-2 averaged as specified in clause F.4.4.2. Value: RSSI-2 measurement reported value as defined in ETSI TS 103 636-2 [1].
average_snr	2	SNR averaged as specified in clause F.4.4.2. Value: SNR measurement reported value as defined in ETSI TS 103 636-2 [1].
received_packet_count	3...6	Number of packets received during the measurement
data	7...(TBS-1)	Set to zero

F.6.5 Loop control messages

F.6.5.1 ACTIVATE_TX_LOOP_MODE

PHY Data SDU for this message is described in Table F.6.5.1-1.

Table F.6.5.1-1: ACTIVATE_TX_LOOP_MODE message

Field	Octet	Description
message_code	0	Message code, set to ACTIVATE_TX_LOOP_MODE
loop_mode_type	1	Transmission loop mode type, values: 0: normal 1: normal, STF cover sequence off 2-255: reserved
loop_channel	2-3	Channel on which the transmission is to take place. Value: absolute channel frequency number as defined in ETSI TS 103 636-2 [1].
loop_start_delay	4	Transmission loop start time in subslots as delta to the STF of the ACTIVATE_TX_LOOP_MODE message.
loop_period	5	Transmission repetition period given in subslots
loop_duration	6	Transmission loop duration given in 10 ms frames. Zero value shall be interpreted as single transmission. Otherwise EUT shall implement many transmissions as possible during given number of 10 ms frames with given periodicity.
plcf_type	7	PLCF Type as in ETSI TS 103 636-4 [3], clause 6.2, values 0: reserved 1: type 1 2: type 2 3-255: reserved
plcf	8..12 or 8..17	PLCF as in ETSI TS 103 636-4 [3], clause 6.2 specifies the transmission format and transmission power EUT should use. Short Network ID, Transmitter Identity and Receiver Identity in EUT transmissions shall be set specified in clause F.3.2, values in these fields shall be disregarded. DF Redundancy version, DF New Data Indication, HARQ process number, Feedback format and Feedback Info in EUT transmissions shall be set by EUT, thus these fields shall be disregarded.
data	...(TBS-1)	Set to zero

F.6.5.2 ACTIVATE_TX_LOOP_MODE_COMPLETE

PHY Data SDU for this message is described in Table F.6.5.2-1.

Table F.6.5.2-1: ACTIVATE_TX_LOOP_MODE_COMPLETE message

Field	Octet	Description
message_code	0	Message code, set to ACTIVATE_TX_LOOP_MODE_COMPLETE
status	1	Request status, values: 0: success 1: failure 2-255: reserved
data	2...(TBS-1)	Set to zero

F.6.5.3 ACTIVATE_RX_LOOP_MODE

PHY Data SDU for this message is described in Table F.6.5.3-1.

Table F.6.5.3-1: ACTIVATE_RX_LOOP_MODE message

Field	Octet	Description
message_code	0	Message code, set to ACTIVATE_RX_LOOP_MODE
loop_mode_type	1	Reception loop mode type, values: 0: Receive loop mode, data field in response packet set to zeros 1: Receive loop mode, data field in response packet from random PN15 sequence 2-255: reserved
loop_channel	2-3	Channel on which the measurement is to take place. Value: absolute channel frequency number as defined in ETSI TS 103 636-2 [1].
loop_start_delay	4	Reception start time in subslots as delta to the STF of the ACTIVATE_RX_LOOP_MODE message.
packet_response_delay	5	Response delay in subslots as delta to the STF of the RX_LOOP_MODE_DATA message to the STF of the RX_LOOP_MODE_DATA_RESPONSE. SS shall not configure delay which exceeds EUT declared HARQ feedback delay ETSI TS 103 636-4 [3], clause 6.4.3.5. EUT HARQ feedback delay is declared in PICS info.
plcf_type	6	PLCF Type as in ETSI TS 103 636-4 [3], clause 6.2, values 0: reserved 1: type 1 2: type 2 3-255: reserved
plcf	7..11 or 7..16	PLCF as in ETSI TS 103 636-4 [3], clause 6.2. specifies the transmission format and transmission power EUT should use in response transmissions. Short Network ID, Transmitter Identity and Receiver Identity in EUT transmissions shall be set specified in clause F.3.2, values in these fields shall be disregarded. DF Redundancy version, DF New Data Indication, HARQ process number, Feedback format and Feedback Info in EUT transmissions shall be set by EUT, thus these fields shall be disregarded.
data	...(TBS-1)	Set to zero

F.6.5.4 ACTIVATE_RX_LOOP_MODE_COMPLETE

PHY Data SDU for this message is described in Table F.6.5.4-1.

Table F.6.5.4-1: ACTIVATE_RX_LOOP_MODE_COMPLETE message

Field	Octet	Description
message_code	0	Message code, set to ACTIVATE_RX_LOOP_MODE_COMPLETE
status	1	Request status, values: 0: success 1: unspecified error 2: loop channel not supported 3: loop start delay not supported 4: packet response delay not supported 5: plcf type not supported 6: transmission type specified for response not supported 7-255: reserved
data	2...(TBS-1)	Set to zero

F.6.5.5 DEACTIVATE_LOOP_MODE

PHY Data SDU for this message is described in Table F.6.5.5-1.

Table F.6.5.5-1: DEACTIVATE_LOOP_MODE message

Field	Octet	Description
message_code	0	Message code, set to DEACTIVATE_LOOP_MODE
data	1...(TBS-1)	Set to zero

F.6.6 Loop report messages

F.6.6.1 REPORT_TX_LOOP_MODE

PHY Data SDU for this message is described in Table F.6.6.1-1.

Table F.6.6.1-1: REPORT_TX_LOOP_MODE message

Field	Octet	Description
message_code	0	Message code, set to REPORT_TX_LOOP_MODE
status	1	Operation status, values: 0: success 1: failure 2-255: reserved
transmitted_packet_count	2...5	Number of transmitted packets
data	6...(TBS-1)	Set to zero

F.6.6.2 REPORT_RX_LOOP_MODE

PHY Data SDU for this message is described in Table F.6.6.2-1.

Table F.6.6.2-1: REPORT_RX_LOOP_MODE message

Field	Octet	Description
message_code	0	Message code, set to REPORT_RX_LOOP_MODE or
status	1	Request status, values: 0: success 1: failure 2-255: reserved
average_rssi_2	2	RSSI-2 averaged as specified in clause F.4.4.2. Value: RSSI-2 measurement reported value as defined in ETSI TS 103 636-2 [1].
average_snr	3	SNR averaged as specified in clause F.4.4.2. Value: SNR measurement reported value as defined in ETSI TS 103 636-2 [1].
received_packet_count	4...7	Number of correctly received packets during the measurement
data	8...(TBS-1)	Set to zero

F.6.7 Loop action messages

F.6.7.1 General

Transmit loop action messages are sent by EUT.

Receive loop action messages are sent by the SS and responded to by the EUT. The PDU of a loop message may give instructions to the EUT regarding the loop execution.

F.6.7.2 TX_LOOP_MODE_DATA

PHY Data SDU for this message is described in Table F.6.7.2-1.

Table F.6.7.2-1: TX_LOOP_MODE_DATA message

Field	Octet	Description
message_code	0	Message code, set to TX_LOOP_MODE_DATA
data	1...(TBS-1)	Random from PN15 sequence

F.6.7.3 RX_LOOP_MODE_DATA

PHY Data SDU for this message is described in Table F.6.7.3-1.

Table F.6.7.3-1: RX_LOOP_MODE_DATA message

Field	Octet	Description
message_code	0	Message code, set to RX_LOOP_MODE_DATA
data	3...(TBS-1)	Random from PN15 sequence

F.6.7.4 RX_LOOP_MODE_DATA_RESPONSE

PHY Data SDU for this message is described in Table F.6.7.4-1.

Table F.6.7.4-1: RX_LOOP_MODE_DATA_RESPONSE message

Field	Octet	Description
message_code	0	Message code, set to RX_LOOP_MODE_DATA_RESPONSE
rss_i_2	1	RSSI-2 measurement of the packet being responded to. Value: RSSI-2 measurement reported value as defined in ETSI TS 103 636-2 [1].
snr	2	SNR measurement of the packet being responded to. Value: SNR measurement reported value as defined in ETSI TS 103 636-2 [1].
data	3...(TBS-1)	Either zeros or from PN15 sequence as specified in ACTIVATE_RX_LOOP_MODE message in clause F.6.5.3.

Annex G (normative): Radio ICS pro forma for DECT-2020 NR Equipment

G.0 The right to copy

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G.1 Introduction

The purpose of a PICS is to identify those standardized functions which an EUT shall support, those which are optional and those which are conditional on the presence of other functions. It helps to identify which functions an EUT will support when performing conformance testing. It is possible that with different choices in an ICS pro forma, several different sets of test cases will be necessary.

Item column

The item column contains a number which identifies the item in the table.

Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Reference column

The reference column gives reference to the relevant DECT-2020 NR core specifications.

Release column

The release column indicates the earliest release from which the capability or option is relevant.

Mnemonic column

The Mnemonic column contains mnemonic identifiers for each item.

Status column

The status column makes assessments on whether requirements, features, components and other capabilities are required according to a referenced standard and in order to achieve compliance. This assessment provides the following options:

- m mandatory – the capability shall be supported.
- o optional – the capability may or may not be supported.
- c.i conditional – the requirement on the capability ("m", "o", "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying a unique conditional status expression which is defined immediately following the table.
- n/a not applicable – in the given context, it is not possible to use the capability.
- o.i qualified optional – for mutually exclusive or selectable options from a set: "i" is an integer which identifies a unique group of related optional items and the logic of their selection which is defined immediately following the table.

References to items

The mnemonics are used to reference items in the tables.

Prerequisite

The items of the current table shall only be filled if the referenced item in the prerequisite indicates a true value.

G.2 Pro forma tables

G.2.1 Baseline Implementation Capabilities

Table G.2.1-1: DECT-2020 NR Operating Bands Supported

Item	Operating Band	Reference	Mnemonic	Status
1	DECT-2020 NR Frequency band 1	ETSI TS 103 636-2, clause 5.2	pc_dect_band1	o.1
2	DECT-2020 NR Frequency band 2	ETSI TS 103 636-2, clause 5.2	pc_dect_band2	o.1
3	DECT-2020 NR Frequency band 3	ETSI TS 103 636-2, clause 5.2	pc_dect_band3	o.1
4	DECT-2020 NR Frequency band 4	ETSI TS 103 636-2, clause 5.2	pc_dect_band4	o.1
5	DECT-2020 NR Frequency band 5	ETSI TS 103 636-2, clause 5.2	pc_dect_band5	o.1
6	DECT-2020 NR Frequency band 6	ETSI TS 103 636-2, clause 5.2	pc_dect_band6	o.1
7	DECT-2020 NR Frequency band 7	ETSI TS 103 636-2, clause 5.2	pc_dect_band7	o.1
8	DECT-2020 NR Frequency band 8	ETSI TS 103 636-2, clause 5.2	pc_dect_band8	o.1
9	DECT-2020 NR Frequency band 9	ETSI TS 103 636-2, clause 5.2	pc_dect_band9	o.1
10	DECT-2020 NR Frequency band 10	ETSI TS 103 636-2, clause 5.2	pc_dect_band10	o.1
11	DECT-2020 NR Frequency band 11	ETSI TS 103 636-2, clause 5.2	pc_dect_band11	o.1
12	DECT-2020 NR Frequency band 12	ETSI TS 103 636-2, clause 5.2	pc_dect_band12	o.1
13	DECT-2020 NR Frequency band 13	ETSI TS 103 636-2, clause 5.2	pc_dect_band13	o.1
14	DECT-2020 NR Frequency band 14	ETSI TS 103 636-2, clause 5.2	pc_dect_band14	o.1
15	DECT-2020 NR Frequency band 15	ETSI TS 103 636-2, clause 5.2	pc_dect_band15	o.1
16	DECT-2020 NR Frequency band 16	ETSI TS 103 636-2, clause 5.2	pc_dect_band16	o.1
17	DECT-2020 NR Frequency band 17	ETSI TS 103 636-2, clause 5.2	pc_dect_band17	o.1
18	DECT-2020 NR Frequency band 18	ETSI TS 103 636-2, clause 5.2	pc_dect_band18	o.1
19	DECT-2020 NR Frequency band 19	ETSI TS 103 636-2, clause 5.2	pc_dect_band19	o.1
20	DECT-2020 NR Frequency band 20	ETSI TS 103 636-2, clause 5.2	pc_dect_band20	o.1
21	DECT-2020 NR Frequency band 21	ETSI TS 103 636-2, clause 5.2	pc_dect_band21	o.1
22	DECT-2020 NR Frequency band 22	ETSI TS 103 636-2, clause 5.2	pc_dect_band22	o.1
o.1: It is mandatory to support at least one of these items.				

Table G.2.1-2: Special Conformance Testing Functions

Item	Special Conformance Testing Function	Reference	Mnemonic	Status
1	EUT special conformance test functions	ETSI TS 104 407-1, Annex F	pc_phyconf_test_functions	m
2	EUT capability to transmit without STF cover sequence for testing purposes	ETSI TS 104 407-1, clause 5.2	pc_phyconf_tx_wo_stfcs	o.1

Table G.2.1-3: DECT-2020 NR Radio Device Class

Item	Radio Device Class	Reference	Mnemonic	Status
1	Class I	ETSI TS 103 636-2, clause 6.2.1	pc_rd_class1	o.1
2	Class II	ETSI TS 103 636-2, clause 6.2.1	pc_rd_class2	o.1
3	Class III	ETSI TS 103 636-2, clause 6.2.1	pc_rd_class3	o.1
4	Class IV	ETSI TS 103 636-2, clause 6.2.1	pc_rd_class4	o.1

o.1: It is mandatory to support at least one of these items.

G.2.2 PHY Implementation Capabilities

Table G.2.2-1: PHY numerology support

Item	PHY Numerologies	Reference	Mnemonic	Status
1	$\mu = 1, \beta = 1$	ETSI TS 103 636-3, clause 4.3	pc_phy_num_mu1_beta1	o.1
2	$\mu = 1, \beta = 2$	ETSI TS 103 636-3, clause 4.3	pc_phy_num_mu1_beta2	o.1
3	$\mu = 1, \beta = 4$	ETSI TS 103 636-3, clause 4.3	pc_phy_num_mu1_beta4	o.1
4	$\mu = 2, \beta = 1$	ETSI TS 103 636-3, clause 4.3	pc_phy_num_mu2_beta1	o.1
5	$\mu = 2, \beta = 2$	ETSI TS 103 636-3, clause 4.3	pc_phy_num_mu2_beta2	o.1
6	$\mu = 4, \beta = 1$	ETSI TS 103 636-3, clause 4.3	pc_phy_num_mu4_beta1	o.1

o.1: It is mandatory to support at least one of these items.

Table G.2.2-2: PHY Modulation and Coding Support

Item	Modulation and Coding Support	Reference	Mnemonic	Status
1	MCS0	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs0	m
2	MCS1	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs1	m
3	MCS2	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs2	o.1
4	MCS3	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs3	o.1
5	MCS4	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs4	o.1
6	MCS5	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs5	o.1
7	MCS6	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs6	o.1
8	MCS7	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs7	o.1
9	MCS8	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs8	o.1
10	MCS9	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs9	o.1
11	MCS10	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs10	o.1
12	MCS11	ETSI TS 103 636-3, Annex A; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mcs11	o.1

o.1: Implies support of all lower order of MCSs.

Table G.2.2-3: PHY MIMO Spatial Stream Support

Item	Maximum number of spatial streams	Reference	Mnemonic	Status
1	Single spatial stream	ETSI TS 103 636-3, clause 7.2; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mimo_ss1	m
2	Two spatial streams	ETSI TS 103 636-3, clause 7.2; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mimo_ss2	o.1
3	Four spatial stream	ETSI TS 103 636-3, clause 7.2; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mimo_ss4	o.1
4	Eight spatial streams	ETSI TS 103 636-3, clause 7.2; ETSI TS 103 636-4, clause 6.2.1	pc_phy_mimo_ss8	o.1

o.1: Implies support of lower order of spatial streams.

Table G.2.2-4: PHY Number of HARQ Processes Support

Item	Number of HARQ processes	Reference	Mnemonic	Status
1	Single process	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_nps1	m
2	Two process	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_nps2	o.1
3	Four process	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_nps4	o.1
4	Eight process	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_nps8	o.1

o.1: Implies support of lower order of HARQ processes.

Table G.2.2-5: PHY Soft Buffer Size Support

Item	Soft buffer size	Reference	Mnemonic	Status
1	16k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft16k	o.1
2	25k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft25k	o.1
3	32k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft32k	o.1
4	64k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft64k	o.1
5	128k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft128k	o.1
6	256k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft256k	o.1
7	512k	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft512k	o.1
8	1M	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft1M	o.1
9	2M	ETSI TS 103 636-3, clause 6.1.5 and Annex B	pc_phy_harq_soft2M	o.1

o.1: It is mandatory to support at least one of these items.

Table G.2.2-6: PHY Packet Length Support

Item	Packet Length	Reference	Mnemonic	Status
1	1 subslot	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss1	m
2	2 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss2	m
3	3 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss3	o.1
4	4 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss4	o.1

Item	Packet Length	Reference	Mnemonic	Status
5	5 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss5	o.1
6	6 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss6	o.1
7	7 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss7	o.1
8	8 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss8	o.1
9	9 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss9	o.1
10	10 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss10	o.1
11	11 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss11	o.1
12	12 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss12	o.1
13	13 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss13	o.1
14	14 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss14	o.1
15	15 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss15	o.1
16	16 subslots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_ss16	o.1
17	1 slot	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl1	o.1
18	2 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl2	o.1
19	3 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl3	o.1
20	4 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl4	o.1
21	5 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl5	o.1
22	6 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl6	o.1
23	7 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl7	o.1
24	8 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl8	o.1
25	9 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl9	o.1
26	10 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl10	o.1
27	11 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl11	o.1
28	12 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl12	o.1
29	13 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl13	o.1
30	14 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl14	o.1
31	15 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl15	o.1
32	16 slots	ETSI TS 103 636-3, clause 5.1; ETSI TS 103 636-4, clause 6.2.1	pc_phy_len_sl16	o.1
o.1: Implies support of all shorter packet lengths for given numerology.				

Annex H (informative): Change history

Date	Version	Information about changes
April 2024	V0.0.1	Early draft
June 2024	V0.0.2	DECT(24)000140r1 - Radio conformance, test mode DECT(24)000141 - Radio conformance, transmit power DECT(24)000142 - Radio conformance, transmit signal quality DECT(24)000143 - Radio conformance, transmit spectrum emissions DECT(24)000144 - Radio conformance, receiver dynamic range and selectivity DECT(24)000145 - Radio conformance, receiver blocking characteristics DECT(24)000146 - Radio conformance, receiver intermodulation characteristics DECT(24)000147r1 - Radio conformance, receiver spectrum emissions DECT(24)000148r1 - Radio conformance, receiver measurements DECT(24)000152r3 - Radio conformance, connection diagrams
August 2025	V0.0.3	DECT(25)000164
September 2025	V0.0.4	DECT(25)000184
September 2025	V0.0.5	DECT(25)000203

History

Version	Date	Status
V1.1.1	October 2025	Publication