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Mobile Standards Group (MSG);
IMT Cellular Networks
Base Stations (BS) Additional Regulatory Requirements

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

The present document addresses additional requirements arising from EC/CEPT spectrum regulatory framework that apply to specific equipment in specific cases in certain countries and/or in certain geographical areas.

1 Scope

The present document applies to the following equipment types:

- E-UTRA, UTRA, NR, NB-IoT, and MSR capable Base Stations.

The present document addresses additional requirements arising from EC/CEPT spectrum regulatory framework that apply to specific equipment in specific cases in certain countries and/or in certain geographical areas.

The present document is referenced in the relevant IMT Harmonised Standards - ETSI EN 301 908 Part 14 [i.5] (E-UTRA BS), Part 18 [i.6] (MSR BS), Part 23 [i.7] (AAS BS) and Part 24 [i.8] (NR BS) - to address those additional requirements.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

[1] ETSI TS 137 141 (V16.8.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing (3GPP TS 37.141 version 16.8.0 Release 16)".

[2] ETSI TS 136 104 (V16.8.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 16.8.0 Release 16)".

[3] ETSI TS 125 104 (V16.0.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 16.0.0 Release 16)".

[4] ETSI TS 138 104 (V16.6.0): "5G; NR; Base Station (BS) radio transmission and reception (3GPP TS 38.104 version 16.6.0 Release 16)".

[5] ETSI TS 136 141 (V16.10.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 16.10.0 Release 16)".

[6] ETSI TS 138 141-2 (V16.8.0): "5G; NR; Base Station (BS) conformance testing Part 2: Radiated conformance testing (3GPP TS 38.141-2 version 16.8.0 Release 16)".

[7] ETSI TS 137 145-1 (V16.5.0): "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: conducted conformance testing (3GPP TS 37.145-1 version 16.5.0 Release 16)".

[8] ETSI TS 137 145-2 (V16.6.0): "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Active Antenna System (AAS) Base Station (BS) conformance testing; Part 2: radiated conformance testing (3GPP TS 37.145-2 version 16.6.0 Release 16)".

[9] ETSI TS 125 141 (V16.0.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 16.0.0 Release 16)".

[10] ETSI TS 138 141-1 (V16.8.0): "5G; NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing (3GPP TS 38.141-1 version 16.8.0 Release 16)".

2.2 Informative 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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ECC Report 318: "Compatibility between RMR and MFCN in the 900 MHz range, the 1900-1920 MHz band and the 2290-2300 MHz band".

[i.2] Commission Implementing Decision (EU) 2019/235 of 24 January 2019 on amending Decision 2008/411/EC as regards an update of relevant technical conditions applicable to the 3400-3800 MHz frequency band.

[i.3] ECC Report 281: "Analysis of the suitability of the regulatory technical conditions for 5G MFCN operation in the 3400-3800 MHz band".

[i.4] Commission Implementing Decision (EU) 2020/636 of 8 May 2020 amending Decision 2008/477/EC as regards an update of relevant technical conditions applicable to the 2 500-2 690 MHz frequency band.

[i.5] ETSI EN 301 908-14: "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS) Release 15".

[i.6] ETSI EN 301 908-18: "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS) Release 15".

[i.7] ETSI EN 301 908-23: "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 23: Active Antenna System (AAS) Base Station (BS); Release 15".

[i.8] ETSI EN 301 908-24: "IMT cellular networks; Harmonised Standard for access to radio spectrum Part 24: New Radio (NR) Base Stations (BS) Release 15".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI TS 137 141 [1] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI TS 137 141 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 137 141 [1] and the following apply:

FRMCS	Future Railway Mobile Communication System
RAS	Radio Astronomy Service

RMR Railway Mobile Radio

4 Regulatory requirements

4.1 Enhanced Selectivity for protection of Band 1 BSs from FRMCS in 1 900 MHz to 1 910 MHz

4.1.1 Introduction

The following requirement is only applicable to E-UTRA, UTRA, NR, NB-IoT or MSR BSs that are intended to be deployed in close geographical proximity of FRMCS Base Stations unless mobile operators deem it is not necessary (noting that there may be a risk of interference from FRMCS).

This requirement is only applicable to the blocking performance against an interfering signal in the frequency range 1 900 MHz to 1 910 MHz and does not change the general blocking requirement between adjacent channels in-band.

Table 4.1.1-1: Base station operating band

Band designation	Direction of transmission	Base Station operating bands
1	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz

4.1.2 Limits

The interfering signal shall be an E-UTRA/NR FDD downlink signal with a 10 MHz channel for a UTRA, E-UTRA, NB-IOT, GSM/EDGE or NR (≤ 20 MHz) wanted signal.

The requirement is applicable outside the Base Station RF Bandwidth or Radio Bandwidth. The interfering signal is defined in the 1 900 MHz to 1 910 MHz frequency range.

For the wanted and interfering signal coupled to the base station antenna input, using the parameters in Table 4.1.2-1 the following requirements shall be met:

- For any E-UTRA carrier, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel defined in ETSI TS 136 104 [2], clause 7.2.
- For any UTRA FDD carrier, the BER shall not exceed 0,001 for the reference measurement channel defined in ETSI TS 125 104 [3], clause 7.2.
- For any NB-IoT carrier, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel defined in ETSI TS 136 104 [2], clause 7.2.
- For any NR carrier, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel defined in ETSI TS 138 104 [4], clause 7.2.

The wanted signal shall be centred at the lowest channel of Band 1.

Table 4.1.2-1: General blocking requirement

Base Station Class	Mean power of interfering signal [dBm]	Wanted Signal mean power [dBm] (note)	Centre Frequency of Interfering Signal
Wide Area BS	-30	$P_{REFSENS}$ + 1 dB	1 905 MHz
Medium Range BS			
NOTE: $P_{REFSENS}$ depends on the RAT, the BS class and on the channel bandwidth, see clause 7.2 of ETSI TS 137 141 [1].			

NOTE: The values in Table 4.1.2-1 are based on the interference and receiver desensitization levels assumed in ECC Report 318 [i.1]. In other blocking requirements, it is more usual to specify receiver desensitization at a level of 6 dB. Assuming the receiver is linear, the values in Table 4.1.2-1 would be equivalent to a Mean power of interfering signal of -19,5 dBm with a Wanted Signal mean power of PREFSENS + 6 dB. If the real receiver is not linear then this would be a tougher requirement than the one in Table 4.1.2-1.

4.1.3 Testing for compliance with technical requirements

The test suite in ETSI TS 137 141 [1] clause 7.4.4, or in ETSI TS 136 141 [5] clause 7.6.4, or in ETSI TS 125 141 [9] clause 7.5.4, or in ETSI TS 138 141-1 [10] clause 7.4.2.4, shall be used depending on the BS type.

The type of the interfering signal, its level, centre frequency and bandwidth shall be as in clause 4.1.2 of the present document. The centre frequency and level of the wanted signal shall be as in clause 4.1.2 of the present document.

The results obtained shall be compared to the limits in clause 4.1.2 in order to prove compliance.

4.2 Protection of radiolocation below 3 400 MHz for country-specific cases

4.2.1 Introduction

The requirement in this clause applies to non-AAS and AAS BSs to ensure the protection of military radiolocation operating below 3 400 MHz in some countries, in accordance with [i.2] and [i.3]. Applicability of this requirement is on national basis.

For non-AAS BSs, countries may decide between two different levels of protection (case A or case B) depending on the level of protection required for the radar in their territory or no limit (case C).

This requirement is applicable to E-UTRA, NR and MSR BSs.

This requirement is applicable to AAS and non-AAS BSs.

This requirement is applicable to BSs operating in the bands in Table 4.2.1-1.

Table 4.2.1-1: Base station operating bands

MSR and E-UTRA Band number	NR Band number	BS transmit & receive		
42		3 400 MHz	to	3 600 MHz
43		3 600 MHz	to	3 800 MHz
77 (notes 1 and 3)	n77	3 300 MHz	to	4 200 MHz
78 (notes 2 and 3)	n78	3 300 MHz	to	3 800 MHz
NOTE 1: In Europe according to [i.2], radio equipment in band 77 operates between 3 400 MHz and 3 800 MHz (F_{DL_low} = 3 400 MHz and F_{DL_high} = 3 800 MHz).				
NOTE 2: In Europe according to [i.2], radio equipment in band 78 operates between 3 400 MHz and 3 800 MHz (F_{DL_low} = 3 400 MHz and F_{DL_high} = 3 800 MHz).				
NOTE 3: The band is for NR only.				

4.2.2 Limits

Table 4.2.2-1: Additional requirement below 3 400 MHz for country specific cases, for non-AAS and AAS base stations

	Case	Frequency range	Non AAS limit	AAS TRP limit	Measurement bandwidth
Case A	Countries with military radiolocation systems below 3 400 MHz	From 2 900 MHz to 3 400 MHz	-80 dBm	-52 dBm	1 MHz
Case B	Countries with military radiolocation systems below 3 400 MHz	From 2 900 MHz to 3 400 MHz	-71 dBm		1 MHz
Case C	Countries without adjacent band usage or with usage that does not need extra protection	From 2 900 MHz to 3 400 MHz	Not applicable	Not applicable	Not applicable

NOTE: These requirements are derived from Table 6 of commission implementing decision (EU) 2019/235 [i.2] assuming a 21 dBi antenna gain for the non-AAS cases.

4.2.3 Testing for compliance with technical requirements

The test suite in ETSI TS 137 141 [1] clause 6.6.2.4, or in ETSI TS 136 141 [5] clause 6.6.3.4, or in ETSI TS 137 145-1 [7] clause 6.6.5.4, or in ETSI TS 137 145-2 [8] clause 6.7.5.4, or in ETSI TS 138 141-1 [10] clause 6.6.4.4, or in ETSI TS 138 141-2 [6] clause 6.7.4.4, shall be used depending on the BS type.

The requirement shall be tested in the entire 2 900 MHz to 3 400 MHz range.

The results obtained shall be compared to the limits in clause 4.2.2 in order to prove compliance.

4.3 Protection of the Radio Astronomy Service operating above 2 690 MHz

4.3.1 Introduction

The following requirement is applicable in specific geographical areas to reduce the size of the coordination zone with RAS stations.

This requirement is applicable to FDD AAS BSs and NR BSs Type 1-H and Type 1-O operating in the frequency range in Table 4.3.1-1.

Table 4.3.1-1: Base station operating band

MSR and E-UTRA Band number	NR Band number	UTRA Band number	Uplink (UL) BS receive UE transmit	Downlink (DL) BS transmit UE receive
7	n7	VII	2 500 MHz to 2 570 MHz	2 620 MHz to 2 690 MHz

4.3.2 Limits

Table 4.3.2-1: Additional requirement for FDD AAS BSs with regard to Radio Astronomy Service

Frequency range	Case (note)	TRP limit
2 690 MHz to 2 700 MHz	A	+3 dBm/10 MHz
	B	Not applicable

NOTE: Case A: This limit yields a reduced coordination zone with respect to RAS stations.
Case B: For situations where additional baseline is not considered necessary by the concerned Member State (e.g. where there is no nearby RAS station or situation where no coordination zone is required).

These requirements are based on Table 7 of Commission Implementing Decision (EU) 2020/636 [i.4].

4.3.3 Testing for compliance with technical requirements

The test suite in ETSI TS 137 145-1 [7] clause 6.6.5.4, or in ETSI TS 137 145-2 [8] clause 6.7.5.4, or in ETSI TS 138 141-1 [10] clause 6.6.4.4, or in ETSI TS 138 141-2 [6] clause 6.7.4.4, shall be used depending on the BS type.

The results obtained shall be compared to the limits in clause 4.3.2 in order to prove compliance.

Annex A (informative): Bibliography

- ECC Decision (20)02: "Harmonised use of the paired frequency bands 874.4-880.0 MHz and 919.4-925.0 MHz and of the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio (RMR)".

History

Document history		
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