TSG-RAN meeting #17 **RP-020461**
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Helsinki, Finland, 12th – 16th August 2002

Title:	Liaison Statement on draft ECC Recommendations related to OOB, spurious and unwanted emissions
Source:	RAN4
To:	ETSI ERM-RM
Cc:	TSG RAN
Response to:	LS (ETSI/ERM-RM21(02)MZ_37r1) on "draft ECC Recommendations related to OOB, spurious and unwanted emissions" from ETSI ERM-RM. "

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Attachments: ANNEX LS response to ERM.doc

TSG RAN WG4 thanks ETSI ERM for providing the information about the new draft ECC recommendations.

TSG RAN WG4 develops radio requirements for UTRA FDD and TDD. We have recently updated all 3GPP specifications to reference the new version of ITU-R spurious emissions recommendation SM.329-9, which is in line with the proposed update of ECC recommendation 74-01. All limits that apply to UTRA are unchanged, as in SM.329-9. The proposed draft CEPT/ECC "Unwanted Emissions" recommendation is a helpful guide to the whole area of unwanted emissions.

Regarding the unwanted emissions requirements developed in 3GPP, TSG RAN WG4 would like to pint out that

- There are UTRA limits defined both for the out-of-band and spurious domains
- The UTRA spurious emission limits are based on the limits in SM.329-9 and are also in line with CEPT/ECC 74-01.
- There are additional stricter limits defined in some frequency ranges for co-existence with other systems in the same geographical area and also optional co-siting requirements.

For information, the latest 3GPP (Release 5) unwanted emissions requirements are provided as Annexes.

Annex 1: UTRA FDD UE (from 3GPP TS 25.101, version 5.3.0)

Annex 2: UTRA TDD UE (from 3GPP TS 25.102, version 5.1.0)

Annex 2: UTRA FDD BS (from 3GPP TS 25.104, version 5.3.0)

Annex 4: UTRA TDD BS (from 3GPP TS 25.105, version 5.1.0)

Date of Next RAN4 Meetings:

Meeting No.	Date	Host	Location
RAN WG4 #25	11-15 November 2002	North American Friends 3GPP	New Jersey, US
RAN WG4 #26	17-21 February 2003		Europe / Korea
RAN WG4 #27	19-23 May 2003	European Friends of 3GPP	Disneyland Paris, FR

Annex 1. Unwanted emission requirements for UTRA FDD UE

Reference:

3GPP TS 25.101 V5.3.0 (2002-06), “3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; UE Radio Transmission and Reception (FDD) (Release 5)”

6.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and Adjacent Channel Leakage power Ratio.

6.6.2.1 Spectrum emission mask

The spectrum emission mask of the UE applies to frequencies, which are between 2.5 MHz and 12.5 MHz away from the UE centre carrier frequency. The out of channel emission is specified relative to the RRC filtered mean power of the UE carrier.

6.6.2.1.1 Minimum requirement

The power of any UE emission shall not exceed the levels specified in Table 6.10

Table 6.10: Spectrum Emission Mask Requirement

?f* in MHz	Minimum requirement Band I, II, III	Additional requirements Band II	Measurement bandwidth
2.5 - 3.5	$\left(35 - 15\left(\frac{\Delta f}{MHz} - 2.5\right)\right)dBc$	-15 dBm	30 kHz **
3.5 - 7.5	$\left(35 - 1\left(\frac{\Delta f}{MHz} - 3.5\right)\right)dBc$	-13 dBm	1 MHz ***
7.5 - 8.5	$\left(39 - 10\left(\frac{\Delta f}{MHz} - 7.5\right)\right)dBc$	-13 dBm	1 MHz ***
8.5 - 12.5 MHz	-49 dBc	-13 dBm	1 MHz ***

* ?f is the separation between the carrier frequency and the centre of the measuring filter.

** The first and last measurement position with a 30 kHz filter is at ?f equals to 2.515 MHz and 3.485 MHz.

*** The first and last measurement position with a 1 MHz filter is at ?f equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The lower limit shall be –50 dBm/3.84 MHz or which ever is higher.

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the RRC filtered mean power centered on the assigned channel frequency to the RRC filtered mean power centered on an adjacent channel frequency.

6.6.2.2.1 Minimum requirement

If the adjacent channel power is greater than –50dBm then the ACLR shall be higher than the value specified in Table 6.11.

Table 6.11: UE ACLR

Power Class	Adjacent channel frequency relative to assigned channel frequency	ACLR limit
3	+ 5 MHz or – 5 MHz	33 dB
3	+ 10 MHz or – 10 MHz	43 dB
4	+ 5 MHz or – 5 MHz	33 dB
4	+ 10 MHz or –10 MHz	43 dB

NOTE 1: The requirement shall still be met in the presence of switching transients.

NOTE 2: The ACLR requirements reflect what can be achieved with present state of the art technology.

NOTE 3: Requirement on the UE shall be reconsidered when the state of the art technology progresses.

6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The frequency boundary and the detailed transitions of the limits between the requirement for out band emissions and spectrum emissions are based on ITU-R Recommendations SM.329-9[2].

6.6.3.1 Minimum requirement

These requirements are only applicable for frequencies, which are greater than 12.5 MHz away from the UE centre carrier frequency.

Table 6.12: General spurious emissions requirements

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
9 kHz ? f < 150 kHz	1 kHz	-36 dBm
150 kHz ? f < 30 MHz	10 kHz	-36 dBm
30 MHz ? f < 1000 MHz	100 kHz	-36 dBm
1 GHz ? f < 12.75 GHz	1 MHz	-30 dBm

Table 6.13: Additional spurious emissions requirements

Operating Band	Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
I	925 MHz ? f ? 935 MHz	100 kHz	-67 dBm *
	935 MHz < f ? 960 MHz	100 kHz	-79 dBm *
	1805 MHz ? f ? 1880 MHz	100 kHz	-71 dBm *
	1893.5 MHz <f<1919.6 MHz	300 kHz	-41 dBm
II	-	-	-
III	925 MHz ? f ? 935 MHz	100 kHz	-67 dBm *
	935 MHz < f ? 960 MHz	100 kHz	-79 dBm *
	2110 MHz ? f ? 2170 MHz	3.84 MHz	-60 dBm *
* The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 6.12 are permitted for each UARFCN used in the measurement			

Annex 2. Unwanted emission requirements for UTRA TDD UE

Reference:

3GPP TS 25.102 V5.1.0 (2002-06), ”3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; UE Radio Transmission and Reception (TDD) (Release 5)”

6.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and adjacent channel leakage power ratio (ACLR).

6.6.2.1 Spectrum emission mask

6.6.2.1.1 3.84 Mcps TDD Option

The spectrum emission mask of the UE applies to frequencies, which are between 2.5 MHz and 12.5MHz from the UE centre carrier frequency. The out of channel emission is specified relative to theRRC filtered mean power of the UE carrier.

6.6.2.1.1.1 Minimum Requirement

The power of any UE emission shall not exceed the levels specified in table 6.5.

Table 6.5: Spectrum Emission Mask Requirement (3.84 Mcps TDD Option)

?f* in MHz	Minimum requirement	Measurement bandwidth
2.5 - 3.5	$\max\left(-35 - 15\left(\frac{\Delta f}{MHz}\right) + 2.5, -dBc\right)$	30 kHz **
3.5 - 7.5	$\max\left(-35 - 1\left(\frac{\Delta f}{MHz}\right) + 3.5, -dBc\right)$	1 MHz ***
7.5 - 8.5	$\max\left(-39 - 10\left(\frac{\Delta f}{MHz}\right) + 7.5, -dBc\right)$	1 MHz ***
8.5 - 12.5	-49 dBc	1 MHz ***
*	?f is the separation between the carrier frequency and the centre of the measuring filter.	
**	The first and last measurement position with a 30 kHz filter is at ?f equals to 2.515 MHz and 3.485 MHz	
***	The first and last measurement position with a 1 MHz filter is at ?f equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.	
The lower limit shall be –50dBm/3.84 MHz or the minimum requirement presented in this table which ever is the higher.		

6.6.2.1.2 1.28 Mcps TDD Option

The spectrum emission mask of the UE applies to frequencies, which are between 0.8MHz and 4.0MHz from the UE centre carrier frequency. The out of channel emission is specified relative to the RRC filtered mean power of the UE carrier.

6.6.2.1.2.1 Minimum Requirement

The power of any UE emission shall not exceed the levels specified in table 6.5A

Table 6.5A: Spectrum Emission Mask Requirement (1.28 Mcps TDD Option)

?f* in MHz	Minimum requirement	Measurement bandwidth
0.8	-35 dBc	30 kHz **
0.8-1.8	$\left(-35 - 14\left(\frac{\Delta f}{MHz} - 0.8\right)\right) dBc$	30 kHz **
1.8-2.4	$\left(-49 - 25\left(\frac{\Delta f}{MHz} - 1.8\right)\right) dBc$	30 kHz **
2.4 – 4.0	-49 dBc	1MHz ***
*	?f is the separation between the carrier frequency and the centre of the measuring filter.	
**	The first and last measurement position with a 30 kHz filter is at ?f equals to 0.815 MHz and 2.385 MHz.	
***	The first and last measurement position with a 1 MHz filter is at ?f equals to 2.9MHz and 3.5MHz .As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.	
The lower limit shall be –55dBm/1.28 MHz or the minimum requirement presented in this table which ever is the higher.		

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the RRC filtered mean power centered on the assigned channel frequency to the RRC filtered mean power centered on an adjacent channel frequency.

6.6.2.2.1 Minimum requirement

6.6.2.2.1.1 3.84 Mcps TDD Option

If the adjacent channel RRC filtered mean power is greater than –50dBm then the ACLR shall be higher than the value specified in Table 6.6.

Table 6.6:UE ACLR (3.84 Mcps TDD Option)

Power Class	adjacent channel	ACLR limit
2, 3	UE channel ± 5 MHz	33 dB
2, 3	UE channel ± 10 MHz	43 dB

NOTE:

1) The requirement shall still be met in the presence of switching transients.

2) The ACLR requirements reflect what can be achieved with present state of the art technology.

3) Requirement on the UE shall be reconsidered when the state of the art technology progresses.

6.6.2.2.1.2 1.28 Mcps TDD Option

If the adjacent channel RRC filtered mean power is greater than –55dBm then the ACLR shall be higher than the value specified in Table 6.6A.

Table 6.6A: UE ACLR (1.28 Mcps TDD Option)

Power Class	adjacent channel	ACLR limit
2, 3	UE channel ± 1.6 MHz	33 dB
2, 3	UE channel ± 3.2 MHz	43 dB

NOTE:

1) The requirement shall still be met in the presence of switching transients.

2) The ACLR requirements reflect what can be achieved with present state of the art technology.

3) Requirement on the UE shall be reconsidered when the state of the art technology progresses.

6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The frequency boundary and the detailed transitions of the limits between the requirement for out band emissions and spectrum emissions are based on ITU-R Recommendations SM.329-8.

6.6.3.1 Minimum Requirement

6.6.3.1.1 3.84 Mcps TDD Option

These requirements are only applicable for frequencies which are greater than 12.5 MHz away from the UE center carrier frequency.

Table 6.7A: General Spurious emissions requirements (3.84 Mcps TDD Option)

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
9 kHz ? f < 150 kHz	1 kHz	-36 dBm
150 kHz ? f < 30 MHz	10 kHz	-36 dBm
30 MHz ? f < 1000 MHz	100 kHz	-36 dBm
1 GHz ? f < 12.75 GHz	1 MHz	-30 dBm

Table 6.7B: Additional Spurious emissions requirements (3.84 Mcps TDD Option)

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
925 MHz ? f ? 935 MHz	100 KHz	-67 dBm*
935 MHz < f ? 960 MHz	100 KHz	-79 dBm*
1805 MHz ? f ? 1880 MHz	100 KHz	-71 dBm*
* The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 6.7A are permitted for each UARFCN used in the measurement.		

6.6.3.1.2 1.28 Mcps TDD Option

These requirements are only applicable for frequencies which are greater than 4 MHz away from the UE center carrier frequency.

Table 6.7C: General Spurious emissions requirements (1.28 Mcps TDD Option)

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
9 kHz ? f < 150 kHz	1 kHz	-36 dBm
150 kHz ? f < 30 MHz	10 kHz	-36 dBm
30 MHz ? f < 1000 MHz	100 kHz	-36 dBm
1 GHz ? f < 12.75 GHz	1 MHz	-30 dBm

Table 6.7D : Additional Spurious emissions requirements (1.28 Mcps TDD Option)

Frequency Bandwidth	Measurement Bandwidth	Minimum requirement
925 MHz ? f ? 935 MHz	100 KHz	-67 dBm*
935 MHz < f ? 960 MHz	100 KHz	-79 dBm*
1805 MHz ? f ? 1880 MHz	100 KHz	-71 dBm*
* The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 6.7C are permitted for each UARFCN used in the measurement.		

Annex 3. Unwanted emission requirements for UTRA FDD BS

Reference:

3GPP TS 25.104 V5.3.0 (2002-06), "3rd Generation Partnership Project; Technical Specification Group radio Access Networks; BS Radio transmission and Reception (FDD) (Release 5)"

6.6.2 Out of band emission

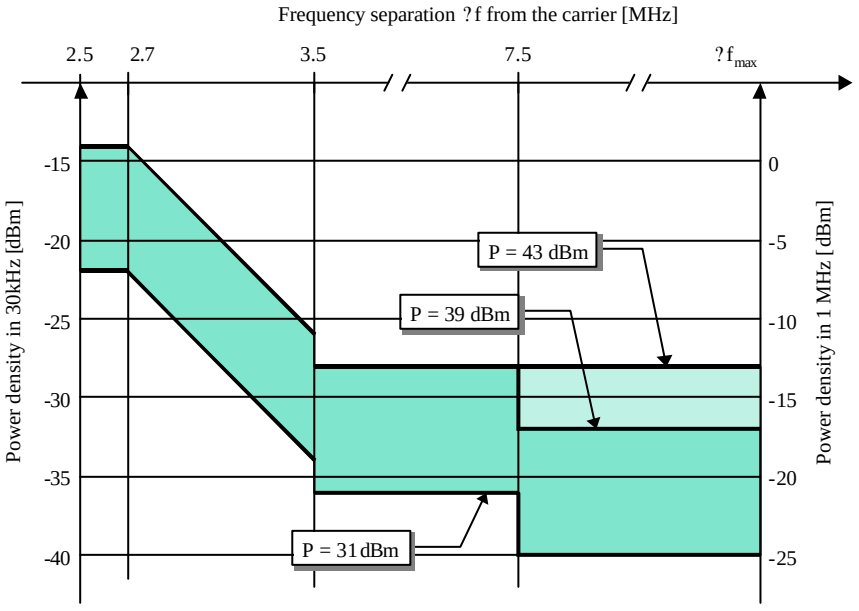
Out of band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission requirement is specified both in terms of a spectrum emission mask and adjacent channel power ratio for the transmitter.

6.6.2.1 Spectrum emission mask

The mask defined in Tables 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.3 to 6.6 for the appropriate BS maximum output power, in the frequency range from ?f = 2.5 MHz to ?f_{max} from the carrier frequency, where:

- ?f is the separation between the carrier frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.
- F_offset is the separation between the carrier frequency and the centre of the measuring filter.
- f_offset_{max} is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in section 5.2, whichever is the greater.
- ?f_{max} is equal to f_offset_{max} minus half of the bandwidth of the measuring filter.



Illustrative diagram of spectrum emission mask

Figure 6.2: Spectrum emission mask

Table 6.3: Spectrum emission mask values, BS maximum output power P ? 43 dBm

Frequency offset of measurement filter -3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement Band I, II, III	Additional requirements Band II [1]	Measurement bandwidth[2]
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	-14 dBm	-15dBm	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$? 14dBm ? 15 ??\frac{f\_offset}{MHz} ? 2.715??dB?$	-15dBm	30 kHz
(see note 3)	3.515MHz ? f_offset < 4.0MHz	-26 dBm	NA	30 kHz
3.5 MHz ? ?f ? ?f_{max}	4.0MHz ? f_offset < f_offset_{max}	-13 dBm	NA	1 MHz

Table 6.4: Spectrum emission mask values, BS maximum output power 39 ? P < 43 dBm

Frequency offset of measurement filter -3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement Band I, II, III	Additional requirements Band II [1]	Measurement bandwidth[2]
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	-14 dBm	-15dBm	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$? 14dBm ? 15 ??\frac{f\_offset}{MHz} ? 2.715??dB?$	-15dBm	30 kHz
(see note 3)	3.515MHz ? f_offset < 4.0MHz	-26 dBm	NA	30 kHz
3.5 MHz ? ?f < 7.5 MHz	4.0MHz ? f_offset < 8.0MHz	-13 dBm	NA	1 MHz
7.5 MHz ? ?f ? ?f_{max}	8.0MHz ? f_offset < f_offset_{max}	P - 56 dB	NA	1 MHz

Table 6.5: Spectrum emission mask values, BS maximum output power 31 ? P < 39 dBm

Frequency offset of measurement filter -3dB point,? f	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement Band I, II, III	Additional requirements Band II [1]	Measurement bandwidth[2]
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	P - 53 dB	-15dBm	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$P ? 53dB ? 15 ??\frac{f\_offset}{MHz} ? 2.715??dB?$	-15dBm	30 kHz
(see note 3)	3.515MHz ? f_offset < 4.0MHz	P - 65 dB	NA	30 kHz
3.5 MHz ? ?f < 7.5 MHz	4.0MHz ? f_offset < 8.0MHz	P - 52 dB	NA	1 MHz
7.5 MHz ? ?f ? ?f_{max}	8.0MHz ? f_offset < f_offset_{max}	P - 56 dB	NA	1 MHz

Table 6.6: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter -3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement Band I, II, II	Measurement bandwidth[2]
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$? 22 dBm ? 15 ?? \frac{f\_offset}{MHz} ? 2.715 ?? dB$	30 kHz
(see note 3)	3.515MHz ? f_offset < 4.0MHz	-34 dBm	30 kHz
3.5 MHz ? ?f < 7.5 MHz	4.0MHz ? f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 MHz ? ?f ? $?f_{max}$	8.0MHz ? f_offset < f_offset_{max}	-25 dBm	1 MHz

Notes for Tables 6.3, 6.4, 6.5 & 6.6

NOTE 1 The minimum requirement for operation in band II is the lower power of the minimum requirement for band 1, II and III and the additional requirement for band II.

NOTE 2 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 can 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 in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

NOTE 3: This frequency range ensures that the range of values of f_offset is continuous.

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the RRC filtered mean power centered on the assigned channel frequency to the RRC filtered mean power centered on an adjacent channel frequency.

6.6.2.2.1 Minimum requirement

The ACLR shall be higher than the value specified in Table 6.7.

Table 6.7: BS ACLR

BS adjacent channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	50 dB

6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions. This is measured at the base station RF output port.

The requirements shall apply whatever the type of transmitter considered (single carrier or multiple-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

Unless otherwise stated, all requirements are measured as mean power.

6.6.3.1 Mandatory Requirements

The requirements of either subclause 6.6.3.1.1 or subclause 6.6.3.1.2 shall apply.

Either requirement applies at frequencies within the specified frequency ranges that are more than 12.5MHz below the first carrier frequency used or more than 12.5MHz above the last carrier frequency used.

6.6.3.1.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-9 [1], are applied.

6.6.3.1.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.8: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement Bandwidth	Note
9kHz - 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
150kHz - 30MHz		10 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
30MHz - 1GHz		100 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
1GHz - 12.75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-9, s2.5 table 1

6.6.3.1.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-9 [1], are applied.

6.6.3.1.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.9: BS Mandatory spurious emissions limits, operating band I, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz ? 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
150kHz ? 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
30MHz ? 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
1GHz ? Fc1 - 60 MHz or 2100 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-9, s4.1
Fc1 - 60 MHz or 2100 MHz *whichever is the higher* ? Fc1 - 50 MHz or 2100 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc1 - 50 MHz or 2100 MHz *whichever is the higher* ? Fc2 + 50 MHz or 2180 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc2 + 50 MHz or 2180 MHz *whichever is the lower* ? Fc2 + 60 MHz or 2180 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc2 + 60 MHz or 2180 MHz *whichever is the lower* ? 12.75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-9, s4.1. Upper frequency as in ITU-R SM.329-9, s2.5 table 1

Table 6.9A: BS Mandatory spurious emissions limits, operating band II, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz ? 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
150kHz ? 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
30MHz ? 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
1GHz ? Fc1 - 60 MHz or 1920 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-9, s4.1
Fc1 - 60 MHz or 1920 MHz *whichever is the higher* ? Fc1 - 50 MHz or 1920 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc1 - 50 MHz or 1920 MHz *whichever is the higher* ? Fc2 + 50 MHz or 1890 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc2 + 50 MHz or 2000 MHz *whichever is the lower* ? Fc2 + 60 MHz or 2000 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 1
Fc2 + 60 MHz or 2000 MHz *whichever is the lower* ? 12.75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-9, s4.1. Upper frequency as in ITU-R SM.329-9, s2.5 table 16

Table 6.9B: BS Mandatory spurious emissions limits, operating band III, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz ? 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
150kHz ? 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
30MHz ? 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-9, s4.1
1GHz ? Fc1 - 60 MHz or 1795 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-9, s4.1
Fc1 - 60 MHz or 1795 MHz *whichever is the higher* ? Fc1 - 50 MHz or 1795 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc1 - 50 MHz or 1795 MHz *whichever is the higher* ? Fc2 + 50 MHz or 1890 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc2 + 50 MHz or 1890 MHz *whichever is the lower* ? Fc2 + 60 MHz or 1890 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-9, s4.3 and Annex 7
Fc2 + 60 MHz or 1890 MHz *whichever is the lower* ? 12.75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-9, s4.1. Upper frequency as in ITU-R SM.329-9, s2.5 table 1

Fc1: Center frequency of emission of the first carrier transmitted by the BS.

Fc2: Center frequency of emission of the last carrier transmitted by the BS.

6.6.3.2 Protection of the BS receiver

This requirement may be applied in order to prevent the receiver of the BS being desensitised by emissions from the BS transmitter, which are coupled between the antennas of the BS. This is measured at the transmit antenna port.

6.6.3.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.10: BS Spurious emissions limits for protection of the BS receiver

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
I	1920 - 1980MHz	-96 dBm	100 kHz	
II	1850-1910 MHz	-96 dBm	100kHz	
III	1710-1785 MHz	-96 dBm	100kHz	

6.6.3.3 Co-existence with GSM 900

6.6.3.3.1 Operation in the same geographic area

This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.

6.6.3.3.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.11: BS Spurious emissions limits for BS in geographic coverage area of GSM 900 MS receiver

Band	Maximum Level	Measurement Bandwidth	Note
921 - 960 MHz	-57 dBm	100 kHz	

6.6.3.3.2 Co-located base stations

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.

6.6.3.3.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.12: BS Spurious emissions limits for protection of the GSM 900 BTS receiver

Band	Maximum Level	Measurement Bandwidth	Note
876-915 MHz	-98 dBm	100 kHz	

6.6.3.4 Co-existence with DCS 1800

6.6.3.4.1 Operation in the same geographic area

This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.

6.6.3.4.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.13: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800 MS receiver

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
I	1805 - 1880 MHz	-47 dBm	100 kHz	

6.6.3.4.2 Co-located base stations

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.

6.6.3.4.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.14: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
I	1710 - 1785 MHz	-98 dBm	100 kHz	
III	1710 – 1785 MHz	-98 dBm	100 kHz	

6.6.3.5 Co-existence with PHS

This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA are deployed.

6.6.3.5.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.15: BS Spurious emissions limits for BS in geographic coverage area of PHS

Band	Maximum Level	Measurement Bandwidth	Note
1893.5 - 1919.6 MHz	-41 dBm	300 kHz	

6.6.3.6 Co-existence with services in adjacent frequency bands

This requirement may be applied for the protection in bands adjacent to bands I, II or III, as defined in clause 5.2 in geographic areas in which both an adjacent band service and UTRA are deployed.

6.6.3.6.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 6.16: BS spurious emissions limits for protection of adjacent band services

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
I	2100-2105 MHz	-30 + 3.4 ?(f - 2100 MHz) dBm	1 MHz	
	2175-2180 MHz	-30 + 3.4 ?(2180 MHz - f) dBm	1 MHz	
II	1920-1925 MHz	-30 + 3.4 ?(f - 1920 MHz) dBm	1 MHz	
	1995-2000 MHz	-30 +3.4 ?(2000 MHz - f) dBm	1 MHz	
III	1795-1800 MHz	-30 + 3.4 ?(f - 1795 MHz) dBm	1MHz	
	1885-1890 MHz	-30 +3.4 ?(1890 MHz - f) dBm	1MHz	

6.6.3.7 Co-existence with UTRA-TDD

6.6.3.7.1 Operation in the same geographic area

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

6.6.3.7.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.17: BS Spurious emissions limits for BS in geographic coverage area of UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1900 - 1920 MHz	-52 dBm	1 MHz	
2010 - 2025 MHz	-52 dBm	1 MHz	

6.6.3.7.2 Co-located base stations

This requirement may be applied for the protection of UTRA-TDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.

6.6.3.7.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.18: BS Spurious emissions limits for BS co-located with UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1900 - 1920 MHz	-86 dBm	1 MHz	
2010 - 2025 MHz	-86 dBm	1 MHz	

6.6.3.8 Co-existence with UTRA in frequency band I

6.6.3.8.1 Operation in the same geographic area

This requirement may be applied for the protection of UTRA UE operating in frequency band I in geographic areas in which both UTRA in frequency band I and III are deployed.

6.6.3.8.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.19: BS Spurious emissions limits for BS in geographic coverage area of UTRA UE receiver operating in frequency band I

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
III	2110 – 2170 MHz	-52 dBm	1 MHz	

6.6.3.8.2 Co-located base stations

This requirement may be applied for the protection of UTRA BS receivers operating in frequency band I when UTRA BS operating in frequency band I and III are co-located.

6.6.3.8.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.20: BS Spurious emissions limits for BS co-located with UTRA BS operating in frequency band I

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
III	1920 - 1980 MHz	-96 dBm	100 kHz	

6.6.3.9 Co-existence with UTRA in frequency band III

6.6.3.9.1 Operation in the same geographic area

This requirement may be applied for the protection of UTRA UE operating in frequency band III in geographic areas in which both UTRA in frequency band III and I are deployed.

6.6.3.9.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.21: BS Spurious emissions limits for BS in geographic coverage area of UTRA UE receiver operating in frequency band III

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
I	1805 – 1880 MHz	-62 dBm	100 kHz	

6.6.3.9.2 Co-located base stations

This requirement may be applied for the protection of UTRA BS receivers operating in frequency band III when UTRA BS operating in frequency band III and I are co-located.

6.6.3.9.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.22: BS Spurious emissions limits for BS co-located with UTRA BS operating in frequency band III

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
I	1710 – 1785 MHz	-96 dBm	100 kHz	

6.6.3.10 Co-existence with PCS1900

6.6.3.10.1 Co-located base stations

This requirement may be applied for the protection of PCS1900 BS receivers when UTRA BS operating in frequency band II and PCS1900 BS are co-located.

6.6.3.10.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.23: BS Spurious emissions limits for BS co-located with PCS1900 BS

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
II	1850 – 1910 MHz	-98 dBm	100 kHz	

6.6.3.11 Co-existence with GSM850

6.6.3.11.1 Co-located base stations

This requirement may be applied for the protection of GSM850 BS receivers when UTRA BS operating in frequency band II and GSM850 BS are co-located.

6.6.3.11.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.24: BS Spurious emissions limits for BS co-located with GSM850 BS

Operating Band	Band	Maximum Level	Measurement Bandwidth	Note
II	824 - 849 MHz	-98 dBm	100 kHz	

Annex 4. Unwanted emission requirements for UTRA TDD BS

Reference:

3GPP TS 25.105 V5.1.0 (2002-06), "3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; BS Radio transmission and Reception (TDD) (Release 5)"

6.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission requirement is specified both in terms of a spectrum emission mask and adjacent channel power ratio for the transmitter.

6.6.2.1 Spectrum emission mask

6.6.2.1.1 3,84 Mcps TDD Option

The mask defined in Table 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.3 to 6.6 for the appropriate BS maximum output power, in the frequency range from $\Delta f = 2.5$ MHz to Δf_{max} from the carrier frequency, where:

- Δf is the separation between the carrier frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the center frequency of the measuring filter. f_offset$_{max}$ is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in section 5.2, whichever is the greater.
- Δf_{max} is equal to f_offset$_{max}$ minus half of the bandwidth of the mesurement filter.

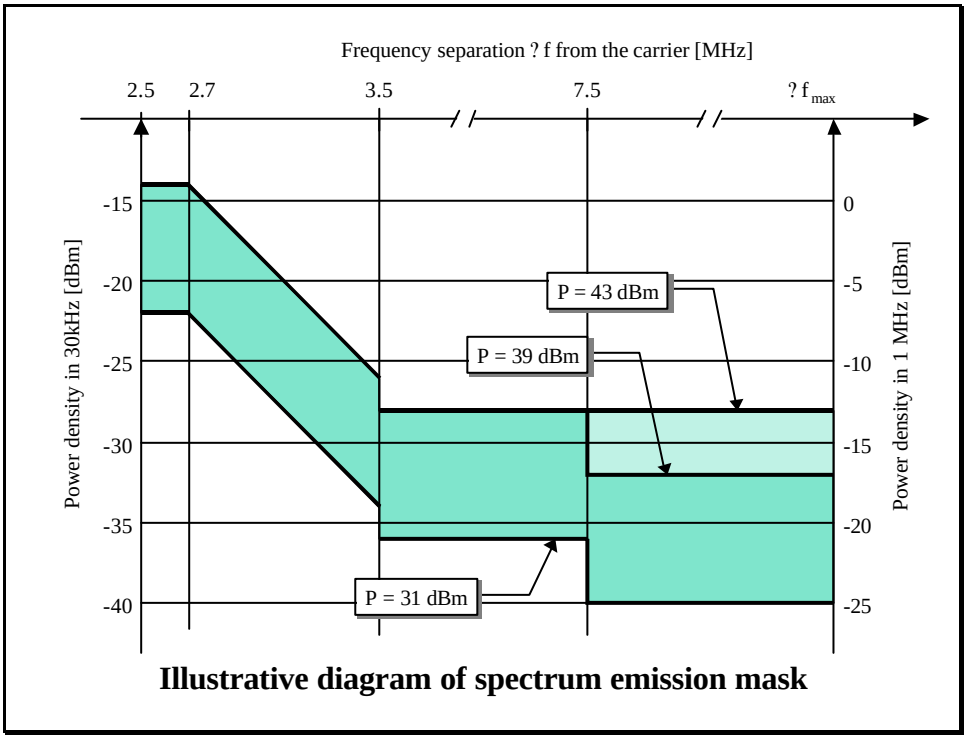


Figure 6.2

Table 6.3: Spectrum emission mask values, BS maximum output power P ? 43 dBm

Frequency offset of measurement filter –3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	-14 dBm	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$? 14dBm ? 15?\left(\frac{f\_offset}{MHz} ? 2.715\right)dB$	30 kHz
(see note)	3.515MHz ? f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 MHz ? ?f ? $?f_{ma}$	4.0MHz ? f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.4: Spectrum emission mask values, BS maximum output power 39 ? P < 43 dBm

Frequency offset of measurement filter –3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	-14 dBm	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$? 14dBm ? 15?\left(\frac{f\_offset}{MHz} ? 2.715\right)dB$	30 kHz
(see note)	3.515MHz ? f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 MHz ? ?f < 7.5 MHz	4.0MHz ? f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 MHz ? ?f ? $?f_{max}$	8.0MHz ? f_offset < f_offset_{max}	P - 56 dB	1 MHz

Table 6.5: Spectrum emission mask values, BS maximum output power 31 ? P < 39 dBm

Frequency offset of measurement filter –3dB point,? f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 MHz ? ?f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	P - 53 dB	30 kHz
2.7 MHz ? ?f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$P ? 53dB ? 15?\left(\frac{f\_offset}{MHz} ? 2.715\right)dB$	30 kHz
(see note)	3.515MHz ? f_offset < 4.0MHz	P - 65 dB	30 kHz
3.5 MHz ? ?f < 7.5 MHz	4.0MHz ? f_offset < 8.0MHz	P - 52 dB	1 MHz
7.5 MHz ? ?f ? $?f_{max}$	8.0MHz ? f_offset < f_offset_{max}	P - 56 dB	1 MHz

Table 6.6: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter –3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 MHz ? ? f < 2.7 MHz	2.515MHz ? f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 MHz ? ? f < 3.5 MHz	2.715MHz ? f_offset < 3.515MHz	$? 22 dBm ? 15 ?? \frac{? f\_offset}{MHz} ? 2.715 ?? dB$	30 kHz
(see note)	3.515MHz ? f_offset < 4.0MHz	-34 dBm	30 kHz
3.5 MHz ? ? f < 7.5 MHz	4.0MHz ? f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 MHz ? ? f ? ? f_{max}	8.0MHz ? f_offset < f_offset_{max}	-25 dBm	1 MHz

NOTE: This frequency range ensures that the range of values of f_offset is continuous.

6.6.2.1.2 1,28 Mcps TDD Option

The mask defined in Table 6.3A to 6.6A may be mandatory in certain regions. In other regions this mask may not be applied.

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in table 6.3A to 6.6A for the appropriate BS maximum output power, in the frequency range from ? f = 0.8 MHz to ? f_{max} from the carrier frequency, where:

- ? f is the separation between the carrier frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the center frequency of the measuring filter.- f_offset_{max} is either 4 MHz or the offset to the UMTS Tx band edge as defined in section 5.2, whichever is the greater.
- ? f_{max} is equal to f_offset_{max} minus half of the bandwidth of the mesurement filter.

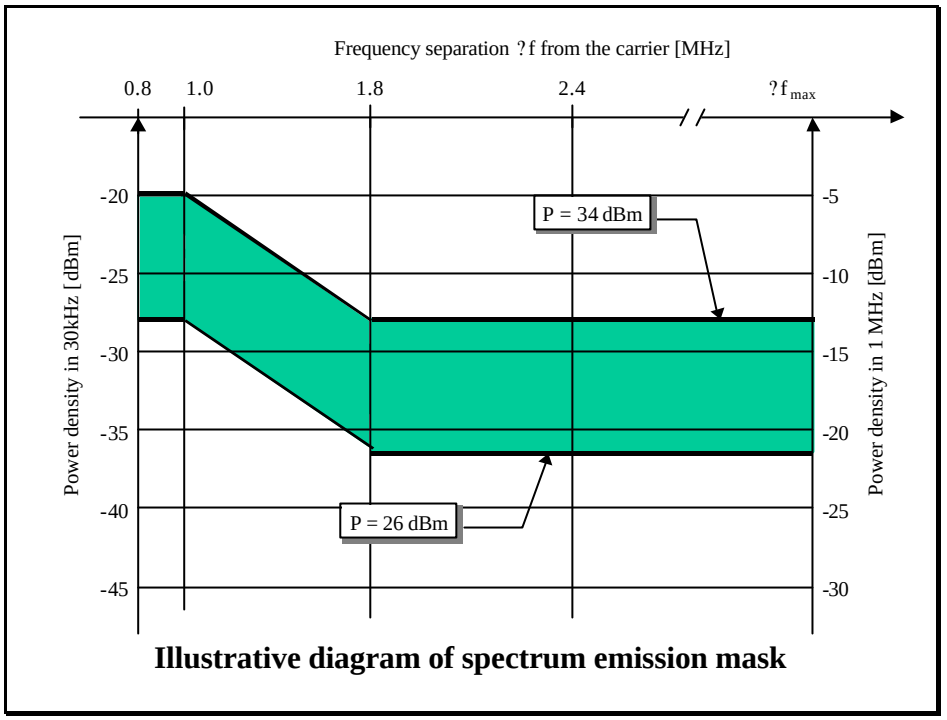


Figure 6.2A

Table 6.3A: Spectrum emission mask values, BS maximum output power P ? 34 dBm

Frequency offset of measurement filter –3dB point, ?f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
0.8 MHz ? ?f < 1.0 MHz	0.815MHz ? f_offset < 1.015MHz	-20 dBm	30 kHz
1.0 MHz ? ?f < 1.8 MHz	1.015MHz ? f_offset < 1.815MHz	$? 20\,dBm ? 10 ?? \frac{f\_offset}{MHz} ? 1{,}015 ??dB$	30 kHz
See note	1.815MHz ? f_offset < 2.3MHz	-28 dBm	30 kHz
1.8 MHz ? ?f ?? f_{max}	2.3MHz ? f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.4A: Spectrum emission mask values, BS maximum output power 26 ? P < 34 dBm

Frequency offset of measurement filter –3dB point, ?f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
0.8 MHz ? ?f < 1.0 MHz	0.815MHz ? f_offset < 1.015MHz	P-54 dB	30 kHz
1.0 MHz ? ?f < 1.8 MHz	1.015MHz ? f_offset < 1.815MHz	$P ? 54\,dB ? 10 ?? \frac{f\_offset}{MHz} ? 1{,}015 ??dB$	30 kHz
See note	1.815 MHz ? f_offset < 2.3 MHz	P-62 dB	30 kHz
1.8 MHz ? ?f ?? f_{max}	2.3 MHz ? f_offset < f_offset_{max}	P - 47 dB	1 MHz

Table 6.5A: Spectrum emission mask values, BS maximum output power P < 26 dBm

Frequency offset of measurement filter –3dB point, ? f	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
0.8 MHz? ?f < 1.0 MHz	0.815MHz ? f_offset < 1.015MHz	-28 dBm	30 kHz
1.0 MHz? ?f < 1.8 MHz	1.015MHz ? f_offset < 1.815MHz	$? 28 dBm ? 10 ?? \frac{f\_offset}{MHz} ? 1{,}015 ?? dB$	30 kHz
See note	1.815MHz ? f_offset < 2.3MHz	-36 dBm	30 kHz
1.8 MHz? ?f ? ? f_{max}	2.3MHz ? f_offset < f_offset_{max}	-21 dBm	1 MHz

NOTE: This frequency range ensures that the range of values of f_offset is continuous.

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the RRC filtered mean power centered on the assigned channel frequency to the RRC filtered mean power centered on an adjacent channel frequency. The requirements shall apply for all configurations of BS (single carrier or multi-carrier), and for all operating modes foreseen by the manufacturer's specification.

In some cases the requirement is expressed as adjacent channel leakage power, which is the maximum absolute emission level on the adjacent channel frequency measured with a filter that has a Root Raised Cosine (RRC) filter response with roll-off a=0,22 and a bandwidth equal to the chip rate of the victim system.

The requirement depends on the deployment scenario. Three different deployment scenarios have been defined as given below.

6.6.2.2.1 Minimum Requirement

6.6.2.2.1.1 3,84 Mcps TDD Option

The ACLR of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall be higher than the value specified in Table 6.7.

Table 6.7: BS ACLR

BS adjacent channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	55 dB

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied individually to the single carriers or group of single carriers.

6.6.2.2.1.2 1,28 Mcps TDD Option

For the 1.28Mcps chip rate option, the ACLR of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall be better than the value specified in Table 6.7A

Table 6.7A: BS ACLR (1.28Mcps chip rate)

BS adjacent channel offset below the first or above the last carrier frequency used	ACLR limit
1.6 MHz	40 dB
3.2 MHz	45 dB

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied individually to the single carriers or group of single carriers.

6.6.2.2.2 Additional requirement for operation in the same geographic area with FDD or unsynchronised TDD on adjacent channels

6.6.2.2.2.1 3,84 Mcps TDD Option

6.6.2.2.2.1.1 Additional requirement for operation in the same geographic area with unsynchronised TDD on adjacent channels

In case the equipment is operated in the same geographic area with an unsynchronised TDD BS operating on the first or second adjacent frequency, the adjacent channel leakage power of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall not exceed the limits specified in Table 6.8.

Table 6.8: Adjacent channel leakage power limits for operation in the same geographic area with unsynchronised TDD on adjacent channels

BS Class	BS adjacent channel offset below the first or above the last carrier frequency used	Maximum Level	Measurement Bandwidth
Wide Area BS	5 MHz	- 29 dBm	3,84 MHz
Wide Area BS	10 MHz	- 29 dBm	3,84 MHz
Local Area BS	5 MHz	-16 dBm	3,84 MHz
Local Area BS	10 MHz	-26 dBm	3,84 MHz

NOTE: The requirement in Table 6.8 for the Wide Area BS are based on a coupling loss of 74 dB between the unsynchronised TDD base stations . The requirement in Table 6.8 for the Local Area BS ACLR1 (± 5 MHz channel offset) are based on a coupling loss of 87 dB between unsynchronised Wide Area and Local Area TDD base stations. The requirement in Table 6.8 for the Local Area BS ACLR2 (± 10 MHz channel offset) are based on a coupling loss of 77 dB between unsynchronised Wide Area and Local Area TDD base stations. The scenarios leading to these requirements are addressed in TR25.942 [4].

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied to those adjacent channels of the single carriers or group of single channels which are used by the TDD BS in the same geographic area.

6.6.2.2.2.1.2 Additional requirement for operation in the same geographic area with FDD on adjacent channels

In case the equipment is operated in the same geographic area with a FDD BS operating on the first or second adjacent channel , the adjacent channel leakage power shall not exceed the limits specified in Table 6.8AA.

Table 6.8AA: Adjacent channel leakage power limits for operation in the same geographic area with FDD on adjacent channels

BS Class	BS Adjacent Channel Offset	Maximum Level	Measurement Bandwidth
Wide Area BS	± 5 MHz	-36 dBm	3,84 MHz
Wide Area BS	± 10 MHz	– 36 dBm	3,84 MHz
Local Area BS	± 5 MHz	-23 dBm	3,84 MHz
Local Area BS	± 10 MHz	-33 dBm	3,84 MHz

NOTE: The requirements in Table 6.8AA for the Wide Area BS are based on a coupling loss of 74 dB between the FDD and TDD base stations. The requirements in Table 6.8AA for the Local Area BS ACLR1 (± 5 MHz channel offset) are based on a relaxed coupling loss of 87 dB between TDD and FDD base stations. The requirement for the Local Area BS ACLR2 (± 10 MHz channel offset) are based on a relaxed coupling loss of 77 dB between TDD and FDD base stations. The scenarios leading to these requirements are addressed in TR 25.942 [4].

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied to those adjacent channels of the single carriers or group of single channels which are used by the FDD BS in the same geographic area.

6.6.2.2.2.2 1,28 Mcps TDD Option

6.6.2.2.2.2.1 Additional requirement for operation in the same geographic area with unsynchronised TDD on adjacent channels

In case the equipment is operated in the same geographic area with an unsynchronised TDD BS operating on an adjacent channel , the requirement is specified in terms of adjacent channel leakage power. In geographic areas where only UTRA 1.28 Mcps TDD option is deployed, the adjacent channel leakage power limits shall not exceed the limits specified in Table 6.8A, otherwise the limits in Table 6.8B shall apply.

Table 6.8A: Adjacent channel leakage limits for operation in the same geographic area with unsynchronised 1.28 Mcps TDD on adjacent channels

BS Class	BS Adjacent Channel Offset	Maximum Level	Measurement Bandwidth
Wide Area BS	± 1,6 MHz	-29 dBm	1,28 MHz
Wide Area BS	± 3,2 MHz	-29 dBm	1,28 MHz
Local Area BS	± 1,6 MHz	-16 dBm	1,28 MHz
Local Area BS	± 3,2 MHz	-16 dBm	1,28 MHz

Table 6.8B: Adjacent Channel leakage power limits for operation in the same geographic area with unsynchronised TDD on adjacent channels

BS Class	BS Adjacent Channel Offset	Maximum Level	Measurement Bandwidth
Wide Area BS	± 3,4 MHz	-29 dBm	3,84 MHz
Local Area BS	± 3,4 MHz	-16 dBm	3,84 MHz

NOTE: The requirement in Table 6.8A and 6.8B for the Wide Area BS are based on a coupling loss of 74 dB between the unsynchronised TDD base stations. The requirement in Table 6.8A and 6.8B for the Local Area BS are based on a coupling loss of 87 dB between unsynchronised Wide Area and Local Area TDD base stations. The scenarios leading to these requirements are addressed in TR25.942 [4].

6.6.2.2.2.2.2 Additional requirement for operation in the same geographic area with FDD on adjacent channels

In case the equipment is operated in the same geographic area with a FDD BS operating on an adjacent channel, the adjacent channel leakage power shall not exceed the limits specified in Table 6.8C. This requirement is only applicable if the equipment is intended to operate in frequency bands specified in 5.2 a) and the highest carrier frequency used is in the range 1916,2 – 1920 MHz.

Table 6.8C: Adjacent channel leakage power limits for operation in the same geographic area with FDD on adjacent channels

BS Class	Center Frequency for Measurement	Maximum Level	Measurement Bandwidth
Wide Area BS	1922,6 MHz	-36 dBm	3,84 MHz
Local Area BS	1922,6 MHz	-23 dBm	3,84 MHz

NOTE: The requirement in Table 6.8C for Wide Area BS is based on a relaxed coupling loss of 74 dB between the TDD and FDD base stations. The requirement in Table 6.8C for Local Area BS is based on a relaxed coupling loss of 87 dB between TDD and FDD base stations. The scenarios leading to these requirements are addressed in TR 25.942 [4].

6.6.2.2.3 Additional requirement in case of co-siting with unsynchronised TDD BS or FDD BS operating on an adjacent channel

6.6.2.2.3.1 3,84 Mcps TDD Option

6.6.2.2.3.1.1 Additional requirement in case of co-siting with unsynchronised TDD BS operating on an adjacent channel

In case the equipment is co-sited to an unsynchronised TDD BS operating on the first or second adjacent frequency, the adjacent channel leakage power of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies shall not exceed the limits specified in Table 6.9.

Table 6.9: Adjacent channel leakage power limits in case of co-siting with unsynchronised TDD on adjacent channel

BS Class	BS adjacent channel offset below the first or above the last carrier frequency used	Maximum Level	Measurement Bandwidth
Wide Area BS	5 MHz	-73 dBm	3.84 MHz
Wide Area BS	10 MHz	-73 dBm	3.84 MHz
Local Area BS	5 MHz	-31 dBm	3.84 MHz
Local Area BS	10 MHz	-31 dBm	3.84 MHz

Note: The requirements in Table 6.9 for the Wide Area BS are based on a minimum coupling loss of 30 dB between unsynchronised TDD base stations. The requirements in Table 6.9 for the Local Area BS are based on a minimum coupling loss of 45 dB between unsynchronised Local Area base stations. The co-location of different base station classes is not considered.

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied to those adjacent channels of the single carriers or group of single channels which are used by the co-sited TDD BS.

6.6.2.2.3.1.2 Additional requirement in case of co-siting with FDD BS operating on an adjacent channel

In case the equipment is co-sited to a FDD BS operating on the first or second adjacent channel, the adjacent channel leakage power shall not exceed the limits specified in Table 6.9AA.

Table 6.9AA: Adjacent channel leakage power limits in case of co-siting with FDD on an adjacent channel

BS Class	BS Adjacent Channel Offset	Maximum Level	Measurement Bandwidth
Wide Area BS	± 5 MHz	-80 dBm	3,84 MHz
Wide Area BS	± 10 MHz	-80 dBm	3,84 MHz

Note: The requirements in Table 6.9AA are based on a minimum coupling loss of 30 dB between base stations. The co-location of different base station classes is not considered. A co-location requirement for the Local Area TDD BS is intended to be part of a later release.

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements shall be applied to those adjacent channels of the single carriers or group of single channels which are used by the co-sited FDD BS.

6.6.2.2.3.2 1,28 Mcps TDD Option

6.6.2.2.3.2.1 Additional requirement in case of co-siting with unsynchronised TDD BS operating on an adjacent channel

In case the equipment is co-sited to an unsynchronised TDD BS operating on an adjacent frequency band, the requirement is specified in terms of adjacent channel leakage power. In geographic areas where only UTRA 1.28 Mcps TDD option is deployed, the adjacent channel leakage power shall not exceed the limits specified in Table 6.9A, otherwise the limits in Table 6.9B shall apply.

Table 6.9A: Adjacent channel leakage power limits in case of co-siting with unsynchronised 1.28 Mcps TDD on an adjacent channel

BS Class	BS Adjacent Channel Offset	Maximum Level	Measurement Bandwidth
Wide Area BS	± 1,6 MHz	-73 dBm	1,28 MHz
Wide Area BS	± 3,2 MHz	-73 dBm	1,28 MHz
Local Area BS	± 1,6 MHz	-34 dBm	1,28 MHz
Local Area BS	± 3,2 MHz	-34 dBm	1,28 MHz

Table 6.9B: Adjacent Channel leakage power limits for operation in the same geographic area with unsynchronised TDD on an adjacent channel

BS Class	BS Adjacent Channel Offset	Maximum Level	Measurement Bandwidth
Wide Area BS	± 3,4 MHz	-73 dBm	3,84 MHz
Local Area BS	± 3,4 MHz	-31 dBm	3,84 MHz

Note: The requirements in Table 6.9A and 6.9B for the Wide Area BS are based on a minimum coupling loss of 30 dB between unsynchronised TDD base stations. The requirements in Table 6.9A and 6.9B for the Local Area BS are based on a minimum coupling loss of 45 dB between unsynchronised Local Area base stations. The co-location of different base station classes is not considered.

6.6.2.2.3.2.2 Additional requirement in case of co-siting with FDD BS operating on an adjacent channel

In case the equipment is co-sited to a FDD BS operating on an adjacent channel, the adjacent channel leakage power shall not exceed the limits specified in Table 6.9C. This requirement is only applicable if the equipment is intended to operate in frequency bands specified in 5.2 a) and the highest carrier frequency used is in the range 1916,2 – 1920 MHz.

Table 6.9C: Adjacent channel leakage power in case of co-siting with UTRA FDD on an adjacent channel

BS Class	Center Frequency for Measurement	Maximum Level	Measurement Bandwidth
Wide Area BS	1922,6 MHz	-80 dBm	3,84 MHz

Note: The requirements in Table 6.9C are based on a minimum coupling loss of 30 dB between base stations. The co-location of different base station classes is not considered. A co-location requirement for the Local Area TDD BS is intended to be part of a later release.

6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions. This is measured at the base station RF output port.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi carrier). It applies for all transmission modes foreseen by the manufacturer's.

For 3.84 Mcps TDD option, either requirement applies at frequencies within the specified frequency ranges which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

For 1.28 Mcps TDD option, either requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

Unless otherwise stated, all requirements are measured as mean power.

6.6.3.1 Mandatory Requirements

The requirements of either subclause 6.6.3.1.1 or subclause 6.6.3.1.2 shall apply.

6.6.3.1.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.

6.6.3.1.1.1 Minimum Requirement

6.6.3.1.1.1.1 3,84 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 6.10: BS Mandatory spurious emissions limits, Category A

Band	Minimum requirement	Measurement Bandwidth	Note
9kHz – 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU SM.329-8, s4.1
150kHz – 30MHz		10 kHz	Bandwidth as in ITU SM.329-8, s4.1
30MHz – 1GHz		100 kHz	Bandwidth as in ITU SM.329-8, s4.1
1GHz – 12.75 GHz		1 MHz	Upper frequency as in ITU SM.329-8, s2.5 table 1

6.6.3.1.1.1.2 1,28 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 6.10A: BS Mandatory spurious emissions limits, Category A

Band	Minimum requirement	Measurement Bandwidth	Note
9kHz – 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU SM.329-8, s4.1
150kHz – 30MHz		10 kHz	Bandwidth as in ITU SM.329-8, s4.1
30MHz – 1GHz		100 kHz	Bandwidth as in ITU SM.329-8, s4.1
1GHz – 12.75 GHz		1 MHz	Upper frequency as in ITU SM.329-8, s2.5 table 1

NOTE: only the measurement bands are different according to the occupied bandwidth.

6.6.3.1.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.

6.6.3.1.2.1 Minimum Requirement

6.6.3.1.2.1.1 3,84 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 6.11: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-8, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-8, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-8, s4.1
1GHz ? Fc1-60 MHz or Fl -10 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-8, s4.1
Fc1 - 60 MHz or Fl -10 MHz *whichever is the higher* ? Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher* ? Fc2 + 50 MHz or Fu +10 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc2 + 50 MHz or Fu + 10 MHz *whichever is the lower* ? Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower* ? 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, s4.3 and Annex 7. Upper frequency as in ITU-R SM.329-8, s2.5 table 1

Fc1: Center frequency of emission of the first carrier transmitted by the BS

Fc2: Center frequency of emission of the last carrier transmitted by the BS

Fl : Lower frequency of the band in which TDD operates

Fu : Upper frequency of the band in which TDD operates

6.6.3.1.2.1.2 1,28 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 6.11A: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-8, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-8, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-8, s4.1
1GHz ? Fc1-19.2 MHz or Fl –10 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-8, s4.1
Fc1 – 19.2 MHz or Fl -10MHz *whichever is the higher* ? Fc1 - 16 MHz or Fl –10 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.1
Fc1 - 16 MHz or Fl –10 MHz *whichever is the higher* ? Fc2 + 16 MHz or Fu +10 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.1
Fc2 + 16 MHz or Fu + 10MHz *whichever is the lower* ? Fc2 +19.2 MHz or Fu + 10MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.1
Fc2 + 19.2 MHz or Fu +10 MHz *whichever is the lower* ? 12,5 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, s4.1. Upper frequency as in ITU-R SM.329-8, s2.5 table 1

Fc1: Center frequency of emission of the first carrier transmitted by the BS

Fc2: Center frequency of emission of the last carrier transmitted by the BS

Fl : Lower frequency of the band in which TDD operates

Fu : Upper frequency of the band in which TDD operates

6.6.3.2 Co-existence with GSM 900

6.6.3.2.1 Operation in the same geographic area

This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.

6.6.3.2.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.12: BS Spurious emissions limits for BS in geographic coverage area of GSM 900 MS receiver

Band	Maximum Level	Measurement Bandwidth	Note
921 – 960MHz	-57 dBm	100 kHz	

6.6.3.2.2 Co-located base stations

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.

6.6.3.2.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.13: BS Spurious emissions limits for protection of the GSM 900 BTS receiver

Band	Maximum Level	Measurement Bandwidth	Note
876 – 915 MHz	–98 dBm	100 kHz	

6.6.3.3 Co-existence with DCS 1800

6.6.3.3.1 Operation in the same geographic area

This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.

6.6.3.3.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.14: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800 MS receiver

Band	Maximum Level	Measurement Bandwidth	Note
1805 – 1880MHz	-47 dBm	100 kHz	

6.6.3.3.2 Co-located base stations

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.

6.6.3.3.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.15: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Band	Maximum Level	Measurement Bandwidth	Note
1710 – 1785 MHz	-98 dBm	100 kHz	

6.6.3.4 Co-existence with UTRA-FDD

6.6.3.4.1 Operation in the same geographic area

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

6.6.3.4.1.1 Minimum Requirement

For TDD base stations which use carrier frequencies within the band 2010 – 2025 MHz the requirements applies at all frequencies within the specified frequency bands in table 6.16. For 3.84 Mcps TDD option base stations which use a carrier frequency within the band 1900-1920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 12,5 MHz above the last carrier used in the frequency band 1900-1920 MHz. For 1.28 Mcps TDD option base stations which use carrier frequencies within the band 1900-1920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 4 MHz above the last carrier used in the frequency band 1900-1920 MHz.

The power of any spurious emission shall not exceed:

Table 6.16: BS Spurious emissions limits for BS in geographic coverage area of UTRA-FDD

BS Class	Band	Maximum Level	Measurement Bandwidth
Wide Area BS	1920 – 1980 MHz	-43 dBm (*)	3,84 MHz
Wide Area BS	2110 – 2170 MHz	-52 dBm	1 MHz
Local Area BS	1920 – 1980 MHz	-40 dBm (*)	3,84 MHz
Local Area BS	2110 – 2170 MHz	-52 dBm	1 MHz

NOTE* For 3.84 Mcps TDD option base stations, the requirement shall be measured with the lowest center frequency of measurement at 1922.6 MHz or 15 MHz above the last TDD carrier used, whichever is higher. For 1.28 Mcps TDD option base stations, the requirement shall be measured with the lowest center frequency of measurement at 1922.6 MHz or 6.6 MHz above the last TDD carrier used, whichever is higher.

NOTE: The requirements for Wide Area BS in Table 6.16 are based on a coupling loss of 67dB between the TDD and FDD base stations. The requirements for Local Area BS in Table 6.16 are based on a coupling loss of 70 dB between TDD and FDD Wide Area base stations. The scenarios leading to these requirements are addressed in TR 25.942 [4].

6.6.3.4.2 Co-located base stations

This requirement may be applied for the protection of UTRA-FDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.

6.6.3.4.2.1 Minimum Requirement

For TDD base stations which use carrier frequencies within the band 2010 – 2025 MHz the requirements applies at all frequencies within the specified frequency bands in table 6.17. For 3.84 Mcps TDD option base stations which use a carrier frequency within the band 1900-1920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 12,5 MHz above the last carrier used in the frequency band 1900-1920 MHz. For 1.28 Mcps TDD option base stations which use carrier frequencies within the band 1900-1920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 4 MHz above the last carrier used in the frequency band 1900-1920 MHz.

The power of any spurious emission shall not exceed:

Table 6.17: BS Spurious emissions limits for BS co-located with UTRA-FDD

BS Class	Band	Maximum Level	Measurement Bandwidth
Wide Area BS	1920 – 1980 MHz	-80 dBm (*)	3,84 MHz
Wide Area BS	2110 – 2170 MHz	-52 dBm	1 MHz

NOTE * For 3.84 Mcps TDD option base stations, the requirement shall be measured with the lowest center frequency of measurement at 1922.6 MHz or 15 MHz above the last TDD carrier used, whichever is higher. For 1.28 Mcps TDD option base stations, the requirement shall be measured with the lowest center frequency of measurement at 1922.6 MHz or 6.6 MHz above the last TDD carrier used, whichever is higher.

NOTE: The requirements in Table 6.17 are based on a minimum coupling loss of 30 dB between base stations. The co-location of different base station classes is not considered. A co-location requirement for the Local Area TDD BS is intended to be part of a later release.