

TSG RAN Meeting #18
New Orleans, US, 3 - 6 December, 2002

RP-020795

Title CRs (Rel-4 and Rel-5 Category A) to TS 25.106 & TS 25.143 on "Input intermodulation: Correction of co-location and addition of co-existence"
Source TSG RAN WG4
Agenda Item 7.4.4

RAN4 Tdoc	Spec	CR	R	Cat	Rel	Curr Ver	Title	Work Item
R4-021675	25.106	011	1	F	Rel-4	4.3.0	Input intermodulation: Correction of co-location and addition of co-existence	RInImp-REP
R4-021676	25.106	012	1	A	Rel-5	5.2.0	Input intermodulation: Correction of co-location and addition of co-existence	RInImp-REP
R4-021683	25.143	021	1	F	Rel-4	4.5.0	Input intermodulation: Correction of co-location and addition of co-existence	RInImp-REP
R4-021684	25.143	022	1	A	Rel-5	5.2.0	Input intermodulation: Correction of co-location and addition of co-existence	RInImp-REP

CHANGE REQUEST

⌘ **25.106 CR 011** ⌘ rev **1** ⌘ Current version: **4.3.0** ⌘

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Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Input intermodulation: correction of co-location and addition of co-existence		
Source:	⌘ RAN WG4		
Work item code:	⌘ RInImp-REP	Date:	⌘ 26/11/2002
Category:	⌘ F	Release:	⌘ Rel-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
	D (editorial modification)	R99	(Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘ 1. Align the input intermodulation interferer level of the repeater, with changes of the corresponding level in the receiver blocking requirement for co-location with GSM/DCS of the base station. 2. There was only a requirement for "Co-location with GSM/DCS". A requirement for a repeater operating in the same geographical area as GSM/DCS system was missing.
Summary of change:	⌘ 1. The level of the interferer for input intermodulation of the repeater is now in line with the blocking requirement for co-location with GSM/DCS of the basestation. 2. A co-existence requirement for a repeater operating in the same geographical area as GSM/DCS systems is added.
Consequences if not approved:	⌘ 1. The requirement for repeater and base station differs. 2. A repeater might disturb the network if operating in the same geographical area as GSM/DCS systems.

Clauses affected:	⌘ 11.1, 11.2, 11.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘ TS25.143
	Y	N									
	<input type="checkbox"/>	<input checked="" type="checkbox"/>									
<input checked="" type="checkbox"/>	<input type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
Test specifications											
O&M Specifications											
Other comments:	⌘ Equivalent CRs in other Releases: CR012r1 cat. A to 25.106 v5.2.0										

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Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ¶ contain pop-up help information about the field that they are closest to.
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11 Input Intermodulation

The input intermodulation is a measure of the capability of the repeater to inhibit the generation of interference in the operating band, in the presence of interfering signals on frequencies other than the operating band.

11.1 General Requirement

The following requirement applies for interfering signals in the frequency bands defined in sub-clause 5.1(a) or 5.1(b), depending on the repeaters operating band. The requirement shall be met with the repeater operating at maximum gain.

11.1.1 Minimum requirement

For the parameters specified in table 11.1, the power in the operating band, shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

The frequency separation between the two interfering signals shall be adjusted so that the 3rd order intermodulation product is positioned in the centre of the operating band.

Table 11.1 specifies the parameters for two interfering signals, where:

- f_{offset} is the separation between the centre frequency of first or last 5 MHz channel in the operating band and one of the interfering signals.

Table 11.1 : Input intermodulation requirement

f_{offset}	Interfering Signal Levels	Type of signals	Measurement bandwidth
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

11.2 Co-location with GSM 900 and/or DCS 1800

The following requirement may be applied when GSM 900 BTS and/or DCS 1800 BTS and UTRA-FDD Repeaters are co-located. The requirement shall be met with the repeater operating at maximum gain.

11.2.1 Minimum requirements

For the parameters specified in table 11.2, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

The frequency separation between the two interfering signals shall be adjusted so that the lowest order intermodulation product is positioned in the centre of the operating band.

NOTE 1: The lowest intermodulation products corresponds to the 4th and 3rd order for the GSM 900 and DCS 1800 bands, respectively.

Table 11.2: Input intermodulation requirements for interfering signals in the GSM 900 and DCS 1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	20 dBm	2 CW carriers	1 MHz
921 - 960 MHz	20+16 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	20 dBm	2 CW carriers	1 MHz
1805 - 1880 MHz	20+16 dBm	2 CW carriers	1 MHz

11.3 Co-existence with GSM 900 and/or DCS 1800

The following requirement may be applied when GSM 900 BTS and/or DCS 1800 BTS and UTRA-FDD Repeaters are co-located. The requirement shall be met with the repeater operating at maximum gain.

11.3.1 Minimum requirements

For the parameters specified in table 11.2a, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

The frequency separation between the two interfering signals shall be adjusted so that the lowest order intermodulation product is positioned in the centre of the operating band.

NOTE 1: The lowest intermodulation products corresponds to the 4th and 3rd order for the GSM 900 and DCS 1800 bands, respectively.

Table 11.2a: Input intermodulation requirements for interfering signals in the GSM 900 and DCS 1800 bands

<u>Frequency of interfering signals</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
<u>876 - 915 MHz</u>	<u>-15 dBm</u>	<u>2 CW carriers</u>	<u>1 MHz</u>
<u>1710 - 1785 MHz</u>	<u>-15 dBm</u>	<u>2 CW carriers</u>	<u>1 MHz</u>

CHANGE REQUEST

⌘ **25.106 CR 012** ⌘ rev **1** ⌘ Current version: **5.2.0** ⌘

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Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Input intermodulation: correction of co-location and addition of co-existence		
Source:	⌘ RAN WG4		
Work item code:	⌘ RInImp-REP	Date:	⌘ 26/11/2002
Category:	⌘ A	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
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	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-4	(Release 4)
		Rel-5	(Release 5)
		Rel-6	(Release 6)

Reason for change:	⌘ 1. Align the input intermodulation interferer level of the repeater, with changes of the corresponding level in the receiver blocking requirement for co-location with GSM/DCS of the base station. 2. There was only a requirement for "Co-location with GSM/DCS". A requirement for a repeater operating in the same geographical area as GSM/DCS system was missing.
Summary of change:	⌘ 1. The level of the interferer for input intermodulation of the repeater is now in line with the blocking requirement for co-location with GSM/DCS of the basestation. 2. A co-existence requirement for a repeater operating in the same geographical area as GSM/DCS systems is added.
Consequences if not approved:	⌘ 1. The requirement for repeater and base station differs. 2. A repeater might disturb the network if operating in the same geographical area as GSM/DCS systems.

Clauses affected:	⌘ 11.1, 11.2, 11.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘ TS25.143
	Y	N									
	<input type="checkbox"/>	<input checked="" type="checkbox"/>									
<input checked="" type="checkbox"/>	<input type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
Test specifications											
O&M Specifications											
Other comments:	⌘ Equivalent CRs in other Releases: CR011r1 cat. F to 25.106 v4.3.0										

How to create CRs using this form:

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11 Input Intermodulation

The input intermodulation is a measure of the capability of the repeater to inhibit the generation of interference in the operating band, in the presence of interfering signals on frequencies other than the operating band.

11.1 General Requirement

The following requirement applies for interfering signals in the frequency bands defined in sub-clause 5.1(a) or 5.1(b), depending on the repeaters operating band. The requirement shall be met with the repeater operating at maximum gain.

11.1.1 Minimum requirement

For the parameters specified in table 11.1, the power in the operating band, shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

The frequency separation between the two interfering signals shall be adjusted so that the 3rd order intermodulation product is positioned in the centre of the operating band.

Table 11.1 specifies the parameters for two interfering signals, where:

- f_{offset} is the separation between the centre frequency of first or last 5 MHz channel in the operating band and one of the interfering signals.

Table 11.1 : Input intermodulation requirement

f_{offset}	Interfering Signal Levels	Type of signals	Measurement bandwidth
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

11.2 Co-location with GSM 900 and/or DCS 1800

The following requirement may be applied when GSM 900 BTS and/or DCS 1800 BTS and UTRA-FDD Repeaters are co-located. The requirement shall be met with the repeater operating at maximum gain.

11.2.1 Minimum requirements

For the parameters specified in table 11.2, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

The frequency separation between the two interfering signals shall be adjusted so that the lowest order intermodulation product is positioned in the centre of the operating band.

NOTE 1: The lowest intermodulation products corresponds to the 4th and 3rd order for the GSM 900 and DCS 1800 bands, respectively.

Table 11.2: Input intermodulation requirements for interfering signals in the GSM 900 and DCS 1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	20 dBm	2 CW carriers	1 MHz
921 - 960 MHz	20+16 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	20 dBm	2 CW carriers	1 MHz
1805 - 1880 MHz	20+16 dBm	2 CW carriers	1 MHz

11.3 Co-existence with GSM 900 and/or DCS 1800

The following requirement may be applied when GSM 900 BTS and/or DCS 1800 BTS and UTRA-FDD Repeaters are co-located. The requirement shall be met with the repeater operating at maximum gain.

11.3.1 Minimum requirements

For the parameters specified in table 11.2a, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

The frequency separation between the two interfering signals shall be adjusted so that the lowest order intermodulation product is positioned in the centre of the operating band.

NOTE 1: The lowest intermodulation products corresponds to the 4th and 3rd order for the GSM 900 and DCS 1800 bands, respectively.

Table 11.2a: Input intermodulation requirements for interfering signals in the GSM 900 and DCS 1800 bands

<u>Frequency of interfering signals</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
876 - 915 MHz	-15 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	-15 dBm	2 CW carriers	1 MHz

CHANGE REQUEST

⌘ **25.143 CR 021** ⌘ rev **1** ⌘ Current version: **4.5.0** ⌘

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Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Input intermodulation: correction of co-location and addition of co-existence		
Source:	⌘ RAN WG4		
Work item code:	⌘ RInImp-REP	Date:	⌘ 26/11/2002
Category:	⌘ F	Release:	⌘ Rel-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	
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	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘ 1. Align the input intermodulation interferer level of the repeater, with changes of the corresponding level in the receiver blocking requirement for co-location with GSM/DCS of the base station. 2. There was only a requirement for "Co-location with GSM/DCS". A requirement for a repeater operating in the same geographical area as GSM/DCS system was missing.
Summary of change:	⌘ 1. The level of the interferer for input intermodulation of the repeater is now in line with the blocking requirement for co-location with GSM/DCS of the basestation. 2. A co-existence requirement for a repeater operating in the same geographical area as GSM/DCS systems is added.
Consequences if not approved:	⌘ 1. The requirement for repeater and base station differs. 2. A repeater might disturb the network if operating in the same geographical area as GSM/DCS systems.

Clauses affected:	⌘ 11.2.2, 11.2.3, 11.5.2, 11.5.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px; text-align: center;">X</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px; text-align: center;">X</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px; text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ TS25.106
	Y	N									
	X										
	X										
	X										
		Test specifications									
		O&M Specifications									
Other comments:	⌘ Equivalent CRs in other Releases: CR022r1 cat. A to 25.143 v5.2.0										

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11 Input intermodulation

The input intermodulation is a measure of the capability of the Repeater to inhibit the generation of interference in the operating band, in the presence of interfering signals on frequencies other than the operating band.

11.1 Definition and applicability

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the Repeater to maintain the wanted frequency free of internally created interference.

This test applies to Uplink and Downlink path of the Repeater.

11.2 Minimum Requirements

11.2.1 General requirement

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.1: General input intermodulation requirement

F_offset	Interfering Signal Levels	Type of signals	Measurement bandwidth
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.1, the power in the operating band shall not increase by more than 10 dB at the output of the Repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.2.2 Co-location with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.2: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	20 dBm	2 CW carriers	1 MHz
921 - 960 MHz	20+16 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	20 dBm	2 CW carriers	1 MHz
1805 - 1880 MHz	20+16 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.2, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.2.3 Co-existence with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.2a: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

<u>Frequency of interfering signals</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
876 - 915 MHz	-15 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	-15 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.2a, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.3 Test purpose

The purpose of this test is to verify that the Repeater meets the intermodulation characteristics requirements as specified in TS 25.106, subclause 11.1.

11.4 Method of test

11.4.1 Initial conditions

- 1) Set-up the equipment as shown in annex A.
- 2) Set the Repeater to maximum gain.
- 3) Connect two signal generators with a combining circuit or one signal generator with the ability to generate several CW carriers to the input.
- 4) Connect a spectrum analyser to the output of the Repeater. Set the resolution bandwidth to 1 MHz in the centre of the operating band. Set averaging to 1 second or more.

11.4.2 Procedure

- 1) Adjust the frequency of the input signals, either below or above the operating band, so that the lowest order intermodulation product is positioned in the centre of the operating band, according to subclause 11.2.
- 2) Take the measurement of the rise of the output signal.
- 3) Repeat the measurement for the opposite path of the Repeater.

11.5 Test requirements

11.5.1 Mandatory requirement

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.3: Input intermodulation requirement

<u>f_offset</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.3, the power in the operating band shall not increase by more than 11,2 dB at the output of the Repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.5.2 Co-location with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.4: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	20 dBm	2 CW carriers	1 MHz
921 - 960 MHz	20+16 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	20 dBm	2 CW carriers	1 MHz
1805 - 1880 MHz	20+16 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.4, the power in the operating band shall not increase with more than 11,2 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.5.3 Co-existence with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.4a: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	-15 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	-15 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.4a, the power in the operating band shall not increase with more than 11,2 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

CHANGE REQUEST

⌘ **25.143 CR 022** ⌘ rev **1** ⌘ Current version: **5.2.0** ⌘

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Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Input intermodulation: correction of co-location and addition of co-existence		
Source:	⌘ RAN WG4		
Work item code:	⌘ RInImp-REP	Date:	⌘ 26/11/2002
Category:	⌘ A	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
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Reason for change:	⌘ 1. Align the input intermodulation interferer level of the repeater, with changes of the corresponding level in the receiver blocking requirement for co-location with GSM/DCS of the base station. 2. There was only a requirement for "Co-location with GSM/DCS". A requirement for a repeater operating in the same geographical area as GSM/DCS system was missing.
Summary of change:	⌘ 1. The level of the interferer for input intermodulation of the repeater is now in line with the blocking requirement for co-location with GSM/DCS of the basestation. 2. A co-existence requirement for a repeater operating in the same geographical area as GSM/DCS systems is added.
Consequences if not approved:	⌘ 1. The requirement for repeater and base station differs. 2. A repeater might disturb the network if operating in the same geographical area as GSM/DCS systems.

Clauses affected:	⌘ 11.2.2, 11.2.3, 11.5.2, 11.5.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ TS25.106
Y	N										
X											
	X										
	X										
		Test specifications									
		O&M Specifications									
Other comments:	⌘ Equivalent CRs in other Releases: CR021r1 cat. F to 25.143 v4.5.0										

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ¶ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

11 Input intermodulation

The input intermodulation is a measure of the capability of the Repeater to inhibit the generation of interference in the operating band, in the presence of interfering signals on frequencies other than the operating band.

11.1 Definition and applicability

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the Repeater to maintain the wanted frequency free of internally created interference.

This test applies to Uplink and Downlink path of the Repeater.

11.2 Minimum Requirements

11.2.1 General requirement

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.1: General input intermodulation requirement

F_offset	Interfering Signal Levels	Type of signals	Measurement bandwidth
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.1, the power in the operating band shall not increase by more than 10 dB at the output of the Repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.2.2 Co-location with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.2: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	20 dBm	2 CW carriers	1 MHz
921 - 960 MHz	20+16 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	20 dBm	2 CW carriers	1 MHz
1805 - 1880 MHz	20+16 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.2, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.2.3 Co-existence with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.2a: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

<u>Frequency of interfering signals</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
876 - 915 MHz	-15 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	-15 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.2a, the power in the operating band shall not increase with more than 10 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.3 Test purpose

The purpose of this test is to verify that the Repeater meets the intermodulation characteristics requirements as specified in TS 25.106, subclause 11.1.

11.4 Method of test

11.4.1 Initial conditions

- 1) Set-up the equipment as shown in annex A.
- 2) Set the Repeater to maximum gain.
- 3) Connect two signal generators with a combining circuit or one signal generator with the ability to generate several CW carriers to the input.
- 4) Connect a spectrum analyser to the output of the Repeater. Set the resolution bandwidth to 1 MHz in the centre of the operating band. Set averaging to 1 second or more.

11.4.2 Procedure

- 1) Adjust the frequency of the input signals, either below or above the operating band, so that the lowest order intermodulation product is positioned in the centre of the operating band, according to subclause 11.2.
- 2) Take the measurement of the rise of the output signal.
- 3) Repeat the measurement for the opposite path of the Repeater.

11.5 Test requirements

11.5.1 Mandatory requirement

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.3: Input intermodulation requirement

<u>f_offset</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.3, the power in the operating band shall not increase by more than 11,2 dB at the output of the Repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.5.2 Co-location with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.4: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

Frequency of interfering signals	Interfering Signal Levels	Type of signals	Measurement bandwidth
876 - 915 MHz	20 dBm	2 CW carriers	1 MHz
921 - 960 MHz	20+16 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	20 dBm	2 CW carriers	1 MHz
1805 - 1880 MHz	20+16 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.4, the power in the operating band shall not increase with more than 11,2 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.5.3 Co-existence with GSM900 and/or DCS1800

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.4a: Input intermodulation requirements for interfering signals in the GSM900 and DCS1800 bands

<u>Frequency of interfering signals</u>	<u>Interfering Signal Levels</u>	<u>Type of signals</u>	<u>Measurement bandwidth</u>
876 - 915 MHz	-15 dBm	2 CW carriers	1 MHz
1710 - 1785 MHz	-15 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.4a, the power in the operating band shall not increase with more than 11,2 dB at the output of the repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.