Appendix 1: Requirement traceability matrix

Req. no.:	Requirement description	TRV reference : E#2020 Green=no TRV impact , Red=update in section xyz	Requirements source	Høringskommentar :	Rationale, justification, concideration, explaination, comment….
HIGH LEVEL REQUIREMENTS					
GSM-R ENI 2.1.1.1.1.1	The GSM-R network used as ETCS communication carrier shall comply with the performance requirements stated in Teknisk Regelverk.	statment for supplier. Reference is TRV mostly 560 and 510	New requirement		Included in order to let the requirement document include all requirements.
GSM-R ENI 2.1.1.1.1.2	The GSM-R network used as ETCS communication carrier shall comply with the RAM requirements stated in Teknisk Regelverk.	560 4. https://trv.banenor.no/wiki/Tele/Prosjektering_og_bygging/Generelle_tekniske_krav#RAMS	New requirement		Included in order to let the requirement document include all requirements.
GSM-R ENI 2.1.1.1.1.3	The GSM-R network shall comply with mandatory requirements in Radio Transmission FFFIS for EuroRadio.	FFFIS mandatory req.s is linked to MORANE http://www.era.europa.eu/Document-Register/Documents/Radio%20Transmission%20FFFIS%20for%20EuroRadio%20v13%200%200.pdf (ok referenced in TRV)	New requirement		Included in order to let the requirement document include all requirements. (Refer also too the Signalling System contract attachment G1)
GSM-R ENI 2.1.1.1.1.4	The GSM-R network shall comply with mandatory requirements in GSM-R Interfaces, Class 1 requirements	Compliant - , (also based on Nokia conformanse testing and networkstatement)	New requirement		Included in order to let the requirement document include all requirements.(Refer also too the Signalling System contract attachment G1)
GSM-R ENI 2.1.1.1.1.5	The GSM-R network shall comply with mandatory requirements in EIRENE FRS	Mandatory requirement ok TSI CCS referenced to ERA index 32 https://trv.banenor.no/wiki/Tele/Prosjektering_og_bygging/Radiosystemer#Referanser	New requirement		Included in order to let the requirement document include all requirements.(Refer also too the Signalling System contract attachment G1)
GSM-R ENI 2.1.1.1.1.6	The GSM-R network shall comply with mandatory requirements in EIRENE SRS	Mandatory requirement ok TSI CCS referenced to ERA index 33 https://trv.banenor.no/wiki/Tele/Prosjektering_og_bygging/Radiosystemer#Referanser	New requirement		Included in order to let the requirement document include all requirements.(Refer also too the Signalling System contract attachment G1)
GSM-R ENI 2.1.1.1.1.7	Prior to implementing ERTMS to a line, any known weak points in the GSM-R network influencing the GSM-R services in an unacceptable manner shall be improved if not otherwise agreed.	Procedural req. Handled in the TLE project in Dig&Tele (checklist for each line)	New requirement		Included in order to let the requirement document include all requirements.
GSM-R ENI 2.1.1.1.1.8	If not otherwise agreed with the Signalling System Contractor, the DNS for ETCS APN shall be implemented as a part of the GPRS sentral systems.	No agreement signed - DNS available, no functional req.	New requirement		Included in order to specify the scope of delivery.
GENERAL COVERAGE REQUIREMENTS					
GSM-R ENI 3.1.1.1.1.1	In normal situation all lines shall have continuous coverage with a signalling strength according to the EIRENE requirements.	ref. current version of coverage report . (Einar Mogstad) the general old radio coverage principles is still applicable. https://trv.banenor.no/wiki/Tele/Prosjektering_og_bygging/Radiosystemer#Signalniv.C3.A5.2FDekningsgrad	New requirement		Previously this issue was covered by process requirements. Changed to technical requirement in order to be more precise.
GSM-R ENI 3.1.1.1.1.2	The signalling strength of the individual BTSes and the relation between them shall support a natural handover sequence along the line.	"Natural handover.." Measurements to state actual status before lines with ERTMS will be set in service. no TRV impact. The TRV handover requirement is stated in https://trv.banenor.no/wiki/Tele/Prosjektering_og_bygging/Radiosystemer#Handover	New requirement		Previously this issue was covered by process requirements. Changed to technical requirement in order to be more precise.
GSM-R ENI 3.1.1.1.1.3	The cell borders shall as far as possible support the possibility for the OBU to choose the most appropriate RBC if short dialling code based on cell-ID is used.	no TRV impact - radio planning and RBC configuration data	New requirement		Previously this issue was covered by process requirements. Changed to technical requirement in order to be more precise.
GSM-R COVERAGE - **HEAVY** TRAFFIC LINES					
GSM-R ENI 3.2.1.1.1.1	Lines with heavy traffic shall have continuous overlapping coverage.	Present TRV statement 560 chapter 9. section 4.1.2.5 Signalnivå/Dekningsgrad , ok h) Ved utbygging av ERTMS på GSM-R strekninger skal det for GSM-R etableres overlappende dekning for CAB innenfor områdene "End of Authority" (EoA) og broer over 50 meter	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.5 + GSM-R GEN 4.1.1.1.1.10 + GSM-R GEN 4.1.1.1.1.14		To avoid train delays due to GSM-R communication loss. As the train frequency is high, continous overlapping coverage shall reduce the probability of several trains being affected if a single failure occurs.
GSM-R ENI 3.2.1.1.1.2	Small coverage gaps (i.e. areas with signal strength lower than -95dBm) due to single BTS failures or single GSM-R tunnel system component failures may be accepted, but must be object to separate evaluations in each case depending on local conditions.	no TRV impact - radio planning and TLE project evaluation	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.5 + GSM-R GEN 4.1.1.1.1.10 + GSM-R GEN 4.1.1.1.1.14		
GSM-R ENI 3.2.1.1.1.3	At international border crossing the Norwegian GSM-R network shall cover parts of the railway on the Swedish side of the border. Overlapping coverage is required: Entering the border from Sweden heading towards Norway, the area requiring overlapping coverage shall be regarded as the area from 100m in front of the balise group ordering Network Registration (NR) to the Norwegian GSM-R network up to the "Level Transition Order (LTO)" balise group ordering immediate transition to the Norwegian ETCS level 2 (located at the border).	See GSM-R ENI 3.3.1.1.1.2 below	New requirement		To ensure coverage in the area of which the train shall connect to the ERTMS system when approaching from Sweden, and to avoid international RBC-RBC handover failure.
GSM-R COVERAGE - LOW TRAFFIC LINES					

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GSM-R ENI 3.3.1.1.1.1	END OF AUTHORITY AREAS Lines with low traffic shall have continuous overlapping coverage 200m in front of all marker boards.	se neste pkt	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.2 + GSM-R GEN 4.1.1.1.1.7 + GSM-R GEN 4.1.1.1.1.12		Adjustments of the source requirement due to the below considerations. All end of authority areas (identified with a markerboard) shall have overlapping coverage to increase the probability of this area having GSM-R coverage. A train having lost the contact with the RBC due to loss of GSM-R, will then due to the overlapping coverage most probably be able to re-establish the connection to the RBC in this area and receive an updated MA. The 200m area in front of marker boards is the area in which the train will stop. Refer to dialog with Simen Farstad (NSB) 04.04.2016: Trains will normally stop not more than 50 m ahead of the MB. A locomotive with wagons will have the GSM-R antenna on the locomotive, meaning that the antenna will normally be located within 50m in front of the MB. However, a combined set of coaches may have the GSM-R antenna in the middel or in one of the ends. A combined set of coaches will normally be less than 110m, hence the overlapping coverage should be at least 50m + 110m in order to ensure the train enables to re-establish connection with the RBC. To include a margin the overlapping coverage area is increased to 200m ahead of each MB.
GSM-R ENI 3.3.1.1.1.2	RAILWAY STATION AREAS Lines with low traffic shall have continuous overlapping coverage in the railway station areas, covering the entire area between the marker boards of each entrance to the station plus a 200m area in front of each of these marker boards.	Present TRV statement 560 chapter 9. section 4.1.2.5 Signalnivå/Dekningsgrad , oppdateres --> Nytt pkt 4.1.2.x Radio dekning for ETCS Ved utbygging av ERTMS på GSM-R strekninger skal det etableres overlappende radio dekning for følgende områder : 1) Linjer som prosjekteres i kategori "høytrafikk" skal ha kontinuerlig overlappende dekning 2) For linjer som er definert som "lavtrafikk" a) CAB innenfor områdene “End of Authority” (EoA) b) Broer over 50 meter. c) Alle stasjonsområder mellom stoppskilt/"Marker Board" d)Ved internasjonale grenseoverganger .{{Dette tilpasses bilaterale avtaler ,prosedyrer og trafikkregler i forhold til NR, LTO og utbyggingstakt }} e) Ved blokkposter {{hensikten er å sikre dekning EoA posisjon definert som 200M foran Stopp skildt/"marker board" - *Ref. ref.xx ERTMS desing and engineering rules ERP-A0-S-00002 - obs ny utgave* }} f) Det skal vurderes for hver enkelt banestrekning om det er behov for dobbelt dekning på sidespor. g) I områder for Nivåoverganger (ref. definisjoner fra (intern trv link) "Signal Prosjektering 4 Nivåer og overganger") {{inkludert 100 m foran balisegruppen som trigger "Session Esablisment" og 100 forbi LTO balise }} h) I RBC <-> RBC handover områder definert som 1000m på hver side av Balise grensen. i) j) For dekning i områder ved planovergang er dekningskav diffrensiert : 1) Bomanlegg med hel- eller halvbom eller lys og lydanlegg tilsvarende bomanlegg uten bommen skal ha dobbelt dekning 1000m på hver side av planovergangen. 2) Lys og lydanlegg; tilsvarende bomanlegg uten bommen skal ha dobbelt dekning 1000m på hver side av planovergangnb 3) Planoverganger med «Enkle lys og lydanlegg» eller «VL – vei lampe, fjøslykt» har ikke krav til dobbelt dekning. k) Ved deteksjonsanlegg for skred skal dobbelt dekning omfatte 500m på hver side av deteksjonssonens lyssignal.	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.2 + GSM-R GEN 4.1.1.1.1.7 + GSM-R GEN 4.1.1.1.1.12		Within the railway station area (i.e. between the entrance marker boards) several marker boards are located in order to enable local working areas, shunting, etc. Continuous overlapping coverage in the complete area is required.
GSM-R ENI 3.3.1.1.1.3	LEVEL TRANSITION AREAS Lines with low traffic shall have continuous overlapping coverage in the level transition areas. The level transition area requiring overlapping coverage shall be regarded as the area from 100m in front of the balise group ordering “Session Establishment (SE)” (the balise informing the train to call the appropriate RBC) up to and including 100m past the “Level Transition Order (LTO)” balise group ordering immediate transition to ETCS level 2 (the level transition board will be located close to the LTO balise group). If the OBU of the train is not expected to be registered in the GSM-R network prior to the level transition, the level transition area requiring overlapping coverage shall be extended starting 100m in front of the balise group ordering Network Registration (NR).	GSM-R ENI 3.3.1.1.1.2	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.1 + GSM-R GEN 4.1.1.1.1.6 + GSM-R GEN 4.1.1.1.1.11		To ensure coverage in the area of which the train shall connect to the RBC in order to receive an MA. The source requirement is adjusted to be more precise of the level transition area definition. Ref also the design and engineering rules in ERP-30-S-00097
GSM-R ENI 3.3.1.1.1.4	RBC-RBC HANDOVER AREAS Lines with low traffic shall have continuous overlapping coverage in the RBC-RBC handover areas, defined to be 1000m on each side of the RBC-RBC border (border balise location).	GSM-R ENI 3.3.1.1.1.2	TE.808256-000-001 ch 4.4.4		To avoid RBC-RBC handover failure due to lacking radio coverage.

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GSM-R ENI 3.3.1.1.1.5	INTERNATIONAL BORDER CROSSING Lines with low traffic shall have continuous overlapping coverage in the area close to international border crossing. Lines with low traffic shall have continuous overlapping coverage the last 1000m before the border. Entering the border from Sweden heading towards Norway, the area requiring overlapping coverage shall be regarded as the area from 100m in front of the balise group ordering Network Registration (NR) to the Norwegian GSM-R network up to and including 100m past the “Level Transition Order (LTO)” balise group ordering immediate transition to the Norwegian ETCS level 2 (located at the border).	GSM-R ENI 3.3.1.1.1.4	New requirement		To ensure coverage in the area of which the train shall connect to the ERTMS system when approaching from Sweden, and to avoid international RBC-RBC handover failure.
GSM-R ENI 3.3.1.1.1.6	At international border crossings, the overlapping GSM-R network coverage (i.e. coverage of the Norwegian GSM-R network on the Swedish side of the border, and visa versa) shall take into account the recommendations and guidelines from the ERTMS user group and additionally be coordinated with Trafikverket in Sweden.	GSM-R ENI 3.3.1.1.1.2	New requirement		To ensure a more smooth handover
GSM-R ENI 3.3.1.1.1.7	BLOCK POSTS Lines with low traffic shall have continuous overlapping coverage at block posts, meaning continuous overlapping coverage in a 200m area in front of each of the block post marker boards. (The marker boards will normally be located 75m in front of the given location of the block post.)	GSM-R ENI 3.3.1.1.1.2	New requirement		To ensure coverage in the EoA position, enabling a train having lost contact with the RBC to reconnect and receive an updated MA. The 200m area in front of marker boards is the area in which the train will stop. Ref also the design and engineering rules in ERP-30-S-00097
GSM-R ENI 3.3.1.1.1.8	SIDETRACK AREAS Overlapping coverage need for sidetrack areas on lines with low traffic shall be evaluated individually for each sidetrack separately. In order to allow a freight train of 750m having the GSM-R antenna on the locomotive, the main guidelines are: - Continuous overlapping coverage shall be implemented 800m on the main track in front of the nose of the point. - Continuous overlapping coverage shall be implemented 800m on the side track (applying to sidetracks with marker boards)	GSM-R ENI 3.3.1.1.1.2	New requirement		To ensure coverage in the EoA position, enabling a train having lost contact with the RBC to reconnect and receive an updated MA. The 200m area in front of marker boards is the area in which the train will stop. Ref also the design and engineering rules in ERP-A0-S-00002 In meeting 17.08.2016 with Terje Rennemo and Ingar Hanserud it was agreed that overlapping coverage in the sidetrack in front of the point and on the main track in parallel with the sidetrack was unnecessary for sidetracks without markerboards as traffic on the main track will not be influenced. For sidetracks with markerboards overlapping coverage requirements at End of Authority apply. In meeting 19.08.2016 – ENI/Trackside - technical and RAMS, with Kjell Kristian Hageland, Odd Inge Haugsbakk, Egil Heinert, Eric Tveter, Svein Djupos and Knut Bergem, it was agreed to include requirements to sidetracks as well. However, individual evaluation of each sidetrack shall be done.
GSM-R ENI 3.3.1.1.1.9	PROTECTED LEVEL CROSSINGS Lines with low traffic shall have the following degree of overlapping coverage at level crossings: a) Level crossings protected with physical barriers and possibility to stop trains if the barrier is not firmly in correct position (“bomanlegg med hel- eller halvbom”); shall have continuous overlapping coverage in the protected level crossing areas, including 1000m at each side of the level crossing. b) Level crossings protected with sound and light warnings towards the road traffic and possibility to stop trains if the correct warnings to road are not present (“lys og lydanlegg; tilsvarende bomanlegg uten bommen”); shall have continuous overlapping coverage in the protected level crossing areas, including 1000m at each side of the level crossing. c) Level crossings protected with simplified sound and light warnings towards the road traffic, but without possibility to stop trains if the correct warnings to road are not present (“enkle lys og lydanlegg”); have no requirement to overlapping coverage. d) Level crossings protected with a single light being lit if a train approaches, but without possibility to stop trains (“VL – vei lampe, fjøslykt”); have no requirement to overlapping coverage.	GSM-R ENI 3.3.1.1.1.2	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.3 + GSM-R GEN 4.1.1.1.1.8 (requirement adjusted with more precise requirements related to types of protected level crossings based on meeting with Kjell Kristian Hageland, Hilde Marie Schade, and Knut Bergem 21.11.2016)		a) To ensure coverage giving the possibility to stop trains if the barrier is not firmly in correct position b) To ensure coverage giving the possibility to stop trains if the correct warnings to road are not present c) Trains will not be stopped if this type of protection system does not function as intended, hence no overlapping coverage is required. d) Trains will not be stopped if this type of protection system does not function as intended, hence no overlapping coverage is required.
GSM-R ENI 3.3.1.1.1.10	AVALANCHE DETECTOR AREAS Lines with low traffic shall have continuous overlapping coverage on each side of avalanche detector fences. The overlapping coverage area shall be from the end point of the avalanche detector fence to the location of the existing light signal + 500m in front of the location of the existing light signal. In case of new avalanche detector fences or sectioning of existing avalanche detector fences, specific considerations shall be made based on the stop distance in relation to expected weight, speed, decline, etc and the expected duration of the reconnecting process of the communication session with the RBC.	GSM-R ENI 3.3.1.1.1.2	New requirement		To ensure the train will be able to receive the stop message from the RBC in due time to stop the train before entering the avalanche detector fence area. The loction of the existing light signal for the avalanche detection is expected to be considered correct based on previous calculations, local conditions and experience. Hence the location will be "reused". The additional 500m overlapping coverage is in order to ensurepossible required time for the train to re-connect to the RBC.

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GSM-R ENI 3.3.1.1.1.11	TUNNELS If no specific requirements related to overlapping coverage exist for a tunnel; the degree of overlapping coverage in the tunnel shall be according to the above stated requirements.	GSM-R ENI 3.3.1.1.1.10	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.4 + GSM-R GEN 4.1.1.1.1.9 + GSM-R GEN 4.1.1.1.1.13		Several tunnels have overlapping coverage due to GSM-R voice requirements. However, from an ETCS train movement perspective tunnels shall be regarded as other parts of the line and the requirements GSM-R 5.2.3.1.1.1 - GSM-R 5.2.3.1.1.9 applies. The reason for having overlapping coverage in a tunnel from an ETCS perspective is to ensure ability to avoid trains stopping within a tunnel due to lacking radio coverage. However, the possibility of moving the train in SR-mode up to the next MB will be sufficient in short tunnels. Tunnels of length more than 1000m will have overlapping coverage due to GSM-R voice requirements. The source requirement is adjusted based on the above considerations. In meeting 17.08.2016 with Terje Rennemo and Ingar Hanserud it was agreed that this requirement is sufficient. Traffic rules will ensure the possibility to remove trains from the area.
GSM-R ENI 3.3.1.1.1.12	BRIDGES If no specific requirements related to overlapping coverage exist for a bridge; the degree of overlapping coverage on the bridge shall be according to the above stated requirements.	GSM-R ENI 3.3.1.1.1.11	TE.808256-000-001 reqs GSM-R GEN 4.1.1.1.1.4 + GSM-R GEN 4.1.1.1.1.9		From an ETCS train movement perspective bridges shall be regarded as other parts of the line and the requirements GSM-R 5.2.3.1.1.1 - GSM-R 5.2.3.1.1.9 applies. The reason for having overlapping coverage on a bridge from an ETCS perspective is to ensure ability to avoid trains stopping on a bridge due to lacking radio coverage. However, the possibility of moving the train in SR-mode up to the next MB will be sufficient for ensuring the train is not being left at stand still on the bridge. The source requirement is adjusted based on the above considerations. In meeting 17.08.2016 with Terje Rennemo and Ingar Hanserud it was agreed that this requirement is sufficient. Traffic rules will ensure the possibility to remove trains from the area.
GSM-R ENI 3.4.1.1.1.1	A single BTS failure shall not result in any coverage gaps (i.e. areas with signal strength lower than -95dBm measured with 8W CAB according to EIRENE SRS 3.2.2) in the above defined areas.		This requirement comes from the restructuring of the previous requirement structure in TE.808256-000-001		Implementation requirement in order to be able to interpret and fulfil reqs GSM-R 3.2.x.x.x.x and 3.3.x.x.x.x
GSM-R ENI 3.4.1.1.1.2	In case of tail-site BTSes (BTSes being dependent of the infrastructure of the site of the donor BTS), a common failures resulting in both the donor BTS and the tail-site BTS failing shall not lead to any coverage gaps (i.e. areas with signal strength lower than -95dBm) in the above defined areas.		This requirement comes from the restructuring of the previous requirement structure in TE.808256-000-001		Implementation requirement in order to be able to interpret and fulfil reqs GSM-R 3.2.x.x.x.x and 3.3.x.x.x.x
GSM-R ENI 3.4.1.1.1.3	A single GSM-R tunnel system component failure or single GSM-R tunnel system donor BTS failure shall not result in any coverage gaps (i.e. areas with signal strength lower than -95dBm) in the above defined areas.	Covered in TRV chapter 9 . Section 5 Tunnels (general req)	This requirement comes from the restructuring of the previous requirement structure in TE.808256-000-001		Implementation requirement in order to be able to interpret and fulfil reqs GSM-R 3.2.x.x.x.x and 3.3.x.x.x.x
GSM-R CAPACITY					
GSM-R ENI 4.1.1.1.1.1	The individual cells in the GSM-R access network shall have sufficient capacity to handle the expected need for simultaneous ETCS communication channels in parallel with the existing (experienced) use of the cell capacity.	Network planning related to capacity - number of TRX/BTS sites	TE.808256-000-001 ch 4.4.2		To ensure the train will be able to connect to the RBC and keep the connection as long as the train is within an ETCS level 2 area, without reducing the existing use of GSM-R.
GSM-R ENI 4.1.1.1.1.2	The BTS, Abis interface, BSC/PCU and A- interface/Gb-interface shall have sufficient capacity to handle the expected need for simultaneous ETCS communication channels in parallel with the existing (experienced) capacity use.	Network planning related to capacity - number of TRX/BTS sites	TE.808256-000-001 ch 4.4.2		To ensure the train will be able to connect to the RBC and keep the connection as long as the train is within an ETCS level 2 area, without reducing the existing use of GSM-R.
GSM-R ENI 4.1.1.1.1.3	The centralised GSM-R modem pool shall have sufficient capacity to handle the expected need for simultaneous ETCS communication channels in parallel with the existing (experienced) capacity use.	Network planning CDS node can be expanded.	TE.808256-000-001 ch 4.4.2		To ensure the train will be able to connect to the RBC and keep the connection as long as the train is within an ETCS level 2 area, without reducing the existing use of GSM-R.
GSM-R ENI 4.1.1.1.1.4	The GSM-R core network (MSC, SGSN, GGSN, etc) shall have sufficient capacity to handle the expected need for simultaneous ETCS communication channels in parallel with the existing (experienced) capacity use.	Network planning	TE.808256-000-001 ch 4.4.2		To ensure the train will be able to connect to the RBC and keep the connection as long as the train is within an ETCS level 2 area, without reducing the existing use of GSM-R.
GSM-R ENI 4.1.1.1.1.5	The GSM-R network shall be dimensioned to handle both CS and PS based ETCS communication channels simultaneously.	Network planning	New requirement		To ensure sufficient capacity to handle any type of OBU entering the network.
GSM-R ENI 4.1.1.1.1.6	The GSM-R network shall be dimensioned to handle one network failure without degrading the GSM-R services for ETCS communication in terms of functionality and capacity.	Network planning related to capacity - number of TRX/BTS sites	New requirement		To ensure sufficient capacity even in failure situations.

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GSM-R PRIORITY					
GSM-R ENI 5.1.1.1.1.1	All ETCS communication in the GSM-R network shall be given priority level 1 according to the ruling version of EIRENE FRS.	Functioinal req. Covered - (project scope : SIM card profiles to be adapted,EoG network to implement diffserv)	New requirement		To ensure the ETCS communication is kept in a situation of lacking capacity.
GSM-R ENI 5.1.1.1.1.2	Priority of ETCS communication shall apply to all parts of the GSM-R system.	Functional req. Covered in SRS/FRS , CS-Data ok , EoG adapt needed.	New requirement		To ensure the ETCS communication is kept in a situation of lacking capacity.
GSM-R ENI 5.1.1.1.1.3	Priority of ETCS communication shall apply when initiating ETCS calls as well as for established ETCS communication sessions.	Functional req. Covered in SRS/FRS , CS-Data ok , EoG adapt. needed.	New requirement		To ensure the ETCS communication is kept in a situation of lacking capacity.
GSM-R ENI 5.1.1.1.1.4	The priority level 1 of ETCS communication shall be implemented as default priority in the ETCS communication SIM profiles.	Functional req. Covered in SRS/FRS , CS-Data ok , EoG adapt. needed.	New requirement		To ensure the ETCS communication is kept in a situation of lacking capacity.
GSM-R ENI 5.1.1.1.1.5	When using GPRS as ETCS communication carrier, the QoS settings, time slot allocation, guaranteed bitrate, etc. shall support priority of the ETCS communication similar to the priority level 1.	Functional requirement from ERA SRS FRS ok 560 kap 9 12 Referanser - # 2 og # 3	New requirement		To ensure the ETCS communication is kept in a situation of lacking capacity.
GSM-R RAM					
GSM-R ENI 6.1.1.1.1.1	When a total of 2 or more lines in the Norwegian railway network are in operation with ERTMS, a redundant standby GSM-R core network located in a separate geographical site shall be in service. The redundancy shall comprise all parts implementing the services used for ETCS communication.	Covered (GRK core project completed)	TE.808256-000-001 req GSM-R GEN 3.1.1.1.1.1		The concequence of the GSM-R core network failing is huge. Redundant GSM-R core network located in a separate geographical site will reduce the possibility of such events. And if it occurs, the time for reestablishment is reduced.
GSM-R ENI 6.1.1.1.1.2	When a total of 2 or more lines in the Norwegian railway network are in operation with ERTMS, each BSC shall have a redundant (1:1 or 1:n) standby BSC in service. The redundant BSC shall be located in a separate geographical site.	BSC structur corrently migrating towards this structure.	TE.808256-000-001 req GSM-R GEN 3.1.1.1.1.2		The concequence of a BSC failure is huge. Redundant BSCs located in separate geographical sites will reduce the possibility of such events. And if it occurs, the time for reestablishment is reduced.
GSM-R ENI 6.1.1.1.1.3	The interconnection between RBC and MSC/GGSN shall utilise the redundant MSC/GGSN structure, ensuring each RBC communicating with both MSCs/GGSNs.	The core network structure is currently supporting both MSS and GGSN geo redundant topoloty. APN loadsharing is under evaluation in the EoG adaptations	New requirement		To enable utilisation of the redundancy in the GSM-R core network
GSM-R ENI 6.1.1.1.1.4	Redundancy mechanisms in the GSM-R network and the transmission network in combination shall as far as possible reduce the concequences of failures in the complete telecommunication network. This applies to single failures as well as multiple simultaneous failures.	Network planinng	New requirement		To avoid/reduce the consequences of failures in the network.