TO BE PUBLISHED IN THE GAZETTE OF INDIA, EXTRAORDINARY, PART III, SECTION 4

TELECOM REGULATORY AUTHORITY OF INDIA

NOTIFICATION

New Delhi, the 24th May, 2013

File No. 409-10/2012-NSL-I.-------- In exercise of the powers conferred upon it under section 36, read with sub-clauses (ii),(iii) and (iv) of clause (b) of sub-section (1) of section 11, of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997), the Telecom Regulatory Authority of India hereby makes the following regulations, namely:-

THE SHORT MESSAGE SERVICES (SMS) TERMINATION CHARGES REGULATIONS, 2013
(No. 7 of 2013)

CHAPTER-I

PRELIMINARY

1. Short title, extent and commencement.-- (1) These regulations may be called the Short Message Services (SMS) Termination Charges Regulations, 2013.

(2) They shall come into force on the 1st day of June, 2013.

2. Definitions. --In these regulations, unless the context otherwise requires,-

(a) "Access Providers" includes the Basic Telephone Service Provider, Cellular Mobile Telephone Service Provider and Unified Access Service Provider;

(b) "Act" means the Telecom Regulatory Authority of India Act, 1997 (24 of 1997);

(c) "Authority" means the Telecom Regulatory Authority of India;

(d) "Originating Access Provider" means the Access Service Provider whose network is used for originating the Short Message Services (SMS);

(e) "regulations" means the Short Message Services (SMS) Termination Charges Regulations, 2013;

(f) "Terminating Access Provider" means the Access Service Provider on whose network the Short Message Services (SMS) is terminated.

(g) all other words and expressions used in these regulations but not defined, and defined in the Act and the rules and other regulations made thereunder, shall have the meanings respectively assigned to them in the Act or the rules or other regulations, as the case may be.

CHAPTER-II

TERMINATION CHARGES FOR SHORT MESSAGE SERVICES

3. Termination charges for Short Message Services (SMS):----- Every Originating Access Provider shall pay to the Terminating Access Provider a termination charge of Re. 0.02 (paise two only) for each Short Message Service (SMS) terminated by it on the network of Terminating Access Provider;

Provided that termination charges for international incoming Short Message Service (SMS) shall be under forbearance.

Rajeev Agrawal
Secretary

Note. -------The Explanatory Memorandum explains the objects and reasons of the 'Short Message Services (SMS) Termination Charges Regulations, 2013.'

EXPLANATORY MEMORANDUM TO 'THE SHORT MESSAGE SERVICES (SMS) TERMINATION CHARGES REGULATIONS, 2013 (7 of 2013)'

1. The framework of Interconnection Usage Charges (IUC) was established by TRAI through "The Telecommunication Interconnection Usage Charges (IUC) Regulation, 2003 (1 of 2003) dated the 24th January 2003. This regulation was implemented from 1st May 2003. At that time the focus was on voice related charges and Short Message Services (SMS) termination charges were under forbearance.

2. The regulation of January 2003 was superseded by 'The Telecommunication Interconnection Usage Charges Regulation, 2003 (4 of 2003)' which became effective from 1st February 2004. While keeping the IUC for SMS under forbearance, in these regulations, it was mentioned that IUC for SMS may be re-visited in the near future.

3. TRAI asked the opinion of the stakeholders, inter-alia on the requirement and method of regulating termination charge for SMS, in the consultations carried out in 2006. After deliberations, TRAI decided vide its decision dated 21.08.2006 that the forbearance on IUC for SMS should continue.

4. During the review of the IUC regulation in 2008-09 some of the service providers showed concern on the growing trend amongst the dominant service providers of charging Interconnection Usage Charges for SMS from new entrants which were not cost based. TRAI noted that, by and large, the arrangement prevalent at the time was bill and keep. Therefore, in the IUC regulations dated 09.03.2009, TRAI decided to continue with the policy of forbearance in the matter of IUC for SMS with a proviso that SMS termination charges, if any, should be transparent, reciprocal and non-discriminatory. The relevant Schedule IV of the regulation is reproduced below:

"Schedule IV

INTERCONNECT USAGE CHARGE (IUC) FOR

SHORT MESSAGE SERVICE (SMS)

Interconnect Usage Charge (IUC) for Short Message Service (SMS).- Interconnect Usage Charge (IUC) for Short Message Service (SMS) shall be under forbearance:

Provided that such charges shall be transparent, reciprocal and non-discriminatory."

5. The IUC Regulations dated 09.03.2009 were challenged by some operators in Telecom Dispute Settlement and Appellate Tribunal (TDSAT) on various grounds. Hon'ble TDSAT vide its judgment dated 29th September 2010 gave its observations/directions on various components of IUC and remanded the matter to TRAI with the direction to consider the matter afresh and to complete the consultation process in a time bound manner. On the issue of SMS termination charge the relevant extracts of Hon'ble TDSAT's judgment dated 29th September 2010 regarding SMS termination charge is given below:

"118. ***SMS TERMINATION CHARGE***

1) ETISALAT only raised the contention that TRAI should have exercised its jurisdiction for fixing a charge in respect thereof. It, however, appears that while leaving the matter to forbearance it was expected the service providers to levy a reasonable charge, having regard to the fact that no consultation on cost based SMS Termination Charge had been undertaken.

2) We, therefore, are of the opinion, that in the interest of the customers vis-à-vis some of the service providers, the TRAI may consider this aspect of the matter also."

6. Against the said TDSAT's judgment dated 29.9.2010, TRAI preferred a statutory Civil Appeal before the Hon'ble Supreme Court of India, under section 18 of the TRAI Act, 1997, which was marked as Civil Appeal No.271-281 of 2011.

7. TRAI also initiated a consultation process to review the IUC charges as the IUC charges were earlier determined in the year 2009. The consultation process carried out by TRAI include pre consultation process, which was initiated through a communication sent to service providers on 24.12.2010. In the pre consultation, service providers were requested to furnish information with regard to framework of Interconnection Usage Charges, components to be reviewed, method of calculation and level of each charge, approach/ methodology/ model to be used for estimating Interconnection Usage Charge etc. They were also asked to provide the model, if any, developed for estimating the level of each component with all calculation sheets along with justification for adopting the proposed approach/ methodology. Cost and revenue corresponding to each service like voice service, SMS, GPRS, EDGE, roaming services and any other value added services, minutes of usage (MOU) (off-net/ on-net), CAPEX and OPEX corresponding to each network element, cables etc. were also asked.

8. Taking into consideration the inputs provided by the service providers and associations, a detailed consultation paper was issued on 27.04.2011. The consultation paper sought stakeholders' comments on various aspects. Stakeholders were given time until 18.05.2011 to respond on the consultation paper. 26 stakeholders including 14 service providers, 4 associations and 8 consulting firms/consumer groups/ individuals sent written comments that were uploaded on TRAI's website. The issue of IUC for SMS was raised by TRAI in its consultation paper dated 27.04.2011. In the consultation paper, following issues were raised:

Question 3.22	*Do you agree that a deterrent termination charge should be imposed for commercial SMS? In your view, what would be the most appropriate level of termination charge for commercial SMS?*

Question 3.23 *Do you agree that Bill and Keep regime should be put in place for other types of SMS (non-commercial SMS)? Please provide justification for your response.*

9. While the exercise to determine the IUC Charges was in progress, TRAI confronted several serious difficulties and accordingly filed an Application in the Hon'ble Supreme Court for direction pointing out that by selectively citing observations of the Hon'ble TDSAT, service providers had challenged /questioned TRAI's power to independently determine IUC charges in exercise of its statutory powers conferred u/s. 11(1)(b)(ii), (iii) and (iv). On 29th July, 2011, Hon'ble Supreme Court passed the following order

> *"… Before taking up the matter for final hearing, this Court would like the Regulator to compute the IUC with the inclusion of capital cost and without inclusion of the capital cost. In this case, the TRAI, which is the original Authority, has taken the view as a matter of law/regulation that capital cost should not be taken into account in the matter of fixation of IUC, whereas the Telecom Disputes Settlement and Appellate Tribunal [`TDSAT', for short] has taken a contrary view saying that the capital cost should be taken into account in the matter of fixation of IUC. Therefore, we want the Regulator to give us the computation of the IUC to be worked out on both the basis, namely, what would be the IUC if capital cost is taken into account and what would be the IUC if the capital cost is not taken into account?...*
>
> *…It is made clear that the Regulator will give its working uninfluenced by the observations made in the impugned judgement by the TDSAT. The Regulator will give its working by 31st October, 2011. …"*

10. During the consultation process, some of the service providers were of the view that a termination charge for all types of SMS (commercial as well as non commercial) should be prescribed at a level, which allows the terminating operator to recover their cost as well as successfully address the concerns of SPAM and pesky SMSs. However, some service providers suggested that on the basis of costs there is no case for imposing any termination charges on any SMS; however, for consumer benefits, TRAI may impose some charge on commercial SMS. Some of the service providers favoured "Bill & Keep" basis for exchange of all types of SMS (both commercial and non-commercial) between networks. These operators were of the view that the cost of regulating, monitoring and settling inter-operator billing for SMS is cumbersome and entail unnecessarily administrative cost; the bill and keep regime is simpler. Summary of the responses is as follows:

(i) A termination charge for all types of SMS (A2P , P2P, Commercial as well as non commercial) should be prescribed at a level, which allows the terminating operator to recover their cost as well as successfully address the concerns of SPAM and pesky SMSs.

(ii) Termination of both commercial as well as non commercial SMS should be charged and may be a fraction of the Voice termination charges i.e. 1/4th of the Voice (mobile) termination charges.

(iii) TRAI should mandate "Bill & Keep" basis for exchange of all types of SMS. As far as concerns over SPAM SMS / unsolicited commercial SMSs, alternate mechanisms for deterring such SMSs as envisaged in TCCCP Regulation may be explored.

(iv) On the basis of cost there is no case for imposing charges on any form of SMS. However, for consumer benefit, the rate for commercial SMS could be 10 paise/ commercial SMS.

(v) "THE TELECOM COMMERCIAL COMMUNICATIONS CUSTOMER Regulations 2010" has created sufficient deterrent on commercial calls and SMS and there is no need for a further deterrence on this.

(vi) The signaling paths of the recipient networks are relatively more loaded because of flow of commercial SMS.

(vii) BAK for non commercial SMS will offers unacceptable arbitrage opportunities to originating operators who will have a strong incentive to reroute or disguise commercial traffic. 10 paisa per SMS is a level which would act as sufficient deterrent to spam. This price is also well below international benchmarks for SMS termination pricing whether regulated or commercially agreed.

(viii) The current regulation of Bill and Keep should be continued. Considering international practices and costs base, we do not see any reason for imposing termination charges for any type of SMSs.

(ix) Commercial SMS are nuisance and deterrent termination charges must be imposed on bulk SMS sent for commercial purposes from origination network, say the same as a call.

(x) The services that are not welcomed by the subscribers must be heavily taxed.

(xi) A deterrent termination charge should be imposed for commercial SMS. The termination charge for commercial SMS may be kept same as the charges for voice call termination.

(xii) Most of the operators have a relatively balances P2P SMS traffic. The traffic imbalance is primarily on account of A2P SMS.

11. A report was filed in Hon'ble Supreme court on 31.10.2011 in compliance with its order dated 29.07.2011 in Civil Appeal No. 271-281/ 2011. Since the issue of inclusion of capital cost has been raised by service providers in the context of calculation of Mobile and Fixed Termination Charges before the Hon'ble TDSAT, the Authority has computed these charges including and excluding the capital cost and has submitted the report to this Hon'ble Court. It is relevant to point out here that as IUC for SMS were kept under forbearance, costing methodology, cost data and hence inclusion of the capital cost in respect of the SMS termination charges was not an issue before the Hon'ble TDSAT. SMS termination Charge was also not part of the Report submitted by the Authority to Hon'ble Supreme Court.

12. Matter along with other concerned matters was heard on 20.11.2012 to 22.11.2012 and on 04.12.2012 by the larger bench on the question of law involved namely whether TDSAT has the power, competence and jurisdiction to exercise powers of judicial review, over the regulations framed u/s. 36(1) of the TRAI Act, 1997. Arguments have been completed and judgment reserved.

13. Meanwhile various complaints with regard to discriminatory termination charge for SMS were received in TRAI from some of the operators wherein they have contended that some dominant operators have imposed 10 Paise /SMS as SMS termination charge, which is discriminatory.

14. One Service Provider informed TRAI that it has filed a petition in Hon'ble TDSAT against the demand raised by one of the dominent service provider on account of charging for SMS termination and also against the threat of withdrawal of interconnection of the SMS services of its network by the respondent. The service provider in its petition requested to declare the demand raised (on account implementation/ imposition of SMS termination charge @ 10 paise per SMS) as arbitrary, illegal, wrong, unilateral and without any basis; and quash/set aside the same. It also requested to direct the respondent not to withdraw the interconnection for SMS service with the petitioner's networks for non payment of the unilaterally increased and imposed demand for SMS termination.

15. A representation was again received by the abovementioned service provider that pending their ongoing dispute, the respondent service provider has unilaterally disconnected the SMS services to their network over the long Diwali weekend, thereby forcing it to sign an agreement with them for SMS termination at 10 paise per SMS. One more petition was filed in the TDSAT regarding interpretation of Schedule IV of the Telecommunication Interconnection Usage Charges (10th Amendment) Regulations, 2009 and the terms of agreements on SMS termination charge entered into between the parties.

16. Hon'ble TDSAT in its judgment in Petition No. 130 of 2011 on 24.09.2012 and in Petition No.430 of 2011 on 30.08.2012, has observed that as per TRAI's regulation SMS termination charge is under forbearance; provided that such charges shall be transparent, reciprocal and non discriminatory. In these orders Hon'ble TDSAT observed that "Indisputably, the TRAI had prescribed forbearance throughout. In that view of the matter, there cannot be doubt or dispute that the parties could enter into any bilateral contract……"

17. Recently a Writ Petition (Civil) No. 198 of 2013 was filed by a Consumer Organisation before Hon'ble Supreme Court. The Petitioner contended that levy of 10 Paise per SMS insisted by certain operators in their bilateral agreements under the guise of termination charges is responsible for increasing the base tariff of SMS many fold. As per the petitioner, the operators are jointly exploiting TRAI's regulations that had kept the tariffs for SMS under forbearance. The petitioner is therefore aggrieved by TRAI's inaction on fixing the cost based tariffs and termination charges for SMSs. Hon'ble Supreme court has issued notice in which TRAI is required to file its reply within four weeks.

18. In the light of developments in last one to two years, which has resulted in a number of litigations and uncertainty in the sector, the Authority noted that the policy of forbearance on SMS termination charge has worked satisfactorily in the past when the use of SMS by the subscriber was limited. In the changed circumstances especially due to exponential increase in the number of commercial SMSs, large imbalance in SMS traffic between the networks of interconnecting service provider, unilateral imposition of SMS termination charge and in case of non agreement, disconnection by some dominant service providers and growing litigations amongst the service providers, the Authority has decided to review the policy of forbearance in SMS termination charges. In order to create certainty in the market, exigencies created by certain dominant players and in order to protect the interests of the

consumers, prescribing cost based termination charges for SMS has also become need of the hour.

19. In continuation to its consultation paper, the Authority vide its letter dated 13.12.2012, also asked all the service providers regarding the international practices with regard to SMS termination charge, network element used for providing SMS termination, cost data and costing methodology for estimating SMS termination charge. Many of the service providers have reiterated their stand of Bill and Keep for SMS termination charge as they have submitted in their comments on the consultation paper dated 27.04.2011. In support of their suggestion of Bill and Keep, they have also submitted international practices in this regard. These service providers have submitted that in case, TRAI decides to prescribe SMS termination charge, it should be strictly on the basis of cost and according to their submission it should be less than 1 paise.

20. In response to the letter dated 13.12.2012, some of the service providers submitted network element wise cost bifurcation and cost estimation model for determination of SMS termination charge. According to their submissions the SMS termination charge ranges from 0.76 paisa per SMS to 10.4 Paise per SMS. These service providers were called for meeting in TRAI to explain the costing methodology used by them for estimating SMS termination charge. During the meeting they showed their cost model estimating SMS termination charge. Some of the service providers in their submission stated that Fully Allocated Cost (FAC) model should be adopted in India for determining SMS termination charge.

21. In the estimation submitted by one of the service providers, the SMS termination charge was worked out as 10.4 paise per SMS. In its model, it has taken 4.4% of their network cost as capital cost for earmarked capacity for SMS and also 4.4% of total cost per year as network operating cost of earmarked capacity for SMS. When asked to explain the rationale behind allocation of 4.4% of total cost towards SMS cost, it stated that it will revert

to TRAI and provide requisite information if any. The service provider has not submitted any further information.

22. Another service provider has estimated the SMS termination charge as 9.46 paisa per SMS. In its model it has estimated total SMS traffic in Erlang per site in busy hour for their network and then based on estimated cost per Erlang for different network elements used in delivering SMS to the consumer, calculated the SMS termination charge. After an extensive discussions, the service provider submitted a revised model to TRAI. As per the revised model, the SMS termination charge comes out to be 8.34 paisa per SMS. In this revised model, the SDCCH Erlang traffic was assumed to be same as TCH Erlang traffic. In the discussions with them, it was pointed out that the SDCCH Erlang traffic is not equal to the TCH Erlang traffic and it was asked to provide technical documents to support this assumption. The service provider has not submitted any documents further to support their assumption.

23. The service provider referred in above para also submitted that they are against Bill and Keep (B&K) approach for SMS termination charge since it is neither consistent with the principles of cost base and work done nor an effective deterrent to control the menace of spam. In this regard they have submitted that Hon'ble TDSAT vide its judgement dated 29.09.2010, clearly stated that IUC /MTC should be cost based and include all cost- CAPEX, OPEX and depreciation. Hence the consideration of Bill and Keep (nil charge) for any component of IUC is simply no longer an option available to the Authority. In this regard the service provider quoted following para of Hon'ble TDSAT:

"***...Its (TRAI's) jurisdiction being limited to determine the charges on cost based and work done principle...."[101(5)].***

"...It is not in controversy that the service providers are required to be compensated for the resources used by other service providers." [114(12)]

24. The Authority observed that the network used for delivering voice calls/ data services is the same for delivering SMS also. Therefore, allocation of proportionate cost for delivery of SMS plays an important role while estimating SMS termination charge. Variation in different cost models is also because of allocation of different proportion of the cost towards SMS termination charge by different service providers. Even in Accounting Separation Report (ASR), service providers have used different cost driver for allocation of cost towards SMS which has led to wide variation among service providers on SMS termination charges.

25. The Authority noted that cost can be divided into two parts: (a) network cost and (b) cost other than network element; network cost corresponding to SMS can be proportionate on the basis of network usage by SMSs. Accordingly on the basis of BTS configuration, number of time slot allocated for SMSs for different BTS configuration, average holding time of SMS (SDCCH seconds) submitted by the service providers, the Authority has estimated percentage Contribution of SMS on wireless network resources of the operators with various BTS configurations for all service providers, as per **Annexure 1**.

26. With regard to cost other than network cost like administrative cost etc., the Authority is of the opinion that it may not be appropriate that such costs also be allocated towards SMSs on the basis of % contribution of SMS in the wireless resource of operators. However, as any other cost driver for allocation of these costs will have subjectivity and may be contested by service providers, the Authority decided that such cost may be taken directly from the Accounting Separation Report as submitted by various service providers under the head of SMS.

27. The summary of results of top five operators on the basis of subscriber base are as follows:

(Rs. in crore)

WIRELESS SEGMENT (ASR 2011-12)							
Particulars	**Service Providers**						
	A	**B**	**C**	**D**	**E**	**F**	**Industry average**
Capital Employed (As per Proforma F of ASR – Wireless Segment)	As per ASR data submitted by service providers						185392
Return on Capital Employed @ 15% (A)							27809
Network Element Operating Cost (including Depreciation) (As per Proforma B of ASR – Wireless Segment) (B)							64231
Average number of SMS (outgoing + incoming) per subscriber per month (m)	103	78	131	30	82	77	81
No. of SMS per subs in a busy hour (n=m/(30*10))	0.34	0.26	0.44	0.10	0.27	0.26	0.27
Relevant Cost to SMS : % contribution on Wireless Network Resources by SMS services (x%) (calculated from Annexure I of Explanatory Memorandum of Regulations)	0.93%	0.70%	1.19%	0.27%	0.74%	0.70%	0.74%
Return on Capital Employed for SMS (x% of A) (a)	Calculation based on ASR data						204
Network Element operating Cost for SMS (including Depreciation) (x% of B) (b)							472
Cost other than Network Element Cost (As per directly allocated to SMS segment in Proforma B of ASR) (c)							688
Relevant Cost to SMS (a+b+c)							1364
Number of SMS (O/G + I/C) (in crore)							83764
Cost per SMS (Paisa)	1.53	1.42	2.53	0.84	1.05	0.77	1.63
Cost per SMS (Paisa) after Loading License Fee and Govt Chargs @ 12%	1.74	1.42	2.87	0.96	1.20	0.87	1.85

Note:

(i) Information submitted by service providers in Accounting Separation Report (ASR)
(ii) Wireless Segment: Network Element Cost is as per Proforma B and also includes depreciation
(iii) Cost other than Network Element Cost includes Admn Cost, Employees cost, Maintenance cost, Other cost and Support Functions/ Deptt cost. It does not include LF, Govt. Charges, Sales & Marketing cost and Finance Charges.
(iv) Loading (x%) factor was calculated from Annexure-1.
(v) Cost Other than Network Element are as directly allocated to SMS Service by Service Providers in Proforma B of ASR.

28. The information furnished by service providers in ASR is confidential. Therefore, name of the service providers and cost data submitted by them are not mentioned in the above table. From the above table, it may be seen that the SMS termination charge varies from 0.87 paisa to 2.87 paisa and the Industry average is 1.85 paisa per SMS. In this exercise, total CAPEX of wireless network submitted by the service providers has been suitably apportioned on the basis of percentage Contribution of SMS on wireless network resources of the operators but the operational cost has been taken as submitted by the service providers in their ASR. In case, the total OPEX of wireless network is also apportioned on the same basis as used for CAPEX allocation towards SMS, the SMS termination charge comes out to be 1.1 Paise.

29. In the above Table, the cost of termination charge of operator C comes 2.87 paisa per SMS. On examination, it was observed that operator C has allocated relatively very high cost towards 'cost other than network elements'. If this cost is normalized either with the similarly situated operator or with the industry average, SMS termination charge for this operator works out to be around 1.8 paisa per minute.

30. Keeping in view all the above analysis the Authority decided that cost based SMS termination charge should be Re. 0.02 (Paise 2 only) per SMS.

31. Some of the large Telecom Service Providers (TSP) submitted that the smaller operators are selling bulk SMSs to the telemarketers at comparatively cheap price. Their contention is that the revenue earned by such service providers through the sale of bulk SMS is primarily because they are able to send large number of A2P SMS to their subscribers. As their subscriber base is large compared to the subscriber base of such service providers, there is a substantial traffic imbalance between the two networks. These service providers further contended that as such service providers are earning

revenue because of the investment done by them for acquiring customers and building the networks, in their opinion they should also be given a part of such revenue. To take care of such externalities and to ensure that the service providers continue to invest in building up the networks, the Authority had earlier prescribed a promotional SMS charge of Re.0.05 on promotional SMS sent by registered telemarketer in the Telecom Commercial Communications Customer Preference Regulations, 2010 (6 of 2010). While doing this exercise, the Authority has observed that apart from promotional SMSs, there is a large traffic imbalance between different networks on account of transactional SMSs also. Hence, with these amendments, the Authority has also simultaneously amended the Telecom Commercial Communications Customer Preference Regulations, 2010 (6 of 2010) to prescribe a transactional SMS charge of Re.0.05 per transactional SMS.

Annexure-I

Following tables calculate % contribution of SMS on wireless network resources of the operators with various BTS configurations:

A. SMS Traffic per subscriber in busy hour				
S.No.	**Item**	**Legend**	**Value**	**Remarks**
1	No. of SMS per subscriber per month	a	81	Source: SMS Data submitted by service providers: No. of SMS per subscriber per month (outgoing + incoming)
2	No. of SMS per subscriber in a busy hour	b=a/(30*10)	0.27	No. of SMS per subscriber in a busy hour= No. of SMS per subscriber in a month/ (No. of days in a month *Equivalent no. of busy hours in a day)

B. No. of SDCCH Erlang due to SMS per subs in a busy hour				
S.No.	**Item**	**Legend**	**Value**	**Remarks**
3	Average holding time of SMS (SDCCH seconds)	c	5	Generally 4-5 seconds are required to transmit an SMS across the SDCCH. Source: Technical Information Bulletin- SMS over SS7.
4	Provisioned holding time of SMS (SDCCH seconds)	d=c*1.3	6.5	Provision of 30% more than average holding time is taken to cater for bouncing busy hour.
5	No. of SDCCH Erlang per SMS	e=d/3600	0.0018	SDCCH Erlang = Holding time in second / 3600
6	No. of SDCCH Erlang due to SMS per subscriber in a busy hour	f=e*b	0.00049	= No. of SDCCH Erlang per SMS * No. of SMS per subscriber in a busy hour

C Conversion Factor for SDCCH Erlang to TCH Erlang

S.No.	Item	Legend	Value						Remarks
1	BTS Configuration	g	2/2/2	3/3/3	4/3/3	4/4/4	6/6/6	8/8/8	As submitted by service provider
2	SDCCH Configuration	h	1/1/1	1/1/1	1/1/1	2/2/2	2/2/2	2/2/2	As submitted by service provider
3	No. of time-slots for traffic in a BTS	i	14/14/14	22/22/22	30/22/22	29/29/29	45/45/45	61/61/61	As per Discussion with service providers
4	No. of TCH (Traffic) Erlangs per sector	j	8.2	14.9	17.2	21	35.6	50.6	As per Erlang-B table at 2% GOS The average number of TCH Erlang for the Configuration 4/3/3 of the three sectors is 17.2E.
5	No. of SDCCH Erlangs per sector	k	2.16	2.16	2.16	6.66	6.66	6.66	As per Erlang-B table at 0.5% GOS (As submitted by the service providers: 2.16E for 7 channels and 6.66E for 14 channels)
6	No. of TCH Erlangs per time slot	l=j/ (No. of time slots for traffic in a sector)	0.586	0.677	0.699	0.724	0.791	0.830	=TCH (Traffic) Erlangs per sector/ No. of TCH per sector in 2/2/2 configuration =8.2/14
7	No. of SDCCH Erlangs per time slot	m=k/ (No. of time slots for SDCCH in a sector)	2.16	2.16	2.16	3.33	3.33	3.33	Per time slot for SDCCH channels in each sector.
8	Conversion Factor for SDCCH Erlang to TCH Erlang	n=l/m	0.271	0.314	0.323	0.217	0.238	0.249	2.73 SDCCH Erlangs = 0.586 TCH Erlang => 1 SDCCH Erlang = 0.215 TCH Erlang

D	**% Contribution of SMS in total load**								
S. No	**Item**	**Legend**	**Value**						**Remarks**
9	No. of Subscribers in each sector	o=j/0.03	273	497	574	700	1187	1687	=No. of TCH Erlangs per sector/ 0.03. Since TCH Erlangs per subscriber is 30 mE.
10	No. of SDCCH Erlangs generated in a busy hour for SMSs in each sector	p=o*f	0.133	0.242	0.280	0.341	0.579	0.823	=No. of SDCCH Erlangs due to SMS per subs in busy hour * No. of Subscribers in each sector
11	No. of SDDCH Erlangs equipped for SMSs in each sector	q=p/0.6	0.222	0.404	0.467	0.569	0.964	1.371	=No. of SDCCH Erlangs generated in busy hour for SMSs in each sector/0.6 (Utilization factor as submitted by service providers)
12	Equivalent no. of TCH Erlangs for SMS in each sector	r=q*n	0.060	0.127	0.151	0.124	0.229	0.341	=No. of SDDCH Erlangs equipped for SMSs in each sector*conversion factor
13	% contribution of SMS in the total load	s=100*r/j	0.73%	0.85%	0.88%	0.59%	0.64%	0.67%	=100*Equivalent TCH Erlangs for SMSs per sector/ No. of TCH Erlangs per sector
14	%BTS Mix of one operator	t	5%	30%	14%	18%	24%	9%	As provided by one service provider in its cost model dated 08.02.2013
15	% Contribution of SMS in the total load	u=s*t	**0.74%**						Weighted average sum of % contribution of SMS in the total load = ∑% contribution of SMS * % BTS Mix