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SP 3650 MHz
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Spectrum Management and Telecommunications

Spectrum Utilization Policy

Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz

Amendments:

[SAB-001-09: Revised List of Grandfathered Fixed Satellite Service Receive Earth Stations](#)

Department of Industry

Radiocommunication Act

Notice No. DGTP-005-09 — Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz

Intent

The purpose of this notice is to announce the release of the above-mentioned spectrum document to accommodate WBS in the band 3650-3700 MHz.

Background

In September 2003, Industry Canada released the *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands* (DGRB-003-03) and later auctioned 175 MHz in the band 3475-3650 MHz. At that time, the Department noted that there was a strong possibility that the United States would deploy licence-exempt devices in the band 3650-3700 MHz.

In October 2004, the Department published *Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation* (DGTP-008-04). In this paper, the Department requested comments on whether to make the band 3650-3700 MHz available for licence-exempt applications. Comments were also sought on the types of systems and services that could be implemented in the band and, noting the availability of licensed spectrum in the adjacent bands, whether there was a requirement to continue the designation for licensed services.

In August 2006, the Department released *Proposed Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz* (DGTP-006-06). The Department added a primary mobile allocation in the band and designated its use for WBS. This consultation proposed policy, technical and licensing considerations to accommodate new WBS in the band 3650-3700 MHz. Subsequently, the Department received comments in support of this allocation.

Discussion

Comments received in response to the 2006 consultation generally supported the Department's proposals on use, applications, channelling plans, technical requirements and eligibility. As well, comments received generally supported technical harmonization with the United States as being in the best interest of Canada.

Details of the spectrum policy, eligibility, technical and licensing provisions, to allow WBS in the band 3650-3700 MHz, are specified in SP 3650 MHz.

Obtaining copies

Copies of this notice and of documents referred to herein are available electronically on the [Spectrum Management and Telecommunications Web site](http://www.ic.gc.ca/spectrum) at <http://www.ic.gc.ca/spectrum>.

Official versions of *Canada Gazette* notices can be viewed at www.gazette.gc.ca/rp-pr/p1/index-eng.html. Printed copies of the *Canada Gazette* can be ordered by telephoning the sales counter of Canadian Government Publishing at 613-941-5995 or 1-800-635-7943.

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1. Intent

This spectrum utilization policy, announced in *Canada Gazette* Notice no. DGTP-005-09, addresses the principal issues governing the implementation of WBS in the band 3650-3700 MHz, including eligibility, the licensing approach, a proposed licensing fee, as well as technical and service rules.

2. Background

In August 1998, Industry Canada released a document entitled *Spectrum Policy and Licensing Provisions for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3700 MHz* (DGTP-013-098), which provided Fixed Wireless Access (FWA) spectrum to radiocommunication carriers on a first-come, first-served (FCFS) basis in rural and high-cost serving areas. Licences issued under the FCFS policy had one-year terms with a six-month implementation requirement, and did not include transferability or divisibility rights.

In February and April 2003 respectively, two *Canada Gazette* notices, *Restructuring the Spectrum in the Band 3400-3650 MHz to More Effectively Accommodate Fixed and Radiolocation Services* (DGTP-002-03) and *Expansion of Spectrum for Fixed Wireless Access in the 3500 MHz Range* (DGTP-006-03), were issued, which announced rearrangements of the spectrum in the band 3400-3650 MHz to better accommodate FWA systems and radiolocation operations.

In September 2003, the Department released *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands* and auctioned 175 MHz in the band 3475-3650 MHz. Three block pairs (25+25 MHz), as well as a stand-alone 25 MHz block were auctioned. At the time, the Department noted that there was a strong possibility that the United States would deploy licence-exempt devices in the band 3650-3700 MHz.

In October 2004, the Department released its *Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation* (DGTP-008-04). In this paper, the Department requested comments on whether to make the band 3650-3700 MHz available for licence-exempt applications. Comments were also sought on the types of systems and services that could be implemented in the band and, noting the availability of licensed spectrum in the adjacent bands, whether there is a requirement to continue the designation for licensed services in the band.

Given the uncertainty of the use of the band 3650-3700 MHz in the United States, most respondents urged the Department to undertake a full consultative review of the band during which time the specific questions raised could be more adequately addressed. Consequently, the Department initiated a public consultation, *Proposed Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz* (DGTP-006-06). In the consultation, the Department added a primary mobile allocation in the band 3650-3700 MHz, and designated its use for WBS. Subsequently, the Department received comments in support of this allocation and designation, as well as proposed technical characteristics in support of U.S. harmonization.

3. U.S. Status

In March 2005, the U.S. Federal Communications Commission (FCC) adopted rules to permit the operation of wireless broadband applications in the band 3650-3700 MHz. The FCC adopted a hybrid approach that draws from both the FCC's unlicensed and licensed regulatory models, and provides for nationwide, non-exclusive licensing of terrestrial operations in the band using technologies that employ contention-based protocols.

The FCC retained the existing fixed service (FS) and fixed-satellite service (FSS) allocations for the band and modified the mobile service (MS) allocation, which was restricted to base station only operation. The Commission also grandfathered previously licensed primary incumbent FSS earth station operations and three federal government radiolocation stations, entitling them to interference protection from new wireless licensees. To protect these incumbent operations, the FCC established circular protection zones around them – 150 km for FSS earth stations and 80 km for federal government stations – and only allowed new terrestrial licensees to operate within these zones once they successfully negotiated agreements with the incumbents. The FCC determined that new FSS stations should be allowed on a secondary basis.

The FCC also concluded that there should be no eligibility restrictions (other than the statutory foreign ownership restrictions) and no in-band or out-of-band spectrum aggregation limits. Licensees will receive a 10-year licence with the right to renew. They will be free to assign and transfer their non-exclusive, nationwide licences and to assign, transfer, or share base stations. In June 2007, the FCC affirmed the previously adopted U.S. nationwide, non-exclusive licensing strategy. Licensees will be required to register all system base stations electronically with the FCC to enable licensees to locate each other's operations and facilitate protection of grandfathered stations from interference.

Furthermore, the FCC finalized its licensing decision, clarified the meaning of contention-based protocol and modified the FCC rules to limit the operation of equipment using "restricted" contention-based protocols to the lower 25 MHz band segment. The operation of these systems in the band 3650-3700 MHz is governed by Part 90 of the FCC rules. As in 2005, the FCC concluded that there should be no eligibility restrictions and no in-band or out-of-band spectrum aggregation limits.

4. Incumbent Licensees

4.1 Point-to-Point Systems

In 1998, the Department opened the band 3400-3550 MHz to license FWA systems in rural areas on an FCFS basis under the *Spectrum Policy and Licensing Provisions for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3700 MHz* (SP 3400-3700 MHz). The Department made the provision that new point-to-point systems were not authorized to use assignments in the band 3500-3700 MHz. A further policy provision was established at that time, which permitted extensions and/or expansions of existing systems that required the use of assignments in the band 3500-3700 MHz, on a case-by-case basis, outside of urban areas. Since that time, several point-to-point systems have been retired from service.

In 2003, Industry Canada imposed a moratorium on the licensing of point-to-point systems in the band 3500-3650 MHz. Existing point-to-point systems in the band 3500-3650 MHz were subject to a transition policy.

In the 2006 consultation (DGTP-006-06), the Department asked whether existing point-to-point systems in the band 3650-3700 MHz should be grandfathered or displaced. Comments received supported the displacement of existing point-to-point systems over grandfathering. However, given that there are very few of these systems in operation, the Department is of the view that they should be allowed to continue to operate on a no-protection-from-interference basis. These systems are located at the following sites:

Location	Latitude (DDMMSS)	Longitude (DDDMMSS)	Tx Frequency (MHz)	Rx Frequency (MHz)
Arichat, NS	453050	0610054	3950	3670
Canso, NS	452011	0605947	3670	3950
Ingonish, NS	464025	0602427	3930	3650
Smokey Mountain, NS	463542	0602355	3650	3930
Smokey Mountain, NS	463542	0602355	3970	3690
Coxheath, NS	460615	0601628	3690	3970

Decision

Existing point-to-point systems are afforded protection from WBS operation for a period of one year from the date of release of this spectrum utilization policy. After this time, these point-to-point systems may continue to operate on a no-protection basis. The Department will notify licensees of these systems about this decision.

4.2 Fixed-Satellite Service

The band 3500-4200 MHz is allocated to the FS and FSS on a co-primary basis. Traditionally, authorization of FSS earth stations for domestic and Canada-U.S. traffic has been in the conventional C-band (3700-4200 MHz).¹ However, some authorizations of earth stations using foreign satellites to provide international overseas traffic have included the extended C-band 3500-3700 MHz.

The Department currently limits the authorization of new FSS earth stations in the band 3500-3650 MHz to large antenna applications, such as gateways located in remote areas outside urban centres. In the 2006 consultation, the Department proposed that this limit extend into the band 3650-3700 MHz.

¹ Technical limits dealing with adjacent band systems, including conventional C-band earth stations, are discussed in Section 8.3.2.

The Department also invited comments on whether future FSS receive earth stations in the band 3650-3700 MHz should be operated on a secondary basis. Some respondents argued that FSS receive earth stations should remain co-primary with WBS and receive similar provisions as applicable to the FSS in the band 3500-3650 MHz under footnote C20.² The Department maintains that this band is designated for the implementation of WBS. If FSS receive earth stations operate in the same band on a co-primary basis, they could unduly constrain the implementation of WBS. However, if the allocation to FSS is changed to a secondary one, the Department understands that it would be difficult to modify a satellite's operating parameters if it were determined that the downlink signal were interfering with a WBS receive station. Consequently, the FSS will retain its primary allocation in this band, but future FSS receive earth stations will operate on a secondary basis as per new footnote CXX.

In the same consultation, the Department proposed that existing FSS receive earth stations be grandfathered and that FS operators planning to establish systems in the vicinity of existing FSS receive earth stations be required to coordinate with the earth station operators; currently, there are FSS receive earth stations located in Weir, PQ (Laurentides) in the band 3650-3700 MHz.

Decision

Refer to [SAB-001-09](#) for a revised list of grandfathered FSS receive earth stations in the band 3650-3700 MHz.

In the band 3650-3700 MHz, the Department will limit the authorization of new FSS earth stations to large antenna applications, such as gateways located in remote areas outside of urban centres.

Any future FSS earth stations in this band will be authorized on a secondary basis. Therefore, the following new footnote will be added to the Canadian Table of Frequency Allocations:

CXX In the band 3650-3700 MHz, new fixed-satellite service earth stations will operate on a secondary basis so as not to constrain the implementation of wireless broadband services.

5. Applications in Canada

The Department works to reduce regulatory barriers in order to encourage the establishment of wireless broadband applications. Accordingly, the Department proposed that new licensees be permitted to deploy a full range of fixed and mobile applications (e.g. point-to-multipoint or point-to-point) in the band 3650-3700 MHz.

The Department sought comments on the types of terrestrial wireless broadband applications foreseen to be deployed in Canada. Proposed broadband applications include high-speed Internet connectivity similar to DSL/cable services for residences and businesses; L2/L3 VPN connectivity for private networks; WiFi AP aggregation; and real-time services requiring quality of service to support interactive gaming, VoIP, video, movie and music streaming, instant messaging, etc.

² C20 (CAN-03) In the band 3500-3650 MHz, the fixed-satellite earth-stations will be located in areas so as not to constrain the implementation of fixed wireless access systems – *Canadian Table of Frequency Allocations*, 2009 Edition.

Decision

The Department will allow a full range of fixed and mobile applications (e.g. point-to-multipoint, point-to-point and point-to-area) to be deployed in the band 3650-3700 MHz. Applications for systems comprising point-to-multipoint, low data rate radio telemetry networks (i.e. less than 25 kHz bandwidth) are not permitted.

6. Licensing Approach

Industry Canada seeks to facilitate the deployment of new applications by providing the maximum flexibility and by minimizing regulatory intervention for WBS in the band 3650-3700 MHz by suggesting in the consultation that spectrum licences be issued.

Comments received during the consultation fully supported the use of spectrum licensing.

Decision

The Department will issue spectrum licences for WBS in the band 3650-3700 MHz, which will expire on March 31 of each year, and will generally be renewable upon payment of required fees.

6.1 Eligibility

The Department proposed that eligibility not be restricted. Comments supported open eligibility. However, for those who intend to operate as radiocommunication carriers, applicants must demonstrate, prior to obtaining a licence, that they meet the eligibility criteria for radiocommunication carriers, as set out in section 10(2) of the *Radiocommunication Regulations*. For further information, refer to Client Procedures Circular 2-0-15, [Canadian Ownership and Control \(CPC-2-0-15\)](#), as amended from time to time (<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01763.html>).

Decision

The Department will not restrict eligibility.

6.2 Service Areas

The Department proposed to use Tier 4 service areas for the licensing of the bands 3650-3700 MHz. Respondents were in favour of Tier 4 service areas. Additional information and descriptions of the service areas used by Industry Canada can be found on the departmental website at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01627.html.

Decision

Spectrum licences for WBS in the band 3650-3700 MHz will be issued on Tier 4 service area basis.

6.3 Licensing Decisions and Spectrum Structure

In the consultation, the Department outlined various licensing options, including the issuance of exclusive spectrum licences, non-exclusive spectrum licences, as well as exclusive urban and non-exclusive rural spectrum licences. Comments were invited on the proposed options for exclusive and/or non-exclusive licensing and any other options, with supporting rationale. Any option could be applied to all or part of the spectrum. In the case of urban/rural service areas, the Department sought the rationale and criteria necessary to define these service areas.

The Department anticipates that the level of demand, and hence the potential for interference, will not be equally high across the entire country. Thus, some relaxation of the technical requirements in low population areas would allow for increased capacity in these areas without unduly increasing the potential for interference.

The consultation sought comments on the establishment of either a single 50 MHz block or two 25 MHz blocks. The use of a single 50 MHz spectrum block allows for more bandwidth-intensive applications and potentially simpler implementation, whereas the use of two 25 MHz spectrum blocks could allow for the application of different rules in each 25 MHz frequency block.

Comments received from industry stakeholders indicated that the proposed spectrum block should be divided into 20/30 MHz, 25/25 MHz or a 50 MHz block. Some suggested that, for very rural areas, where the population is less than 30,000, licences should be issued on an FCFS basis. There was no unified view from industry stakeholders as to whether an “exclusive use” or “non-exclusive use” licensing approach should be taken, or some combination thereof. Responses were varied; however, there was concurrence to harmonize with the United States. As discussed in Section 3, the United States has adopted a non-exclusive licensing strategy and Canada will implement a similar approach.

Decision

There will be no limitation on the number of licences that may be issued for the same spectrum and geographic area. Licensing for all areas will be on an FCFS basis and all licences will have equal access to the spectrum. No access priority will be given to any operations for any reasons.

The Department will proceed with the issuance of spectrum licences, on a shared basis, for the full 50 MHz frequency block in the band 3650-3700 MHz.

6.4 Licence Term

The Department proposed that spectrum licences for the WBS operation in the band 3650-3700 MHz be issued for a 10-year term.

Comments received generally supported the proposal of a 10-year term; however, the band 3650-3700 MHz for WBS will be licensed on an FCFS basis. Traditionally, authorizations on an FCFS basis are issued for one-year terms, expiring on March 31, and are renewable upon payment of an annual licence fee.

Decision

The Department will issue spectrum licences that will expire on March 31 of each year. Provided that the licensee is in good standing and that there are no modifications to the technical and licensing requirements in this band, a licensee may renew its licence for the next annual term upon payment of the applicable annual licence fees in advance of March 31.

6.5 Spectrum Aggregation Limit

The Department invited comments on whether spectrum aggregation limits are necessary in the event that a competitive process is adopted. Given that Industry Canada is moving ahead with a spectrum licensing regime, on a shared basis, the Department believes that it is not necessary to impose a spectrum aggregation limit.

Decision

The Department is not imposing a spectrum aggregation limit in the band 3650-3700 MHz.

7. Interim Licensing for WBS in the Band 3650-3700 MHz

With the publication of this notice, the Department will be moving forward with the tabling of the fee proposal before the House of Commons as required under the *User Fees Act*. In the interim, the Department will accept applications for licensing pending the establishment of the fee. Licensees will be required to pay annual fees as soon as the fee order is in place.

8. Technical Considerations

8.1 Technical Parameters

In the consultation, the Department proposed that the following provisions, which are harmonized with U.S. rules, be included:

- Fixed stations will be permitted a peak e.i.r.p. of 25 Watts/25 MHz of bandwidth.
- Mobile stations, including those operating in mobile-to-mobile mode, will only be permitted to transmit if they have first received and decoded an enabling signal transmitted by a base station.
- Mobile stations will be permitted a peak e.i.r.p. of 1 Watt/25 MHz of bandwidth.
- Stations will be permitted to use any antenna that respects the e.i.r.p. limits specified. For systems using smart antennas with multiple beams, the total power in a given direction must respect the above e.i.r.p. limits; however, the aggregate output power in all directions for systems using smart antennas will be permitted to exceed the single-beam e.i.r.p. limits by up to 8 dB.

- Any emission outside of the authorized band must be attenuated by at least $43 + 10 \log(P)$ dB below the transmitter power level P, where P is measured in Watts, in a measurement bandwidth of 1 MHz.

The Department invited comments on the above technical rules. Respondents were in favour of harmonizing Canadian technical rules with U.S. rules.

Decision

The Department will adopt technical specifications that are harmonized with those in the United States. Detailed technical specifications for WBS in the band 3650-3700 MHz will be contained in a Radio Standards Specification (RSS) and/or a Standard Radio System Plan (SRSP), to be developed in consultation with the Radio Advisory Board of Canada.

8.2 Contention-based Protocols

With the issuance of spectrum licences, on a shared basis, it will be necessary to employ mitigating measures to reduce interference between radiocommunication systems.

As part of the 2006 consultation, Industry Canada invited comments on whether to adopt the FCC's definition of a contention-based protocol, noting that the definition could possibly change, as it was the subject of petitions for reconsideration in the United States.

Respondents to DGTP-006-06 supported the adoption of the U.S. definition of a contention-based protocol and urged the Department to harmonize its rules with those adopted by the FCC. In the Memorandum Opinion and Order, adopted in May 2007, the FCC addressed these petitions for reconsideration. In particular, the FCC clarified the definition of contention-based protocol. As well, the FCC adopted definitions of "restricted" and "unrestricted" protocols, and modified its rules to limit the operation of equipment using "restricted" contention-based protocols to the lower 25 MHz portion of the 3650 MHz band. The Department believes that these descriptions and approach are, for the most part, appropriate for this band.

Nevertheless, Industry Canada anticipates that the level of demand, and hence the potential for interference, will not be equally high across the entire country. Thus, some relaxation of these technical requirements in low population areas would allow for increased capacity in these areas without unduly increasing the potential for interference.

Decision

The Department adopts the following descriptions, applicable to the band 3650-3700 MHz:

Contention-based protocol: A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and by establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel.

Restricted contention protocols: Restricted contention protocols can prevent interference only to radio equipment that uses the same or similar protocols.

Unrestricted contention protocols: Unrestricted contention protocols can prevent interference to radio equipment that uses dissimilar contention protocols.

The Department requires the use of contention-based protocols for equipment licensed in the band 3650-3700 MHz.

Equipment incorporating unrestricted contention-based protocols may operate anywhere within the band.

The Department requires that equipment incorporating restricted protocols operate only in the sub-band 3650-3675 MHz. However, in low population areas,³ away from the Canada-United States border,⁴ equipment incorporating restricted protocols may be permitted to operate in the 3675-3700 MHz sub-band. In such cases, licensees are encouraged to use the lowest available frequency channel.

Detailed technical specifications for WBS in the band 3650-3700 MHz will be contained in an RSS and/or an SRSP, to be developed in consultation with the Radio Advisory Board of Canada.

8.3 Interference

8.3.1 In-band Interference

Equipment deployed in this band must incorporate contention-based protocols. These protocols are designed to manage the interference between systems without coordination. Because of the implementation of these protocols, the number of licenses awarded within an area will not be restricted. Licensees will not have the same interference protection rights commonly associated with licensed systems. WBS operators should note that, although interference may still be possible, it is expected to be manageable.

The Department will not be involved in coordinating station assignments or resolving interference problems. Licensees are expected to cooperate in order to identify and resolve possible interference issues among themselves. To facilitate cooperation, all licensees will be required to provide site-specific station information and contact information for a publicly accessible database before deploying their equipment.

³ For the purposes of this policy, “low population areas” are defined as those Tier 4 areas that are subject to the minimum licence fee. A separate notice will be available regarding the licensing fee for WBS in the band 3650-3700 MHz.

⁴ See Section 9.

Decision

Licensees will not have the same interference protection rights commonly associated with licensed systems. The Department will not be involved in coordinating station assignments or resolving interference problems. Licensees are expected to cooperate to identify and resolve possible interference themselves.

Industry Canada will require that licensees provide site-specific data, contact information, including any additional information outlined in CPC-2-1-23, to the Department. Licensees will be required to keep this information up to date.

8.3.2 Adjacent Band Interference

Industry Canada requested comments on whether the out-of-band emission limits specified in Section 8.1 would provide sufficient protection to services operating in adjacent spectrum, including FSS earth stations operating in the conventional C-band (3700-4200 MHz). The Department also asked about the potential impact of emissions below 3700 MHz on FSS receivers.

Some respondents did not agree with proposed technical specifications and urged the Department to review and tighten the technical parameters for WBS transmitters, including maximum allowable power density and out-of-band emission limits, to ensure that FSS receivers in the adjacent 3700-4200 MHz band are adequately protected.

Industry Canada recognizes the importance of both WBS and FSS services. It also recognizes the benefits of harmonization of technical specifications with the United States. Therefore, the Department is of the view that the out-of-band emission limit for WBS systems, as set out in Section 8.1, should be adopted. Additional mitigation measures may be required of both services and may be established through the development of appropriate technical standards in consultation with the RABC. Furthermore, licensees will be required to notify the FSS operator when deploying a base station in the vicinity (within 25 km) of a licensed earth station. Potential interference should be resolved through mutual arrangements between the affected parties.

Decision

Licensees are required to notify FSS operators when deploying a base station within 25 km of a licensed FSS earth station operating in the bands 3700-4200 MHz.

Potential interference should be resolved through mutual agreements between the affected parties.

9. International Coordination

Canada does not currently have a formal arrangement with the Government of United States for the sharing of the band 3650-3700 MHz along the border regions. Until such time as an arrangement with the United States is concluded, operators will be bound by two conditions for the deployment of fixed stations along the Canada-United States border: if the antenna looks within the 160° sector away from the border, fixed stations must be located at least 8 km away from the border; if the antenna looks within

the 200° sector towards the border, fixed stations must be located at least 56 km away from the border. Operations within those distances may be allowed if such use can be successfully coordinated with the United States.

Licensees will be subject to any future agreements between Canada and the United States regarding use of these systems in the border regions, which may include obtaining departmental approval before allowing certain stations to operate. The arrangement for this band will be available at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08960.html>.