DERIVATION OF CHANNELS

501. 10 Mc/s Convention

a. On naval ISB and SSB fixed services the 10 Mc/s Convention will be observed, and sideband ALFA radiated on SSB services as follows:-

(1) On frequencies above 10 Mc/s sideband ALFA is the USB (Sideband H, CCIR 1959).

(2) On frequencies below 10 Mc/s sideband ALFA is the LSB (Sideband L, CCIR 1959).

b. Due to interference or other factors the Watch System Controller may order a sideband reversal on SSB, or inversion on SSB provided the assigned frequency band is wide enough.

502. Sideband and Channel Designation

See BJTEI Chapter 5.

503. Channel Usage

a. It is an aid to System Engineering practice for all Fixed Services to comply with a standard channel usage pattern. Channel usage on Naval fixed services will be as follows, and temporary changes should only be made in cases of equipment defects, interference or for special traffic requirements.

(1) SSB - FDM (120 c/s tone spacing)

Channel 1 - Primary Traffic
Channel 2 - Secondary Traffic
Channel 3 - Patch Circuits
Channel 4 - Engineering
Channel 5 - Traffic
Channel 6 - Traffic

(2) SSB - FDM (170 c/s basic tone spacing - interlacing may be used)

Channel 1 - Engineering
Channel 2 - Primary Traffic
Channel 3 - Secondary Traffic
Channel 4 - Patch Circuits

(3) FFD

Channel 1 - Primary Traffic
Channel 2 - Engineering, or with EDC → Eng. Sub-Channel B
→ Traffic, Sub-Channel A

(4) FST

Primary traffic with engineering traffic cleared at Operational Immediate precedence.

(5) FST - TDM (EDC)

Sub-Channel ALFA - Primary Traffic
Sub-Channel BRAVO - Engineering

(6) SSB - FDM - Two Tone Morse

Primary traffic channel only used for high precedence traffic including engineering messages.

(7) FFD/FST - On/Off Morse

As in (6) above.

504. Change of Mode and Channel Reduction

a. The decisions to counter deteriorating ionospheric conditions and interference must lie in the discretion of the Watch System Controller/Watch Supervisor (Receiving Station) in terms of the aim set out in Chapter 2.

b. In general, channel reduction and more especially mode alteration should be a last resort as they compromise traffic flow, and the following considerations should be investigated:-

(1) Duplicated Path emission.

(2) Use of receiver input attenuators.

(3) De-tuning of receiver RF stages.

(4) Use of manual gain control.

(5) Channel change.

(6) Regeneration.

(7) Sideband change.

(8) Shift reduction on FST services.

(9) Activation of established patches.

(10) Activation of any patch circuit at the discretion of the Watch System Controller.

(11) Assistance of Rad-Control in cases of interference.

c. The general order of channel reduction and mode change is given in BJTEI Chapter 5, but on Naval services the primary traffic channel will be given the highest priority followed by the engineering channel. This does not accord with present Army and RAF practice.

d. Reduction to the morse mode will normally be carried out vide Paras. 709 and 726 when terminals have been out of touch more than 30 minutes, but streams should have been changed to plain working RTT before this time.

505. Channel Patching

a. The requirement for channel patching may arise from the need for intercommunication between terminals not connected by a direct service, or when the direct leg is not available or not suitable for traffic. Channel patching may also be used to meet a conference requirement.

b. "Established Patches" on the Network are those which have been subjected to trial and proved. They patch channels in both directions and thus affect both halves of a circuit.

Established patches are as follows:-

PATCH	LEG IDENTIFICATION INDICATORS (Derived from ANNEX D)
(1) PATCH ONE	CA.SI.AD / AD.SI.CA.
(2) PATCH TWO	CA.SI.VA.AD / AD.VA.SI.CA.
(3) PATCH THREE	CA.VA.AD / AD.VA.CA.
(4) PATCH FOUR	WE.CA.AD / AD.CA.WE.
(5) PATCH FIVE	VA.MA.AD / AD.MA.VA.

c. The decision to open or close an established patch or any other patch due to conditions or requirements rests with Watch System Controllers in terms of traffic requirements stated by the DCO.

506. Routine for Opening Patches

a. When the activation of a patch is ordered, each station including the terminals will send their standard calls as soon as their outgoing channels are ready.

b. Intermediate stations will continue to do this until their incoming channel is received ZBZ 4 to 5, when they will complete their part of patch. The incoming channel is to be monitored frequently to allow completion of the patch at the earliest opportunity.

c. Should any channel comprising a patch become unsuitable for traffic, e.g. fault condition or propagation etc., the System Control concerned should order a Standard Call to be fed forward instead of the output from the unsuitable channel. This should continue until regular testing shows the channel as fit for use once more.

d. This procedure provides System Control Centres with continuous patched stream information, and reduces engineering traffic.

507. In cases where opening of a patch involves activating a fixed service

. The following advance routine is to be carried out in preparation.

a. System Control Centres involved are to exchange Starting Frequency Forecasts in the "Out of Touch Message" format to cover a 24 hour period.

b. Officers-in-Charge/Senior System Controllers will be responsible for amending these forecasts from time to time in the light of seasonal trends and general experience of the service.

c. In the case of actual patch requirements being occasional only, arrangements are to be made for the frequent 'airing' of these services; which in itself will provide more accurate assessment of Starting Frequency Forecasts.

508. Channel and Sideband Changes

When Channels or Sidebands are changed from the normal configuration, transmitting stations are to retain the new configuration until specifically instructed to revert by the controlling System Control Centre.

601. Frequency Prediction Charts

Monthly Prediction Charts are supplied to Naval Shore Wireless Stations and form the basis of a guide to frequency planning.

The choice of correct frequencies can only be made at the Receiving Station by an appreciation of predictions, empirical results and a study of current propagation conditions.

Fixed Service experience, and the ability to evaluate noise conditions and fading cannot be over-emphasised.

Frequency plans should be considered entirely flexible and Watch Supervisors/Quality Controllers should be constantly alert for the unexpected.

The objective must always be to change frequency successfully before the channels in use deteriorate to unacceptable error rates.

Details of the above considerations are given in BJTEI Chapter 6.

602. Propagation Prediction Broadcast

a. Prediction broadcasts are to be read by Receiving Stations and taken into account when frequency planning. They are to be passed to System Control who in turn will advise the Communications Centre for use with Ship Broadcasts.

b. WWV (Washington)

(1) This broadcast is radiated continuously on 5000, 10000 and 15000 kc/s. It consists of time signals interrupted at 5 minute intervals with a morse (MCW) propagation prediction, and voice time announcement.

(2) Propagation predictions will contain one of the following letters - N (normal), W (Disturbed) or U (Unsettled), followed by a numerical suffix as follows:-

1. Impossible.

2. Impossible to Very Poor.

3. Very Poor.

4. Poor.

5. Fair.

6. Fair to Good.

7. Good.

8. Good to Excellent.

9. Excellent.

c. CRPL Forecasts

(1) These forecasts (known as CRPL NA J FORECASTS) are issued twice weekly on the basis of latest information available on propagation conditions in the North Atlantic Area.

(2) Forecast Message - Breakdown.

Message received - ADA06 12534 66665 07085

Breakdown:-

ADA	Advanced Atlantic Forecast
06	Greenwich date of beginning of seven day period to which forecast applies.
12	Greenwich date ending seven day period.
5346666	Forecast quality figures for each day of period.
5	CHECK - i.e. shows the units digit of the sum of the preceding 11 digits (in this case 45).
07	Greenwich date at beginning of disturbed period.
08	Greenwich date ending disturbed period.
5	CHECK - i.e. shows the units digit of the sum of the preceding 4 digits (in this case 15).

NOTE: Where no disturbed period is expected, the last group is signalled as NONEX.

(3) Forecast Quality Code.

The numbers applicable to each day of the seven day period have the same meaning as given in b. (2).

603. Frequency Changing Procedure

a. Single Path System.

(1) Local Receiving Station informs System Control on liaison T/P of need to change frequency and sets continuous listening watch on receiver.

(2) Message confirmed and passed to distant System Control on engineering circuit.

(3) Distant System Control obtains concurrence for traffic break from his local Communications Centre.

(4) Distant System Control passes message to his Transmitting Station.

(5) Local Receiving Station shifts frequency immediately the old frequency goes off the air, and continues listening watch on new frequency.

(6) Local Receiving Station completes tuning immediately the new emission is received and continues to monitor. Quality Controller confirms correct tuning and that receiver functions normally in terms of AFC lock, AGC, etc.

(7) Local Receiving Station informs his local System Control that new signal is connected. System control in turn informs Communications Centre that system is ready for traffic. If there is none waiting a check message or Standard call should be sent by the traffic staff (see ANNEX F 3(a).

(8) Local Receiving Station carries out distortion checks on all channels including printability checks on 'plain working' channels. Similar checks may be made at System Control.

NOTE. Though it may be necessary to disconnect lines connected to TARES, those lines to the traffic bays are not disconnected. Experience shows that the traffic break is often under ten minutes and sound frequency planning makes an extended traffic break for the purpose of routine engineering checks unjustified. This is not in accordance with present Army and RAF practice.

b. Duplicated Path.

(1) The standby leg, which is maintained under full monitoring surveillance, will be terminated at the Receiving Station, but will be connected to the Comcentre in lieu of the other leg at the discretion of the Watch Supervisor in the Receiving Station.

(2) The frequency changing procedure remains as for single path operation with the exception that Communications Centre concurrence is not required when no traffic break is involved.

604. Standard Frequency Transmissions

a. Transmission of certain BBC programmes is very accurately controlled for frequency stability. Such transmissions are accurate to within one part in 10^6 and may be of considerable value for checking frequency calibrations. The exact times between which these frequencies are emitted are subject to alteration with BBC schedules.

b. Standard frequency transmissions are radiated from Rugby on a 24-hour basis (except 15 to 20 minutes past each hour) using 2,500, 5,000 and 10,000 kc/s, callsign, MSF and speech announcement. Transmissions are additionally made at 60 kc/s, between 1429-1530 and 1959 2100 GMT.

605. Assigned Frequencies

a. Frequencies assigned to the Network are given in R.N. Signal Order S6.

b. Assigned frequencies are also given in the International Frequency List. This catalogue is issued by the International Frequency Registration Bureau (part of the ITU) in Geneva, and contains full details of the "ownership", use, power, etc., for any given assigned frequency/band.

As almost every frequency assignment is shared by two or more users, questions of offending interference tend to be resolved by relative dates of registration of a particular frequency assignment by the nation concerned.

606. Application for a New Frequency Assignment

a. New requirements are cleared by a Frequency Assignment Committee set up in various parts of the world. Represented on these FACs are all users of radio, both military and civil. The Defence Signal Board is responsible for co-ordinating radio services in the United Kingdom and United Kingdom territories, referring assignments to local FACs abroad for clearance as necessary. Assignments taken into use by the Armed Forces which require registration with the ITU are forwarded to the IFRB by the DSB.

b. An authority requiring a new assignment or change in technical characteristics of existing assignment should apply through the MOD (Navy), except in those cases where local FACs are authorised to assign frequencies within certain limits (usually in relation to the order of power to be used) when applications should be made through Commanders-in-Chief concerned.

607. Use of Frequency Assignments made to Other Naval Stations or Commands

The practice of using a frequency assignment made for use on another Naval station or command is not permitted. Such an assignment may well have another use unconnected with the Navy in the area for which it is desired to use it.

608. 'Off-Set' Carrier Frequencies

See "Off-Set Carrier" - Chapter 7, 705.

609. Starting Frequencies

a. In the case of initial or trial activations starting frequencies should be exchanged.

b. See "Out of Touch Messages" - Chapter 7.

610. Radiation of Inactive Frequencies

a. To ensure the suitability and adequate protection of radio frequencies used for communication purposes and to comply with Radio Regulations 1959, paragraphs 619 to 622, Commanders-in-Chief, Flag Officers and Senior System Controllers should arrange as far as possible for radiation on all frequencies, whether in abeyance or not, which are assigned to stations within their groups, to be radiated at least every three months.

b. Transmissions from a ship using master oscillator control at the port of an inactive wireless station may be used to satisfy this requirement.