

AUTUMN 1955 COLOUR TESTS

The questionnaire reproduced here was sent to TV receiver manufacturers and others during autumn 1955 and was intended that collaborating viewers could report their findings.

This particular copy was sent to Cossor Radio & TV, and was contributed by Malcolm George. It is a photocopy of a stencil-duplicated original, so it may not reproduce very well. I hope it will be legible, however.

QUESTIONNAIRE A

General Instructions

1. If possible please make a complete series of observations during one transmission. If some of the tests are missed leave the form blank at the appropriate place.
2. Please endeavour to keep the sound and picture settings the same during any one series of tests. In particular do not alter the sound volume control after the line-up during Test 2. Any adjustment of the picture subsequent to Test 2 should be kept to a minimum.
3. Any viewing distance may be chosen for a particular transmission, but, if you have a viewing distance which you consider normal please carry out the tests at this distance. It is important to maintain this distance constant during any one series of tests except during Test 2 when any other desired distance may be used.
4. The lighting conditions in the room during the tests should be those you normally use for programme viewing.
5. Please send your completed questionnaires in batches of a complete week through the organisation to which you belong:

The Secretary,
B.R.E.M.A.,
59 Russell Square,
London, W.C.1.

In the case of B.B.C. personnel, please send to H.D.D.

EXPERIMENTAL COLOUR TELEVISION TRANSMISSIONS FROM ALEXANDRA PALACE

AUTUMN 1955

1. Object of Tests

Experimental colour transmissions to be broadcast from Alexandra Palace during the Autumn of 1955 will use a variant of the N.T.S.C. colour system adapted for British standards* and will have two main objects:

- (i) To see whether this system can give a colour picture of an acceptable standard with sufficient reliability and at an economic cost from both the transmission and the reception viewpoints.
- (ii) To see whether or not the system is compatible.

The probability is that the picture will be good enough on the colour reproduction point of view, and in any case it will not be possible to do many tests on this until satisfactory colour receivers are available in adequate numbers. The initial tests are therefore bound to concentrate rather on the compatibility of the scaled-down N.T.S.C. system. The principal points on which information is required are:

1. The visibility of the dot structure on existing black and white receivers.
2. Whether the "buzz" introduced into the sound of black and white receivers is objectionable.
3. Whether the tonal gradation of a typical colour picture is satisfactory when viewed on black and white receivers.
4. Whether the transmission of a picture on fixed frame and line frequencies will give satisfactory reception on normal receivers in the hands of the public, particularly at times when the power supply frequency is varying.
5. Whether the presence of the colour burst on the post-sync. line suppression is visible on black and white receivers.
6. Whether the presence of colour information at the end of a scanning line causes interference with the synchronising of black and white receivers.
7. Whether the presence of a phase-corrected notch filter in the luminance channel produces any deterioration in the quality of the pictures seen on a black and white receiver.
8. Whether the presence of the phase network, which is inserted between the output of the coded colour signal and the input of the vision transmitter to correct the response of colour receivers, has any noticeable effect on the quality of pictures seen on black and white receivers.

*The colour signal will be in accordance with the specification given in the document entitled "Specification for Colour Television Standards for Experimental Transmissions from Alexandra Palace", issued by the B.B.C. and dated 25th March, 1955.

The first two points are well-known and require no explanation. The third point arises because the gamma correction in the N.T.S.C. system is applied to the R.G. and B. components and these signals are then coded to give the luminance signal. This is not the same thing as if the luminance signal were gamma corrected, and therefore when the signal is applied to a normal black and white receiver, the overall contrast is not correct. The presence of the colour sub-carrier acts to rectify this defect to some extent. This is important as it may influence a decision whether the colour information should be in band or out of band.

Points 4 and 5 are self-explanatory.

As regards point 6, the low bandwidth of the colour information will cause some of this information to continue after the cessation of the associated luminance information, and for a colour at the end of a scanning line this could cause the colour sub-carrier to extend into the synchronising period, or at least into the pre-sync. suppression period. It is desired to test this particular aspect, since, if it causes trouble, a minor redesign of the colour system would be necessary.

Point 7: the presence of a phase-corrected notch filter in the luminance channel improves the colour picture by removing the components of the luminance signal which fall in the colour band. It is necessary to see whether the presence of this filter will distort the pictures viewed on a black and white receiver.

2. Hours of Transmission

Monday and Tuesday	23.00 - 24.00
Wednesday, Thursday and Friday	13.15 - 14.15

The day-time transmissions may have to be cancelled occasionally if programme commitments make this necessary, but the late night tests will always be radiated. They will begin at 23.00 or a quarter of an hour after the end of the public transmission, whichever is the later. It is intended that the tests for which this Questionnaire A is designed shall last for a period of four weeks and will be repeated unchanged on every transmission. This period of four weeks may be extended or curtailed if experience shows this to be necessary. It is expected that the tests will begin on Monday, 3rd October.

3. Sequence of Tests

Weeks 1, 2, 3 and 4	Compatibility tests with the waveform radiated exactly as in the published specification. If found necessary, these tests could be extended beyond the four week period.
Weeks 5 and 6	Observation of the effect of a notch filter in the luminance channel and of the effect of the phase compensating network in the input to the vision transmitter.
Weeks 7 and 8	If found necessary as a result of the tests during weeks 1, 2, 3 and 4, compatibility tests would be repeated with the chrominance information reduced by 3 dB.
Week 9	If found necessary as a result of the tests during weeks 1, 2, 3 and 4, compatibility tests would be repeated with the burst amplitude reduced by 6 dB.

The tests during weeks 1, 2, 3 and 4 would be the same for each period of transmission. The suggested transmission schedule is shown on Page 3. For obvious reasons it is not yet possible to draw up transmission schedules for the weeks following the initial compatibility tests.

4. Transmission Schedule for Weeks 1 - 4

<u>Test No.</u>	<u>Time</u>	<u>Vision Signal</u>	<u>Sound Signal</u>	<u>Purpose</u>
1	"0"	Colour Test Card	Tone	Line-up of colour receivers. Adjustment of gain of Black/white receivers.
2	+ 5 mins.	Test Card C	Music	Line-up of black/white receivers and assessment of performance.
3	+10 mins.	Colour slides 1 to 10. Colour information switched on and off at 15 sec. intervals.	Carrier on. No modulation.	Assessment of: 1. "Buzz" on sound. 2. Dot pattern interference. 3. Effect on contrast of colour sub-carrier. 4. Synchronising troubles. 5. Burst interference.
4	+20 mins.	Colour slide 11	Music. Sound carrier switched on/off at 15 sec. intervals.	Assessment of sound signal interference on picture.
5	+25 mins.	Black/white caption.	Carrier on. No modulation.	Assessment of burst inter- ference on most critical picture.
6	+35 mins.	Colour film.	Accompanying sound.	Assessment of: 1. "Buzz" on sound. 2. Dot pattern interference. 3. Effect on contrast of colour sub-carrier. 4. Synchronising troubles. 5. Burst interference.
7	+45 mins.	Same or similar film without colour information.	Accompanying sound.	Comparison with Test 6.

5. Explanation of Compatibility Tests

The tests will be radiated by the low power transmitters at Alexandra Palace so that considerable re-adjustment of sound and vision gain will be necessary during the radiation of the line-up signals. Each test will be announced in sound and the colour slides will be numbered.

For the benefit of those observers whose work has not yet brought them into contact with an N.T.S.C. type of colour signal, a brief and simple explanation of its principal characteristics follows:

The luminance information occupies the frequency band up to 3 Mc/s in exactly the same fashion as on the present black/white transmission. The synchronising information is identical in form except for the addition of a few cycles of the colour sub-carrier on the post sync. suppression period. Two pieces of colour information are used to modulate a colour sub-carrier at 2.66 Mc/s in both amplitude and phase, the carrier itself being suppressed. At the receiving end this colour information is recovered by adding a local carrier at 2.66 Mc/s which is locked in phase and frequency by reference to the colour synchronising burst. This colour information is arranged in such a fashion as to produce minimum visibility on a monochrome receiver. In particular, when there is no colour information in a particular part of the picture no colour signal is sent. In coloured areas, the amplitude of the colour signal depends upon the degree of saturation of the colour. It is the purpose of these tests to find out how much this additional colour information interferes with the picture and sound as observed on a monochrome receiver.

TEST 1

This is a radiation of a colour test card with accompanying tone. It is intended primarily for the adjustment of colour receivers but it can be usefully employed by observers on black/white receivers to make the required adjustments on vision and sound gain. It is designed primarily to check the registration of colour displays and the correct phasing of the colour sub-carrier generated in the receiver.

TEST 2

This is a standard radiation of Test Card 'C' and accompanying music for adjustment and lining-up of black/white receivers. Once the desired sound volume has been decided, this should not be altered during the course of the tests. Slight readjustment of the picture may well be necessary but this should be kept to a minimum. A question is asked to establish the performance of the receiver in general terms.

TEST 3

The ten colour slides to be radiated during this test have been carefully selected to provide a wide range of colour subjects. Slide 10 has a special characteristic in that it has a highly saturated colour at the extreme right hand edge occupying a few lines. This is to establish whether the presence of a strong colour sub-carrier immediately prior to the synchronising pulse causes line sync. pulling. The total colour information is switched on and off at 15 second intervals so that an effective comparison can be made of the effect of this information on the picture and sound. Questions have to be answered in respect of the performance of black and white receivers regarding:

- (i) Buzz on sound.
- (ii) Effect of dots.
- (iii) Effect on picture contrast.
- (iv) Synchronising difficulties.
- (v) Visibility of colour burst.

TEST 4

Slide 11 has been selected to have large areas of colour information so that any beat pattern produced by interaction of the colour sub-carrier and the sound carrier will be present in large areas of the picture. The sound carrier will be switched on and off at 15 second intervals so that this pattern, if present, may be identified. The pattern will be stationary due to the fixed frequency relation between vision and sound carriers.

TEST 5

The slide is a caption with white letters on a black background and has been chosen as the most critical picture to reveal interference by the colour synchronising burst. This interference occurs during the fly-back time of the line time base and appears as a series of vertical white lines.

TEST 6

This is a colour film with full colour information. The questions are the same as for Test 5.

TEST 7

At the time of writing it is hoped that the test will employ the same film as in Test 6, transmitted without colour information. If not the same, a very similar film will be used so that a comparison can be made with the pictures received during Test 6.

Since the signal is not locked to the mains frequency, observers are asked to assess the annoyance caused by the presence of asynchronous hum and/or geometric distortion.