

GTech Surveys Limited

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Television Reception Assessment

CHANGE HISTORY

Issue	Date	Details of Changes
0.0	30/03/2026	Working draft
0.1	08/04/2026	First draft issue
1.0	08/04/2026	First issue - minor editing
Author: G Phillips		Reviewer: O Lloyd

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GTech Surveys Limited

GTech Surveys Limited is a Midlands based broadcast and telecommunications consultancy conducting projects throughout the entire UK. We undertake mobile phone network, television and radio reception surveys (pre- and post-construction signal surveys), conduct broadcast interference and reception investigations, and support telecommunications planning work for wind energy developers, construction companies, architects, broadcasters and Local Planning Authorities.

In addition to radio interference modelling services and television reception surveys, we produce EIA and ES Telecommunications Chapters (also known as an 'Electronic Interference Chapter'); satisfying the requirements of Part 5, Regulation 18 (Parts 5a and 5b) of The Town and Country Planning EIA Regulations 2017. We peer review ES and EIA work, liaising with telecommunications providers (Arqiva, BT etc.) and advise developers with respect to associated Section 106 (Town and Country Planning Act 1990) and Section 75 (Town and Country Planning (Scotland) Act 1997) agreements.

GTech Surveys Limited is a consultant member of the Trade Association for Content Delivery - (Confederation of Aerial Industries Ltd - CAI) and the RDI - the digital sector's professional body and trade organisation. We are listed on Constructionline and verified as a Safety Schemes in Procurement (SSIP) member by Safety Management Advisory Services (SMAS), making us compliant with the industry standard PAS 91:2013 + A1:2017.

Professional broadcast trained project engineers deliver, and supply Market (UK) Limited insured technical products to support planning applications, discharge planning conditions (including S106 agreement schedules) and for due diligence. For more information about GTech Surveys Limited please visit our website - www.gtechsurveys.com



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Executive Summary

As required in planning condition 32 and planning condition 64, a signal survey has been performed to assess the baseline TV signal reception conditions in previously identified locations. The study has focused on the reception digital terrestrial television (DTT, commercially known as *Freeview*) services. Planning condition 32 states;

Prior to the commencement of development (not including demolition) within Phase 1, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 1 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.

And planning condition 64 states;

Prior to the commencement of development (not including demolition) within Phase 2, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 2 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.

Based on signal levels and signal qualities, DTT services provide robust coverage in the study area. Reception conditions were optimal for signal and data decoding. This report details the existing level and quality of television signal reception within the survey area and can be used to discharge planning condition 32 part (a) and planning condition 64 part (a).

1 - Introduction

This report outlines the findings of a reception assessment and pre-commencement signal reception survey to assess the signal baseline and to determine the viewing preference of receptors located in identified areas, located where the consented development could impact the reception of digital terrestrial television (DTT) services. Two planning conditions (number 32 and number 64) relating to phase 1 and 2 respectively state;

32) Prior to the commencement of development (not including demolition) within Phase 1, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

- a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 1 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.*

and

64) Prior to the commencement of development (not including demolition) within Phase 2, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

- a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 2 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.*

The Site

Figure 1 shows the location of the Site.

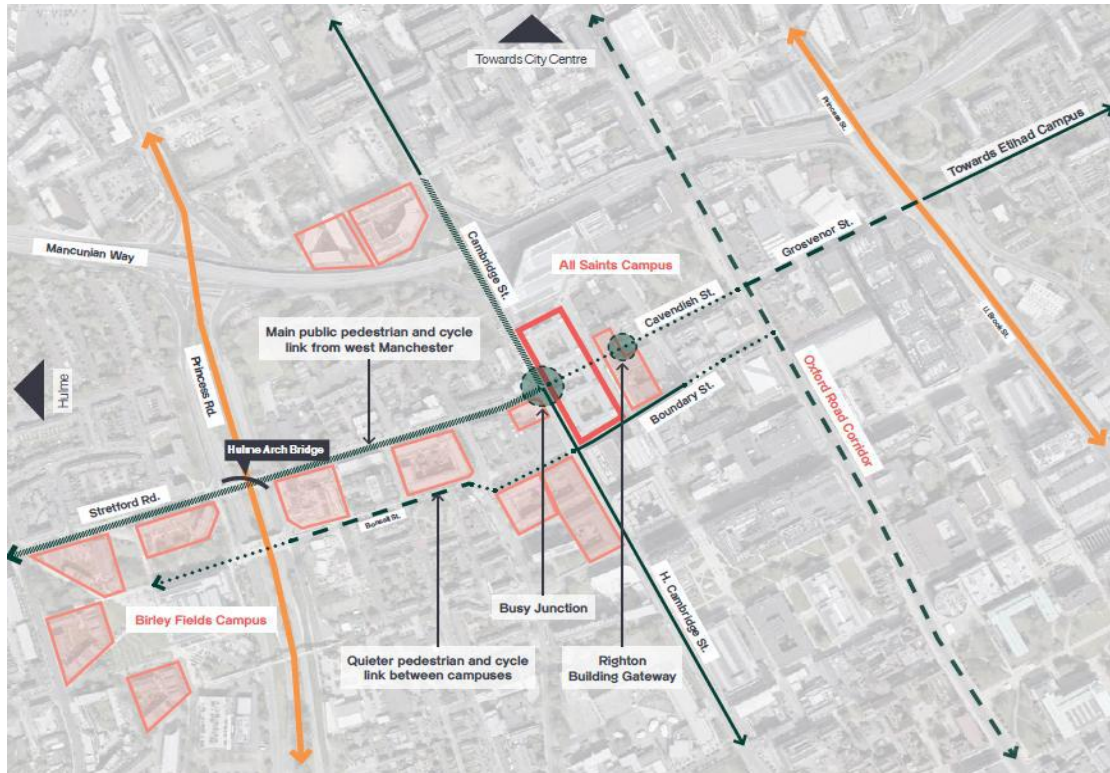


Figure 1 - Location of the Site (delineated in red)

The Assessment

A desktop study was first undertaken, based on broadcast transmission information, plans of the development and maps of the area. The relevant TV and radio signal survey area for the development was identified from the Report¹, and a site visit was then subsequently conducted to establish the baseline television reception conditions. This study was undertaken to discharge part (a) of planning condition 32 and part (a) of planning condition 64. Consideration has been given to digital terrestrial television transmission emanating from the main regional DTT transmitter, located at Winter Hill. The assessment details the baseline reception conditions for future reference. This assessment follows the structure:

Chapter 1 introduces the work, the planning condition, the development, the site and format of the assessment

Chapter 2 describes the available television services in the survey area

Chapter 3 describes the pre-commencement television reception conditions around the Site and in previously identified areas

Chapter 4 presents the conclusion

1 - The 'Report' means the Terrestrial Television Baseline Survey report by Pagerpower dated June 2024

Since 2006, GTech Surveys Limited has been a consultant member of the Trade Association for Content Delivery (Confederation of Aerial Industries Ltd. (CAI)).

The full wording of planning condition 32 and planning condition 64 can be found in *Appendix - Planning Condition 32* and *Appendix - Planning Condition 64* respectively.

2 - Available Television Broadcast Services

Terrestrial Television Services

The area around the Site is no longer served by analogue television transmissions due to the completed Digital Television Switchover. All analogue services were switched off in the Granada television region during 2009.

Digital Terrestrial Television (DTT) - Freeview

The survey area is served by DTT services (Granada TV region) from the Winter Hill DTT transmitter (grid reference SD 66053 14463), on a bearing of 314° (with respect to true north) and 25 km from the Site. The Winter Hill DTT transmitter is shown relative to the Site in Figure 2.

Technical transmission information for each DTT service broadcast from the Winter Hill DTT transmitter site is detailed in Table A, found in the Appendix - *Television Transmission Frequencies*.

Up to date technical information regarding the Granada TV region and Winter Hill transmitter group can be found on the Everyone TV website².

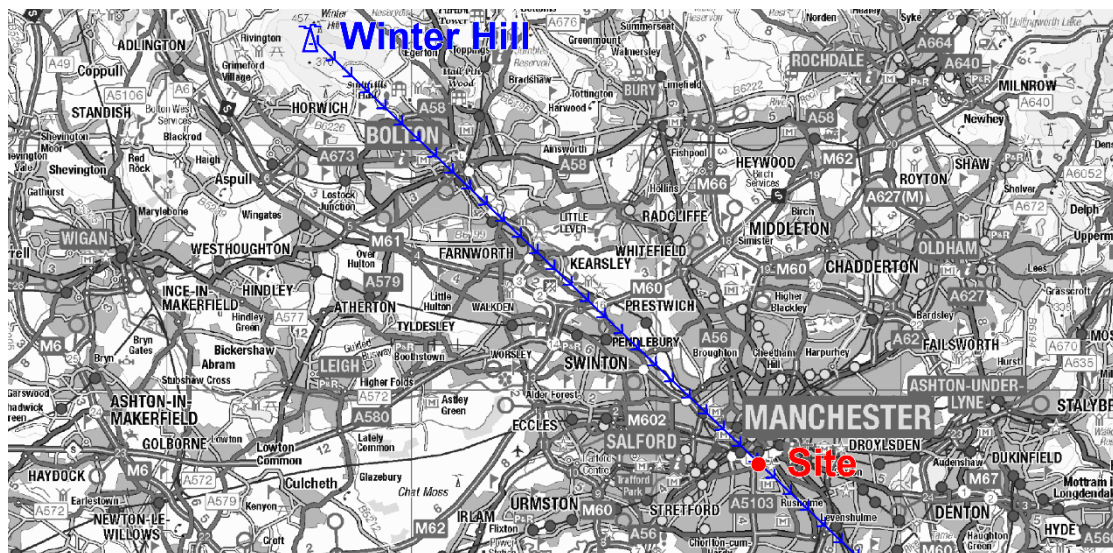


Figure 2 - The Locations of the Winter Hill DTT Transmitter, the Site and the direction of the incoming DTT signals at the Site (indicated by the blue arrowed line)

2 - <https://www.everyonetv.co.uk/>

3 - Survey Methodology & Description of Baseline

In this study, measurements were undertaken up to five kilometres from the Site, as presented in the Report.

These locations are shown in Figure 3 (from the Report) and for better clarity, replotted in Figure 4.

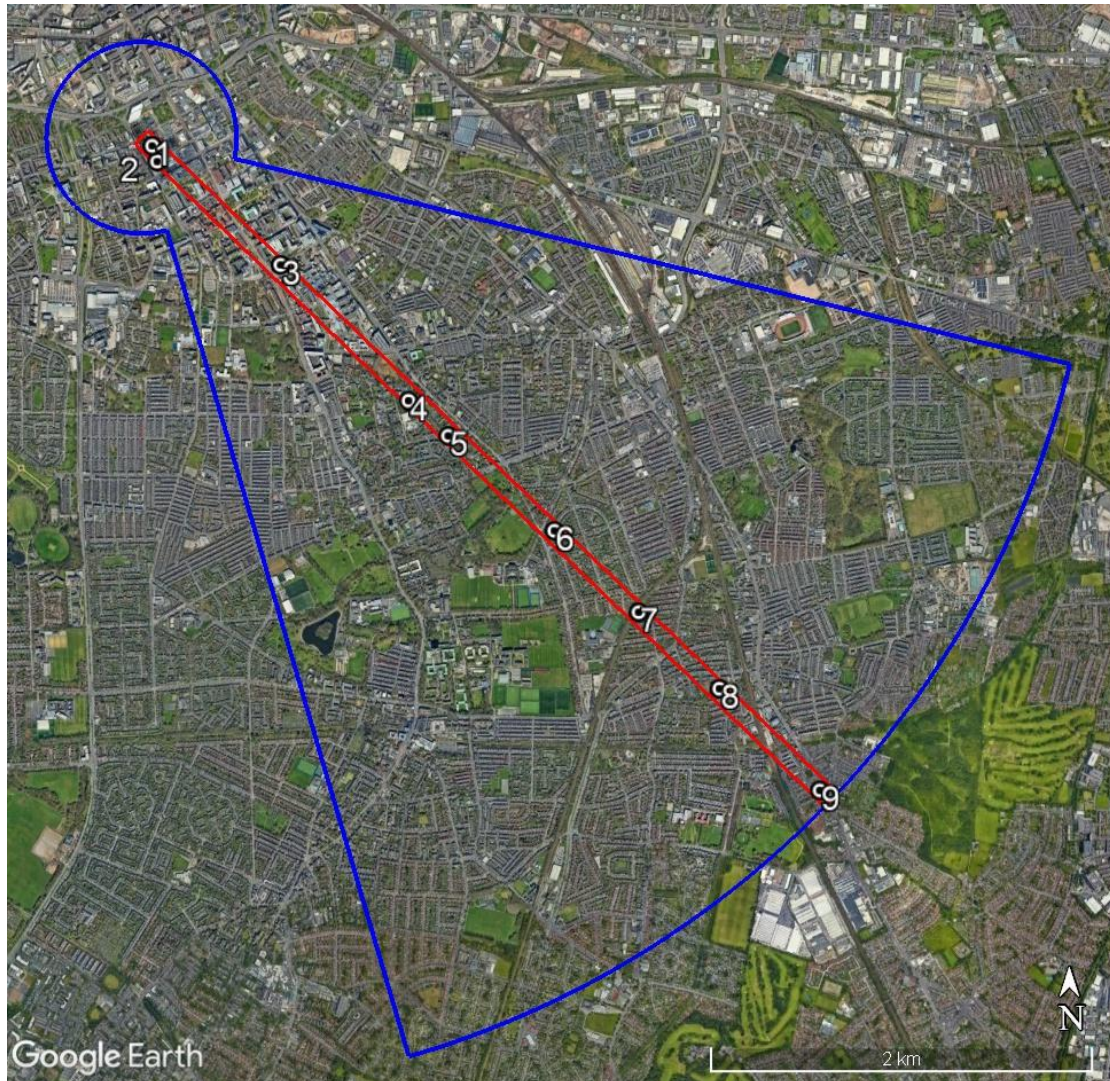


Figure 3 - Survey locations 1 to 9 as presented in the Report

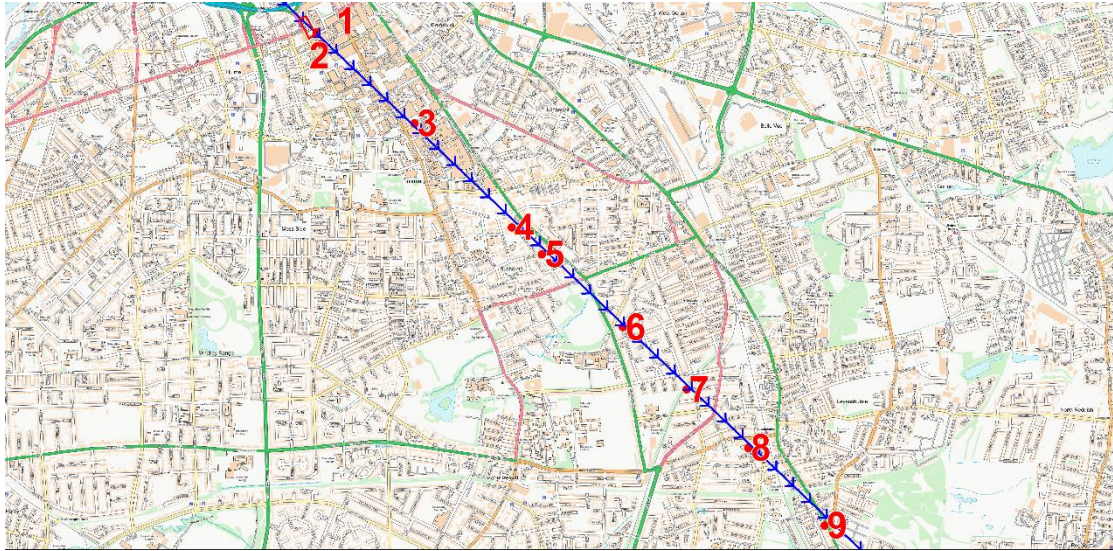


Figure 4 - Survey locations. The blue arrow indicates the direction of the incoming DTT signals from Winter Hill transmitter. The Site is delineated in red

The measurements are detailed in Table B, found in the *Appendix - Signal Measurements*. The following data was recorded:

- Field strength and technical signal measurements of DTT transmissions from the main serving transmitter
- Viewing preference (choice of television transmitter) of residents in all areas visited

All television measurements were carried out using a UHF log-periodic receive antenna. During the survey, no assessment was made of reception conditions within viewers' homes. Equipment details are detailed in the *Appendix - Survey Equipment*.

Digital Terrestrial Television (DTT) - Freeview

DTT transmissions emanating from the Winter Hill DTT transmitter employ a guard interval³ in the digital video broadcasting - terrestrial (DVB-T) data stream, which ensures resilience against the interference caused by signal multipath in cluttered urban areas. In addition to the embedded protection in DVB-T data stream offered by forward error correction (FEC) techniques, the guard interval enables the DTT receiver to make advantageous use of constructive multipath interference created in typical urban environments. In addition to the use of FEC, DTT transmissions now utilise eight thousand (8K) sub-carriers per digital multiplex. The use of 8K helps overcome the problems associated with impulse interference, which is more common in large towns and cities where many electrical items and electrical systems are in use⁴.

DTT services were available at all surveyed locations from the Winter Hill transmitter. DTT services currently provide very good coverage and service throughout the study area. Based on existing signal and technical measurements, all signal levels are above recommended minimum amounts (as specified in Code of Practice (COP) For the Installation of Aerials / Antennas & Receiving Equipment in the Single Dwelling Unit CAI COP 2: September 2022).

All terrestrial television antennas observed were directed towards the Winter Hill DTT transmitter. All signal receiving antenna systems are mounted on rooftops, ensuring optimal reception conditions.

3 - In the UK's DTT network, guard intervals are used to ensure that distinct transmissions do not interfere with one another, or otherwise cause overlapping transmissions. The purpose of the guard interval is to introduce immunity to propagation delays, echoes and reflections, to which digital data is normally very sensitive. In a cluttered city environment, existing structures (buildings etc.) can cause numerous signal echoes and reflections.

4 - At the launch of DTT, the DTT signal was split into 2000 (2k) sub-carriers, because receivers were not technically advanced. The standard now is to use 8000 sub-carriers (8k), which allows the data to be sent 4 times slower. This is advantageous because slower data is more resilient against impulse interference. This is likely to particularly benefit reception using indoor aerials and antennas located in city environments, as they are closer to sources of impulse interference (unwanted interference).

4 - Conclusions

A desktop-based study and pre-commencement survey have been performed to assess the baseline TV signal reception conditions in previously identified locations. The study has focused on the reception digital terrestrial television (DTT, commercially known as Freeview) services. Planning condition 32 states;

Prior to the commencement of development (not including demolition) within Phase 1, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 1 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.

And planning condition 64 states;

Prior to the commencement of development (not including demolition) within Phase 2, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 2 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.

Based on signal levels and signal qualities, DTT services provide robust coverage in the study area. Reception conditions were optimal for signal and data decoding. This report details the existing level and quality of television signal reception within the survey area and can be used to discharge planning condition 32 part (a) and planning condition 64 part (a).

Appendices

Television Transmission Frequencies

Signal Measurements

An Overview of Signal Measurements

Survey Equipment

Calculation of Received Field Strength

References

Mapping Data

Planning Condition 32

Planning Condition 64

Television Transmission Frequencies

Digital TV Multiplex	Multiplex Operator	UHF Channel Number⁵	Channel Frequency Fc (MHz)⁶	Transmitter Power (kW)
BBC A	BBC	32	562.0	100.0
D3&4	Digital 3 & 4	34	578.0	100.0
BBC B (HD)	BBC	35	586.0	100.0
SDN	SDN	29	538.0	100.0
Arqiva A	Arqiva	31	554.0	100.0
Arqiva B	Arqiva	37	602.0	100.0
G-MAN	Comux	27	522.0	1.0
L-MAN	Comux	24	498.0	2.0

Table A - Winter Hill DTT Services⁷

Public Service Broadcaster (PSB) Digital Multiplexes
Commercial (COM) Digital Multiplexes

5 - Digital multiplexes with a "+" or "-" sign operate with a frequency offset making the channel frequency + or - 167 kHz

6 - The nominal channel frequency, Fc (in Megahertz) of the multiplex can be calculated using $F_c = 8n + 306$, where 'n' is the UHF channel number

7 - Information correct at time of writing. Information provided by DigitalUK and Arqiva

Signal Measurements

Measurement Point Number	Channel Frequency Service	32	34	35	29	31	37	27	24
		562.00	578.00	586.00	538.00	554.00	602.00	522.00	498.00
		BBC A	D3&4	BBC B	SDN	Arqiva A	Arqiva B	G-MAN	L-MAN
1	FS	73.4	75.6	76.0	76.9	76.6	77.4	60.1	58.5
	CSI	22.9	20.4	-	23.9	25.7	24.9	-	-
	MER	30.1	29.3	-	31.0	29.9	30.4	-	-
2	FS	75.3	75.0	76.6	75.4	79.7	79.3	57.4	54.7
	CSI	26.1	25.2	-	22.1	23.2	22.0	-	-
	MER	30.4	32.2	-	30.4	31.4	30.2	-	-
3	FS	72.3	71.8	70.2	71.1	73.2	72.1	52.3	51.2
	CSI	22.5	21.3	-	26.5	25.1	20.6	-	-
	MER	30.3	30.0	-	29.0	29.5	31.8	-	-
4	FS	80.4	84.0	83.2	83.4	80.8	82.1	60.0	57.4
	CSI	26.5	25.9	-	26.8	24.3	23.6	-	-
	MER	30.9	30.6	-	30.7	29.3	30.7	-	-
5	FS	76.1	74.8	71.0	72.1	77.5	74.6	53.0	52.1
	CSI	26.2	24.1	-	19.6	19.8	20.5	-	-
	MER	33.6	32.0	-	31.1	32.9	33.3	-	-
6	FS	83.4	84.3	85.6	84.3	86.5	84.2	65.0	63.0
	CSI	19.5	20.4	-	22.8	18.7	22.5	-	-
	MER	31.8	32.8	-	33.4	32.8	32.6	-	-
7	FS	83.6	80.5	83.8	83.4	86.7	87.6	60.0	61.2
	CSI	19.3	17.8	-	22.4	22.1	18.1	-	-
	MER	31.1	33.1	-	31.7	32.4	33.6	-	-
8	FS	83.0	83.2	83.9	86.7	88.6	86.5	61.2	60.7
	CSI	21.0	22.4	-	22.1	20.9	18.2	-	-
	MER	33.1	30.3	-	33.4	31.8	33.6	-	-
9	FS	85.4	84.3	88.7	87.8	86.5	83.4	61.4	62.3
	CSI	21.4	22.0	-	18.9	17.3	21.0	-	-
	MER	33.6	33.3	-	31.7	32.9	33.0	-	-

Table B - Winter Hill DTT Services

Frequencies listed are in MHz

Field Strength (FS) values are indicated in dB μ V/m (8MHz FFT average hold 5 sec)

Channel Status Information (CSI) %

Modulation Error Ratio (MER) dB

8MHz FFT average hold 5 sec

An Overview of Signal Measurements

The first and easiest parameter to check is signal level (also referred to as amplitude or terminated signal strength). In many cases this gives a good indication of the available decoding margin, or the extent of any shortfall.

At the receiver input, the terminated level of a DTT signal is measured in the usual units of dB μ V (a maximum signal level of 70 dB μ V and a minimum signal level of 50 dB μ V). It is helpful to understand that the level of a DTT signal represents the total power of all the carriers in the Coded Orthogonal Frequency Division Multiplexing (COFDM) signal and not the level of each individual COFDM carrier. For satisfactory reception of digital signals, it is important the signals applied to the receiver are within these ranges. These maximum and minimum levels define a so-called window of operation for the receiver.

Common practice dictates that in order to measure the quality of a received DTT signal we have to look at one or more of the following parameters: Bit-Error Rate (BER), Channel BER (CBER), Carrier-to-Noise Ratio (CNR) and Modulation Error Ratio (MER). The Channel State Information (CSI) feature available in DTT measurement equipment is a very valuable tool providing additional insight into the quality of reception in a typical domestic or professional DTT installation.

Using the BER alone is an ill-advised “hit-or-miss” strategy because of the 'cliff-edge effect' characteristic of any digital TV system. A BER reading below the reference quasi error free (QEF) value of 2×10^{-4} might wrongly lead us to conclude that the receiving conditions are satisfactory.

However, the BER provides a very narrow signal measurement range. Even for vanishingly small BER readings, a small drop in the level of received DTT signal can push the DTT receiver over the digital cliff edge beyond the point of system failure. The CBER is closely related to the BER providing a wider signal measurement range. Depending on the type(s) of unknown disturbance(s) affecting our DTT installation (noise, co-channel or adjacent PAL, co-channel DTT, etc.), the CBER corresponding to the reference QEF BER of 2×10^{-4} varies between 4 and 7 in 100. Unfortunately, the CBER is not a reliable indicator of how far the digital cliff edge is.

DTT engineers need a tool with a wide measurement range that solves the shortcomings of the BER and CBER. This measurement tool should provide some estimate of the noise margin of the DTT installation. A first candidate comes to mind: CNR or, alternatively, its sibling the MER.

The CNR is defined as the ratio of the average RF power of the DTT signal to the power of the noise present in the UHF channel. Similarly, the MER is defined as the ratio of the average power of the DTT signal to the average power of the constellation errors. It can therefore be used to give a more direct indication of decoding margin when, as is often the case, there is co-channel

interference as well as noise in the channel. The higher the MER value, the **better** the reception conditions.

In situations where there is no multipath propagation so that the channel frequency response remains reasonably flat, CNR and MER are in principle the same thing. In practice, the accuracy of the measured CNR is limited by the noise floor of the measurement equipment and by the presence of other disturbances on adjacent UHF channels. Likewise, both the receiver's noise floor and other issues resulting from its practical implementation degrade the MER estimate.

Channel State Information (CSI)

Some flavour of CSI is used internally by all commercial DTT receivers to achieve the recommended target system performance⁸. CSI counts the effect of both the noise present in the channel and the shape of the transmission channel itself. In other words, the CSI gives a measure of the reliability of the received DTT signal. We measure the average of the CSI across the UHF channel occupied by the DTT signal. The higher the value of CSI, the **less** reliable DTT reception is.

As explained, the CSI can be used as a means to measure the noise margin in a DTT installation. Let us call CSI_{QEF} the percentage CSI measured at the point where the measurement equipment displays the reference QEF BER. The noise margin in dB is then approximately given by –

$$\text{NM (dB)} = \frac{\text{CSI}_{\text{QEF}} - \text{CSI}}{2.6}$$

This empirical approximation represents a good estimate for NM below 8dB. The CSI alone, on the other hand, has a wider measurement range, providing meaningful results for NM of up to 15dB.

⁸ - J. Lago-Fernández, "Using Channel State Information (CSI) to Characterize DVB-T Reception", IBC, Amsterdam, 12-17 September 2002

Survey Equipment

1 x Promax Prolink 4C Premium – Serial Number PK4COPAB11B /
060419030005 Running firmware version 2.47

1 x Sony Wide screen CRT Reference Receiver KV-16TIU – Serial Number
4014480

1 x Professional Broadcast Wideband Log Periodic 8 element antenna
Amphenol Jaybeam (details below)

**Amphenol JAYBEAM**

468-860 MHz

A Log Periodic antenna designed for UHF Broadcast, TETRA and Cellular communications applications. This antenna is often used in a stacked array to form a rugged, high power, extended range antenna. Produced to the highest quality standards, these robust antenna designs will insure reliable operation in harsh environmental conditions.

Replace "x" with desired model number option.

Electrical Characteristics

Frequency band	468-860 MHz	
Model number options (x)	Model Number LPU/R-N LPU/R-7/16	Connector type N-Female 7/16-DIN Female
Polarization	Vertical or Horizontal	
Horizontal beamwidth	70°	
Gain	7.9 dBd	
Impedance	50Ω	
VSWR	<1.3:1	
Maximum power	250 W	
Connector type	see model number options above	
Lightning protection	DC grounded	

Mechanical Characteristics

Materials	Aluminium Alloy	
Dimensions (Length x Width)	1210 x 320 mm	47.6 x 12.6 in
Weight without bracket	3.5 kg	7.7 lbs

Mounting Options

Mounting	Mounting bracket included to fit 38-50 mm dia. pipe.
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LPU/Rx
V-Pol or H-Pol | Log Periodic | 70° | 7.9 dBd



Technical Specification for an Amphenol Jaybeam Professional Broadcast Wideband Log Periodic 8-Element Antenna

All RF cables, interconnects and systems of professional quality and calibrated to determine feeder losses and antenna gains. These are factored into the results, providing accurate descriptions of actual field strength values – see *Calculation of Received Field Strength*

Calculation of Received Field Strength

The Field Strength (dBμV/m) is derived from the Terminated Level (dBμV) as measured at the input of the measurement receiver.

Field Strength (dBμV/m) = Terminated Level (dBμV) – Aerial Gain (a) + Dipole Factor (b) + Feeder Loss (c)

where -

Dipole Factor (to matched load)	(b)	$20\text{Log}\left(\frac{2\pi}{\lambda}\right)$ <i>Where λ = Transmission Wavelength (m)</i>
Feeder Loss	(c)	3 dB
Aerial Gain (dB _{dipole})	(a)	7.9 dB

Impedance matching at receiver input and consideration of losses over the feeder runs between 490 MHz and 610 MHz are factored in to calculated FS values.

Andrew out of band rejection filter used to reject unwanted RF interference. Insertion loss 3dB.

Mapping Data

This report includes mapping and mapping data provided by Ordnance Survey (OS), under the terms of the Open Government Licence, OS data Crown copyright and database copyright (2025).

Planning Condition 32

Prior to the commencement of development (not including demolition) within Phase 1, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 1 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.

b) Assess the impact of the development on television signal reception within the potential impact area identified in part (a) of this condition within one month of the practical completion of the Phase 1 development or before the Phase 1 development is first occupied, whichever is the sooner, and at any other time during the construction of the Phase 1 development if requested in writing by the City Council as local planning authority in response to identified television signal reception problems within the potential impact area. The study shall identify such measures necessary to maintain at least the pre-existing level and quality of signal reception identified in the survey carried out in part (a) of this condition above. The approved measures must be carried out either before the Phase 1 building is first occupied or within one month of the study being submitted to the City Council as local planning authority, whichever is the earlier.

Reason - To provide an indication of the area of television signal reception likely to be affected by the development to provide a basis on which to assess the extent to which the development during construction and once built, will affect television reception and to ensure that the development at least maintains the existing level and quality of television signal reception, pursuant to Policy DM1 of the Core Strategy for the City of Manchester and Section 10 of the National Planning Policy Framework.

Planning Condition 64

Prior to the commencement of development (not including demolition) within Phase 2, studies with regard to television reception in the area containing the site shall be submitted to and approved in writing by the City Council as local planning authority. The studies shall include:

a) Measure the existing television signal reception within the potential impact areas identified in the Terrestrial Television Baseline Survey by Pagerpower dated June 2024 before development (not including demolition) within Phase 2 commences. The work shall be undertaken either by an aerial installer registered with the Confederation of Aerial Industries or by a body approved by the Office of Communications and shall include an assessment of the survey results obtained.

b) Assess the impact of the development on television signal reception within the potential impact area identified in part (a) of this condition within one month of the practical completion of the Phase 2 development or before the Phase 2 development is first occupied, whichever is the sooner, and at any other time during the construction of the Phase 2 development if requested in writing by the City Council as local planning authority in response to identified television signal reception problems within the potential impact area. The study shall identify such measures necessary to maintain at least the pre-existing level and quality of signal reception identified in the survey carried out in part (a) of this condition above. The approved measures must be carried out either before the Phase 2 building is first occupied or within one month of the study being submitted to the City Council as local planning authority, whichever is the earlier.

Reason - To provide an indication of the area of television signal reception likely to be affected by the development to provide a basis on which to assess the extent to which the development during construction and once built, will affect television reception and to ensure that the development at least maintains the existing level and quality of television signal reception, pursuant to Policy DM1 of the Core Strategy for the City of Manchester and Section 10 of the National Planning Policy Framework.

DISCLAIMER

This Report was completed by GTech Surveys Limited on the basis of a defined programme of work and terms and conditions agreed with the Client. We confirm that in preparing this Report we have exercised all reasonable skill and care taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

GTech Surveys Limited accepts no responsibility to any parties whatsoever, following the issue of the Report, for any matters arising outside the agreed scope of the works. This work was conducted under GTech Surveys Limited's standard terms and conditions which can be found on our website.

This Report is issued in confidence to the Client and GTech Surveys Limited have no responsibility to any third parties to whom this Report may be circulated, in part or in full, and any such parties rely on the contents of the report solely at their own risk.

The UK's terrestrial television and radio networks are highly complex engineering systems and are constantly being modified, re-designed, upgraded and maintained. The reception conditions detailed in this report were those prevailing at the time of the survey in the study area. Engineering work at transmitter sites, weather conditions and the time of the year will influence the quality and coverage of terrestrial services and their susceptibility to interference. Whilst every effort was made to accurately measure and assess the available television and radio transmissions and services at the time of the survey, GTech Surveys Limited cannot assume that any part of the television or radio broadcast network or transmission from any transmitter was operating in required specification or correctly to any design criteria. The signal measurements undertaken during the survey work were used to define the possible impacts to television and radio reception for this project. Although best practice has been applied in understanding the potential impacts, due to the complex nature of the subject, GTech Surveys Limited is not accountable in anyway whatsoever if unpredicted impacts occur at any location anywhere in the study area.

Modelling parameters assume that all installed UHF antenna systems are mounted at least 10m AGL and installed to a modern standard, with all components meeting CAI quality standards. Antennas mounted at lower heights and poor-quality installations will be more prone to the effects of interference from external sources and as such, reception conditions to installations with the aforementioned characteristics have not been accounted for in any impact modelling. Consequently, properties with such installations may be prone to interference effects that have not been identified. Such installations are commonly found in camping and caravan parks, on bungalows and properties where it is not possible to attach an antenna to the exterior roof. Antennas mounted in lofts are also more prone to interference effects arising from the signal attenuation caused by roofing materials. Again, reception conditions to properties with the aforementioned antenna installation characteristics have not been accounted for in any impact modelling and as such, properties with these installations may be prone to interference effects that have not been identified.

Digital terrestrial television (Freeview) coverage may vary as a result of engineering works or any frequency changes authorised by Ofcom. We advise that consumers always check future reception predictions (<https://www.freeview.co.uk/platform-management>) before buying TV equipment. GTech Surveys Limited, Ofcom and Digital UK are not responsible for household TV reception arrangements.

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Any questions or matters arising from this Report should be addressed in the first instance to the Project Manager.