TV/FM & DAB RECEPTION SURVEY REPORT

THIS POST CONSTRUCTION TV/FM & DAB RECEPTION SURVEY WAS CONDUCTED BY:

SCS Technologies Ltd
Unit 4, Centre 21 Business Park
Bridge Lane
Woolston
Warrington
WA1 4AW
0800 3777 485
www.SCStechnologies.co.uk

DATE OF SURVEY: 11th JULY 2026
REF NO: TBAER072

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EXECUTIVE SUMMARY

The new development at MCFC stadium is now complete and this Post Construction TV Reception Survey has been conducted to ascertain whether the introduction of the development has caused an impact to existing viewers' television reception in the surrounding area.

Since the Pre Construction TV Reception Survey, which was undertaken in November 2022, the Winter Hill television transmitter remained unchanged in broadcast frequency and power level (please refer to the Transmitter Technical Background section of this report). As no changes have taken place, we are able to carry out an accurate comparison of the Pre and Post Construction Survey results.

There has been a slight reduction in aerial signal to the southeast of the development. This is as largely as predicted in the initial Pre Construction report, this area mostly covers areas of roadways and parking and the Etihad Campus training facilities and as such no residential properties should be affected by the introduction of the development and as such will be of minor impact.

A comparison of the remaining Pre and Post construction test results show that there has not been any widescale impact to television reception caused by the new development and that the pre-existing signal levels have been maintained.

There was no satellite dishes highlighted on the Pre construction survey that would be affected to the north of the development, and when assessing this on the post construction survey no satellite dishes were visible that were close enough to be affected from ground level.

This report has been prepared in relation to condition 47:
Notwithstanding the TV reception survey prepared by ME Engineers received by the City Council, as Local Planning Authority, on the 18 April 2023, within one month of the practical completion of section 3 or at any other time during the construction of the 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 a study shall identify such measures necessary to maintain at least the preexisting level and quality of signal reception identified in the survey carried out above.

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INTRODUCTION

Theory predicts, and practical evaluation has confirmed, that the introduction of new structures into an area can cause interference to television reception.

This Post-Construction TV Reception Survey has been undertaken to record the new television reception baseline conditions and assess if the introduction of the development has impacted upon existing viewers' television reception in the surrounding area.

To enable us to make an assessment, an initial desktop study is conducted, followed by a comprehensive field survey.

The desktop study is conducted using plans of the development for example the buildings' location and elevations, along with maps of the surrounding area and details of local television transmitter broadcast information.

The field survey is then conducted at several test point locations surrounding the development. Television signal test results and relevant information are recorded at each of the test point locations.

This report includes the information collated during the desk top study and field survey along with an assessment of where, or if, the introduction of the development has the caused interference to existing viewers' television reception and determine if mitigation is required.

SCOPE

To carry out a desktop study and comprehensive field survey to record existing baseline television reception conditions in the surrounding area to the development. To provide details of any potential impact zone and methods of mitigation if required, to conform to Local Planning Authority requirements.
The results and information recorded during this field survey assist in assessing if, or where, the introduction of the development has the potential to impact upon existing viewers' television reception.

DISCUSSIONS

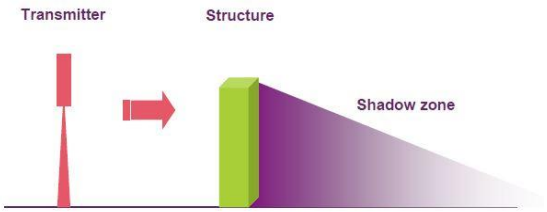
The introduction of a new building or structure into an area has the potential to cause interference to existing viewers' television and listeners radio reception.

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SIGNAL BLOCKING

Wireless signals, especially those using relatively high frequencies such as television, behave much like light. Therefore, it is desirable to have a clear line of sight path between the transmitter and a receiving aerial to achieve the most reliable reception. The presence of a tall structure between the transmitter and receiver will cause a 'shadow' to be cast behind the structure on the side opposite the transmitter. This effect is like the way that an obstruction between a lamp and an observer's eye blocks out the light.

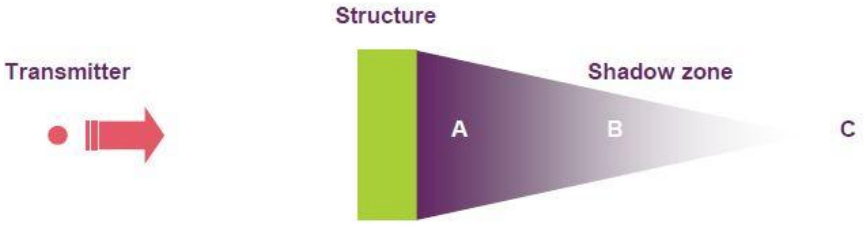


The shadow cast by a structure does not have hard edges though and does not usually extend indefinitely. While there would be a large reduction in signal levels immediately behind the structure, the blocking effect of the structure diminishes with distance because of diffraction. Diffraction is a process where signals appear to bend behind the structure and partially fill in the shadow.

Zone A - close behind the structure (typically a few tens of metres) there may be a large reduction in signal level with a possible complete loss of reception.

Zone B - further away (typically a few hundred metres) the signal reduction is less severe, and the shadow will be smaller as diffraction effects partially fill in the shadow. Depending on the size of the structure, some locations could still lose reception completely.

Zone C - some distance away (1-5km) the shadow will effectively have disappeared.
The resulting shadow is therefore a triangular shape as shown in Figure 2.



It should be noted that the severity of the reduction and the actual size of the shadow will depend upon many factors including the construction of the structure and its height – the distances given above are for guidance only.

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FIELD SURVEY METHOD

Tests are carried out at a selection of locations in the area surrounding the development.

Test results are recorded regarding television signal strength and quality:
Strength is recorded in: dBµv.
Quality is recorded in: VBER (Standard definition SD)
LBER (High-definition HD)

Due to the rollout of the 4G Networks all results are recorded with a CAI approved benchmarked aerial with a balun and LTE filter.

An alternative transmitter is tested for and where receivable, results are recorded.

All tests are carried out at a 10m height above ground level.

The direction and type of existing viewers' television aerials is noted.

A bearing and distance to the development is recorded at each test point location, for comparison with the bearing and distance to the television transmitter serving the area.

Existing obstructions to television reception are noted.

FIELD SURVEY EQUIPMENT

The field survey is carried out using the following equipment:

- Specialist vehicle complete with telescopic mast.
- 360º Antenna rotator
- 14 Element CAI approved wideband UHF antenna with balun and LTE filter, one vertical and one horizontal polarisation.
- FM Omni aerial
- DAB Omni aerial
- 20m x WF100 twin screened CAI approved coaxial cable.
- Televes spectrum analyser/field strength meter
- Ordnance survey maps
- Garmin GPS receiver
- Compass
- Digital camera

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SERVICES LIKELY TO BE AFFECTED

TERRESTRIAL TELEVISION RECEPTION

There are two potential ways that the introduction of a new building or extension can cause interference to terrestrial television reception; these are obstruction and reflection.

Obstruction occurs when existing viewers are in an area where their television aerial beam path (direction) to the television transmitter is either through, or within very close proximity to, the new building or structure. This can result in a reduction of television signal strength and quality and in some cases (if existing viewers are located within proximity to the new building or structure); receiving terrestrial television signals can become problematic and may not be achievable.

Reflection occurs when the new building or extension reflects terrestrial television signals. These unwanted reflected signals are received on the existing viewer's television aerial along with the direct signals from the television transmitter, resulting in irregularities of television signal strength and quality. However, digital terrestrial television broadcasts are less prone to reflections than the previous analogue television broadcasts, but this must still be taken into account when assessing any potential impact.

SATELLITE TELEVISION RECEPTION

Satellite television reception requires a clear line of sight between the satellite antenna and the satellite it is aligned to. In most cases the angle of the satellite antenna to the satellite orbiting the earth is between 20- and 30-degrees elevation.

This elevation must be taken into account when assessing if the introduction of the new building or structure has the potential to obstruct existing viewers' satellite antenna beam path to the satellite.

Satellite reception is very rarely affected on a large scale and is mostly only relevant to existing viewers within proximity to the new building or structure.

FM & DAB RECEPTION

There are two potential ways that the introduction of a new building or extension can cause interference to radio reception; these are obstruction and reflection.

Obstruction occurs when existing listeners are in an area where their radio reception to the radio transmitter is either through, or within very close proximity to, the new building or structure. This can result in a reduction of radio signal strength and quality and in some cases (if existing listeners are located within proximity to the new building or structure); receiving radio signals can become problematic and may not be achievable.

Reflection occurs when the new building or extension reflects radio signals.

FM & DAB reception is very rarely affected on a large scale and is mostly only relevant to existing listeners within proximity to the new building or structure.

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THE NEW DEVELOPMENT:
Project MCFC
Etihad Stadium
Manchester

CONDUCTED ON BEHALF OF:
John Sisk & Son Ltd
1 Curo Park,
Frogmore
St Albans,
Hertfordshire
AL2 2DD

OVERVIEW OF NEW DEVELOPMENT
The development is a new development.

DETAILS OF DEVELOPMENT

Development Type:	New development
Building Height:	maximum elevation of approximately 40m.

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COORDINATES

Prior to commencement of the survey, coordinates at the development's location are entered into a GPS receiver, along with the coordinates for the television transmitter serving the area. This enables us to record a bearing and distance from each test point location to the development, for comparison with the bearing and distance to the television transmitter. The coordinates used throughout the survey are listed below and shown on Plan A.

LOCATION	NATIONAL GRID REFERENCE
Development Position	SJ 86772 98637
Winter Hill Transmitter	SD 66000 14400
Holme Moss FM Transmitter	SE 09497 04077
Sunley Building (city tower) DAB Transmitter	SJ 84268 98194

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TECHNICAL BACKGROUND – WINTER HILL

Transmitter No:	103.00
NGR:	SD 660144
Approximate bearing from the development:	313º
Approximate distance from the development:	25.51 km

Television Broadcasts from the Winter Hill Transmitter at the present time (July 2026):

UHF Channel	Frequency	Multiplexer	Format	Broadcast Power
37	602.0	ARQB	SD	14,000W
31	554.0	ARQA	SD	100,000W
32	562.0	BBCA	SD	100,000W
35	585.8	BBCB	HD	100,000W
29	538.0	SDN	SD	100,000W
34	578.0	D3+4	SD	100,000W

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PHOTO A: The new development



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TERRESTRIAL TELEVISION SERVICES

Viewers in the surrounding area to the development are receiving their terrestrial television services from the Winter Hill transmitter, located to the northwest of the building/structure, approx. 24 km away.

The Winter Hill transmitter broadcasts 6 digital multiplexers providing the full range of standard definition and high-definition digital terrestrial television services available on Freeview, with regional programming. Please refer to the transmitter details for further information

The test results recorded during the survey show that terrestrial television reception from the Winter Hill transmitter has good signal strengths and at the majority of test points the quality is good. Please note that the results are recorded at a 10mt aerial height, in accordance with TV reception survey specifications and that for existing television aerials sited at multi-storey height reception could be much improved.

During the survey, tests were carried out to receive an alternative transmitter to the Winter Hill transmitter. The result of these tests was that no alternative transmitter could be received at an acceptable quality or strength.

SATELLITE TELEVISION SERVICES

Both Sky TV and Freesat are broadcast from the same fleet of satellites located at an orbital position of 28.2º east of south, with a required satellite dish elevation of approximately 23º.

Sky TV is primarily a subscription-based service offering several packages of various television services at monthly subscription costs.

Freesat is a non-subscription-based service and offers a similar television service line up to Freeview and selectable regional programming.

FM RADIO SERVICES

Listeners in the surrounding area to the development are receiving their radio services from the Holme Moss transmitter, located to the northwest of the building/structure, approx. 23 km away at a compass bearing of 76 degrees.

DAB RADIO SERVICES

Listeners in the surrounding area to the development are receiving their radio services from the Sunley Building, (now city tower) Piccadilly transmitter, located to the east of the building/structure, approx. 2.5km away at a compass bearing of 257 degrees.

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FIELD SURVEY TEST RESULTS AND INFORMATION

TEST POINT 1

Location: Sportcity Way
NGR: SJ 86669 98918
Alt: 58 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	25.8 km
Development	153°	0.3 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	77	42	33	-8		Pass
31	554.0	ARQA	SD	79	31	32	-8		Pass
32	562.0	BBCA	SD	80	32	31	-8		Pass
35	585.8	BBCB	HD	78	36	33		-6	Pass
29	538.0	SDN	SD	80	33	32	-8		Pass
34	578.0	D3+4	SD	78	42	35	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	75	45	225.64(12B)	85	45
BBC 2	89.3	74	44	225.64(12B)	85	45
BBC 3	91.5	73	42	225.64(12B)	85	45
BBC 4	95.1	76	44	225.64(12B)	85	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	76	40	33	-8		Pass
31	554.0	ARQA	SD	78	32	32	-8		Pass
32	562.0	BBCA	SD	80	32	32	-8		Pass
35	585.0	BBCB	HD	79	37	32		-6	Pass
29	538.0	SDN	SD	79	34	32	-8		Pass
34	578.0	D3+4	SD	77	40	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	75	45	225.64(12B)	84	44
BBC 2	89.3	75	40	225.64(12B)	84	44
BBC 3	91.5	74	42	225.64(12B)	84	44
BBC 4	95.1	76	42	225.64(12B)	84	44

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TEST POINT 2

Location Asda
NGR: SJ 87162 98462
Alt: 64 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	26.4 km
Development	292°	0.4 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	78	42	32	-8		Pass
31	554.0	ARQA	SD	77	30	30	-8		Pass
32	562.0	BBCA	SD	79	32	30	-8		Pass
35	585.8	BBCB	HD	76	34	32		-6	Pass
29	538.0	SDN	SD	78	32	32	-8		Pass
34	578.0	D3+4	SD	78	40	35	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	70	35	225.64(12B)	80	45
BBC 2	89.3	69	35	225.64(12B)	80	45
BBC 3	91.5	66	33	225.64(12B)	80	45
BBC 4	95.1	65	28	225.64(12B)	80	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	78	42	32	-8		Pass
31	554.0	ARQA	SD	77	32	32	-8		Pass
32	562.0	BBCA	SD	79	34	34	-8		Pass
35	585.0	BBCB	HD	74	32	32		-6	Pass
29	538.0	SDN	SD	79	34	30	-8		Pass
34	578.0	D3+4	SD	79	38	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	72	38	225.64(12B)	78	45
BBC 2	89.3	71	35	225.64(12B)	78	45
BBC 3	91.5	72	34	225.64(12B)	78	45
BBC 4	95.1	69	30	225.64(12B)	78	45

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TEST POINT 3

Location: Ashton New Road
NGR: SJ 87727 98549
Alt: 71 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	26.9 km
Development	277	1.0 km

Visible Existing Aerial Arrays: 12 element aerial on 1m mast, mounted at rooftop height on 2 storey property, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various buildings/commercial properties in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	38	30	-8		Pass
31	554.0	ARQA	SD	71	30	32	-8		Pass
32	562.0	BBCA	SD	69	30	30	-8		Pass
35	585.8	BBCB	HD	70	32	32		-6	Pass
29	538.0	SDN	SD	71	32	32	-8		Pass
34	578.0	D3+4	SD	71	40	35	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	64	38	225.65(12B)	70	44
BBC 2	89.3	60	40	225.64(12B)	70	44
BBC 3	91.5	62	42	225.64(12B)	70	44
BBC 4	95.1	59	35	225.64(12B)	70	44

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	74	34	32	-8		Pass
31	554.0	ARQA	SD	70	28	28	-8		Pass
32	562.0	BBCA	SD	70	30	30	-8		Pass
35	585.0	BBCB	HD	70	32	32		-6	Pass
29	538.0	SDN	SD	70	32	32	-8		Pass
34	578.0	D3+4	SD	70	32	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	65	40	225.64(12B)	70	42
BBC 2	89.3	60	38	225.64(12B)	70	42
BBC 3	91.5	62	40	225.64(12B)	70	42
BBC 4	95.1	60	34	225.64(12B)	70	42

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TEST POINT 4

Location: Greenside Street
NGR: SJ 87791 98056
Alt: 78 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	27.23 km
Development	300°	1.18 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various Trees/sports fields in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	71	35	30	-8		Pass
31	554.0	ARQA	SD	70	30	32	-8		Pass
32	562.0	BBCA	SD	69	30	30	-8		Pass
35	585.8	BBCB	HD	70	31	31		-6	Pass
29	538.0	SDN	SD	70	30	30	-8		Pass
34	578.0	D3+4	SD	70	30	30	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	70	42	225.64(12B)	72	42
BBC 2	89.3	70	40	225.64(12B)	72	42
BBC 3	91.5	69	41	225.64(12B)	72	42
BBC 4	95.1	73	42	225.64(12B)	72	42

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	36	32	-8		Pass
31	554.0	ARQA	SD	70	30	30	-8		Pass
32	562.0	BBCA	SD	70	32	30	-8		Pass
35	585.0	BBCB	HD	66	38	32		-6	Pass
29	538.0	SDN	SD	70	32	32	-8		Pass
34	578.0	D3+4	SD	69	32	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	70	40	225.64(12B)	70	40
BBC 2	89.3	71	38	225.64(12B)	70	40
BBC 3	91.5	70	40	225.64(12B)	70	40
BBC 4	95.1	72	42	225.64(12B)	70	40

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TEST POINT 5

Location Clayton Lane
NGR: SJ 87650 97847
Alt: 64 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	27.2 km
Development	310°	1.2 km

Visible Existing Aerial Arrays: 10 element aerial on 1m mast, mounted at rooftop height on 2 storey property, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various Tree/buildings in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	70	36	32	-8		Pass
31	554.0	ARQA	SD	72	32	30	-8		Pass
32	562.0	BBCA	SD	71	30	28	-8		Pass
35	585.8	BBCB	HD	72	32	30		-6	Pass
29	538.0	SDN	SD	71	30	30	-8		Pass
34	578.0	D3+4	SD	72	32	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	74	42	225.64(12B)	73	44
BBC 2	89.3	71	42	225.64(12B)	73	44
BBC 3	91.5	70	42	225.64(12B)	73	44
BBC 4	95.1	74	45	225.64(12B)	73	44

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	38	32	-8		Pass
31	554.0	ARQA	SD	72	32	30	-8		Pass
32	562.0	BBCA	SD	70	30	30	-8		Pass
35	585.0	BBCB	HD	70	30	30		-6	Pass
29	538.0	SDN	SD	68	30	28	-7		Pass
34	578.0	D3+4	SD	70	32	30	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	72	40	225.64(12B)	74	44
BBC 2	89.3	70	42	225.64(12B)	74	44
BBC 3	91.5	70	40	225.64(12B)	74	44
BBC 4	95.1	72	42	225.64(12B)	74	44

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TEST POINT 6

Location: Stainburn Road
NGR: SJ 87786 97878
Alt: 63 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	1.2 km
Development	307°	27.3 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various Trees and industrial units in the general direction of the Winter Hill Transmitter.

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	71	34	32	-8		Pass
31	554.0	ARQA	SD	71	32	30	-8		Pass
32	562.0	BBCA	SD	70	30	30	-8		Pass
35	585.8	BBCB	HD	71	32	32		-6	Pass
29	538.0	SDN	SD	70	31	31	-8		Pass
34	578.0	D3+4	SD	72	32	30	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	75	44	225.64(12B)	74	45
BBC 2	89.3	74	42	225.64(12B)	74	45
BBC 3	91.5	71	42	225.64(12B)	74	45
BBC 4	95.1	72	44	225.64(12B)	74	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	70	32	32	-8		Pass
31	554.0	ARQA	SD	70	32	32	-8		Pass
32	562.0	BBCA	SD	66	30	30	-8		Pass
35	585.0	BBCB	HD	70	32	32		-6	Fail
29	538.0	SDN	SD	68	30	30	-8		Fail
34	578.0	D3+4	SD	68	32	32	-8		Fail

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	70	42	225.64(12B)	75	44
BBC 2	89.3	74	40	225.64(12B)	75	44
BBC 3	91.5	70	40	225.64(12B)	75	44
BBC 4	95.1	72	44	225.64(12B)	75	44

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TEST POINT 7

Location Dulgar Street
NGR: SJ 87551 97715
Alt: 61 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	27.2 km
Development	320°	1.2 km

Visible Existing Aerial Arrays: 12 element aerial on 1m mast, mounted at rooftop height on 2 storey property, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various Tree/buildings in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	33	32	-8		Pass
31	554.0	ARQA	SD	69	30	30	-8		Pass
32	562.0	BBCA	SD	70	32	30	-8		Pass
35	585.8	BBCB	HD	72	34	32		-6	Pass
29	538.0	SDN	SD	71	32	32	-8		Pass
34	578.0	D3+4	SD	72	34	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	73	42	225.64(12B)	72	42
BBC 2	89.3	72	42	225.64(12B)	72	42
BBC 3	91.5	72	44	225.64(12B)	72	42
BBC 4	95.1	75	44	225.64(12B)	72	42

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	34	30	-8		Pass
31	554.0	ARQA	SD	71	30	32	-8		Pass
32	562.0	BBCA	SD	69	30	30	-8		Pass
35	585.0	BBCB	HD	70	32	32		-6	Pass
29	538.0	SDN	SD	70	32	32	-8		Pass
34	578.0	D3+4	SD	71	40	35	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	70	44	225.64(12B)	70	44
BBC 2	89.3	60	40	225.64(12B)	70	44
BBC 3	91.5	62	42	225.64(12B)	70	44
BBC 4	95.1	70	44	225.64(12B)	70	44

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TEST POINT 8

Location: Wilson Street
NGR: SJ 87577 97879
Alt: 63 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	27.1 km
Development	315°	1.1 km

Visible Existing Aerial Arrays: High gain antenna on 1mt mast, mounted at rooftop height on 2 storey property, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various Trees and houses in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	70	32	32	-8		Pass
31	554.0	ARQA	SD	70	30	30	-8		Pass
32	562.0	BBCA	SD	71	30	30	-8		Pass
35	585.8	BBCB	HD	72	32	32		-6	Pass
29	538.0	SDN	SD	71	32	32	-8		Pass
34	578.0	D3+4	SD	73	34	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	77	42	225.64(12B)	70	44
BBC 2	89.3	72	43	225.64(12B)	70	44
BBC 3	91.5	72	42	225.64(12B)	70	44
BBC 4	95.1	72	42	225.64(12B)	70	44

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	30	30	-8		Pass
31	554.0	ARQA	SD	70	30	30	-8		Pass
32	562.0	BBCA	SD	71	32	32	-8		Pass
35	585.0	BBCB	HD	70	32	32		-6	Pass
29	538.0	SDN	SD	70	32	32	-8		Pass
34	578.0	D3+4	SD	72	32	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	70	38	225.64(12B)	72	42
BBC 2	89.3	72	38	225.64(12B)	72	42
BBC 3	91.5	70	40	225.64(12B)	72	42
BBC 4	95.1	70	40	225.64(12B)	72	42

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TEST POINT 9

Location: Bartlett Street
NGR: SJ 87991 97601
Alt: 65 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	27.6 km
Development	311°	1.6 km

Visible Existing Aerial Arrays: 18 element aerials on 1m mast, mounted at rooftop height on 2 storey property, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various Trees/commercial properties in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	69	34	32	-8		Pass
31	554.0	ARQA	SD	68	30	28	-8		Pass
32	562.0	BBCA	SD	71	30	30	-8		Pass
35	585.8	BBCB	HD	68	30	30		-6	Pass
29	538.0	SDN	SD	70	30	30	-8		Pass
34	578.0	D3+4	SD	70	32	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	74	42	225.64(12B)	69	42
BBC 2	89.3	74	40	225.64(12B)	69	42
BBC 3	91.5	72	40	225.64(12B)	69	42
BBC 4	95.1	71	42	225.64(12B)	69	42

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµv)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	70	35	34	-8		Pass
31	554.0	ARQA	SD	66	34	34	-8		Pass
32	562.0	BBCA	SD	65	34	32	-8		Pass
35	585.0	BBCB	HD	62	30	30		-6	Pass
29	538.0	SDN	SD	64	30	30	-8		Pass
34	578.0	D3+4	SD	62	32	32	-8		Pass

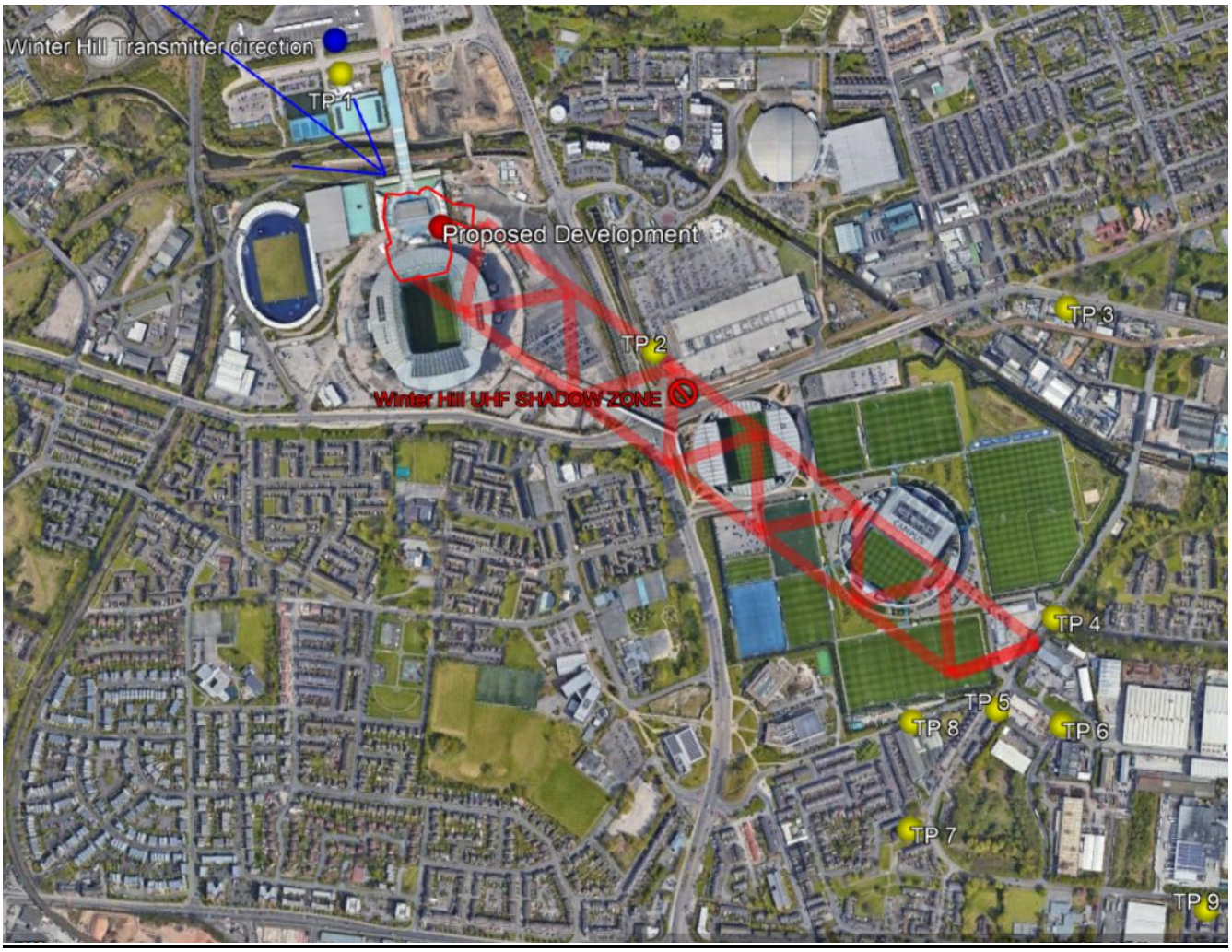
FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµv) FM	CN Db FM	Frequency DAB	Level (dBµv) DAB	CN Db DAB
BBC 1	98.9	68	40	225.64(12B)	69	42
BBC 2	89.3	70	40	225.64(12B)	69	42
BBC 3	91.5	70	44	225.64(12B)	69	42
BBC 4	95.1	72	40	225.64(12B)	69	42

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IMPACT ZONE – MAP 1



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REFERENCE OF TERMS

c.	Circa
CH	The UHF Channel allocation from the transmitter.
MUX	The digital multiplexer allocation/operator.
Tx	Transmitter.
dBµv	Carrier strength reading (decibel microvolt).
C/N	Carrier /Noise Ratio
VBER	Measurement for digital signal after error correction (BER after VITERBi)
LBER	BER after been applied the LDPC (low density parity check) error correction.
SD	SD Standard Definition
HD	HD High Definition
NGR	National Grid Reference
ALT	Altitude above sea level at the location.
BRG	Bearing from North.
GPS	Global Positioning System.

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