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**Process Manual -- 2rn Co-locations Network Access Services**

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SUBJECT TO CONTRACT/CONTRACT DENIED

**CHANGE CONTROL**

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## 1. INTRODUCTION

Pursuant to Decision D11/13 of ComReg Market Review Broadcasting Transmission Services in Ireland (ref ComReg 13/71.3) 2rn shall consider all reasonable requests for Network Access in accordance with its regulatory obligations and shall provide pricing for reasonable requests for new services and unbundled access from national analogue terrestrial Downstream Sound Broadcasting Contractors and Multiplex Operators.

## 2. PRICING MECHANISM

### 2.1 Introduction

The pricing model used by the Service Provider to derive charges for provision of national terrestrial broadcast transmission services has been developed to be consistent with the following core regulatory principles:

- **Causality:** Costs shall be ascribed in accordance with the activities that cause the cost (or revenue) to be incurred. This ensures that only those costs associated, either directly or indirectly, with providing a service are allocated to it. This reduces the potential for cross-subsidisation.
- **Objectivity:** Attribution must not benefit the access provider, any access seeker, service or business. It must be based on verifiable information, with the use of management estimates to calculate costs usually limited. As an example, any allocation of costs to digital services, rather than analogue services, will need to be clearly justified based on actual data that could be reviewed by external auditors.
- **Consistency:** Cost allocation methods, treatment of costs and the approach used to calculate tariffs need to be consistent from year to year.
- **Transparency:** Within a cost model, this implies that attributed items must be traceable back to their source and the elements that contribute to the cost of the service should be visible.

### 2.2 The network cost model

The inputs to the network cost model are the costs incurred by the Service Provider in providing network services to its Clients, including Digital Terrestrial Television (DTT), radio and third party customers. The cost inputs include:

- Operating expenditures (opex).

- Relevant, efficiently incurred operating costs apportioned on a Fully Allocated Cost basis to users of the network.
- Capital costs (capex), including:
  - Depreciation on fixed assets.
    - Depreciation of Regulated Assets apportioned to regulated markets based on system usage.
  - A WACC-based return on asset values.
    - Asset values on which a return is calculated is the Net Book Value of Regulatory Assets.

### 2.3 Application of cost model

The above cost model shall be appropriately applied to all reasonable requests from Broadcast Operators for Access to any element of a fully managed Broadcast Transmission Service (including Broadcast Distribution Service) that falls within the scope of section 7.2 of the Final Decision Instrument Market – A ComReg Reference 13/71, dated 26/07/2013 on an unbundled/unmanaged basis:

- Co-location space for Clients' self-supplied Transmitter equipment,
- Combined access into 2rn National Broadcast antenna,
- Electricity supply and back-up electrical generator where installed,
- Telemetry services,
- Microwave distribution service where available.
- Support Services

Other services, including but not limited to antennae hosting, requested by qualifying Broadcast Operators shall be priced with reference to a rate-card which is available on request.

Subject to the scale and type Access provided electricity consumption shall be measured and charged separately.

## 3. ACCESS SCOPE

**3.1** The scope and specification of Network Access will depend upon the particular stations to which the Customer requires access and also upon the Customer's requirements at each site, and shall be specified in by the customer on a site by site basis by completing the Statement of Requirements (SoR) template.

**3.2** Subject to the availability of space and capacity, 2rn will provide national analogue terrestrial Downstream Sound Broadcasting Contractors and

Multiplex Operators (Clients) with an un-bundled Access solution. This anticipates that the Client shall require access to 2rn infrastructure to install self supplied transmitters combining into 2rn antennae systems and may wish to avail of other services. 2rn shall consider all reasonable requests from Clients who require Access to 2rn infrastructure in order to establish their own technical solution.

If requested, subject to space and capacity 2rn can provide:

1. Co-location space for Clients' self-supplied Transmitter equipment,
2. Combined access into 2rn National Broadcast antenna,
3. Electricity supply and back-up electrical generator where installed,
4. Telemetry services,
5. Microwave distribution service where available.
6. Support Services

## 4. ACCESS REQUEST PROCESS

### 4.1 Process Overview

An assessment of the Clients proposed transmitter type and power output, antenna type and sizes, feeder types and sizes, electrical requirements, frequencies, etc are necessary to ensure sufficient infrastructural capacity is available at the required 2rn site(s) to meet the Clients' requirements. The evaluation process will consist of a number of sub-processes as follows:

- (a) **Provision of basic site specific information.** 2rn shall maintain, and make available on their website, a basic site-specific technical library.
- (b) **Initial Site(s) Survey.** On request 2rn shall facilitate and attend an initial Site Survey with a potential Client to determine the feasibility of the proposed Access Request.
- (c) **Full Design Survey.** On request 2rn shall facilitate and attend a detailed on-site design review with the Clients design team.
- (d) **Statement of Requirements.** Following the full Design Survey the Client shall submit to 2rn a full technical proposal consisting of a completed Statement of Requirements Forms and accompanying drawings and design pack.

### 4.2 Provision of basic site specific information.

In order to facilitate efficient business planning 2rn shall publish, and keep up to date, a Technical Site database which shall contain basic information for each broadcast site. This shall include site location co-ordinates & altitude, confirmation of existing broadcast antenna, back-up power availability and mast/tower heights. Other technical data such as vertical and horizontal antenna

patterns for relevant antenna systems and building layout drawings shall be made available to Clients on receipt of an initial enquiry and signing of a Non Disclosure Agreement.

#### **4.3 Initial Site(s) Survey.**

The purpose of the Initial Site Survey is to allow the Client a quick and cost effective means of matching the potential co-location facilities of a transmission site to their needs. On completion of the Initial Site Survey 2rn shall prepare an initial Survey report which shall address, subject to Full Design details the following:

- (i) the availability of co-location transmitter space
- (ii) availability & capacity of existing electrical facilities
- (iii) availability of antennae space
- (iv) availability of antennae capacity

#### **4.4 Full Design Survey & Submission of SoR**

On request and subject to payment of an Access Request Fee, 2rn shall facilitate and attend a detailed on-site design review with the Clients design team.

Access Request Fees shall only payable in event that the Client wishes to proceed to Full Design and Submission of SoR.

Access Fees shall be as follows:

€1,000 per Main station Site

€500 per Other Site

The Client shall also be liable for any necessary external design or consultancy fees. Any such fees shall be communicated to the Client in advance.

On foot of a request and in advance of the survey 2rn shall provide site layout drawings to the Clients Design Team. Marked up versions of these drawings shall form part of the Clients SoR submission. The Client shall complete the Statement of Requirements form for the relevant services and submit this along with all of the supporting documentation to 2rn.

## **5. ACCESS EVALUATION PROCESS**

### **5.1 Process Overview**

- (a) Receipt

- (b) Review
- (c) Consultation
- (d) Response

## **5.2 Process Detail**

### **Receipt**

All SoR documentation including supporting drawings and design details should be issued by the Client for the attention of the 2rn Commercial Manager. The Commercial Manager shall check the received documentation for completeness. The commercial Manager shall confirm to the Client that submission is complete and therefore valid and confirm an estimated timeframe in which the Client may expect a response. In the event that the documentation is incomplete the submission shall be considered invalid and returned to the Client.

### **Distribution & Review**

2rn's Commercial Manager shall distribute valid SoR packages for review and sign-off to the following:

Chief Technical Officer

Infrastructure Manager

Operations Manager

Structural Engineer

Electrical Engineer

### **Consultation**

2rn's Commercial Manager shall manage the Evaluation process and chair internal review meetings and communicate any additional information requests to the Client.

### **Response**

At the end of the evaluation process 2rn shall issue a response to the Client proposal. In the event that the proposal is rejected a detailed explanation shall be issued.



All approved submissions shall be accompanied by an offer and contract template for signing.

An approved SoR and offer shall not constitute a contract and 2rn shall not reserve space or infrastructure capacity on foot of an approved SoR longer than 30 days following issue of offer and approval.

No works may begin onsite until the submission is approved and contract is agreed.

## **6. INSTALLATION PROCESS**

### **6.1 Introduction**

Unless otherwise communicated or agreed the following conditions shall apply at all 2rn transmission sites:

- (a) Where applicable 2rn shall specify, supply, install, upgrade, own and operate;
  - (i) any combining equipment required to integrate the output of the Clients self supplied Transmitter with 2rn's antennae system,
  - (ii) any equipment required to aggregate and/or disaggregate Clients signals with 2rn's Distribution system,
  - (iii) any equipment required to aggregate and/or disaggregate Clients signals with 2rn's Telemetry except where equipment is an integral part of the Clients self supplied equipment.
  - (iv) Any upgrades or modification or replacement of the 2rn's antennae system
- (b) The Client shall be responsible for all other site preparation and equipment installation works relating to the installation of the Clients Transmitter(s) and or antennas. This shall include but shall not be limited to:
  - (i) Any required Electrical works;
  - (ii) Any building modifications;
  - (iii) All cable and feeder installation;
  - (iv) Supply and install of any additional cable managements

systems;

- (v) Supply and installation of ventilation and cooling systems specifically related to the Clients Self supplied Transmitter; and
  - (vi) Supply and installation of self supplied broadcast and/or receive antennae.
- (c) In the event that a suitable in-building co-location accommodation is not available, the Client will be offered co-location space for a self supplied equipment cabin.
- (d) Any self supplied Transmitter shall as meet the required minimum Transmitter specification contained in appendix 2.
- (e) Subject to 2rn's Site Access policy Contractors Code of Practice, Clients may appoint authorised contractors to carry-out installation and ongoing maintenance on their behalf.
- (f) 2rn reserves the right to supervise the installation of equipment.
- (g) Clients may provide their own unsupervised maintenance services where their equipment is sufficiently isolated from 2rn's national services transmitters and associated ancillary equipment.

## **APPENDIX A Statement of Requirements Form**

## Statement of Requirements (SoR) (Unbundled Broadcast Solution)

2rn references. (office use only)

**SoR Ref number:**

**Applicant:**

**Date of Receipt:**

### Notes on completion:

This form should be used where a qualifying Customer wishes to request unbundled Market A access to 2rn Broadcast infrastructure in accordance with Decision Document D11/13 of ComReg Market Review Broadcasting Transmission Services in Ireland (ref ComReg 13/71.3).

Applicants should complete this Statement of Request Form in full and append all of the required documentation and drawings.

On receipt of a valid SoR 2rn shall inform the Client of an estimated date for response.

This SoR shall be accompanied by a set of design drawings. The drawings shall show the proposed location of the customers' transmitter & any ancillary equipment, where applicable, the proposed antennae arrangement & support steelwork and shall include details of proposed cable and feeder runs.

If accommodation is required in a 2rn building this SoR must be accompanied by a Transmitter cooling plan design. The cooling system shall be designed to limit ambient temperature change to  $\pm 2^{\circ}\text{C}$  under all operating conditions.

Where the applicant requests access to combine with 2rns antennae the proposed transmitters and associated controls must comply with 2rns minimum technical transmitter specification.

2rn reserve the right to be in attendance during all third party installation & maintenance work.

No equipment will be accommodated on a tower/mast or in adjacent buildings or on site without the completion and sign-off of this form.

Successful approval of this SoR document should not be construed as a contract and no equipment will be accommodated on a tower/mast or in adjacent buildings or on site unless a valid contract has been executed.

Subject to meeting 2rn safety and operating standards, Clients may provide their own ongoing operation & maintenance services. All maintenance visits shall be supervised by 2rn to ensure that transmitters are maintained, as a minimum to manufacturers' recommendations and where applicable the integrity of national services is not compromised.

Alternatively, 2rn can provide a turnkey maintenance service which shall include remote monitoring & control. On request 2rn can extend a remote monitoring facility to the Client.

This SoR shall be accompanied by design drawings showing the proposed location of the customers' transmitter and any ancillary equipment. The drawings shall include details of proposed cable and feeder runs.

All parties attending 2rn sites for any purpose shall comply in full with 2rn's Health & Safety Policies and Procedures.

## 1. Project Details

Applicants Company Name:	
Applicants contact details:	
Name of Project:	
Nature of Project: (FM/DTT)	

## 2. Service Matrix & Check list

Service Description	Required Yes/No	Information to present if “Yes”	Details Complete Yes/No
Ground co-Location space required?		1. Complete separate Section 3 for each site	
		2. Append proposed layout drawings for each site.	
2rn electricity supply and Generator back-up required?		1. Complete separate Section 4 for each site.	
Access to 2rn Antenna System required?		1. Complete separate Section 5 for each site.	
		2. Append ComReg & BAI documentation.	
		3. Append coverage maps & required radiation patterns.	
		4. Complete section 7 for receive antenna.	
Telemetry services required?		1. Complete Section 6.	
Microwave distribution service required?		1. Complete Section 7.	
Support Services required?		1. Complete Section 8.	
Additional Services (Antennae Hosting etc)		1. Complete separate Section 9 for each site.	
		2. Append proposed location and steelwork drawings for each site.	
		3. Complete section 7 for receive antenna.	

### 3. Ground Co-location Space

(A separate section 3 must be completed for each site at which access is requested)

2rn site name:	
Is accommodation in the 2rn buildings requested?	
If yes, what floor space is required (sq. metres)?	
Confirm proposed transmitter output power in (kW)	
<p>Details/results of site survey(s) and proposal drawings attached?</p> <p>As a minimum drawings should detail proposed location of all equipment, power cable &amp; transmitter feeder routes and pedestrian access routes. Drawings shall be provided in AutoCad.</p>	
<p>Cooling plan attached?</p> <p>If accommodation is required in the 2rn building this SoR must be accompanied by a Transmitter cooling plan design. The cooling system shall be designed to limit ambient temperature change to <math>\pm 2^{\circ}\text{C}</math> under all operating conditions.</p>	
Is accommodation required on-site for an external equipment cabinet?	
If yes, provide details of the cabin footprint and the required concrete plinth (sq. metres)?	
<p>Details/results of site survey(s) and proposal drawings attached ?</p> <p>As a minimum drawings should detail proposed location of proposed equipment cabin, power cable &amp; transmitter feeder routes and pedestrian access routes. Drawings shall be provided in AutoCad.</p>	

#### 4. **Electrical Supply**

(A separate section 4 must be completed for each site at which access is requested)

2rn site name:	
Is access to 2rn electrical supply infrastructure required?	
Is access to 2rn standby generator supply required?	
If yes, what is the total electrical load of the proposed equipment in kW?	
Confirm proposed transmitter output RF power in (k)W	
Confirm if single phase or three phase supply is required?	
Confirm if separate supplies are required for cooling equipment?	
Confirm ratings in Amps and whether three or single phase for all circuit protection devices?	

**5. Combined Antenna Accommodation request details**  
 (A separate section 6 must be completed for each site at which access is requested)

2rn site name:	
Identify Franchise Area: i.e. enclose any available maps	
Identify any priority locations within the Franchise Area	
Confirm make and model of proposed Transmitter	
Confirm the normal operating transmitter output average power	
Confirm the normal operating transmitter output peak power (or peak to average ratio)	
Confirm the maximum transmitter output average power	
Confirm precise Transmit frequency & Tx power planned at 2rn site (MHz):	
State the transmitter Output channel filter details:	
Details of required Horizontal and Vertical Radiation patterns attached?	
Copy of the Comreg licence attached?	
Technical details/limits (from BAI/ComReg) relating to the site/franchise area attached? i.e. frequency, power, permitted antenna height, antenna pattern, aperture requirements	
Technical details of other sites in network attached? i.e. frequency, power, antenna height, antenna pattern	
Provide details of the means source signal distribution: i.e. Studio location / handover point / off-air source etc/	
If separate source signal receive antennas are required please add the details to section 7	



## 6. Telemetry Services

2rn shall meet all reasonable requests from Broadcast Operators for carriage of their Telemetry data stream.

A Client's Telemetry data stream presented at the Signal Interface Points may be transported to and made available for Transmission at up to eleven main transmission sites. In order to assess an operator's requirement the following information table should be completed:

Bandwidth Required (mBit/s):	
(The minimum available bandwidth block is 2mBit/s)	
Breakout Sites	Yes/No
Three Rock	
Kippure	
Mount Leinster	
Mullaghanish	
Spur Hill	
Woodcock Hill	
Maghera	
Cairn Hill	
Truskmore	
Holywell Hill	
Clermont Carn	

## 7. Microwave Distribution Service:

A Clients broadcast stream presented at the Signal Interface Points maybe be transported to and made available for Transmission at up to eleven main transmission sites. In order to assess an operator's requirement the following information table should be completed:

<b>Bandwidth Required (mBit/s):</b> (The minimum available bandwidth block is 2mBit/s)	
<b>Breakout Sites</b>	<b>Yes/No</b>
Three Rock	
Kippure	
Mount Leinster	
Mullaghanish	
Spur Hill	
Woodcock Hill	
Maghera	
Cairn Hill	
Truskmore	
Holywell Hill	
Clermont Carn	

## 8. Support Services

2rn shall meet all reasonable requests from Broadcast Operators for Support Services.

2rn can provide the following list of Support Services

- Service design and specification
- Project management, procurement, installation, commissioning and testing
- H24 breakdown repair including call out
- Preventative maintenance service
- Continuous monitoring of the service delivery
- Field reception measurement of broadcast services

In order to allow 2rn assess the availability of the required service Operators should define in as much technical and descriptive detail possible the nature and extent of the required service in the space below.

## 9. Additional Requirements

Additional Requirements such as antennae hosting should be described in this section.

### a. Broadcast Antennae Hosting request details

(A separate form must be completed for each site at which Antennae hosting is requested)

2rn site name:	
Structure: (Main mast or service tower)	
<b>Transmit Antenna Specification</b>	
Requested height location of antenna on structure(m agl): (height to centre of antennae).	
Proposed antenna type (panel, dipole):	
Antenna manufacturer & model no.:	
No. of elements & arrangement: (e.g. 4 dipoles, 1Rx4H or 16 panels, 4Rx4H)	
Antenna aperture (m)	
Bearing(s) of antenna from 2rn site (ETN):	
Precise Tx frequencies 2rn site (MHz):	
Tx ERP at 2rn site (dBW):	
Describe Antenna Main Feeder: e.g. type, size & manufacturer:	
No. of Main Feeders required:	
Describe any other items required on the structure: e.g. power dividers , junction boxes etc	
Detailed Autocad drawing of Antenna and support steelwork provided?	
If separate source signal receive antennas are required please add the details to section 7	

**b. Receive Antenna details**

2rn site name:			
Antenna specification	Detail Antenna 1	Detail Antenna 2	Detail Antenna 3
Manufacturer			
Model No.			
Antenna description e.g. microwave dish, yagi, satellite dish etc			
Dimensions			
Height (on structure) (0m if satellite dish at grnd level)			
Weight			
Bearing			
Feeder type			
Feeder Number			

**c. Space for self Supplied Equipment Cabin**

2rn site name:	
Cabin Dimensions:	
Concrete plinth dimensions:	
Cabin Location:	

## 10. 2RN Sign-Off Form

Sign-off must be completed before work can commence to accommodate any third party equipment

Applicant's Company Name:	
Applicant's Contact Details:	
Name of project for correspondence:	
Nature of project:	
2rn site name:	

### Sign-off

#### Required Signatures

\_\_\_\_\_  
CTO

\_\_\_\_\_  
Infrastructure Manager

\_\_\_\_\_  
Structural Engineer

\_\_\_\_\_  
2rn Commercial Manager

#### Comments


#### Optional Signatures

\_\_\_\_\_  
(e.g. Electrical)

#### Comments

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## **APPENDIX B Minimum Transmitter Specification**





## **Minimum Technical FM Transmitter Specification**

**Version: 1.0**

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## Scope

### General Requirements

The scope of this Specification details the minimum technical requirements for Transmitters, which are to be combined into a 2rn antenna system.

## Mechanical design

### General Requirements

- 2.1.1 Equipment proposed shall comply with all applicable EU directives and shall carry the CE mark.
- 2.1.2 If accommodation is required in a 2rn building then absolute limit for noise introduced by the cooling or transmitter system shall be <75dB or should not increase the ambient noise level by more than 1 dB where the ambient noise level is greater than 75dB. The applicant shall state the total acoustic noise in dB produced by the transmitter system with all ancillary equipment.
- 2.1.3 If accommodation is required in a 2rn building the application must be accompanied by a Transmitter cooling plan design. The cooling system shall be designed to limit ambient temperature change to  $\pm 2^{\circ}\text{C}$  under all operating conditions.

## Electrical Design

### Transmission Standard

- 3.1.1 The transmission standard shall conform to **ETS 300 384 (Jan 1995) with Amendment A1 (Feb 1997)**: "Radio broadcasting systems; Very High Frequency (VHF), frequency modulated, sound broadcasting transmitters" with provision for **CENELEC EN 50067 (April 1998)**: "Specification of the Radio Data System (RDS) for VHF/FM Sound Broadcasting in the Frequency range from 87.5 to 108.0 MHz." or any superseding document(s).

### Frequency Bands

- 3.2.1 The basic design shall be capable of satisfying the requirements of this specification throughout Band II, as defined in the **European Broadcasting Agreement, Stockholm, 1961**. The nominal Irish frequency allocation is as follows; -.
 

Band II:	Channel frequency allocation	87.5 to 108 MHz.
	Channel frequency spacing	Multiples of 100kHz.
	Nominal Channel spacing	2.2MHz.
- 3.2.2 The maximum peak Frequency Deviation of the installed transmitter shall not exceed  $\pm 75$  kHz under normal operating conditions.
- 3.2.3 Parameters specified in sections **2.3** of **Recommendation ITU-R BS.412-9** and **2.2** of **Recommendation ITU-R BS.450-3** shall be fulfilled.

## Electromagnetic Compatibility

- 3.3.1 The equipment offered shall comply with the latest edition of **EC Directive on Electromagnetic Compatibility 2004/108/EC** or any superseding document(s).
- 3.3.2 The Contractor shall ensure that any spurious emissions from the supplied equipment shall be of a sufficiently low level so as not to interfere with the performance of existing transmission equipment on-site.

## Frequency Stability

- 3.4.1 For a constant input signal, the output centre frequency shall not depart from its assigned value by more than  $\pm 500\text{Hz}$  over a period of one year. Provision shall be made for adjusting the frequency of the oscillator(s) to allow for long-term ageing effects. To facilitate routine frequency measurements, an output test point from each oscillator stage shall be readily available.
- 3.4.2 The carrier frequency shall be maintained within  $\pm 1\text{kHz}$  of its nominal value, under normal and extreme conditions as defined in section **5.2.5 of IEC 60244-1**.
- 3.4.3 The carrier frequency stability shall be better than  $\pm 300\text{Hz}$  within a six month period when measured under identical operating conditions as defined in section **5.2.6 of IEC 60244-1**.

## Over-Deviation

- 3.5.1 Non-linearities in the transmitter shall not cause excessive out-of-band emissions when the transmitter is subjected to abnormal Audio Frequency (AF) input levels. Under these conditions it is possible that the RF spectrum will be unacceptably polluted, even though the deviation may not exceed  $\pm 75\text{ kHz}$ . Measurement procedures shall be in accordance with Clause 4.9 of **ETS 300 384**.

## Input Conditions

- 3.6.1 Both AF channels shall incorporate a  $15\text{kHz}$  low-pass filter with at least  $40\text{dB}$  attenuation at  $19\text{kHz}$  with reference to the  $15\text{kHz}$  level. The maximum permissible group delay of the low pass filter shall be  $50\text{ nS}$ . Also the stop-band attenuation above  $19\text{kHz}$  shall be  $\geq 30\text{dB}$ .
- 3.6.2 The transmitter shall maintain a constant RF output power ( $\pm 0.5\text{dB}$ ) over the full range of input signals.

## RF Output Conditions

- 3.7.1 The equipment shall be capable of delivering the rated output power, within  $\pm 1\text{dB}$  under normal conditions, whilst meeting the performance requirements of this specification. The output power shall be capable of being to a user set level.

## RF Output Metering

- 3.8.1 Voltages, currents and RF levels shall be metered at suitable points.
- 3.8.2 Overall power metering shall be provided to enable the true rms output power to be measured at normal output power under any conditions of modulation. The output power shall be given in terms of absolute power level (Watts, not dBm).

- 3.8.3 A high output power alarms shall be made avail to 2rn. Transmitter shall alarm at 1dB above normal transmit power and shall automatically shut down at 2db above normal transmit power. All alarms shall be presented as dry contacts.

## Radio Frequency Monitoring

- 3.9.1 A dual directional coupler with forward and reverse monitoring output shall be provided at the final transmitter output after any harmonic filters. The couplers shall have a forward directivity of not less than 30dB and a reverse directivity of not less than 40dB. The coupling factor of each to be chosen to provide a RF output level, via an 'N' type connector of approximately 0dBm into 50Ω load.
- 3.9.2 All directional couplers shall be supplied with test results measured by the Contractor to verify the directivity and the coupling factors of each port.
- 3.9.3 It shall be possible to derive the coupling factor in one of the following methods;
- The coupling factor, calibrated to  $\pm 0.1$ dB at the operating frequency, shall be stated. The coupling factor graph shall be provided over the range 87.5 - 108 MHz.
  - The coupling factor at a nominal (centre) frequency, calibrated to  $\pm 0.1$ dB, shall be stated and an interpolation provided for the range 87.5 - 108 MHz.
- 3.9.4 Test points shall be provided to allow monitoring of the RF output frequency signal.

## Power Supplies

- 3.10.1 The equipment shall comply with standard good electrical practice. The equipment shall comply with this specification when operated from 48 to 52 Hz. three phase 400V or 230V single phase (+10% to -15%) electricity supplies. There shall be no electrical connection between the neutral and earth terminals within the equipment. Any internal fusing shall be in the phase conductors and not in the neutral. Any regulation of voltages within the equipment, which may be necessary to meet the required performance, shall be incorporated within the transmitter so as to render external voltage regulation unnecessary.

## Power Consumption, Efficiency and Power Factors

- 3.11.1 The Tenderer shall state the power consumption (in kWatts) and the power factor for the following conditions:
- The complete transmitter system, including all auxiliaries, fans, and any water pumps, when the transmitter is operating at normal output power.
  - The transmitter in isolation from associated cooling plant, at normal output power.

## Safety

- 3.12.1 The equipment shall fully comply with specification **IEC215: 1987 "Safety Requirements for Radio Transmitting Equipment"**.

- 3.12.2 The electrical installation shall comply with National Rules for Electrical Installations, Fourth Edition ET101:2008 and subsequent amendments.
- 3.12.3 The complete installation shall be labelled in accordance with the 2rn Labelling Specification.

### Surge Protection

- 3.13.1 In addition to the safety requirements, effective lightning protection and surge protection shall be provided.
- 3.13.2 The customer shall supply detail descriptions of the lightning protection system employed in their transmission system design.
- 3.13.3 Voltage monitoring shall be provided for each separate supply rail in the equipment and also for the current drawn by each component RF module incorporated in a solid-state amplifier whose power capability is 15W or more.

## Transmission Performance

### Radio Frequency Response

- 3.14.1 The Amplitude/Frequency response of the transmitter shall remain within  $\pm 0.5$ dB relative to the ideal pre-emphasis curve between 10Hz  $\leftrightarrow$  15kHz over the desired VHF Band II channel.

### Channel Separation

- 3.15.1 Separation between AF channels shall be  $\geq 46$ dB between (100Hz  $\leftrightarrow$  5kHz), decreasing by less than 6dB per octave below 100Hz and above 10kHz.

### Spurious Radiation

- 3.16.1 Spurious Radiation shall not exceed the specifications set out in section **4.11.1 of ETS 300-384**.

### Harmonic Distortion

- 3.17.1 The total harmonic distortion measured on the demodulated output of the transmitter shall not exceed 0.5% over the frequency range 40Hz  $\leftrightarrow$  15kHz at full ( $\pm 75$ kHz) deviation.

### Spurious Emissions

- 3.18.1 The Tender response shall include details of the guaranteed transmitter maximum unfiltered out-of-channel products up to  $\pm 20$  MHz from the centre frequency.
- 3.18.2 The supplied equipment shall also be compliant with **ETR 132**.
- 3.18.3 In addition, the supplied equipment shall also be compliant with guidelines issued by the **Commission for Communications Regulation (ComReg), Ireland**.

## Control and Monitoring

### Modes of operation

- 4.1.1 There shall be three modes of operation.
- 4.1.1.1 **Local:** Tx. manually controlled from front panel.
- 4.1.1.2 **Remote:** Tx. controlled remotely via telemetry.
- 4.1.1.3 **Auto:** Tx. under control of automatic control unit.

### Transmitter Status

- 4.2.1 The following transmitter status indications shall be available both locally and remotely
- 4.2.1.1 Transmitter on/off.
- 4.2.1.2 Output Power Alarm.(Hi)
- 4.2.1.3 Transmitter Mode.

## **APPENDIX C Contractors Code of Practice**



# **Code of Practice for Contractors Accessing 2rn Sites & Structures**

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## Introduction

This document outlines the procedures and conditions for gaining access to 2rn sites and structures.

Under the current H&S Legislation 2rn has a responsibility to provide a safe place of work for third party contractors, agents or employees who access and utilise 2rn sites and structures. Accordingly 2rn has put specific procedures and control measures into effect. These include the authorising of contractors to access 2rn structures on behalf of 2rn's Customers, providing an induction course for employees of authorised contractors, co-ordination of site access via the on-line booking system "Site Share", the Network Monitoring Centre (NMC) function and approving the installation, removal, replacement and relocation of equipment via the Accommodation Request Form (ARF).

## Contractor Conditions of Access

Contractors and subcontractors shall be authorised to access and carry out works unaccompanied in the non-broadcast areas of 2rn sites subject to written acceptance of the following conditions:

- No contractor shall attempt to enter or carryout works in a Broadcast Area of a 2rn site unless accompanied and under the supervision of a 2rn Engineer.
- As part of the authorisation process contractors agree that they shall abide by all of the elements of this code of practice. Where a contractor intends to carry out works on 2rn sites on behalf of more than one Client, 2rn must receive a separate request to authorise the contractor from each Client.
- Any contractor who attends a 2rn site on behalf of a 2rn Licensee must be properly authorised to do so.
- Contractors shall ensure that all of their personnel attending a 2rn site have carried out the relevant induction course.
- Contractors shall ensure that all equipment changes, additions or removals they carry out have been approved by 2rn via the ARF process.
- Contractors shall comply fully with the Site Access Procedure described in section 6 of this document.
- Contractors shall ensure the competency of all their personnel working on 2rn site.
- Contractors as a minimum shall observe the installation standards identified in section 7.
- Contractors shall return to site, at no cost to 2rn, to rectify any installation, which in the opinion of 2rn, is sub standard.
- Contractors, shall as minimum, comply with all of the Site Safety Rules contained in section 8.
- Contractors shall not damage the reputation or commercial interests of 2rn. Any contractor who in any way, in the sole opinion of 2rn, damages the reputation or commercial interests of 2RN shall have their authorisation to access 2rn sites and structures withdrawn permanently.

## Authorised contractors

Only those contractors authorised by 2rn are permitted on 2rn structures/sites.

2rn shall authorise direct contractors of our Licensees following a request for authorisation from our Licensee. The request for contractor authorisation from our Licensee must be accompanied by confirmation that the Licensee has completed a Health and Safety assessment of the contractor and is satisfied that the contractor meets the definition of a competent contractor as contained within the Safety, Health and Welfare Act, 2005.

2rn shall not authorise further subcontracting of the works.

2rn shall base their decision to authorise contractors, primarily, but not exclusively, on the basis of a Licensees Health and Safety assessment of the contractor. 2rn may consider other factors in the decision process to authorise a contractor.

A contractor intending to carry out works on 2rn sites on behalf of more than one Client must be authorised separately by 2rn to carry out works for each Client.

Authorised contractors must ensure that all personnel under their control have completed the relevant 2rn induction course prior to attending an 2rn site.

2rn reserves the right to reject a request to authorise a contractor. In the event of a breach of any of the instructions / procedures contained herein or any provision of the 2005 Safety Health & Welfare Act, 2rn may suspend and/or permanently withdraw a contractors authorisation to work on 2rn sites.

Contractors authorisations to access 2rn sites must be renewed annually. Renewals will take place between 1<sup>st</sup> and 31<sup>st</sup> of January each year.

2rn, at its sole discretion, reserves the right to suspend, decline to renew or permanently withdraw any contractors authorisation to work on 2rn sites who in the opinion 2rn is in breach of any part of this code of practice.

Whereas a contractor intending to carry out works on 2rn sites on behalf of more than one Client must be authorised separately by 2rn to carry out works for each Client, when a contractor is de-authorised as a result of a breach of any part of this code of practice then that de-authorisation applies to **all** of the contractors activities on 2rn sites.

## 2rn Induction Courses

2rn provides two induction courses for personnel of customers and authorised contractors. These induction courses are mandatory and no Customer or Authorised Contractor shall allow any of their operatives to access 2rn site or structure unless they have completed the

relevant 2rn induction course. The 2rn induction courses are designed to fit two simple categories of visitor; those who attend site to work at ground level and those who attend to work at height.

### **2rn Ground Level Induction Course:**

The 2rn ground level induction course is mandatory for all visitors to 2rn sites. This induction course is expected to be self administered. 2rn shall make the contents of this induction course available to the Health and Safety Managers of all Customers and Authorised Contractors for inclusion in their own training plan. Each Customer and Authorised Contractor shall register on SiteShare, the details of each staff member who has completed this induction course. The Ground Level Induction course will be available on Site Share for customers and contractors to access.

### **2rn Climbers Induction Course:**

The 2rn Climbers induction course is a taught course and is mandatory for all personnel working above ground level on 2rn sites.

The course takes approximately two hours to complete and includes sections on:

- RF Radiation
- 2rn Policy & Procedures
- General Site Safety
- Installation Standards

At the end of the course each inductee is issued with an identity card which can be used as proof of having completed the induction course. The identity cards issued expire after four years at which point the course must be repeated.

## **Site Access Procedure**

In order to control access efficiently 2rn has implemented an online site access control system known as “Site Share”.

The following guidelines represent the basic rules governing access to 2rn sites:

- **All** requests to access 2rn Sites, must be processed through the on-line access system ‘Site-Share’. For the avoidance of doubt ground only access requests, as well structure access requests must be processed through and approved Siteshare.
- Where accompanied access to a 2rn Broadcast area is required the applicant must contact the Engineering supervisor and arrange an attending 2rn Engineer prior to booking on-line access.
- Access Requests via Site Share may be initiated by an Authorised Contractor but must be approved electronically by the Equipment Owner.

- Only Authorised Contractors and inducted personnel shall be nominated as attendees on the access request.
- The approved Access Request, or an electronic copy, must be on site and available for inspection.
- Where required, a power down of high powered antennae will be arranged and under no circumstances should the structure be accessed until such time as it has been confirmed that the power reduction has been effected. Where engineers attend site the Power Reduction Form/Permit must be signed by both parties prior to work commencing and when the power reduction has been returned to normal levels.
- For emergency access to a structure, an Access Request must be submitted. In this instance, the Access Request shall be processed in the shortest possible time with consideration given to the nature of the emergency works and the requirement to ensure H&S concerns are addressed.
- The Access Request shall only be valid for the period, the work and the working height specified on the approved Access Request.
- On arrival to, and departure from, all 2rn sites, contractors/agents must inform the 2rn Network Monitoring Centre (NMC) by text message to the following number **087 7872128**. Text messages should be in the following format:

**Entering\_Site\_SAF Number\_Person Name\_Company Name**  
**Exiting\_Site\_SAF Number\_Person Name\_Company Name**

**Eg**  
**Entering Kippure BP5000 John Smith ACME Telecoms**  
**Exiting Kippure BP5000 John Smith ACME Telecoms**

**Please note that this number is reserved for logging access and egress only.**  
**No other issues should be reported via this service and no calls will be accepted.**  
**Texters should note that they may not get a response to their text message.**  
**Other queries should be addressed to 01-2082259 or 01-2082685.**

**Please note because of its full time security presence this process does not apply to Donnybrook.**

- Any contractor/agent found to be in breach of **any** of the conditions shall be instructed to leave site immediately and have the keys they used to gain access confiscated. Pending a follow up investigation and depending on the nature of the breach Contractors may be suspended temporarily or permanently from the Authorised Contractors List.

### **Competency of Personnel**

2rn requires that everyone working on its sites is competent to carry out the required task. It is the responsibility of all customers, contractors and agents to ensure that their staff has the

required competency and training to carry out the required site works.

2rn will periodically audit compliance to this competency requirement, which may involve:

- On-site inspection of climbing certificates for each worker
- Inspection of Safe Pass, CSCS and 2rn induction cards
- Inspection of certificates for lifting equipment
- Ensuring that the supervisor nominated on the Site Access Form (SAF) is present on-site throughout the works.
- Adherence to installation standards.

## **Installation Standards**

As a minimum the following installation standards shall apply:

- All cables installed on 2rn structures must be labelled in accordance with 2rn's Procedure for Labelling antennae Cables..
- Only fixings approved by 2rn to be used on structures. All antennae support steelwork must be fabricated from galvanised mild steel.
- All metallic elements of cable management products must be fabricated from either galvanised mild steel or stainless steel.
- The use of 'black steel', sheradised steel or chrome coated steel is strictly prohibited for any purposes on 2rn structures.
- Remclamps or similar must be used to secure cables on the structures. The use of cable ties is not an acceptable means of cable management on an 2rn structure.
- Cables must not be attached to or obstruct climbing ladder.
- Cables must pass under bracings and steelwork when passing from structure to cable gantry.
- Care must be taken to ensure that cable management studding is not installed in a manner that might cause injury.
- All cables must be earthed.
- Drilling of any of the members of a structure or outer building envelope is strictly prohibited.
- All antennae support steelwork and fixings shall be fit for purpose and it shall be the responsibility of the equipment owner to ensure that a design review is carried out on all support steelwork.
- All electrical work must be carried out by a qualified and registered Contractor and must as a minimum be in compliance with ETCI standards

## General Site Safety Rules

- The contractor shall ensure that 2rn's Access Request procedure is followed and a valid Access Request has been processed for the proposed work.
- For all site visits it is mandatory to Log into and out of site via an SMS message to the 2rn NMC.
- Only inducted personnel of Authorised Contractors are allowed access 2rn structures.
- Vehicles shall not be parked in the structure exclusion zones or where they are likely to obstruct other traffic.
- A site supervisor named on the Access Request shall be present on-site.
- Each contractor is responsible for securing the site when working on the site and when they leave.
- Appropriate PPE must be worn at all times. At a minimum, all 2rn sites should be treated as construction sites at all times.
- All Lifting Equipment, safety Harnesses, rescue kits etc shall be in good condition and have up to date certification for use.
- Job and site specific risk assessments shall be prepared and available on site for inspection.
- Under no circumstances shall any operative climb beyond the height above ground level licensed by the approved Access Request.
- When working on the structure there shall always be a minimum of two trained, competent climbers on site. Minimum training being climbing and mast rescue certification.
- At least one personal NIR monitor / badge per two climbers shall be in use at all times on the structure. All NIR personal monitors shall be in good working order and within calibration.
- In the event that high levels of NIR are detected by personal NIR monitors, each crew shall have access to a properly calibrated NIR meter to measure actual NIR levels.
- Any unexpected NIR levels above ICNIRP Occupational guidelines should be recorded with a height tag and reported immediately to 2rn. All measurements should be recorded in volts/m.
- Under no circumstances shall a mobile crane or truck mounted HIAB be used to lift antennae or antenna support steelwork on to the face of any 2rn structure without prior consent from 2rn
- Prior to excavation work beginning the area shall be scanned for all buried services. The contractor shall be responsible for the re-instatement of any disturbed services.



- Excavations of depth greater than 600mm are prohibited on 2rn sites unless agreed in advance.
- The site must be kept tidy at all times.

At the end of the every day the site works area shall be cleaned and all materials cleared away or stored correctly. All litter, waste materials etc shall be collected at the end of the site works and removed from the site by the contractor. At the end of the works the site must be returned to the same condition that it was originally found in.

- Where welfare facilities exist, these are available to authorised contractors, however at all times 2rn operatives and their direct contractors shall have precedence for use of these facilities. 2rn reserve the right to withdraw the use of welfare facilities by third party contractors should they be abused in any way.
- Training records such as Safepass cards, 2rn induction cards etc, must be available on-site for inspection at all times.
- A copy of the NIR survey as issued by 2rn for the structure being worked must be available on site.
- All local speed restrictions must be observed at all times and consideration and courtesy must be shown to hill walkers, farmers and their animals that frequently use 2rn access roads.

#### Structure Safety Exclusion Zone

Prior to beginning any work on a structure the contractor shall establish safety exclusion zones around the structure in order to minimise the risk to personnel from falling objects. The inner zone will be as per the table below and designated as an exclusion zone (only the person in charge of the Access Request and those specialists authorised by that person will have access).

All other areas on site (outside the exclusion zone) will be designated a controlled area – i.e. wearing of PPE etc will be mandatory.

<i>Working Height h on the structure (m)</i>	<i>Required radius dependent of h</i>	<i>Required minimum radius (m)</i>
<i>h up to 60</i>	<i>h/5</i>	<i>8,00</i>
<i>h &gt; 60 up to 100</i>	<i>h/5</i>	<i>12,50</i>
<i>h &gt; 100 up to 150</i>	<i>h/6</i>	<i>20,00</i>
<i>h &gt; 150 up to 200</i>	<i>h/7</i>	<i>25,00</i>
<i>h &gt; 200</i>	<i>h/8</i>	<i>30,00</i>

*The outer edge of the structure is the basis for measuring the radius of the exclusion zone.*

The Contractor shall ensure that the safety zone is secured in a way that nobody can enter unless authorised to be there. The safety zone has to be fenced off adequately and with appropriate signage. A cordoning off with plastic warning tape is not sufficient.

The guideline does not exempt the contractor from undertaking their own site risk assessment prior to works and also if the supervisor on site decides that following such an assessment (environmental considerations, nature of the works etc.) that the safety zone should be extended then that will be down to their discretion on the day.

## Sign Off Section

[Contractors Registered Name], [Company Registration Number] having its registered office at [xxxxxx, xxxxxx]

[Contractor] hereby acknowledges and accepts that their authorisation to access and/or carry out or control works on the sites or structures owned or controlled by RTÉ Transmission Network Limited (Trading as 2rn) is granted at the discretion of 2rn.

[Contractor] hereby acknowledges and accepts that 2rn, at its sole discretion, has the right to suspend, decline to renew, or permanently withdraw their authorisation to work on 2rn sites, if in the opinion 2rn, [Contractor] is in breach of any part of this code of practice.

[Contractor] hereby acknowledges and accepts that in the event their de-authorisation howsoever arising, 2rn shall have no liability whatsoever to [Contractor].

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**SIGNED**

for and on behalf of

**[Contractor]**

Position:-

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**DATE**