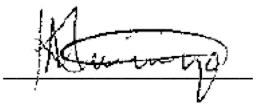
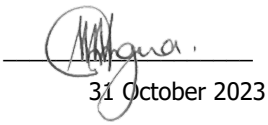
RAIL NETWORK TELECOMS

REGISTER

EVALUATED RADIO EQUIPMENT

(LIST OF APPROVED RADIO EQUIPMENT)

Quality Assurance National Test Centre

Author:	Chief Engineering Technician Rail Network Telecoms - Quality Assurance National Test Centre	K S Mniniyo	
Authorised:	Principal Engineer Rail Network Telecoms - Rail Access Network	M Mmbengwa	
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I. Distribution

Once updated, a copy of the latest revision will be published in the document management system in use. An e-mail to this effect will be sent to the relevant personnel or heads of department.

II. Document Version Control

VERSION NO.	DATE ISSUED	ISSUED BY	HISTORY DESCRIPTION
1.0	5 August 2010	Infrastructure Telecoms	First document
2.0	6 October 2010	Infrastructure Telecoms	Update list of evaluated radio equipment
3.0	3 May 2011	Infrastructure Telecoms	Update list of evaluated radio equipment
4.0	18 January 2012	Infrastructure Telecoms	Update list of evaluated radio equipment. Apply new standard. Remove discontinued items.
4.1	17 April 2012	Infrastructure Telecoms	Update list of evaluated radio equipment.
4.2	1 August 2012	Rail Network Telecoms	Change document heading & company registration number. Update list of evaluated radio equipment.
4.3	17 September 2012	Rail Network Telecoms	Add abbreviations and definitions. Change Handheld Radio heading and comment.
4.4	13 June 2013	Rail Network Telecoms	Update list of evaluated radio equipment. Add IP Rating explanation.
5.0	22 May 2014	Rail Network Telecoms	Change Handheld Radio heading and comment. Update list of evaluated radio equipment.
5.1	24 June 2014	Rail Network Telecoms	Update list of evaluated radio equipment.
5.2	15 August 2014	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3	15 Sep 2014	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.1	18 Sep 2014	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.2	16 Jan 2015	Rail Network Telecoms	Update list of evaluated radio equipment. Add Battery service life
5.3.3	10 January 2017	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.4	24 July 2018	Rail Network Telecoms	Update list of evaluated radio equipment.

5.3.5	08 July 2019	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.5	03 September 2019	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.6	29 April 2020	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.6	14 May 2021	Rail Network Telecoms	Added Kopano remote base station evaluated and passed in 2012
5.3.7	20 June 2022	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.8	08 February 2023	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.8	08 February 2023	Rail Network Telecoms	Update list of evaluated radio equipment.
5.3.9	23 October 2023	Rail Network Telecoms	Update list of evaluated radio equipment.

III. List of Abbreviations and Definitions

ABBREVIATIONS	DESCRIPTION
A	Ampere
dB(A)	Sound Pressure A-weighted in decibel.
DC	Direct current
Fn	Function
GHz	Gigahertz
ICASA	Independent Communications Authority of South Africa
IP	Ingress Protection'
IR	Iridium
kPa	Kilo Pascal
m	Metre
MHz	Megahertz
Mic	Microphone
MIMO	Multi-in & Multi-out
mm	Millimetre
PMU	Power Management Unit
PSU	Power supply unit
RF	Radio frequency
Rx	Radio receiver
SPL	Sound Pressure Level
TFR	Transnet Freight Rail
Tx	Radio transmitter
V	Voltage

DEFINITIONS	DESCRIPTION
VERSION	A particular form of something, which varies slightly from other forms of the same thing.
Base Radio Stations	A Radio station designed to be installed in a fixed location and performing the function of a repeater/enhancer.
Fixed Radio Station	It is a fixed radio station installed in an office or control room, fitted with an external antenna.
Handheld/Portable Radio	A Radio designed to be carried by or on a person.
Mobile Radio	A radio designed for installation in a surface vehicle and capable of operating while the vehicle is in motion and while it is stationary.
A-weighted	It is a network that weights an audio signal in a manner, which approximates to an inverted equal loudness contour (it approximates the human ear's response to sound).
Safe Working	It refers to any working where the safety of people and equipment rely on radio communication.
IP Rating **IP5X**	Dust protected: Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact
IP Rating **IP6X**	Dust tight: No ingress of dust; complete protection against contact
IP Rating **IPX4**	Splashing of water: Water splashing against the enclosure from any direction shall have no harmful effect. Test duration: 5 minutes. Water volume: 10 litres per minute Pressure: 80–100 kPa
IP Rating **IPX6**	Powerful water jets: Water projected in powerful jets (12.5 mm nozzle) against the enclosure from any direction shall have no harmful effects. Test duration: at least 3 minutes. Water volume: 100 litres per minute Pressure: 100 kPa at distance of 3 m
IP Rating **IPX7**	Immersion up to 1 m: Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion). Test duration: 30 minutes. Immersion at depth of at least 1 m measured at bottom of device, and at least 15 cm measured at top of device

1. SCOPE

1.1 This document lists the radio equipment that complies with the Act No. 36 of 2005 Electronic Communications Act as well as the Transnet Freight Rail technical standard BBD8635 Transnet Freight Rail technical standard BBD8635 ver. 8.2 extracted from ETSI EN 300 086 as well as the BBG 1946 Ver. 4 & BBF 2516 Ver. 5 specifications.

1.2 This document is a reference guide for acquiring ICASA and TFR type approved radio equipment. Where the ICASA type approval certificate number does not appear in the list, that equipment does not require a type approval certificate.

1.3 Radio equipment that does not comply with the TFR standard is listed in a separate document, can be released upon request to facilitate decision making and tender processes.

2. COMMENT

2.1 A supplier's radio not appearing on the list, but having ICASA type approval, can be submitted during Request for Proposal to supply and deliver radio equipment issued by TFR Telecoms yearly.

3. LIST OF APPROVED EVALUATED RADIO EQUIPMENT

3.1 HANDHELD/PORTABLE RADIOS

MAKE	MODEL	Open channel APPROVED	Trunk APPROVED	TFR APPROVAL NUMBER	IP RATING	ICASA TYPE CERTIFICATE	Battery service life	COMMENTS
HYTERA	PD685	Yes	Yes	QA-NTC020/19	IP 67	TA-2016/3527	n.a.	Software version number V8.05.06.008 EMS should be used when programming this portable radio. 1024 Conventional channels 64 zones consisting of 256 channels per zone Full Keypad with auto lock function Display
HYTERA	PD-705	Yes	No	QA-NTC015/14	IP 67	TA-2013/106	03:55	Firmware version number 6.05.07.105SA should be used when programming this portable radio. 1024 Conventional channels No Keypad No Display
HYTERA	PD785G	Yes	Yes	QA-NTC013/19	IP 67	TA-2011/1385	n.a.	Software version number V8.05.06.008 EMS should be used when programming this portable radio. 1024 Conventional channels 64 zones consisting of 16 channels per zone Full Keypad with auto lock function Display
HYTERA	X1p	Yes	Yes	QA-NTC015/19	IP 67	TA-2016/094	n.a.	Firmware version number V8.01.02.002 EM5 should be used when programming this portable radio. 1024 Conventional channels 64 zones consisting of 16 channels per zone Full Keypad with auto lock function Display
Icom	IC-F4032T	Yes	No	QA-NTC009/14	IP 67	TA-2012/251	05:08	128 Conventional channels Full Keypad Programmable lock Display **Radio discontinued – replaced with IC-F2000T**

Icom	IC-F4262DT	Yes	No	QA-NTC013/14	IP 67	TA-2012/753	04:57	512 Conventional channels Full Keypad Programmable lock Display. **Radio discontinued – replaced with IC-F4400D**
Kenwood	NX 300E	Yes	Yes	QA-NTC011/11	IP 67	TA-2013/2240	03:57	512 Conventional channels Full Keypad Programmable lock Display
Kenwood	NX 300E4	Yes	Yes	QA-NTC011/11	IP 54/ 55/67	TA-2009/120	03:57	512 Conventional channels Limited Keypad Programmable lock Display
Kenwood	NX 300GE	Yes	Yes	QA-NTC002/19	IP 54/ 55/67 MIL-STD-810-C/D/E/F	TA-2013/2240	n.a.	Software version number KPG 111d, firmware ver. 5.21 512 Conventional channels Full Keypad with key lock function Display
Kenwood	NX3220EX	Yes	No	TFR-ICTM-T-QA-NTC004/23	IP 67	TA-2017/1415	n.a.	Software KPG-3D V3.30 with test/tuning Fn 1000 optional channels 128 zones consisting of 250 channels per zone. Radio operates in Digital or Analogue mode. Full Keypad with auto lock function Display NB: The program needs to be authenticated online with a license key and is limited to 1 PC installation. Intrinsically safe VHF digital radio
	NX 3320E1	Yes	No Firmware not compatible with MPT 1327 trunk mode	QA-NTC003/19 ver. 1	IP 67	TA-2017/1416	n.a.	Software version number KPG-3D V1.40 with test/tuning Fn should be used when programming this portable radio. 250 Conventional channels 128 zones consisting of 250 channels per zone 1000 optional channels Full Keypad with auto lock function Display. Approved radio for Point switching

Kenwood	NX 3320E2	Yes	No Firmware not compatible with MPT 1327 trunk mode	QA-NTC004/19	IP 67 & MIL-STD-810-C/D/E/F/G	TA-2017/1416	n.a.	Software version number KPG-3D V1.40 with test/tuning Fn should be used when programming this portable radio. 250 Conventional channels 128 zones consisting of 250 channels per zone 1000 optional channels 4-way Directional-pad (D-pad) with auto lock function Display Approved radio for Point switching
Simoco	SRP9180	Yes	Yes	QA-NTC005/19	IP67	TA-2010/444	n.a.	1000 Conventional channels Full Keypad with key lock function Display Quality and durability problems rectified by re-designing the outer radio casing.
Tait	TP3350	Yes	No	QA-NTC007/19	IP67	TA-2018/3953	n.a.	TP3000 Software version number V1.12.009 should be used when programming this portable radio. 2000 Conventional channels 250 Zones with digital & analogue channels Full Keypad with key lock function Display
Tait	TP8110	Yes	No	QA-NTC005/13	IP67	TA-2007/1060	04:20	16 Conventional channels No Keypad No Display **Radio in the process of being discontinued**
Tait	TP8115	Yes	No	QA-NTC005/13	IP67	TA-2007/1060	04:20	128 Conventional channels Limited Keypad Display. **Radio in the process of being discontinued**
Tait	TP8120	Yes	No	QA-NTC005/13	IP67	TA-2007/1060	04:20	350 Conventional channels Full Keypad Programmable lock Display **Radio in the process of being discontinued**

Tait	TP8135	Yes	Yes	QA-NTC005/13	IP67	TA-2007/1060	04:20	100 Conventional channels Limited Keypad Programmable lock Display Only 100 Alphanumeric Presets Trunk numbers. **Radio in the process of being discontinued**
Tait	TP8140	Yes	Yes	QA-NTC005/13	IP67	TA-2007/1060	04:20	100 Conventional channels Full Keypad Programmable lock Display **Radio in the process of being discontinued**
Tait	TP9360-H5	Yes	Yes	QA-NTC006/19	IP67	TA-2013/2157	n.a.	TP9300 programming application should be used when programming this portable radio. UHF Digital Transceiver 1500 Conventional channels 100 Zones consisting of 253 channels per zone Full Keypad with key lock function Display Radio intrinsically safe (Atex radio)
Tait	TP9361-HB Atex	Yes	Yes	QA-NTC006/19 Ver.1	IP67	TA-2013/2157	n.a.	TP9300 programming application should be used when programming this portable radio. UHF Digital Transceiver 1500 Conventional channels 100 Zones consisting of 253 channels per zone Full Keypad with key lock function Display Radio intrinsically safe (Atex radio)

3.2 MOBILE RADIOS

MAKE	MODEL	Open channel APPROVED	TRUNKED APPROVED	TFR APPROVAL NUMBER	ICASA TYPE APPROVAL CERTIFICATE	COMMENTS
Hytera	MD785G	Yes	Yes	QA-NTC003/20	TA-2013/105	
Icom	IC-F6022	Yes – Condition apply	No	QA-NTC003/16	TA-2009/800	Frequency allocation to be considered when distributing the radios – refer to radio report QA-NTC003/16 comments.
Kenwood	Nexedge NX700	Yes	Not applicable	QA-NTC003/12	TA-2009/117	VHF mobile radio
Kenwood	Nexedge NX800	Yes	Yes	QA-NTC005/17 v1	TA-2009/118	
Kenwood	TK 8102	Yes – Condition apply	Not applicable	Rep-00089/07	TA-2003/311	Not for safe working operations. General use only.
Kenwood	TK 8180	Yes	Yes	QA-NTC022/05	TA-2004/765	
Kenwood	TK-8302	Yes	No	QA-NTC001/18 v1	TA-2009/1422	Frequency allocation to be considered when distributing the radios – refer to radio report QA-NTC001/18 comments.
Motorola	GM 340	Yes	Not applicable	QA-NTC021/05	SPLS/RX-87/2002	
Simoco	SRM9020	Yes	Yes	QA-NTC005/12	TA-2011/820	
Tait	TM9315	Yes	Yes	TFR-RNT-QA-NTC001/22 v1	TA-2013/2158	
Tait	TM 9300	Yes	No (Not tested, out of tender scope)	TFR-RNT-QA-NTC001/23 TFR-RNT-QA-NTC002/23	TA-2013/2158	
Tait	TM8254	Yes	Yes	Rep-00044/06	TA-2004/285	Radio only, no faceplate, to work with inelegant handset. (Train driver handset) **Squelch Detect Type** to be set to Noise Level.
Tait	TM8255	Yes	Yes	Rep-00044/06	TA-2004/285	Radio with faceplate, to work with Fist microphone with a numeric keypad. **Squelch Detect Type** to be set to Noise Level.

Tait	TM9315	Yes	Yes	QA-NTC005/20 QA-NTC002/22 QA-NTC003/22 TFR-RNT-QA-NTC001/22 TFR-RNT-QA-NTC002/22	TA-2013/2158	TM9300 TFR Programming Application (35.27.31.1) The radio is IP 54 compliant. The radio needs to be deployed in an area where adjacent channel frequency allocation is closely monitored (refer to recommendations of report QA-NTC005/20) as that can pose interference.
Vertex Standard	EVX5300	Yes	No	QA-NTC009/15	TA-2014/2228	
Vertex Standard	VX4500	Yes – Condition apply	No	QA-NTC002/16	TA-2012/320	Frequency allocation to be considered when distributing the radios – refer to radio report number QA-NTC002/16 comments.

3.3 PORTA PACK RADIO

MAKE	MODEL	APPROVED	TRUNKED APPROVED	TFR APPROVAL NUMBER	ICASA TYPE APPROVAL CERTIFICATE	COMMENTS
Emcom	Tait TM8254	Yes	Yes	QA-NTC006/17 ver. 2	TA-2004/285	The radio porta pack contains a Tait TM8255 mobile radio.

3.4 BASE RADIO STATIONS (Repeaters)

MAKE	MODEL	APPROVED	TRUNKED APPROVED	TFR APPROVAL NUMBER	ICASA TYPE APPROVAL CERTIFICATE	COMMENTS
Simoco	TSF21000	Yes – Condition apply	Yes	QA-NTC020/11	TA-2009/1602	The radio dual power requirement must be converted to a single supply.
Simoco	Xfin Blade TSF 2000 series	Yes	Yes	QA-NTC028/11	TA2009/1602	Power 50 W.
Spectra	MX 800 1 Watt	Yes – Condition apply	Not applicable	Rep 00048/06	TA-2006/090	Acceptable as a link radio. When used as a repeater the talk-through audio circuit to be modified to improve frequency response.
Spectra	MX 800 50 Watt	Yes	Yes	Rep-00068/07	TA-2006/090	Engineering panel must be ordered separately.

Tait	TB-7100	Yes	Not applicable	QA-NTC008/13	TA-2005/572	
Tait	TB-8100 1 W	Yes	Not applicable	Rep-00088/07	TA-2003/198	**Squelch Detect Type** to be set to Noise Level.
Tait	TB-8100 50 W	Yes	Yes	Rep-00046/07	TA-2003/198	**Squelch Detect Type** to be set to Noise Level.
Tait	TB-9300 50 W	Yes	Not tested (out of tender scope test request)	QA-NTC010/21	TA-2013/2156	**Squelch Detect Type to be set to Noise Level.**
Tait	TB-9300 5 W	Yes	Not tested (out of scope test request)	QA-NTC010/21	TA-2013/2156	**Practical speech quality field test after repeater installation will be recommended to ensure that there's no impact to the audio quality over a long distance**
Tait	TB-9400 50 W	Yes	Not tested (out of scope test request)	QA-NTC007/23	TA-2021/3206	**DMR/MPT version dmr-3.40.00.0006** The frequency allocation on shared sites should not include the 8th channel above and below the receiving channel as that could cause interference. **Squelch Detect Type** to be set to Noise Level.
Tait	TB-9400 5 W	Yes	Not tested (out of scope test request)	QA-NTC007/23	TA-2021/3206	**DMR/MPT version dmr-3.40.00.0006** The frequency allocation on shared sites should not include the 8th channel above and below the receiving channel as that could cause interference.

3.5 FIXED STATIONS AND CONSOLES

MAKE	MODEL	APPROVED	TRUNKED APPROVED	TFR APPROVAL NUMBER	ICASA TYPE APPROVAL CERTIFICATE	COMMENTS
SOS	S034	Yes	No	Tel. Rad 035/04	Not applicable.	Based on Tait headset.
Emcom	Kopano	Yes	No	QA-NTC006/21	Not applicable.	Based on Tait headset.

3.6 REMOTE BASE STATIONS

MAKE	MODEL	APPROVED	TRUNKED APPROVED	TFR APPROVAL NUMBER	ICASA TYPE APPROVAL CERTIFICATE	COMMENTS
EMCOM	KOPANO	Yes	N/A	QA-NTC006/12 Ver. 1	Not applicable.	The base unit houses a TM8225 mobile radio (approved radio - report no. REP- 00044)

3.7 RADIOS FOR TELEMETERS

MAKE	MODEL	APPROVED	TFR APPROVAL NUMBER	ICASA TYPE APPROVAL CERTIFICATE	COMMENTS
DAKA	DT155	Yes Condition apply	QA-NTC014/14	0044272	Pre-emphasis is applied at the transmitter, but no de-emphasis at the receiver. Does not comply with the audio frequency response (Tx & Rx) and adjacent channel power. Therefore the radio is acceptable to be used with telemeters (data applications) at Transnet with reference to standard ETSI EN300 113-1.
Friendcom	FC-301/D	Yes RF only	QA-NTC006/11	TA-2009/756	RX audio frequency response not acceptable. Tx audio distortion too high. The RF performance of the radio is acceptable.

3.8 POWER UNITS

MAKE	MODEL	TYPE	APPROVED	TFR APPROVAL NUMBER	COMMENTS
Mean Well	SD 200C-12 48 V to 12 V 16.7 A	DC – DC converter	No	-----	High output voltage noise. No alarms available & no fuse provided in the output line on the converter. QA-NTC004/08.
Mean Well	SD-100D-24 110 V to 24 V 4.2 A	DC – DC converter	No	-----	High output voltage noise. No alarms available & no fuse provided in the output line on the converter. QA-NTC007/08.
Mean Well	SD-100B-12 24 V to 12 V 8.5 A	DC – DC converter	Yes	QA-NTC006/08	
Mean Well	SE-600-24 AC to 24 V DC 25 A	PSU	No	-----	High output voltage noise. QA-NTC010/11.
Mean Well	ESC-240-27	Battery charger	No	-----	Additional filtering to limit maximum ripple voltage. No alarm indicators or monitoring facilities provided with the battery charger. REP 040/06.

Orion	SMC 12R2 24V to 12 V 12 A	DC – DC converter	Yes – Condition apply	QA-NTC026/11	In line fuses to be provided. Not dust and splash proof.
SOS	004C 60V to 48 V 5 A	DC – DC converter	Yes – Condition apply	Tel.Rad 042/03	Fuse to be provided in the output line. No alarms indicators provided on the converter.
SOS	S004CR 110 V to 48 V 5 A	DC – DC converter	Yes – Condition apply	Tel.Rad 042/04	Fuse to be provided in the output line. No alarms available on the converter.
SOS	S004A 48V 48 V to 12 V 12 A	DC – DC converter	Yes – Condition apply	QA-NTC008/08	Input and output terminals to be labelled. Maximum current drain to be indicated. Fuses to be provided in the input and the output lines. No alarms available on the converter.
SOS	S104C 60VLS 48 V 10 A	PSU	Yes	QA-NTC017/11	
SOS	S106B 24 V 20 A	PSU	Yes – Condition apply	QA-NTC015/11	Dust filters to be provided. Have no alarms & load shedding.
SOS	S119A 13.8 V 30 A	PSU	Yes – Condition apply	REP 00092/07	19” enclosure. Output ratings to be indicated on the PSU.
SOS	S130A 13.8 V 30 A	PSU	Yes – Condition apply	REP 00094/08	In line fuse to be included in the battery line if not equipped. Output ratings to be indicated on the PSU.
Tait	PMU 13.8 V 15 A	PSU & Battery Charger	Yes – Condition apply	QA-NTC002/05	The load shed hysteresis to be increased to 2 V.

3.9 BATTERIES

MAKE	MODEL	TYPE	APPROVED	TFR APPROVAL NUMBER	COMMENTS
CSB	TPL121500AFR	Sealed Lead Acid	Yes	QA-NTC003/18	12 V 150 Ah battery 547 mm x 124.8 mm x 320.3 mm

Deltec Power Distributors Pty LTD.	CNFJ-120	Lead Crystal	Yes	-----	12 V 120 Ah battery 405 cm x 170 cm x 240 cm Deployment of batteries to evaluate them in the actual environmental conditions will be required, especially where equipment has to stay powered after load shedding has occurred.
Emcom	EB48-100LifeP04	Sealed Lithium Ion Acid	Yes	QA-NTC008/21	48 V 100 Ah battery 400 mm x 442 mm x 176 mm

3.10 DUPLEXERS & COMBINERS

MAKE	MODEL	APPROVED	TFR APPROVAL NUMBER	COMMENTS
Webb	DU 400/6 Duplexer	Yes	Tel. Rad 001/01	
Webb	4-Port Tx-Rx Combiner	Yes	QA-NTC001/12	All combiners procured must be inspected by QA NTC department (due to combiner critical adjustments) prior delivery to Transnet/TFR regions.

3.11 LINE BRANCHING UNITS

MAKE	MODEL	APPROVED	TFR APPROVAL NUMBER	COMMENTS
Owl II	RP-013	Yes – Condition apply	REP 058/06	

3.12 ANTENNAE

MAKE	MODEL	APPROVED	TFR APPROVAL NUMBER	COMMENTS
Amphenol Jaybeam	7018450 12 dBd Yagi	Yes	QA-NTC010/12	
Amphenol Jaybeam	7536000 6 dBd Collinear	Yes	QA-NTC010/12	
Amphenol Jaybeam	7148455 4 stack dipole	Yes	QA-NTC014/09	15° down tilt

Powerlane	Eagle 450Y3 3 Element Yagi	Yes	QA-NTC012/08	
Sinclair Technologies	SY307-SF3SNM 9 dBd Yagi	Yes	QA-NTC010/12	
Sinclair Technologies	SC329-HF2SNM 6 dBd Collinear	Yes	QA-NTC010/12	6° down tilt
Sirio	SPO440-8 5 dBd Collinear	Yes	QA-NTC024/11	
Webb	HD460/4 4-stack Dipole	Yes	QA NTC 014/09	
Webb	SM 450/5 5 dBd Collinear	Yes	REP 00066/06	
Webb	SM 450/6 6 dBd Collinear	Yes	QA-NTC010/12	
Webb	TRD 150GLS Low profile train antenna	Yes - Condition apply	QA-NTC023/11	TRD 150GLS VHF train antenna: VHF and GSM systems to be connected to minimise Rx desensing.
Webb	TRD 450GLS Low profile train antenna	Yes - Condition apply	QA-NTC023/11	TRD 450GLS UHF train antenna: UHF, WiFi and GPS systems to be connected to minimise Rx desensing.
Webb	TRD450 MIMO	Yes (Condition apply)	TFR-RNT-QA-NTC011/22	
Webb	TRD1000	Yes (Condition apply)	TFR-RNT-QA-NTC005/22	IR (Iridium) Low Profile train antenna. Frequency band: (Iridium 1616.0 MHz to 1626.0 MHz), GSM / WiFi 900 MHz; 1.8 GHz & 2.4 GHz bands, GPS receiving antenna 1.2276 GHz & 1.57542 GHz
Webb	TRD 4067	Yes	QA-NTC006/15	

Webb	Y460/7 7 Element Yagi	Yes	QA-NTC024/11 ver 2	
Webb	Y460/12 12 Element Yagi	Yes	QA-NTC010/12	
Powerlane	Eagle 450 Folded dipole	No	-----	Radiating power loss is unacceptably high. Report no. QA-NTC 012/08.
Powerlane	Eagle 450Y8 8 Element Yagi	No	-----	Low gain of antenna is unacceptable. Report no. QA-NTC 012/08.

3.13 COAXIAL CABLES

MAKE	MODEL	APPROVED	TFR APPROVAL NUMBER	COMMENTS
Times Microwave Systems	LMR100A	Yes	QA-NTC 018/11	
Times Microwave Systems	LMR195DB & UF	Yes	QA-NTC 018/11	
Times Microwave Systems	LMR240DB & UF	Yes	QA-NTC 018/11	
Times Microwave Systems	LMR400DB & UF	Yes	QA-NTC 018/11	
Amphenol	TEB4001UF	No	-----	Insertion loss too high – does not comply with the manufacturer's claimed specification.

3.14 RF SURGE SUPPRESSOR

MAKE	MODEL	APPROVED	TFR APPROVAL NUMBER	COMMENTS
Telegärtner	Series N 40 Watt.	Yes	QA-NTC 002/10	

4. APPLICABLE DOCUMENTATION

APPLICABLE

DOCUMENT NO.	DESCRIPTION	LOCATION
Act No. 36 of 2005 as amended Act No. 1 of 2014 (Date:07 April 2014)	Electronic Communications Amendment Act, 2013.	Internal -Manager, Spectrum Management
BBD2051 version 2 (Date:04 January 2016)	Compliance Manual to the Independent Communications Authority of South Africa (ICASA) Frequency Spectrum Regulations, Directive relating to the procurement of electronic communications equipment facilities in Transnet	Manager, Spectrum Management
BBD8635 version 8.1 (Date:27 June 2014)	Technical Specification and Methods of Measurement for Angle Modulated Radio Equipment.	Internal -Manager, Quality Assurance National Test Centre

END OF DOCUMENT