

Report Reference ID:	309138-2TRFWL
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Title 47 – Telecommunication
Chapter I – Federal Communications Commission
Subchapter A – General
Part 24 – Personal Communication Services
Subpart E – Broadband PCS

Applicant:

TEKO Telecom Srl.
Via Meucci, 24/a
I-40024 Castel S. Pietro Terme (BO) (Italy)

Apparatus:

Enhanced Power Remote Unit

TRL8SC1925AT

FCC ID:

XM2-EP8SC1925

Testing laboratory:

Nemko Italy Spa
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	Name and title	Date
Tested by:	P. Barbieri, Wireless/EMC Specialist	2016-06-24
Reviewed by:	Curianis	2016-06-24
	G. Curioni, Wireless/EMC Specialist	20.0 00 21

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## Table of contents

Continu 1	Panert augment	
1.1	Report summary4 Test specification4	
1.2	Statement of compliance	2
1.3	Exclusions	2
1.4	Registration number	2
1.5	Test report revision history	2
1.6	Limits of responsibility	2
<b>Section 2:</b> \$2.1	Summary of test results 5 FCC Part 24, test results	
<b>Section 3:</b> 1 3.1	Equipment under test (EUT) and application details6 Applicant details6	
3.2	Modular equipment	6
3.3	Product details	6
3.4	Application purpose	6
3.5	Composite/related equipment	7
3.6	Sample information	7
3.7	EUT technical specifications	7
3.8	Accessories and support equipment	8
3.9	Operation of the EUT during testing	9
3.10	EUT setup diagram	9
Section 4:   4.1	Engineering considerations	
4.2	Deviations from laboratory tests procedures	10
4.3	Technical judgment	10
<b>Section 5:</b> 5.1	Test conditions	11
5.2	Test conditions, power source and ambient temperatures	1
5.3	Measurement uncertainty	12
5.4	Test equipment	12
Appendix A Clause 935	A: Test results	13
Clause 935	210 D05v01 (3.3) Out of band rejection	14
Clause 24.2	238(b) Occupied bandwidth	15
	232(a) Peak output power at RF antenna connector	
Clause 24.2	238(a) Spurious emissions at RF antenna connector	23





Clause 24.238(a) Radiated Spurious emissions	3′
Appendix B: Block diagrams of test set-ups	39
Appendix C: EUT Photos	40



Specification: FCC 24

## Section 1: Report summary

#### 1.1 Test specification

**Specifications** 

Part 24 Subpart E, Broadband PCS

### 1.2 Statement of compliance

#### Compliance

In the configuration tested the EUT was found compliant

Yes ⊠ No □

This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko Canada Inc. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 24. Radiated tests were conducted in accordance with ANSI C63.4-2003.

#### 1.3 Exclusions

**Exclusions** 

None

#### 1.4 Registration number

Test site FCC
ID number

176392 (3 m Semi anechoic chamber)

## 1.5 Test report revision history

•	
Revision #	Details of changes made to test report
TRF	Original report issued
R1TRF	

### 1.6 Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

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Product: TRL8SC1925AT

## Section 2: Summary of test results

Part	Methods	Test description	Verdict
	§ 935210 D05v01 (3.2)	AGC threshold	Pass
	§ 935210 D05v01 (3.3)	Out of band rejection	Pass
§24.238(b)	§ 935210 D05v01 (3.4)	Occupied bandwidth	Pass
§24.232(a)	§ 935210 D05v01 (3.5)	Peak output power at RF antenna connector	Pass
§24.238(a)	§ 935210 D05v01 (3.6)	Spurious emissions at RF antenna connector	Pass
§24.238(a)	§ 935210 D05v01 (3.8)	Radiated spurious emissions	Pass
§24.235	§ 935210 D05v01 (3.7)	Frequency stability	N/A a)

#### Notes:

a) NOT APPLICABLE: Modulation/frequency conversion circuitry not in use. No frequency change in EUT (input and output have same frequency)



Specification: FCC 24

# Section 3: Equipment under test (EUT) and application details

3.1 Applicant of	lotaile		
		Tales Tales are Orl	
Applicant	Name:	Teko Telecom Srl	
complete	Federal		
business name	Registration	0018963462	
	Number (FRN):		
	Grantee code	XM2	
Mailing address	Address:	Via Meucci, 24/a	
	City:	Castel S. Pietro Terme	
	Province/State:	Bologna	
	Post code:	40024	
	Country:	Italy	
	Oddritry.	ricity	
3.2 Modular ed	quipment		
a) Single modular	Single modular approval		
approval	Yes □ No ⊠		
b) Limited single	Limited single modula	Limited single modular approval	
modular approval	Yes □ No ⊠		
••	<u> </u>		
00 0 1 1 1			
3.3 Product de			
FCC ID	Grantee code:	XM2	
	Product code:	-EP8SC1925	
Equipment class	B2I		
Description of	Booster		
product as it is	Model	TDL0004005AT	
marketed	name/number:	TRL8SC1925AT	
	Serial number:	1004837001	
3.4 Application	purpose		
Type of	Original certi	fication	
application	☐ Change in id	entification of presently authorized equipment	
-	Original FCC	, , , , , , , , , , , , , , , , , , , ,	
	_	nissive change or modification of presently authorized	
	equipment	institute straings of modification of proportity dutiforized	
	equipinent		



Product: TRL8SC1925AT

### Section 3: Equipment under test

3.5 Composite/related equipment		
a) Composite	The EUT is a composite device subject to an additional equipment	
equipment	authorization	
	Yes □ No ⊠	
b) Related	The EUT is part of a system that operates with, or is marketed with,	
equipment	another device that requires an equipment authorization	
	Yes □ No ⊠	
c) Related FCC ID	If either of the above is "yes":	
	☐ has been granted under the FCC ID(s) listed below:	
	is in the process of being filled under the FCC ID(s) listed below:	
	is pending with the FCC ID(s) listed below:	
	has a mix of pending and granted statues under the FCC ID(s)	
	listed below:	
	i FCC ID:	
	ii FCC ID:	

3.6 Sample information		
Receipt date:	2016-06-20	
Nemko sample ID number:		

3.7 EUT technical specifications		
Operating band:	Down Link 1930-1995 MHz; Up Link 1850-1915 MHz	
Operating frequency:	Wideband	
Modulation type:	GSM, EDGE, CDMA, WCDMA, LTE (QAM and QPSK)	
Occupied bandwidth:	GSM and EDGE: 200 kHz; CDMA: 1,25 MHz,	
	WCDMA: 5 MHz LTE: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz	
Channel spacing:	standard	
Emission	GSM and EDGE: GXW;	
designator:	CDMA, WCDMA: F9W,	
	LTE: D7W	
RF Output	Down Link: 31dBm (1,25W) Up Link: N.A. (The EUT does not transmit over the air in the up-link direction)	
Gain	Down Link: 36dB Up Link: N.A. (The EUT does not transmit over the air in the up-link direction)	
Antenna type:	External Antenna is not provided, equipment that has an external 50 $\Omega$ RF connector	
Power source:	100-240 Vac	



Specification: FCC 24

### Section 3: Equipment under test

Item # 1  Type of equipment: Master Unit - Subrack Brand name: Teko Telecom srl Model name or number: SUB-TRX-PSU Serial number: 101083001 Nemko sample number: Connection port: 1280 Telecom srl Model lame or number: 101083001 Nemko sample number: 1010842253 Nemko sample number: 110942253 Nemko sample number: 110942253 Nemko sample number: 110942253 Nemko sample number: 11087007 Nemko sample number: 11087007 Nemko sample number: 110679007 Nemko sample number: 110879007 Nemko sample number: 110879004	3.8 Accessories and support equipment			
Item # 1  Type of equipment: Master Unit - Subrack Brand name: Teko Telecom srl Model name or number: SUB-TRX-PSU Serial number: 101083001 Nemko sample number: Cable length and type: Item # 2  Type of equipment: Master Unit - Management Module Brand name: Teko Telecom srl Model name or number: TSPV-R Serial number: 110942253 Nemko sample number: Cable length and type: Item # 3  Type of equipment: Master Unit - Optical Module Brand name: Teko Telecom srl Model name or number: Connection port: LAN port Cable length and type: Item # 3  Type of equipment: Master Unit - Optical Module Brand name: Teko Telecom srl Model name or number: 110679007 Nemko sample number: Serial number: 110679007 Nemko sample number: Cable length and type: Item # 4  Type of equipment: Master Unit - Power Supply Brand name: Teko Telecom srl Model name or number: Teko Telecom srl				
Brand name: Teko Telecom srl  Model name or number: SUB-TRX-PSU  Serial number: 101083001  Nemko sample number:  Cable length and type:  Item # 2  Type of equipment: Master Unit – Management Module  Brand name: Teko Telecom srl  Model name or number: TSPV-R  Serial number: 110942253  Nemko sample number: LAN port  Cable length and type:  Item # 3  Type of equipment: Master Unit – Optical Module  Brand name: Teko Telecom srl  Model name or number: TRU4W-S-M  Serial number: 11094253  Type of equipment: Master Unit – Optical Module  Brand name: Teko Telecom srl  Model name or number: 11094254  Connection port: LAN port  Cable length and type:  Braid name: 11094255  Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment: Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: Teko Telecom srl  Model name or number: Teko Telecom srl  Model name: O81063004  Nemko sample number:		ortained acceptance acca to excision the Eo F daring toothing.		
Brand name: Teko Telecom srl  Model name or number: SUB-TRX-PSU  Serial number: 101083001  Nemko sample number:  Cable length and type:  Item # 2  Type of equipment: Master Unit – Management Module  Brand name: Teko Telecom srl  Model name or number: TSPV-R  Serial number: 110942253  Nemko sample number: LAN port  Cable length and type:  Item # 3  Type of equipment: Master Unit – Optical Module  Brand name: Teko Telecom srl  Model name or number: TRU4W-S-M  Serial number: 11094253  Type of equipment: Master Unit – Optical Module  Brand name: Teko Telecom srl  Model name or number: 11094254  Connection port: LAN port  Cable length and type:  Braid name: 11094255  Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment: Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: Teko Telecom srl  Model name or number: Teko Telecom srl  Model name: O81063004  Nemko sample number:	Type of equipment:	Master Unit - Subrack		
Model name or number: Serial number: 101083001 Nemko sample number: Connection port: Cable length and type: Item # 2 Type of equipment: Brand name: Model name or number: TSPV-R Serial number: Nemko sample number: Connection port: LAN port Cable length and type: Item # 3 Type of equipment: Master Unit – Management Module Brand name: 110942253 Nemko sample number: Connection port: LAN port Cable length and type: Item # 3 Type of equipment: Master Unit – Optical Module Brand name: Teko Telecom srl Model name or number: TTRU4W-S-M Serial number: Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit) Cable length and type: Item # 4 Type of equipment: Master Unit – Power Supply Brand name: Teko Telecom srl Master Unit – Power Supply Brand name: Teko Telecom srl Master Unit – Power Supply Brand name: Teko Telecom srl Master Unit – Power Supply Brand name: Teko Telecom srl Master Unit – Power Supply Brand name: Teko Telecom srl Model name or number: Serial number: O81063004 Nemko sample number:				
Serial number: 101083001 Nemko sample number:				
Nemko sample number: Connection port: Cable length and type: Item # 2  Type of equipment:  Master Unit – Management Module Brand name: Model name or number: Serial number: Connection port: LAN port Cable length and type: Item # 3  Type of equipment: Master Unit – Optical Module Brand name: Teko Telecom srl Module Brand name: Topto Telecom srl Module Serial number: Topto Telecom srl Module Toptical Mo				
Connection port: Cable length and type: Item # 2  Type of equipment:				
Cable length and type:  Item # 2  Type of equipment:				
Item # 2  Type of equipment: Master Unit – Management Module Brand name: Teko Telecom srl Model name or number: TSPV-R Serial number: 110942253 Nemko sample number: Connection port: LAN port Cable length and type: Item # 3  Type of equipment: Master Unit – Optical Module Brand name: Teko Telecom srl Model name or number: TTRU4W-S-M Serial number: 110679007 Nemko sample number: Optical port (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type: Item # 4  Type of equipment: Master Unit – Power Supply Brand name: Teko Telecom srl Model name or number: Teko Telecom srl Master Unit – Power Supply Brand name: Teko Telecom srl Model name or number: TPSU/AC Serial number: 081063004 Nemko sample number:	· · · · · · · · · · · · · · · · · · ·			
Brand name: Teko Telecom srl  Model name or number: TSPV-R Serial number: 110942253  Nemko sample number: Connection port: LAN port Cable length and type: Item # 3  Type of equipment: Master Unit – Optical Module Brand name: Teko Telecom srl  Model name or number: TTRU4W-S-M Serial number: 110679007  Nemko sample number: Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type: Item # 4  Type of equipment: Master Unit – Power Supply Brand name: Teko Telecom srl  Model name or number: TPSU/AC Serial number: 081063004  Nemko sample number:	• • • • • • • • • • • • • • • • • • • •			
Brand name: Teko Telecom srl  Model name or number: TSPV-R Serial number: 110942253  Nemko sample number: Connection port: LAN port Cable length and type: Item # 3  Type of equipment: Master Unit – Optical Module Brand name: Teko Telecom srl  Model name or number: TTRU4W-S-M Serial number: 110679007  Nemko sample number: Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type: Item # 4  Type of equipment: Master Unit – Power Supply Brand name: Teko Telecom srl  Model name or number: TPSU/AC Serial number: 081063004  Nemko sample number:	Type of equipment:	Master Unit – Management Module		
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Nemko sample number:  Connection port:  LAN port  Cable length and type:  Item # 3  Type of equipment:  Master Unit – Optical Module  Brand name:  Teko Telecom srl  Model name or number:  Serial number:  110679007  Nemko sample number:  Connection port:  DL/UL RF connector (to connect to the base station)  Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment:  Master Unit – Power Supply  Brand name:  Model name or number:  TPSU/AC  Serial number:  081063004  Nemko sample number:	Model name or number:			
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Connection port:  Cable length and type:  Item # 3  Type of equipment:  Master Unit — Optical Module  Brand name:  Teko Telecom srl  Model name or number:  TTRU4W-S-M  Serial number:  110679007  Nemko sample number:  Connection port:  DL/UL RF connector (to connect to the base station)  Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment:  Master Unit — Power Supply  Brand name:  Model name or number:  Model name or number:  TPSU/AC  Serial number:  081063004  Nemko sample number:	Nemko sample number:			
Cable length and type:  Item # 3  Type of equipment:	•	LAN port		
Item # 3  Type of equipment: Master Unit – Optical Module Brand name: Teko Telecom srl Model name or number: TTRU4W-S-M Serial number: 110679007 Nemko sample number: Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type: Item # 4  Type of equipment: Master Unit – Power Supply Brand name: Teko Telecom srl Model name or number: TPSU/AC Serial number: 081063004 Nemko sample number:				
Brand name: Teko Telecom srl  Model name or number: TTRU4W-S-M  Serial number: 110679007  Nemko sample number:  Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment: Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:				
Brand name: Teko Telecom srl  Model name or number: TTRU4W-S-M  Serial number: 110679007  Nemko sample number:  Connection port: DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment: Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	Type of equipment:	Master Unit – Optical Module		
Serial number:  Nemko sample number:  Connection port:  DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment:  Master Unit – Power Supply  Brand name:  Teko Telecom srl  Model name or number:  TPSU/AC  Serial number:  081063004  Nemko sample number:		Teko Telecom srl		
Nemko sample number:  Connection port:  DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment:  Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	Model name or number:	TTRU4W-S-M		
Connection port:  DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment:  Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	Serial number:	110679007		
Connection port:  DL/UL RF connector (to connect to the base station) Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment:  Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	Nemko sample number:			
Optical port (to connect to remote unit)  Cable length and type:  Item # 4  Type of equipment: Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	·	DL/UL RF connector (to connect to the base station)		
Item # 4  Type of equipment: Master Unit – Power Supply  Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	·			
Type of equipment: Master Unit – Power Supply Brand name: Teko Telecom srl Model name or number: TPSU/AC Serial number: 081063004 Nemko sample number:	Cable length and type:			
Brand name: Teko Telecom srl  Model name or number: TPSU/AC  Serial number: 081063004  Nemko sample number:	Item # 4			
Model name or number: TPSU/AC Serial number: 081063004 Nemko sample number:	Type of equipment:	Master Unit – Power Supply		
Serial number: 081063004 Nemko sample number:	Brand name:	Teko Telecom srl		
Nemko sample number:	Model name or number:	TPSU/AC		
	Serial number:	081063004		
	Nemko sample number:			
1	Connection port:			
Cable length and type:	Cable length and type:			



Specification: FCC 24

#### 3.9 Operation of the EUT during testing

**Details:** 

In down-link direction, normal working at max gain with max RF power output.

### 3.10 EUT setup diagram

In this system, Remote Unit is the EUT. Master Unit includes only management module and optical module (to convert RF signal in optical signal in down link direction and viceversa optical signal in RF signal in up link direction). As described in "Operational description", master unit is connected directly to base station, so the system doesn't use another equipment (under another FCC ID) to exercise the EUT. Signal generator is linked directly to the RF connector of optical module in the Master Unit.

#### Test setup for output power, occupied bandwidth, spurious emissions:



#### **Procedure**

Connect the signal modulated generator to the input of the EUT, so that the EUT works at the max gain. Raise the input level to the EUT until reach the maximum output power. Connect the spectrum analyzer to the RF output connector of the EUT.



Product: TRL8SC1925AT

## Section 4: Engineering considerations

7				
4.1 Modificatio	ns incorporated in the EUT			
Modifications	Modifications performed to the EUT during this assessment None ☑ Yes ☐, performed by Client ☐ or Nemko ☐ Details:			
4.2 Deviations	from laboratory tests procedures			
Deviations	Deviations from laboratory test procedures  None   Yes   - details are listed below:			
4.3 Technical judgment				
Judgment	None			



onditions Product: TRL8SC1925AT

Specification: FCC 24

## Section 5: Test conditions

## 5.1 Deviations from laboratory tests procedures

No deviations were made from laboratory test procedures.

5.2 Test conditions, power source and ambient temperatures				
Normal temperature, humidity and air pressure test conditions	Temperature: 15–30 °C Relative humidity: 20–75 % Air pressure: 86–106 kPa			
	When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.			
Power supply range:	The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.			



Specification: FCC 24

#### Section 5: Test conditions, continued

#### 5.3 Measurement uncertainty

Nemko S.p.A. measurement uncertainty has been calculated using the standard CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements". All calculations can be found in Nemko S.p.A. document WML1002.

5.4 Test equ			1	
Equipment	Manufacturer	Model No.	Asset/Serial No.	Next cal.
Vector Signal Generator	Agilent	N5172B EXG	MY53051238	Jan 2018
Vector Signal Generator	Agilent	E4438C ESG	MY45094485	Ago 2016
Spectrum Analyzer	Agilent	N9030A PXA	MY53120882	Jun 2016
Network Analyzer	Agilent	E5071C ENA	MY46106183	Jun 2016
V-network	R&S	ESH2-Z5	872 460/041	11/2016
Trilog Broad Band Antenna 25-2000 MHz	Schwarzbeck	VULB 9168	VULB 9168-242	06/2018
Trilog Broad Band Antenna 25-8000 MHz	Schwarzbeck	VULB 9162	VULB 9162-25	07/2018
Antenna 1-18 GHz	Schwarzbeck	STLP 9148	STPL 9148-123	06/2018
Double ridge waveguide horn	RFspin	DRH40	061106A40	08/2016
Preamplifier 18-40 GHz	Miteq	JS44	1648665	12/2016
Broadband preamplifier 1-18 GHz	Schwarzbeck	BBV 9718	9718-137	10/2016
EMI receiver 20 Hz ÷ 8 GHz	R&S	ESU8	100202	04/2017
EMI receiver 20 Hz ÷ 3 GHz	R&S	ESCI	100888	09/2016
Hydraulic revolving platform	Nemko	RTPL 01	4.233	NCR
Turning-table	R&S	HCT	835 803/03	NCR
Antenna mast	R&S	HCM	836 529/05	NCR
Controller	R&S	HCC	836 620/7	NCR
Spectrum Analyzer 9kHz ÷ 40GHz	R&S	FSEK	848255/005	11/2016
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	09/2016
Shielded room	Siemens	10m control room	1947	NCR
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	70	NCR
Shielded Room	Siemens	3m semi-anechoic chamber	3	NCR
Motor controller	Emco	1051-25	9012-1559	NCR
Motor controller	Emco	1061-1.521	9012-1508	NCR
Antenna Tower	Emco	2071-2	9601-1940	NCR
Controller pole/table	Emco	2090	9511-1099	NCR

N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use (\*) Equipment supplied by manufacturer's



Specification: FCC 24

## Appendix A: Test results

## Clause 935210 D05v01 (3.2) AGC threshold

Measure of EUT AGC Threshold

Test date: 2016-06-21
Test results: Pass

#### Special notes

- Narrowband amplifiers: MSK test signal used (GSM-TDMA signal)
- Broadband amplifiers: AWGN test signal used (5 MHz LTE channel)

#### Test data

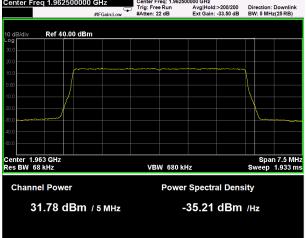


MSK signal, nominal input signal





AWGN signal, nominal input signal



AWGN signal, nominal input signal +1 dB



Specification: FCC 24

## Clause 935210 D05v01 (3.3) Out of band rejection

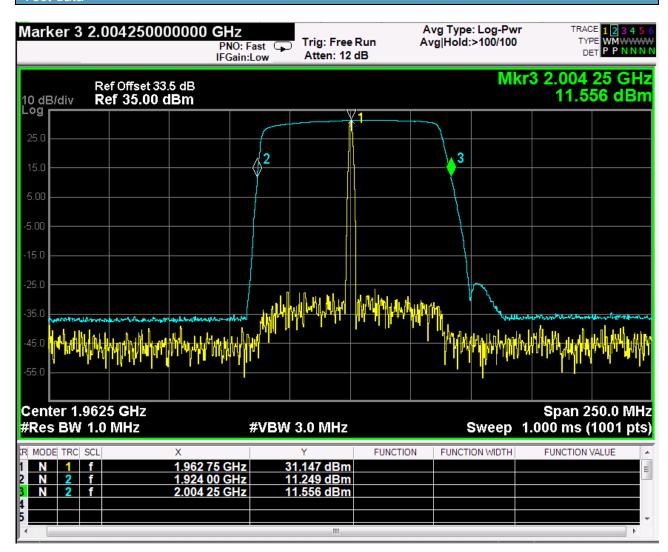
Out of Band Rejection - Test for rejection of out of band signals.

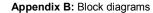
Test date: 2016-06-21
Test results: Pass

Special notes

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#### Test data







Specification: FCC 24

## Clause 24.238(b) Occupied bandwidth

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test date: 2016-06-21

Test results: Pass

#### Special notes

Narrowband amplifiers: MSK test signal used (GSM-TDMA signal)

Broadband amplifiers: AWGN test signal used (5 MHz LTE channel)

Product: TRL8SC1925AT

#### Clause 24.238(b) Occupied bandwidth, continued

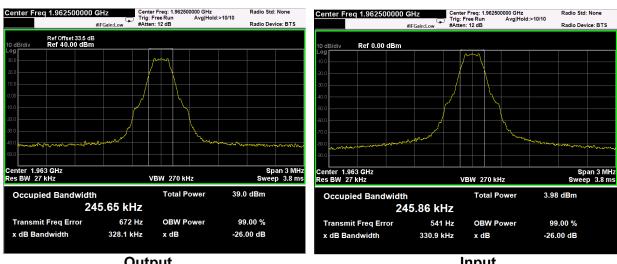
#### Test data

#### MSK signal, nominal input signal



Output Input

#### MSK signal, nominal input signal + 3dB



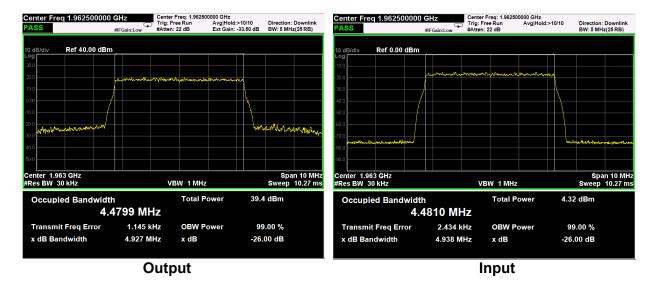
**Output** Input

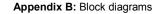
Product: TRL8SC1925AT

#### AWGN signal, nominal input signal



#### AWGN signal, nominal input signal + 3dB







Specification: FCC 24

## Clause 24.232(a) Peak output power at RF antenna connector

- (a) (1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
- (a) (2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
- (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test date: 2016-06-21

Test results: Pass

#### Special notes

Narrowband amplifiers: MSK test signal used (GSM-TDMA signal)

Broadband amplifiers: AWGN test signal used (5 MHz LTE channel)



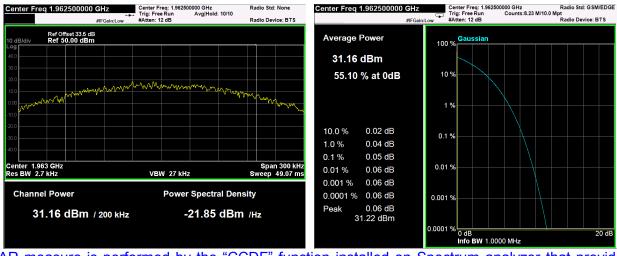
Specification: FCC 24

#### Clause 24.232(a) Peak output power at RF antenna connector

Test data

#### MSK signal, nominal input signal

Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	PAR (dB)
Down-link	MSK (GSM, 200kHz)	1962.5	31.16	1,31	0,06



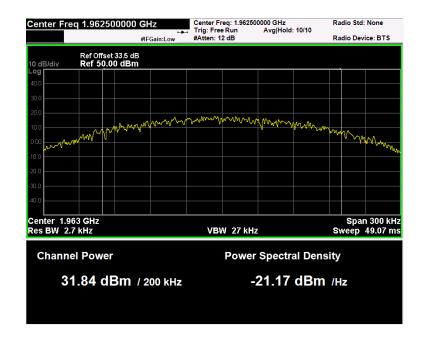
PAR measure is performed by the "CCDF" function installed on Spectrum analyzer that provides average power (the same measured with "Channel power" function), peak power and PAR.



Product: TRL8SC1925AT

#### MSK signal, nominal input signal + 3dB

Test data				
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)
Down-link	MSK (GSM, 200kHz)	1962.5	31.84	1.53





Specification: FCC 24

#### AWGN signal, nominal input signal

Test dat	a					
Directio	n Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	RF output Power (W/MHz)	PAR (dB)
Down-lir	ik AWGN (LTE, 5MHz)	1962.5	31.16	1.31	0.26	11.09



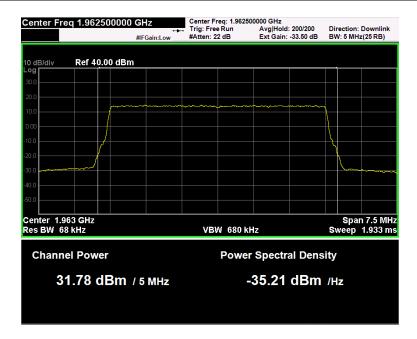
PAR measure is performed by the "CCDF" function installed on Spectrum analyzer that provides average power (the same measured with "Channel power" function), peak power and PAR.



Product: TRL8SC1925AT

#### AWGN signal, nominal input signal + 3dB

Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	RF output Power (W/MHz)
Down-link	AWGN (LTE, 5MHz)	1962.5	31.78	1.51	0.302





Specification: FCC 24

## Clause 24.238(a) Spurious emissions at RF antenna connector

a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 Log (P) dB.

Test date: 2016-06-21

Test results: Pass

#### Special notes

Narrowband amplifiers: MSK test signal used (GSM-TDMA signal)

Broadband amplifiers: AWGN test signal used (5 MHz LTE channel)



Specification: FCC 24

## Clause 24.238(a) Spurious emissions at RF antenna connector, continued

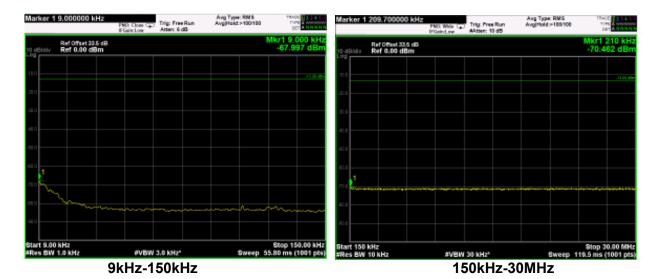
Test data			
See Plots below			
Spurious emissions me	easurement results:		
Frequency (MHz)	Spurious emission (dBm)	Limit (dBm)	Margin (dB)
Low channel			
First channel	Negligible	-13	
Mid channel			
1962,5 MHz	Negligible	-13	
High channel			
Last channel	Negligible	-13	

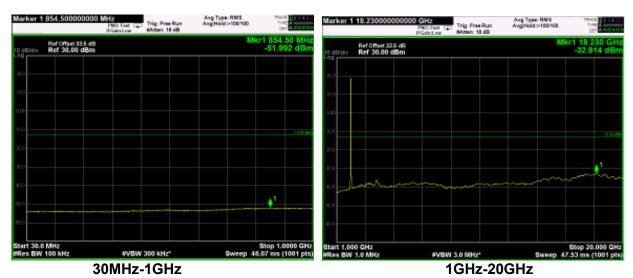
Product: TRL8SC1925AT

#### Test data: spurious emissions at antenna terminal

#### **MSK** signal

(Plots are referred to modulated carrier at the Middle Channel)

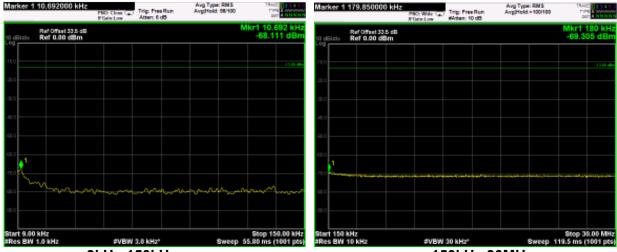




Product: TRL8SC1925AT

#### **AWGN** signal

(Plots are referred to modulated carrier at the Middle Channel)



9kHz-150kHz 150kHz-30MHz

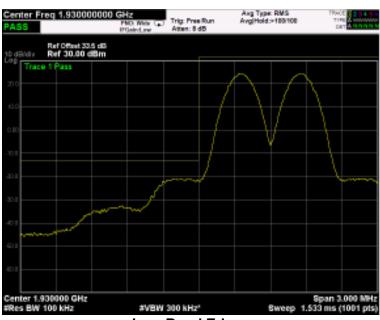


30MHz-1GHz 1GHz-20GHz

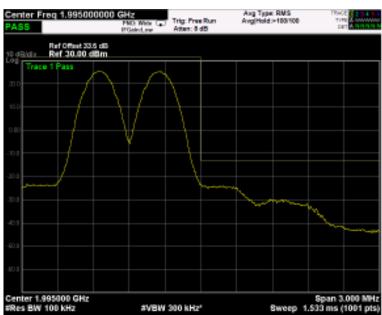
Product: TRL8SC1925AT

#### Test data, continued: band edges Inter modulation

#### MSK signal, nominal input signal



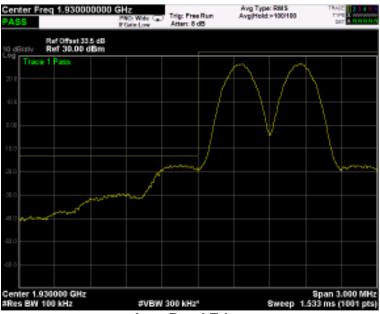
**Low Band Edge** 



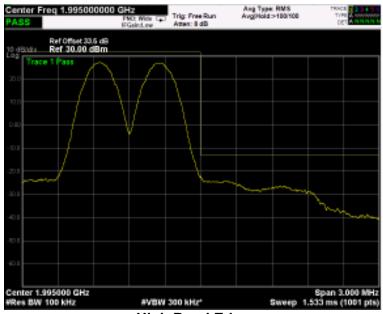
**High Band Edge** 

Product: TRL8SC1925AT

### MSK signal, nominal input signal + 3dB



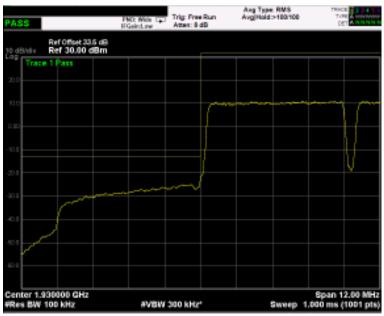
**Low Band Edge** 



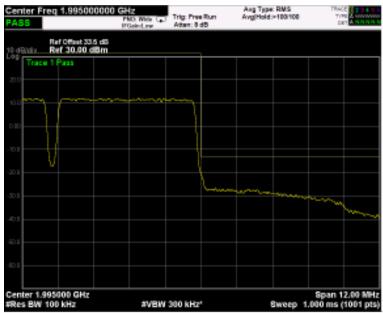
**High Band Edge** 

Product: TRL8SC1925AT

### AWGN signal, nominal input signal



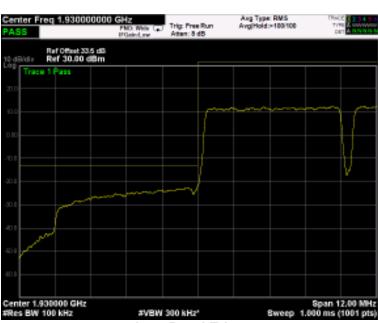
Low Band Edge



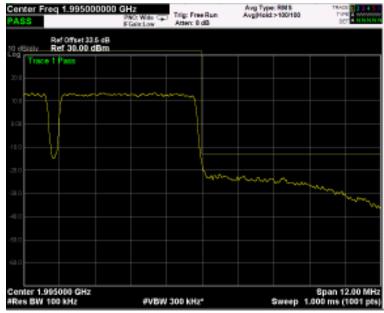
**High Band Edge** 

Product: TRL8SC1925AT

#### AWGN signal, nominal input signal + 3dB



Low Band Edge



**High Band Edge** 



Test date: 2016-06-20/21
Test results: Pass

Product: TRL8SC1925AT

Specification: FCC 24

## Clause 24.238(a) Radiated Spurious emissions

a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 Log (P) dB.

Special notes		



Specification: FCC 24

#### Clause 24.238(a) Radiated spurious emissions, continued

#### Test data

The D.U.T. was positioned according to the radiated emissions set-up

The D.U.T. antenna connector was terminated by a 50  $\Omega$  shielded dummy load.

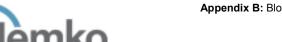
The spectrum was searched from 30 MHz to 1 GHz (RBW 100 kHz) & 1 GHz (RBW 1 MHz) to the tenth harmonic of the carrier.

There were no emissions detected above the noise floor which was at least 20 dB below the specification limit.

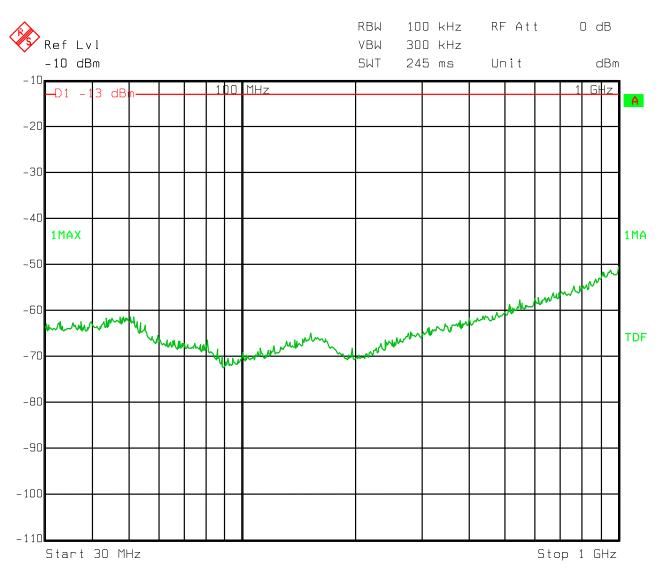
Spurious emissions measurement results:

Frequency (MHz)	Polarization. V/H	Field strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)		
Low channel	VIII	(αυμν/ιιι)	(αυμν/ιιι)	(u <i>b)</i>		
LOW CHAINICI						
Mid channel		L		L		
High channel	High channel					
_						

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.



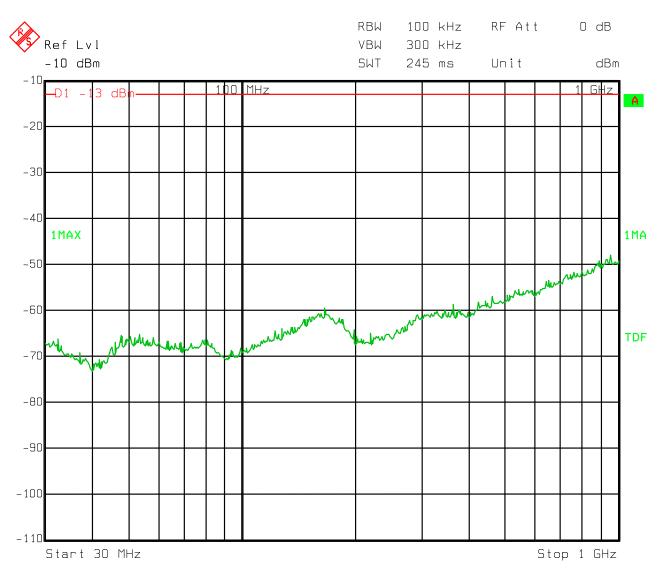
Product: TRL8SC1925AT



Date: 20.JUN.2016 15:44:10

30MHz-1GHz - H Pol

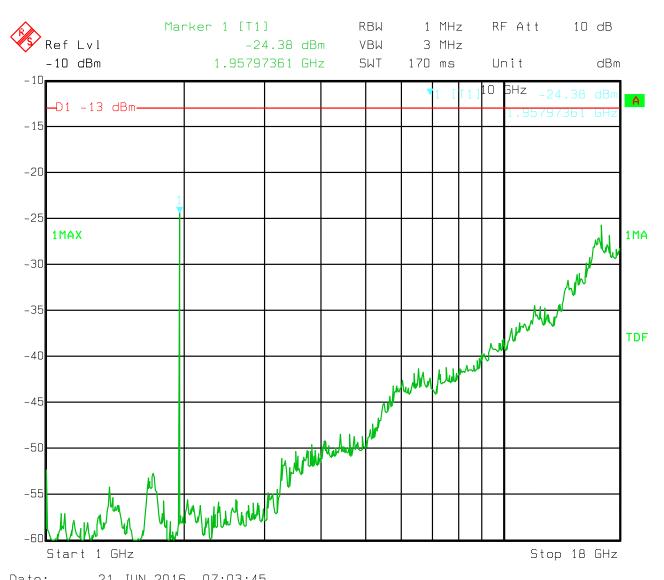




Date: 20.JUN.2016 15:46:07

30MHz-1GHz - V Pol

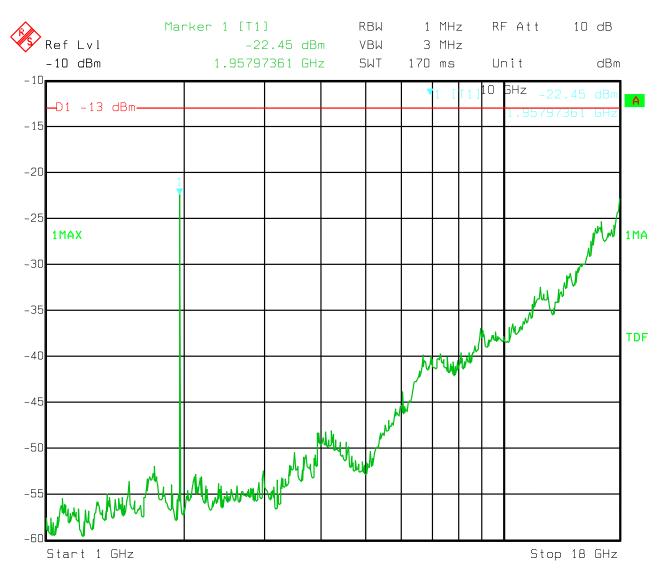




Date: 21.JUN.2016 07:03:45

1GHz-18GHz - H Pol

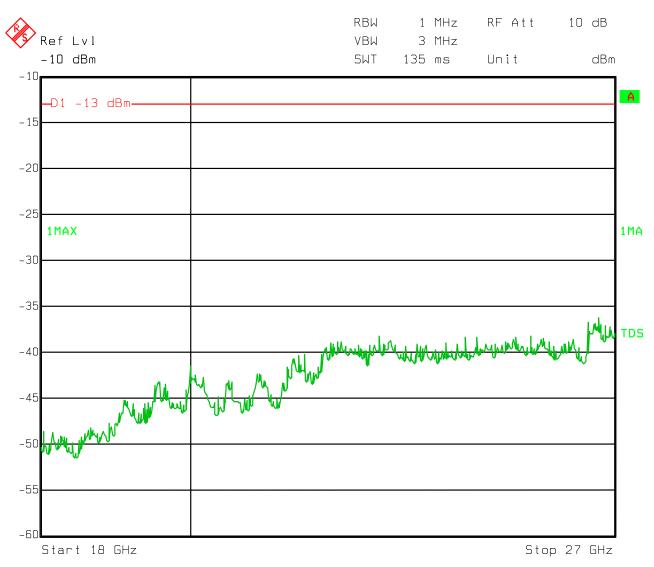




Date: 21.JUN.2016 07:00:23

1GHz-18GHz - V Pol

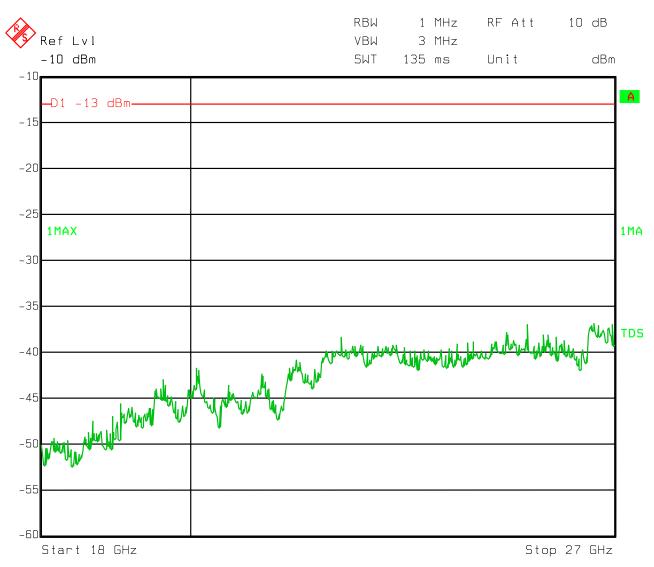




Date: 21.JUN.2016 07:41:33

18GHz-27GHz - H Pol





Date: 21.JUN.2016 07:42:52

18GHz-27GHz - V Pol



Product: TRL8SC1925AT

## Appendix B: Block diagrams of test set-ups

# Radiated emissions set-up Radio absorbing material Antenna 3 m Variable search height EUT Non-conducting 1 m 80 cm Turntable Metal ground plane To test receiver Substitution method set-up Radio absorbing material 3 m Variable search height 150 cm 1 m Metal ground plane To test receiver To signal generator

Nemko

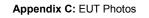
Product: TRL8SC1925AT

Specification: FCC 24

# Appendix C: EUT Photos

#### Photo Set up



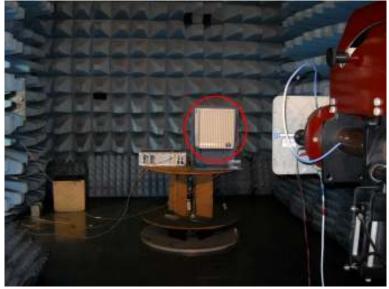


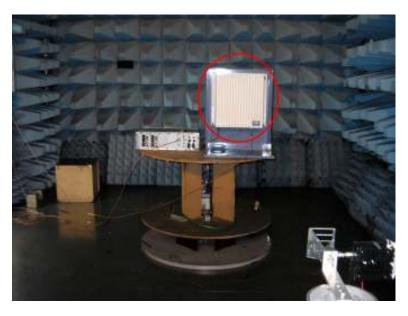
Nemko



Specification: FCC 24







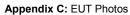


Specification: FCC 24

### Photo EUT









Product: TRL8SC1925AT

