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Report Reference ID:	253922-2_TRFWL
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Test specification:	Title 47 – Telecommunication Chapter I – Federal Communications Commission Subchapter B – Common carrier services – Part 27 – Miscellaneous wireless communications services
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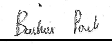
Applicant:	TEKO Telecom Srl Via Meucci, 24/a I-40024 Castel S. Pietro Terme (BO) (Italy)
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Apparatus:	Remote Unit
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FCC ID:	XM2-EP6B
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Model:	TRE7S8SC8A9S19AWAS
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Testing laboratory:	Nemko Italy S.p.A. Via Carroccio, 4 I-20853 Biassono (Italy)
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	Name and title	Date
Tested by:	 _____ G. Curioni, Wireless/EMC Specialist	2014/03/27
Reviewed by:	 _____ P. Barbieri, Wireless/EMC Specialist	2014/03/27

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Table of contents

Section 1: Report summary	3
1.1 Test specification	3
1.2 Statement of compliance	3
1.3 Exclusions	3
1.4 Registration number	3
1.5 Test report revision history	3
1.6 Limits of responsibility	3
Section 2: Summary of test results	4
2.1 FCC Part 27, test results	4
Section 3: Equipment under test (EUT) and application details.....	5
3.1 Applicant details	5
3.2 Modular equipment	5
3.3 Product details	5
3.4 Application purpose	5
3.5 Composite/related equipment.....	5
3.6 Sample information.....	5
3.7 EUT technical specifications.....	6
3.8 Operation of the EUT during testing	6
3.9 EUT setup diagram.....	6
Section 4: Engineering considerations	7
4.1 Modifications incorporated in the EUT.....	7
4.2 Deviations from laboratory tests procedures	7
4.3 Technical judgment	7
Section 5: Test conditions	8
5.1 Power source and ambient temperatures.....	8
Section 6: Measurement uncertainty	9
Section 7: Test equipment	10
Section 8: Testing data	11
8.1 Clause 27.50(b) Peak output power at RF antenna connector.....	11
8.2 Clause 27.52 RF safety	16
8.3 Clause 27.53 (c) Spurious emissions at RF antenna connector	17
8.4 Clause 27.53 (c) Radiated spurious emissions	28
8.5 Clause 27.53(f) Radiated spurious emissions within 1559–1610 MHz band.....	31
8.6 Clause 27.54 Frequency stability	34
8.7 Clause 2.1049 Occupied bandwidth.....	36
Section 9: Filter Frequency Response.....	41
Section 10: Block diagrams of test set-ups	42
Section 11: EUT photos.....	43

	Section 1: Report summary	Product: TRE7S8SC8A9S19AWAS

Section 1: Report summary

1.1 Test specification	
Specifications	Part 27 – Miscellaneous wireless communications services

1.2 Statement of compliance	
Compliance	<p>In the configuration tested the EUT was found compliant Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>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 27. Radiated tests were conducted in accordance with ANSI C63.4-2003.</p>

1.3 Exclusions	
Exclusions	None

1.4 Registration number	
Registration number:	481407 (10 m Semi anechoic chamber)

1.5 Test report revision history	
Revision #	Details of changes made to test report
TRF	Original report issued
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1.6 Limits of responsibility	
<p>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.</p> <p>This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.</p> <p>Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.</p> <p>Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.</p> <p>Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.</p>	




Section 2: Summary of test results

2.1 FCC Part 27, test results

Part	Test description	Verdict
§27.50(b)	Peak output power at RF antenna connector	Pass
§27.52	RF safety	N/A a)
§27.53(c)	Spurious emissions at RF antenna connector	Pass
§27.53(c)	Radiated spurious emissions	Pass
§27.53(f)	Radiated spurious emissions within 1559–1610 MHz band	Pass
§27.54	Frequency stability	N/A b)
§2.1049	Occupied bandwidth	Pass
§2.1047	Modulation characteristics	Pass
§2-11-04/EAB/RF	Filter Frequency Response	Pass

Notes:

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

	Section 3: Equipment under test (EUT) details	Product: TRE7S8SC8A9S19AWAS

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

3.1 Applicant details

Applicant complete business name	Name:	Teko Telecom Srl
	Federal Registration Number (FRN):	0018963462
	Grantee code	XM2
Mailing address	Address:	Via Meucci, 24/a
	City:	Castel S. Pietro Terme
	Province/State:	Bologna
	Post code:	40024
	Country:	Italy

3.2 Modular equipment

a) Single modular approval	Single modular approval Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
b) Limited single modular approval	Limited single modular approval Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

3.3 Product details

FCC ID	Grantee code:	XM2
	Product code:	-EP6B
Equipment class	B2I	
Description of product as it is marketed	Remote Unit for optical system	
	Model name/number:	TRE7S8SC8A9S19AWAS
	Serial number:	132059001

3.4 Application purpose


Type of application	<input checked="" type="checkbox"/> Original certification <input type="checkbox"/> Change in identification of presently authorized equipment Original FCC ID: _____ Grant date: _____ <input type="checkbox"/> Class II permissive change or modification of presently authorized equipment
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3.5 Composite/related equipment

a) Composite equipment	The EUT is a composite device subject to an additional equipment authorization Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
b) Related equipment	The EUT is part of a system that operates with, or is marketed with, another device that requires an equipment authorization Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
c) Related FCC ID	If either of the above is "yes": <input type="checkbox"/> has been granted under the FCC ID(s) listed below: <input type="checkbox"/> is in the process of being filled under the FCC ID(s) listed below: <input type="checkbox"/> is pending with the FCC ID(s) listed below: <input type="checkbox"/> 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

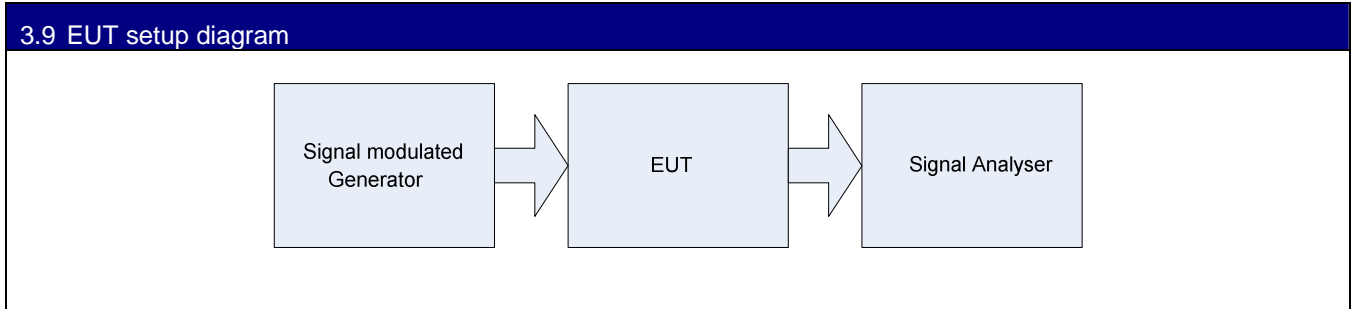
Receipt date:	2014-03-03
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	Section 3: Equipment under test (EUT) details	Product: TRE7S8SC8A9S19AWAS

Nemko sample ID number:	-----
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3.7 EUT technical specifications	
Operating band:	Down Link 746–757 MHz, Up Link 776-787 MHz
Operating frequency:	Wideband
Modulation type:	LTE (QAM and QPSK)
Occupied bandwidth:	1,4 MHz – 3 MHz – 5 MHz – 10MHz
Channel spacing:	standard
Emission designator:	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 Ω RF connector
Power source:	100-240 Vac

3.8 Operation of the EUT during testing	
Details:	In down-link direction, normal working at max gain with max RF power output



	Section 4: Engineering considerations	Product: TRE7S8SC8A9S19AWAS

Section 4: Engineering considerations

4.1 Modifications incorporated in the EUT


Modifications	Modifications performed to the EUT during this assessment None <input checked="" type="checkbox"/> Yes <input type="checkbox"/> , performed by Client <input type="checkbox"/> or Nemko <input type="checkbox"/> Details:
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4.2 Deviations from laboratory tests procedures

Deviations	Deviations from laboratory test procedures None <input checked="" type="checkbox"/> Yes <input type="checkbox"/> - details are listed below:
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4.3 Technical judgment

Judgment	None
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	Section 5: Test conditions	Product: TRE7S8SC8A9S19AWAS

Section 5: Test conditions

5.1 Power source and ambient temperatures

Normal temperature, humidity and air pressure test conditions	<p>Temperature: 15–30 °C Relative humidity: 30–60 % Air pressure: 860–1060 hPa</p> <p>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.</p>
Power supply range:	<p>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 $\pm 5\%$, for which the equipment was designed.</p>



Section 6: Measurement uncertainty

Product: TRE7S8SC8A9S19AWAS

Section 6: 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 have been performed to provide a confidence level of 95 % and can be found in Nemko S.p.A. document WML1002.



Section 7: Test equipment

Product: TRE7S8SC8A9S19AWAS

Section 7: Test equipment


Client's property:

Identification number	Description	Manufacturer model	s/n	Cal. Due
1a	Vector Signal Generator	Agilent N5182A MXG	MY48180714	May 2015
1b	Vector Signal Generator	Agilent E4438C ESG	MY45094485	Ago 2016
2a	Spectrum Analyzer	Agilent E4440A	US40420470	May 2015
2b	Spectrum Analyzer	Agilent E9020A MXA	MY48011812	Ago 2015
3	Network Analyzer	Agilent E5071B	MY42301133	Ago 2016
4	Climatic chamber	Angelantoni Hygros 600	7237	Nov 2014

Property of Nemko Italy:

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle months	Next cal.
Trilog Broad Band Antenna 25-2000 MHz	Schwarzbeck	VULB 9168	VULB 9168-242	36	02/2015
Trilog Broad Band Antenna 25-8000 MHz	Schwarzbeck	VULB 9162	VULB 9162-25	36	05/2015
Antenna 1-18 GHz	Schwarzbeck	STLP 9148	STPL 9148-123	36	02/2015
Double ridge waveguide horn	RFspin	DRH40	061106A40		08/2016
Preamplifier 18-40 GHz	Miteq	JS44	1648665		09/2014
Broadband preamplifier 1-18 GHz	Schwarzbeck	BBV 9718	9718-137	36	09/2014
EMI receiver 20 Hz ÷ 8 GHz	R&S	ESU8	100202	12	02/2015
EMI receiver 20 Hz ÷ 3 GHz	R&S	ESCI	100888	12	08/2014
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		08/2014
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530		08/2014
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
V-Network	Rohde & Schwarz	ESH2-Z5	872 460/041	12	09/2014


Note: N/A = Not applicable, NCR = No cal required, COU = Cal on use

	Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
	Test name: Clause 27.50(b) Peak output power at RF antenna connector		
	Test date: 03-27 March 2013		Test engineer: G. Curioni
	Verdict: Pass		Supply input: 100-240 Vac
	Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
	Specification: FCC Part 27		

Section 8: Testing data

8.1 Clause 27.50(b) Peak output power at RF antenna connector

§ 27.50(b) Operation within the bands: 746–763 MHz, 775–793 MHz and 805–806 MHz.
<p>(1) Fixed and base stations transmitting a signal in the 757–758 and 775–776 MHz bands must not exceed an effective radiated power (ERP) of 1000 watts and an antenna height of 305 m height above average terrain (HAAT), except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.</p>
<p>(2) Fixed and base stations transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands with an emission bandwidth of 1 MHz or less must not exceed an ERP of 1000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.</p>
<p>(3) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands with an emission bandwidth of 1 MHz or less must not exceed an ERP of 2000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts ERP in accordance with Table 2 of this section.</p>
<p>(4) Fixed and base stations transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.</p>
<p>(5) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.</p>
<p>(6) Licensees of fixed or base stations transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands at an ERP greater than 1000 watts must comply with the provisions set forth in paragraph (b)(8) of this section and §27.55(c).</p>
<p>(7) Licensees seeking to operate a fixed or base station located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands at an ERP greater than 1000 watts must:</p> <ul style="list-style-type: none"> (i) coordinate in advance with all licensees authorized to operate in the 698–763 MHz, 775–793, and 805–806 MHz bands within 120 kilometers (75 miles) of the base or fixed station (ii) coordinate in advance with all regional planning committees, as identified in §90.527 of this chapter, with jurisdiction within 120 kilometers (75 miles) of the base or fixed station

	Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
	Test name: Clause 27.50(b) Peak output power at RF antenna connector		
	Test date: 03-27 March 2013		Test engineer: G. Curioni
	Verdict: Pass		Supply input: 100-240 Vac
	Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27			

- (8) Licensees authorized to transmit in the 746–757 MHz, 758–763 MHz, 776–787 MHz, and 788–793 MHz bands and intending to operate a base or fixed station at a power level permitted under the provisions of paragraph (b)(6) of this section must provide advanced notice of such operation to the Commission and to licensees authorized in their area of operation. Licensees who must be notified are all licensees authorized to operate in the 763–775 MHz and 793–805 MHz bands under part 90 of this chapter within 75 km of the base or fixed station and all regional planning committees, as identified in §90.527 of this chapter, with jurisdiction within 75 km of the base or fixed station. Notifications must provide the location and operating parameters of the base or fixed station, including the station's ERP, antenna coordinates, antenna height above ground, and vertical antenna pattern, and such notifications must be provided at least 90 days prior to the commencement of station operation.
- (9) Control stations and mobile stations transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands and fixed stations transmitting in the 787–788 MHz and 805–806 MHz bands are limited to 30 watts ERP.
- (10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
- (11) For transmissions in the 757–758, 775–776, 787–788, and 805–806 MHz bands, maximum composite transmit power shall be measured over any interval of continuous transmission using instrumentation calibrated in terms of RMS-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, etc., so as to obtain a true maximum composite measurement for the emission in question over the full bandwidth of the channel.
- (12) For transmissions in the 746–757, 758–763, 776–787, and 788–793 MHz bands, licensees may employ equipment operating in compliance with either the measurement techniques described in paragraph (b)(11) of this section or a Commission-approved average power technique. In both instances, equipment employed must be authorized in accordance with the provisions of §27.51

Special notes
<ul style="list-style-type: none"> – The power was measured using spectrum analyzer with RMS detector / average power meter. – In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB



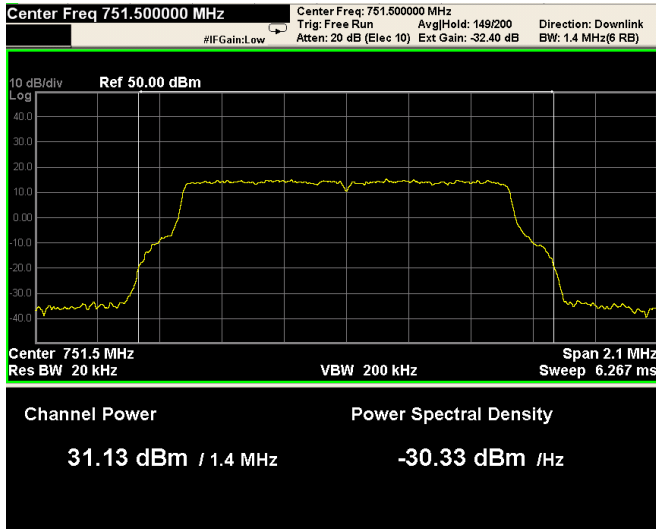
Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.50(b) Peak output power at RF antenna connector		
Test date: 03-27 March 2013		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	PAR (dB)
Down-link	LTE (QAM, 1,4MHz)	751,5	31.13	1.30	9.99
Down-link	LTE (QPSK, 1,4MHz)	751,5	31.15	1.30	9.59
Down-link	LTE (QAM, 3MHz)	751,5	31.11	1.29	10.37
Down-link	LTE (QPSK, 3MHz)	751,5	31.12	1.29	10.44
Down-link	LTE (QAM, 5MHz)	751,5	31.18	1.31	10.82
Down-link	LTE (QPSK, 5MHz)	751,5	31.11	1.29	10.15
Down-link	LTE (QAM, 10MHz)	751,5	31.11	1.29	10.72
Down-link	LTE (QPSK, 10MHz)	751,5	31.10	1.29	10.75

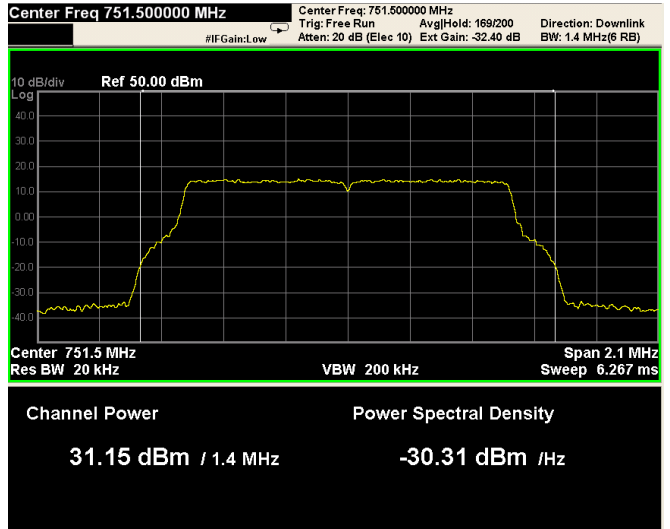


Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.50(b) Peak output power at RF antenna connector		
Test date: 03-27 March 2013		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Mod. LTE 1,4MHz (Down-link)

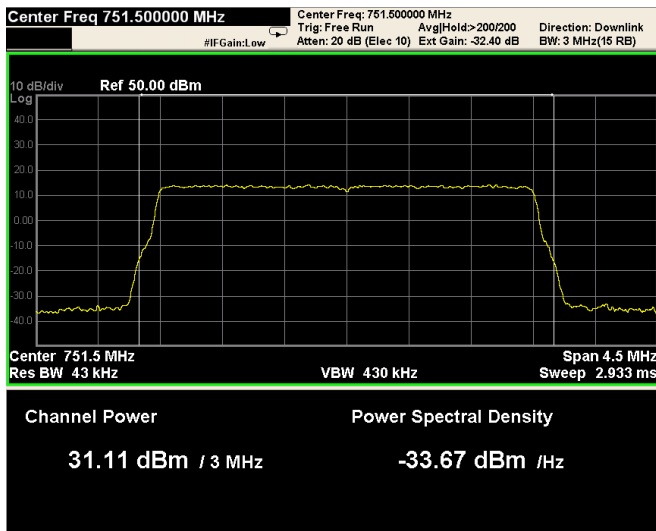


QAM

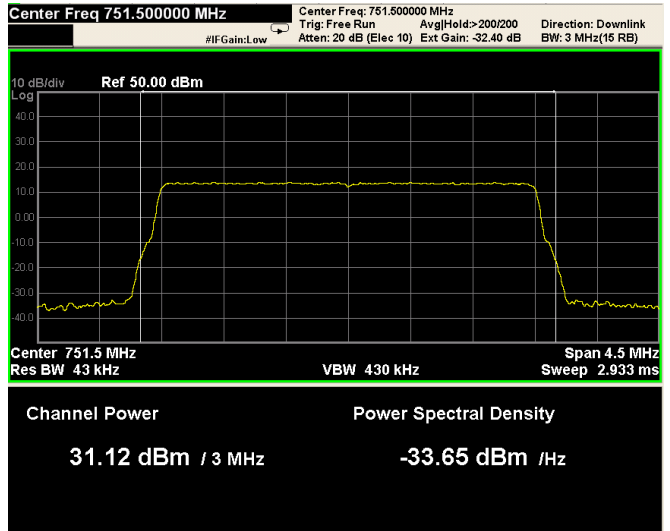


QPSK

Mod. LTE 3MHz (Down-link)



QAM

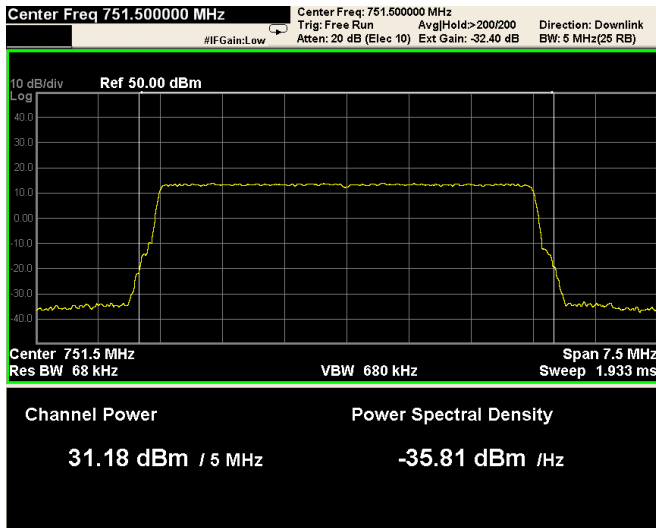


QPSK

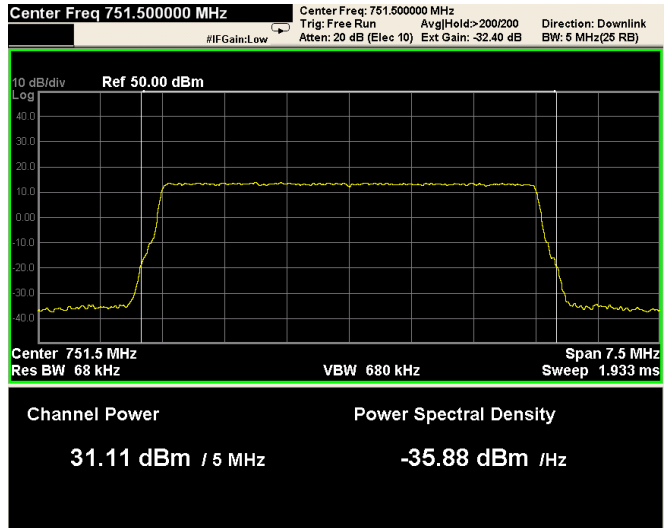


Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.50(b) Peak output power at RF antenna connector		
Test date: 03-27 March 2013		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Mod. LTE 5MHz (Down-link)

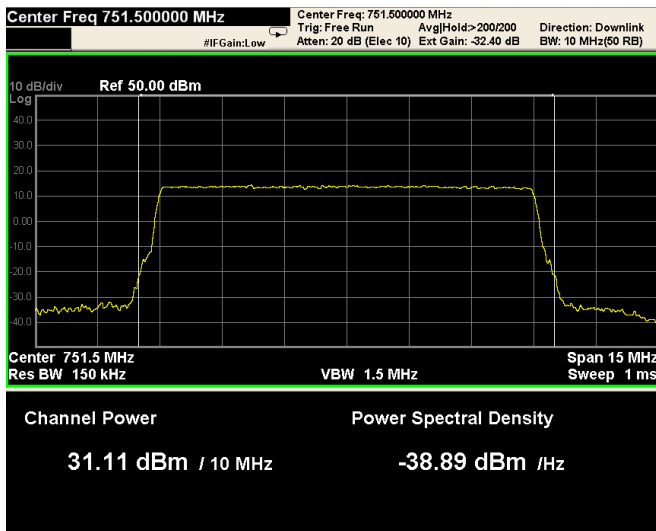


QAM

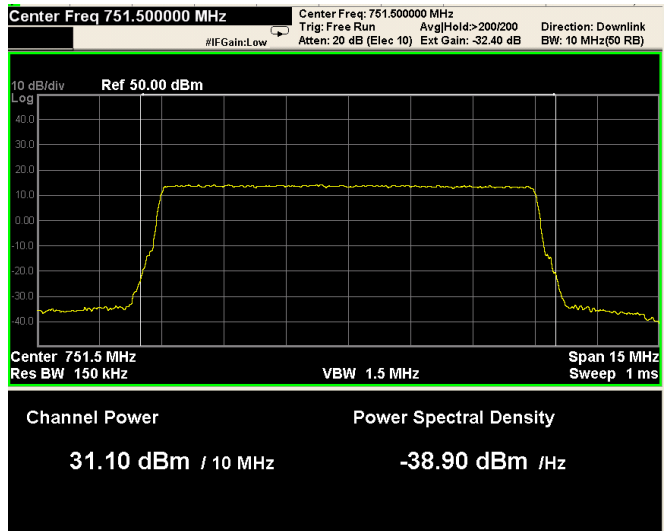


QPSK


Mod. LTE 10MHz (Down-link)



QAM



QPSK

	Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS	
	Test name: Clause 27.52 RF safety			
	Test date: 03-27 March 2014		Test engineer: G. Curioni	
	Verdict: Pass		Supply input: 100-240 Vac	
	Temperature: 25 °C		Air pressure: 860-1060 hPa	
	Relative humidity: 50 %			
Specification: FCC Part 27				

8.2 Clause 27.52 RF safety

Licenseses and manufacturers are subject to the radio frequency radiation exposure requirements specified in sections 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Special notes

The test was performed using E-field probe slowly moving towards the EUT until E-field equivalent to the maximum permitted power density was measured


Equivalent power density was calculated from electric field strength as follows:

$$S_{[mW/cm^2]} = \frac{0.1 \times E^2_{[V/m]}}{120 \times \pi} \quad S[W/m^2] = E^2[V/m]/377[\Omega]$$

where S is power density and E is electric field strength.

Test data				
Test distance (cm)	Field strength (V/m)	Equivalent power density (mW/cm ²)	Limit (mW/cm ²)	Margin (mW/cm ²)
300				
250				
200				
150				
100				
50				
30				
20				
10				
5				

NOT APPLICABLE; External Antenna is not provided.

	Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
	Test name: Clause 27.53 (c) Radiated spurious emissions		
	Test date: 03-27 March 2014		Test engineer: G. Curioni
	Verdict: Pass		Supply input: 100-240 Vac
	Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27			

8.3 Clause 27.53 (c) Spurious emissions at RF antenna connector

- (c) For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
- (1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
 - (2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
 - (3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
 - (4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
 - (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
 - (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

Special notes

- The spectrum was searched from 30 MHz to the 10th harmonic.
- RBW within 30–1000 MHz was 100 kHz and 30 kHz for bandedge; 1 MHz above 1 GHz. VBW was wider than RBW.



Section 8: Testing data	Product: TRE7S8SC8A9S19AWAS	
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Test data			
Insert plots here			
Spurious emissions measurement results:			
Frequency (MHz)	Spurious emission (dBm)	Limit (dBm)	Margin (dB)
Low channel			
First channel Down-link	Negligible	-13	
First channel Up-link	Negligible	-13	
Mid channel			
751,5 MHz Down-link	Negligible	-13	
781,5 MHz Down-link	Negligible	-13	
High channel			
Last channel Down-link	Negligible	-13	
Last channel Up-link	Negligible	-13	

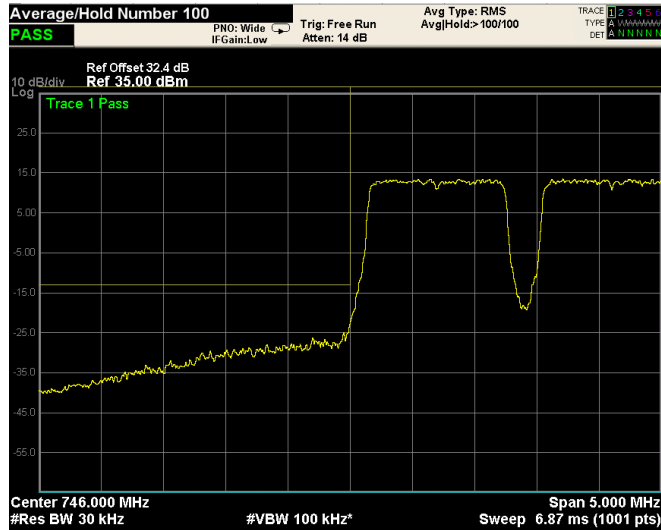
[See Plots below](#)



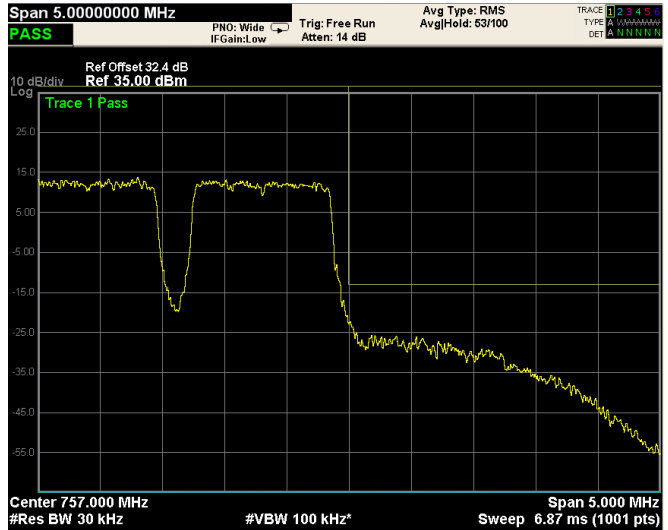
Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Test data, continued band edges Inter modulation:

Mod. LTE 1.4MHz (QAM) (Down-link)

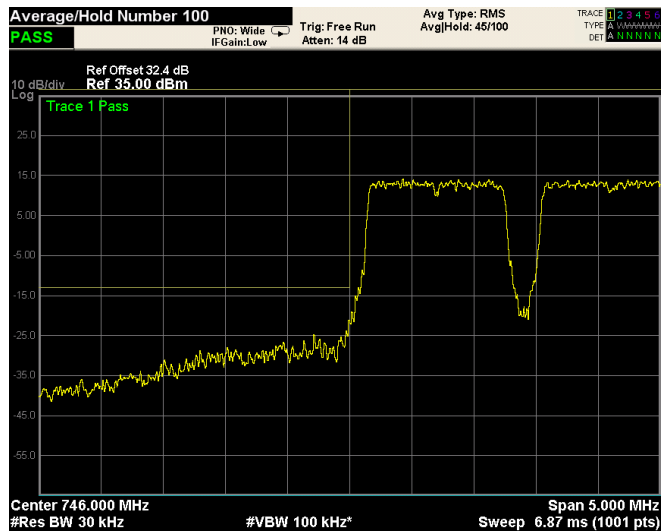


Low Band Edge

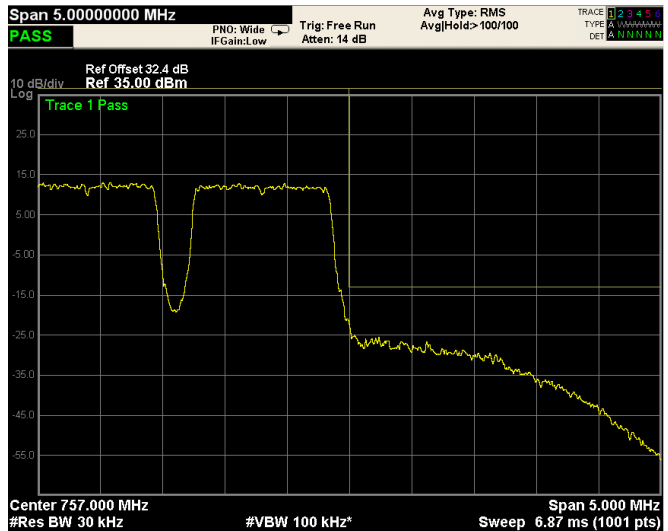


High Band Edge

Mod. LTE 1.4MHz (QPSK) (Down-link)



Low Band Edge

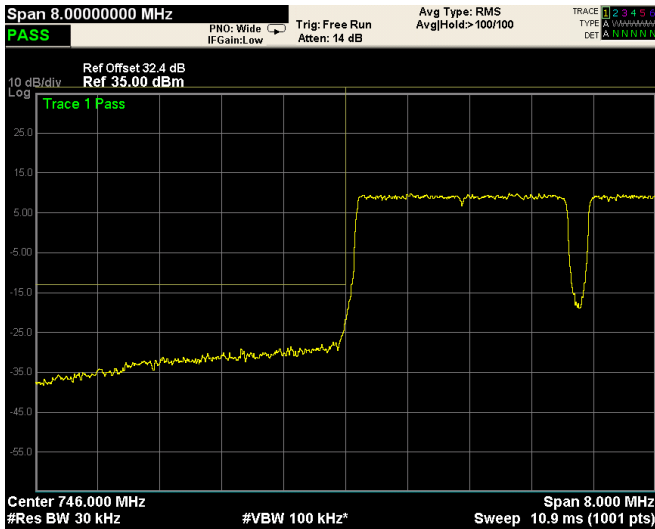


High Band Edge

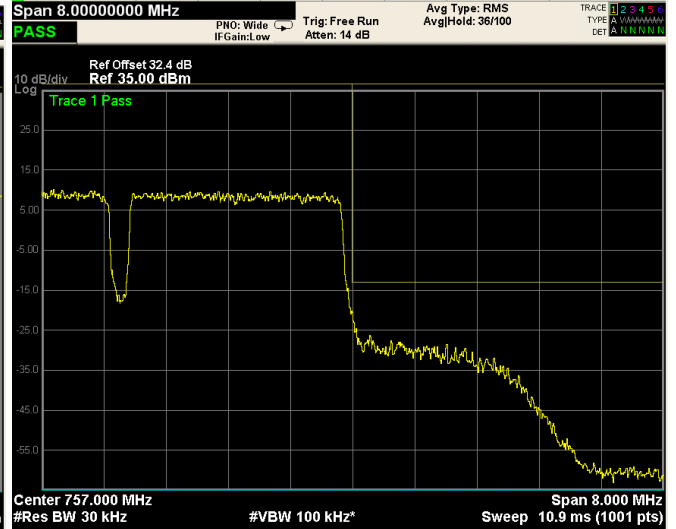


Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Mod. LTE 3MHz (QAM) (Down-link)

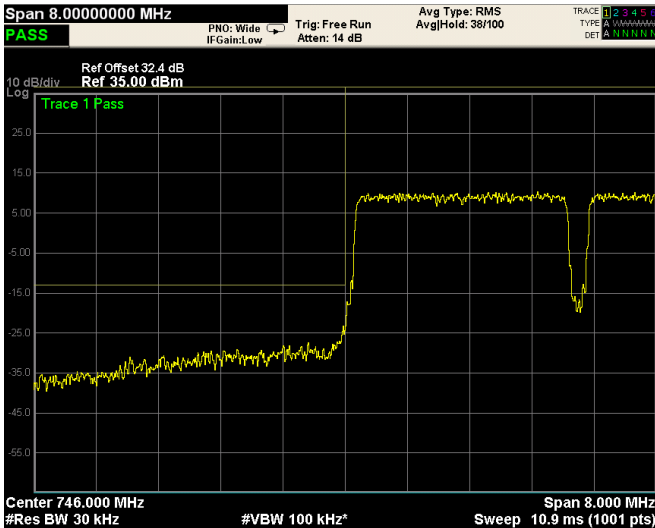


Low Band Edge

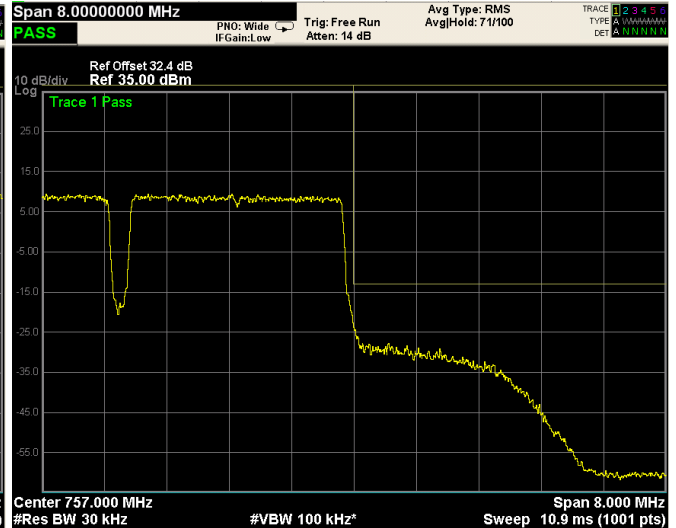


High Band Edge

Mod. LTE 3MHz (QPSK) (Down-link)



Low Band Edge

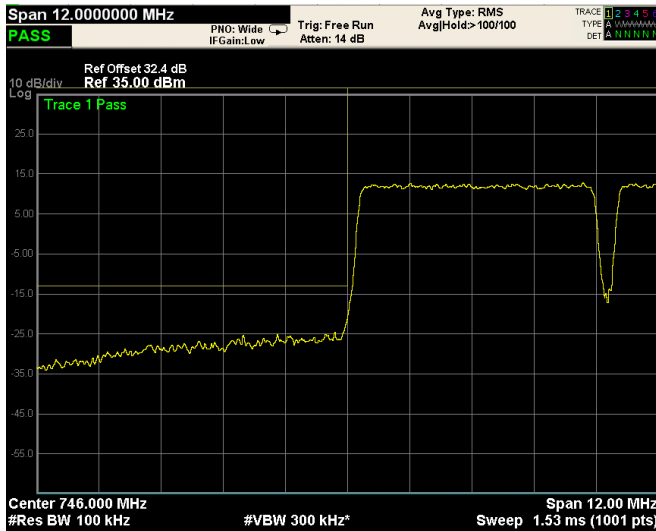


High Band Edge

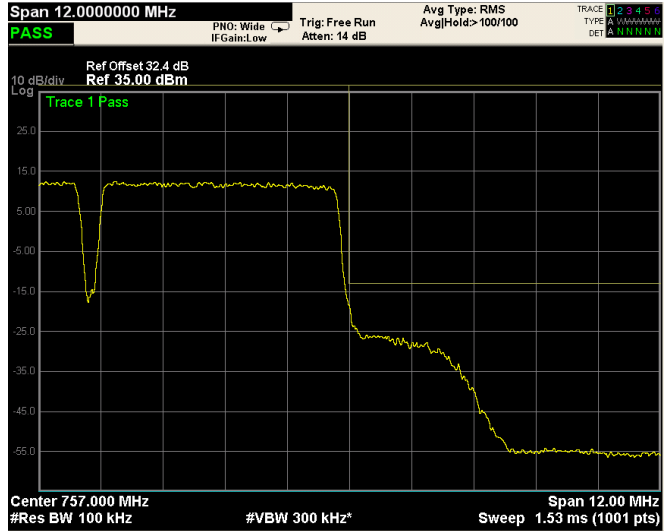


Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Mod. LTE 5MHz (QAM) (Down-link)

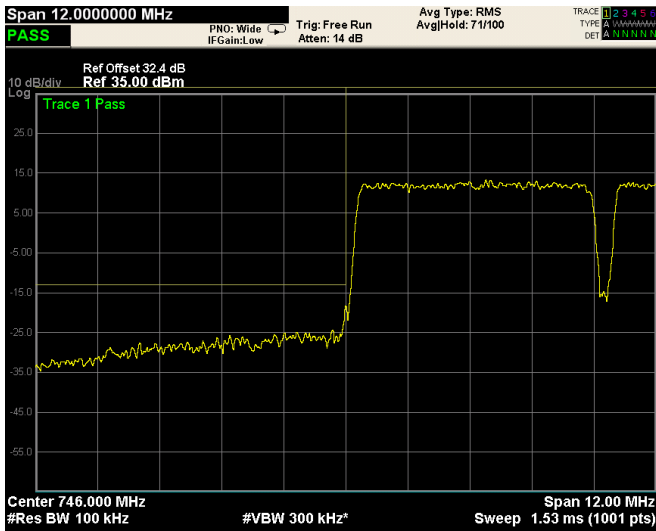


Low Band Edge

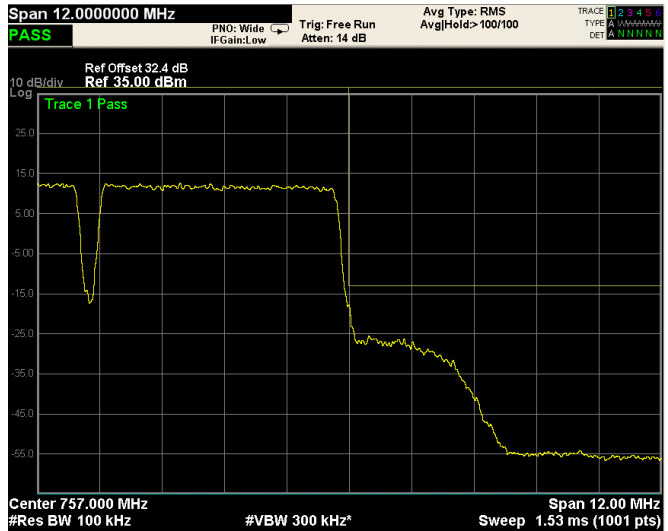


High Band Edge

Mod. LTE 5MHz (QPSK) (Down-link)



Low Band Edge

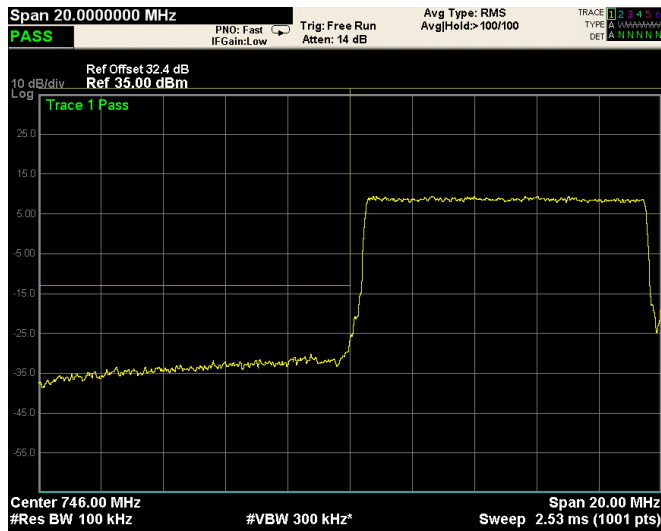


High Band Edge

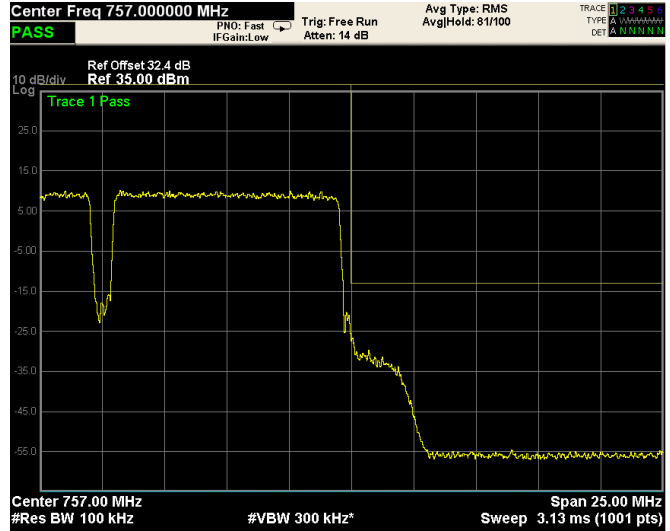


Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Mod. LTE 10MHz (QAM) (Down-link)

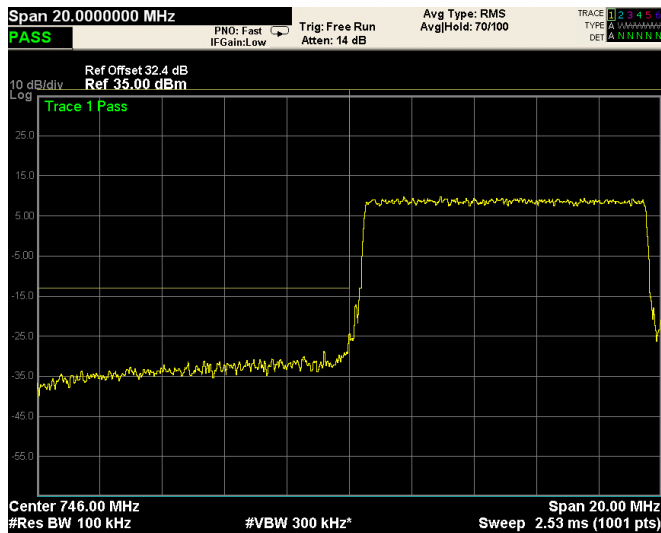


Low Band Edge

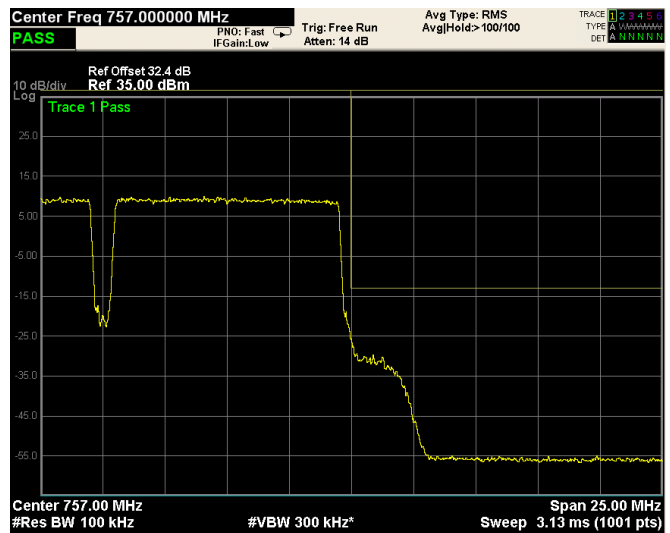


High Band Edge

Mod. LTE 10MHz (QPSK) (Down-link)



Low Band Edge



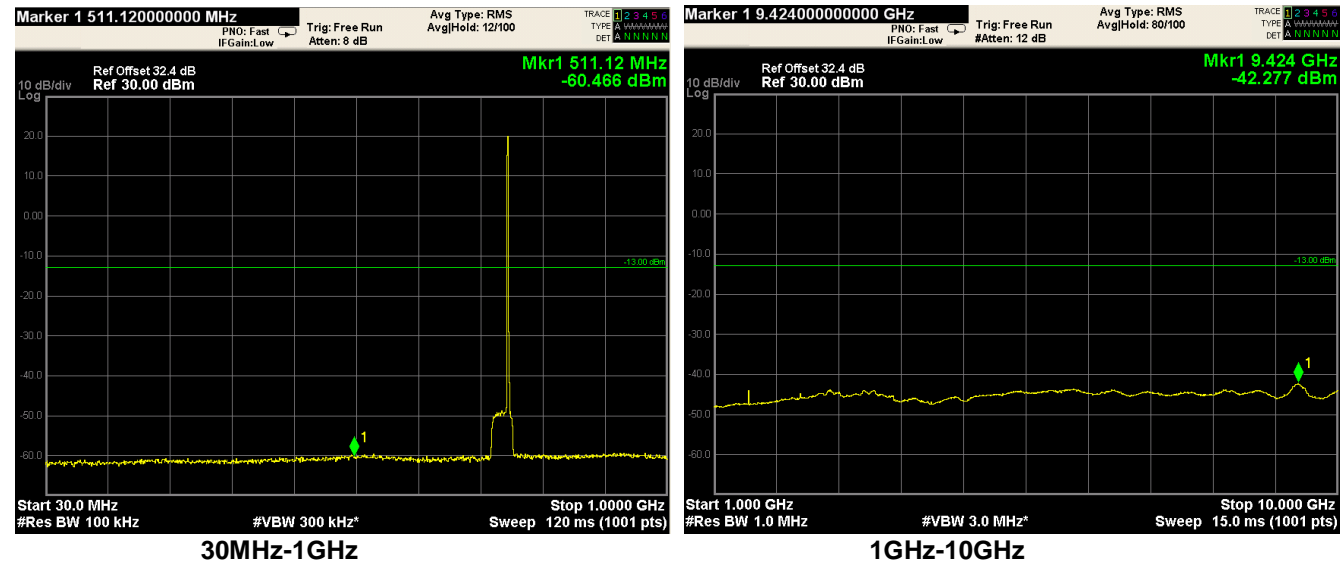
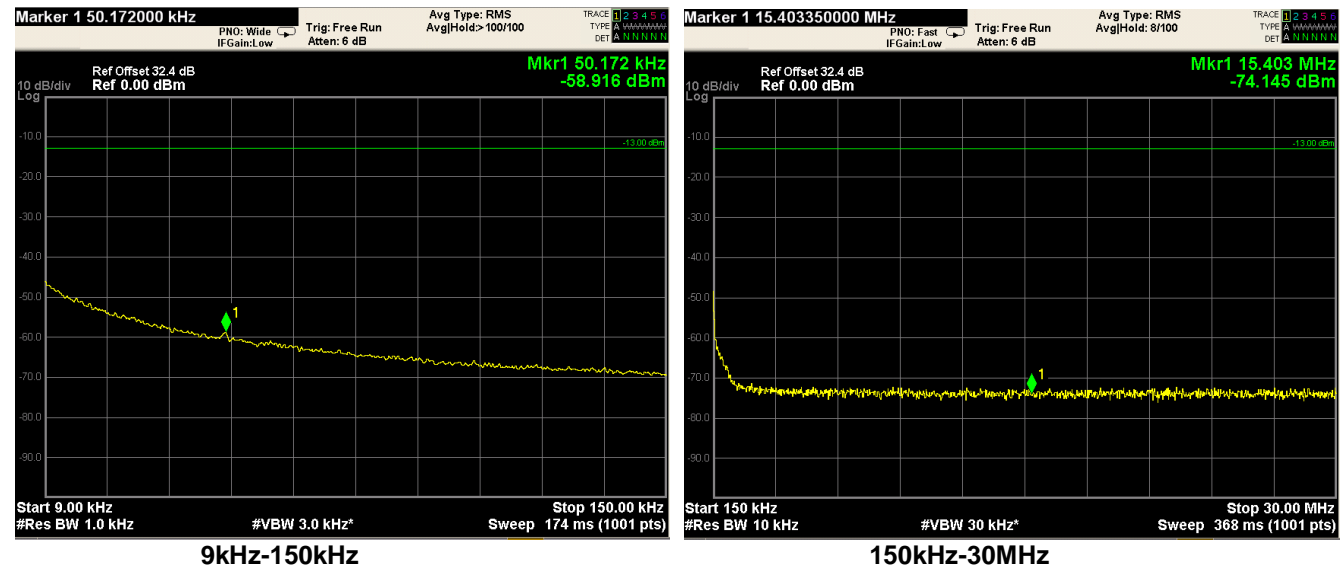
High Band Edge



Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Spurious emissions at antenna terminal,

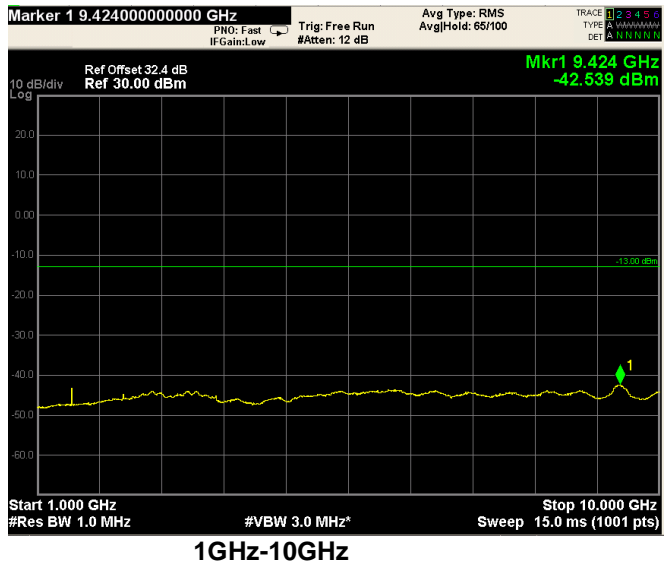
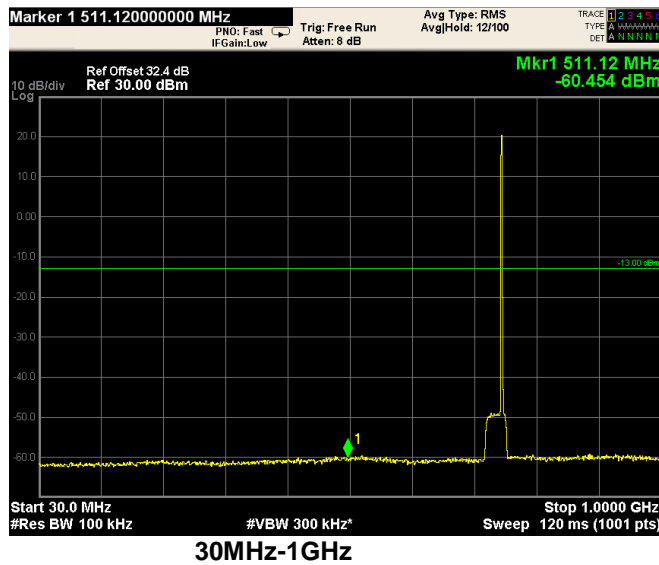
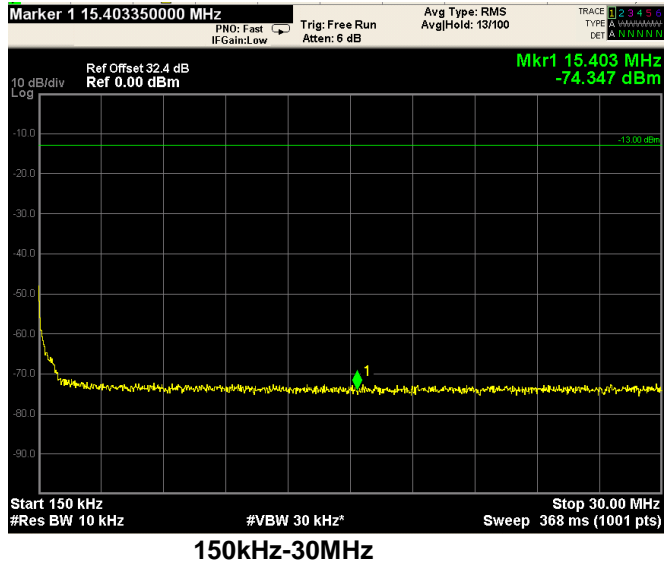
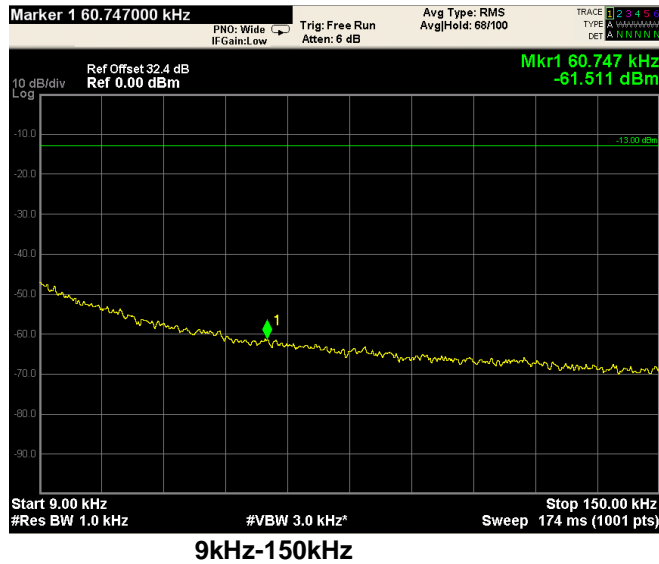
Mod. LTE 1.4MHz (QAM) (Down-link)





Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

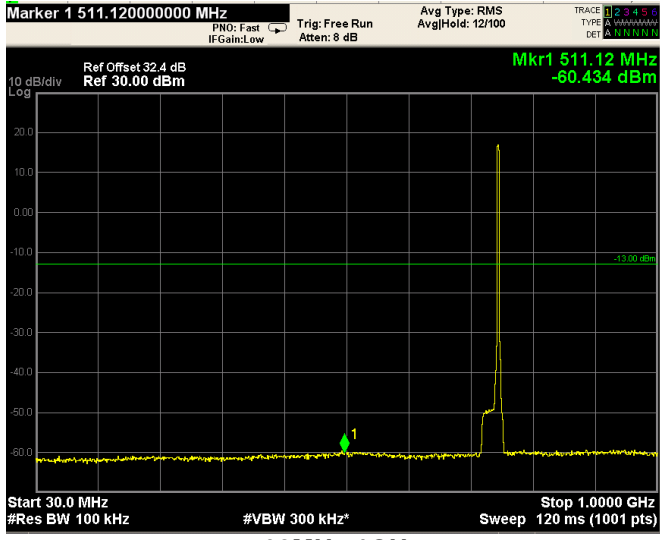
Mod. LTE 1.4MHz (QPSK) (Down-link)



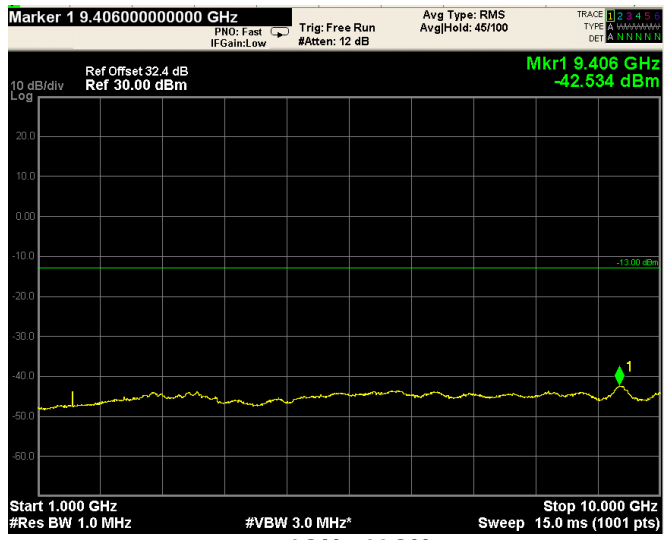


Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS	
Test name: Clause 27.53 (c) Radiated spurious emissions			
Test date: 03-27 March 2014		Test engineer: G. Curioni	
Verdict: Pass		Supply input: 100-240 Vac	
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %	
Specification: FCC Part 27			

Mod. LTE 3MHz, only 30M-10G plot (Down-link)

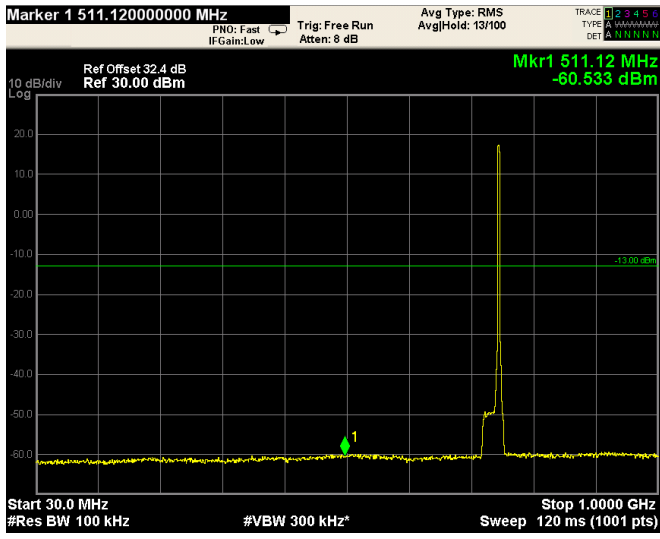


30MHz-1GHz

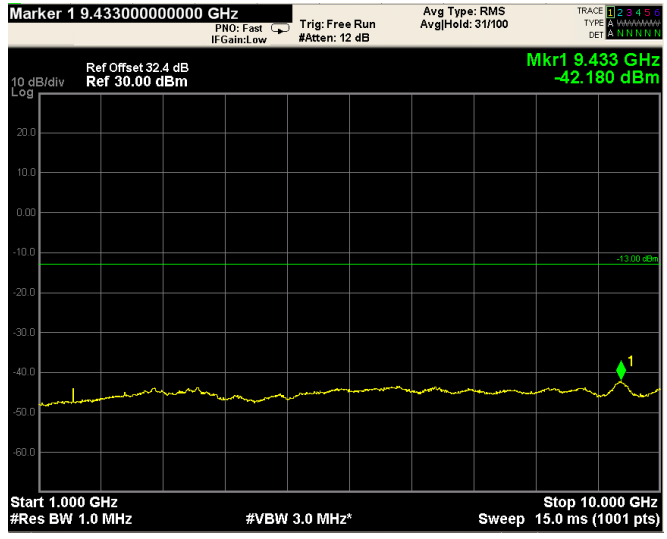


1GHz-10GHz

Mod. LTE 5MHz, only 30M-10G plot (Down-link)



30MHz-1GHz

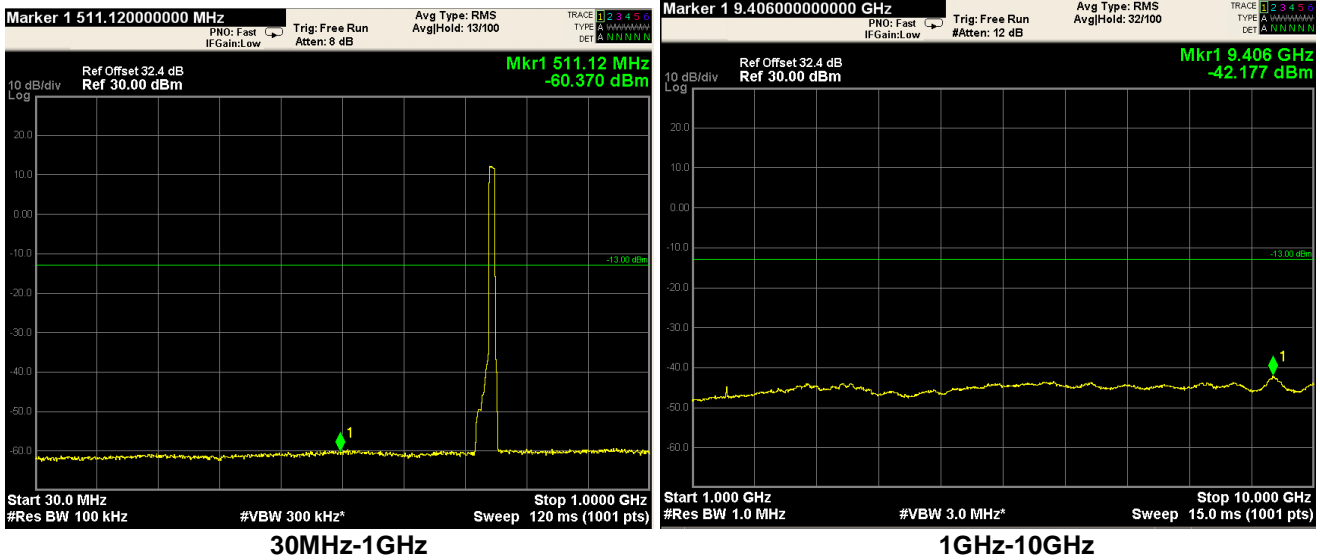


1GHz-10GHz



Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Mod. LTE 10MHz, only 30M-10G plot (Down-link)





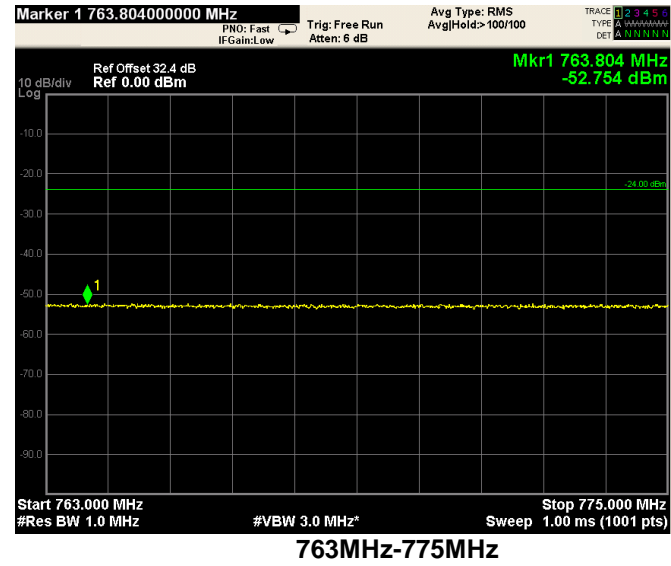
Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		

Spurious emissions at antenna terminal, band 763-775MHz and 793-805MHz

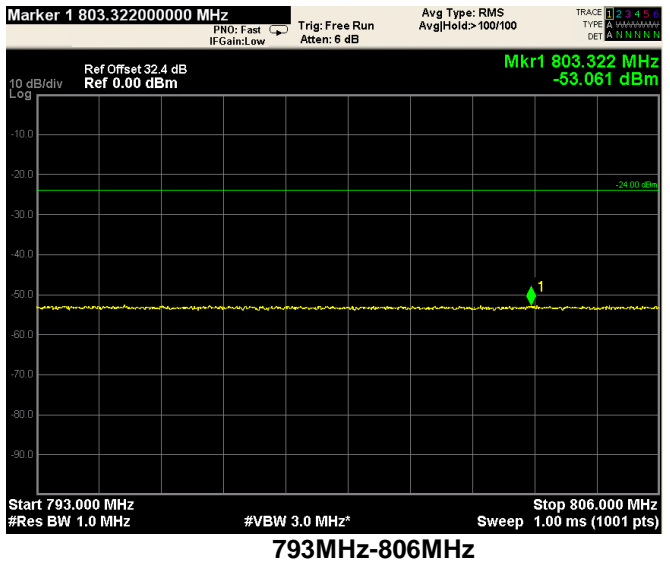
Special notes

On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations


$$76 + 10 \log P (W) = 76 + 10 \log 1,25W = 77$$
$$P (W) = 1,25W = 31 \text{ dBm}$$
$$\rightarrow \text{limit: } 31 - 77 = -46 \text{ dBm/6,25kHz} = -24\text{dBm/1MHz}$$



763MHz-775MHz



793MHz-806MHz

	Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
	Test name: Clause 27.53 (c) Radiated spurious emissions		
	Test date: 03-27 March 2014		Test engineer: G. Curioni
	Verdict: Pass		Supply input: 100-240 Vac
	Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27			

8.4 Clause 27.53 (c) Radiated spurious emissions

(c) For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

Special notes

- The spectrum was searched from 30 MHz to the 10th harmonic.
- All measurements were performed using a peak detector.
- The measurements were performed at the distance of 3 m.
- RBW within 30–1000 MHz was 100 kHz and 1 MHz above 1 GHz. VBW was wider than RBW.

Test Data

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

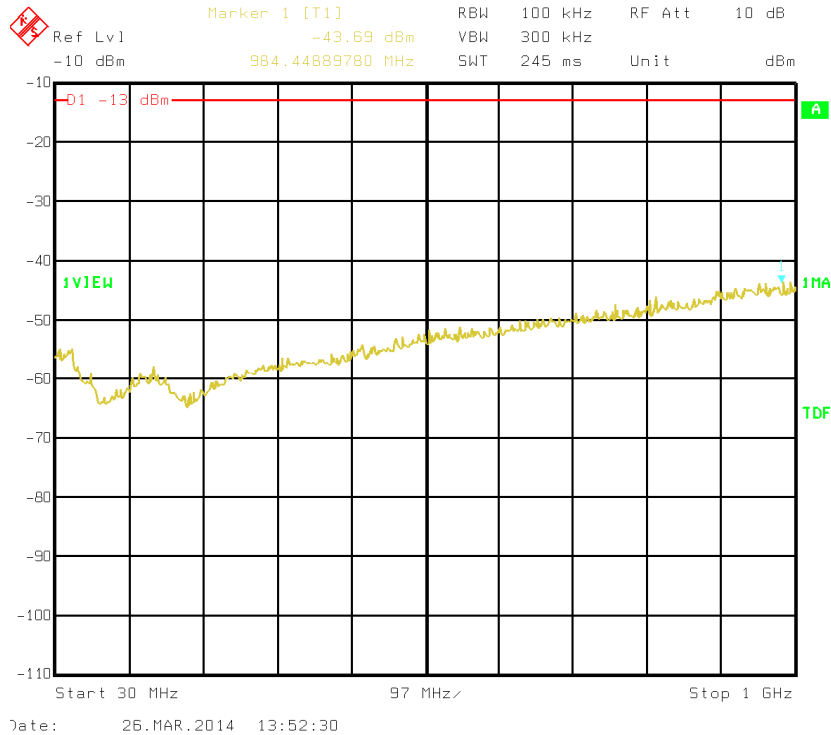
The D.U.T. antenna connector was terminated by a 50 Ω shielded dummy load.

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.

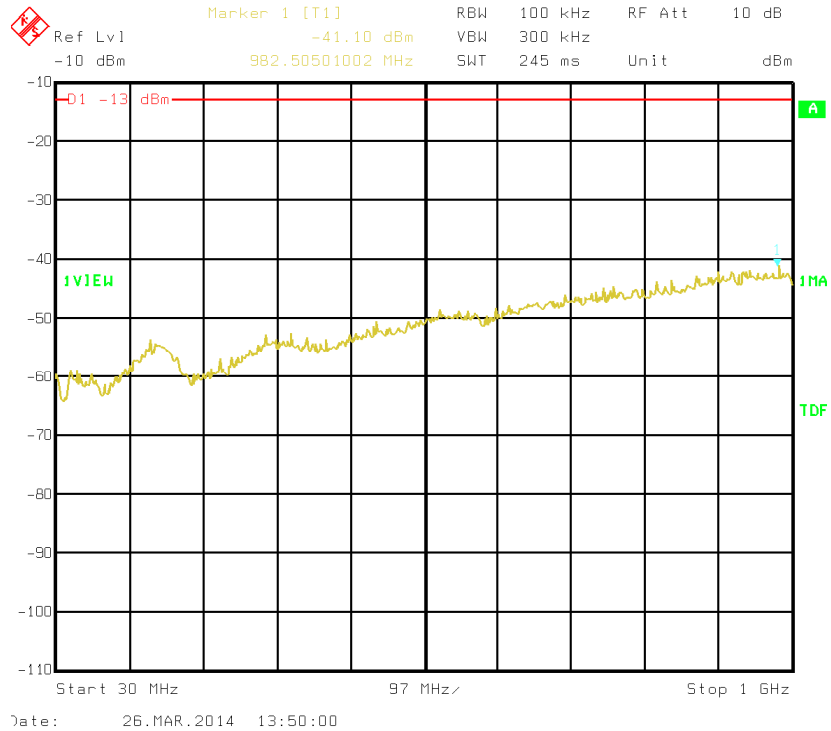
There were no emissions detected above the noise floor which was at least 20 dB below the specification limit.



Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		



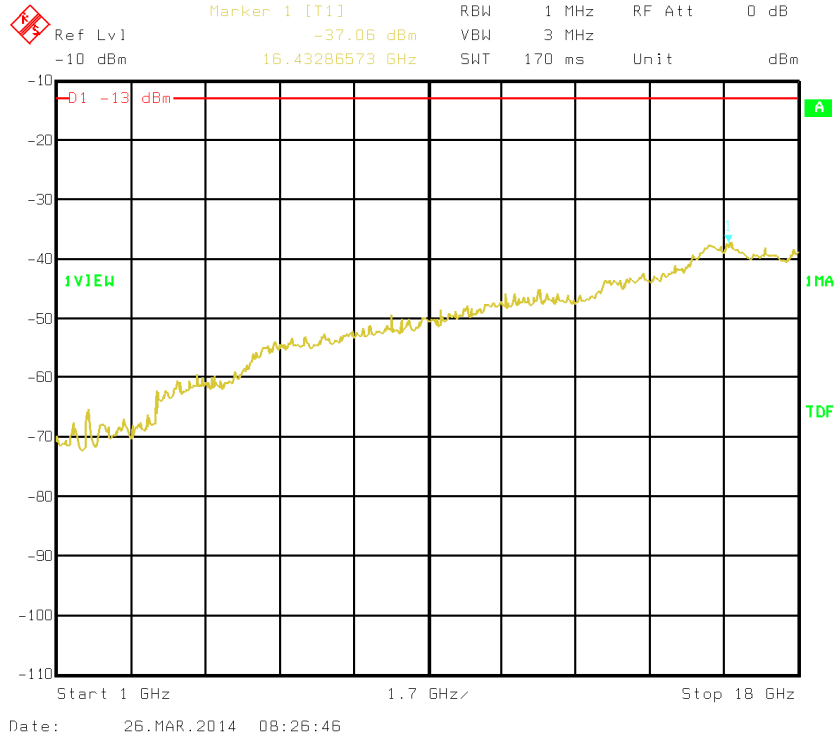
30MHz-1GHz – H Pol



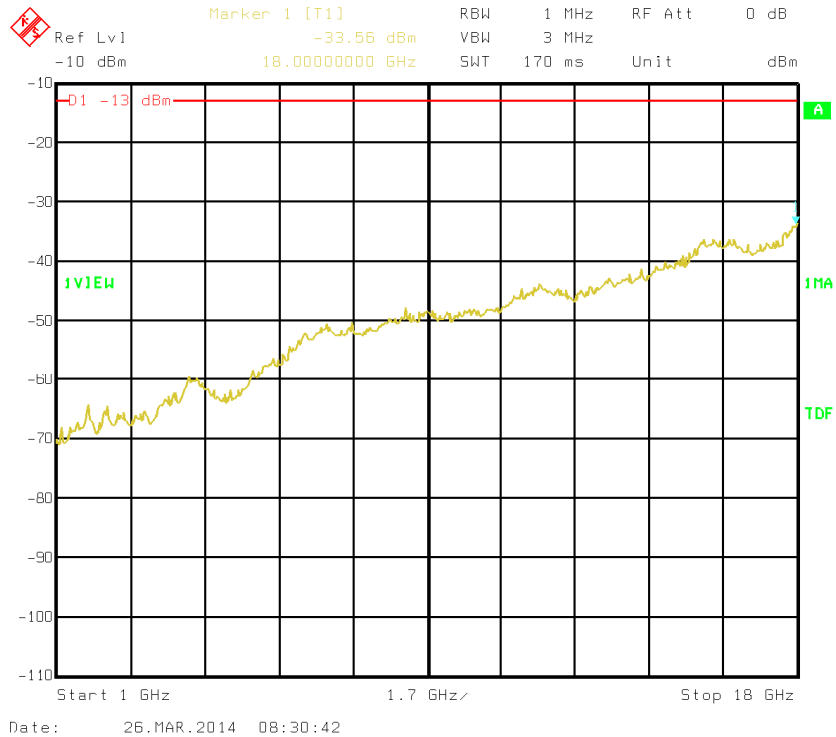
30MHz-1GHz – V Pol



Section 8: Testing data		Product: TRE7S8SC8A9S19AWAS
Test name: Clause 27.53 (c) Radiated spurious emissions		
Test date: 03-27 March 2014		Test engineer: G. Curioni
Verdict: Pass		Supply input: 100-240 Vac
Temperature: 25 °C	Air pressure: 860-1060 hPa	Relative humidity: 50 %
Specification: FCC Part 27		



1GHz-18GHz – H Pol



1GHz-18GHz – V Pol.

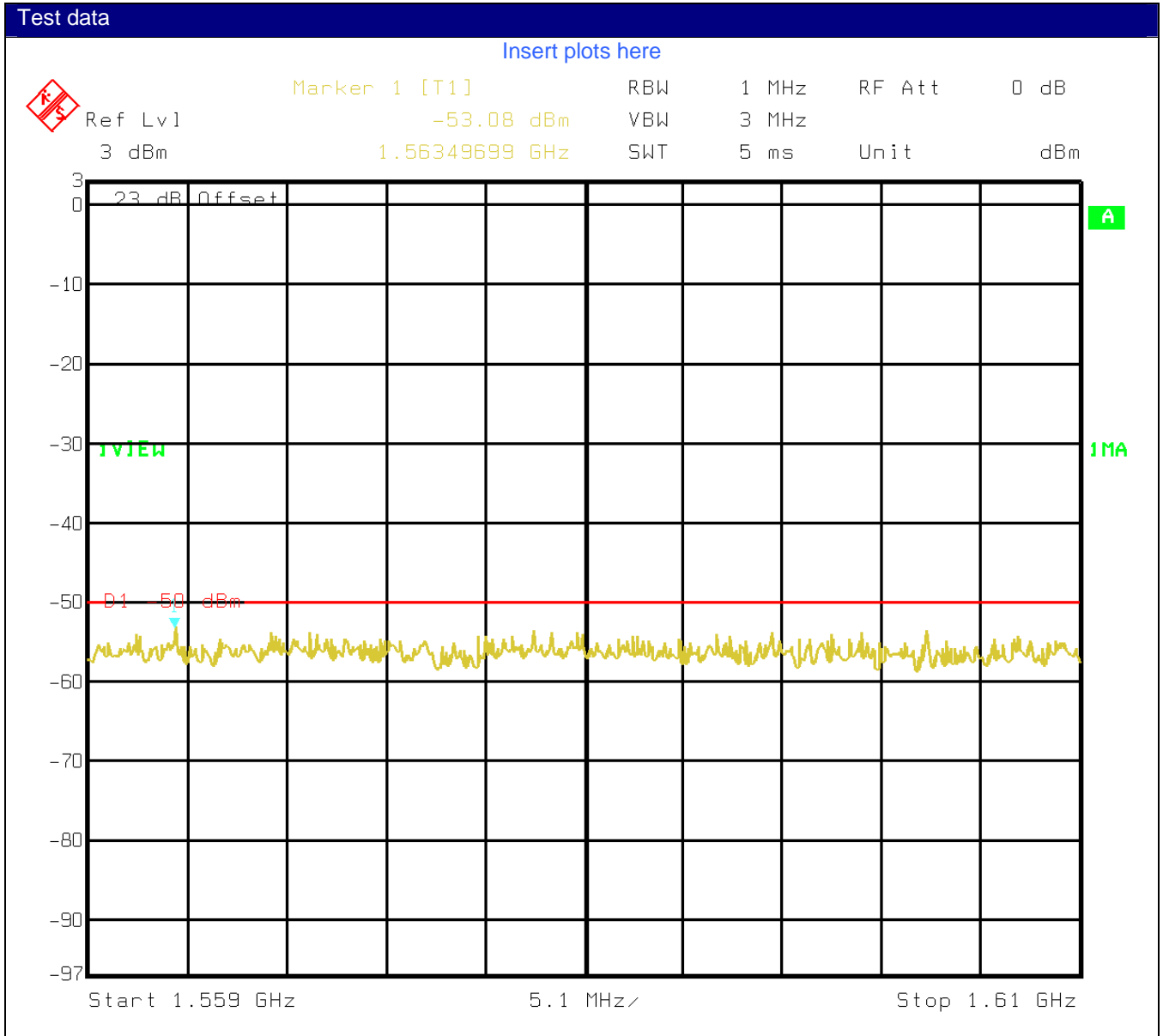
8.5 Clause 27.53(f) Radiated spurious emissions within 1559–1610 MHz band

(f) For operations in the 746–763 MHz, 775–793 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Special notes

- The spectrum was searched from 1559–1610 MHz.
- All measurements were performed using a peak detector.
- The measurements were performed at the distance of 3 m.
- RBW was set to 1 MHz and VBW was wider than RBW.

Result of D.L. 31 dBm, 751.5 MHz, "1.4" QAM occupied bandwidth 1.2 MHz





Spurious emissions measurement results:				
Frequency (MHz)	Polarization. V/H	Result Eirp (dBm)	Limit eirp (dBm)	Margin (dB)
1563.49	V(max. eirp)	-53.08	-50	-3.08
Note: . Method of measurement according to TIA-603-C (EIRP in GNSS band: 1.556 to 1.610 GHz) . Δ Band = 51 MHz, Correction Factor calculated at central band 1604.5 MHz. in Fraunhofer Region.				

Limit used for discrete emissions: -80 dBw = -50 dBm



8.6 Clause 27.54 Frequency stability

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Special notes

- 26 dBc points including frequency tolerance were assessed to remain within assigned band.
- The resolution bandwidth was set to 100 kHz, video bandwidth was set to 100 kHz

**Test data**

26 dBc points measurement:

Down-link

Frequency tolerance measurements:

Test conditions	Δ Frequency (Hz)	Offset (Hz)
+50 °C, Nominal		
+40 °C, Nominal		
+30 °C, Nominal		
+20 °C, +15 %		
+20 °C, Nominal		
+20 °C, -15 %		
+10 °C, Nominal		
0 °C, Nominal		
-10 °C, Nominal		
-20 °C, Nominal		
-30 °C, Nominal		

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



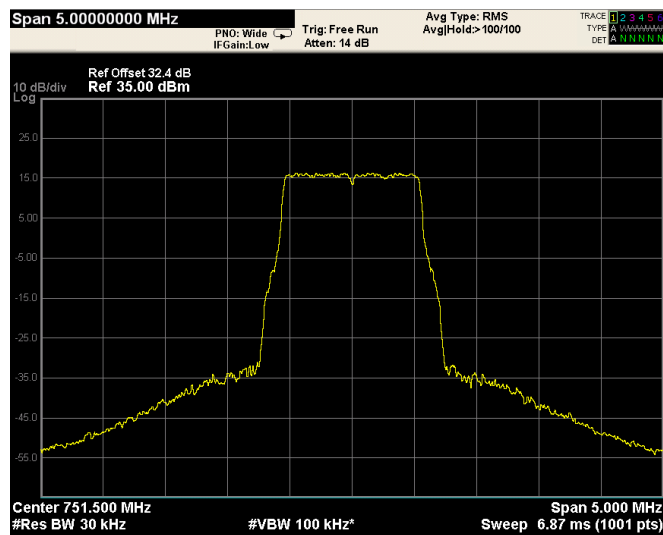
8.7 Clause 2.1049 Occupied bandwidth

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.

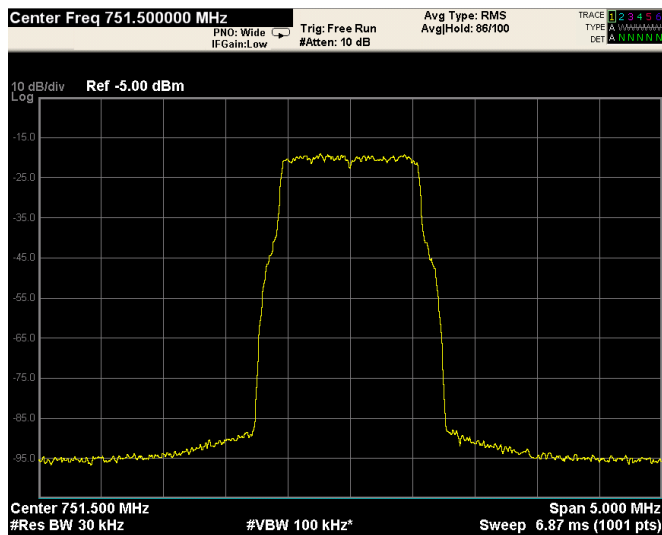
Special notes

- 26 dBc points provided in terms of attenuation below unmodulated carrier.
- RBW was set to 1 % of emissions bandwidth.

Mod. LTE 1.4MHz (QAM) (Down-link)

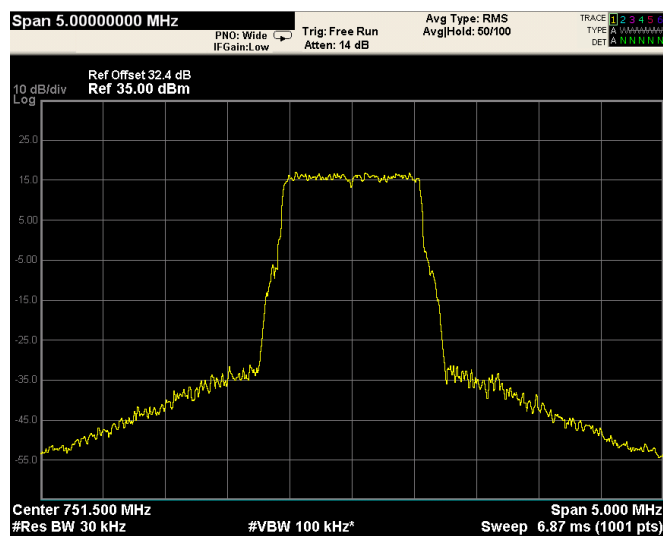


Output

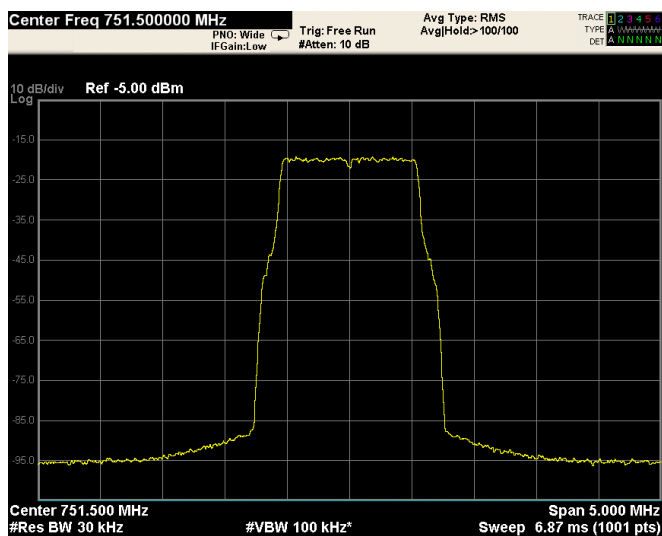


Input

Mod. LTE 1.4MHz (QPSK) (Down-link)

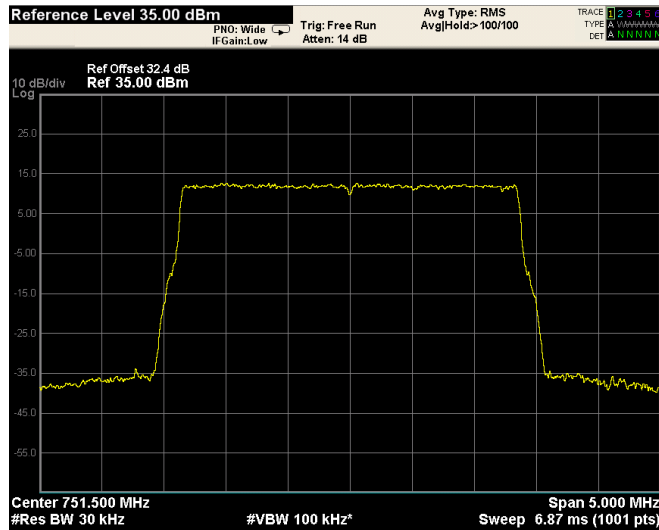


Output

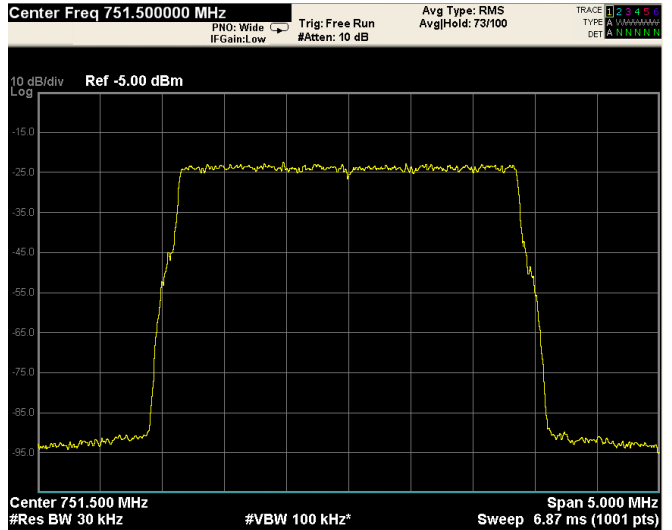


Input

Mod. LTE 3MHz (QAM) (Down-link)

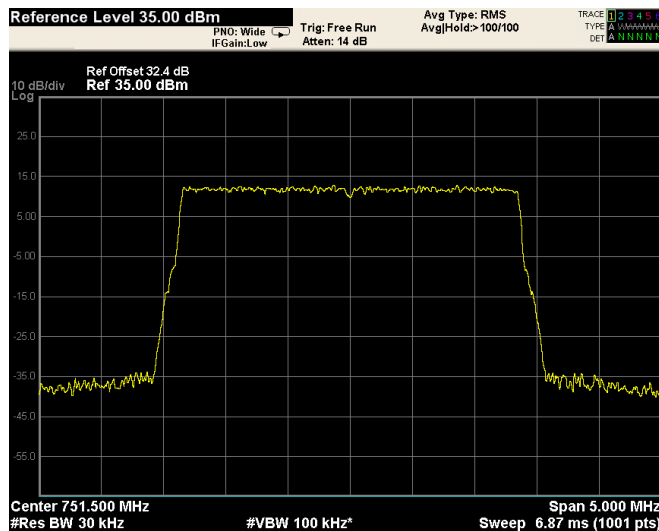


Output

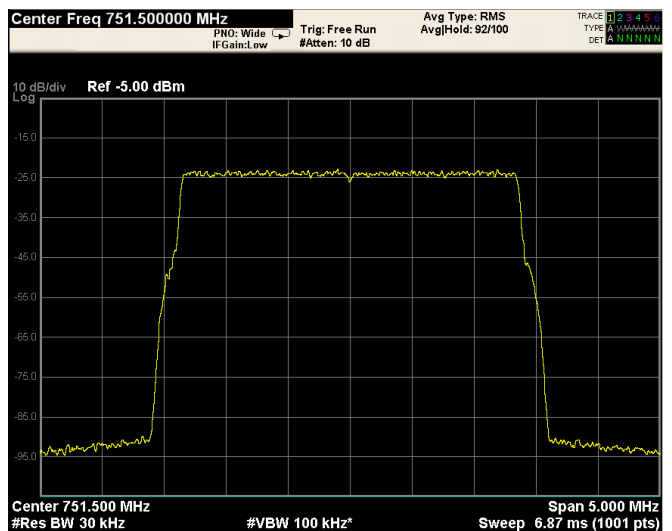


Input

Mod. LTE 3MHz (QPSK) (Down-link)

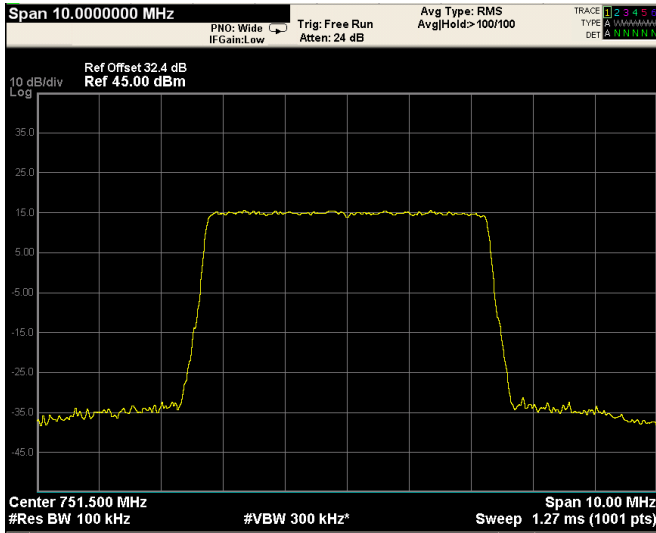


Output

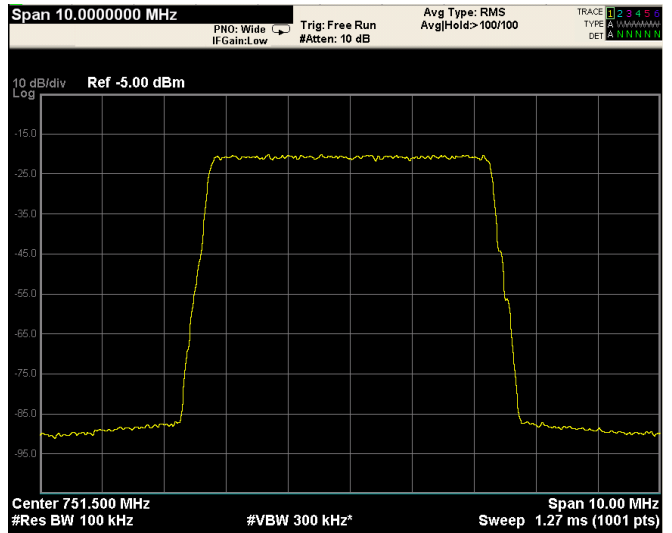


Input

Mod. LTE 5MHz (QAM) (Down-link)

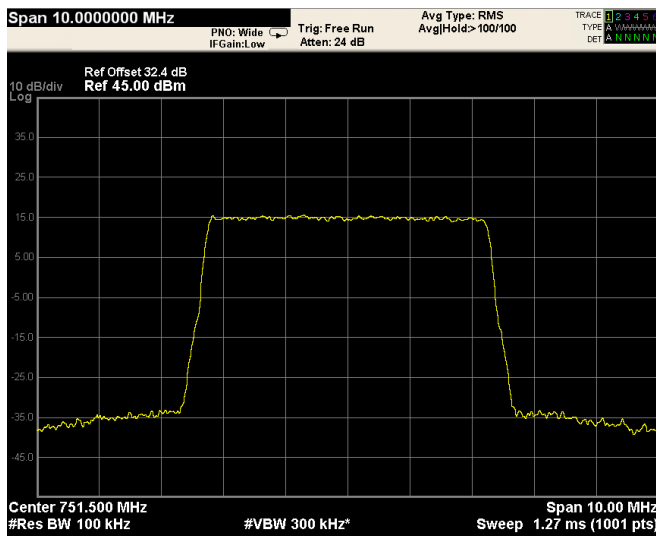


Output

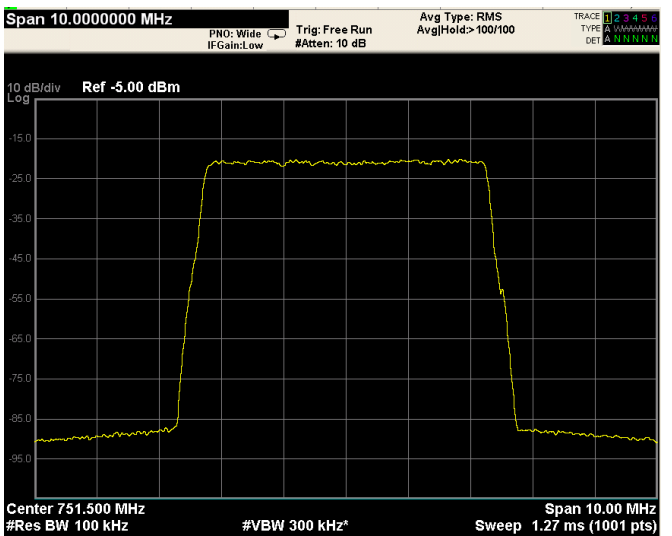


Input

Mod. LTE 5 MHz (QPSK) (Down-link)

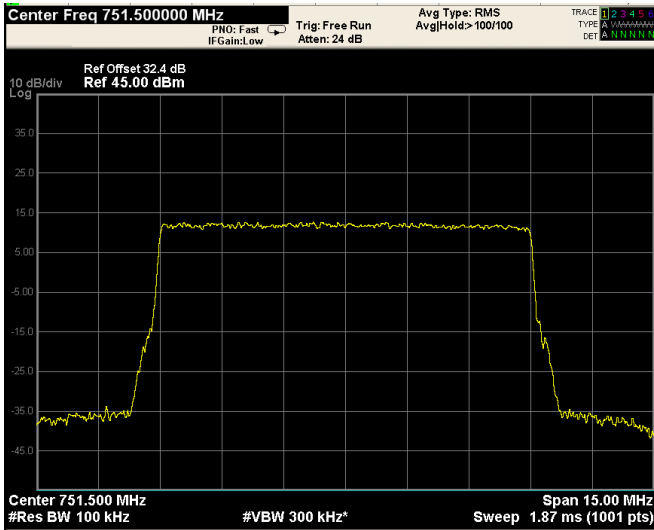


Output

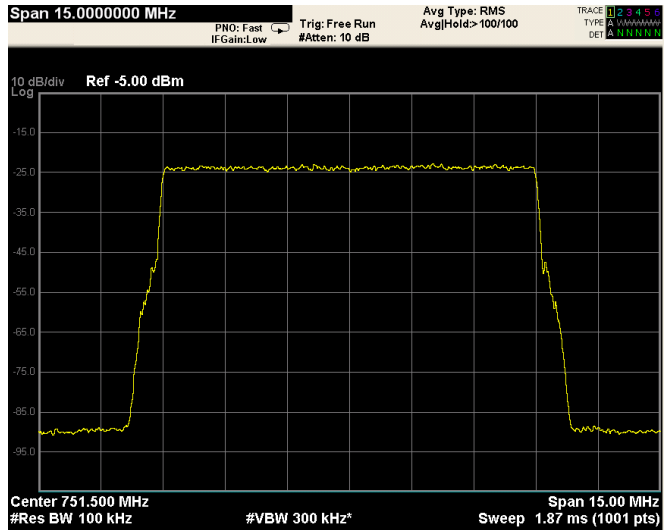


Input

Mod. LTE 10MHz (QAM) (Down-link)

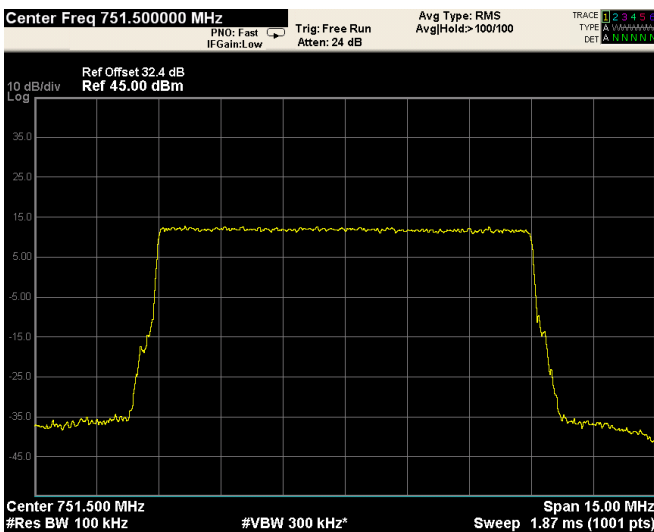


Output

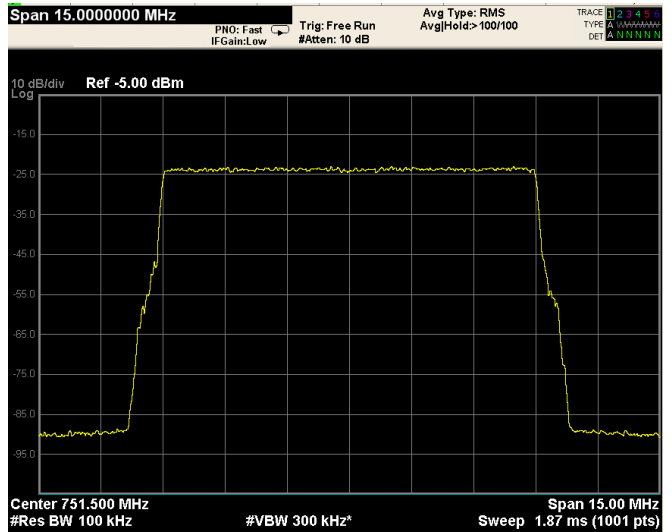


Input

Mod. LTE 10MHz (QPSK) (Down-link)

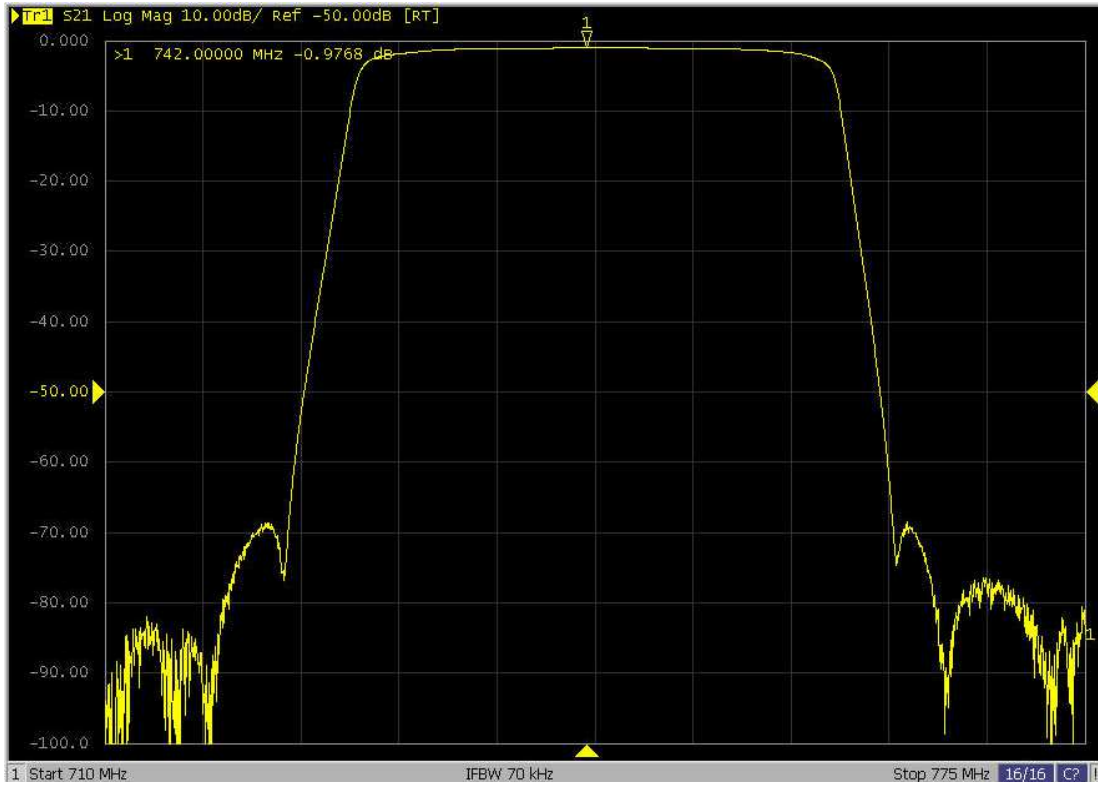


Output



Input

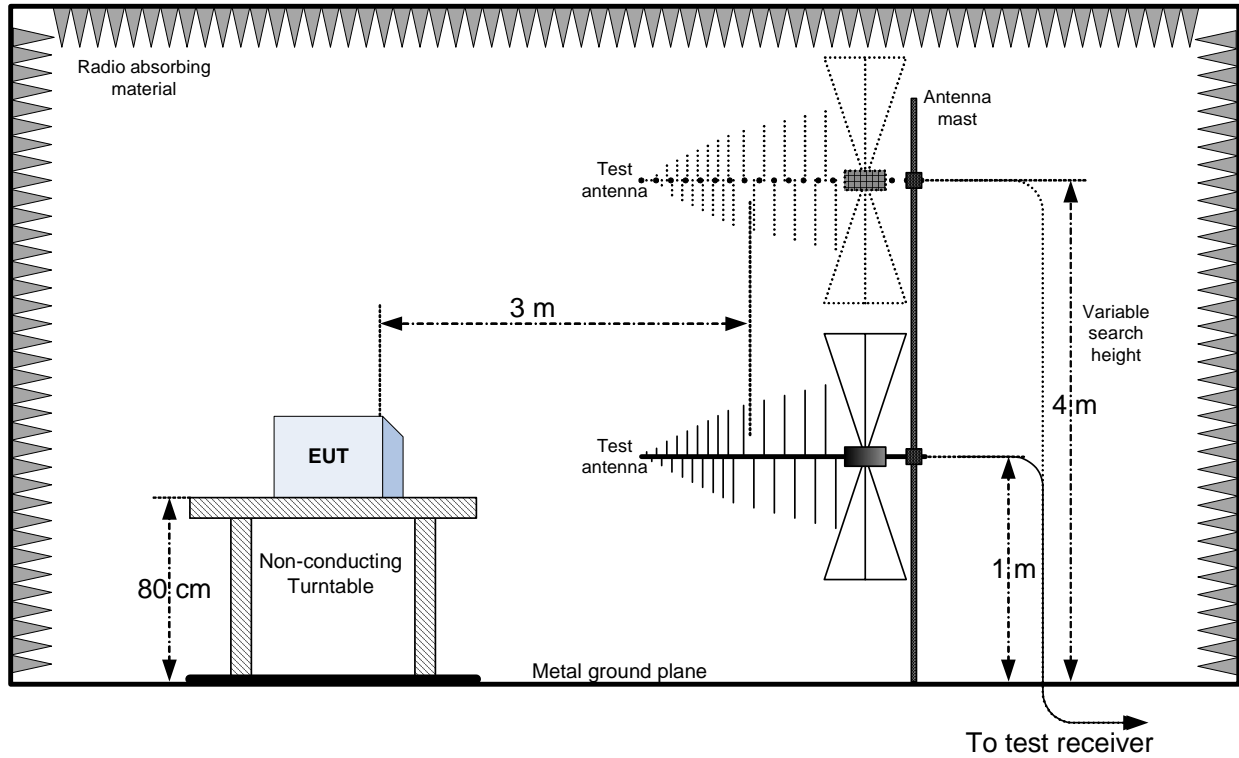
Section 9: Filter Frequency Response



Down-link

Section 10: Block diagrams of test set-ups

Radiated emissions set-up



Section 11: EUT photos

Photo Set up





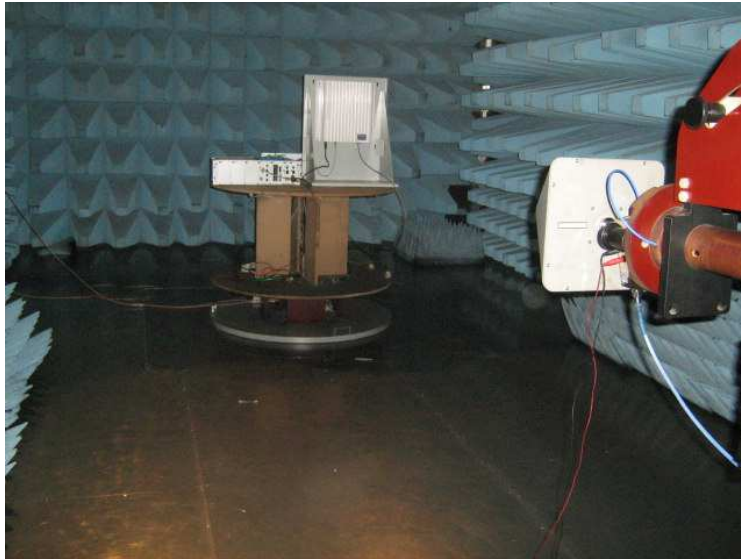


Photo EUT



