FCC ID: 2AEEH-CMROB66AC2X5

F C C T E S T R E P O R T

Test Report No. :	**T40336-00-00KJ**	10. December 2015 Date of issue

Type / Model Name : 9768 CMRO / SU-MECRCB66

Product Description : 9768 CMRO B66 (AWS1/3) 2x5W V2

Applicant **:** Alcatel-Lucent Deutschland AG

Address : Lorenzstraße 10

70435 STUTTGART, GERMANY

Manufacturer **:** FLEXTRONICS Romania SRL

Address : Calea Torontalui DN6

30000 TIMISOARA, ROMANIA

Licence holder **:** Alcatel-Lucent

Address : 148/152 route de la Reine

92100 BOULOGNE-BILLANCOURT, FRANCE

Test Result according to the standards listed in clause 1 test standards:	**POSITIVE**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

Contents

Attachment A as separatly supplement

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 2, Subpart J - General (September, 2015)

Part 2, Subpart J, Section 2.1033 (c)(14)	Applications for equipment other than that operating under parts 15 and 18 of the rules shall be accompanied by a technical report containing the following information
Part 2, Subpart J, Section 2.1046	RF power output
Part 2, Subpart J, Section 2.1047	Modulation characteristics
Part 2, Subpart J, Section 2.1049	Occupied bandwidth
Part 2, Subpart J, Section 2.1051	Spurious emissions at antenna terminals
Part 2, Subpart J, Section 2.1053	Field strength of spurious radiation
Part 2, Subpart J, Section 2.1055	Frequency stability

FCC Rules and Regulations Part 27, Subpart C - General (September, 2015)

Part 27, Subpart C, Section 27.50	Power limits and duty cycle.
Part 27, Subpart C, Section 27.53	Emission limits
Part 27, Subpart C, Section 27.54	Frequency stability

OET Rules 412172 D01	(August, 2015)	Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropically Radiated Power (EIRP) of an RF Transmitting System
OET Rules 662911 D01	(October, 2013)	Emission Testing of Transmitters with Multiple Outputs in the Same Band
OET Rules 662911 D02	(October, 2011)	MIMO with Cross-Polarized Antenna
OET Rules 971168 D01	(October, 2014)	Measurement Guidance for Certification of Licensed Digital Transmitters
OET Rules 971168 D02	(October, 2014)	Measurement Guidance for Specific Service Rules
ANSI C63.4: 2014		Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI / TIA-603-C: 2004		Land Mobile FM or PM – Communication Equipment – Measurement and Performance Standards
CISPR 16-4-2: 2013		Uncertainty in EMC measurement

2 Test result summary

The LTE radio head using digital modulation QPSK, 16QAM and 64QAM and operating in the 2110 MHz to 2180 MHz frequency band.

Test Case	Description	Requirements	Result
AWS Band			
2.1046 27.50(h)(1) KDB 971168 D01 (5.1.1)	RF power output	EIRP not exceed 33 dBW + 10log(X/Y) dBW	Pass
2.1047 KDB 971168 D01 (3)	Modulation characteristics	Digital modulation	Pass
27.50(B) KDB 971168 D01 (5.7.1)	Peak-to-average power ratio (PAPR)	Peak-to-average power ratio not exceed 13 dB	Pass
2.1049 27.53(h)(3) KDB 971168 D01 (4.1)	Emission bandwidth (26 dB)	Emission bandwidth below 26 dB	Pass
2.1049(h)	Occupied bandwidth (99 %)	(not specified)	Pass
2.1051 27.53(h)	Band edges compliance	Below -13 dBm / 1%*EBW, in 1 MHz range	Pass
2.1051 27.53(h) KDB 971168 D01 (6)	Spurious emissions at antenna terminals	Below -13 dBm from 9 kHz to 10th harmonics	Pass
2.1053 27.53(h) KDB 971168 D01 (7)	Field strength of spurious radiation	Below -13 dBm from 9 kHz to 10th harmonics	Pass
2.1055 27.54 KDB 971168 D01 (9)	Frequency stability	Stay within the authorized bands of operation	Pass

2.1 Final assessment

The equipment under test **fulfills** the EMC requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 13 October 2015

Testing concluded on : 20 November 2015

Checked by:

K. Gegenfurtner
Klaus Gegenfurtner
I confirm the correctness and Integrity of this document
2015.12.10 16:19:40 +01'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:

Josef Knab
I'm the autor of this document
2015.12.10 16:18:16 +01'00'

Josef Knab
Radio Team

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see attachment A

3.2 Short description of the equipment under test (EUT)

This application for the 9768 Compact Metro Radio Outdoor (CMRO) B66 (AWS1/3) 2x5W V2 under FCC ID: 2AEEH-CMROB66AC2X5, is for operation in AWS-1 and AWS-3 bands. The 9768 CMRO is a Radio Head LTE FDD system intended to use in the frequency range between 2110 MHz and 2180 MHz to transmit. The data summarized below is in the form presently used by the Commission's Radio Equipment List.

Manufacturer:	Alcatel-Lucent	
Equipment Identification:	3BK 61687 AAAA 01	
Frequency Range:	2110 – 2180 MHz	Transmit Band
	1710 – 1780 MHz	Receive Band
Output Power:	+27.0 dBm (0.5 W) to +37.0 dBm (5 W) varied by software for cell sizing	
Frequency Tolerance:	±0.1 ppm	
Temperature Range:	-40 °C to +50 °C	

The 9768 CMRO B66 (AWS1/3) 2x5W V2 is a small, lightweight Radio Head designed to fill coverage gaps between macro cells in a LTE network. It can be easily mounted on walls, lamp posts and poles. The 9768 CMRO consists of the Radio component with an extra antenna filter, an optical digital interface (CPRI) and a power supply.

The 9768 CMRO contains two identical transceiver paths and is typically operated as 2x2 multiple input multiple output (MIMO) configuration. Each transceiver has a RF output power of maximal 5 watts at the External Antenna Connector (EAC) port.

The baseband signal via CPRI is delivered to a TX RoC (Radio on Chip) with direct up conversion to the RF frequency. Then the signal passes through the power amplifier and transmit filter to the antenna port (EAC).

The 9768 CMRO is designed to transmit in the frequency band of 2110 – 2180 MHz with the capability to set 5 MHz, 10 MHz, 15 MHz or 20 MHz signal bandwidth. The signal modulation is QPSK, 16QAM or 64QAM.

Number of tested samples:	1
Serial number:	LBALLU-RT154380195
Firmware version:	RM2XALB66_405.15.01.00.04.109
Software release	LR15.1

EUT configuration:
(The CDF filled by the applicant can be viewed at the test laboratory.)

3.3 Variants of the EUT

There are no variants of the EUT.

3.4 Operation frequency and channel plan

E-UTRA Band	Duplex Mode	Downlink (TX)		Uplink (RX)	
		Frequency (MHz)			
66	FDD	2110	2180	1710	1780
		Channel Number			
		66436	67136	131972	132672

	Channel bandwidth (MHz)			
	5	10	15	20
Channel	TX-Frequency (MHz)			
Bottom	2112.5	2115.0	2117.5	2120.0
Middle	2145.0	2145.0	2145.0	2145.0
Top	2177.5	2175.0	2172.5	2170.0

3.5 Power supply system utilised

Power supply voltage, V_{nom} : 110 V AC / 60 Hz / 1ϕ

3.6 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- Desktop PC Model : HP Compaq dc7900
- Spectrum analyzer Model : Agilent, PXA 9030A with LTE-FDD option
- Power analyzer Model : Tektronics, PA1000
  - unscreened power cables
  - customer specific cables

3.7 Determination of worst case conditions for final measurement

Following channels and test modes are selected as worst case for the final tests:

FCC Measurement, E-UTRA, AWS-1 / AWS-3

Description	Channel bandwidth (MHz)				Modulation			Channel			Antenna	
	5	10	15	20	QPSK	16QAM	64QAM	B	M	T	1	2
RF output power	X	X	X	X	X	X	X	---	X	---	X	X
Modulation characteristics	X	X	X	X	X	X	X	---	X	---	X	X
Peak to average ratio	X	X	X	X	X	X	X	---	X	---	X	X
Emission bandwidth (99 % and 26 dB)	X	X	X	X	X	X	X	---	X	---	X	X
Band edges compliance	X	X	X	X	X	X	X	X	---	X	X	X
Spurious emissions at antenna terminals	X	X	X	X	X	X	X	---	X	---	X	X
Field strength of spurious radiation	---	---	---	X	---	---	X	---	X	---	X	X
Frequency stability, temperature change	---	---	---	X	---	---	X	---	X	---	X	---
Frequency stability, voltage change	---	---	---	X	---	---	X	---	X	---	X	---

X measured
--- not measured

Pre-measurements have been done to find out the worst case from the RF output power point of view. The following settings were found and they are considered as representative for the performed measurements. This corresponds to the maximum load. Please note, only the diagrams from antenna port 1 are shown in this test report. The diagrams from antenna port 2 are similar. Please refer to the test result tables.

Channel bandwidth	Number of Resource blocks
5 MHz	25
10 MHz	50
15 MHz	75
20 MHz	100

The radiated emission test was performed with antenna connectors terminated with 50 ohms.

3.7.1 Test jig

No test jig is used.

3.7.2 Test software

The test software for the EUT provides a special factory mode to set up different E-UTRA test models to transmit data during the tests with maximum output power and different modulations.

Output power: 2 x 5 Watt (2 x 37 dBm)

Modulation: QPSK, 16QAM and 64QAM

3.7.3 Test Models

Test Model	Test Model Description
E-TM1.1	3GPP TS 36.141, clause 6.1.1.1, E-TM 1.1, QPSK modulation
E-TM3.2	3GPP TS 36.141, clause 6.1.1.5, E-TM 3.2, 16QAM modulation
E-TM3.1	3GPP TS 36.141, clause 6.1.1.4, E-TM 3.1, 64QAM modulation

4 TEST ENVIRONMENT

4.1 Address of the test laboratories

CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY

Alcatel-Lucent Deutschland AG
Lorenzstraße 10
70435 STUTTGART
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 °C
Humidity:	30-60 %
Atmospheric pressure:	86-106 kPa

5 TEST CONDITIONS AND RESULTS

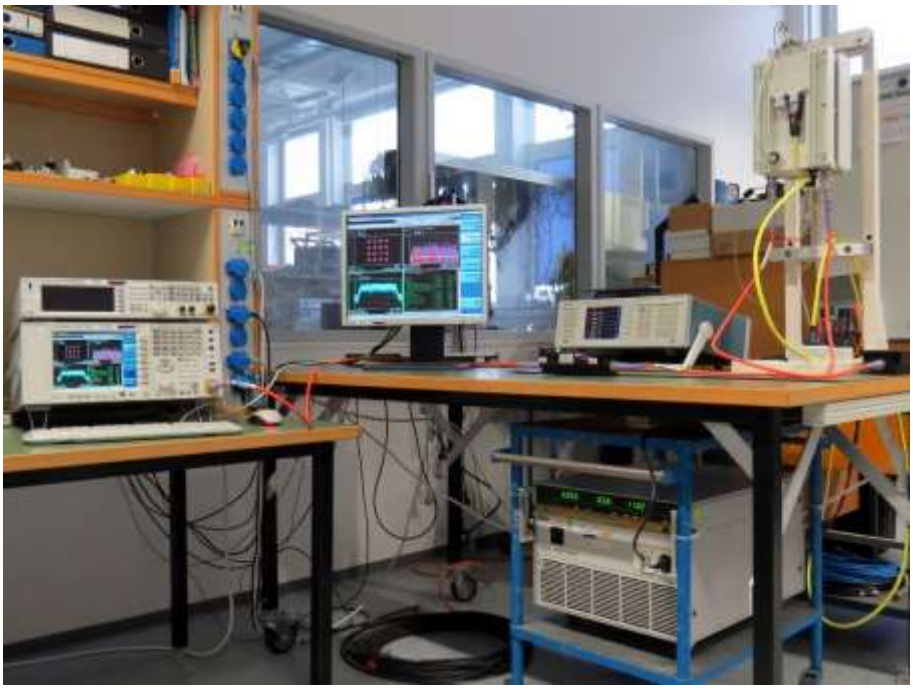
5.1 RF power output

For test instruments and accessories used see section 6 Part **CPC3**.

5.1.1 Description of the test location

Test location: Room 008/00/132

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 27, Section 27.50(h):
(1) Main, booster and base stations. (i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section. Description of Measurement

5.1.4 Description of measurement – Measurement guidance KDB 971168 D01 (5.1.1)

The RF power output is measured conducted using a spectrum analyser with the function “LTE - Channel Power”. The EUT is set in TX continuous mode and E-UTRA test model described below while measuring. The EUT is measured at antenna port 1 and port 2. The resulting values are listed in the following tables.
The measurement values at antenna port 1 and port 2 are converted into linear values and the antenna 1 and antenna 2 is summed and converted back into log values. The resulting values are also listed in the following tables.

5.1.5 Spectrum analyser settings

The settings are automatically changed by analyser software and is dependent to the used channel bandwidth. Please refer to the test result plots under point 5.1.6.1. & 5.1.6.2.

5.1.6 Test result table

Antenna	Modulation	E-UTRA Test Model	Channel	RF power output CH BW: 5 MHz		RF power output CH BW: 10 MHz	
				(dBm)	(Watt)	(dBm)	(Watt)
1	QPSK	E-TM1.1	B	---	---	---	---
			M	37.3	5.31	37.2	5.3
			T	---	---	---	---
	16QAM	E-TM3.2	B	---	---	---	---
			M	37.2	5.26	37.3	5.3
			T	---	---	---	---
	64QAM	E-TM3.1	B	---	---	---	---
			M	37.3	5.32	37.2	5.2
			T	---	---	---	---
2	QPSK	E-TM1.1	B	---	---	---	---
			M	37.3	5.32	37.3	5.4
			T	---	---	---	---
	16QAM	E-TM3.2	B	---	---	---	---
			M	37.3	5.33	37.3	5.3
			T	---	---	---	---
	64QAM	E-TM3.1	B	---	---	---	---
			M	37.3	5.38	37.2	5.3
			T	---	---	---	---
Sum of Ant.1 and Ant. 2	QPSK	E-TM1.1	B	---	---	---	---
			M	40.3	10.63	40.3	10.7
			T	---	---	---	---
	16QAM	E-TM3.2	B	---	---	---	---
			M	40.3	10.59	40.3	10.6
			T	---	---	---	---
	64QAM	E-TM3.1	B	---	---	---	---
			M	40.3	10.70	40.2	10.5
			T	---	---	---	---

Antenna	Modulation	E-UTRA Test Model	Channel	RF power output CH BW: 15 MHz		RF power output CH BW: 20 MHz	
				(dBm)	(Watt)	(dBm)	(Watt)
1	QPSK	E-TM1.1	B	---	---	---	---
			M	37.3	5.3	37.3	5.3
			T	---	---	---	---
	16QAM	E-TM3.2	B	---	---	---	---
			M	37.2	5.3	37.2	5.3
			T	---	---	---	---
	64QAM	E-TM3.1	B	---	---	---	---
			M	37.2	5.3	37.3	5.4
			T	---	---	---	---
2	QPSK	E-TM1.1	B	---	---	---	---
			M	37.3	5.4	37.3	5.4
			T	---	---	---	---
	16QAM	E-TM3.2	B	---	---	---	---
			M	37.2	5.3	37.3	5.3
			T	---	---	---	---
	64QAM	E-TM3.1	B	---	---	---	---
			M	37.3	5.3	37.3	5.3
			T	---	---	---	---
Sum of Ant.1 and Ant. 2	QPSK	E-TM1.1	B	---	---	---	---
			M	40.3	10.7	40.3	10.7
			T	---	---	---	---
	16QAM	E-TM3.2	B	---	---	---	---
			M	40.2	10.6	40.3	10.6
			T	---	---	---	---
	64QAM	E-TM3.1	B	---	---	---	---
			M	40.3	10.6	40.3	10.7
			T	---	---	---	---

5.1.6.1 Test result plot – CH BW: 5 MHz

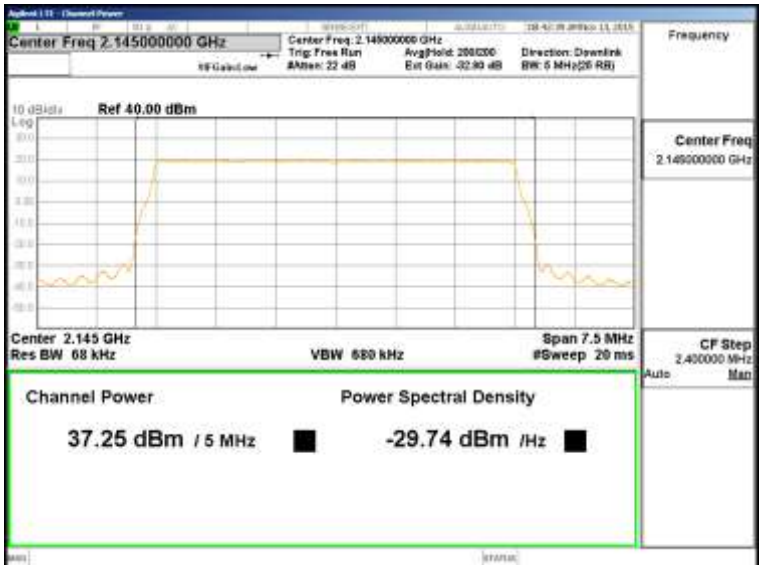
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1



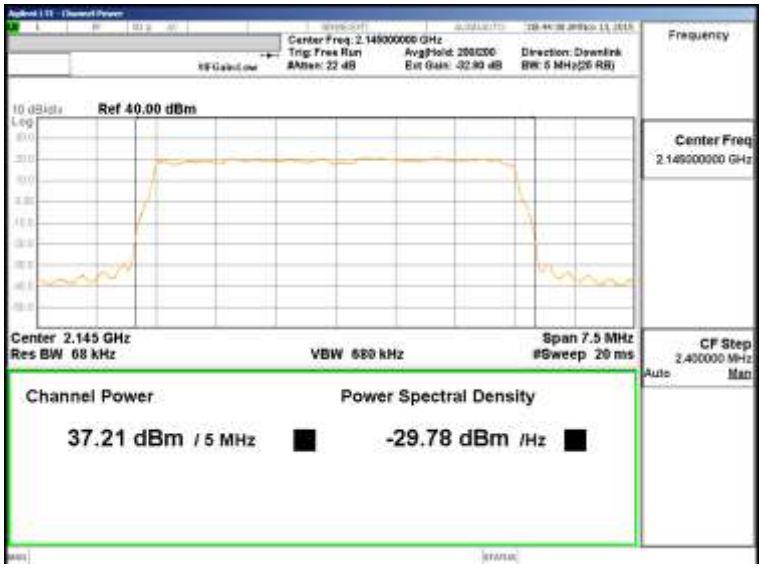
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1



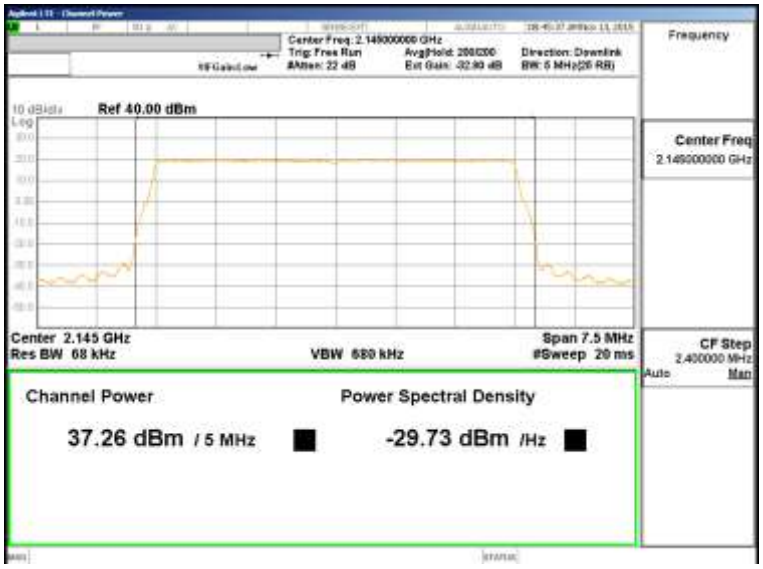
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1



5.1.6.2 Test result plot – CH BW: 10 MHz

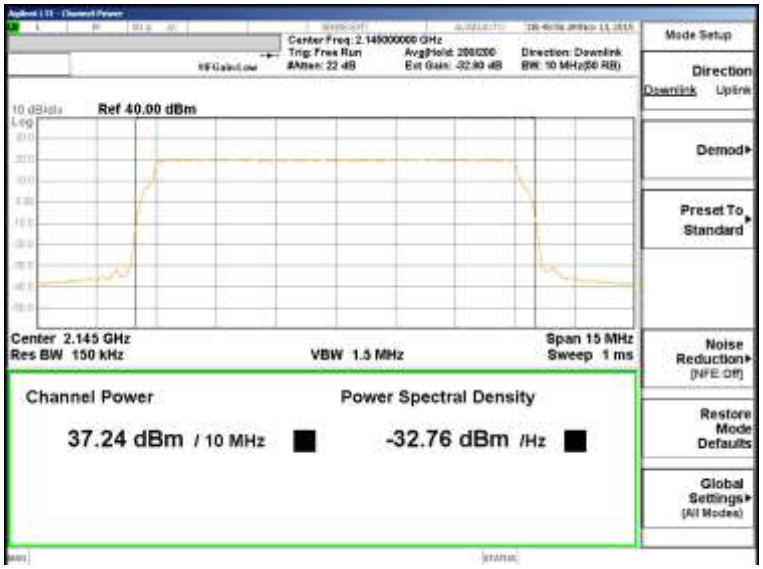
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1



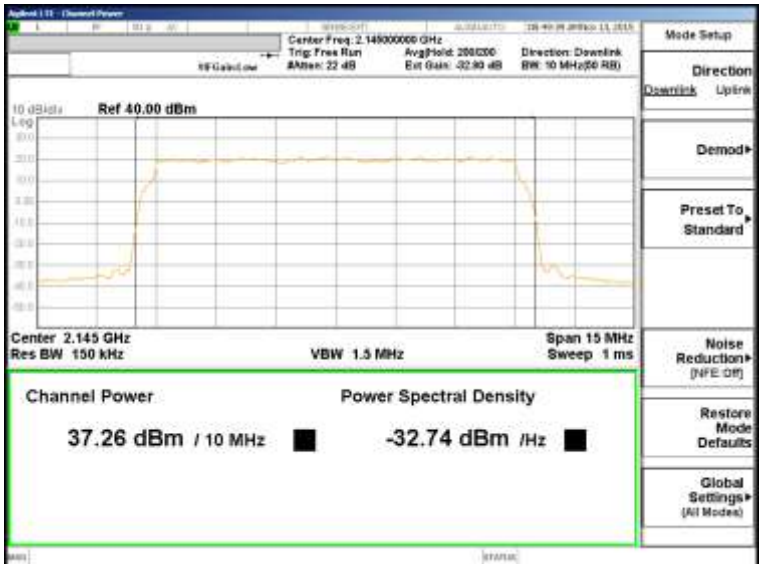
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1



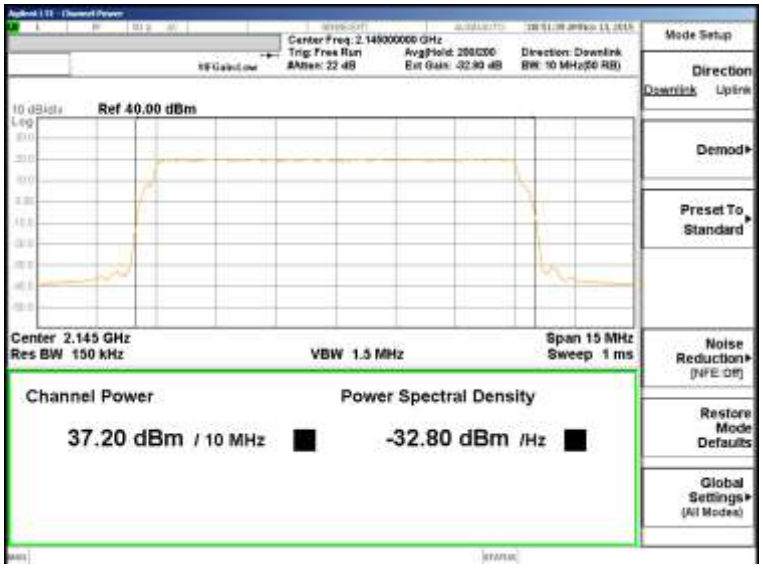
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1



5.1.6.3 Test result plot – CH BW: 15 MHz

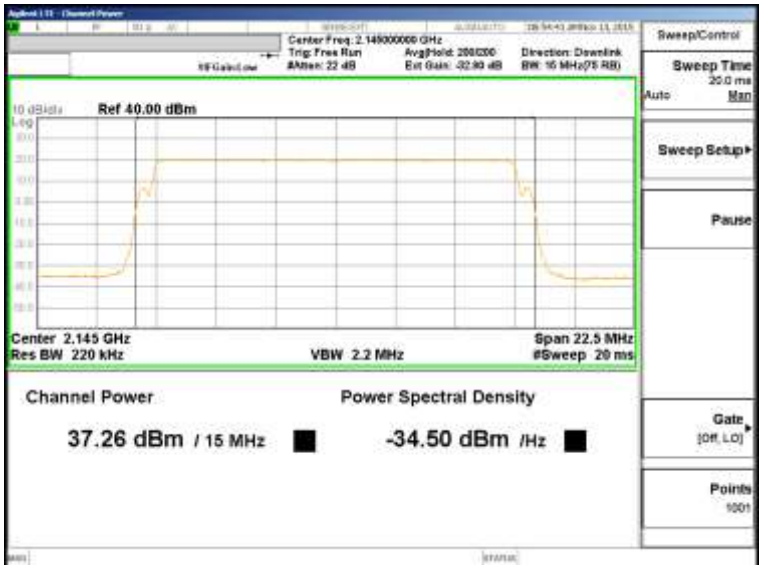
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1



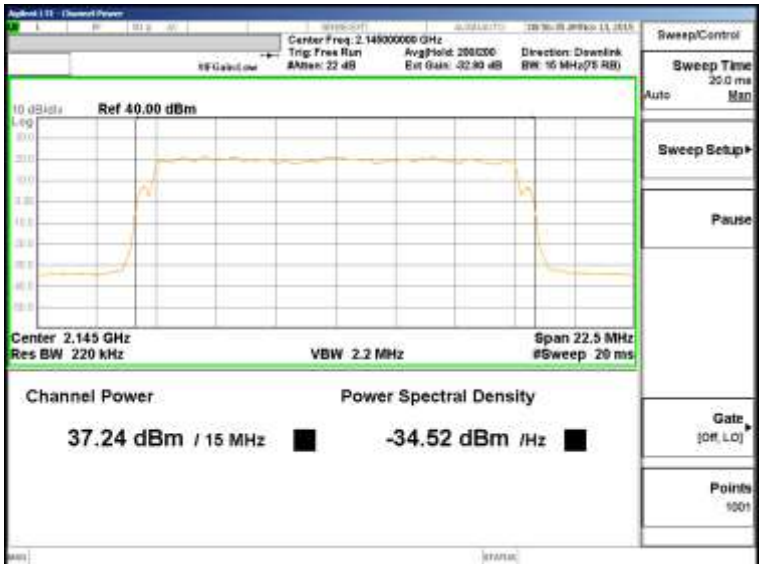
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1



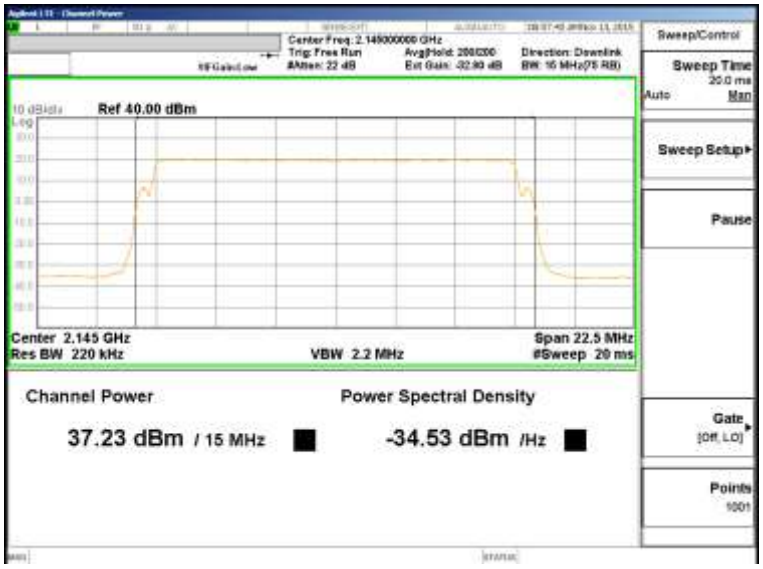
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1



5.1.6.4 Test result plot – CH BW: 20 MHz

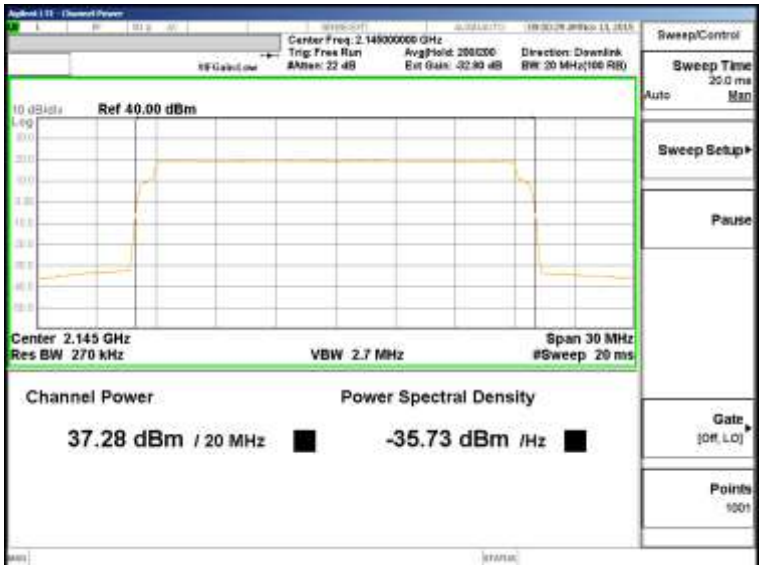
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1



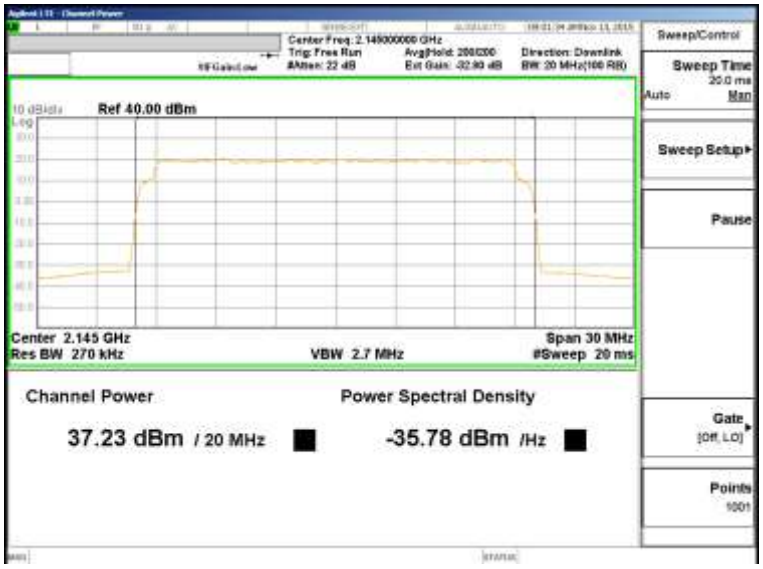
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1



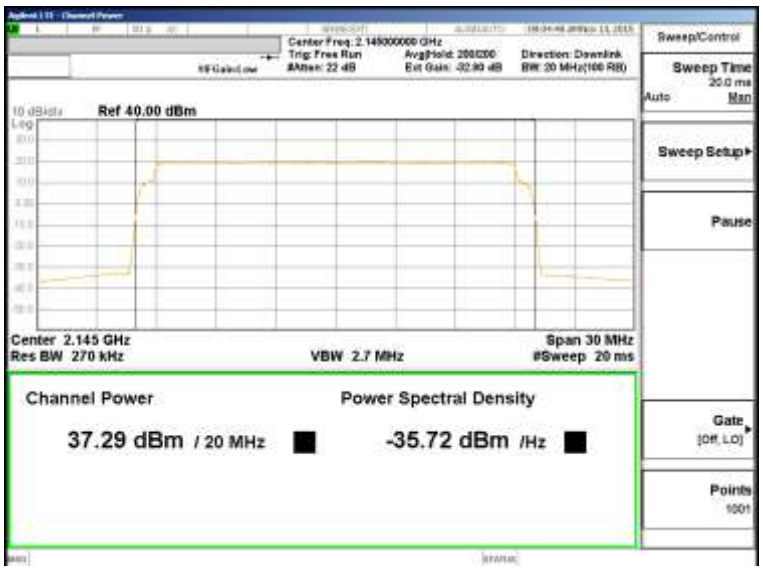
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1



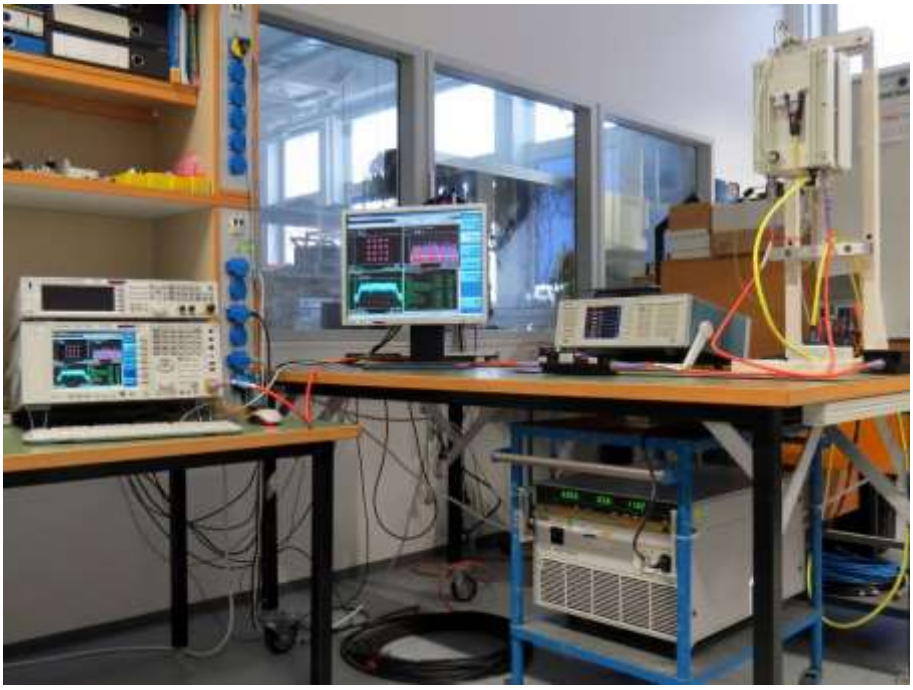
5.2 Modulation characteristics

For test instruments and accessories used see section 6 Part **MB**.

5.2.1 Description of the test location

Test location: Room 008/00/132

5.2.2 Photo documentation of the test set-up



5.2.3 Applicable standard

According to FCC Part 2, Section 2.1033(c):
(13) For equipment employing digital modulation techniques, a detailed description of the modulation system to be used, including the response characteristics (frequency, phase and amplitude) of any filters provided, and a description of the modulating wavetrain, shall be submitted for the maximum rated conditions under which the equipment will be operated.

5.2.4 Description of measurement – Measurement guidance KDB 971168 D01 (3)

The modulation characteristic is measured conducted using a spectrum analyser with the function “LTE - Modulation Analysis”. The EUT is set in TX continuous mode while measuring. The EUT is measured at antenna port 1 and antenna port 2. The resulting values are listed in the following tables.

5.2.5 Spectrum analyser settings

The settings are automatically changed by analyser software and is dependent to the used channel bandwidth. Please refer to the test result plots under point 5.2.6.1.

5.2.6 Test result table

Antenna	Modulation	E-UTRA Test Model	Channel	Modulation Characteristics CH BW: 5 MHz	Modulation Characteristics CH BW: 10 MHz
1	QPSK	E-TM1.1	B	---	---
			M	Passed	Passed
			T	---	---
	16QAM	E-TM3.2	B	---	---
			M	Passed	Passed
			T	---	---
	64QAM	E-TM3.1	B	---	---
			M	Passed	Passed
			T	---	---
2	QPSK	E-TM1.1	B	---	---
			M	Passed	Passed
			T	---	---
	16QAM	E-TM3.2	B	---	---
			M	Passed	Passed
			T	---	---
	64QAM	E-TM3.1	B	---	---
			M	Passed	Passed
			T	---	---

Antenna	Modulation	E-UTRA Test Model	Channel	Modulation Characteristics CH BW: 15 MHz	Modulation Characteristics CH BW: 20 MHz
1	QPSK	E-TM1.1	B	---	---
			M	Passed	Passed
			T	---	---
	16QAM	E-TM3.2	B	---	---
			M	Passed	Passed
			T	---	---
	64QAM	E-TM3.1	B	---	---
			M	Passed	Passed
			T	---	---
2	QPSK	E-TM1.1	B	---	---
			M	Passed	Passed
			T	---	---
	16QAM	E-TM3.2	B	---	---
			M	Passed	Passed
			T	---	---
	64QAM	E-TM3.1	B	---	---
			M	Passed	Passed
			T	---	---

5.2.6.1 Test result plot – CH BW: 5 MHz

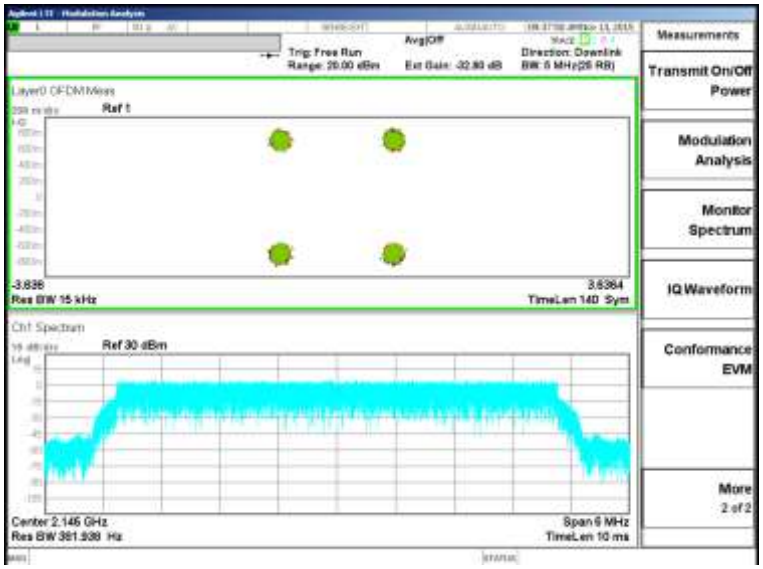
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1



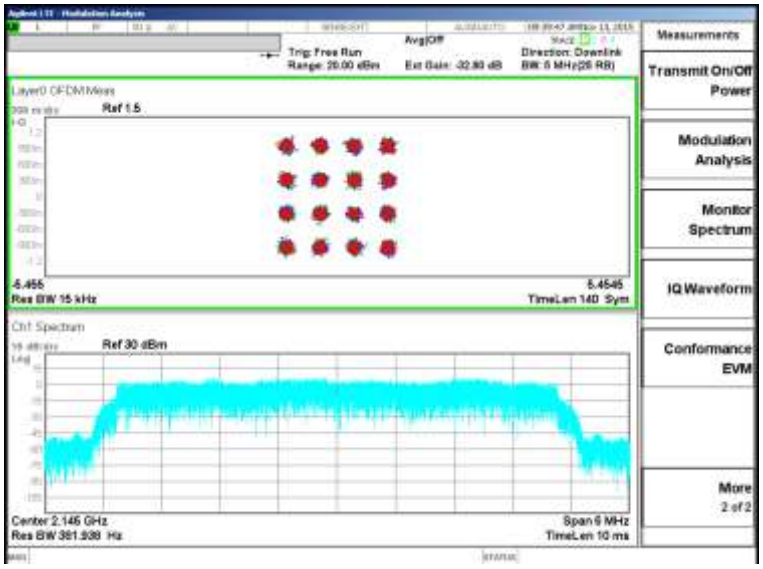
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

5.2.6.2 Test result plot – CH BW: 10 MHz

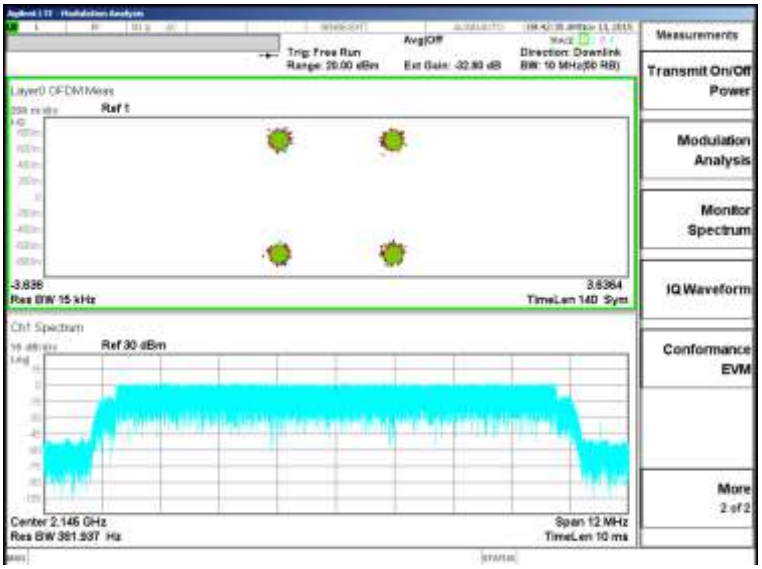
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1



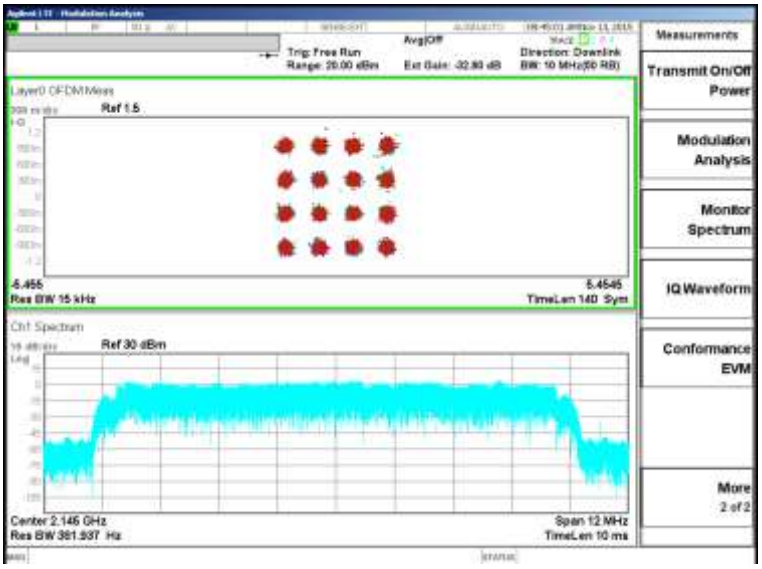
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

5.2.6.3 Test result plot – CH BW: 15 MHz

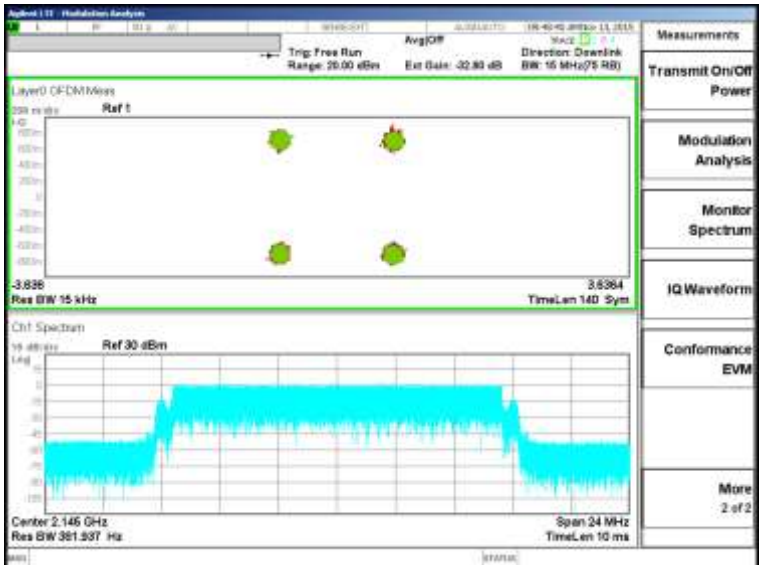
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1



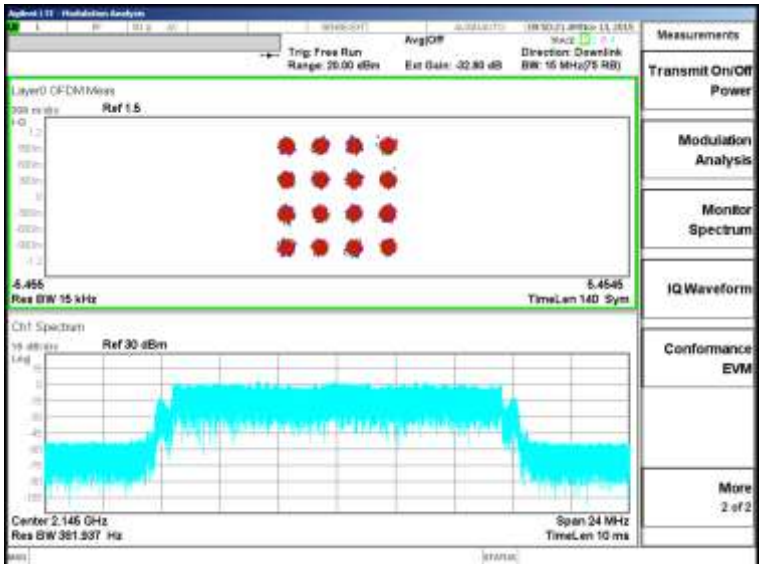
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1



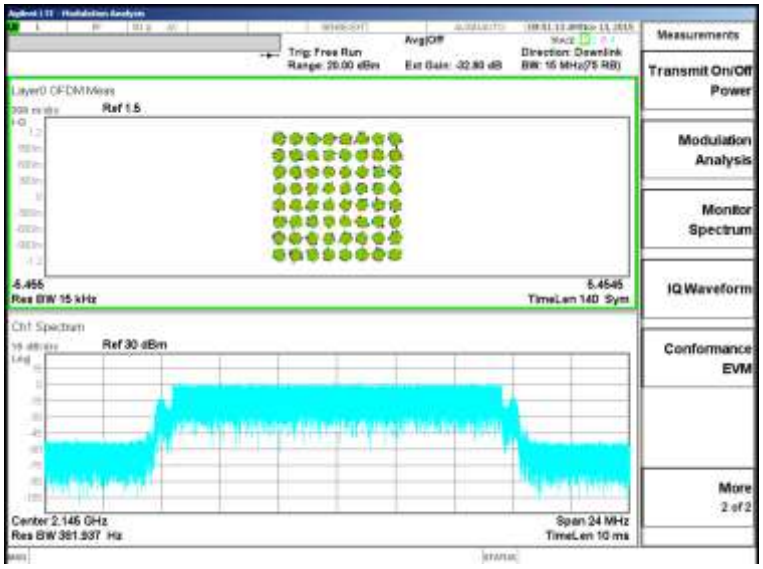
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1



5.2.6.4 Test result plot – CH BW: 20 MHz

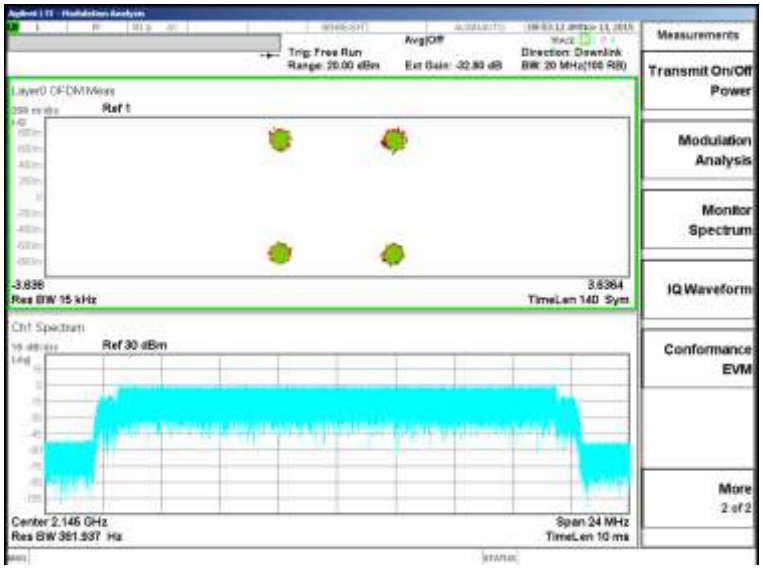
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1



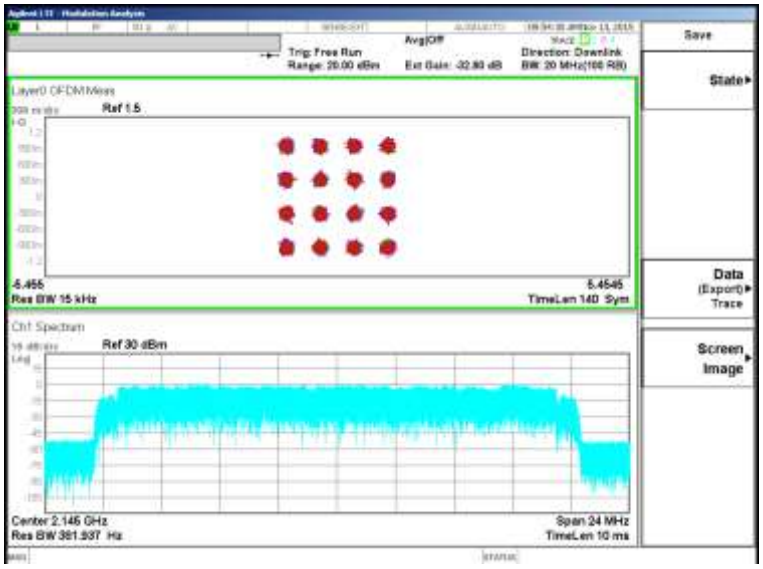
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1



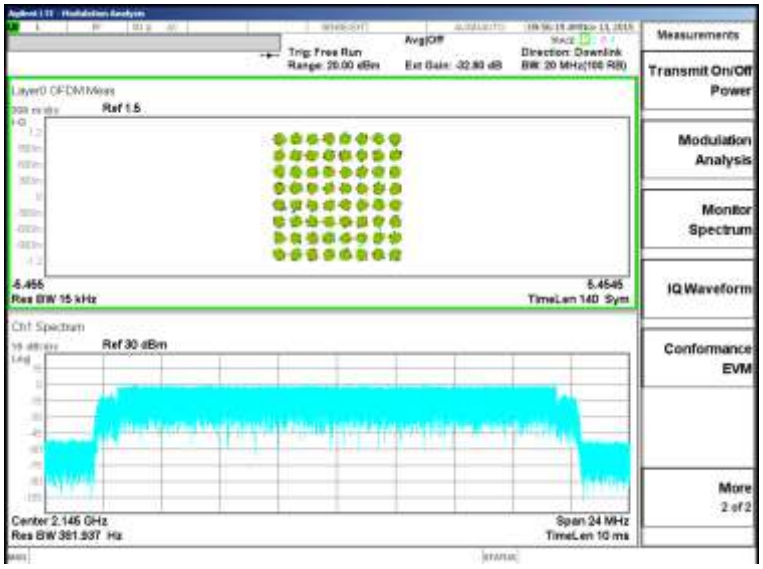
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1



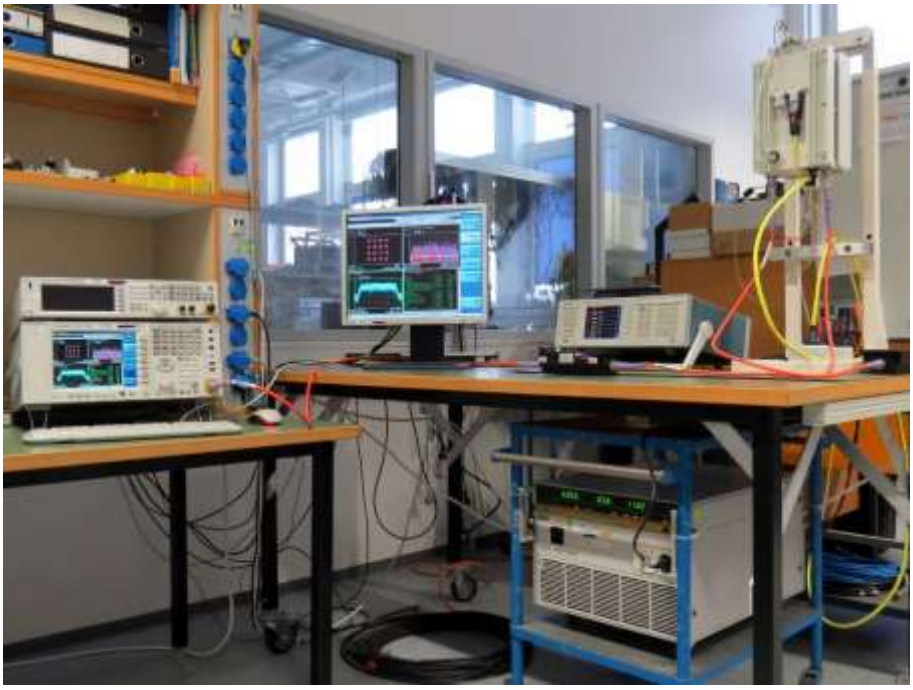
5.3 Peak to average power ratio (PAPR)

For test instruments and accessories used see section 6 Part **SEC3**.

5.3.1 Description of the test location

Test location: Room 008/00/132

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 27, Section 27.50(B):
The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

5.3.4 Description of measurement – Measurement guidance KDB 971168 D01 (5.7.1)

The peak-to-average power ratio (PAPR) is measured conducted using a spectrum analyser with the function “LTE – Power Stat CCDF”. The EUT is set in TX continuous mode while measuring. The EUT is measured at antenna port 1 and antenna port 2. The resulting values are listed in the following tables.

5.3.5 Spectrum analyser settings

The settings are automatically changed by analyser software and is dependent to the used channel bandwidth. Please refer to the test result plots under point 5.3.6.1.

5.3.6 Test result table

Antenna	Modulation	E-UTRA Test Model	Channel	PAR CH BW: 5 MHz (dB)	PAR CH BW: 10 MHz (dB)	Limit (dB)
1	QPSK	E-TM1.1	B	---	---	13.0
			M	6.67	6.71	
			T	---	---	
	16QAM	E-TM3.2	B	---	---	
			M	6.67	6.74	
			T	---	---	
	64QAM	E-TM3.1	B	---	---	
			M	6.66	6.74	
			T	---	---	
2	QPSK	E-TM1.1	B	---	---	
			M	6.71	6.73	
			T	---	---	
	16QAM	E-TM3.2	B	---	---	
			M	6.69	6.75	
			T	---	---	
	64QAM	E-TM3.1	B	---	---	
			M	6.69	6.75	
			T	---	---	

Antenna	Modulation	E-UTRA Test Model	Channel	PAR CH BW: 15 MHz (dB)	PAR CH BW: 20 MHz (dB)	Limit (dB)
1	QPSK	E-TM1.1	B	---	---	13.0
			M	6.90	7.04	
			T	---	---	
	16QAM	E-TM3.2	B	---	---	
			M	6.77	6.91	
			T	---	---	
	64QAM	E-TM3.1	B	---	---	
			M	6.75	7.04	
			T	---	---	
2	QPSK	E-TM1.1	B	---	---	
			M	6.94	7.06	
			T	---	---	
	16QAM	E-TM3.2	B	---	---	
			M	6.75	6.92	
			T	---	---	
	64QAM	E-TM3.1	B	---	---	
			M	6.76	7.05	
			T	---	---	

5.3.6.1 Test result plot – CH BW: 5 MHz

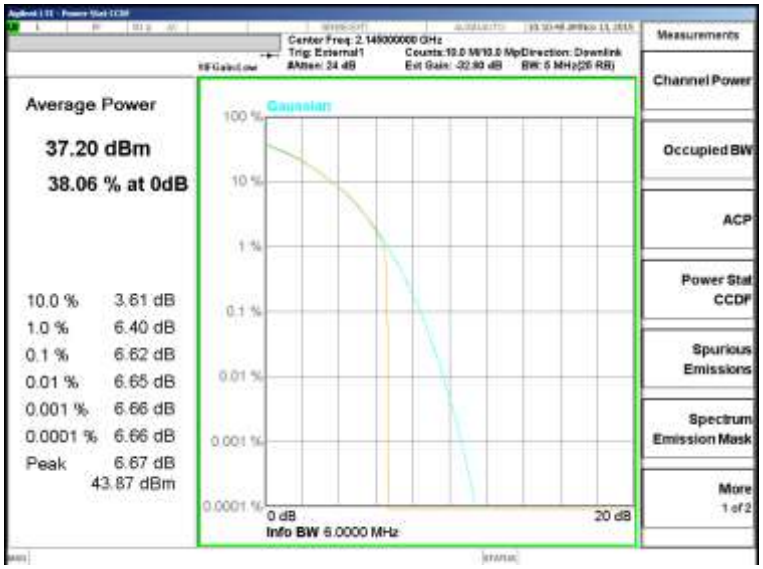
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1



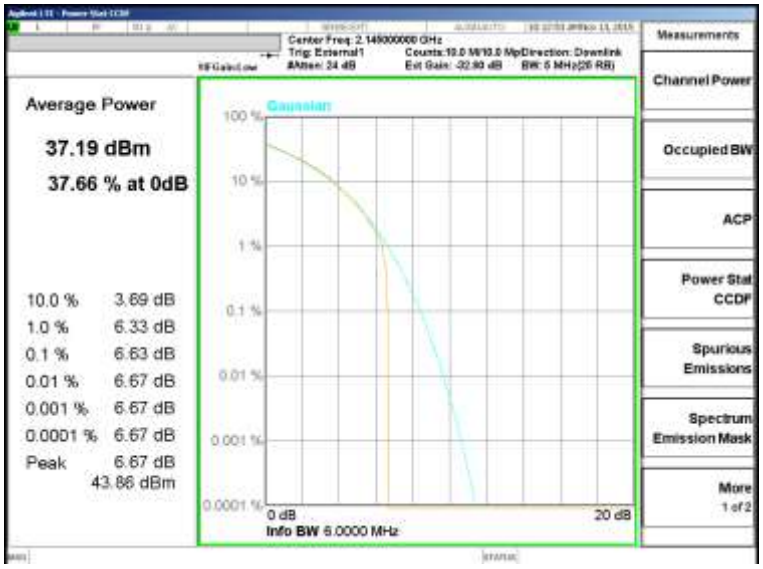
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1



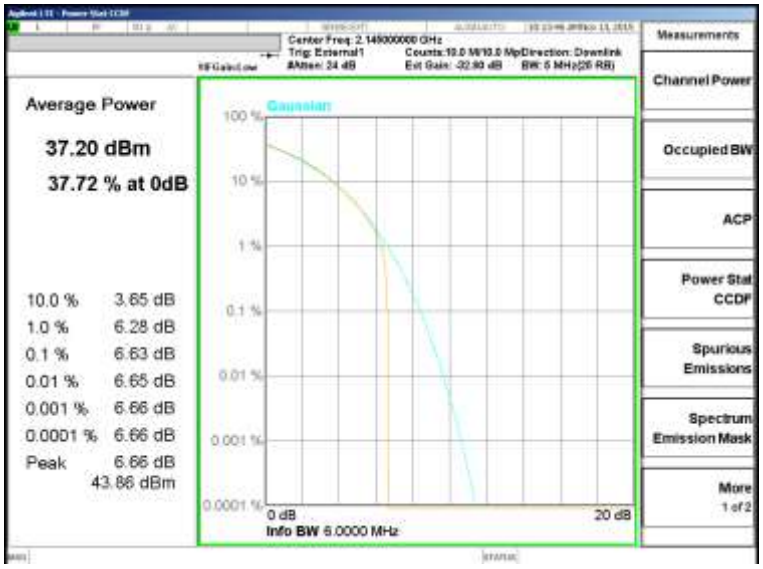
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1



5.3.6.2 Test result plot – CH BW: 10 MHz

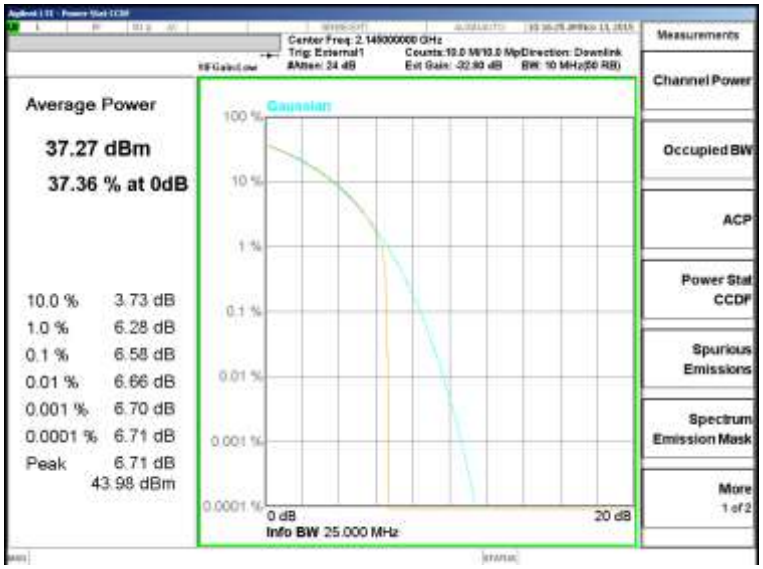
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1



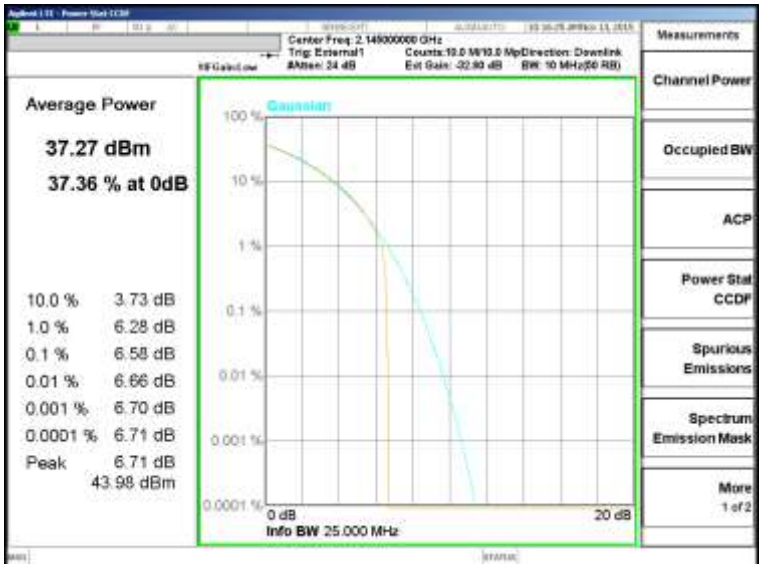
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1



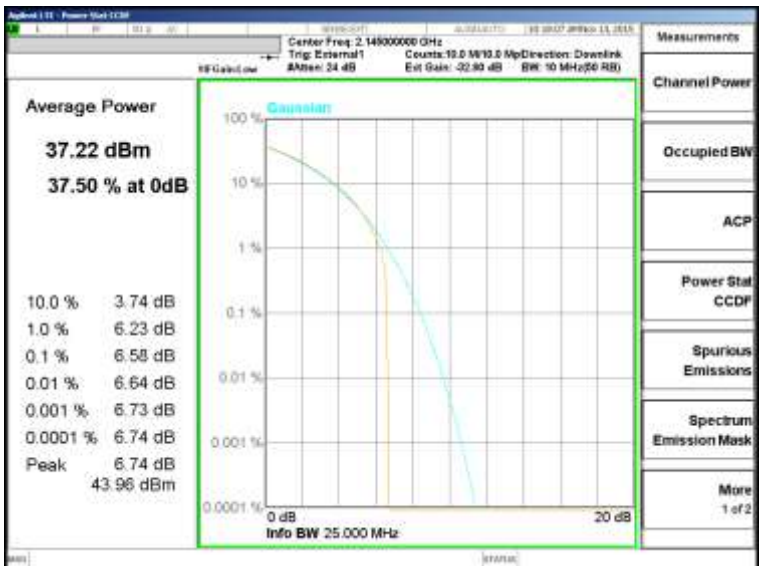
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1



5.3.6.3 Test result plot – CH BW: 15 MHz

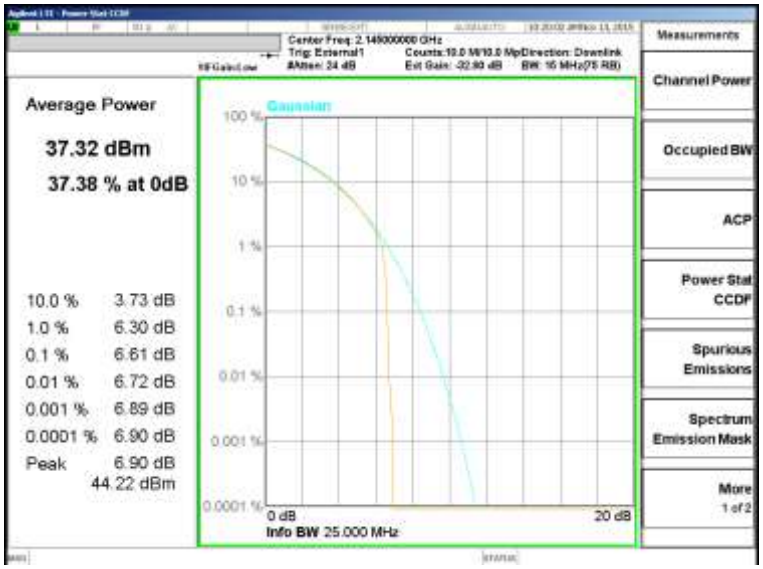
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1



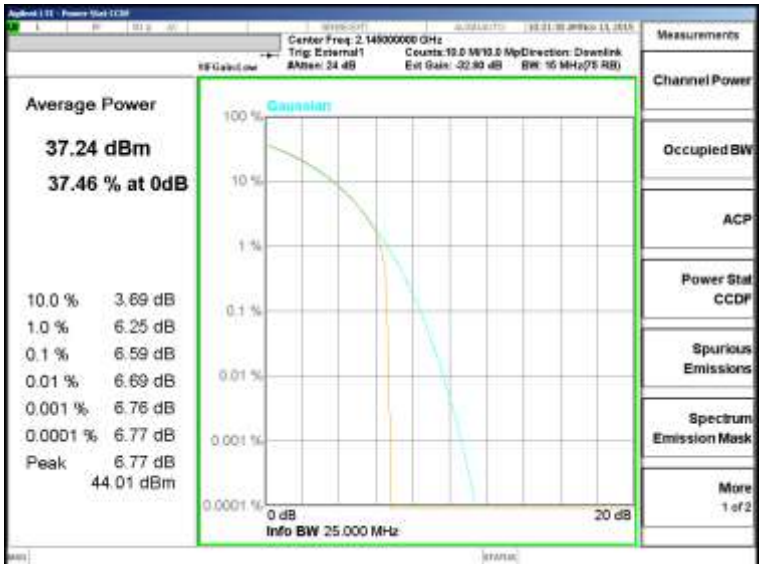
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1



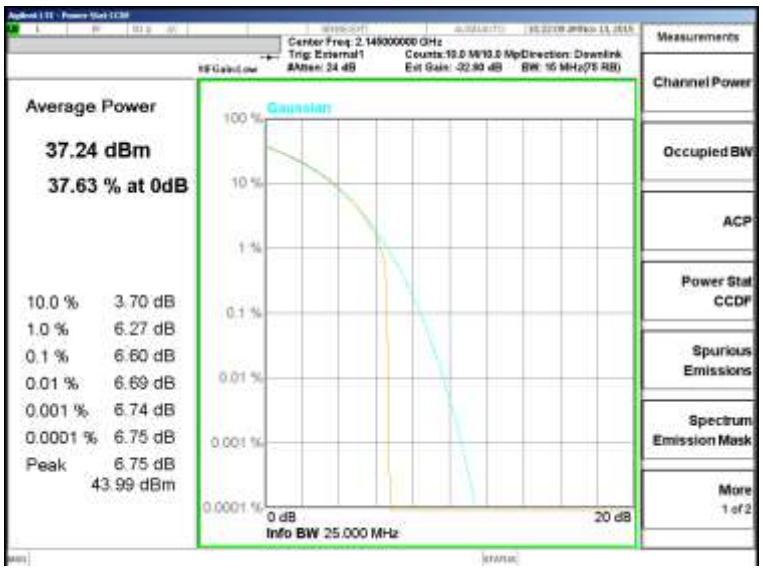
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1



5.3.6.4 Test result plot – CH BW: 20 MHz

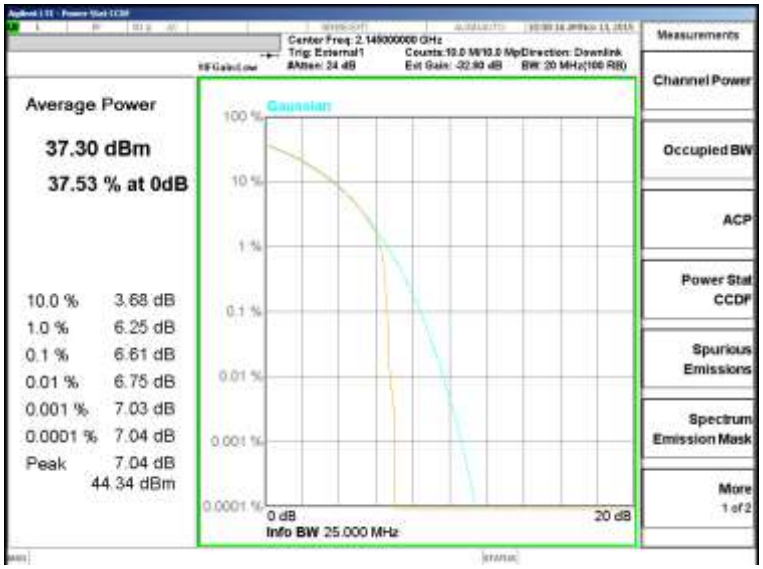
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1



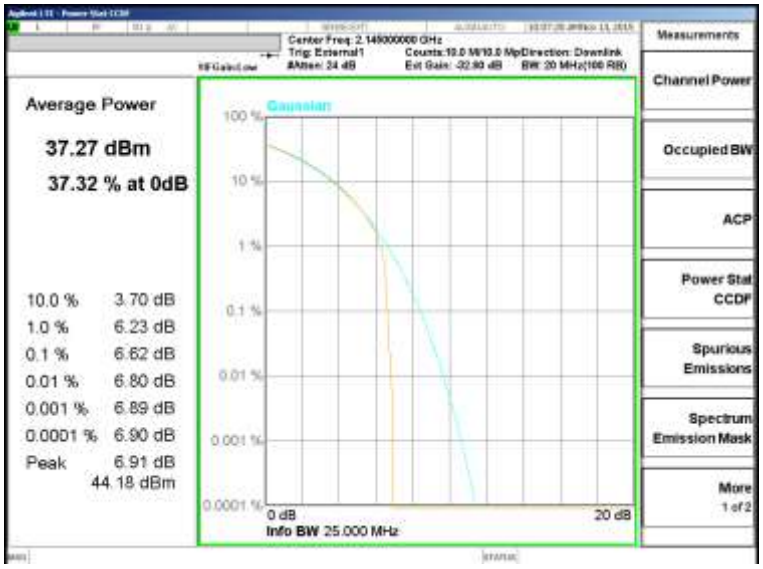
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1



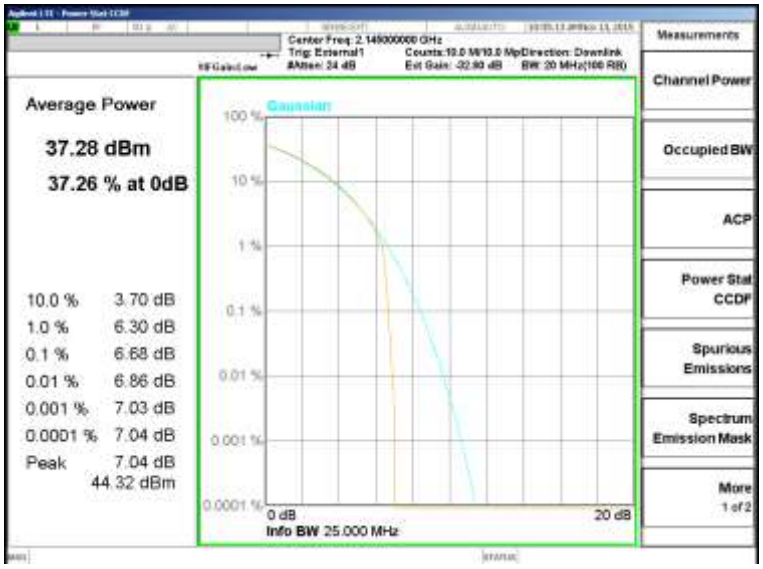
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1



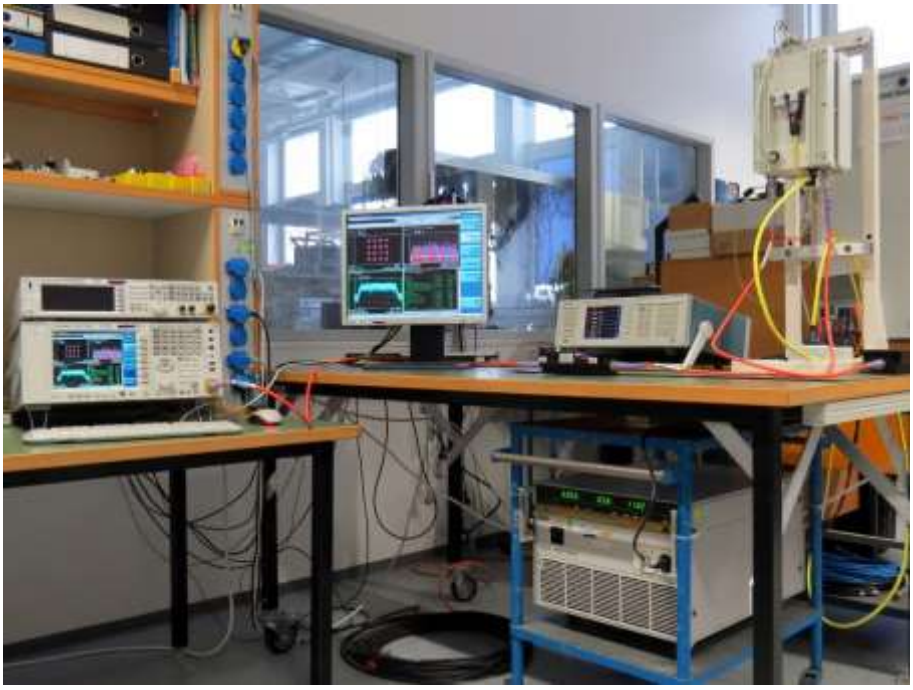
5.4 Emission bandwidth

For test instruments and accessories used see section 6 Part **MB**.

5.4.1 Description of the test location

Test location: Room 008/00/132

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

According to FCC Part 2, Section 2.53(h):
(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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.

According to FCC Part 2, Section 2.1049(h):
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

5.4.4 Description of measurement – Measurement guidance KDB 971168 D01 (4.1 & 4.2)

The emission bandwidth is measured conducted using a spectrum analyser with the function “LTE – Occupied BW”. The EUT is set in TX continuous mode while measuring. The EUT is measured at antenna port 1 and antenna port 2. The resulting values are listed in the following tables.

5.4.5 Spectrum analyser settings

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
30 kHz	1 MHz	40 MHz	AV (100 Sweeps)	External1	52.8 ms

5.4.6 Test result table

CH BW: 5 MHz

Antenna	Modulation	E-UTRA Test Model	26 dB Bandwidth (MHz)			Occupied bandwidth (99 %) (MHz)		
			B	M	T	B	M	T
1	QPSK	E-TM1.1	---	4.83	---	---	4.48	---
	16QAM	E-TM3.2	---	4.81	---	---	4.44	---
	64QAM	E-TM3.1	---	4.88	---	---	4.48	---
2	QPSK	E-TM1.1	---	4.83	---	---	4.48	---
	16QAM	E-TM3.2	---	4.81	---	---	4.44	---
	64QAM	E-TM3.1	---	4.88	---	---	4.48	---

CH BW: 10 MHz

Antenna	Modulation	E-UTRA Test Model	26 dB Bandwidth (MHz)			Occupied bandwidth (99 %) (MHz)		
			B	M	T	B	M	T
1	QPSK	E-TM1.1	---	9.81	---	---	8.95	---
	16QAM	E-TM3.2	---	9.83	---	---	8.92	---
	64QAM	E-TM3.1	---	9.82	---	---	8.97	---
2	QPSK	E-TM1.1	---	9.81	---	---	8.95	---
	16QAM	E-TM3.2	---	9.83	---	---	8.92	---
	64QAM	E-TM3.1	---	9.82	---	---	8.97	---

CH BW: 15 MHz

Antenna	Modulation	E-UTRA Test Model	26 dB Bandwidth (MHz)			Occupied bandwidth (99 %) (MHz)		
			B	M	T	B	M	T
1	QPSK	E-TM1.1	---	14.85	---	---	13.43	---
	16QAM	E-TM3.2	---	14.81	---	---	13.41	---
	64QAM	E-TM3.1	---	14.85	---	---	13.39	---
2	QPSK	E-TM1.1	---	14.85	---	---	13.43	---
	16QAM	E-TM3.2	---	14.81	---	---	13.41	---
	64QAM	E-TM3.1	---	14.85	---	---	13.39	---

CH BW: 20 MHz

Antenna	Modulation	E-UTRA Test Model	26 dB Bandwidth (MHz)			Occupied bandwidth (99 %) (MHz)		
			B	M	T	B	M	T
1	QPSK	E-TM1.1	---	19.80	---	---	17.99	---
	16QAM	E-TM3.2	---	19.74	---	---	17.99	---
	64QAM	E-TM3.1	---	19.78	---	---	18.01	---
2	QPSK	E-TM1.1	---	19.80	---	---	17.99	---
	16QAM	E-TM3.2	---	19.74	---	---	17.99	---
	64QAM	E-TM3.1	---	19.78	---	---	18.01	---

5.4.6.1 Test result plot – CH BW: 5 MHz

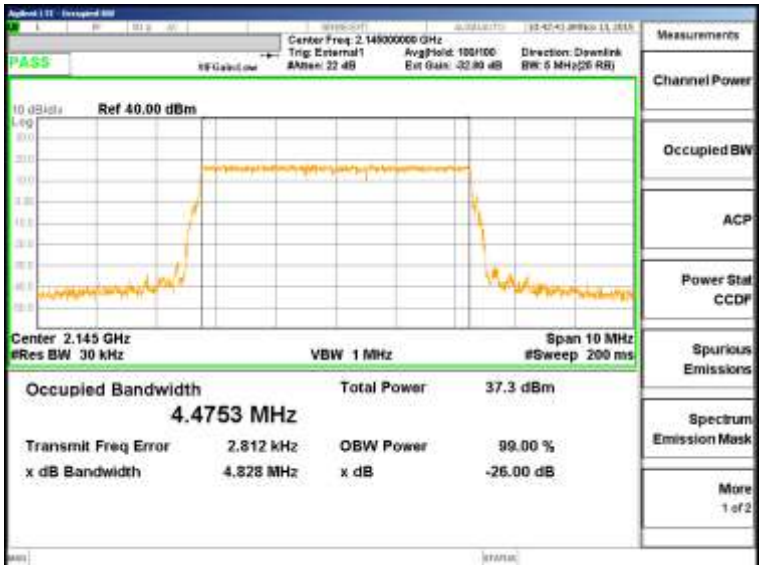
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1



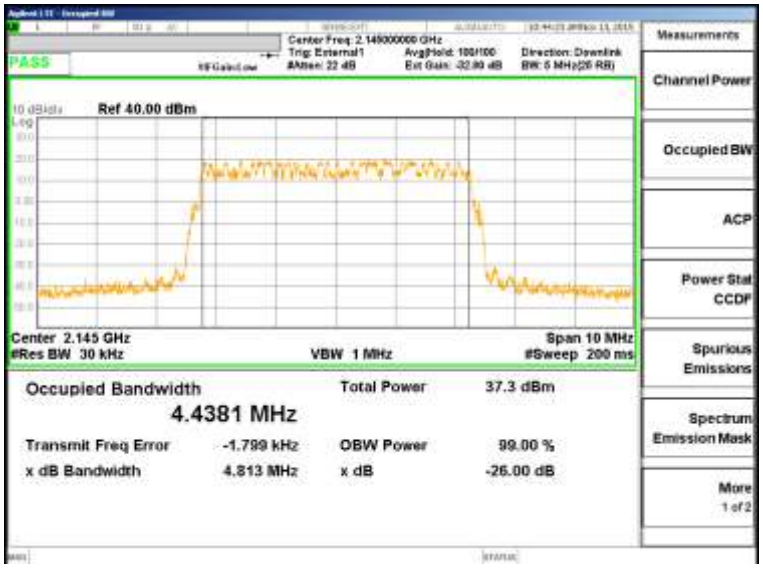
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1



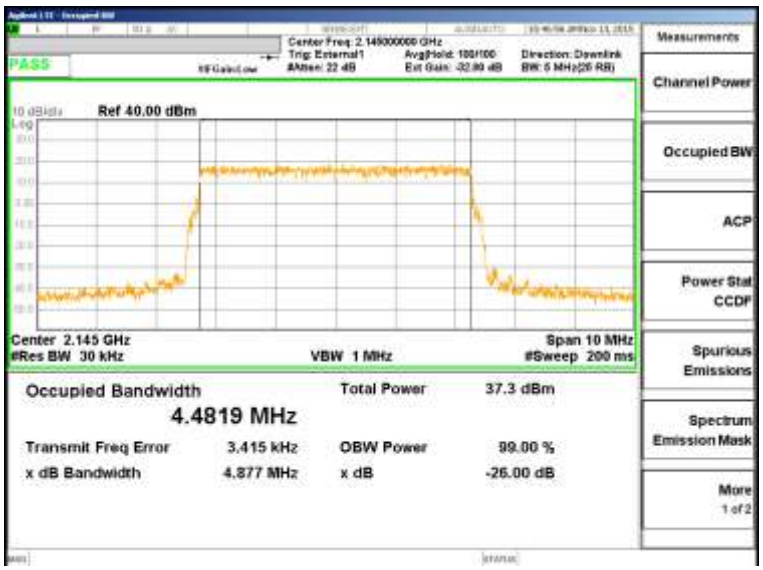
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1



5.4.6.2 Test result plot – CH BW: 10 MHz

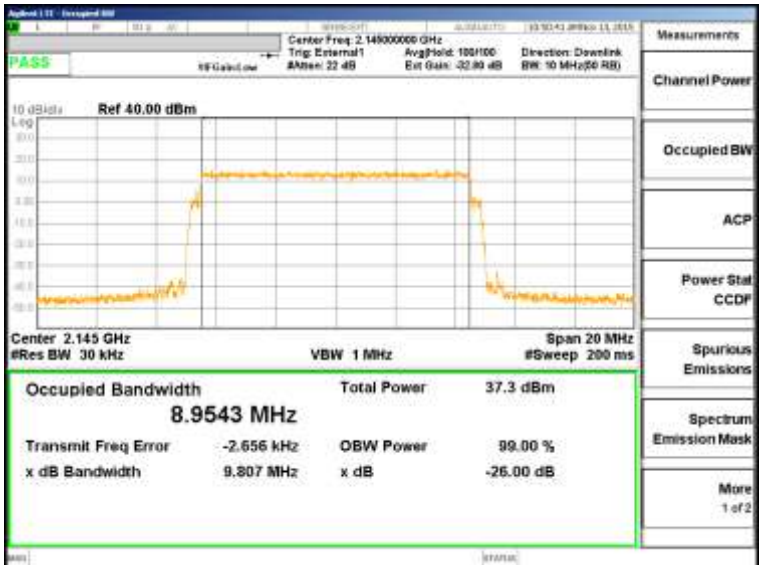
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1



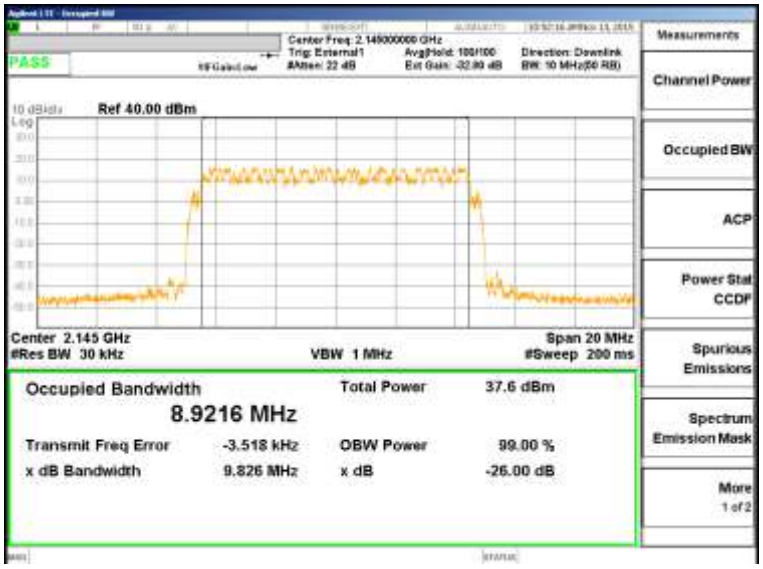
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1



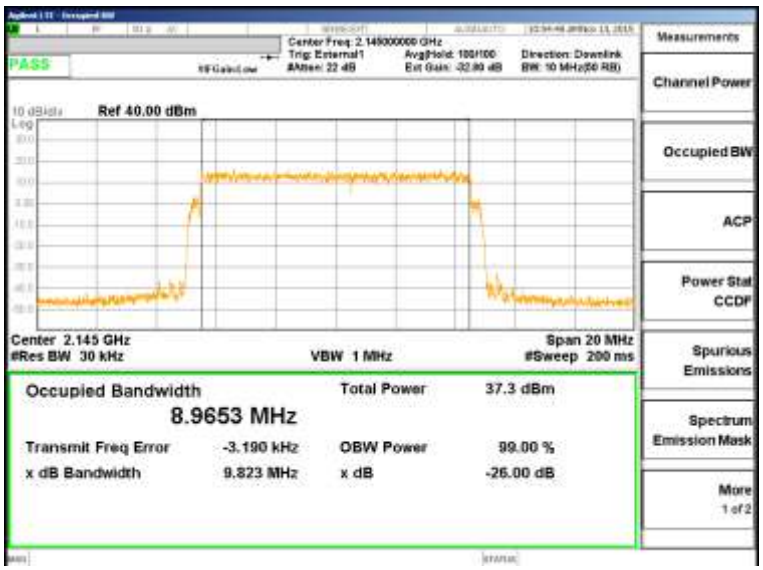
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1



5.4.6.3 Test result plot – CH BW: 15 MHz

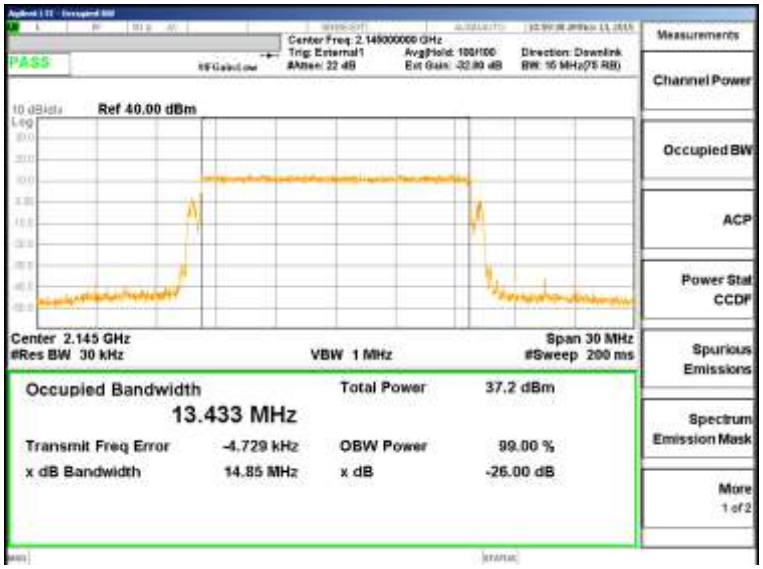
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1



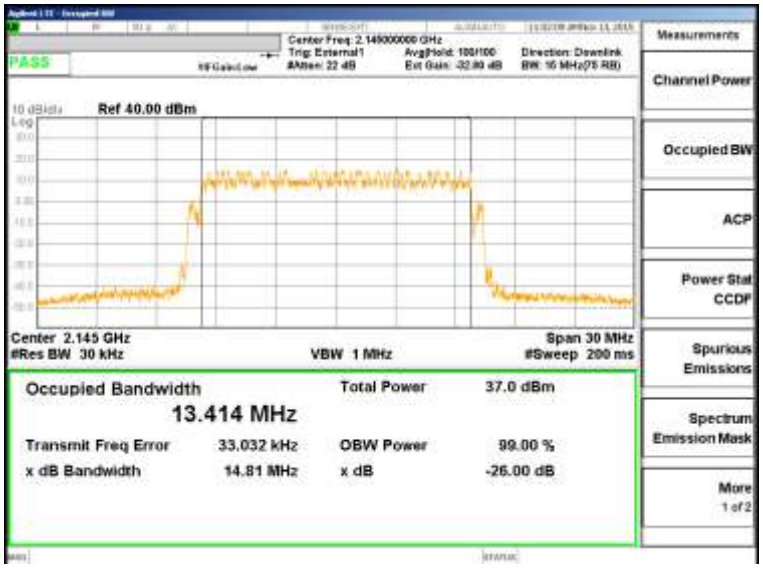
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1



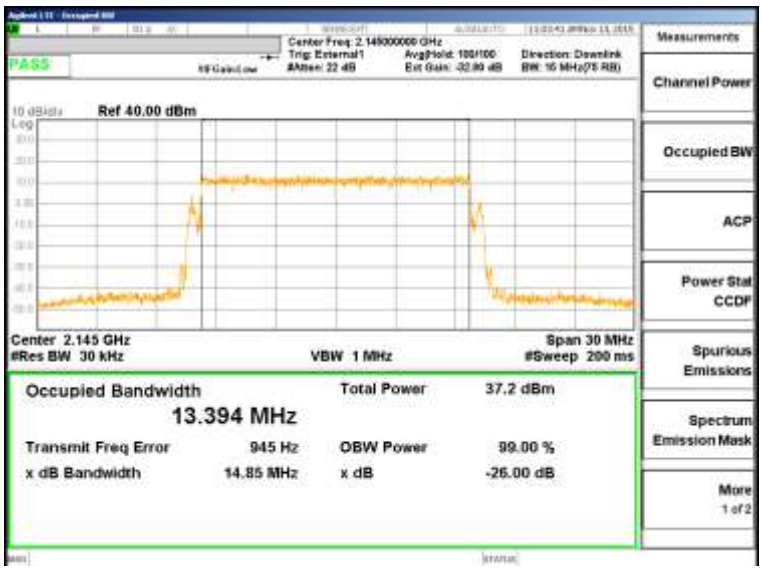
Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1



5.4.6.4 Test result plot – CH BW: 20 MHz

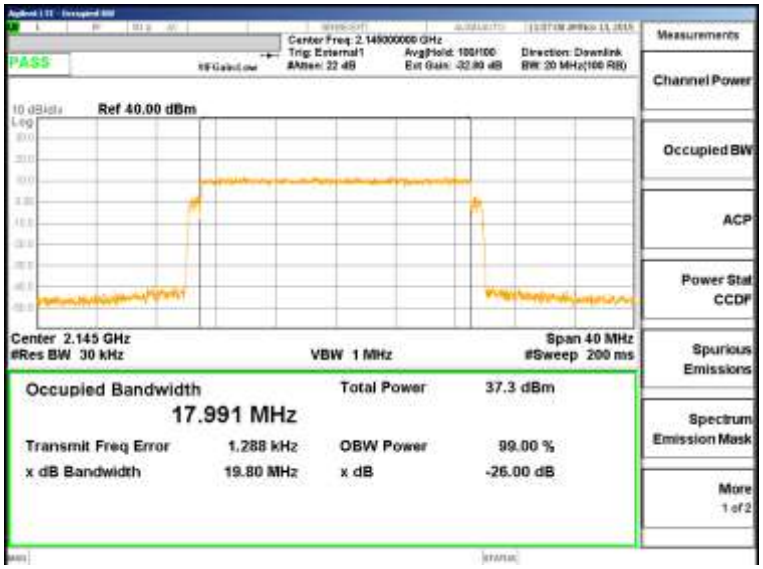
Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1



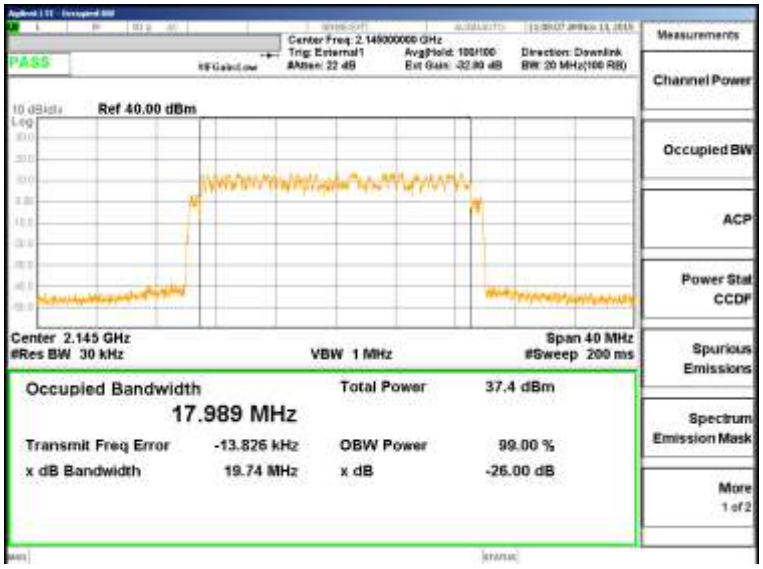
Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

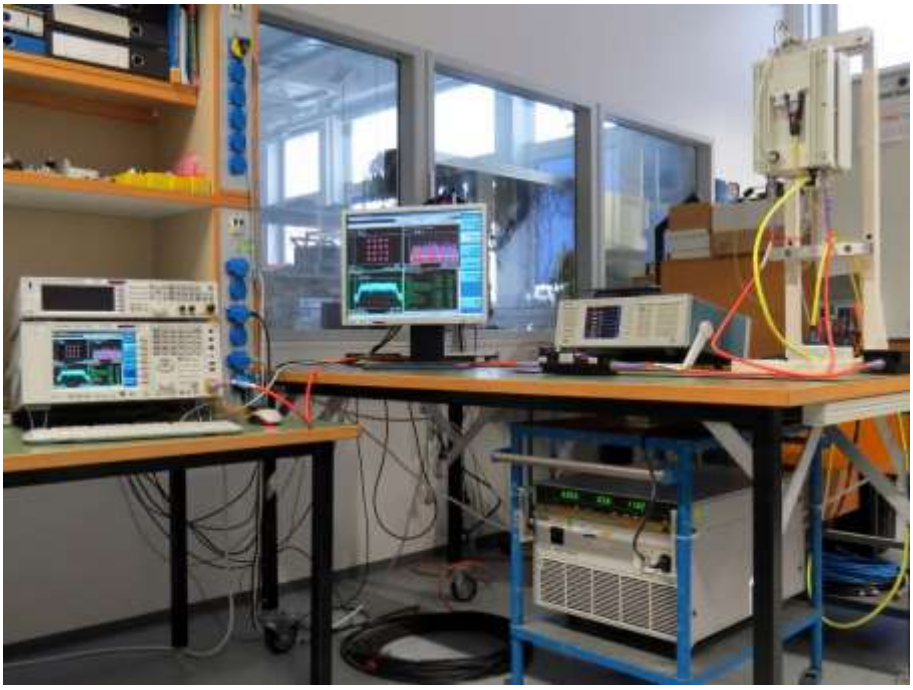
5.5 Band edge

For test instruments and accessories used see section 6 Part **MB**.

5.5.1 Description of the test location

Test location: Room 008/00/132

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 27, Section 27.53(h):
(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

Pursuant to FCC OET RULES 662911 D01 and D02 for two antenna MIMO mode of operations, the FCC limit of -13 dBm shall be 3 dB more stringent, therefore all channel edge and out of band spurious emissions shall be -16 dBm. Further limits are adjusted for lower resolution BW using 10 log (100kHz/1% of channel BW).

5.5.4 Limit calculation

The limit is specified as

-{43 + 10log (mean power output in watts) } dB = -13 dBm

Within the 1st MHz outside the band the limit of -13 dBm is specified when measured with a 1% bandwidth. When measured with a different bandwidth the adjustment is made against 1% of the signal bandwidth. With the EUT channel bandwidths BW of 5 MHz / 10 MHz / 15 MHz / 20 MHz the limits are adjusted to

-13 + 10LOG (30 kHz / (BW/100) kHz) dBm = x dBm

BW (kHz)	Limit x (dBm)	Limit 2 TX (dBm)
5000	-15.22	-18.23
10000	-18.23	-21.24
15000	-19.99	-23.00
20000	-21.24	-24.25

When accounting for a 2 Transmitter signal, (per KDB 662911 D01 Multiple Transmitter Output v01r01), the level needs to be adjusted by 10LOG (n) where n= number of outputs. The adjustment for n=2 is:

3 dB = 10LOG (2)

The resultant limits for 2 TX operation are calculated in the table above.

5.5.5 Description of measurement – Measurement guidance

The emission bandwidth is measured conducted using a spectrum analyser. The EUT is set in TX continuous mode while measuring. The EUT is measured at antenna port 1 and antenna port 2. The resulting values are listed in the following tables.

5.5.6 Spectrum analyser settings

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
30 kHz	1 MHz	2 MHz	RMS	Free Run	5 sec.

5.5.7 Test result table

CH BW: 5 MHz

Antenna	Modulation	E-UTRA Test Model	Band edges emissions (dBm)			Limit (dBm)
			B	M	T	
1	QPSK	E-TM1.1	-24.67	---	-24.75	-18.23
	16QAM	E-TM3.2	-24.66	---	-25.21	
	64QAM	E-TM3.1	-25.00	---	-24.97	
2	QPSK	E-TM1.1	-24.74	---	-24.77	
	16QAM	E-TM3.2	-24.61	---	-25.35	
	64QAM	E-TM3.1	-24.97	---	-25.07	

CH BW: 10 MHz

Antenna	Modulation	E-UTRA Test Model	Band edges emissions (dBm)			Limit (dBm)
			B	M	T	
1	QPSK	E-TM1.1	-26.15	---	-26.45	-21.24
	16QAM	E-TM3.2	-25.99	---	-26.05	
	64QAM	E-TM3.1	-26.34	---	-26.25	
2	QPSK	E-TM1.1	-26.30	---	-26.68	
	16QAM	E-TM3.2	-26.24	---	-26.19	
	64QAM	E-TM3.1	-26.50	---	-26.41	

CH BW: 15 MHz

Antenna	Modulation	E-UTRA Test Model	Band edges emissions (dBm)			Limit (dBm)
			B	M	T	
1	QPSK	E-TM1.1	-25.19	---	-25.38	-23.00
	16QAM	E-TM3.2	-25.49	---	-25.37	
	64QAM	E-TM3.1	-25.23	---	-25.41	
2	QPSK	E-TM1.1	-25.33	---	-25.50	
	16QAM	E-TM3.2	-25.64	---	-25.45	
	64QAM	E-TM3.1	-25.38	---	-25.52	

CH BW: 20 MHz

Antenna	Modulation	E-UTRA Test Model	Band edges emissions (dBm)			Limit (dBm)
			B	M	T	
1	QPSK	E-TM1.1	-35.17	---	-35.96	-24.25
	16QAM	E-TM3.2	-35.85	---	-35.77	
	64QAM	E-TM3.1	-35.30	---	-35.77	
2	QPSK	E-TM1.1	-34.38	---	-35.54	
	16QAM	E-TM3.2	-35.12	---	-35.43	
	64QAM	E-TM3.1	-34.67	---	-35.77	

5.5.7.1 Test result plot – CH BW: 5 MHz – Bottom frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: B

CH BW: 5 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: B

CH BW: 5 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: B

CH BW: 5 MHz

Antenna port: 1

5.5.7.2 Test result plot – CH BW: 5 MHz – Top frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: T

CH BW: 5 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: T

CH BW: 5 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: T

CH BW: 5 MHz

Antenna port: 1

5.5.7.3 Test result plot – CH BW: 10 MHz – Bottom frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: B

CH BW: 10 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: B

CH BW: 10 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: B

CH BW: 10 MHz

Antenna port: 1

5.5.7.4 Test result plot – CH BW: 10 MHz – Top frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: T

CH BW: 10 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: T

CH BW: 10 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: T

CH BW: 10 MHz

Antenna port: 1

5.5.7.5 Test result plot – CH BW: 15 MHz – Bottom frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: B

CH BW: 15 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: B

CH BW: 15 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: B

CH BW: 15 MHz

Antenna port: 1

5.5.7.6 Test result plot – CH BW: 15 MHz – Top frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: T

CH BW: 15 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: T

CH BW: 15 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: T

CH BW: 15 MHz

Antenna port: 1

5.5.7.7 Test result plot – CH BW: 20 MHz – Bottom frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: B

CH BW: 20 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: B

CH BW: 20 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: B

CH BW: 20 MHz

Antenna port: 1

5.5.7.8 Test result plot – CH BW: 20 MHz – Top frequency

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: T

CH BW: 20 MHz

Antenna port: 1

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: T

CH BW: 20 MHz

Antenna port: 1

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: T

CH BW: 20 MHz

Antenna port: 1

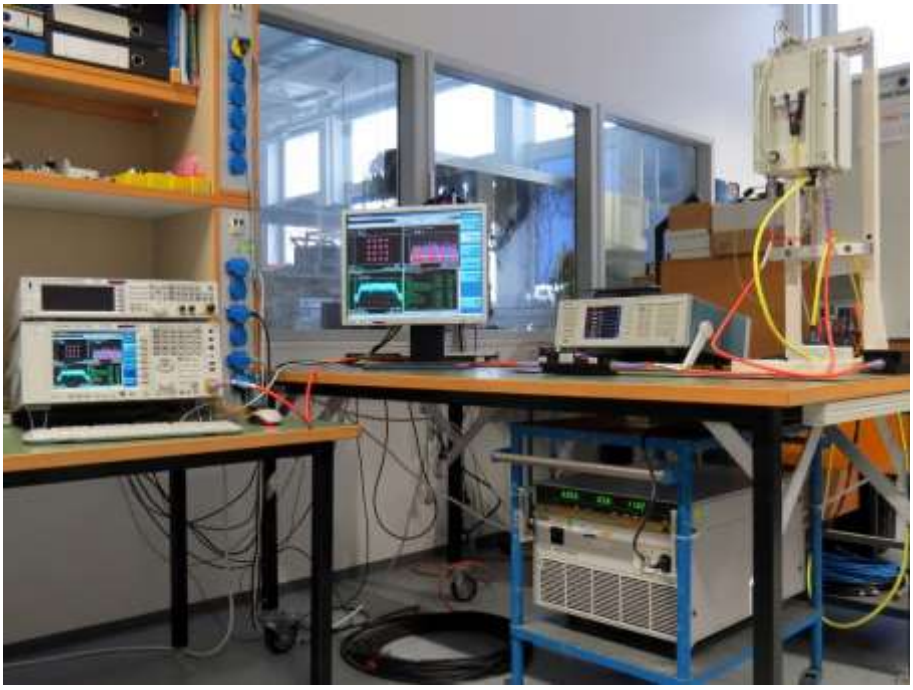
5.6 Spurious emissions at antenna terminals

For test instruments and accessories used see section 6 Part **SEC1-3**.

5.6.1 Description of the test location

Test location: Room 008/00/132

5.6.2 Photo documentation of the test set-up



5.6.3 Applicable standard

According to FCC Part 27, Section 27.53(h):
(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

Pursuant to FCC OET RULES 662911 D01 and D02 for two antenna MIMO mode of operations, the FCC limit of -13 dBm shall be 3 dB more stringent, therefore all channel edge and out of band spurious emissions shall be -16 dBm. Further limits are adjusted for lower resolution BW using 10 log (100kHz/1% of channel BW)

5.6.4 Description of measurement – Measurement guidance KDB 971168 D01 (6)

The spurious emission at the antenna terminal is measured conducted using a spectrum analyser. The EUT is set in TX continuous mode while measuring. The EUT is measured at antenna port 1 and antenna port 2. The resulting values are listed in the following tables.

5.6.5 Spectrum analyser settings

9 kHz to 150 kHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
1 kHz	3 kHz	-	RMS	Free run	20 sec.

150 kHz to 30 MHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
10 kHz	30 kHz	-	RMS	Free run	20 sec.

30 MHz to 1 GHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
100 kHz	300 kHz	-	RMS	Free run	20 sec.

1 GHz to 27 GHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
1 MHz	3 MHz	-	RMS	Free run	20 sec.

5.6.6 Test result tables

QPSK-Modulation (CH BW: 5 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.96	0.13	-62.09	0.13	
	0.15	30	-65.62	0.21	-65.93	0.21	
	30	1000	-54.92	887.67	-54.86	897.18	
	1000	3500	-38.18	3148.50	-38.11	3149.00	
	3500	12750	-59.10	12750.00	-59.19	12744.45	
	12750	21800	-47.73	21559.27	-47.70	21564.70	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

16QAM-Modulation (CH BW: 5 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.72	0.12	-61.48	0.13	
	0.15	30	-65.93	0.21	-65.76	0.20	
	30	1000	-54.86	889.03	-54.85	899.90	
	1000	3500	-38.15	3155.00	-38.27	3156.00	
	3500	12750	-59.19	12748.15	-59.17	12750.00	
	12750	21800	-47.71	21557.46	-47.70	21561.08	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

64QAM-Modulation (CH BW: 5 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.77	0.13	-61.65	0.12	
	0.15	30	-65.52	0.29	-65.63	0.76	
	30	1000	-54.89	890.58	-54.91	886.51	
	1000	3500	-38.12	3154.50	-38.09	3154.50	
	3500	12750	-59.16	12748.15	-59.19	12746.30	
	12750	21800	-47.73	21562.89	-47.74	21559.27	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

QPSK-Modulation (CH BW: 10 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.29	0.13	-62.22	0.13	
	0.15	30	-66.02	0.39	-65.76	0.26	
	30	1000	-54.88	877.00	-54.87	883.79	
	1000	3500	-38.19	3150.00	-38.12	3154.00	
	3500	12750	-59.14	12750.00	-59.23	12750.00	
	12750	21800	-47.68	21564.70	-47.69	21570.13	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

16QAM-Modulation (CH BW: 10 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.34	0.13	-61.67	0.12	
	0.15	30	-66.38	2.50	-65.76	0.25	
	30	1000	-54.90	882.24	-54.87	889.03	
	1000	3500	-38.27	3150.50	-38.26	3154.50	
	3500	12750	-59.20	12742.60	-59.20	12742.60	
	12750	21800	-47.62	21564.70	-47.70	21561.08	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

64QAM-Modulation (CH BW: 10 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.38	0.13	-61.30	0.13	
	0.15	30	-65.94	0.19	-65.97	0.26	
	30	1000	-54.92	870.80	-54.89	891.55	
	1000	3500	-38.18	3152.50	-38.16	3154.00	
	3500	12750	-59.20	12742.60	-59.20	12750.00	
	12750	21800	-47.72	21559.27	-47.67	21568.32	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

QPSK-Modulation (CH BW: 15 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.92	0.13	-61.37	0.13	
	0.15	30	-65.87	0.26	-66.16	0.17	
	30	1000	-54.84	880.50	-54.91	884.96	
	1000	3500	-38.16	3153.50	-38.26	3156.00	
	3500	12750	-59.15	12748.15	-59.10	12750.00	
	12750	21800	-47.74	21566.51	-47.70	21559.27	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

16QAM-Modulation (CH BW: 15 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.51	0.13	-61.96	0.13	
	0.15	30	-65.73	0.25	-66.05	0.25	
	30	1000	-54.95	865.75	-54.97	880.88	
	1000	3500	-38.20	3150.50	-38.30	3159.00	
	3500	12750	-59.18	12750.00	-59.19	12746.30	
	12750	21800	-47.75	21559.27	-47.75	21562.89	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

64QAM-Modulation (CH BW: 15 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.92	0.13	-61.47	0.13	
	0.15	30	-65.32	0.26	-66.33	0.26	
	30	1000	-54.87	877.59	-54.93	880.69	
	1000	3500	-38.17	3151.00	-38.30	3152.00	
	3500	12750	-59.15	12746.30	-59.21	12748.15	
	12750	21800	-47.67	21564.70	-47.73	21566.51	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

QPSK-Modulation (CH BW: 20 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.64	0.13	-60.87	0.13	
	0.15	30	-65.87	0.25	-66.55	0.26	
	30	1000	-54.97	886.12	-55.05	869.83	
	1000	3500	-38.28	3151.50	-38.20	3153.00	
	3500	12750	-59.24	12746.30	-59.15	12750.00	
	12750	21800	-47.82	21564.70	-47.68	21566.51	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

16QAM-Modulation (CH BW: 20 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.64	0.13	-61.98	0.12	
	0.15	30	-66.30	0.25	-65.91	0.25	
	30	1000	-54.94	927.06	-55.05	904.16	
	1000	3500	-38.22	3152.00	-38.25	3154.00	
	3500	12750	-59.24	12750.00	-59.15	12750.00	
	12750	21800	-47.81	21559.27	-47.71	21561.08	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

64QAM-Modulation (CH BW: 20 MHz)

Channel	Start Frequency (MHz)	Stop Frequency (MHz)	Antenna 1		Antenna 2		Limit (dBm)
			Peak (dBm)	Frequency (MHz)	Peak (dBm)	Frequency (MHz)	
Bottom	0.009	0.15	---	---	---	---	-16.0
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	
Middle	0.009	0.15	-61.94	0.13	-61.85	0.13	
	0.15	30	-66.48	0.20	-65.11	0.25	
	30	1000	-54.85	857.60	-54.92	867.50	
	1000	3500	-38.31	3150.00	-38.32	3150.00	
	3500	12750	-59.24	12746.30	-59.15	12746.30	
	12750	21800	-47.80	21559.27	-47.72	21562.89	
Top	0.009	0.15	---	---	---	---	
	0.15	30	---	---	---	---	
	30	1000	---	---	---	---	
	1000	3500	---	---	---	---	
	3500	12750	---	---	---	---	
	12750	21800	---	---	---	---	

5.6.6.1 Test result plot – CH BW: 5 MHz

Modulation: QPSK

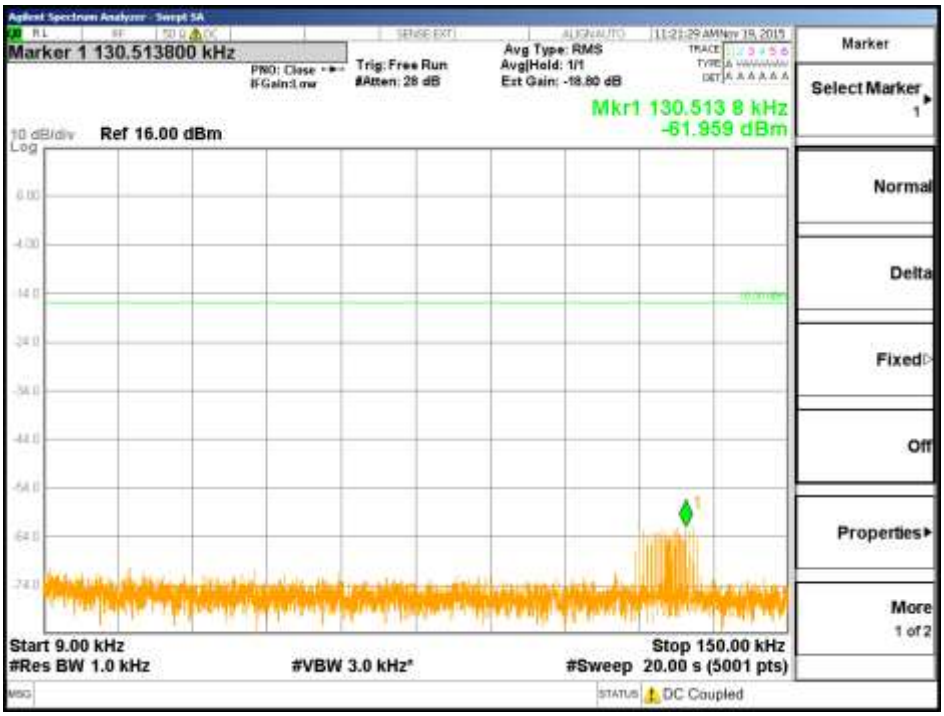
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: QPSK

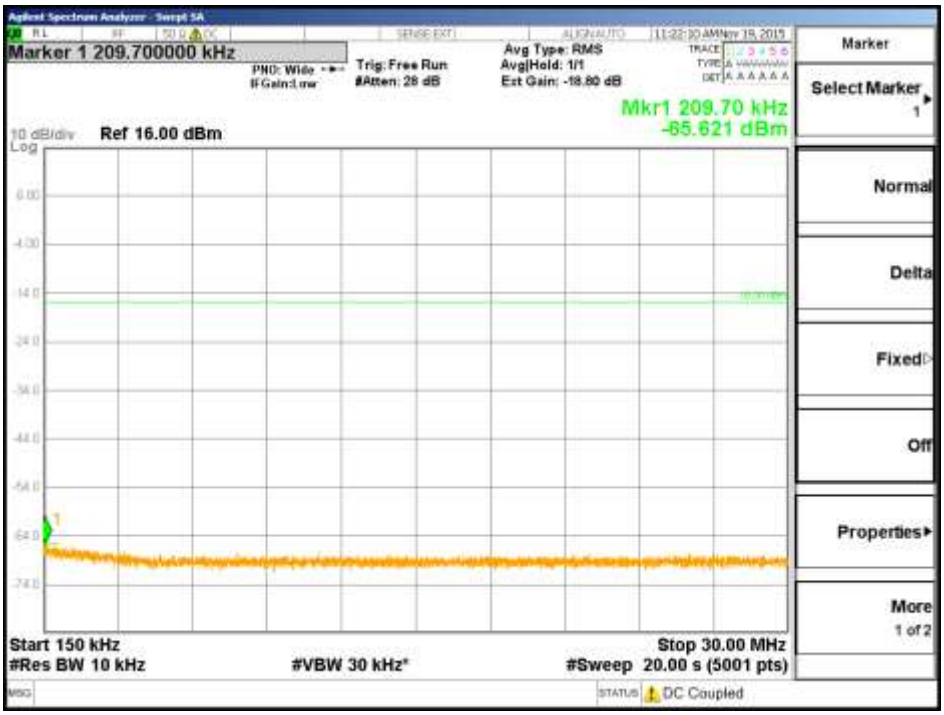
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz



Modulation: QPSK

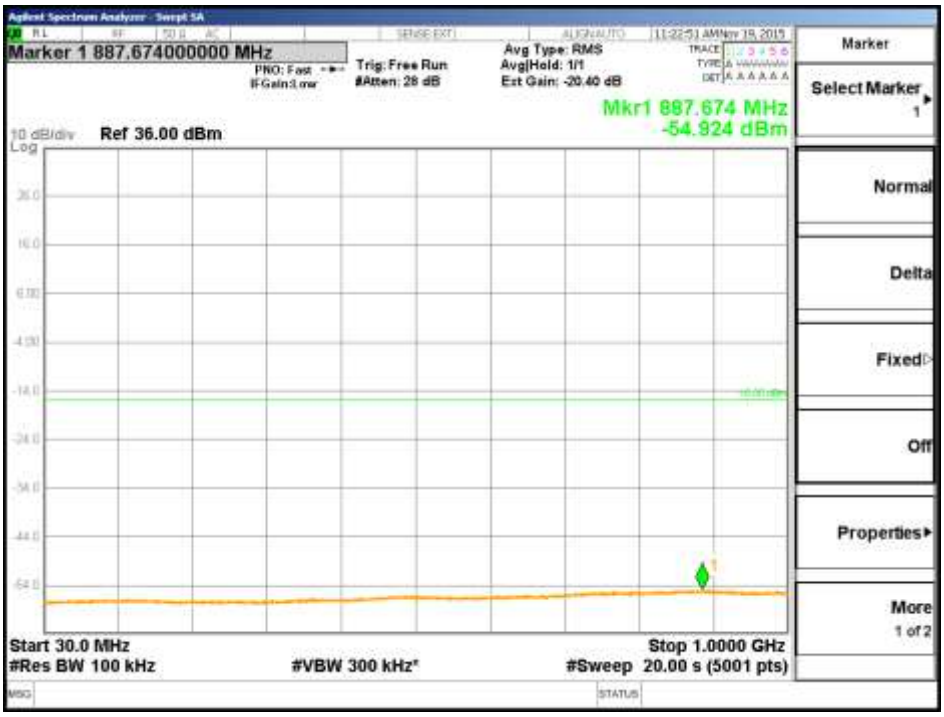
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: QPSK

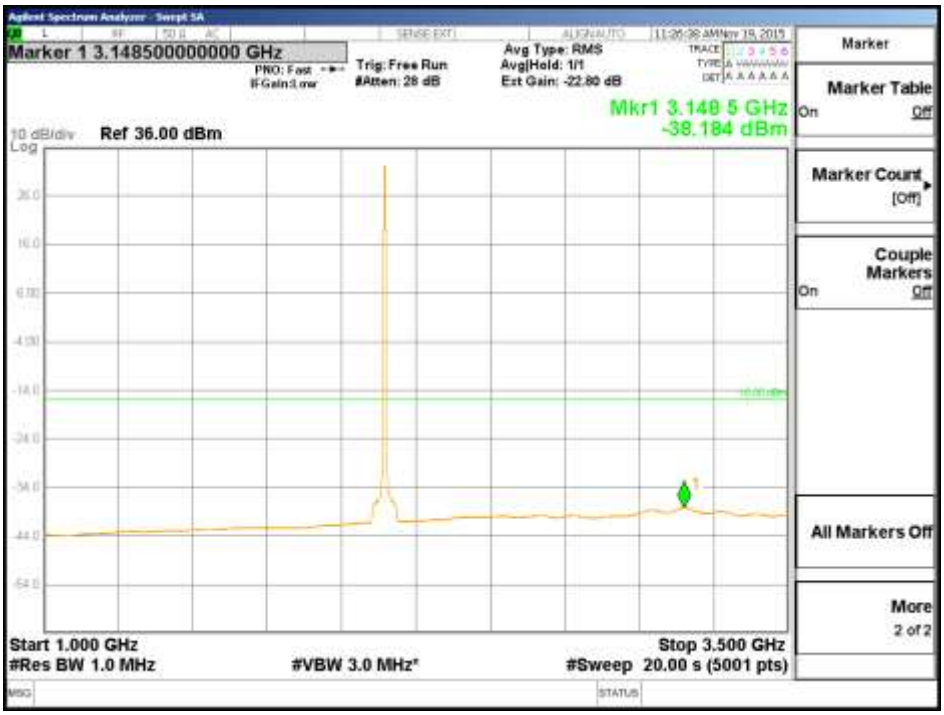
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 16QAM

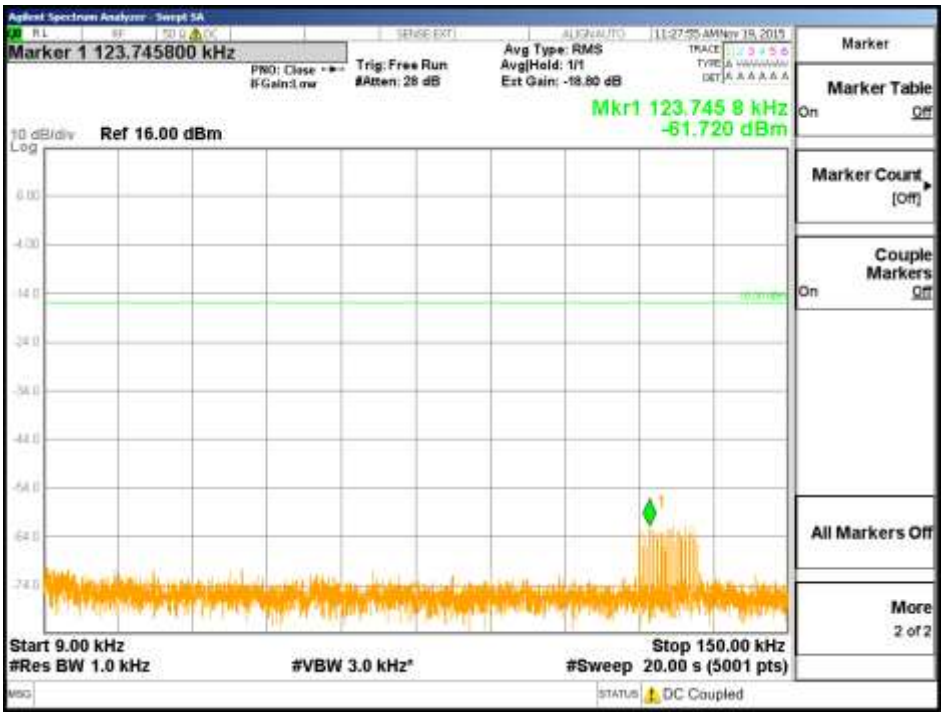
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz

Modulation: 16QAM

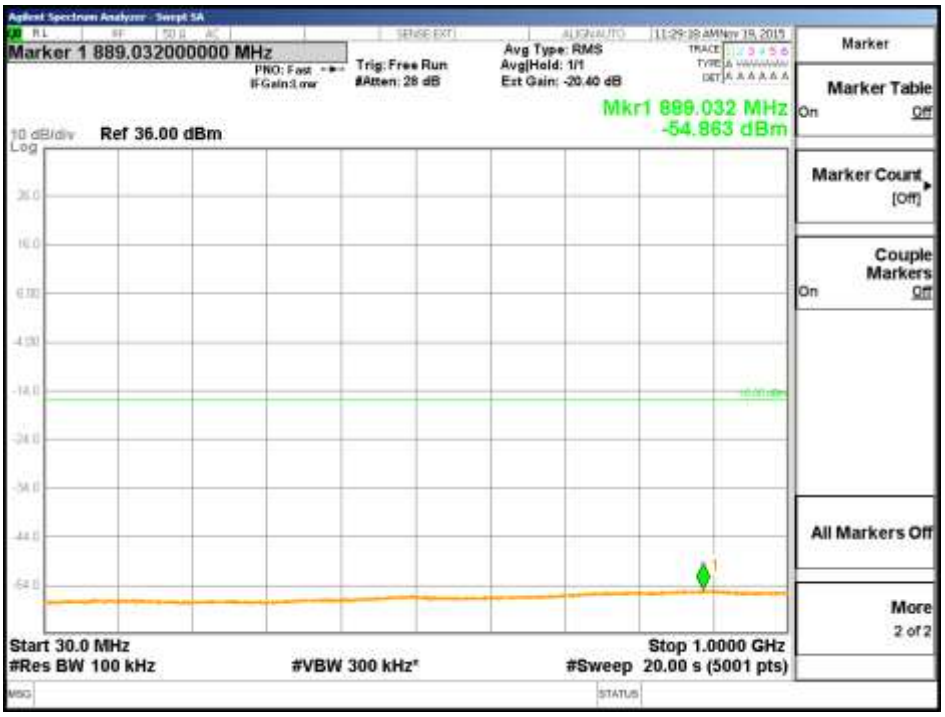
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: 16QAM

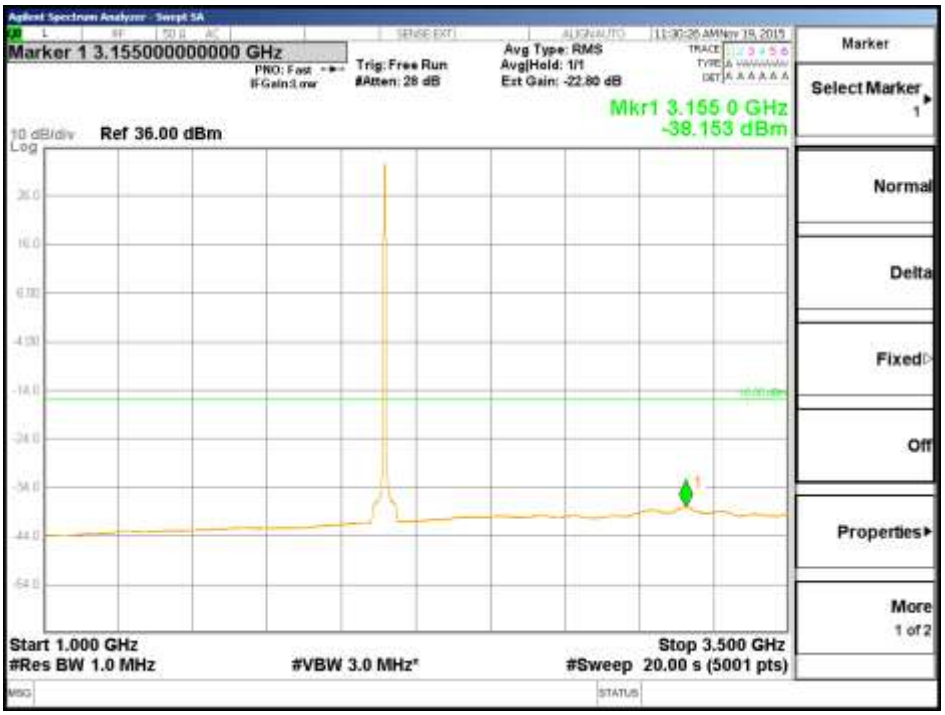
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 64QAM

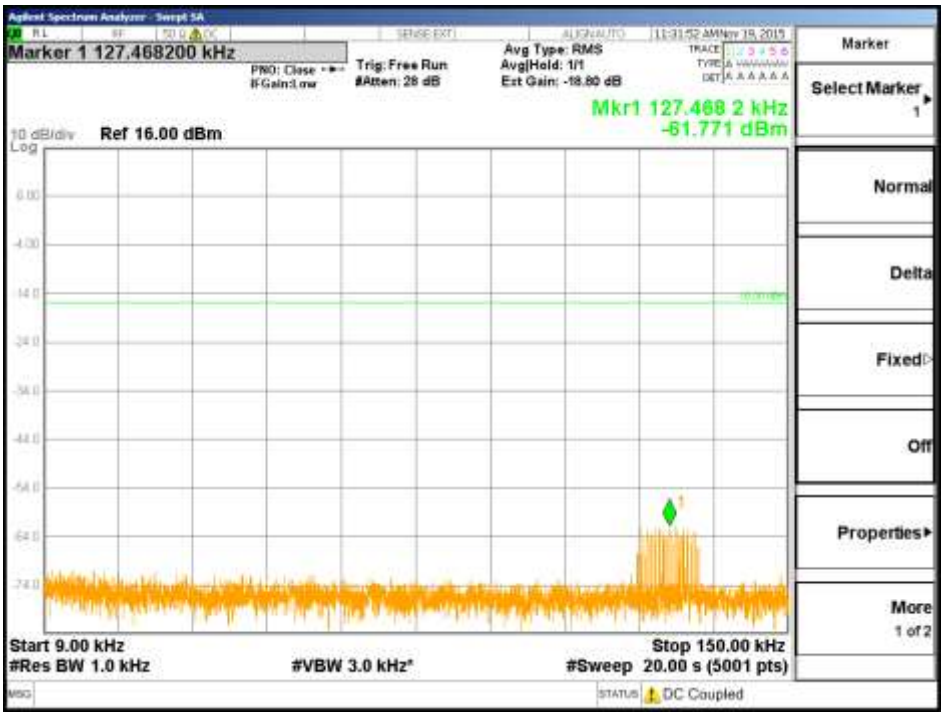
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz

Modulation: 64QAM

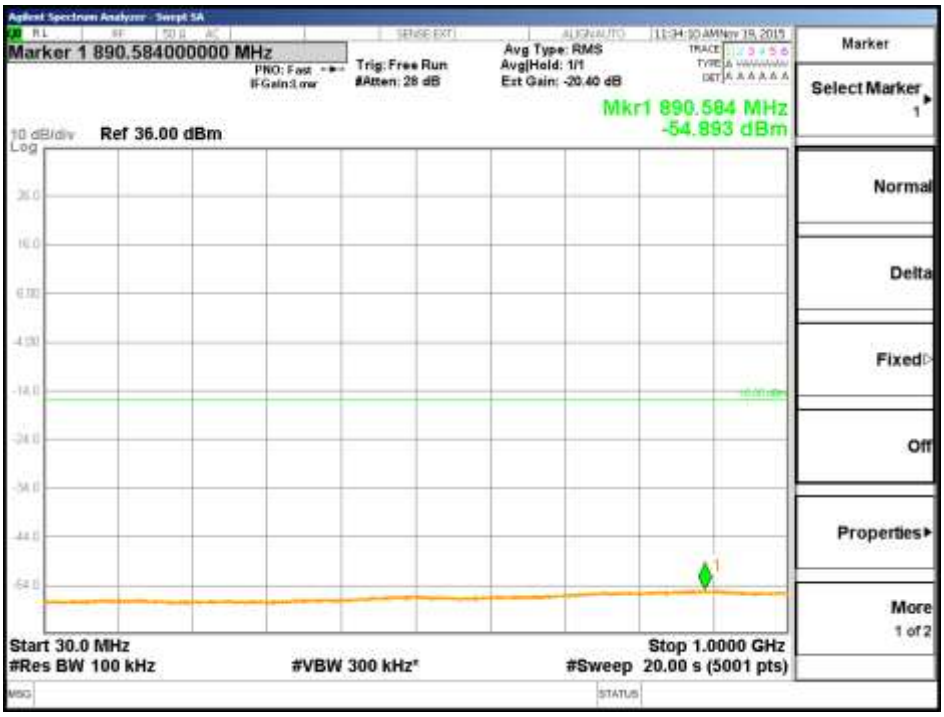
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: 64QAM

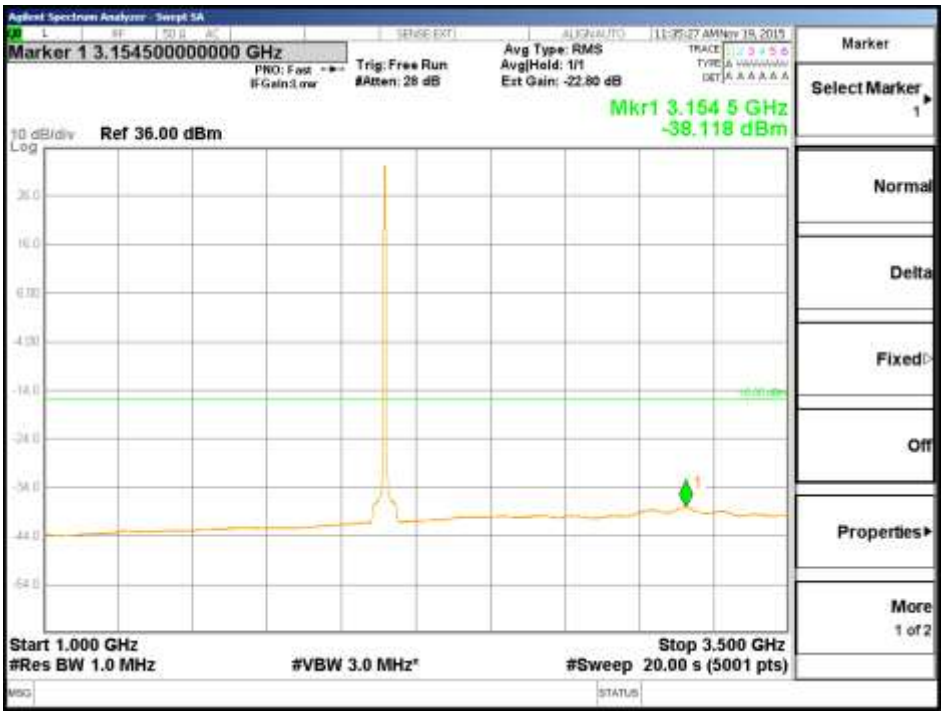
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 5 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

5.6.6.2 Test result plot – CH BW: 10 MHz

Modulation: QPSK

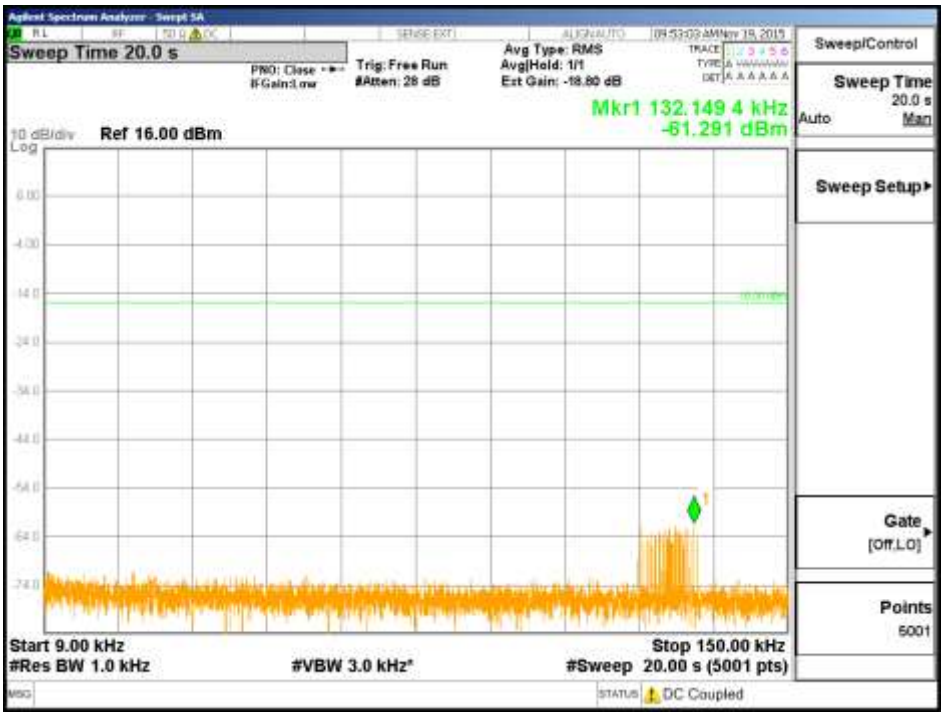
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz

Modulation: QPSK

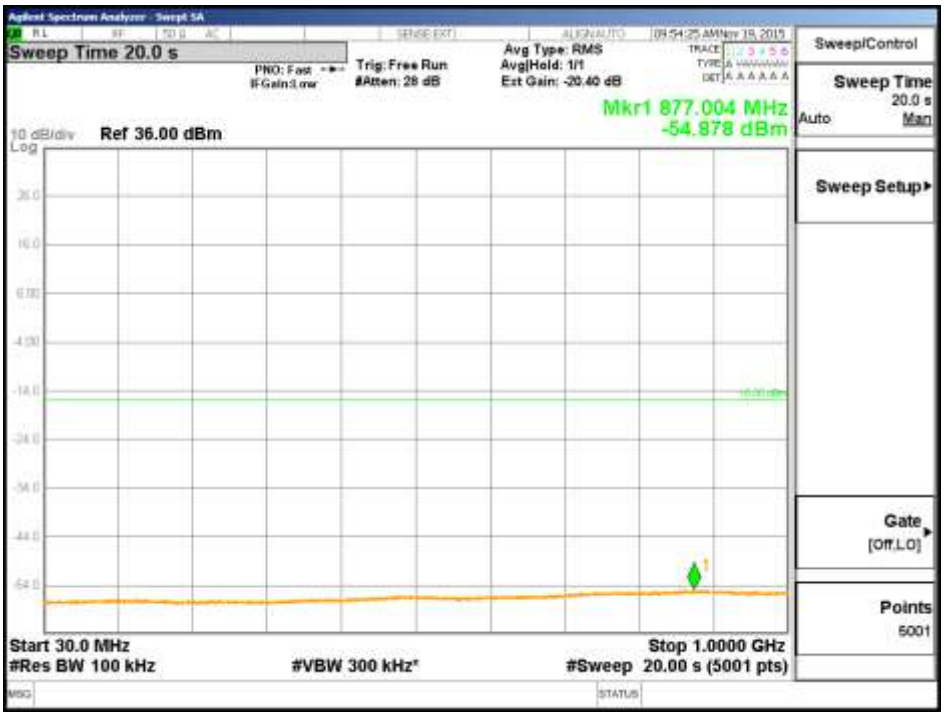
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: QPSK

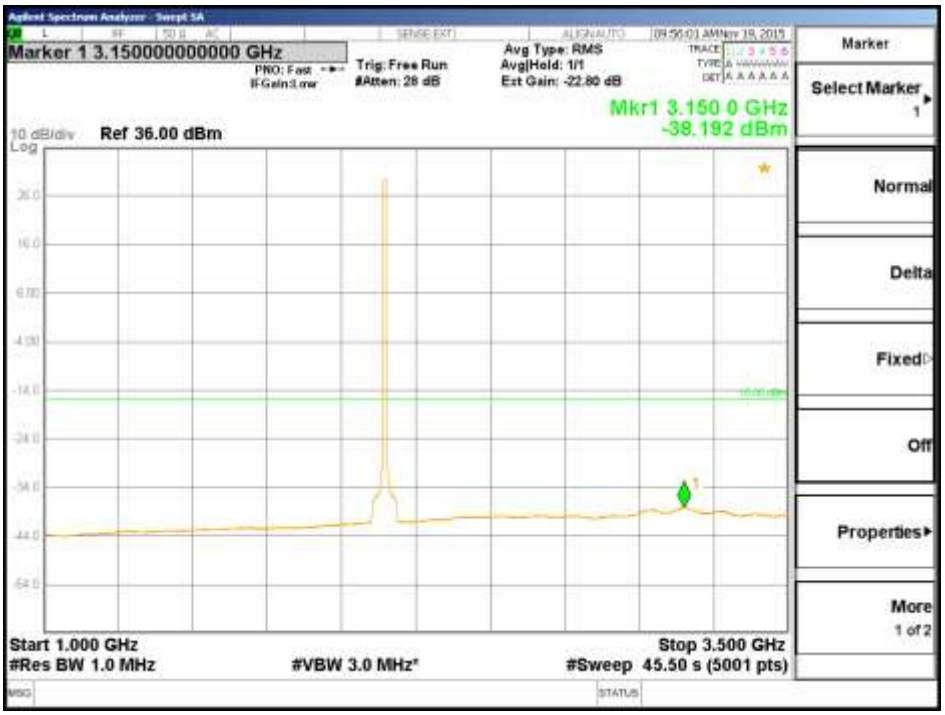
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 16QAM

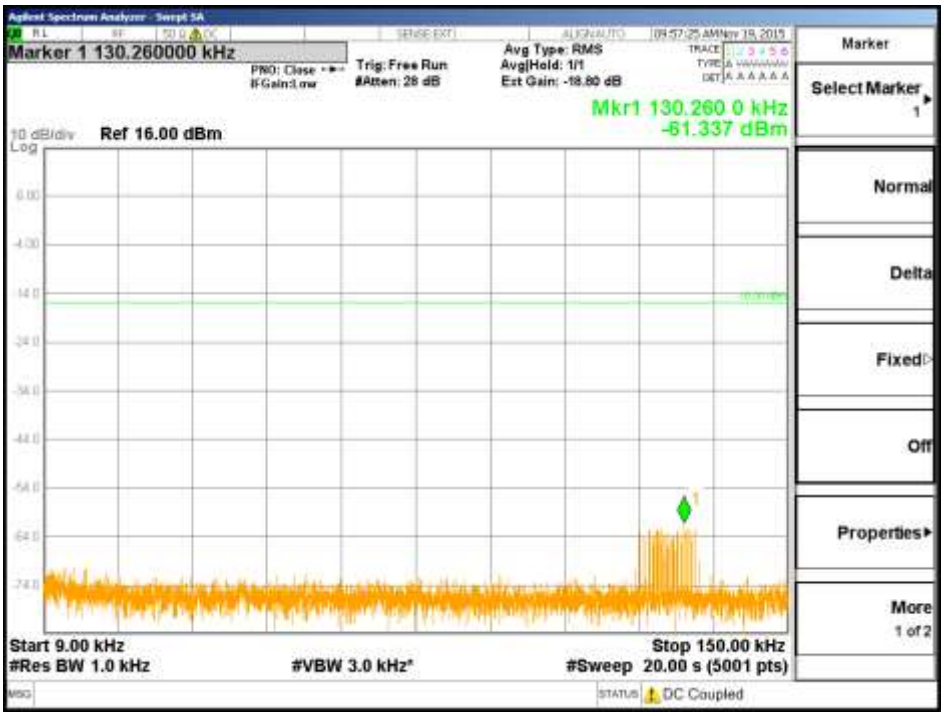
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 16QAM

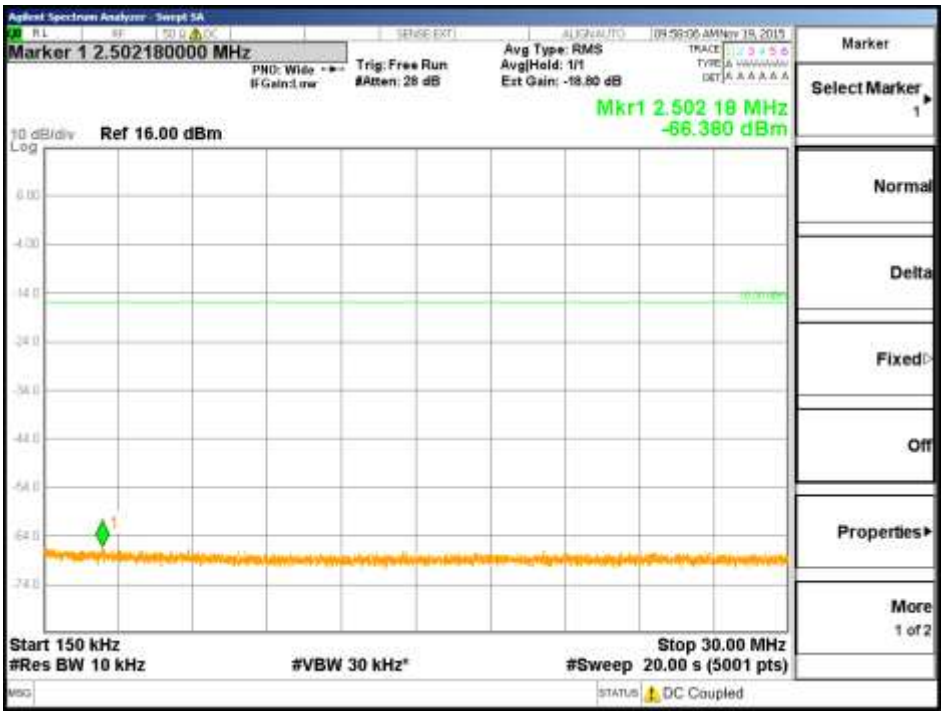
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz

Modulation: 16QAM

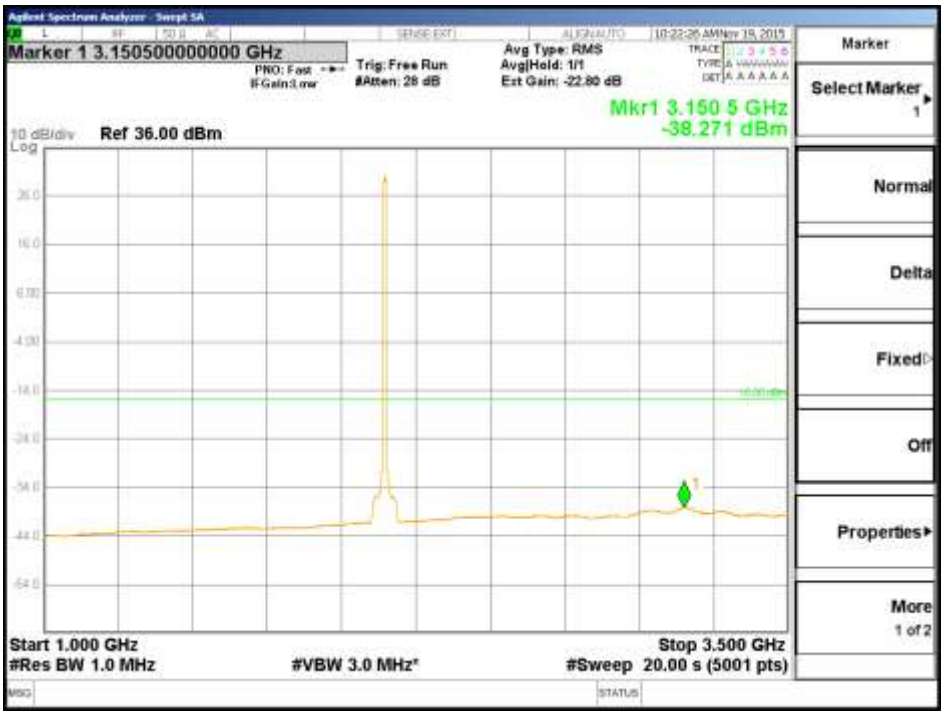
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 64QAM

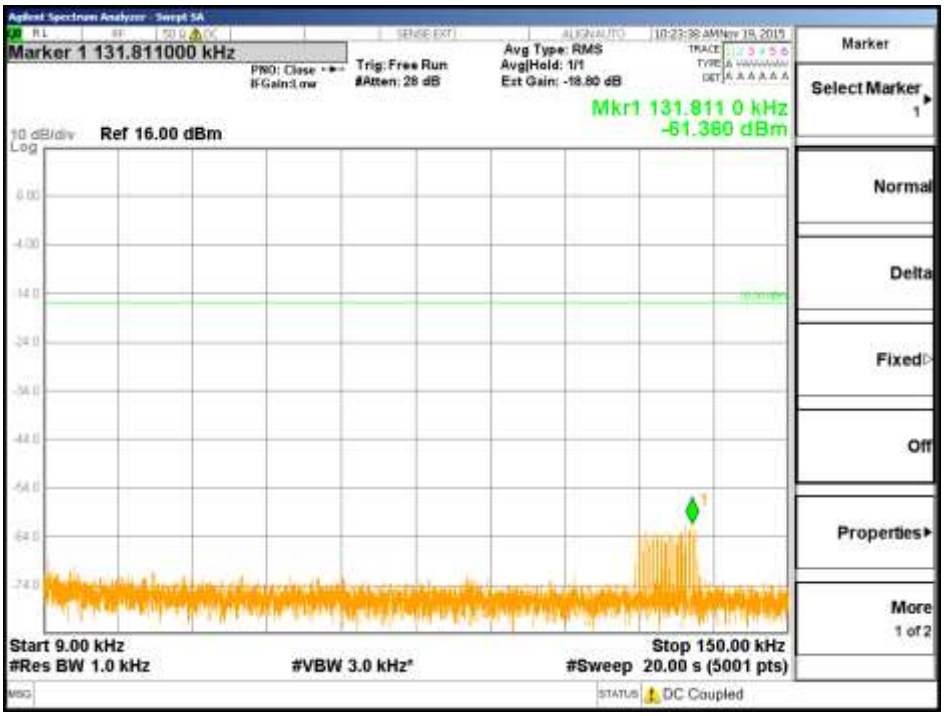
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 64QAM

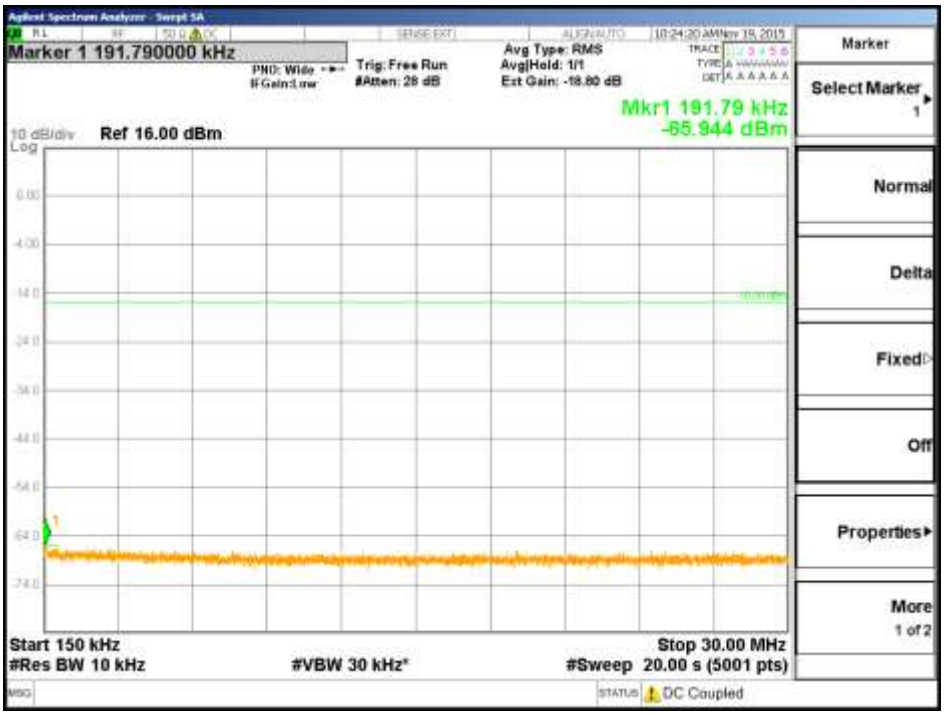
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz



Modulation: 64QAM

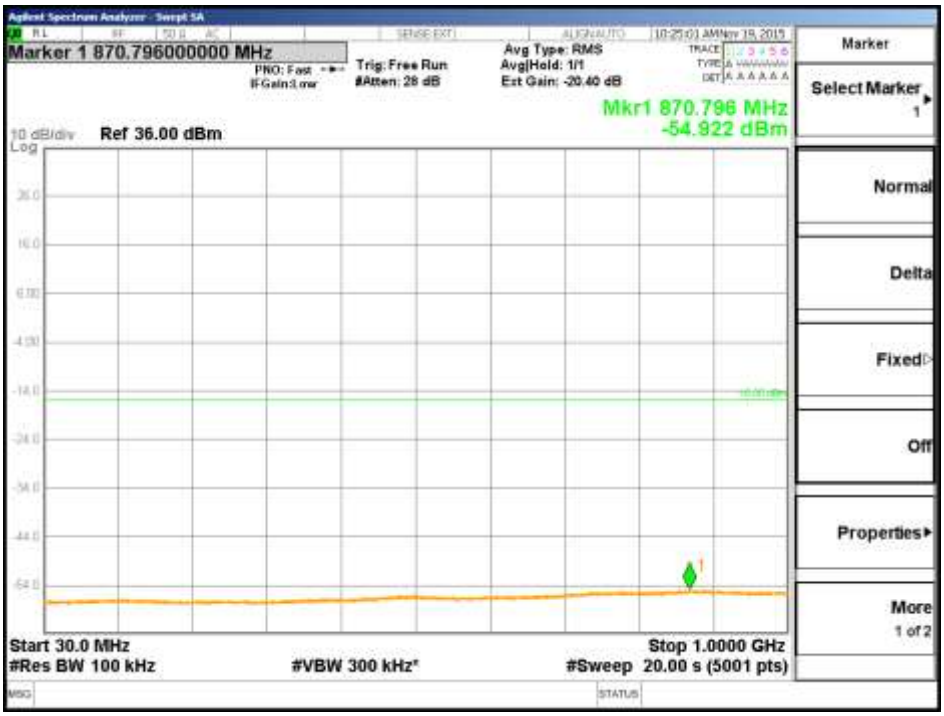
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: 64QAM

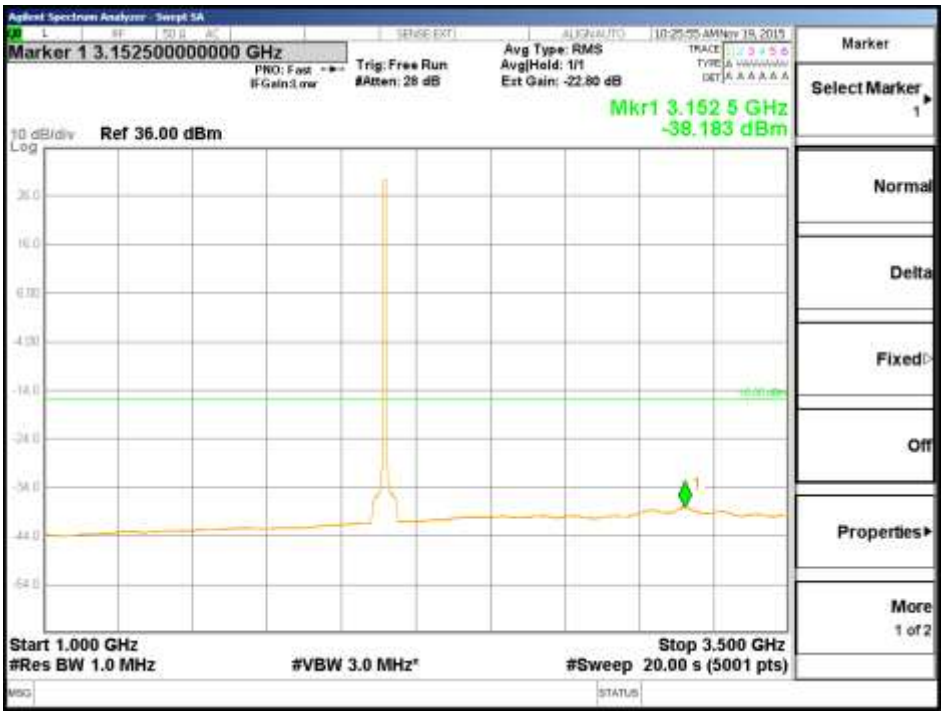
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 10 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

5.6.6.3 Test result plot – CH BW: 15 MHz

Modulation: QPSK

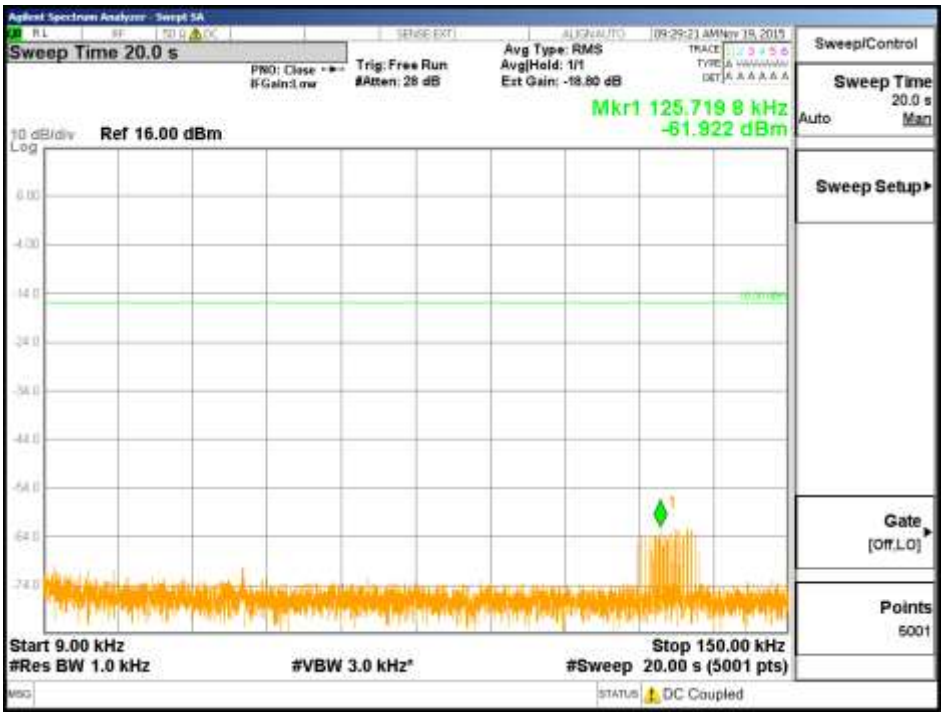
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: QPSK

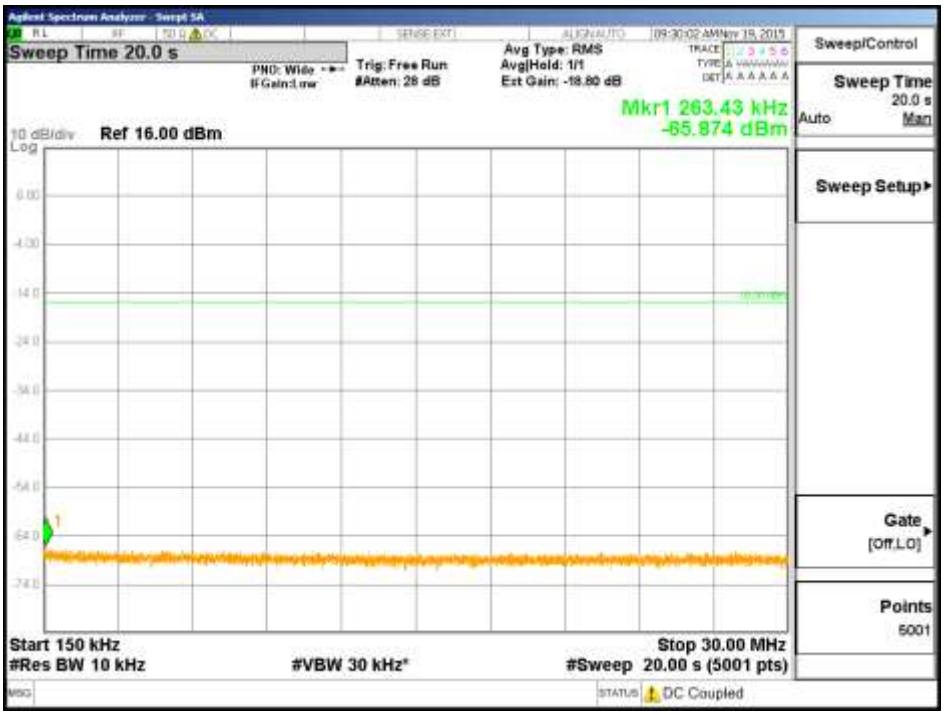
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz



Modulation: QPSK

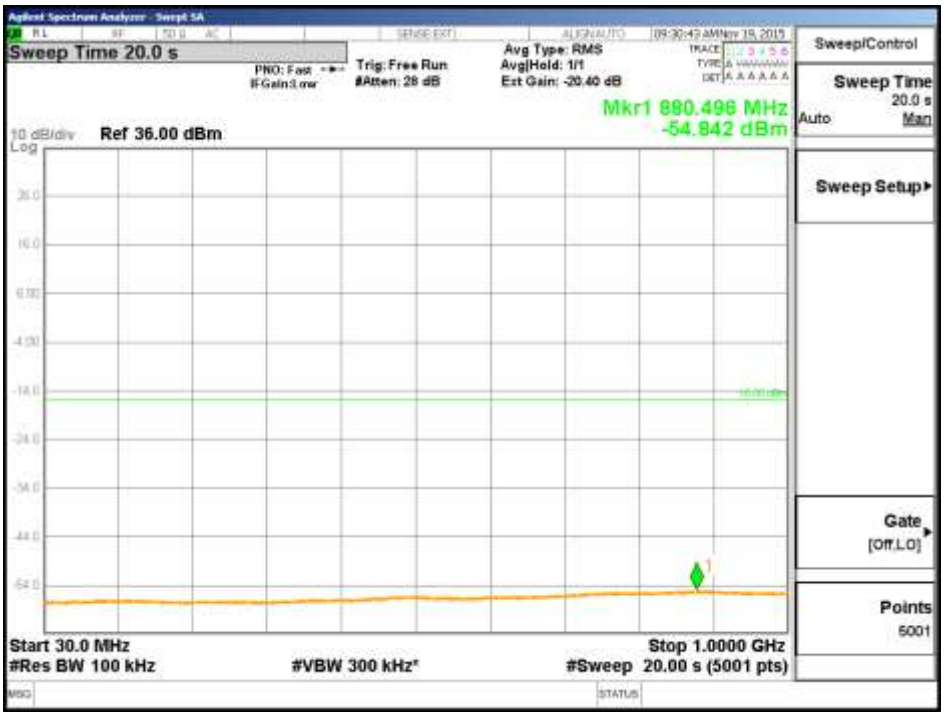
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: QPSK

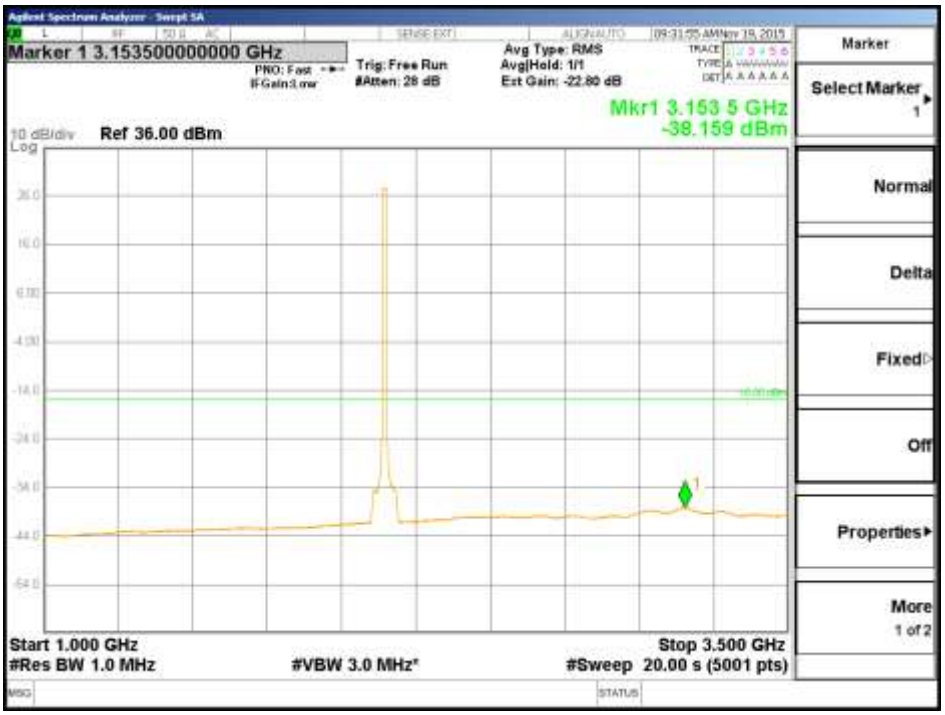
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 16QAM

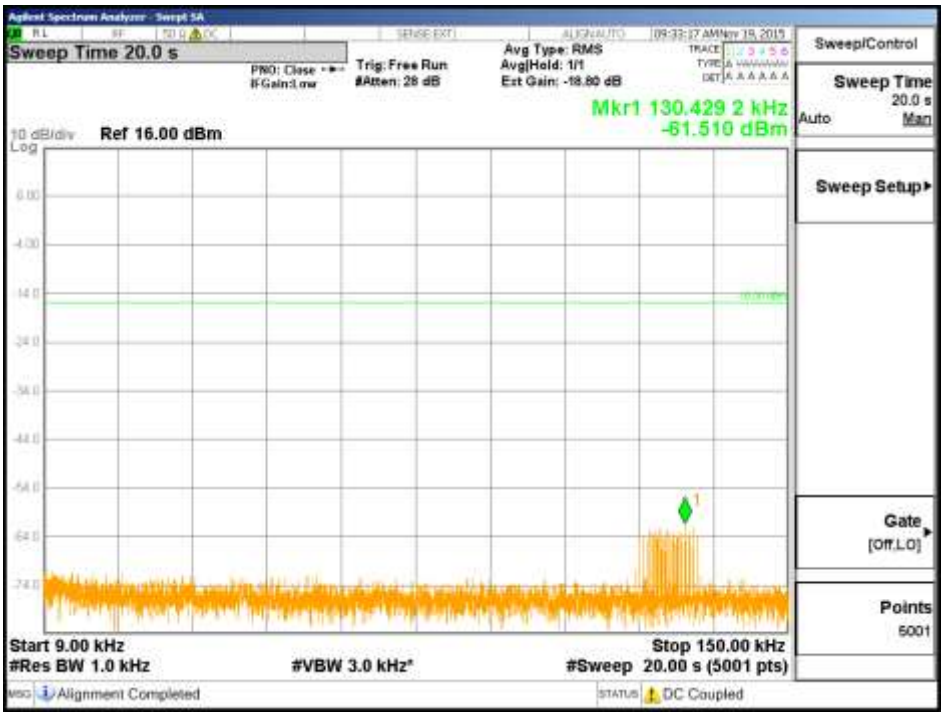
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 16QAM

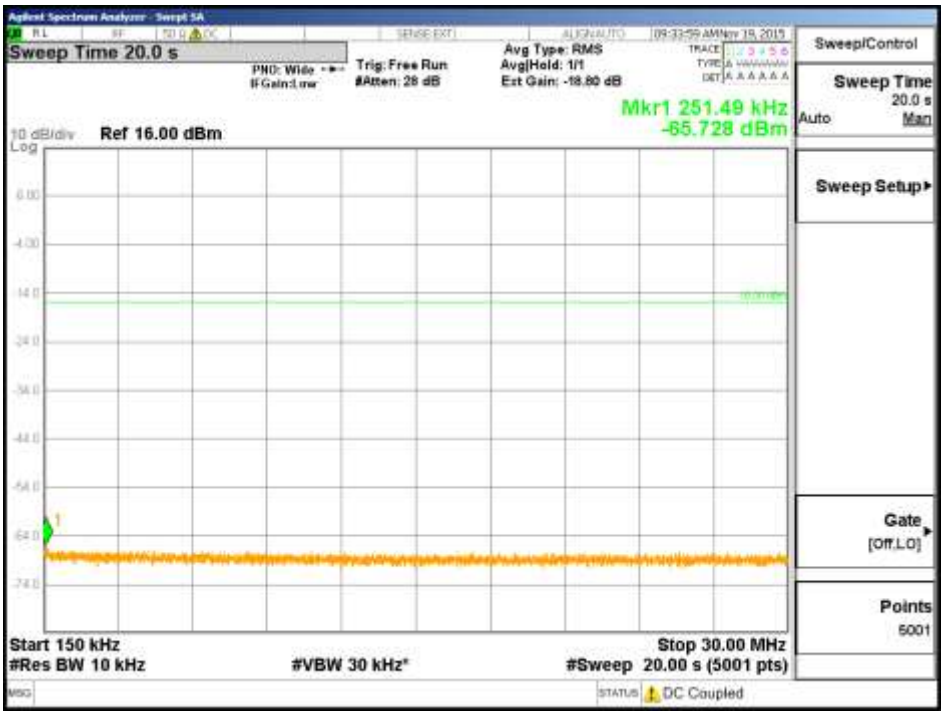
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz



Modulation: 16QAM

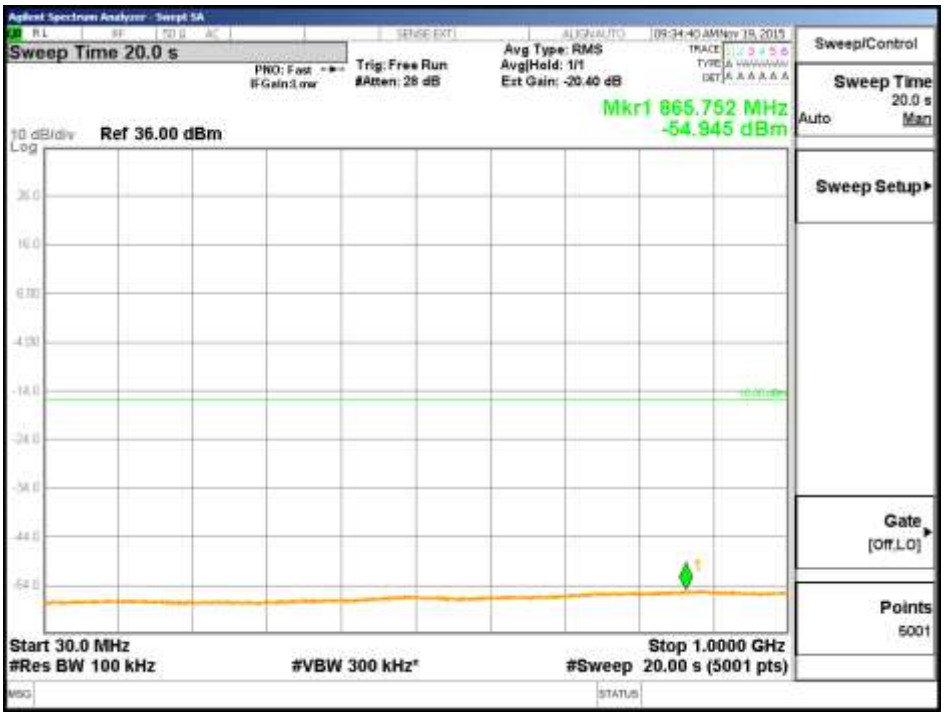
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: 16QAM

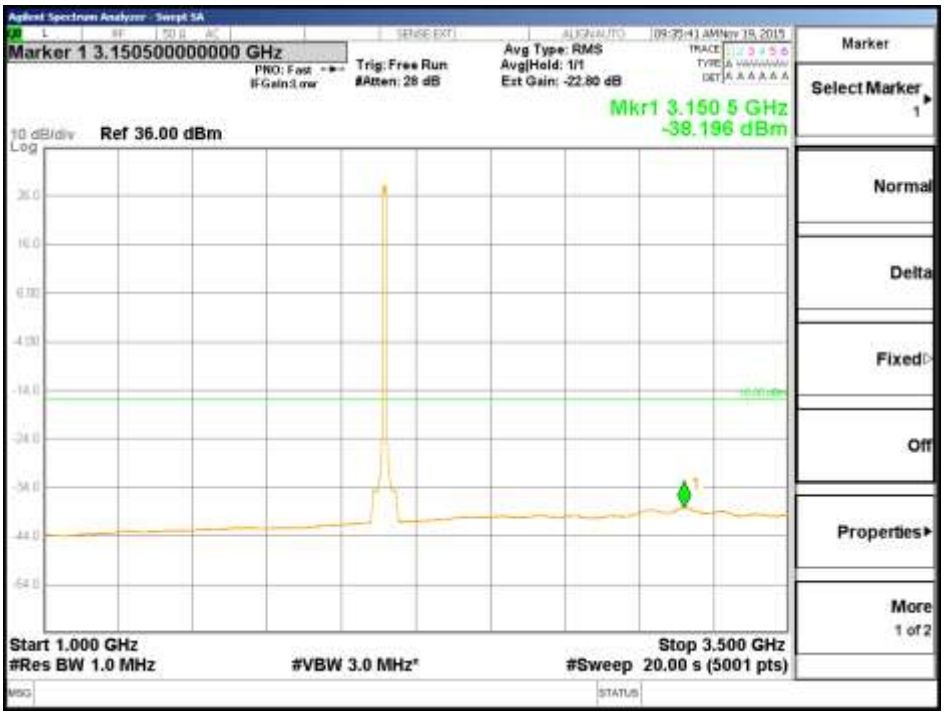
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 64QAM

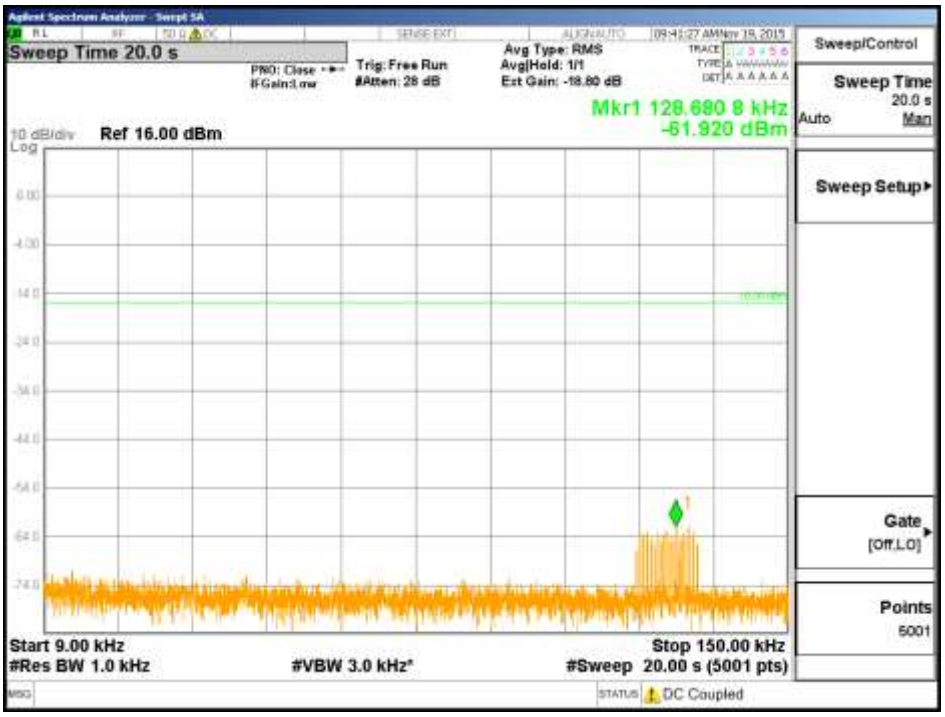
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz

Modulation: 64QAM

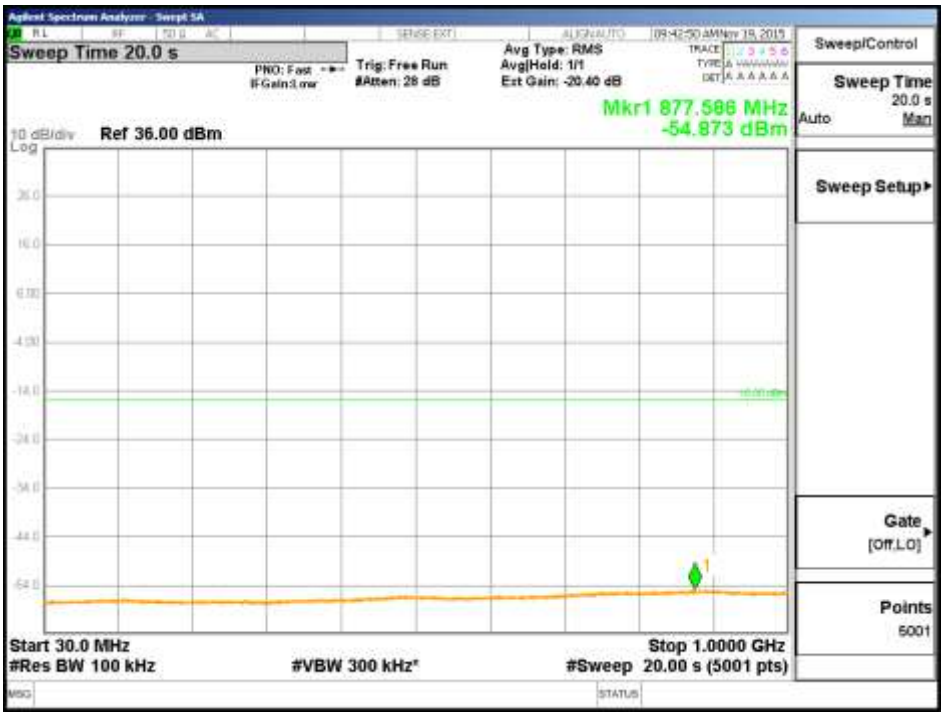
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: 64QAM

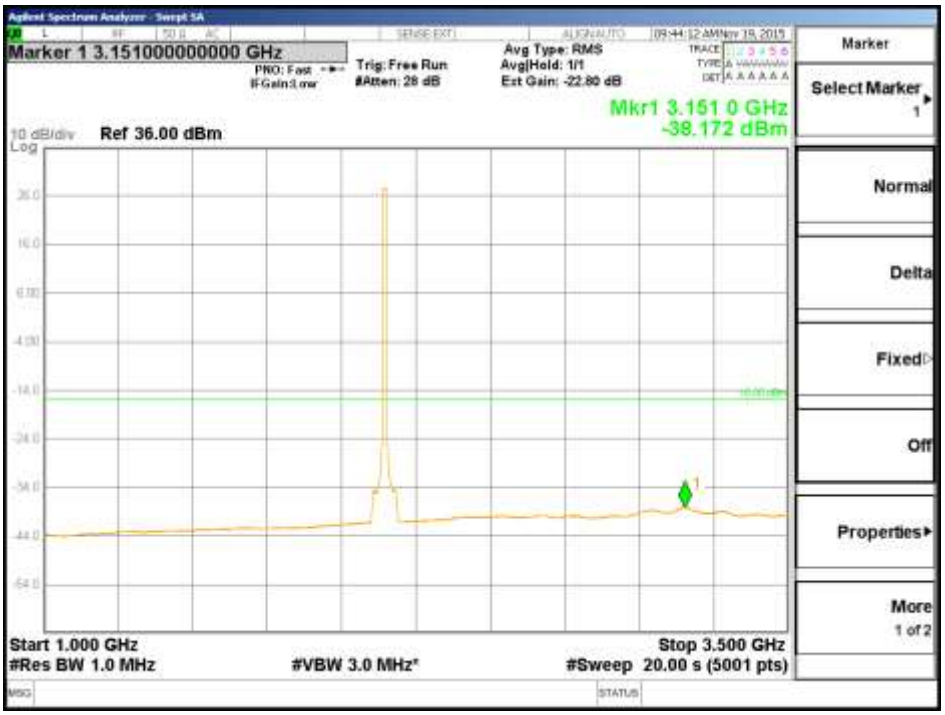
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 15 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

5.6.6.4 Test result plot – CH BW: 20 MHz

Modulation: QPSK

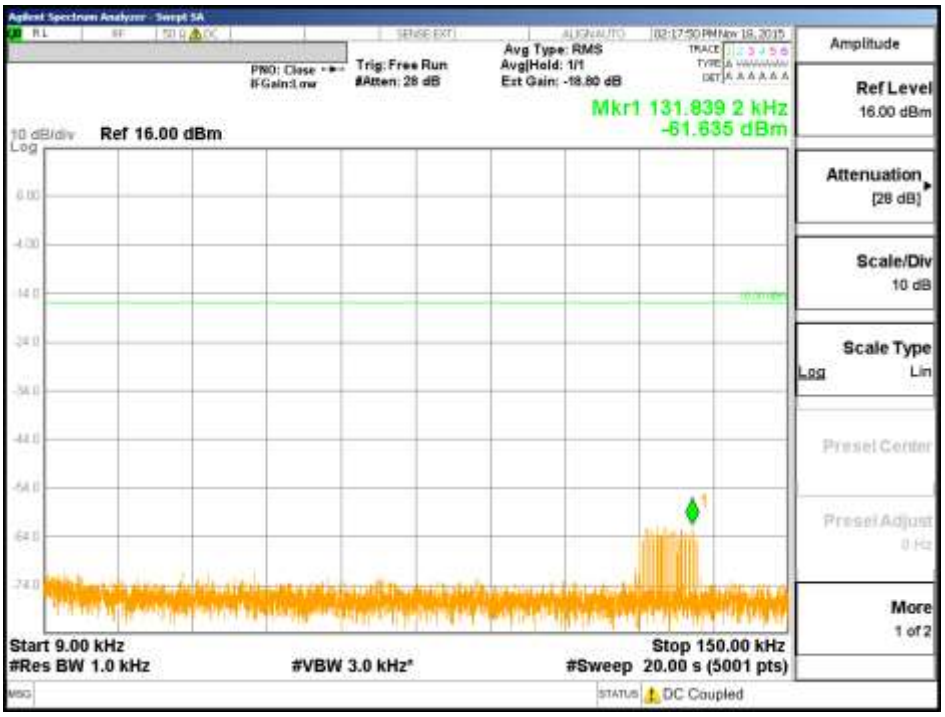
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz

Modulation: QPSK

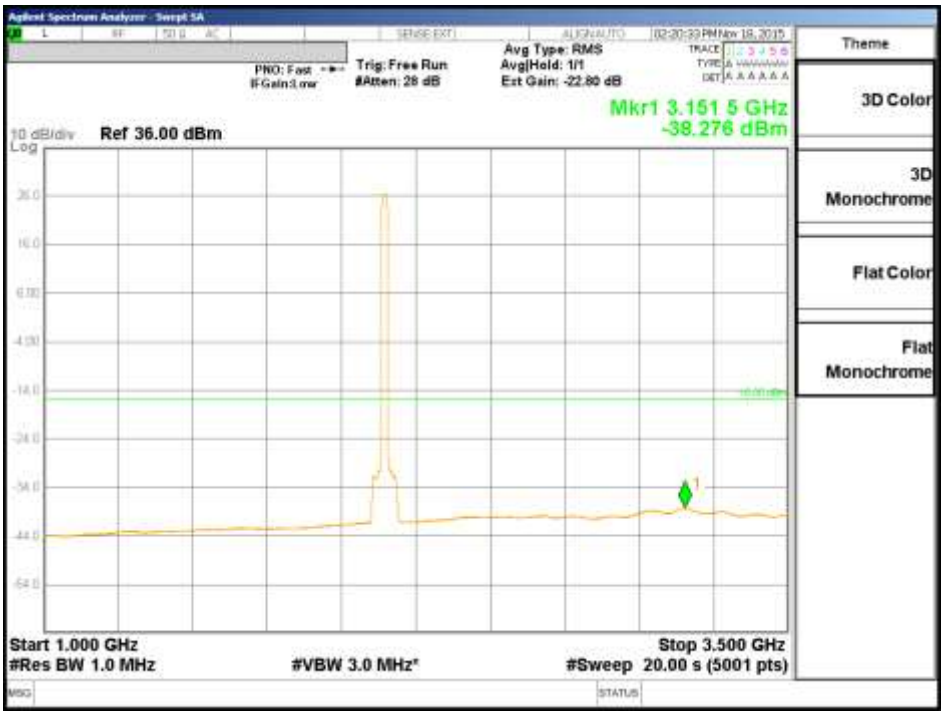
E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: QPSK

E.UTRA Test Model: E-TM1.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 26.5 GHz

Modulation: 16QAM

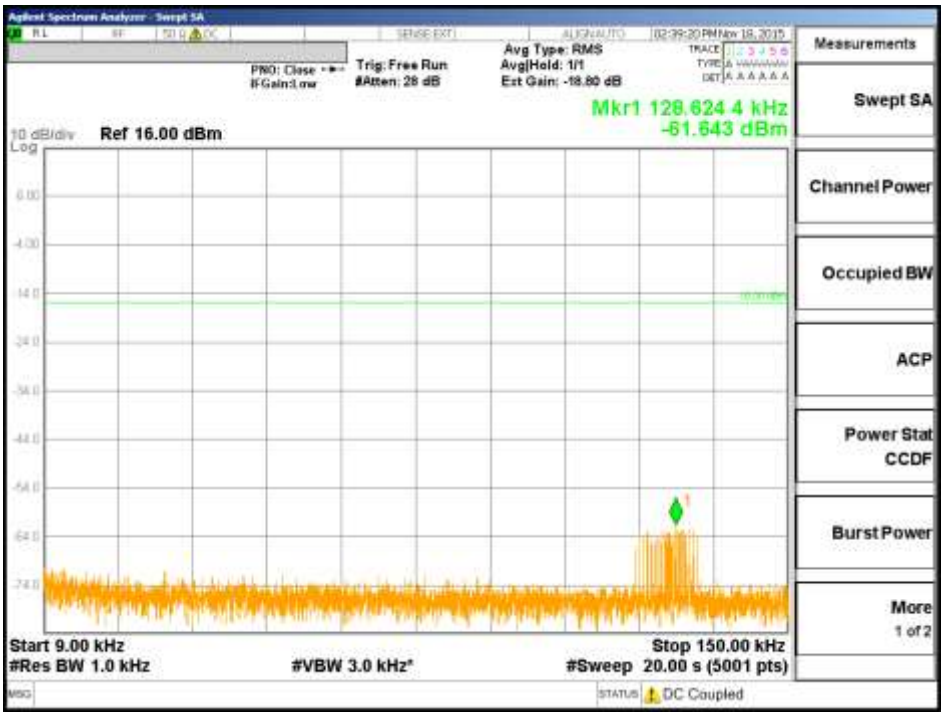
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz

Modulation: 16QAM

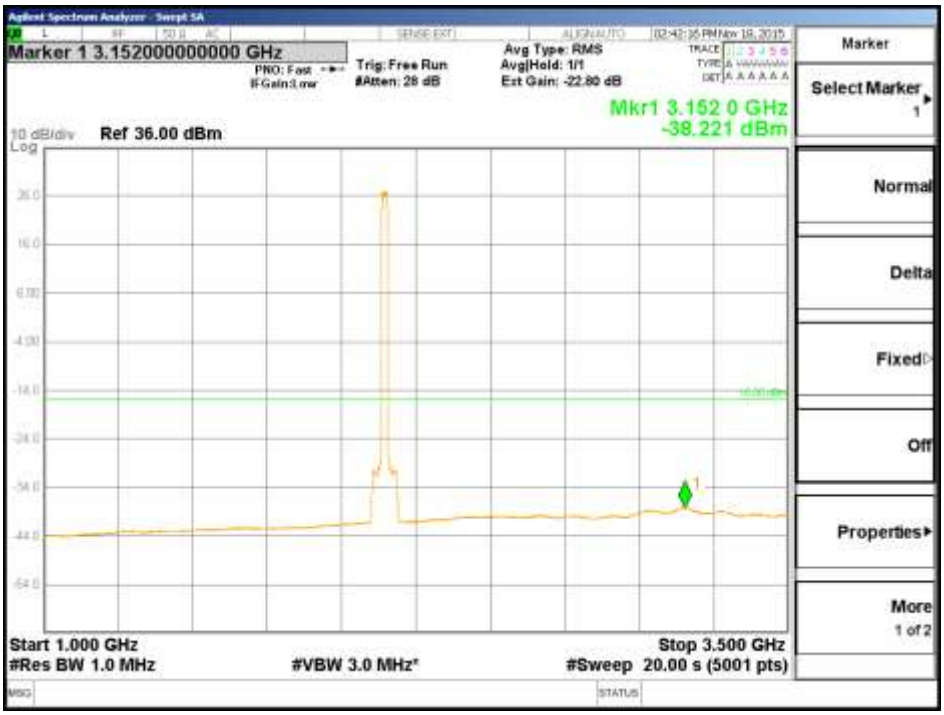
E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 16QAM

E.UTRA Test Model: E-TM3.2

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

Modulation: 64QAM

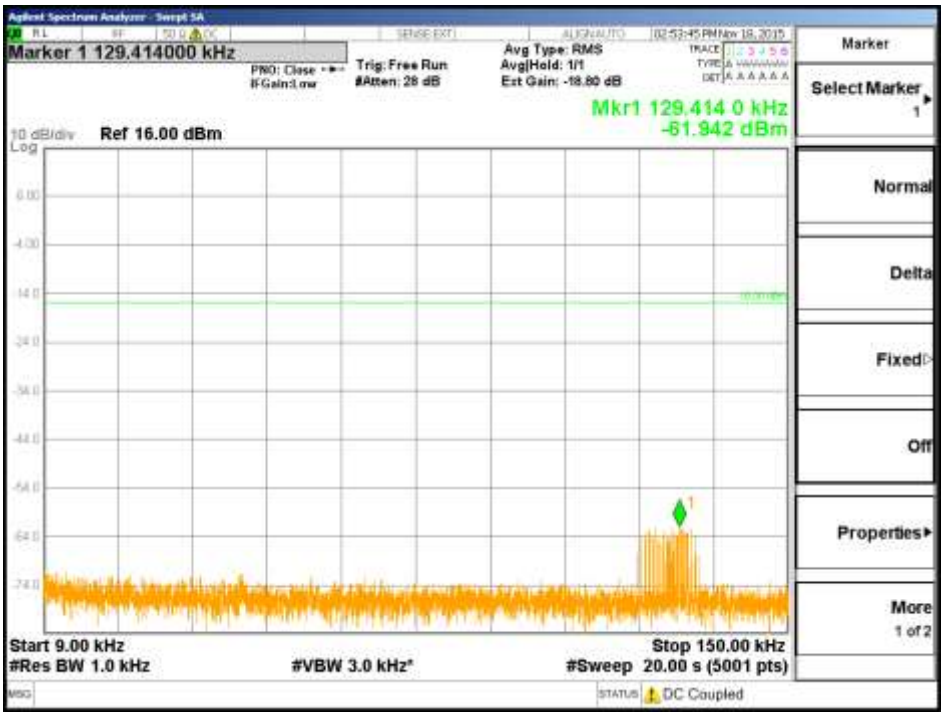
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
9 kHz to 150 kHz



Modulation: 64QAM

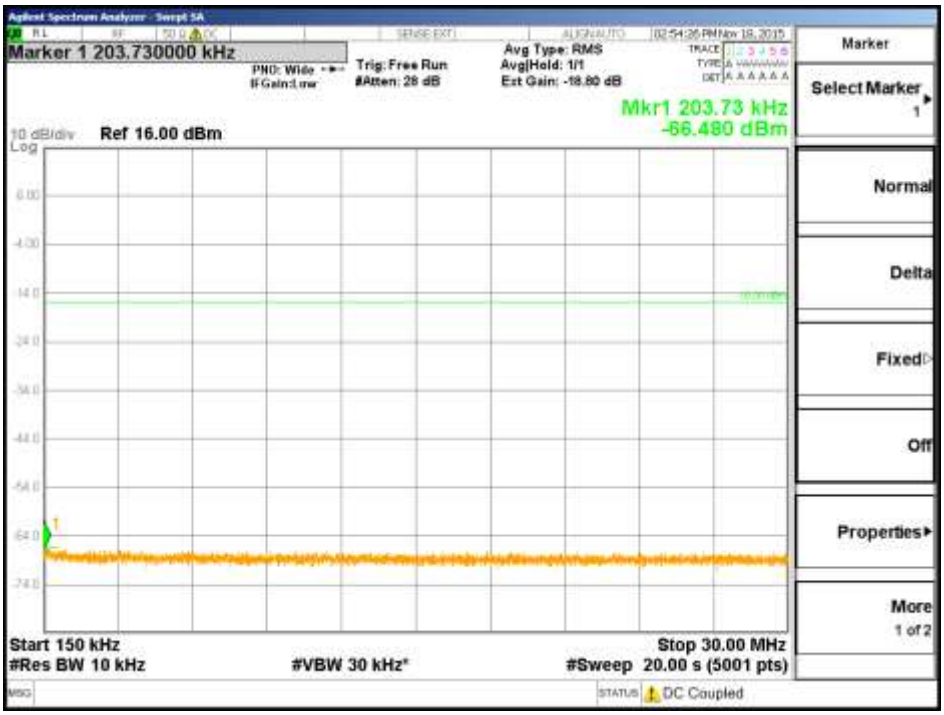
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
150 kHz to 30 MHz



Modulation: 64QAM

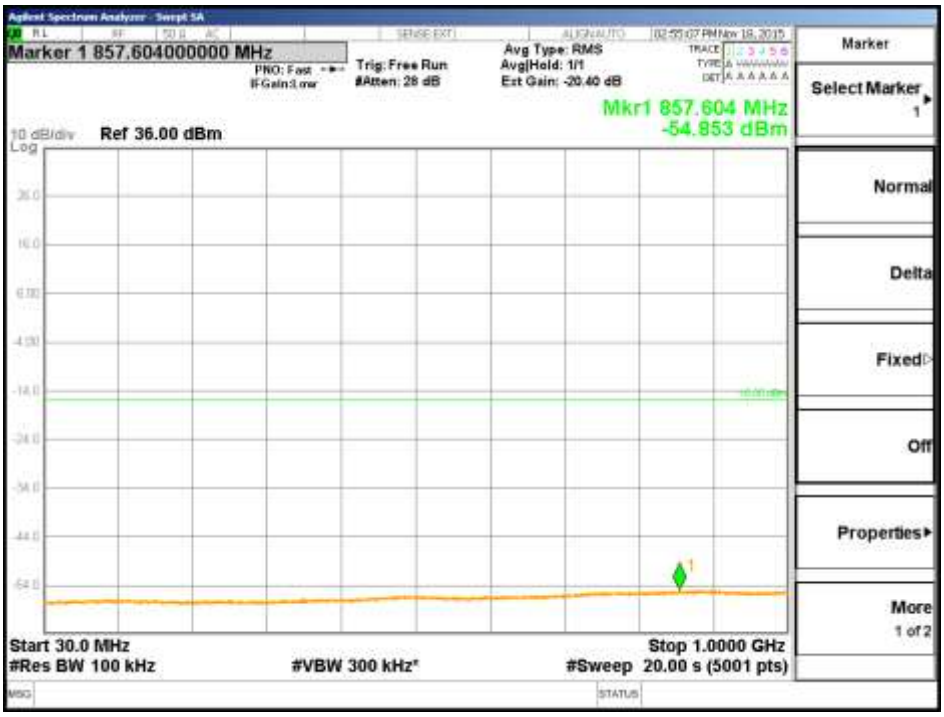
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
30 MHz to 1000 MHz



Modulation: 64QAM

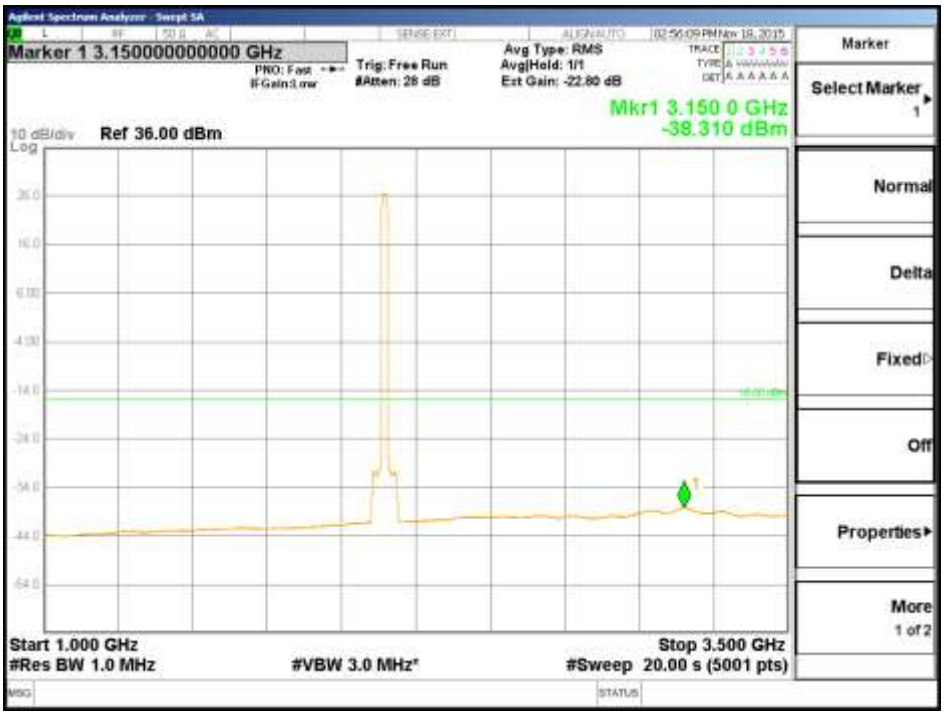
E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
1 GHz to 3.5 GHz



Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
3.5 GHz to 12.75 GHz

Modulation: 64QAM

E.UTRA Test Model: E-TM3.1

CH: M

CH BW: 20 MHz

Antenna port: 1

Frequency range:
12.75 GHz to 21.8 GHz

5.7 Field strength of spurious radiation

For test instruments and accessories used see section 6 Part **SER 1, SER 2, SER 3**.

5.7.1 Description of the test location

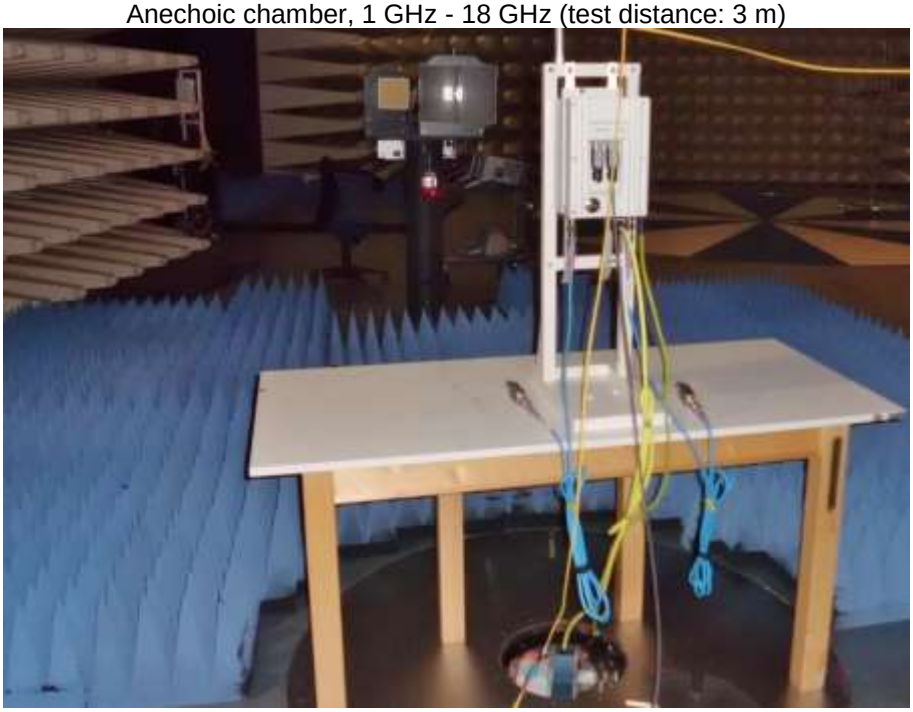
Test location: OATS 1
Test location: Anechoic chamber 1

5.7.2 Photo documentation of the test set-up

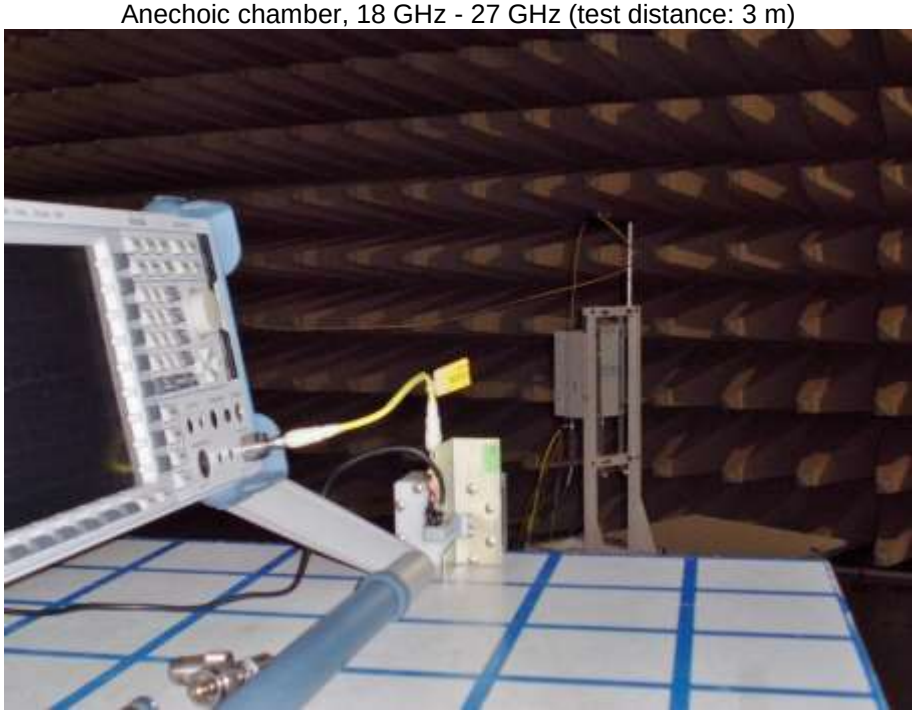
Open area test site, 9 kHz - 30 MHz (test distance: 3 m)

Open area test site, 30 MHz - 1000 MHz (test distance: 10 m)

Anechoic chamber, 1 GHz - 18 GHz (test distance: 3 m)



Anechoic chamber, 18 GHz - 27 GHz (test distance: 3 m)



5.7.3 Applicable standard

According to FCC Part 27, Section 27.53(h):
(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

Pursuant to FCC OET RULES 662911 D01 and D02 for two antenna MIMO mode of operations, the FCC limit of -13 dBm shall be 3 dB more stringent, therefore all channel edge and out of band spurious emissions shall be -16 dBm. Further limits are adjusted for lower resolution BW using 10 log (100kHz/1% of channel BW)

5.7.4 Description of measurement – Measurement guidance KDB 971168 D01 (7)

The spurious emission at the antenna terminal is measured radiated using a spectrum analyser. The EUT is set in TX continuous mode while measuring. The antenna port 1 and antenna port 2 are terminated with 50 ohm. The resulting values are listed in the following tables.

5.7.5 Spectrum analyser settings

9 kHz to 150 kHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
1 kHz	3 kHz	-	RMS	Free run	10 sec.

150 kHz to 30 MHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
10 kHz	30 kHz	-	RMS	Free run	10 sec.

30 MHz to 1 GHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
100 kHz	300 kHz	-	RMS	Free run	10 sec.

1 GHz to 27 GHz:

RBW:	VBW:	Span:	Detector:	Trigger:	Sweep time:
1 MHz	3 MHz	-	RMS	Free run	10 sec.

5.7.6 Test result table

Modulation: QPSK - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - RX Antenna vertical								
Start frequency (MHz)	Stop frequency (MHz)	RBW (kHz)	VBW (kHz)	Frequency (MHz)	Max emission observed (dBm)	Limit (dBm)	Margin dB	Verdict
0.009	0.075	1	3	0.009	-25.3	-16.0	9.3	OK
0.075	0.15	1	3	0.150	-45.2	-16.0	29.2	OK
0.15	10	10	30	0.213	-38.3	-16.0	22.3	OK
10	20	10	30	11.224	-65.3	-16.0	49.3	OK
20	30	10	30	24.836	-67.1	-16.0	51.1	OK
30	200	100	300	76.08	-63.5	-16.0	47.5	OK
200	400	100	300	284.63	-52.7	-16.0	36.7	OK
400	600	100	300	591.15	-57.7	-16.0	41.7	OK
600	800	100	300	797.51	-54.5	-16.0	38.5	OK
800	1000	100	300	998.30	-50.7	-16.0	34.7	OK
1000	3000	1000	3000	2145.6	-23.2	-16.0	7.2	---
3000	6000	1000	3000	4914.4	-55.6	-16.0	39.6	OK
6000	9000	1000	3000	6880.9	-50.4	-16.0	34.4	OK
12000	15000	1000	3000	12750.0	-52.5	-16.0	36.5	OK
15000	18000	1000	3000	16900.8	-58.0	-16.0	42.0	OK
18000	21000	1000	3000	20221.5	-61.7	-16.0	45.7	OK
21000	24000	1000	3000	23949.0	-57.9	-16.0	41.9	OK

--- fundamental frequency

Modulation: QPSK - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - RX Antenna horizontal								
Start frequency (MHz)	Stop frequency (MHz)	RBW (kHz)	VBW (kHz)	Frequency (MHz)	Max emission observed (dBm)	Limit (dBm)	Margin dB	Verdict
0.009	0.075	1	3	0.009	-25.3	-16.0	9.3	OK
0.075	0.15	1	3	0.150	-45.2	-16.0	29.2	OK
0.15	10	10	30	0.213	-38.3	-16.0	22.3	OK
10	20	10	30	11.224	-65.3	-16.0	49.3	OK
20	30	10	30	24.836	-67.1	-16.0	51.1	OK
30	200	100	300	151.98	-67.7	-16.0	51.7	OK
200	400	100	300	300.51	-54.4	-16.0	38.4	OK
400	600	100	300	596.24	-58.3	-16.0	42.3	OK
600	800	100	300	799.21	-53.2	-16.0	37.2	OK
800	1000	100	300	951.86	-51.3	-16.0	35.3	OK
1000	3000	1000	3000	2138.5	-28.9	-16.0	12.9	---
3000	6000	1000	3000	4914.4	-65.3	-16.0	49.3	OK
6000	9000	1000	3000	6880.9	-52.7	-16.0	36.7	OK
12000	15000	1000	3000	12755.3	-53.0	-16.0	37.0	OK
15000	18000	1000	3000	17350.3	-58.4	-16.0	42.4	OK
18000	21000	1000	3000	20211.0	-60.8	-16.0	44.8	OK
21000	24000	1000	3000	23956.5	-56.0	-16.0	40.0	OK

--- fundamental frequency

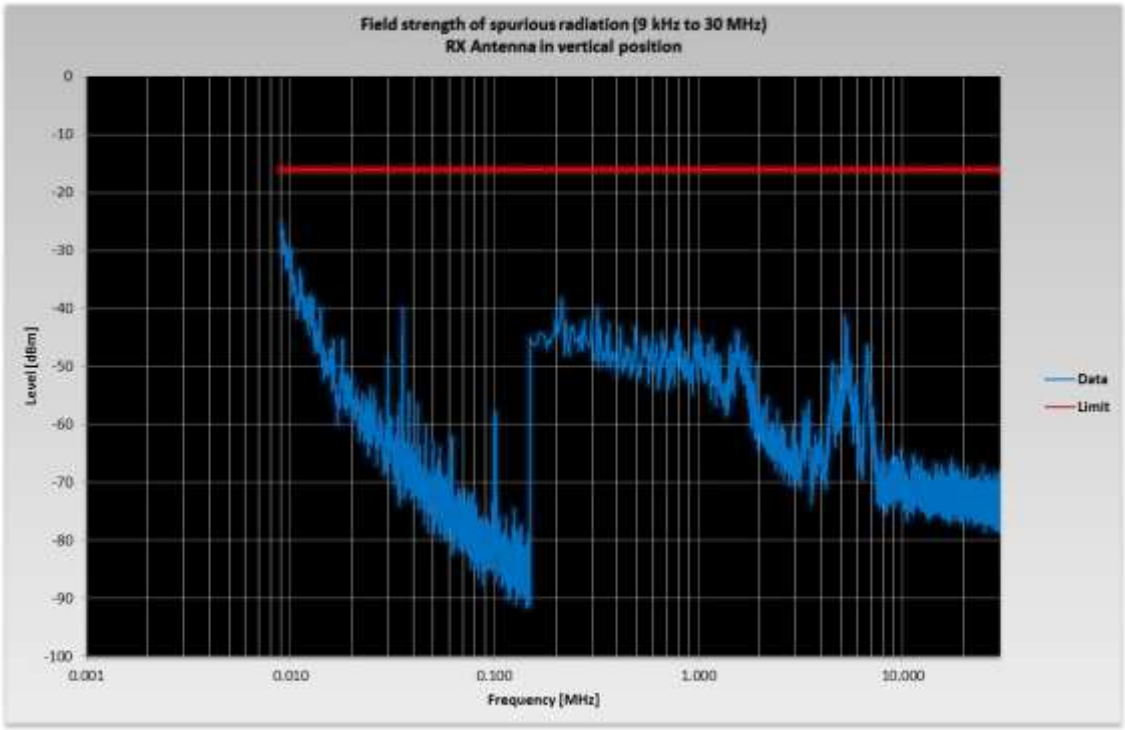
5.7.7 Test result remarks

For this particular test, the field strength of any spurious radiation is required to be less then -16 dBm.

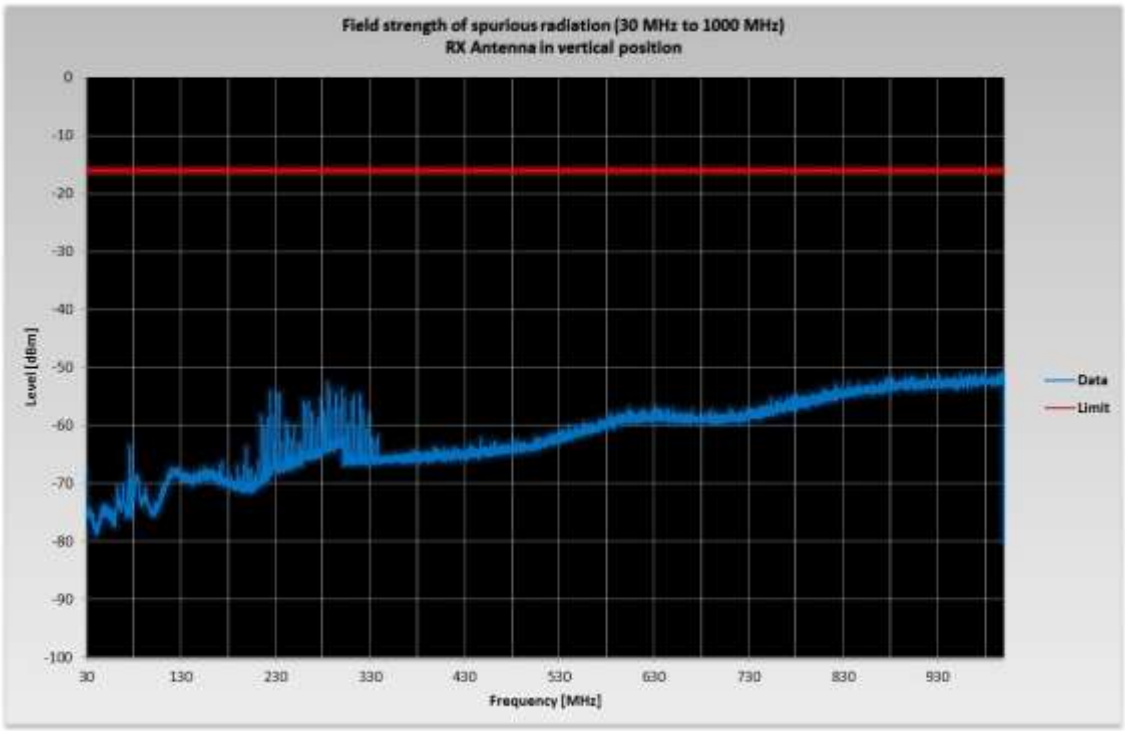
No harmonics above noise floor were found (<20 dB to the limit) over the frequency range from 9 kHz to 24 GHz. Therefore no final measurement where performend.

5.7.7.1 Test result plot – 64QAM – vertical

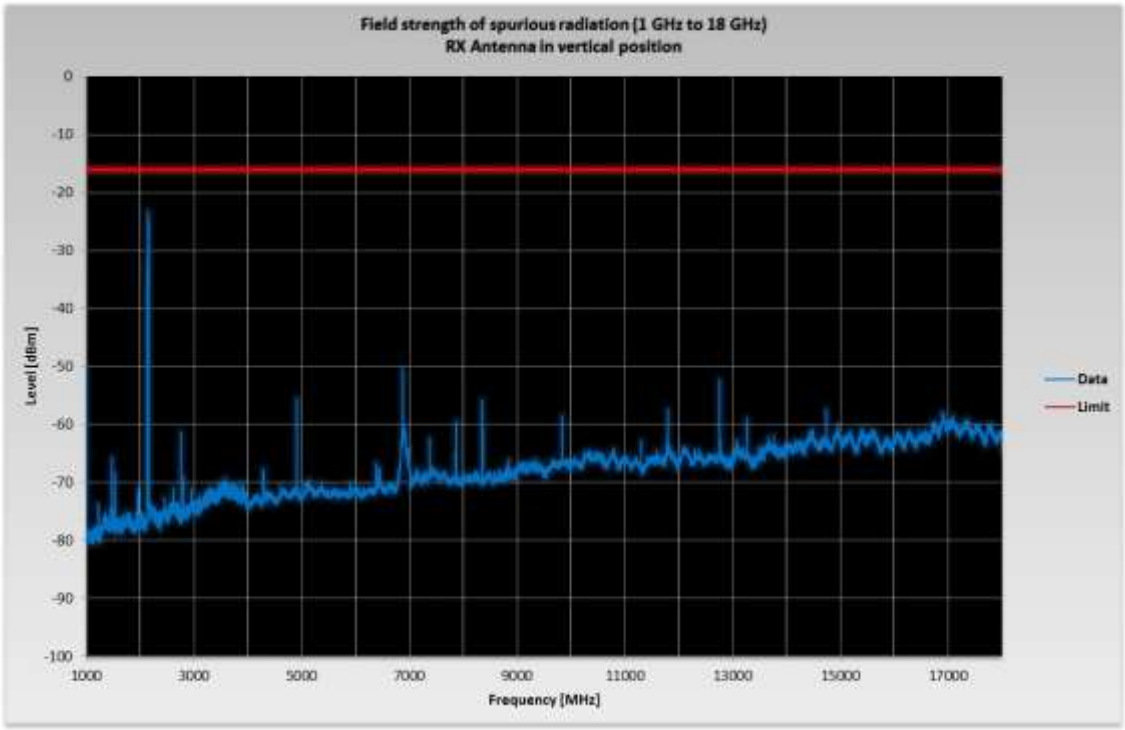
Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 9 kHz to 30 MHz



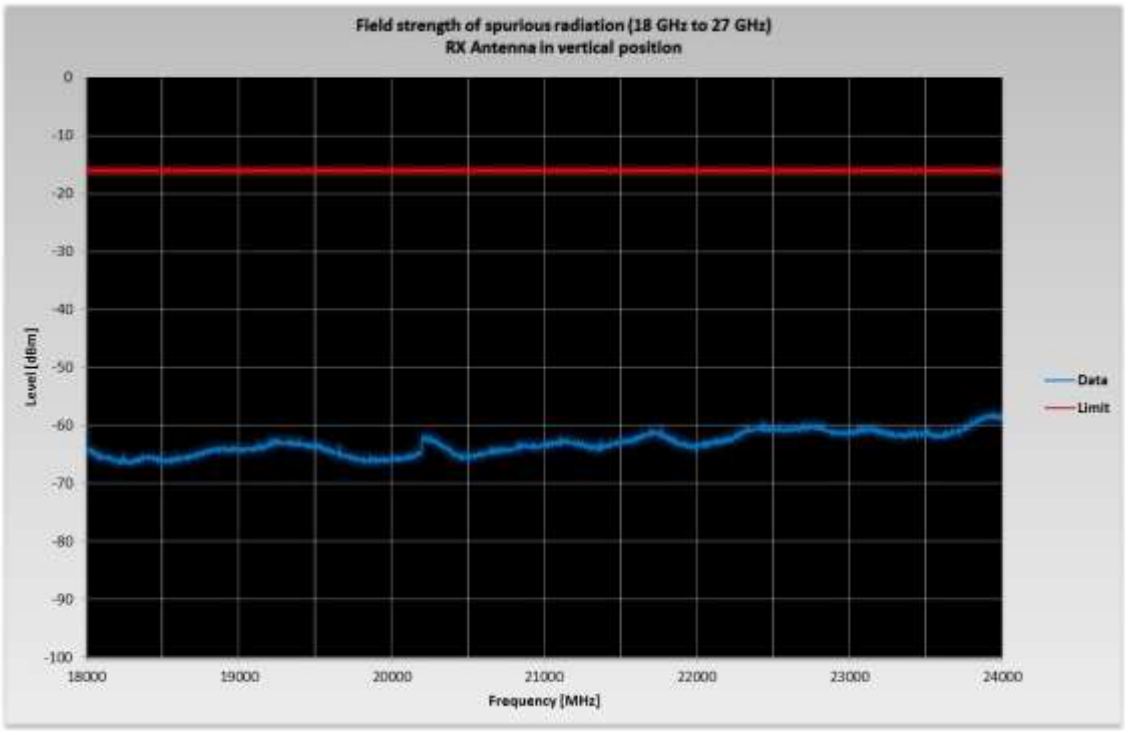
Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 30 MHz to 1000 MHz



Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 1 GHz to 18 GHz

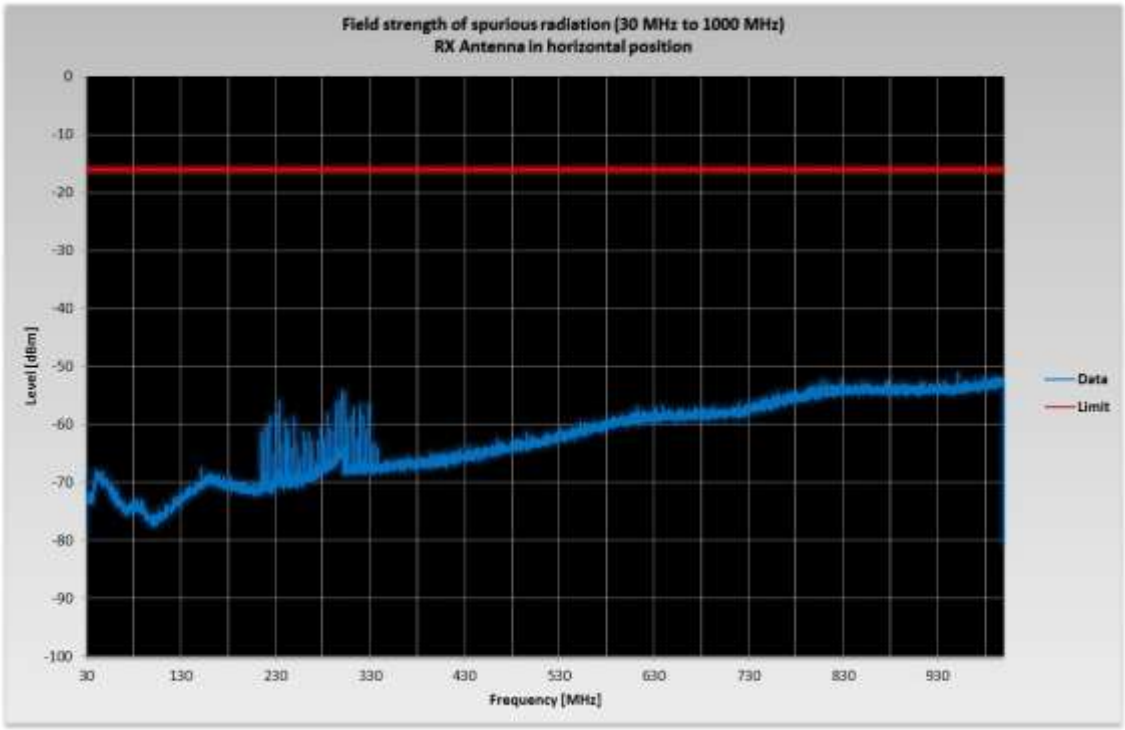


Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 18 GHz to 24 GHz

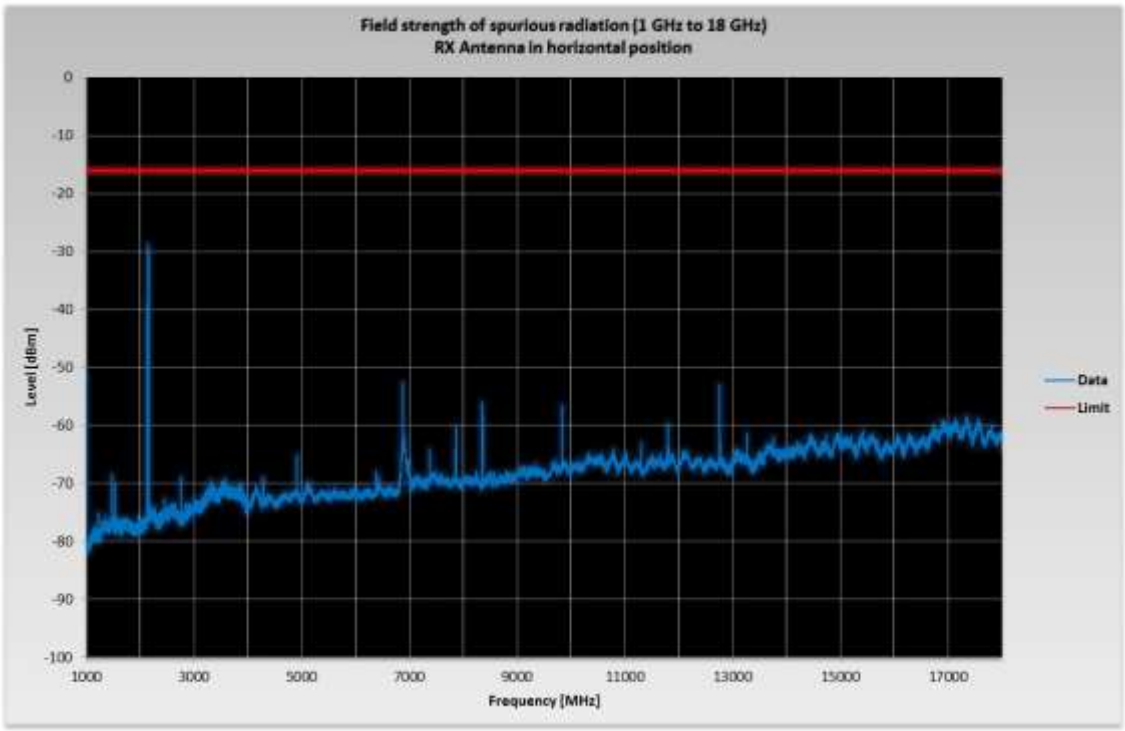


5.7.7.2 Test result plot – 64QAM – horizontal

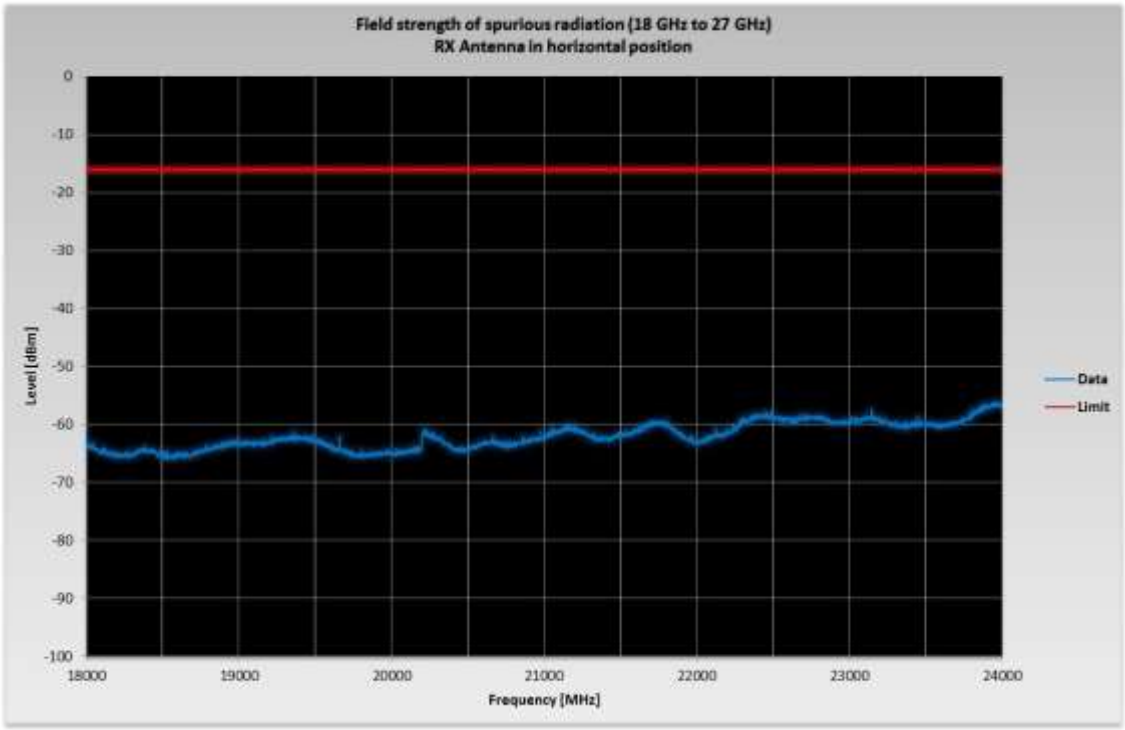
Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 30 MHz to 1000 MHz



Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 1 GHz to 18 GHz



Modulation: 64QAM - CH: M - CH BW: 20 MHz - Antenna port: 1 & 2 - Frequency range: 18 GHz to 24 GHz



5.8 Frequency stability

For test instruments and accessories used see section 6 Part **FS**.

5.8.1 Description of the test location

Test location: Room 008/U1/135

5.8.2 Photo documentation of the test set-up

5.8.3 Applicable standard

According to FCC Part 2, Section 2.1055:
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

5.8.4 Description of measurement – Measurement guidance KDB 971168 D01 (9)

After 60 minutes of temperature stabilization the frequency stability is measured conducted using a spectrum analyser with the function “LTE - Modulation Analysis”. The EUT is set in TX continuous mode with the maximal output power and the test model is E-TM3.1 on middle channel (2145.0 MHz) while measuring. The EUT is measured at antenna port 1. Within 3 minutes after the temperature stabilization, a measurement result was taken every 30 seconds (declared by manufacturer). The resulting values are listed in the following tables.

5.8.5 Spectrum analyser settings

The settings are automatically changed by analyser software and is dependent to the used channel bandwidth.

5.8.6 Limit

The limit of the frequency stability is ±0.1 ppm. For the middle frequency the calculated limit is: ±214.5 Hz.

5.8.7 Test result table

Variable temperature and constant voltage			
Temperature (°C)	**Voltage (VAC)**	**Time (minutes)**	**Frequency error (Hz)**
+50	110.0	0.0	-4.05
		0.5	-8.50
		1.0	3.20
		1.5	5.94
		2.0	-9.42
		2.5	-3.22
		3.0	5.03
+40		0.0	-4.69
		0.5	-4.53
		1.0	1.21
		1.5	-9.32
		2.0	7.66
		2.5	-0.50
		3.0	-9.45
+30		0.0	0.57
		0.5	-5.23
		1.0	2.57
		1.5	-4.49
		2.0	2.20
		2.5	-5.00
		3.0	-2.57
+20		0.0	3.19
		0.5	2.55
		1.0	3.11
		1.5	-8.21
		2.0	-4.76
		2.5	7.00
		3.0	-6.33
+10		0.0	9.90
		0.5	-10.56
		1.0	-6.87
		1.5	-5.08
		2.0	5.26
		2.5	-6.60
		3.0	4.02

Variable temperature and constant voltage			
Temperature (°C)	**Voltage (VAC)**	**Time (minutes)**	**Frequency error (Hz)**
0	110.0	0.0	4.45
		0.5	2.35
		1.0	-3.28
		1.5	3.38
		2.0	-2.82
		2.5	-1.10
		3.0	3.32
-10		0.0	8.72
		0.5	-8.39
		1.0	-10.36
		1.5	-6.37
		2.0	-11.24
		2.5	-10.23
		3.0	-5.28
-20		0.0	4.72
		0.5	-4.33
		1.0	-11.07
		1.5	-10.29
		2.0	-1.14
		2.5	5.79
		3.0	-2.99
-30		0.0	-3.91
		0.5	-2.72
		1.0	1.48
		1.5	-8.11
		2.0	2.34
		2.5	-4.98
		3.0	6.62
-40.00		0.0	9.61
		0.5	4.19
		1.0	4.10
		1.5	9.60
		2.0	-2.28
		2.5	-0.88
		3.0	-8.36

Constant Temperature and Nominal Voltage			
Temperature (°C)	Voltage (VAC)	Time (minutes)	Frequency error (Hz)
+25	110.0	0.0	1.47
		0.5	2.70
		1.0	4.29
		1.5	-5.59
		2.0	3.31
		2.5	-3.30
		3.0	-2.02

Constant Temperature and Variable Voltage			
Temperature (°C)	Voltage (VAC)	Time (minutes)	Frequency error (Hz)
+25	93.5	0.0	-8.85
		0.5	-8.62
		1.0	-5.51
		1.5	-4.26
		2.0	-7.81
		2.5	3.82
		3.0	-4.05
	96.8	0.0	3.18
		0.5	-1.23
		1.0	-5.26
		1.5	-1.61
		2.0	-2.96
		2.5	-5.88
		3.0	3.35
	100.1	0.0	-2.47
		0.5	6.77
		1.0	-4.18
		1.5	-4.42
		2.0	2.97
		2.5	-10.45
		3.0	3.08
	103.4	0.0	-2.92
		0.5	-6.69
		1.0	1.07
		1.5	4.06
		2.0	4.01
		2.5	7.56
		3.0	-3.35
	106.7	0.0	-10.48
		0.5	-8.07
		1.0	-4.24
		1.5	2.12
		2.0	1.60
		2.5	-5.94
		3.0	2.99

Constant Temperature and Variable Voltage			
Temperature (°C)	Voltage (VAC)	Time (minutes)	Frequency error (Hz)
+25	113.3	0.0	5.67
		0.5	2.48
		1.0	4.16
		1.5	0.14
		2.0	0.79
		2.5	-2.93
		3.0	-4.88
	116.6	0.0	3.24
		0.5	7.08
		1.0	0.69
		1.5	-6.03
		2.0	2.13
		2.5	-0.30
		3.0	-2.16
	119.9	0.0	3.40
		0.5	-6.09
		1.0	4.70
		1.5	2.92
		2.0	-5.41
		2.5	-7.34
		3.0	4.19
	123.2	0.0	3.00
		0.5	-7.18
		1.0	-5.37
		1.5	2.66
		2.0	2.62
		2.5	0.47
		3.0	-4.31
	126.5	0.0	2.40
		0.5	1.90
		1.0	0.37
		1.5	-7.31
		2.0	2.19
		2.5	4.24
		3.0	-6.89

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
CPC 3	8040 C	99-02/05-15-001	27/01/2016	27/01/2015		
	PA4000	99-02/07-15-001	22/06/2016	22/06/2015		
	N9030A	99-02/11-15-001	02/11/2016	02/11/2015		
	PCR1000	99-02/50-15-001				
	WA 35-10-33	99-02/50-15-004				
FS	8040 C	99-02/05-15-001	27/01/2016	27/01/2015		
	PA4000	99-02/07-15-001	22/06/2016	22/06/2015		
	34970A	99-02/07-15-002	27/03/2016	27/03/2015		
	N9030A	99-02/11-15-001	02/11/2016	02/11/2015		
	TW-60/24	99-02/45-15-001				
	PCR1000	99-02/50-15-001				
	WA 35-10-33	99-02/50-15-004				
MB	8040 C	99-02/05-15-001	27/01/2016	27/01/2015		
	PA4000	99-02/07-15-001	22/06/2016	22/06/2015		
	N9030A	99-02/11-15-001	02/11/2016	02/11/2015		
	PCR1000	99-02/50-15-001				
	WA 35-10-33	99-02/50-15-004				
SEC1	8040 C	99-02/05-15-001	27/01/2016	27/01/2015		
	PA4000	99-02/07-15-001	22/06/2016	22/06/2015		
	N9030A	99-02/11-15-001	02/11/2016	02/11/2015		
	PCR1000	99-02/50-15-001				
	48-10-34-LIM	99-02/50-15-005				
	48-10-34-LIM	99-02/50-15-006				
	WHK3.5/18G-10EE	99-02/50-15-007				
SEC2	8040 C	99-02/05-15-001	27/01/2016	27/01/2015		
	PA4000	99-02/07-15-001	22/06/2016	22/06/2015		
	N9030A	99-02/11-15-001	02/11/2016	02/11/2015		
	PCR1000	99-02/50-15-001				
	48-10-34-LIM	99-02/50-15-005				
	48-10-34-LIM	99-02/50-15-006				
	WHK3.5/18G-10EE	99-02/50-15-007				
SEC3	8040 C	99-02/05-15-001	27/01/2016	27/01/2015		
	PA4000	99-02/07-15-001	22/06/2016	22/06/2015		
	N9030A	99-02/11-15-001	02/11/2016	02/11/2015		
	PCR1000	99-02/50-15-001				
	48-10-34-LIM	99-02/50-15-005				
	48-10-34-LIM	99-02/50-15-006				
	WHK3.5/18G-10EE	99-02/50-15-007				
SER 1	FMZB 1516	01-02/24-01-018			19/01/2016	19/01/2015
	ESCI	02-02/03-05-004	17/09/2016	17/09/2015		
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Next Verif.
SER 2	ESVS 30	02-02/03-05-003	09/07/2016	09/07/2015		
	VULB 9168	02-02/24-05-005	17/04/2016	17/04/2015	29/02/2016	31/08/2015
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 3	FSP 40	02-02/11-11-001	28/10/2016	28/10/2015		
	JS4-18004000-30-5A	02-02/17-05-017				
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	BBHA 9120 E 251	02-02/24-05-006	27/04/2016	27/04/2015	19/02/2016	19/08/2015
	BBHA 9170	02-02/24-05-014	02/06/2018	02/06/2015	02/12/2016	02/12/2015
	WBH2-18NHG	02-02/24-08-002	27/04/2016	27/04/2015	19/02/2016	19/08/2015
	WHJS 1000-10EE	02-02/50-05-070				
	Sucoflex N-2000-SMA	02-02/50-05-075				
	WHK 3.0/18G-10EF	02-02/50-05-180				
	KMS102-0.2 m	02-02/50-11-020				
	SF104/11N/11N/1500MM	02-02/50-13-015				
	SF104/11SMA/11N/1500MM	02-02/50-13-016				
	SF104/11SMA/11N/1500MM	02-02/50-13-017				