

InterLab®

Final Report on

TOBY-L4006

FCC ID: XPY1EHQ37NN

IC: 8595A-1EHQ37NN

Report Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Date: February 05, 2018

Test Laboratory:

7layers GmbH
Borsigstraße 11
40880 Ratingen
Germany



Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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A Bureau Veritas Group Company

1 Administrative Data

1.1 Project Data

<i>Project Responsible:</i>	Patrick Lomax
<i>Date Of Test Report:</i>	2018/02/05
<i>Date of first test:</i>	2017/06/14
<i>Date of last test:</i>	2017/07/17

1.2 Applicant Data

Company Name: u-blox AG
Street: Zürcherstrasse 68,
CH-8800 Thalwil
Country: Switzerland
Contact Person: Mr. Giulio Comar
Function: Certification Manager
Department: Cellular Product Certification
Phone: +41 44 722 7462
Fax: +41 44 722 7447
E-Mail: giulio.comar@u-blox.com

1.3 Test Laboratory Data

The following list shows all places and laboratories involved for test result generation:

7 layers DE

Company Name : 7layers GmbH
Street : Borsigstrasse 11
City : 40880 Ratingen
Country : Germany
Contact Person : Mr. Michael Albert
Phone : +49 2102 749 201
Fax : +49 2102 749 444
E Mail : Michael.Albert@7Layers.com

Laboratory Details

<i>Lab ID</i>	<i>Identification</i>	<i>Responsible</i>	<i>Accreditation Info</i>
Lab 1	Radiated Emissions	Mr. Marco Kullik Mr. Jens Dörwald	DAkkS-Registration no. D-PL-12140-01-00 ISEDC OATS registration number 3699A-1 FCC accreditation registration number 929146
Lab 2	Radio Lab	Mr. Dobrin Dobrinov Mr. Daniel Gall	DAkkS-Registration no. D-PL-12140-01-00 ISEDC OATS registration number 3699A-1 FCC accreditation registration number 929146

1.4 Signature of the Testing Responsible



Patrick Lomax
responsible for tests performed in: Lab 1, Lab 2

1.5 Signature of the Accreditation Responsible



[M. KULLIK]



2 Test Object Data

2.1 General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

OUT: TOBY-L4006

Type / Model / Family:	TOBY-L4006 FCC ID: XPY1EHQ37NN IC: 8595A-1EHQ37NN
Product Category:	Module
Manufacturer:	
Company Name:	see applicant data
Contact Person:	see applicant data
Parameter List:	
Parameter name	Value
Parameter for Scope FCC_v2:	
AC Power Supply	120V / 60Hz - for AC DC Adapter
Antenna gain 1700 band	not specified (dBi)
Antenna gain 1900 band	not specified (dBi)
Antenna gain 850 band	not specified (dBi)
highest channel	251 (848.8MHz) for GSM850, 810 (1909.8MHz) for GSM1900, 4233 (846.6MHz) for FDD5, 9538 (1907.6MHz) for FDD2, 1513 (1752.6MHz) for FDD4
lowest channel	128 (824.2MHz) for GSM850, 512 (1850.2MHz) for GSM1900, 4132 (826.4MHz) for FDD5, 9262 (1852.4MHz) for FDD2, 1312 (1712.4MHz) for FDD4
mid channel	190 (836.6MHz) for GSM850, 661 (1880.0MHz) for GSM1900, 4183 (836.6MHz) for FDD5, 9400 (1880MHz) for FDD2, 1412 (1732.4MHz)/1450 (1740.0MHz) for FDD4
LTE Channels	See table located in Annex

2.2 Detailed Description of OUT Samples

Sample : am04

<i>OUT Identifier</i>	TOBY-L4006		
<i>Sample Description</i>	Standard Sample		
<i>Serial No.</i>	355958080015191		
<i>HW Status</i>	294A00		
<i>SW Status</i>	40.12		
<i>Low Voltage</i>	3.3 V	<i>Low Temp.</i>	-20 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	55 °C
<i>Nominal Voltage</i>	3.8 V	<i>Normal Temp.</i>	25 °C

2.3 OUT Features

Features for OUT: TOBY-L4006

Designation	Description	Allowed Values	Supported Value(s)
Features for scope: FCC_v2			
AC	The OUT is powered by or connected to AC Mains		
Eant	removable antenna supplied and type tested with the radio equipment, designed as an indispensable part of the equipment		
EDGE850	EUT supports EDGE in the band 824 MHz - 849 MHz		
EDGE1900	EUT supports EDGE in the band 1850 MHz - 1910 MHz		
eFDD2			
eFDD4			
eFDD5			
eFDD7			
eFDD12			
eFDD13			
FDD2	EUT supports UMTS FDD2 in the band 1850 MHz - 1910 MHz		
FDD4	EUT supports UMTS FDD4 in the band 1710 MHz - 1755 MHz		
FDD5	EUT supports UMTS FDD5 in the band 824 MHz - 849 MHz		
GSM850	EUT supports GSM850 band 824MHz - 849MHz		
HSDPA-	EUT supports UMTS FDD2 HSDPA in the band 1850 MHz - 1910 MHz		
FDD2			
HSDPA-	EUT supports UMTS FDD4 HSDPA in the band 1710 MHz - 1755 MHz		
FDD4			
HSDPA-	EUT supports UMTS FDD5 HSDPA in the band 824 MHz - 849 MHz		
FDD5			
HSUPA-	EUT supports UMTS FDD2 HSUPA in the band 1850 MHz - 1910 MHz		
FDD2			
HSUPA-	EUT supports UMTS FDD4 HSUPA in the band 1710 MHz - 1755 MHz		
FDD4			
HSUPA-	EUT supports UMTS FDD5 HSUPA in the band 824 MHz - 849 MHz		
FDD5			
PCS1900	EUT supports PCS1900 band 1850MHz - 1910MHz		
TantC	temporary antenna connector, which may be only built-in for testing, designed as an example part of the equipment		

2.4 Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used. The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

Setup No.	List of OUT samples		List of auxiliary equipment	
	Sample No.	Sample Description	AE No.	AE Description
am06 (am06)				
	Sample: am04	Standard Sample		

3 Results

3.1 General

Documentation of tested devices:

Available at the test laboratory.

Interpretation of the test results:

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.

In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation.

Note:

1. All tests are performed under environmental conditions within the requirements of the specifications. Environmental conditions are available at the laboratory.

3.2 List of the Applicable Body

(Bodies for Scope: FCC_v2)

<i>Designation</i>	<i>Description</i>
FCC47CFRChIPART22PUBLIC MOBILE SERVICES	Part 22, Subpart H - Cellular Radiotelephone Service
FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES	Part 24, Subpart E - Broadband PCS
FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	Part 27, Subpart C - Technical Standards

3.3 List of Test Specification

Test Specification: **FCC part 2 and 22**

Version 10-1-15 Edition

Title: PART 2 - GENERAL RULES AND REGULATIONS
PART 22 - PUBLIC MOBILE SERVICES

Test Specification: **FCC part 2 and 24**

Date / Version 2015/10/01 Version: 10-1-15 Edition

Title: PART 2 - GENERAL RULES AND REGULATIONS
PART 24 - PERSONAL COMMUNICATIONS SERVICES

Test Specification: **FCC part 2 and 27**

Version 10-1-13 Edition

Title: PART 2 - GENERAL RULES AND REGULATIONS
PART 27 - MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

3.4 Summary

Test Case Identifier / Name Test (condition)	Result	Date of Test	Lab Ref.	Setup
Test Specification: FCC part 2 and 22				
22.1 RF Power Output §2.1046, §22.913 22.1; _RF Power Output Summary §2.1046, §22.913	Passed	2017/06/23	Lab 2	am06
22.2 Frequency stability §2.1055 22.2; _Frequency stability Summary §2.1055	Passed	2017/06/24	Lab 2	am06
22.3 Spurious emissions at antenna terminals §2.1051, §22.917 22.3; Spurious emissions at antenna terminals summary §2.1051, §22.917	Passed	2017/06/23	Lab 2	am06
22.4 Field strength of spurious radiation §2.1053, §22.917 22.4; Field strength of spurious radiation Summary §2.1053, §22.917	Passed	2017/06/14	Lab 1	am06
22.5 Emission and Occupied Bandwidth §2.1049, §22.917 22.5; _Emission and Occupied Bandwidth Summary §2.1049, §22.917	Passed	2017/06/23	Lab 2	am06
22.6 Band edge compliance §2.1053, §22.917 22.6; _Band edge compliance Summary §2.1053, §22.917	Passed	2017/06/23	Lab 2	am06
22.7 Peak-to-Average Ratio Summary §2.1046 22.7; Peak-to-Average Ratio Summary §2.1046	Passed	2017/07/01	Lab 2	am06
Test Specification: FCC part 2 and 24				
24.1 RF Power Output §2.1046, §24.232 24.1; RF Power Output Summary §2.1046, §24.232	Passed	2017/06/23	Lab 2	am06
24.2 Frequency stability §2.1055, §24.235 24.2; Frequency stability Summary §2.1055, §24.235	Passed	2017/06/24	Lab 2	am06
24.3 Spurious emissions at antenna terminals §2.1051, §24.238 24.3; Spurious emissions at antenna terminals Summary §2.1051, §24.238	Passed	2017/06/23	Lab 2	am06
24.4 Field strength of spurious radiation §2.1053, §24.238 24.4; Field strength of spurious radiation Summary §2.1053, §24.238	Passed	2017/06/17	Lab 1	am06
24.5 Emission and Occupied Bandwidth §2.1049, §24.238 24.5; Emission and Occupied Bandwidth Summary §2.1049, §24.238	Passed	2017/06/23	Lab 2	am06
24.6 Band edge compliance §2.1053, §24.238 24.6; Band edge compliance summary §2.1053, §24.238	Passed	2017/06/23	Lab 2	am06
24.7 Peak-to-Average ratio §2.1046, §24.232 24.7; Peak-to-Average Ratio Summary §2.1046, §24.232	Passed	2017/06/23	Lab 2	am06
Test Specification: FCC part 2 and 27				
27.1 RF Power Output §2.1046, §27.250 27.1; RF Power Output Summary §2.1046, §27.250	Passed	2017/06/23	Lab 2	am06

Reference: MDE_UBLOX_1717_FCCa according to: FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C <i>Lab</i>					
<i>Test Case Identifier / Name</i>	<i>Test (condition)</i>	<i>Result</i>	<i>Date of Test</i>	<i>Ref.</i>	<i>Setup</i>
27.2 Frequency stability §2.1055, §27.54	27.2; Frequency stability Summary §2.1055, §27.54	Passed	2017/06/23	Lab 2	am06
27.3 Spurious emissions at antenna terminals §2.1051, §27.53	27.3; Spurious emissions at antenna terminals Summary §2.1051, §27.53	Passed	2017/06/23	Lab 2	am06
27.4 Field strength of spurious radiation §2.1053, §27.53	27.4; Field strength of spurious radiation Summary §2.1053, §27.53	Passed	2017/07/17	Lab 1	am06
27.5 Emission and Occupied Bandwidth §2.1049	27.5; Emission and Occupied Bandwidth Summary §2.1049	Passed	2017/06/23	Lab 2	am06
27.6 Band edge compliance §2.1053, §27.53	27.6; Band edge compliance summary §2.1053, §27.53	Passed	2017/06/23	Lab 2	am06
27.7 Peak-to-Average ratio §2.1046, §27.50	27.7; Peak-to-Average Ratio Summary §2.1046, §27.50	Passed	2017/06/23	Lab 2	am06

3.5 Detailed Results**3.5.1 22.1 RF Power Output §2.1046, §22.913****Test: 22.1; _RF Power Output Summary §2.1046, §22.913**

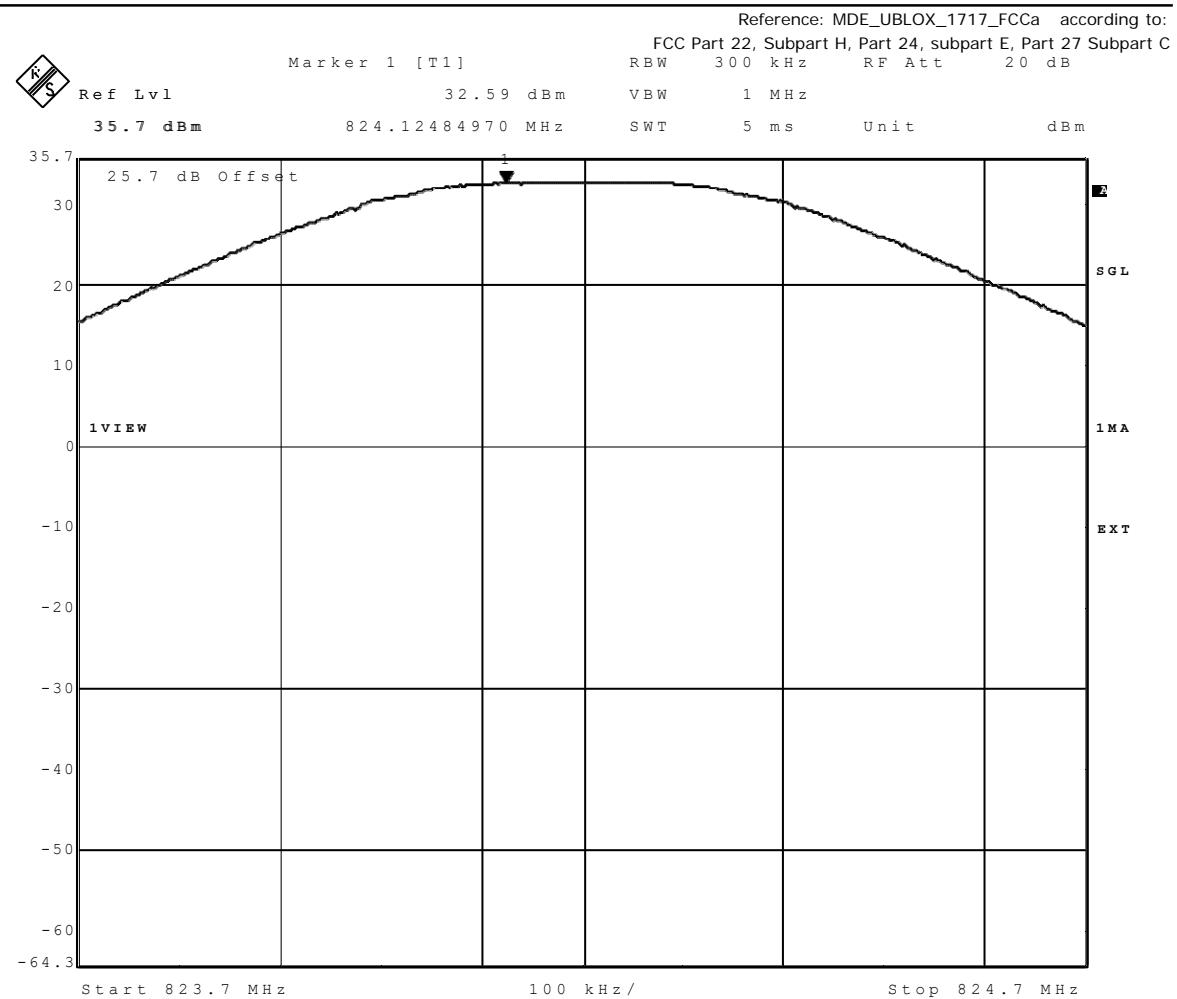
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<i>Setup No.:</i>	am06
<i>Date of Test:</i>	2017/06/23 9:44
<i>Body:</i>	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
<i>Test Specification:</i>	FCC part 2 and 22

Detailed Results:

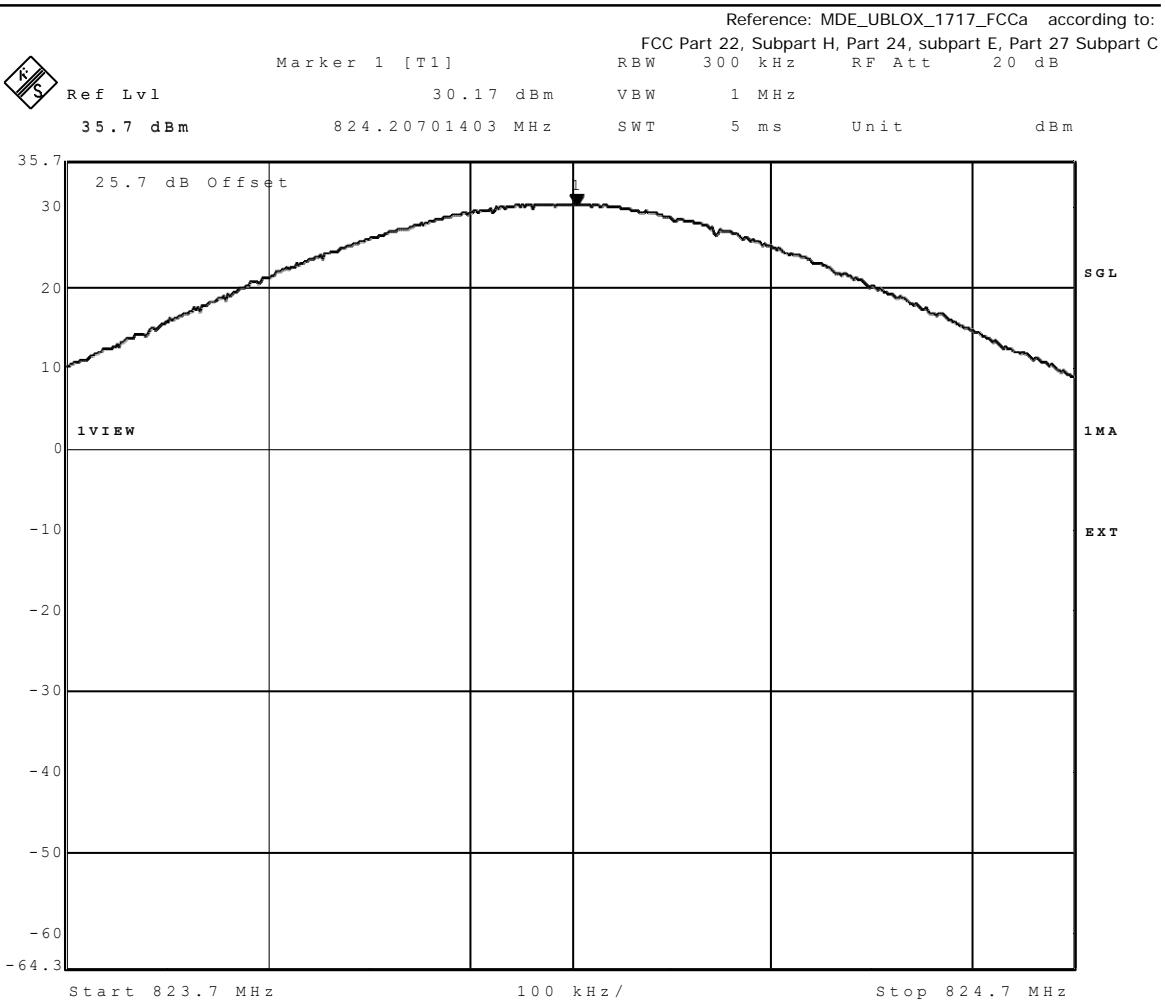
Radio Technology	Channel	Resource Blocks	Band width [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC EIRP Limit [dBm]	IC EIRP Limit [W]	Max. Antenna Gain [dBi]
GSM 850	low	-	0.2	32.59	32.54	32.55	11.5	11.5	8.01
GSM 850	mid	-	0.2	32.5	32.47	32.44	11.5	11.5	8.1
GSM 850	high	-	0.2	32.52	32.45	32.47	11.5	11.5	8.08
GSM 850 GPRS	low	-	0.2	32.33	32.3	32.3	11.5	11.5	8.27
GSM 850 GPRS	mid	-	0.2	32.28	32.22	32.26	11.5	11.5	8.32
GSM 850 GPRS	high	-	0.2	32.23	32.17	32.19	11.5	11.5	8.37
GSM 850 EDGE	low	-	0.2	30.17	30.14	30.14	11.5	11.5	10.43
GSM 850 EDGE	mid	-	0.2	30.14	30.1	30.11	11.5	11.5	10.46
GSM 850 EDGE	high	-	0.2	30.11	30.12	30.12	11.5	11.5	10.49
FDD V	low	-	5	28.38	23.09	23.24	11.5	11.5	17.36
FDD V	mid	-	5	28.51	23.06	23.18	11.5	11.5	17.42
FDD V	high	-	5	28.51	22.99	23.14	11.5	11.5	17.46
FDD V HSDPA Subtest 1	low	-	5	28	23.3	23.46	11.5	11.5	17.14
FDD V HSDPA Subtest 1	mid	-	5	28	23.42	23.7	11.5	11.5	16.9
FDD V HSDPA Subtest 1	high	-	5	28	23.28	23.4	11.5	11.5	17.2
FDD V HSDPA Subtest 2	low	-	5	28.8	23.04	23.54	11.5	11.5	17.06
FDD V HSDPA Subtest 2	mid	-	5	29.04	23.15	23.68	11.5	11.5	16.92
FDD V HSDPA Subtest 2	high	-	5	28.91	22.92	23.42	11.5	11.5	17.18
FDD V HSDPA Subtest 3	low	-	5	28.91	22.94	23.62	11.5	11.5	16.98
FDD V HSDPA Subtest 3	mid	-	5	29.41	22.92	23.58	11.5	11.5	17.02
FDD V HSDPA Subtest 3	high	-	5	29.29	22.8	23.53	11.5	11.5	17.07
FDD V HSUPA Subtest 4	low	-	5	28.8	22.62	23.46	11.5	11.5	17.14
FDD V HSUPA Subtest 4	mid	-	5	28.51	22.54	23.5	11.5	11.5	17.1
FDD V HSUPA Subtest 4	high	-	5	28.91	22.68	23.43	11.5	11.5	17.17
FDD V HSUPA Subtest 1	low	-	5	28.13	21.81	22.17	11.5	11.5	18.43
FDD V HSUPA Subtest 1	mid	-	5	28.38	21.85	22.15	11.5	11.5	18.45
FDD V HSUPA Subtest 1	high	-	5	28.13	21.76	22.16	11.5	11.5	18.44
FDD V HSUPA Subtest 2	low	-	5	28.66	21.17	22.06	11.5	11.5	18.54
FDD V HSUPA Subtest 2	mid	-	5	29.04	21.18	21.89	11.5	11.5	18.71
FDD V HSUPA Subtest 2	high	-	5	29.04	21.09	21.88	11.5	11.5	18.72
FDD V HSUPA Subtest 3	low	-	5	29.29	22.02	22.74	11.5	11.5	17.86
FDD V HSUPA Subtest 3	mid	-	5	30.11	22.18	22.91	11.5	11.5	17.69
FDD V HSUPA Subtest 3	high	-	5	29.29	22.12	22.73	11.5	11.5	17.87
FDD V HSUPA Subtest 4	low	-	5	29.04	21.19	21.93	11.5	11.5	18.67
FDD V HSUPA Subtest 4	mid	-	5	28.8	21.16	21.98	11.5	11.5	18.62
FDD V HSUPA Subtest 4	high	-	5	29.04	21.21	21.94	11.5	11.5	18.66
FDD V HSUPA Subtest 5	low	-	5	27.48	21.87	22.17	11.5	11.5	18.43
FDD V HSUPA Subtest 5	mid	-	5	28.26	21.84	22.12	11.5	11.5	18.48
FDD V HSUPA Subtest 5	high	-	5	27.76	21.6	21.96	11.5	11.5	18.64
eFDD 5 QPSK	low	1	1.4	-	-	21.38	11.5	11.5	19.22
eFDD 5 QPSK	low	3	1.4	-	-	21.3	11.5	11.5	19.3
eFDD 5 QPSK	low	6	1.4	-	-	20.21	11.5	11.5	20.39
eFDD 5 QPSK	mid	1	1.4	-	-	21.17	11.5	11.5	19.43
eFDD 5 QPSK	mid	3	1.4	-	-	21.17	11.5	11.5	19.43
eFDD 5 QPSK	mid	6	1.4	-	-	20.16	11.5	11.5	20.44
eFDD 5 QPSK	high	1	1.4	-	-	20.98	11.5	11.5	19.62
eFDD 5 QPSK	high	3	1.4	-	-	20.89	11.5	11.5	19.71
eFDD 5 QPSK	high	6	1.4	-	-	20.09	11.5	11.5	20.51
eFDD 5 16QAM	low	1	1.4	-	-	20.33	11.5	11.5	20.27
eFDD 5 16QAM	low	6	1.4	-	-	19.25	11.5	11.5	21.35
eFDD 5 16QAM	mid	1	1.4	-	-	20.3	11.5	11.5	20.3
eFDD 5 16QAM	mid	6	1.4	-	-	19.07	11.5	11.5	21.53
eFDD 5 16QAM	high	1	1.4	-	-	20.02	11.5	11.5	20.58
eFDD 5 16QAM	high	6	1.4	-	-	19.01	11.5	11.5	21.59

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	Resource Blocks	Band width [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC EIRP Limit [W]	IC EIRP Limit [W]	Max. Antenna Gain [dBi]
eFDD 5 QPSK	low	1	3	-	-	22.32	11.5	11.5	18.28
eFDD 5 QPSK	low	15	3	-	-	19.89	11.5	11.5	20.71
eFDD 5 QPSK	mid	1	3	-	-	22.31	11.5	11.5	18.29
eFDD 5 QPSK	mid	15	3	-	-	19.83	11.5	11.5	20.77
eFDD 5 QPSK	high	1	3	-	-	22.18	11.5	11.5	18.42
eFDD 5 QPSK	high	15	3	-	-	19.66	11.5	11.5	20.94
eFDD 5 16QAM	low	1	3	-	-	21.34	11.5	11.5	19.26
eFDD 5 16QAM	low	15	3	-	-	18.84	11.5	11.5	21.76
eFDD 5 16QAM	mid	1	3	-	-	21.37	11.5	11.5	19.23
eFDD 5 16QAM	mid	15	3	-	-	18.78	11.5	11.5	21.82
eFDD 5 16QAM	high	1	3	-	-	21.22	11.5	11.5	19.38
eFDD 5 16QAM	high	15	3	-	-	18.66	11.5	11.5	21.94
eFDD 5 QPSK	low	1	5	-	-	22.08	11.5	11.5	18.52
eFDD 5 QPSK	low	12	5	-	-	19.61	11.5	11.5	20.99
eFDD 5 QPSK	low	25	5	-	-	19.55	11.5	11.5	21.05
eFDD 5 QPSK	mid	1	5	-	-	22.01	11.5	11.5	18.59
eFDD 5 QPSK	mid	12	5	-	-	19.51	11.5	11.5	21.09
eFDD 5 QPSK	mid	25	5	-	-	19.53	11.5	11.5	21.07
eFDD 5 QPSK	high	1	5	-	-	21.78	11.5	11.5	18.82
eFDD 5 QPSK	high	12	5	-	-	19.5	11.5	11.5	21.1
eFDD 5 QPSK	high	25	5	-	-	19.36	11.5	11.5	21.24
eFDD 5 16QAM	low	1	5	-	-	21.24	11.5	11.5	19.36
eFDD 5 16QAM	low	25	5	-	-	19.58	11.5	11.5	21.02
eFDD 5 16QAM	mid	1	5	-	-	21.17	11.5	11.5	19.43
eFDD 5 16QAM	mid	25	5	-	-	18.61	11.5	11.5	21.99
eFDD 5 16QAM	high	1	5	-	-	20.93	11.5	11.5	19.67
eFDD 5 16QAM	high	25	5	-	-	18.42	11.5	11.5	22.18
eFDD 5 QPSK	low	1	10	-	-	22.51	11.5	11.5	18.09
eFDD 5 QPSK	low	50	10	-	-	20.19	11.5	11.5	20.41
eFDD 5 QPSK	mid	1	10	-	-	22.48	11.5	11.5	18.12
eFDD 5 QPSK	mid	50	10	-	-	20.16	11.5	11.5	20.44
eFDD 5 QPSK	high	1	10	-	-	22.35	11.5	11.5	18.25
eFDD 5 QPSK	high	50	10	-	-	20.07	11.5	11.5	20.53
eFDD 5 16QAM	low	1	10	-	-	21.5	11.5	11.5	19.1
eFDD 5 16QAM	low	50	10	-	-	19.09	11.5	11.5	21.51
eFDD 5 16QAM	mid	1	10	-	-	21.48	11.5	11.5	19.12
eFDD 5 16QAM	mid	50	10	-	-	19.11	11.5	11.5	21.49
eFDD 5 16QAM	high	1	10	-	-	21.52	11.5	11.5	19.08
eFDD 5 16QAM	high	50	10	-	-	18.99	11.5	11.5	21.61



GSM850 Channel=low



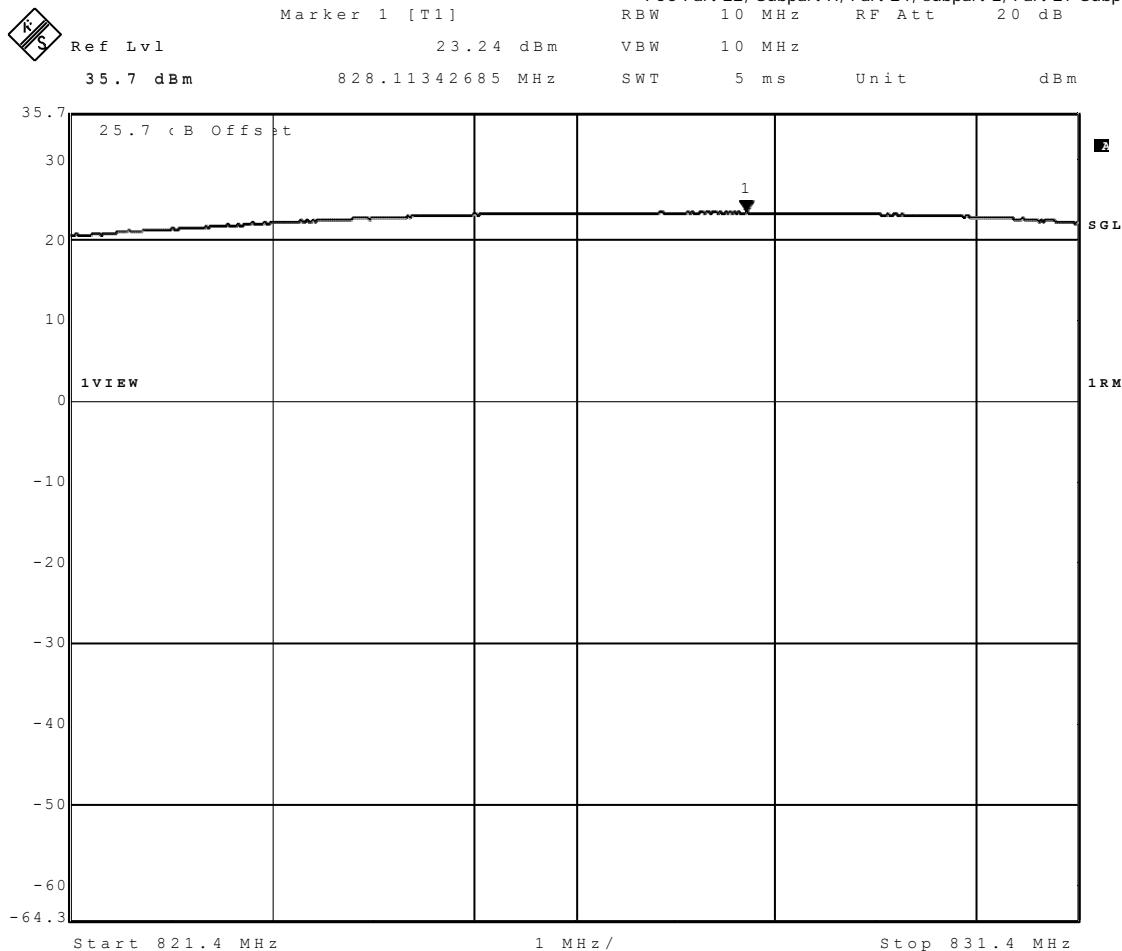
Date : 26.JUN.2017 15:30:19

EDGE850 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



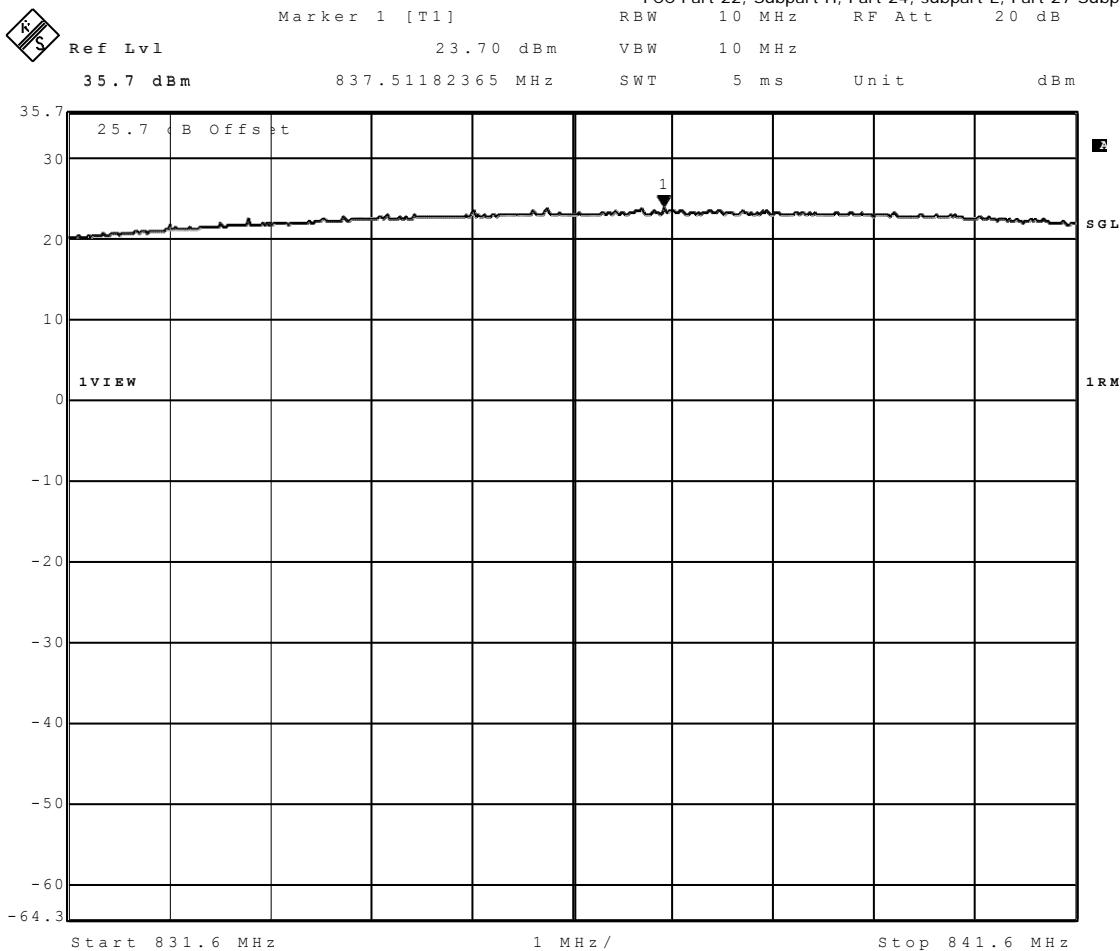
Date: 14.JUL.2017 15:57:06

WCDMA FDD5 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

R BW 10 MHz R F Att 20 dB



Date: 15.JUL.2017 09:25:34

HSDPA FDD5 SUB1 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

22.91 dBm

VBW 10 MHz

35.7 dBm

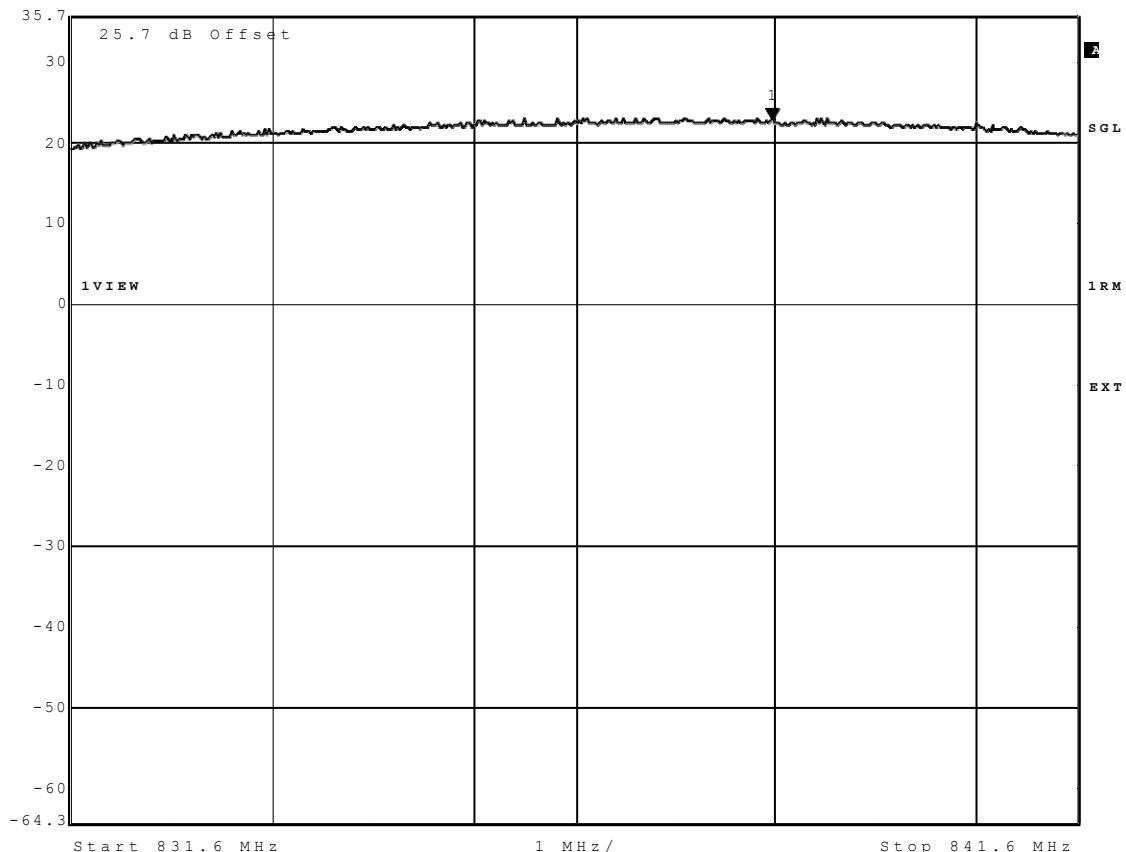
838.57394790 MHz

SWT

5 ms

Unit

dBm



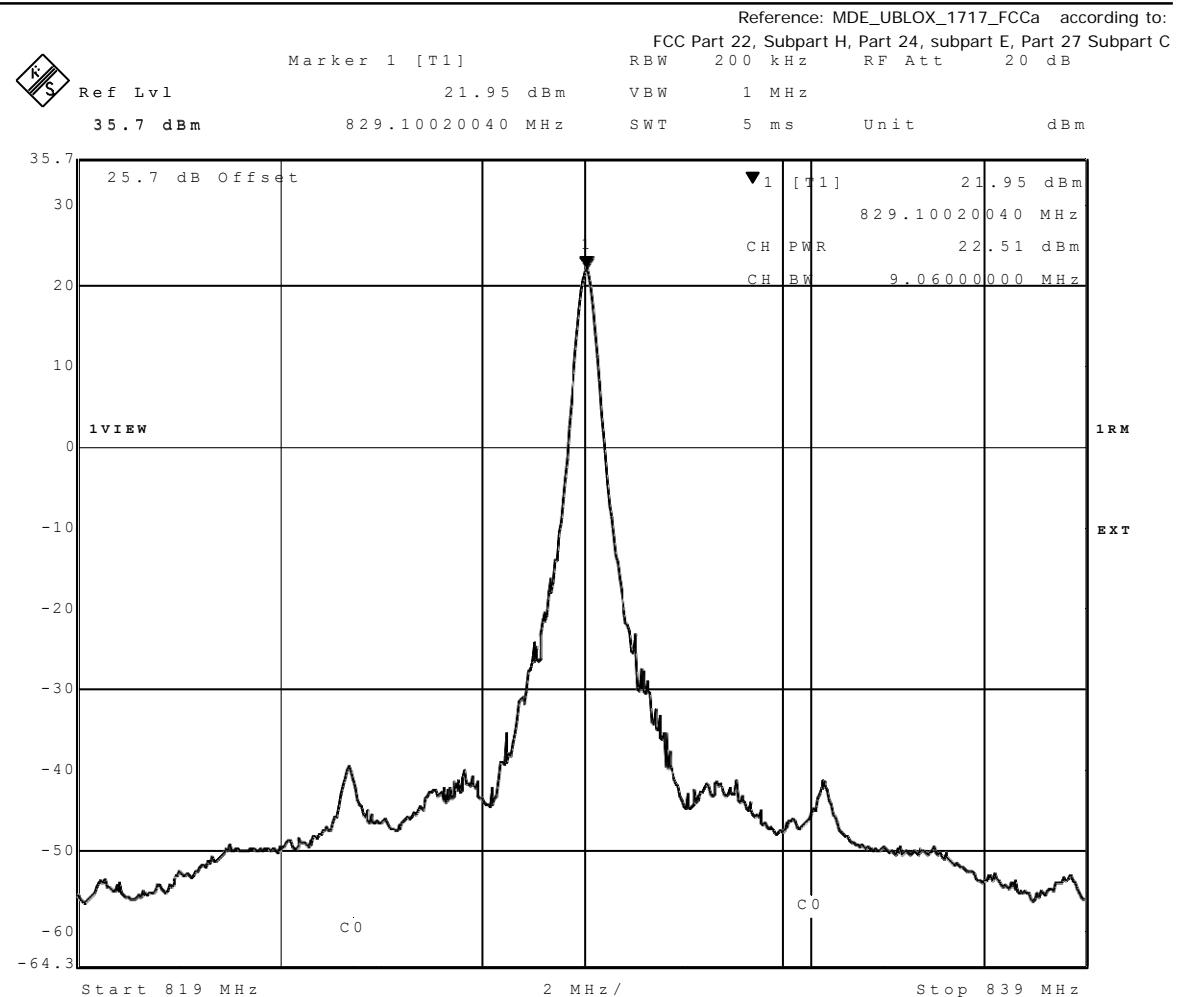
Start 831.6 MHz

1 MHz /

Stop 841.6 MHz

Date: 26.JUN.2017 11:51:28

HSUPA FDD5 SUB3 Channel=mid



Date: 23.JUN.2017 15:35:36

eFDD5 QPSK 10MHz RB1 Channel=low



Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

3.5.2 22.2 Frequency stability §2.1055

Test: 22.2; _Frequency stability Summary §2.1055

Result: Passed

Setup No.: am06

Date of Test: 2017/06/24 14:21

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

Detailed Results:

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	0	-11	passed
-30	5			-3	-12	passed
-30	10			-3	-11	passed
-20	0	normal	2095.5	-6	-12	passed
-20	5			-4	-12	passed
-20	10			-9	-9	passed
-10	0	normal	2095.5	1	11	passed
-10	5			1	15	passed
-10	10			4	13	passed
0	0	normal	2095.5	-3	9	passed
0	5			-8	16	passed
0	10			6	14	passed
10	0	normal	2095.5	2	-7	passed
10	5			4	13	passed
10	10			8	-10	passed
20	0	low	2095.5	4	14	passed
20	5			2	12	passed
20	10			-3	8	passed
20	0	normal = high ¹⁾	2095.5	6	-7	passed
20	5			4	12	passed
20	10			9	9	passed
20	0	high	2095.5	6	-6	passed
20	5			4	10	passed
20	10			8	-8	passed
30	0	normal	2095.5	-6	-7	passed
30	5			-7	-13	passed
30	10			3	10	passed
40	0	normal	2095.5	4	9	passed
40	5			6	14	passed
40	10			2	13	passed
50	0	normal	2095.5	0	-6	passed
50	5			3	-15	passed
50	10			3	-11	passed

GSM850

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	2	19	passed
-30	5			-3	16	passed
-30	10			1	16	passed
-20	0	normal	2095.5	-3	-21	passed
-20	5			0	-12	passed
-20	10			4	-26	passed
-10	0	normal	2095.5	-3	15	passed
-10	5			-2	14	passed
-10	10			-3	-13	passed
0	0	normal	2095.5	-5	-14	passed
0	5			-1	-9	passed
0	10			-3	-16	passed
10	0	normal	2095.5	-2	16	passed
10	5			2	-14	passed
10	10			3	-15	passed
20	0	low	2095.5	3	14	passed
20	5			2	12	passed
20	10			4	16	passed
20	0	normal = high ¹⁾	2095.5	-1	13	passed
20	5			0	13	passed
20	10			3	19	passed
20	0	high	2095.5	-3	15	passed
20	5			2	10	passed
20	10			3	16	passed
30	0	normal	2095.5	0	15	passed
30	5			2	1	passed
30	10			1	16	passed
40	0	normal	2095.5	-3	-15	passed
40	5			4	-15	passed
40	10			-2	-13	passed
50	0	normal	2095.5	-2	-20	passed
50	5			-3	-15	passed
50	10			-2	-14	passed

EDGE850

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	1	11	passed
-30	5			1	7	passed
-30	10			1	15	passed
-20	0	normal	2095.5	1	13	passed
-20	5			0	-14	passed
-20	10			0	12	passed
-10	0	normal	2095.5	0	-16	passed
-10	5			1	14	passed
-10	10			0	12	passed
0	0	normal	2095.5	2	17	passed
0	5			1	12	passed
0	10			0	9	passed
10	0	normal	2095.5	1	-12	passed
10	5			-1	10	passed
10	10			0	14	passed
20	0	low	2095.5	1	12	passed
20	5			0	-14	passed
20	10			0	8	passed
20	0	normal = high ¹⁾	2095.5	0	-1	passed
20	5			0	13	passed
20	10			0	-14	passed
20	0	high	2095.5	1	12	passed
20	5			1	4	passed
20	10			0	13	passed
30	0	normal	2095.5	1	13	passed
30	5			0	8	passed
30	10			0	9	passed
40	0	normal	2095.5	1	11	passed
40	5			1	8	passed
40	10			0	14	passed
50	0	normal	2095.5	-1	-13	passed
50	5			0	-12	passed
50	10			1	11	passed

WCDMa FDD5

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	35	49	passed
-30	5			19	38	passed
-30	10			21	-61	passed
-20	0	normal	2095.5	-38	-12	passed
-20	5			-26	-55	passed
-20	10			30	109	passed
-10	0	normal	2095.5	-15	-89	passed
-10	5			11	47	passed
-10	10			26	18	passed
0	0	normal	2095.5	-1	70	passed
0	5			-16	-64	passed
0	10			-14	-24	passed
10	0	normal	2095.5	14	7	passed
10	5			23	-26	passed
10	10			-8	-49	passed
20	0	low	2095.5	-12	42	passed
20	5			-14	14	passed
20	10			16	8	passed
20	0	normal = high ¹⁾	2095.5	-15	-11	passed
20	5			-23	22	passed
20	10			-8	-7	passed
20	0	high	2095.5	-17	21	passed
20	5			26	19	passed
20	10			18	-8	passed
30	0	normal	2095.5	-11	19	passed
30	5			19	-51	passed
30	10			-21	-62	passed
40	0	normal	2095.5	42	67	passed
40	5			18	74	passed
40	10			29	48	passed
50	0	normal	2095.5	-1	87	passed
50	5			27	19	passed
50	10			-21	-14	passed

HSDPA FDD5

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	16	40	passed
-30	5			19	57	passed
-30	10			22	49	passed
-20	0	normal	2095.5	34	61	passed
-20	5			28	72	passed
-20	10			29	55	passed
-10	0	normal	2095.5	36	25	passed
-10	5			41	62	passed
-10	10			30	83	passed
0	0	normal	2095.5	14	49	passed
0	5			13	48	passed
0	10			18	40	passed
10	0	normal	2095.5	20	36	passed
10	5			23	68	passed
10	10			4	37	passed
20	0	low	2095.5	14	54	passed
20	5			22	42	passed
20	10			21	36	passed
20	0	normal = high ¹⁾	2095.5	26	61	passed
20	5			36	37	passed
20	10			29	42	passed
20	0	high	2095.5	18	24	passed
20	5			22	47	passed
20	10			20	42	passed
30	0	normal	2095.5	20	44	passed
30	5			23	68	passed
30	10			4	37	passed
40	0	normal	2095.5	15	30	passed
40	5			25	68	passed
40	10			21	37	passed
50	0	normal	2095.5	37	30	passed
50	5			26	36	passed
50	10			48	42	passed

HSUPA FDD5

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2091.25	0	1	passed
-30	5			1	6	passed
-30	10			0	5	passed
-20	0	normal	2091.25	2	4	passed
-20	5			1	4	passed
-20	10			1	5	passed
-10	0	normal	2091.25	0	2	passed
-10	5			2	3	passed
-10	10			1	4	passed
0	0	normal	2091.25	1	1	passed
0	5			1	6	passed
0	10			0	7	passed
10	0	normal	2091.25	0	2	passed
10	5			2	3	passed
10	10			0	10	passed
20	0	low	2091.25	2	8	passed
20	5			2	7	passed
20	10			4	9	passed
20	0	normal = high ¹⁾	2091.25	0	6	passed
20	5			0	7	passed
20	10			1	9	passed
20	0	high	2091.25	1	4	passed
20	5			2	6	passed
20	10			1	3	passed
30	0	normal	2091.25	1	3	passed
30	5			2	4	passed
30	10			0	6	passed
40	0	normal	2091.25	2	3	passed
40	5			1	3	passed
40	10			0	5	passed
50	0	normal	2091.25	0	1	passed
50	5			1	1	passed
50	10			1	2	passed

Battery operating end point voltage ²⁾						
Temp. °C	Duration min	Voltage V	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
20	0	x.xx	2091.25			passed
20	5					passed
20	10					passed

3.5.3 22.3 Spurious emissions at antenna terminals §2.1051, §22.917

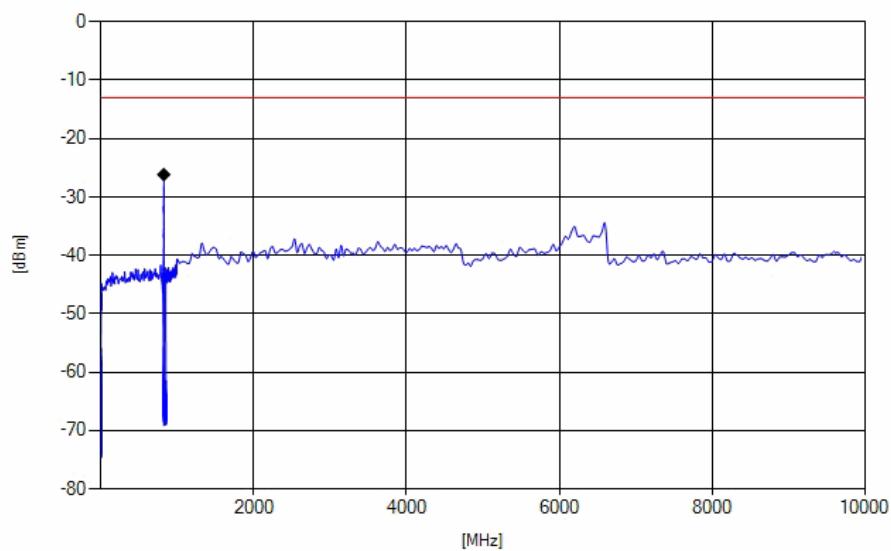
Test: 22.3; Spurious emissions at antenna terminals summary §2.1051, §22.917

<i>Result:</i>	Passed
<i>Setup No.:</i>	am06
<i>Date of Test:</i>	2017/06/23 16:58
<i>Body:</i>	FCC47CFRCh1PART22PUBLIC MOBILE SERVICES
<i>Test Specification:</i>	FCC part 2 and 22

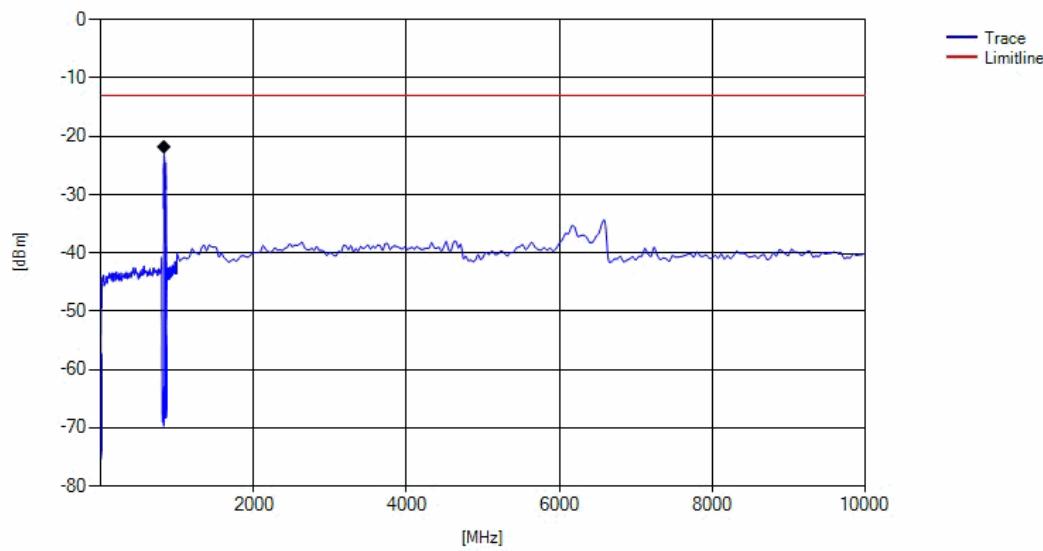
Detailed Results:

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
GSM 850	low	peak	maxhold	3	823.9	-25.11	-13	12.11
GSM 850	mid	-	-	-	-	-	-13	>20
GSM 850	high	peak	maxhold	3	849	-26.6	-13	13.6
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
EDGE 850	low	peak	maxhold	3	823.9	-21.71	-13	8.71
EDGE 850	mid	-	-	-	-	-	-13	>20
EDGE 850	high	peak	maxhold	3	849	-21.81	-13	8.81
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
WCDMa FDD5	low	-	-	-	-	-	-13	>20
WCDMa FDD5	mid	-	-	-	-	-	-13	>20
WCDMa FDD5	high	-	-	-	-	-	-13	>20
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSDPA FDD5	low	peak	maxhold	100	822.6	-28.5	-13	15.5
HSDPA FDD5	low	peak	maxhold	100	871.6	-20.48	-13	7.48
HSDPA FDD5	mid	peak	maxhold	100	880	-19.73	-13	6.73
HSDPA FDD5	high	peak	maxhold	100	890	-18.61	-13	5.61
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSUPA FDD5	low	rms	maxhold	50	824	-28.74	-13	15.74
HSUPA FDD5	mid	-	-	-	-	-	-13	>20
HSUPA FDD5	high	rms	maxhold	50	849	-29.34	-13	16.34
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD5	low	rms	maxhold	5	824	-26.8	-13	13.8
eFDD5	mid	-	-	-	-	-	-13	>20
eFDD5	high	rms	maxhold	5	849	-26.34	-13	13.34

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C

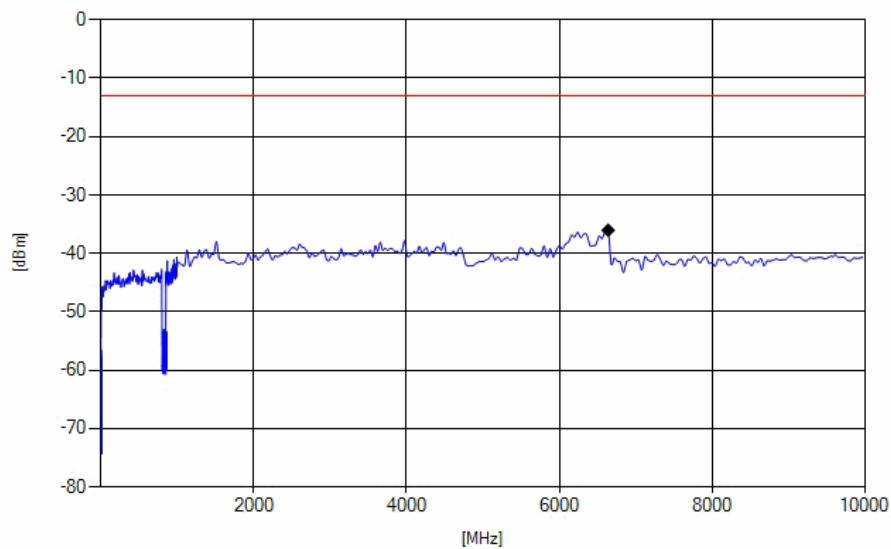


GSM850 Channel=low

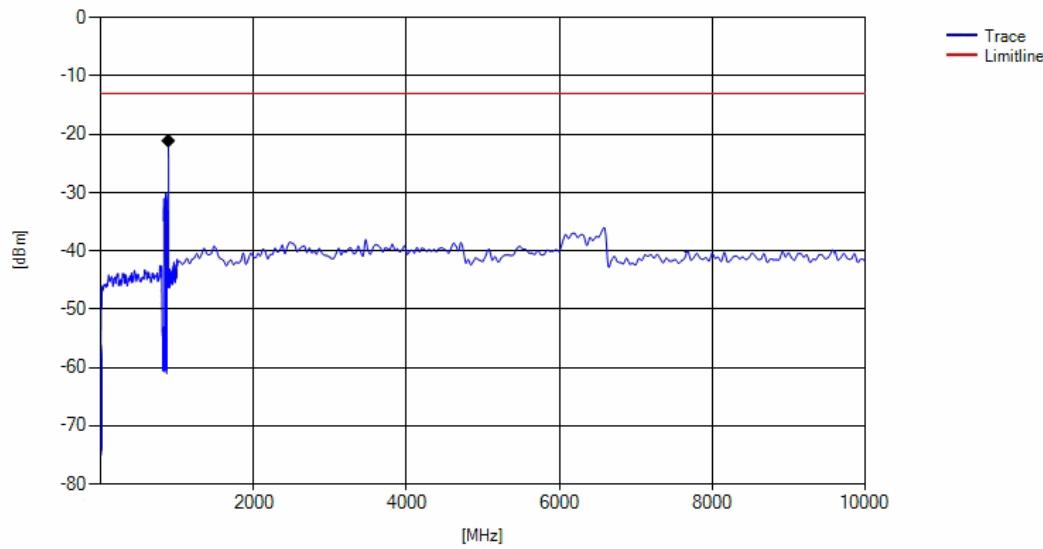


EDGE850 Channel=Low

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C

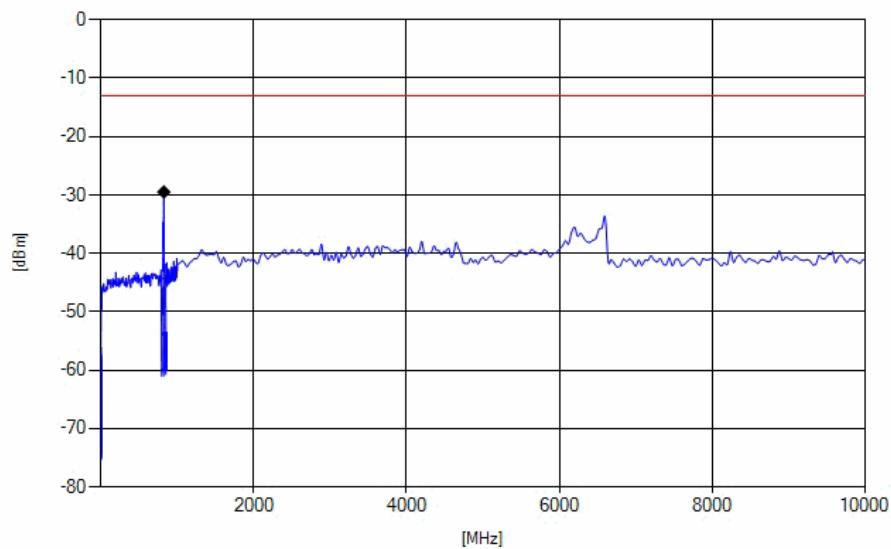


WCDMa FDD5 Channel=mid

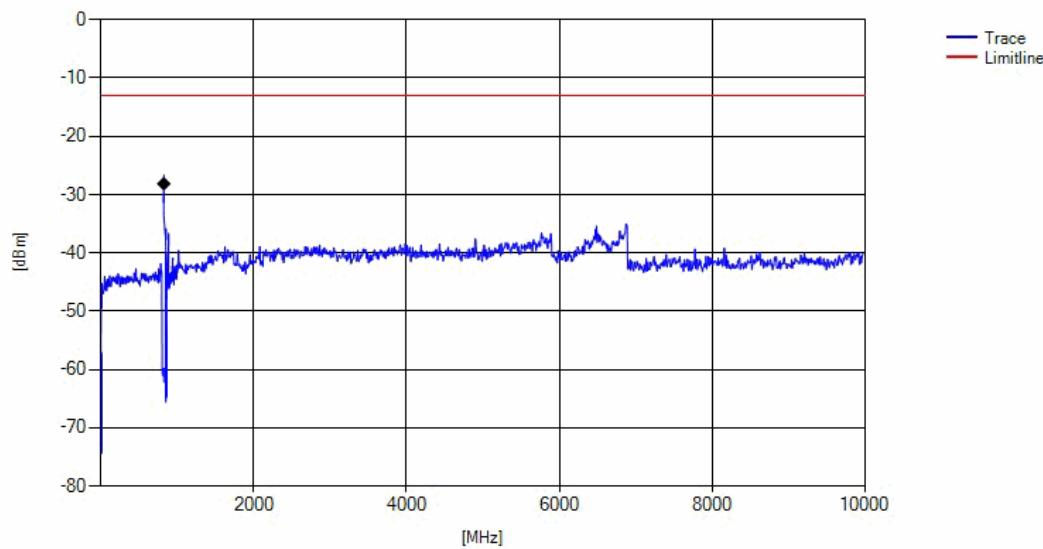


HSDPA Channel=High

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



HSUPA Channel=low



eFDD5 Channel=high

3.5.4 22.4 Field strength of spurious radiation §2.1053, §22.917

Test: 22.4; Field strength of spurious radiation Summary §2.1053, §22.917

Result: Passed

Setup No.: am06

Date of Test: 2017/06/14 14:39

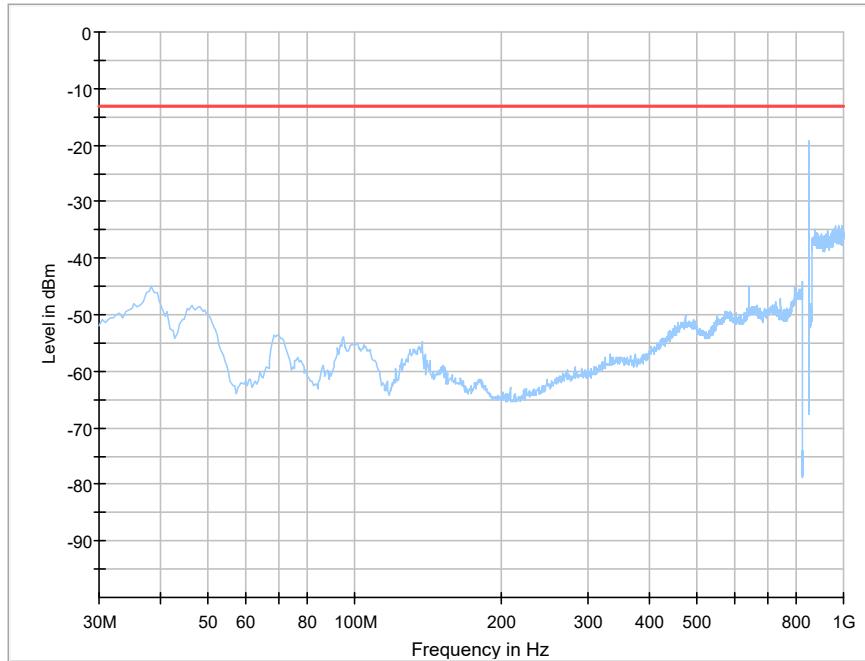
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

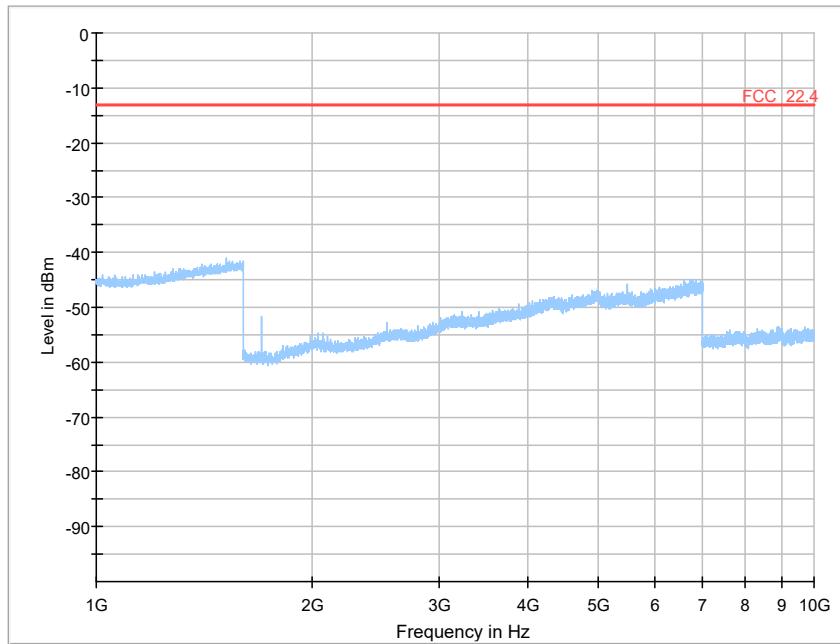
Detailed Results:

Mode: Test: 22.4; Frequency Band = 850, Mode = EDGE, Channel = 128, Frequency = 824.2MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 22.4; Frequency Band = 850, Mode = EDGE, Channel = 190, Frequency = 836.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 22.4; Frequency Band = 850, Mode = EDGE, Channel = 251, Frequency = 848.8MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
823.986	-18.74	-13	5.74	2000	3	150	H	45	0	-72.2
Mode: Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
849.015	-18.88	-13	5.88	2000	3	150	H	45	0	-72.7
849.022	-18.35	-13	5.35	2000	3	150	H	45	0	-72.7
849.034	-18.74	-13	5.74	2000	3	150	H	45	0	-72.7
Mode: Test: 22.4; Frequency Band = eFDD5, Mode = QPSK5MHz, Channel = 20425, Frequency = 826.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 22.4; Frequency Band = eFDD5, Mode = QPSK5MHz, Channel = 20525, Frequency = 836.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 22.4; Frequency Band = eFDD5, Mode = QPSK5MHz, Channel = 20625, Frequency = 846.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---

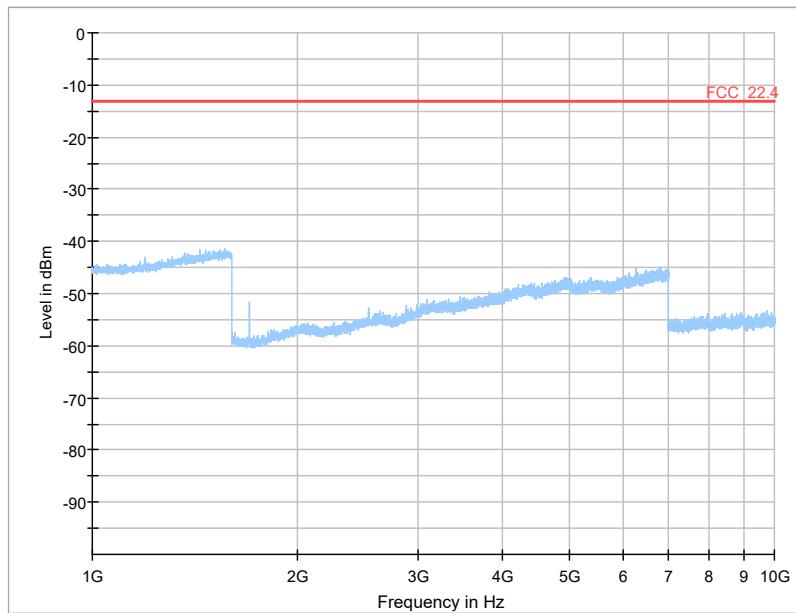
Mode: Test 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4132, Frequency = 826.4MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
823.995	- 15.96	- 13	2.96	1000	50	150	H	45	0	- 72.2
823.983	- 16.23	- 13	3.23	1000	50	150	H	45	0	- 72.2
823.996	- 16.63	- 13	3.63	1000	50	150	H	45	0	- 72.2
Mode: Test 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849.002	- 14.92	- 13	1.92	1000	50	150	H	- 135	0	- 72.7
849.003	- 16.17	- 13	3.17	1000	50	150	H	- 135	0	- 72.7
849.004	- 16.32	- 13	3.32	1000	50	150	H	- 135	0	- 72.7
849.005	- 16.73	- 13	3.73	1000	50	150	H	45	0	- 72.7
Mode: Test 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4132, Frequency = 826.4MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849	- 17.51	- 13	4.51	1000	50	150	H	- 135	0	- 72.7
Mode: Test 22.4; Frequency Band = FDD5, Mode = W- CDMA, Channel = 4132, Frequency = 826.4MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test 22.4; Frequency Band = FDD5, Mode = W- CDMA, Channel = 4183, Frequency = 836.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test 22.4; Frequency Band = FDD5, Mode = W- CDMA, Channel = 4233, Frequency = 846.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849.002	- 14.8	- 13	1.8	1000	50	150	H	- 135	0	- 72.7
849.003	- 16.14	- 13	3.14	1000	50	150	H	- 135	0	- 72.7
849.004	- 16.12	- 13	3.12	1000	50	150	H	- 135	0	- 72.7
849.005	- 15.56	- 13	2.56	1000	50	150	H	- 135	0	- 72.7
849.006	- 15.86	- 13	2.86	1000	50	150	H	- 135	0	- 72.7
849.007	- 16.49	- 13	3.49	1000	50	150	H	- 135	0	- 72.7



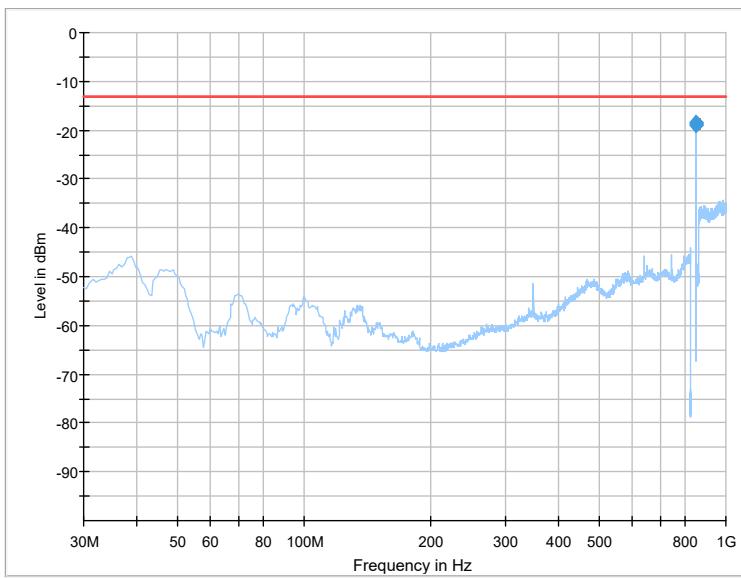
Mode: Test: 22.4; Frequency Band = 850, Mode = EDGE, Channel = 251, Frequency = 848.8MHz



Mode: Test: 22.4; Frequency Band = 850, Mode = EDGE, Channel = 251, Frequency = 848.8MHz



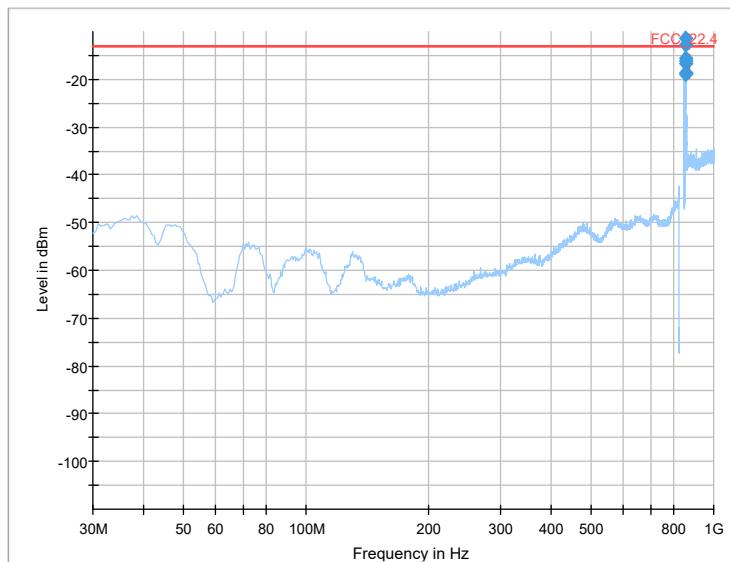
Mode: Test: 22.4; Frequency Band = 850, Mode =GSM, Channel = 251, Frequency = 848.8MHz



Final Result

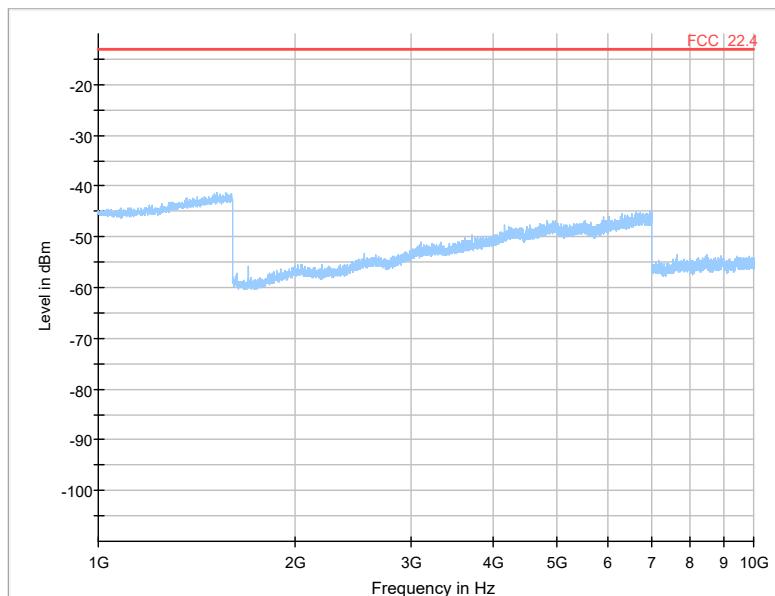
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849.015000	-18.88	-13.00	5.88	2000.0	3.000	150.0	H	45.0	0.0	-72.7
849.022000	-18.35	-13.00	5.35	2000.0	3.000	150.0	H	45.0	0.0	-72.7
849.034000	-18.74	-13.00	5.74	2000.0	3.000	150.0	H	45.0	0.0	-72.7

Mode: Test: 22.4; Frequency Band = 850, Mode =GSM, Channel = 251, Frequency = 848.8MHz

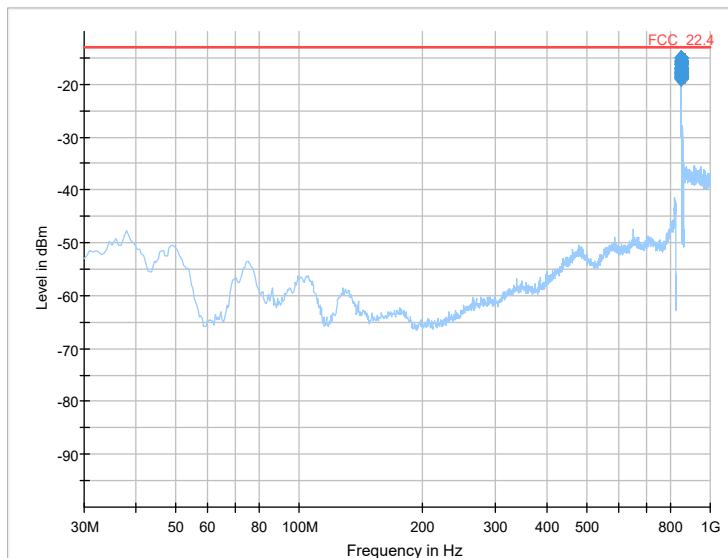


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
852.850000	-18.89	-13.00	5.89	2000.0	1000.000	150.0	H	-135.0	0.0	-72.5

Mode: Test: 22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20625, Frequency = 846.5MHz, Method = radiated



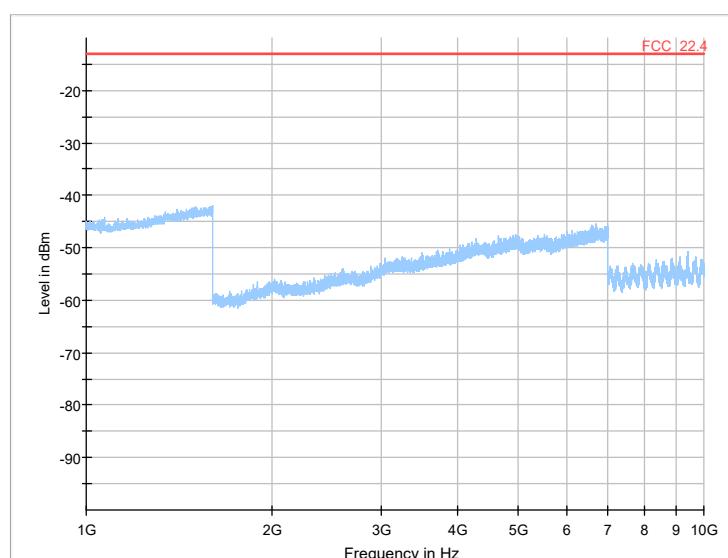
Mode: Test: 22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20625, Frequency = 846.5MHz, Method = radiated



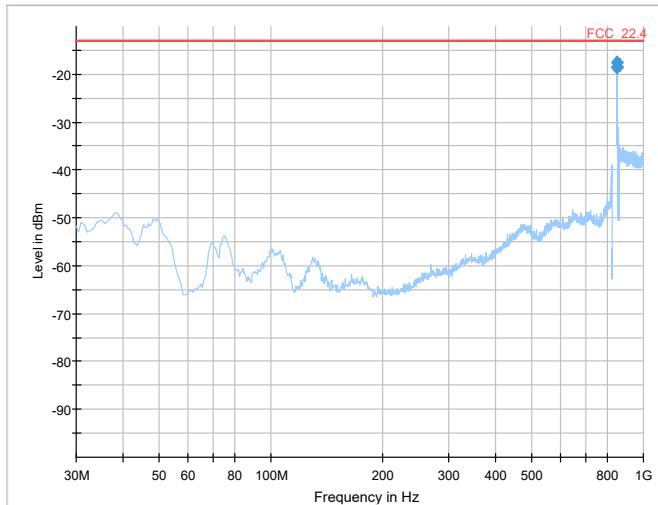
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849.000000	-17.61	-13.00	4.61	1000.0	50.000	150.0	H	45.0	0.0	-72.7
849.001000	-16.92	-13.00	3.92	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.002000	-14.92	-13.00	1.92	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.003000	-16.17	-13.00	3.17	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.004000	-16.32	-13.00	3.32	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.005000	-16.73	-13.00	3.73	1000.0	50.000	150.0	H	45.0	0.0	-72.7
849.006000	-15.14	-13.00	2.14	1000.0	50.000	150.0	H	45.0	0.0	-72.7

Mode: Test: 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz



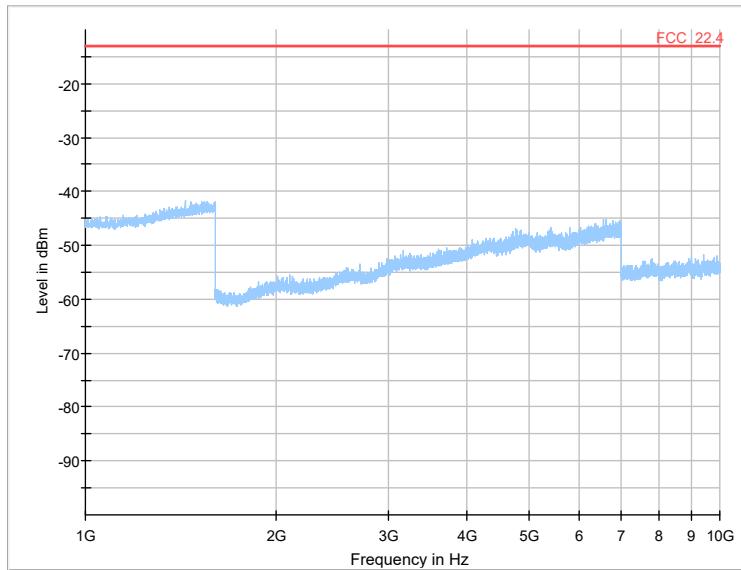
Mode: Test: 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz



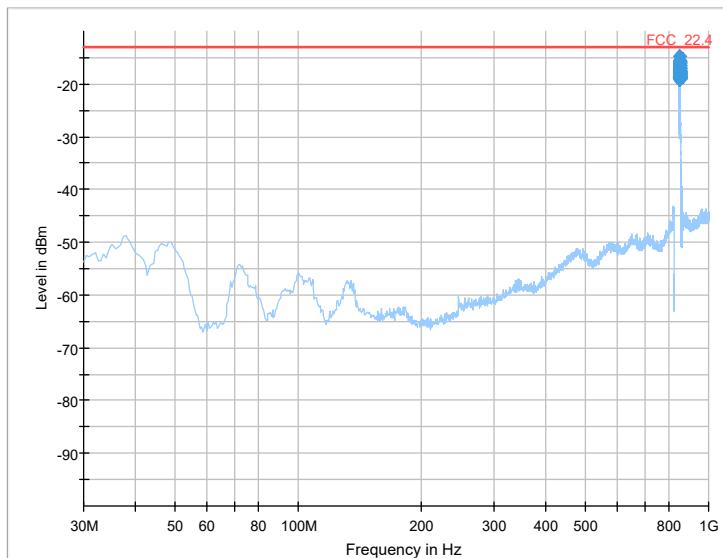
Final Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849.000000	-17.51	-13.00	4.51	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.001000	-18.58	-13.00	5.58	1000.0	50.000	150.0	H	45.0	0.0	-72.7
849.010000	-18.57	-13.00	5.57	1000.0	50.000	150.0	H	45.0	0.0	-72.7

Mode: Test: 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz



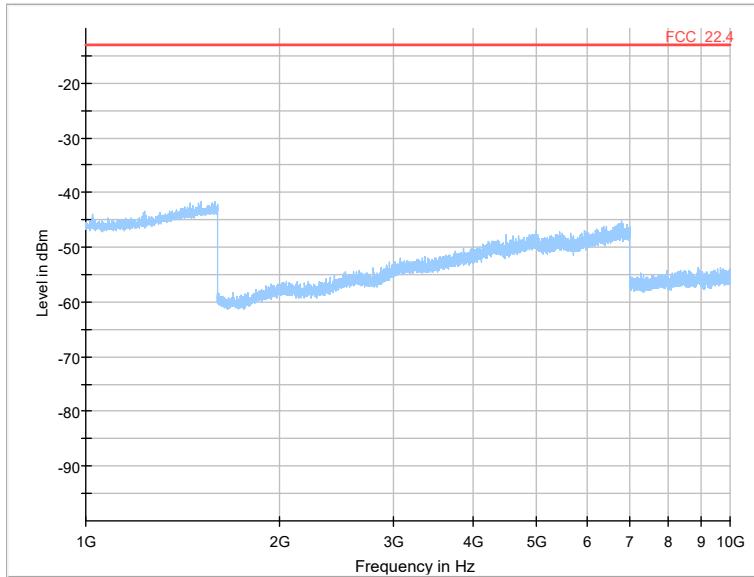
Mode: Test: 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
849.000000	-16.07	-13.00	3.07	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.001000	-16.43	-13.00	3.43	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.002000	-14.80	-13.00	1.80	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.003000	-16.14	-13.00	3.14	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.004000	-16.12	-13.00	3.12	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.005000	-15.56	-13.00	2.56	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.006000	-15.86	-13.00	2.86	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.007000	-16.49	-13.00	3.49	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.008000	-16.86	-13.00	3.86	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.009000	-16.43	-13.00	3.43	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.010000	-16.71	-13.00	3.71	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.011000	-15.86	-13.00	2.86	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.012000	-16.92	-13.00	3.92	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.013000	-16.10	-13.00	3.10	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.014000	-18.13	-13.00	5.13	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.015000	-16.50	-13.00	3.50	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.016000	-16.45	-13.00	3.45	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.017000	-17.57	-13.00	4.57	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.018000	-17.87	-13.00	4.87	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.019000	-17.66	-13.00	4.66	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.020000	-18.76	-13.00	5.76	1000.0	50.000	150.0	V	0.0	90.0	-73.5
849.021000	-16.70	-13.00	3.70	1000.0	50.000	150.0	V	0.0	90.0	-73.5
849.022000	-18.01	-13.00	5.01	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.023000	-15.86	-13.00	2.86	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.024000	-18.09	-13.00	5.09	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.025000	-17.63	-13.00	4.63	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.026000	-17.52	-13.00	4.52	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.027000	-17.05	-13.00	4.05	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.028000	-17.31	-13.00	4.31	1000.0	50.000	150.0	H	-135.0	0.0	-72.7
849.029000	-18.92	-13.00	5.92	1000.0	50.000	150.0	H	-135.0	0.0	-72.7

Mode: Test: 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4233, Frequency = 846.6MHz



Mode: Test: 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4233, Frequency = 846.6MHz

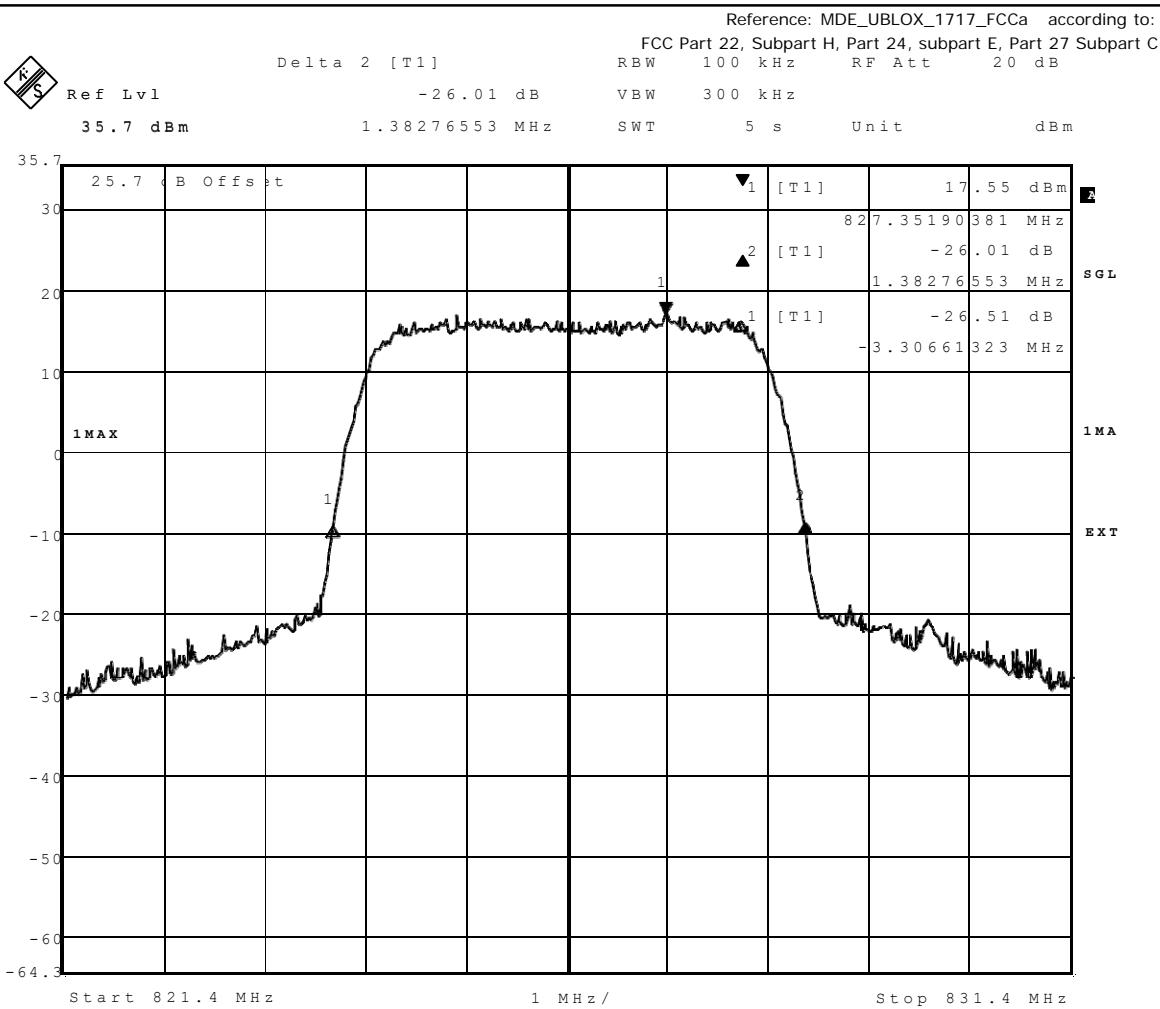
3.5.5 22.5 Emission and Occupied Bandwidth §2.1049, §22.917

Test: 22.5; _Emission and Occupied Bandwidth Summary §2.1049, §22.917

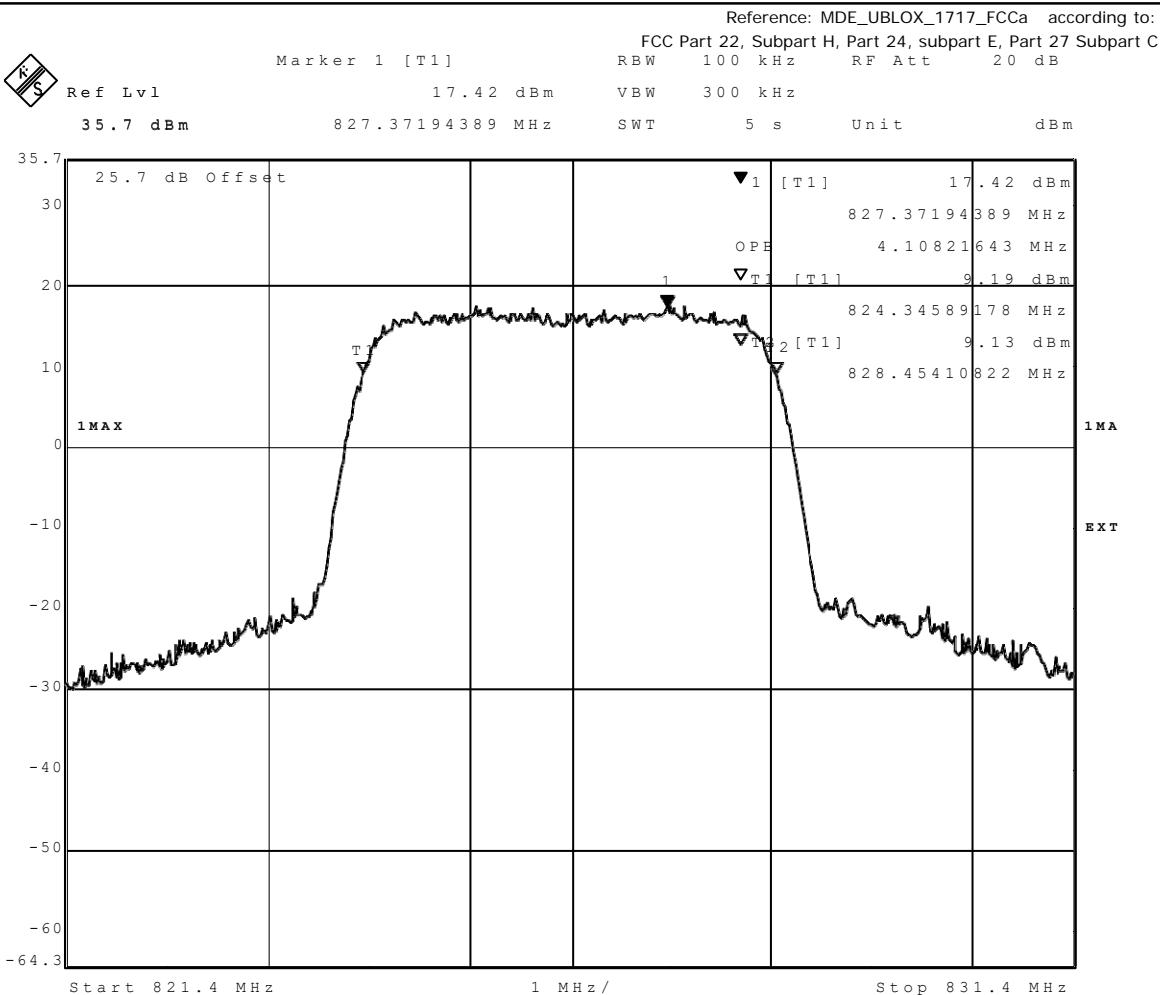
<i>Result:</i>	Passed
<i>Setup No.:</i>	am06
<i>Date of Test:</i>	2017/06/23 10:05
<i>Body:</i>	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
<i>Test Specification:</i>	FCC part 2 and 22

Detailed Results:

Radio Technology	Channel	Resource Blocks	Band width [MHz]	Nominal BW [MHz]	26 dB BW [kHz]	99 % BW [kHz]
GSM 850	low	-	0.2	0.2	318.64	240.48
GSM 850	mid	-	0.2	0.2	318.64	242.48
GSM 850	high	-	0.2	0.2	314.63	242.48
GSM 850 GPRS	low	-	0.2	0.2	314.63	244.49
GSM 850 GPRS	mid	-	0.2	0.2	314.63	244.49
GSM 850 GPRS	high	-	0.2	0.2	314.63	242.48
GSM 850 EDGE	low	-	0.2	0.2	278.56	226.45
GSM 850 EDGE	mid	-	0.2	0.2	276.55	226.45
GSM 850 EDGE	high	-	0.2	0.2	280.56	232.46
FDD V	low	-	5	5	4689.38	4088.18
FDD V	mid	-	5	5	4689.38	4088.18
FDD V	high	-	5	5	4709.42	4088.18
FDD V HSDPA Subtest 1	low	-	5	5	4709.42	4088.18
FDD V HSDPA Subtest 1	mid	-	5	5	4669.34	4088.18
FDD V HSDPA Subtest 1	high	-	5	5	4709.42	4068.14
FDD V HSUPA Subtest 1	low	-	5	5	4689.38	4108.22
FDD V HSUPA Subtest 1	mid	-	5	5	4689.38	4088.18
FDD V HSUPA Subtest 1	high	-	5	5	4709.42	4088.18
FDD V HSUPA Subtest 5	low	-	5	5	4709.42	4088.18
FDD V HSUPA Subtest 5	mid	-	5	5	4689.34	4088.18
FDD V HSUPA Subtest 5	high	-	5	5	4709.42	4108.22
eFDD 5 QPSK	low	6	1.4	1.4	-	1106.21
eFDD 5 QPSK	mid	6	1.4	1.4	-	1106.21
eFDD 5 QPSK	high	6	1.4	1.4	-	1118.24
eFDD 5 16QAM	low	6	1.4	1.4	-	1118.24
eFDD 5 16QAM	mid	6	1.4	1.4	-	1106.21
eFDD 5 16QAM	high	6	1.4	1.4	-	1100.2
eFDD 5 QPSK	low	15	3	3	-	2741.48
eFDD 5 QPSK	mid	15	3	3	-	2741.48
eFDD 5 QPSK	high	15	3	3	-	2741.48
eFDD 5 16QAM	low	15	3	3	-	2729.46
eFDD 5 16QAM	mid	15	3	3	-	2741.48
eFDD 5 16QAM	high	15	3	3	-	2753.51
eFDD 5 QPSK	low	25	5	5	-	4549.1
eFDD 5 QPSK	mid	25	5	5	-	4529.06
eFDD 5 QPSK	high	25	5	5	-	4529.06
eFDD 5 16QAM	low	25	5	5	-	4549.1
eFDD 5 16QAM	mid	25	5	5	-	4549.1
eFDD 5 16QAM	high	25	5	5	-	4529.06
eFDD 5 QPSK	low	50	10	10	-	9058.12
eFDD 5 QPSK	mid	50	10	10	-	9058.12
eFDD 5 QPSK	high	50	10	10	-	9058.12
eFDD 5 16QAM	low	50	10	10	-	9018.04
eFDD 5 16QAM	mid	50	10	10	-	9058.12
eFDD 5 16QAM	high	50	10	10	-	9018.04



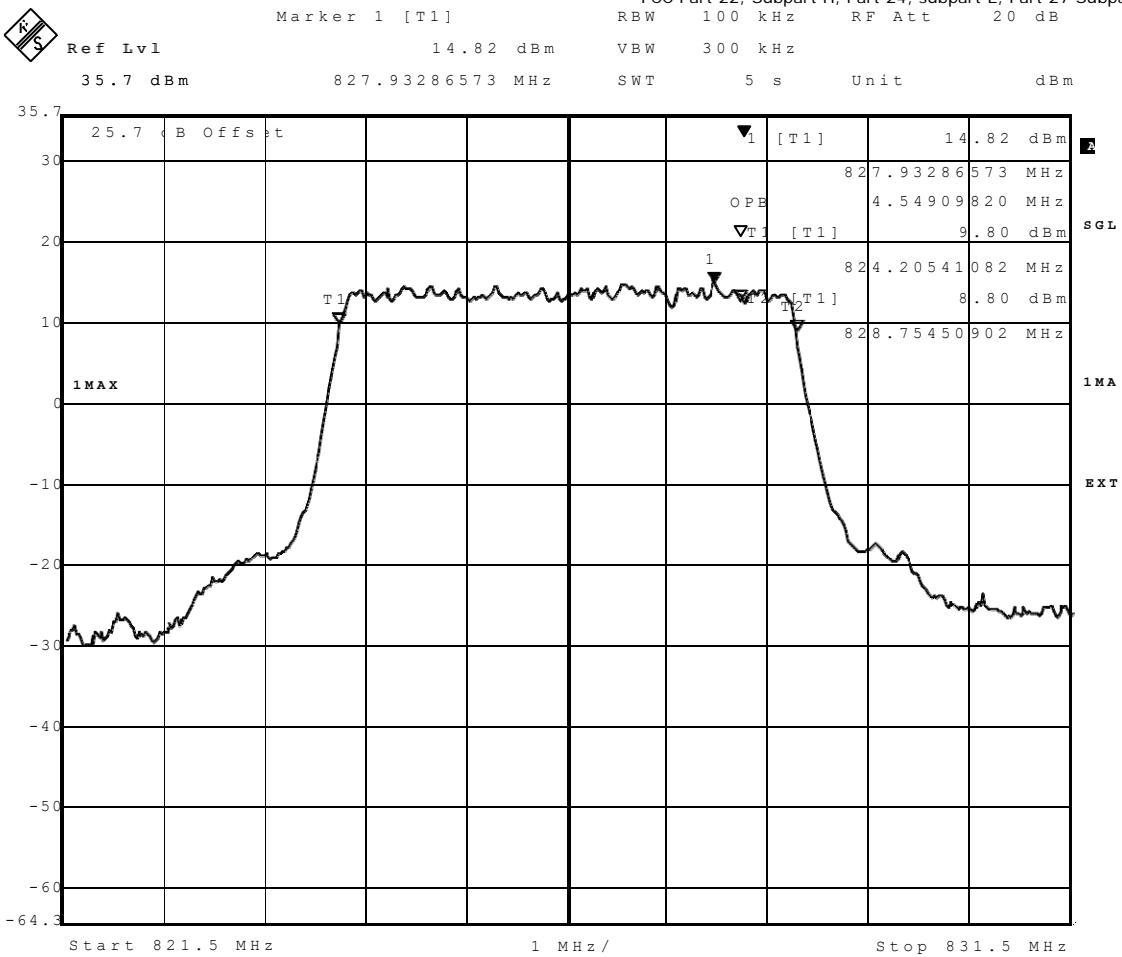
26dB: HSUPA FDD5 SUB1 Channel=low



Date: 26.JUN.2017 09:13:29

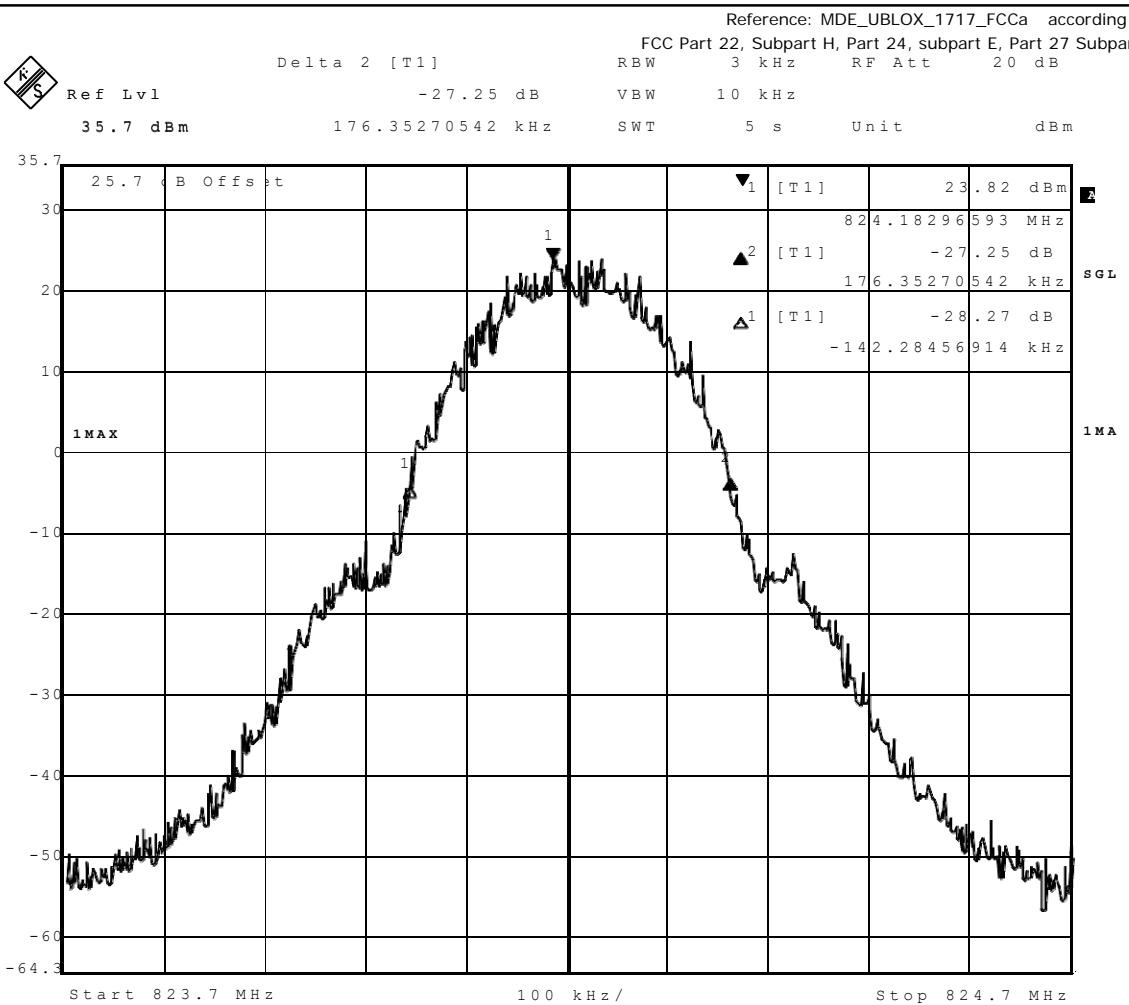
99%: HSUPA FDD5 SUB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C
 RBW 100 kHz RF Att 20 dB



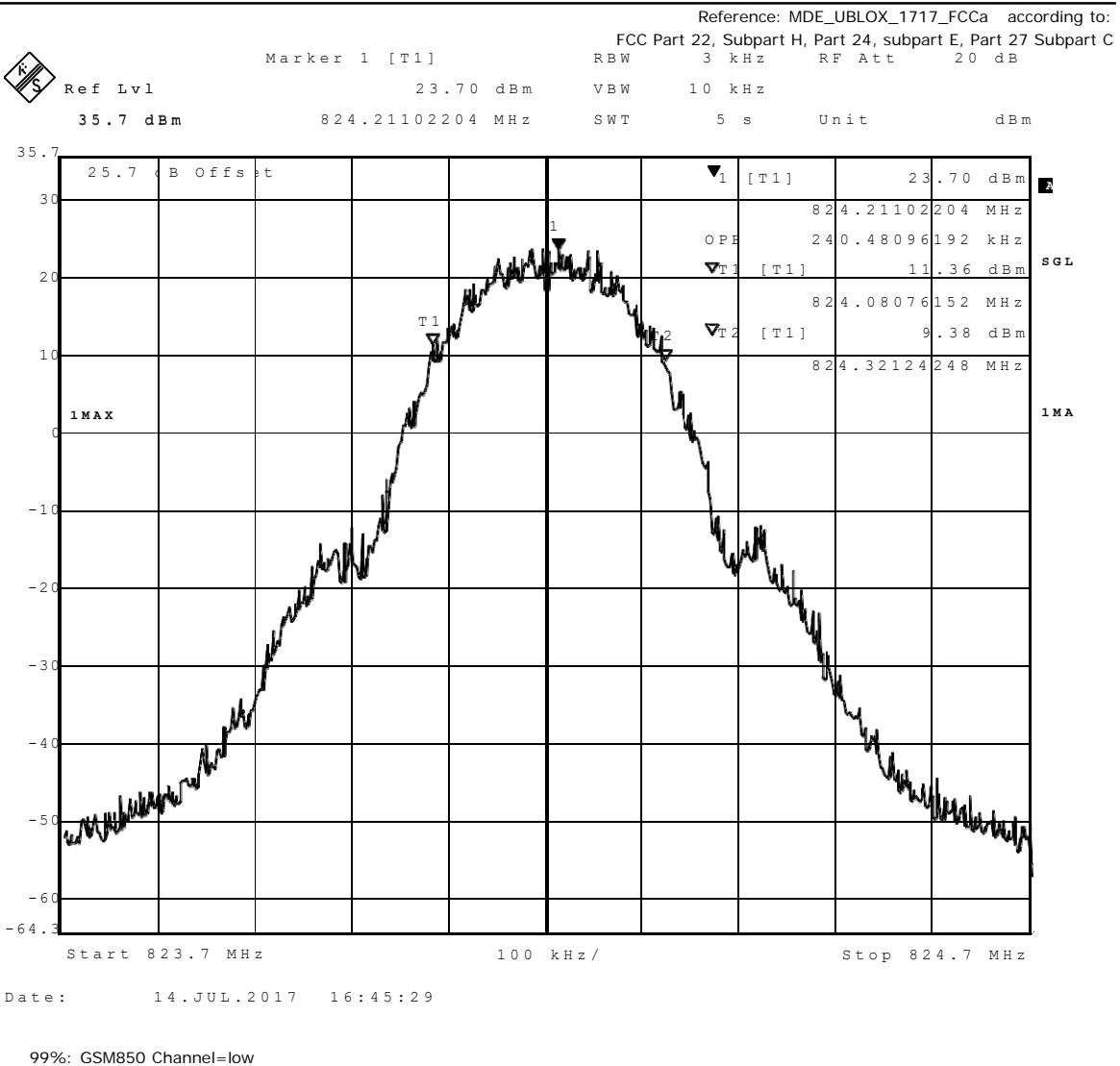
Date: 22.JUN.2017 13:13:39

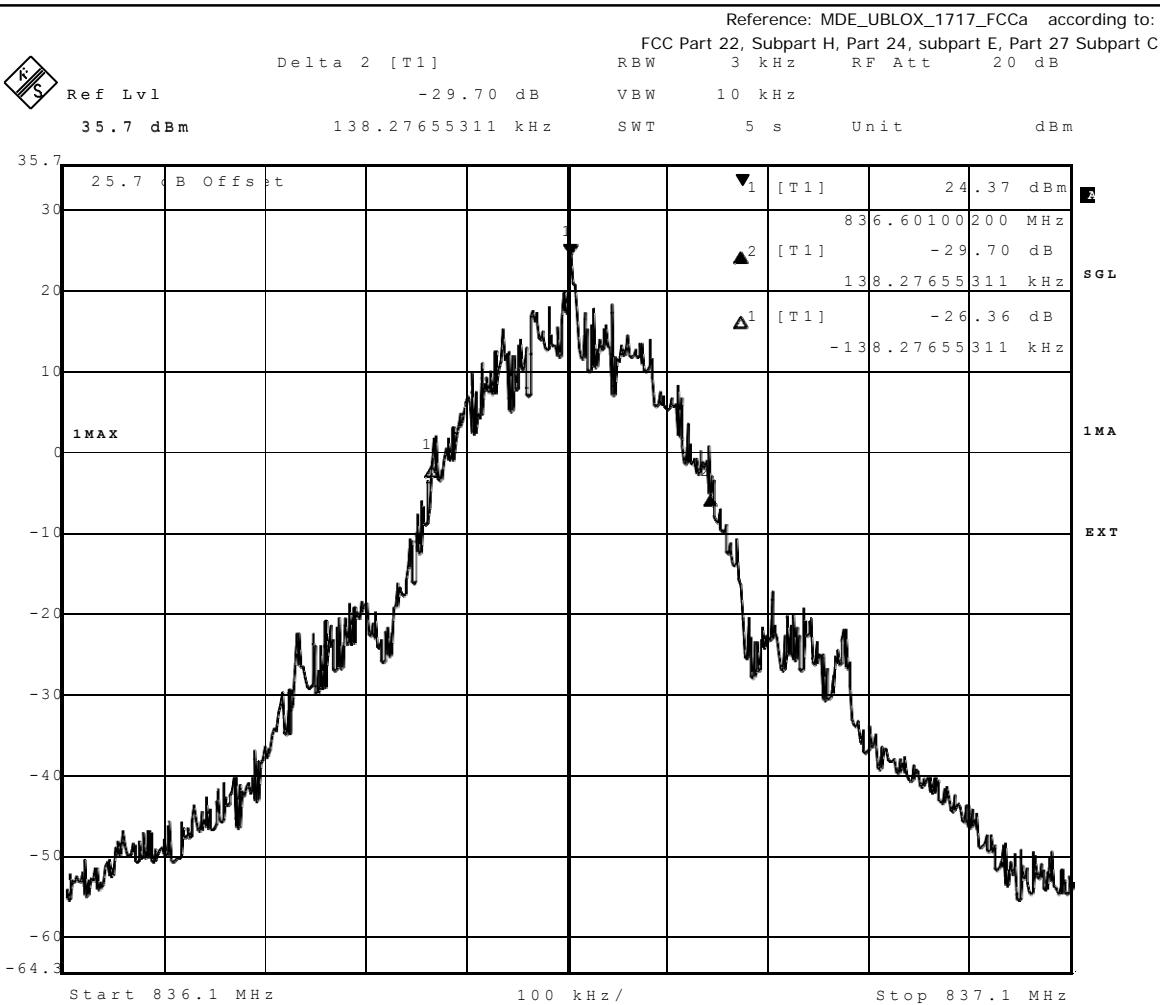
99%: eFDD5 QPSK 5MHz RB25 Channel=low



Date: 14.JUL.2017 16:46:03

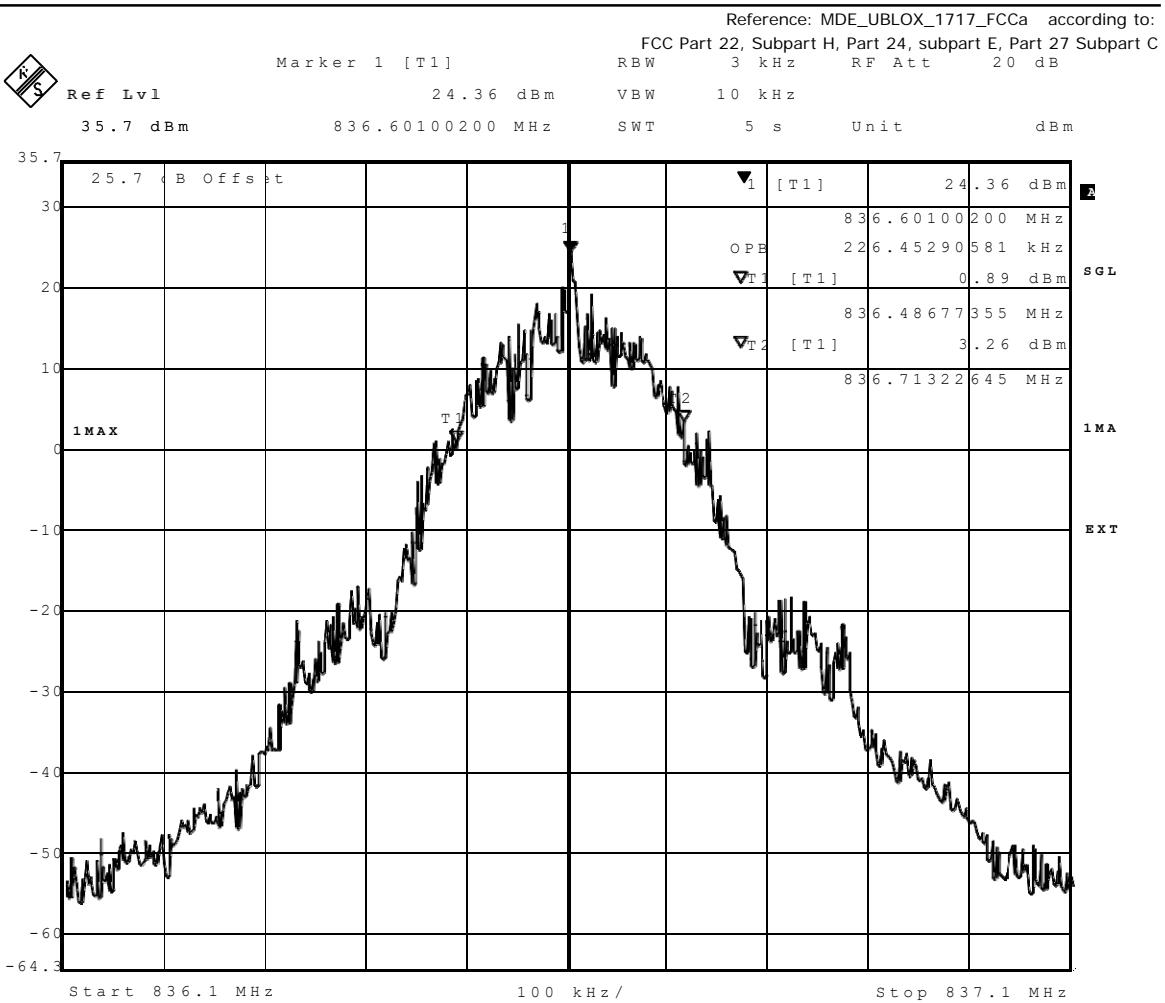
26dB: GSM850 Channel=low





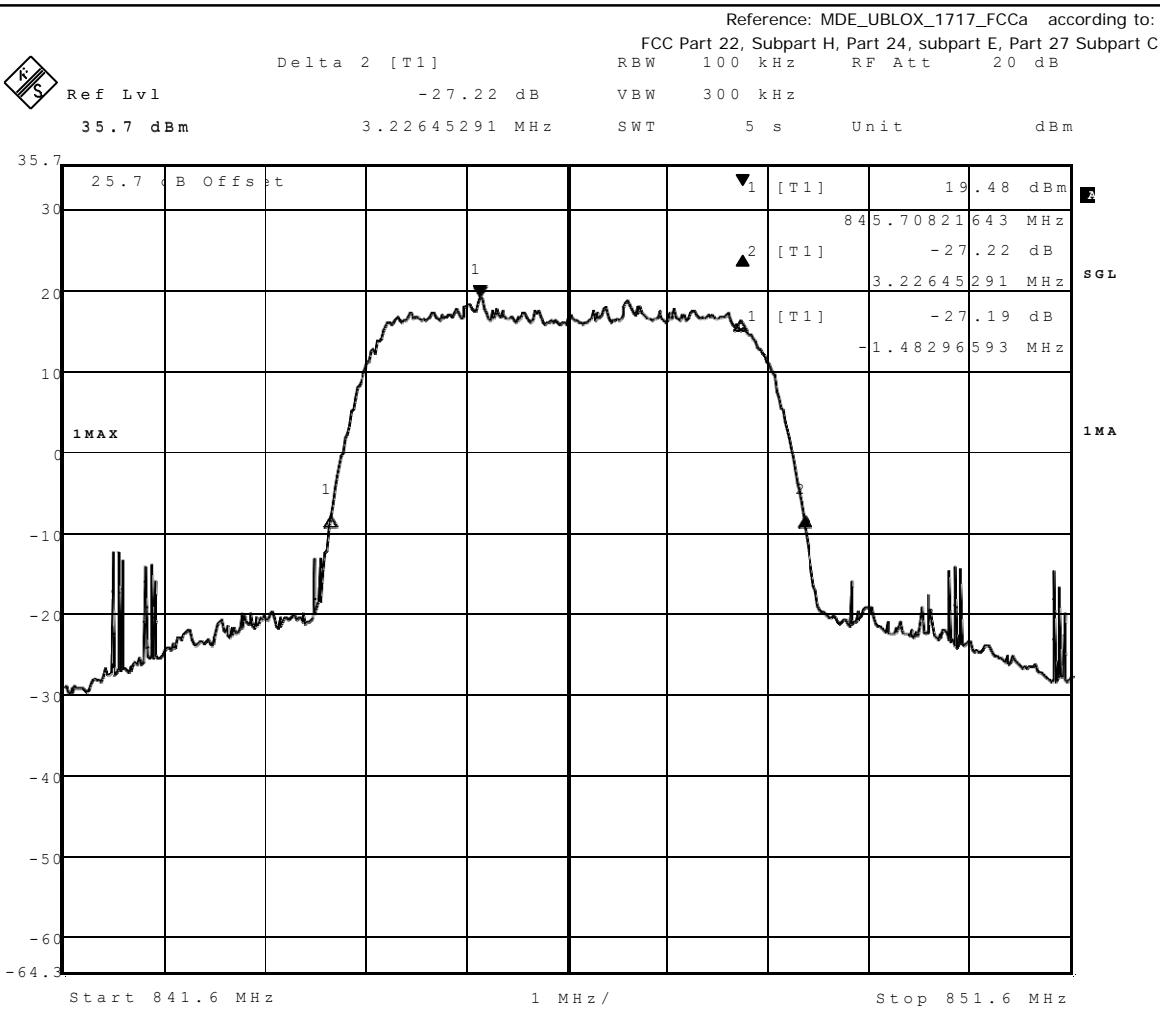
Date: 26.JUN.2017 13:48:33

26dB: EDGE850 Channel=mid



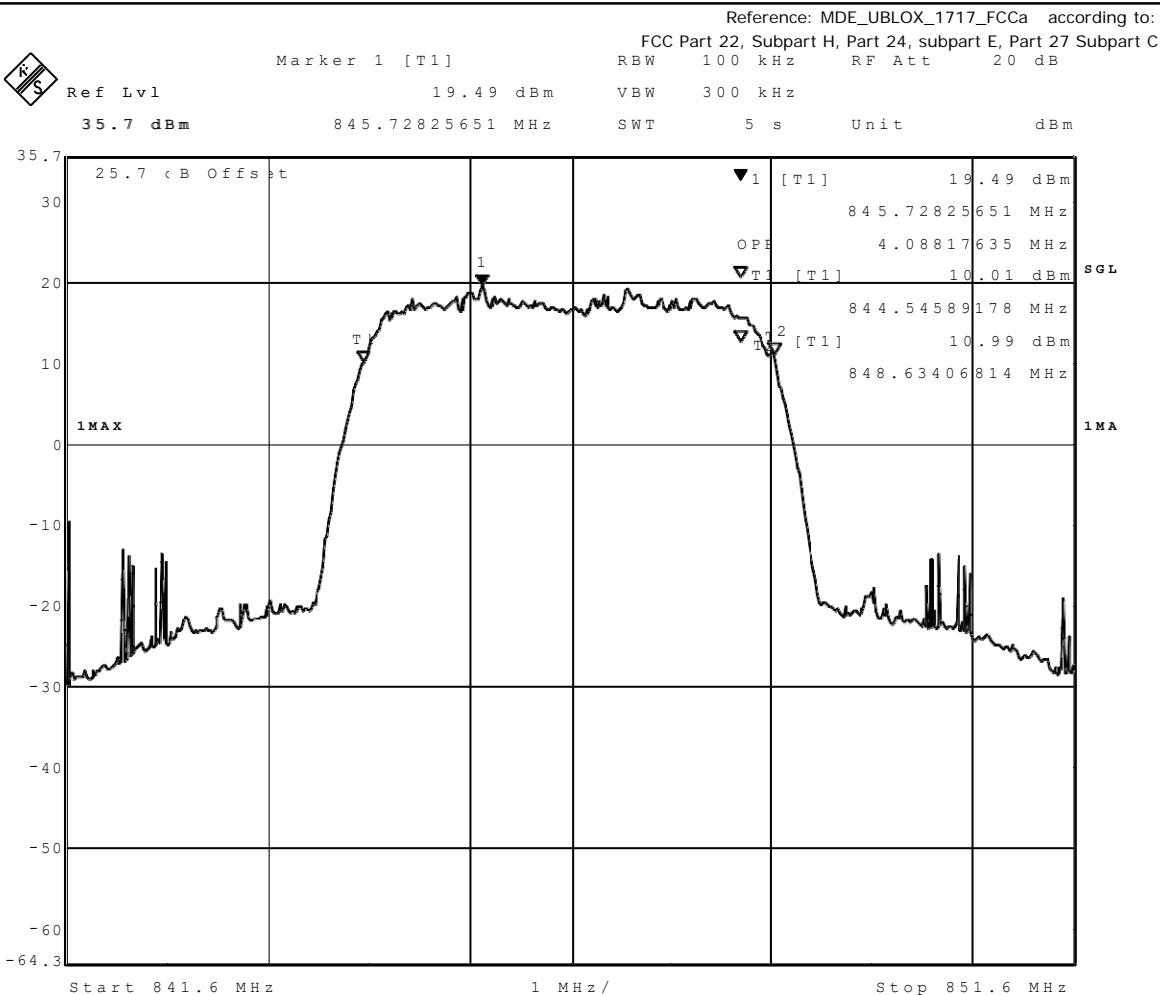
Date: 26.JUN.2017 13:48:00

99%: EDGE850 Channel=mid

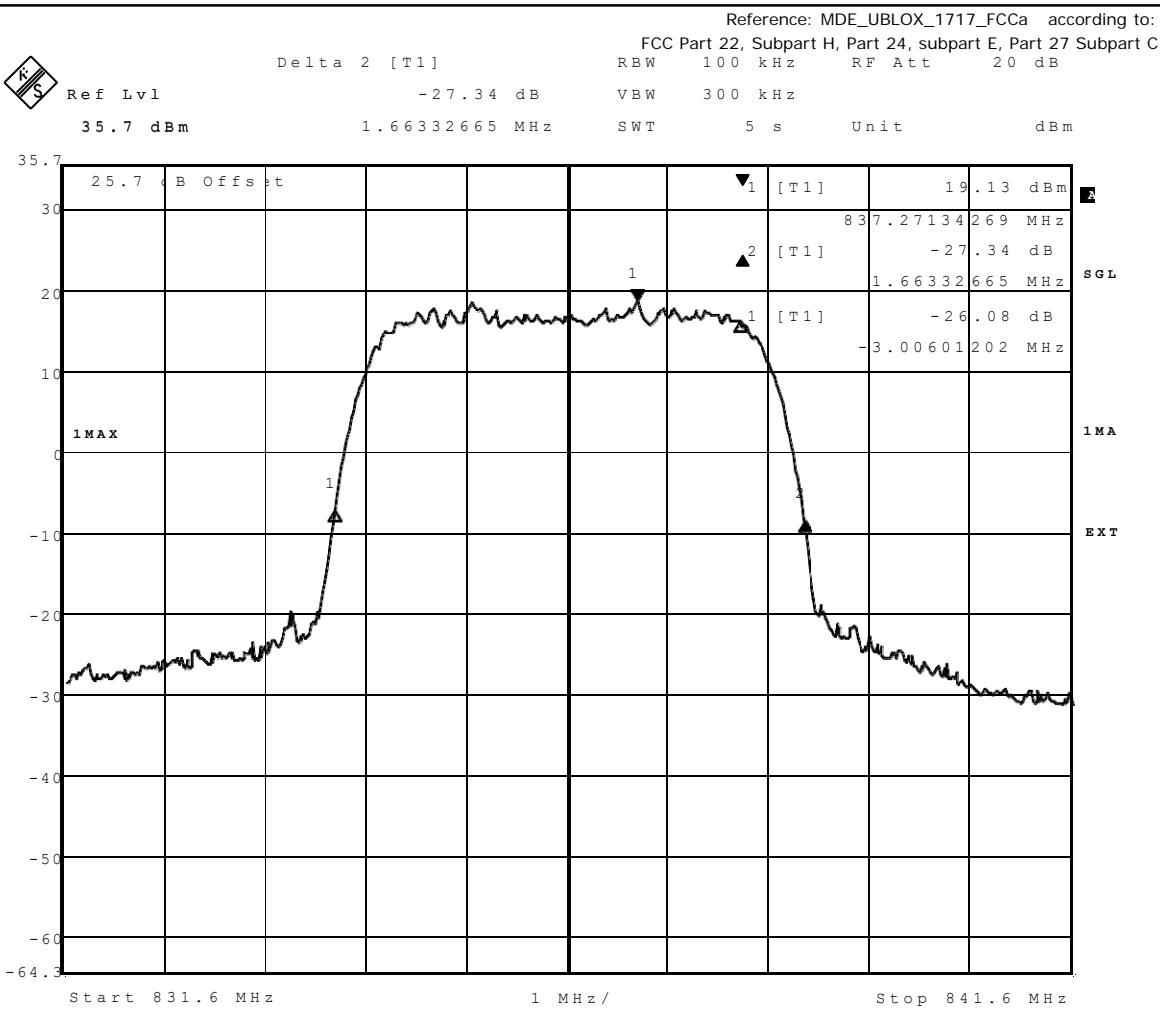


Date: 14.JUL.2017 16:08:35

26dB: WCDMa FDD5 Channel=high

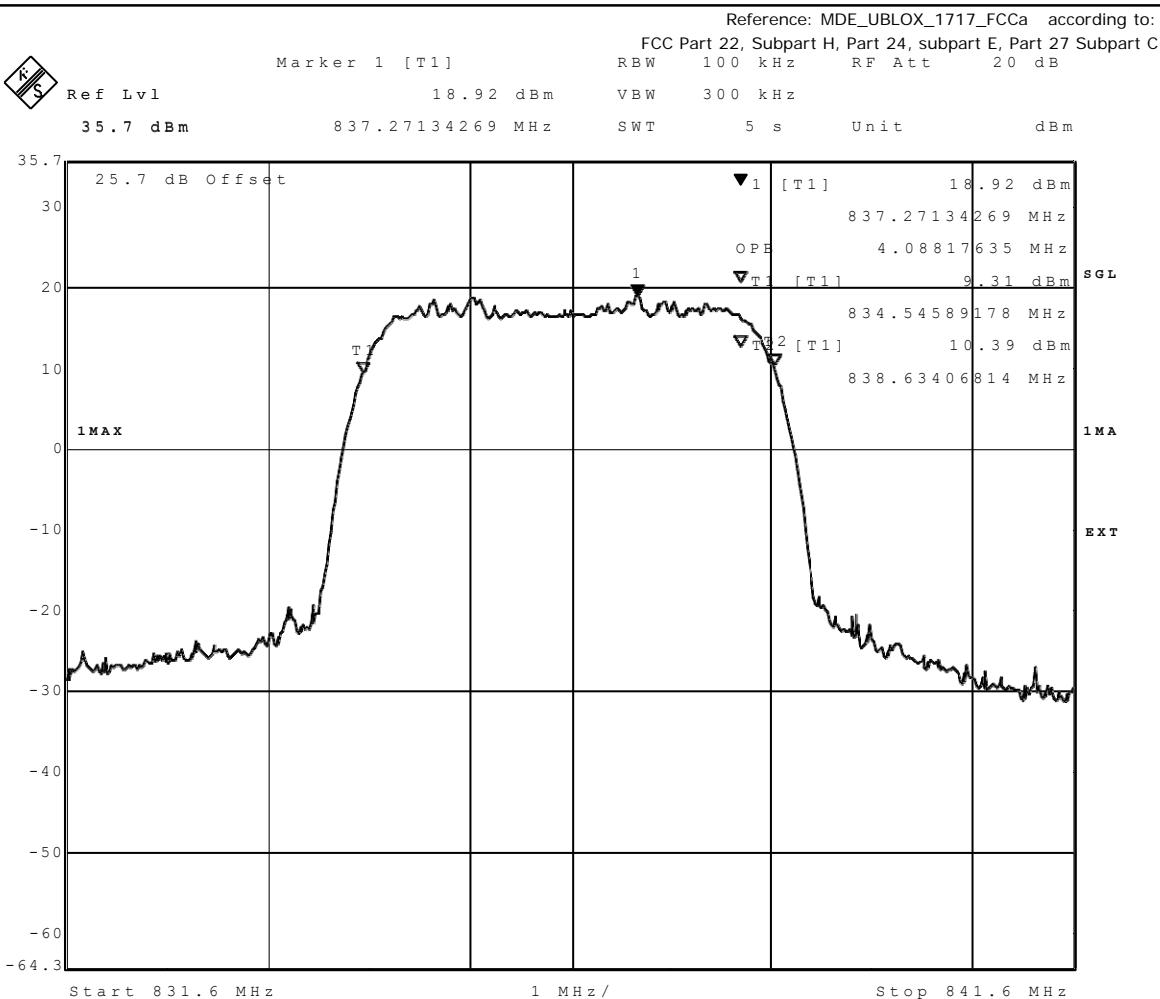


99%: WCDMA FDD5 Channel=low



Date: 26.JUN.2017 12:42:42

26dB: HSDPA FDD5 SUB1 Channel=mid



Date: 26.JUN.2017 12:42:10

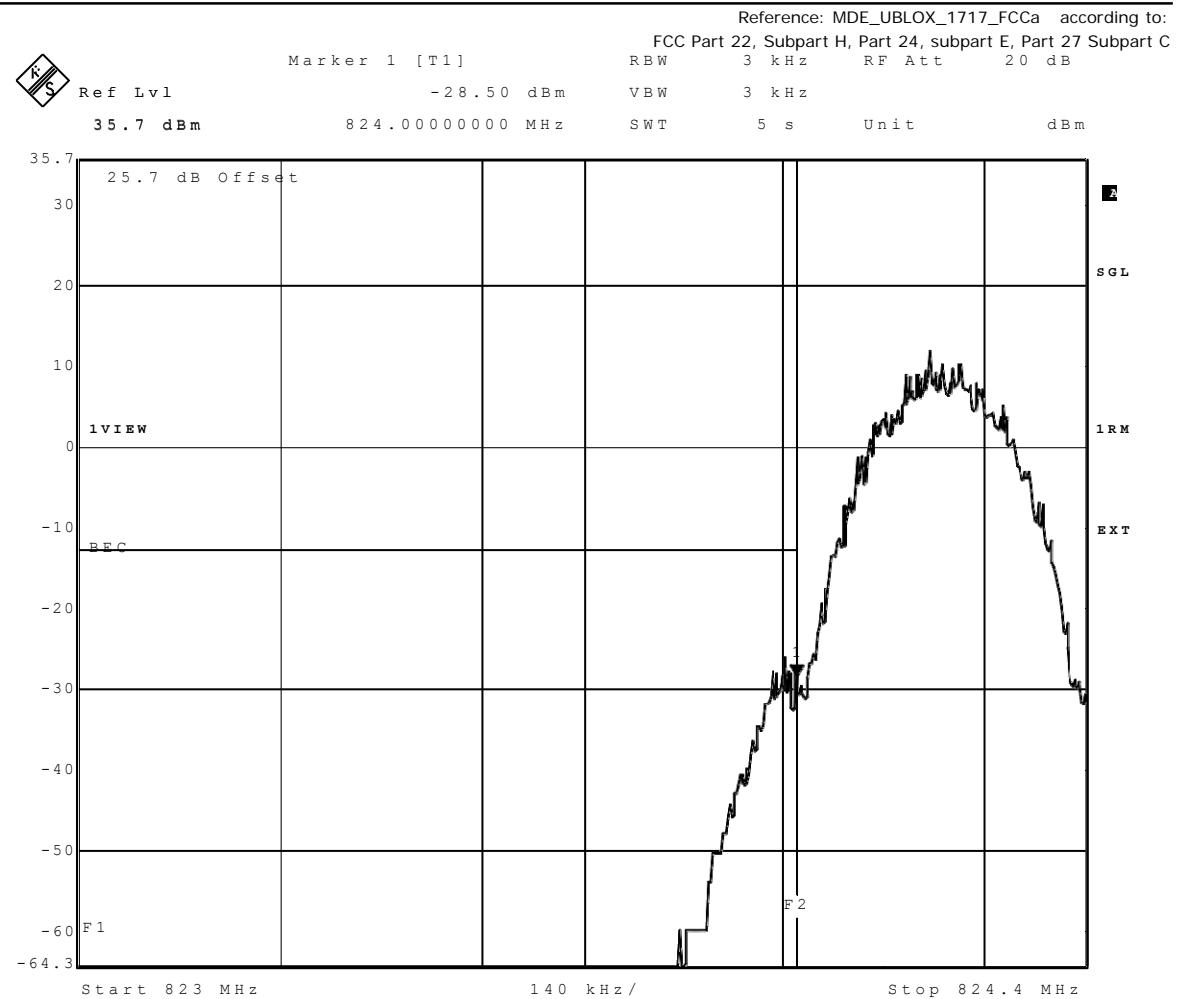
99%: HSDPA FDD5 SUB1 Channel=mid

3.5.6 22.6 Band edge compliance §2.1053, §22.917
Test: 22.6; _Band edge compliance Summary §2.1053, §22.917

Result: Passed
Setup No.: am06
Date of Test: 2017/06/23 10:41
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification: FCC part 2 and 22

Detailed Results:

Radio Technology	Channel	Nominal BW	Resource Blocks	Peak [dBm]	Average [dBm]	RMS [dBm]	Limit [dBm]	Margin to Limit [dB]
GSM 850	low	0.2	-	-17.2	-39.04	-28.5	-13	4.21
GSM 850	high	0.2	-	-18.3	-41.8	-30.9	-13	5.29
GSM 850 GPRS	low	0.2	-	-19.3	-34.76	-29.2	-13	6.27
GSM 850 GPRS	high	0.2	-	-19.1	-40.78	-32.3	-13	6.05
GSM 850 EDGE	low	0.2	-	-21.2	-39.87	-31.6	-13	8.19
GSM 850 EDGE	high	0.2	-	-24.8	-42.96	-35.8	-13	11.84
FDD V	low	5	-	-16.6	-27	-26.4	-13	13.42
FDD V	high	5	-	-20.1	-29.5	-28.7	-13	15.74
FDD V HSDPA Subtest 1	low	5	-	-18.9	-27.2	-26.2	-13	13.24
FDD V HSDPA Subtest 1	high	5	-	-19.3	-29.5	-28.7	-13	15.74
FDD V HSUPA Subtest 1	low	5	-	-19.7	-28.5	-27.8	-13	14.82
FDD V HSUPA Subtest 1	high	5	-	-21.9	-30.92	-29.8	-13	16.76
FDD V HSUPA Subtest 5	low	5	-	-20	-28.74	-27.8	-13	14.82
FDD V HSUPA Subtest 5	high	5	-	-21.1	-30.92	-30	-13	17.04
eFDD 5 QPSK	low	1.4	6	-15.3	-28.21	-26.8	-13	13.76
eFDD 5 QPSK	high	1.4	6	-17.8	-27.93	-26.9	-13	13.94
eFDD 5 16QAM	low	1.4	6	-16.5	-29.5	-27.8	-13	14.82
eFDD 5 16QAM	high	1.4	6	-17.4	-28.98	-27.8	-13	14.82
eFDD 5 QPSK	low	3	15	-28.5	-31.24	-29	-13	15.98
eFDD 5 QPSK	high	3	15	-18	-31.24	-29.5	-13	16.5
eFDD 5 16QAM	low	3	15	-18.1	-31.91	-29.8	-13	16.76
eFDD 5 16QAM	high	3	15	-19.5	-32.26	-30.6	-13	17.62
eFDD 5 QPSK	low	5	25	-15.5	-32.63	-29.2	-13	16.24
eFDD 5 QPSK	high	5	25	-18	-32.26	-30	-13	17.04
eFDD 5 16QAM	low	5	25	-16.4	-33.84	-30.6	-13	17.62
eFDD 5 16QAM	high	5	25	-17.3	-32.63	-30.6	-13	17.62
eFDD 5 QPSK	low	10	50	-13.3	-33.84	-30	-13	17.04
eFDD 5 QPSK	high	10	50	-15.3	-32.26	-30.3	-13	17.32
eFDD 5 16QAM	low	10	50	-16.9	-35.26	-31.6	-13	18.57
eFDD 5 16QAM	high	10	50	-16.9	-33.02	-31.2	-13	18.24



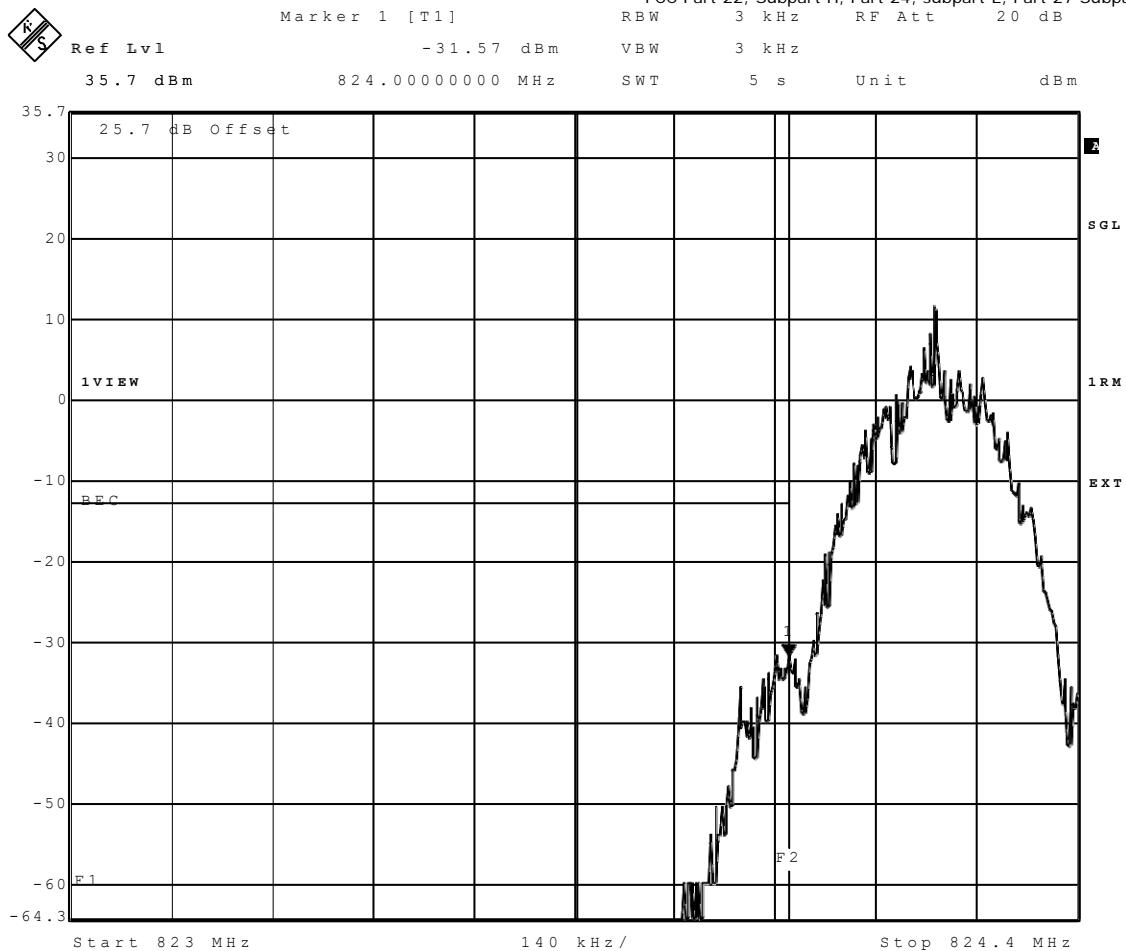
Date : 23.JUN.2017 09:10:25

GSM850 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 3 kHz RF Att 20 dB



Date: 26.JUN.2017 15:27:06

EDGE850 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 50 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-26.42 dBm

VBW 50 kHz

SWT

5 s

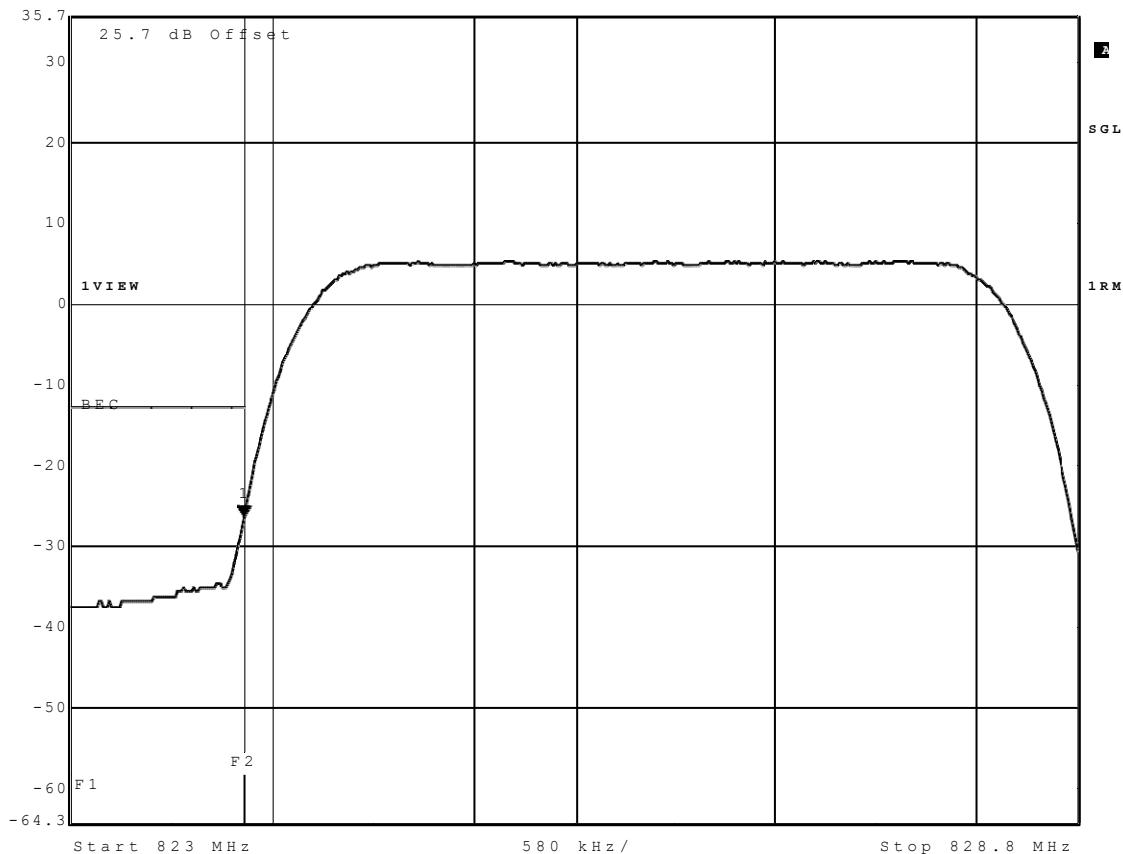
Unit

dBm

35.7 dBm

824.00000000 MHz

dBm



Date: 14.JUL.2017 16:02:35

WCDMA FDD5 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 50 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-26.24 dBm

VBW 50 kHz

SWT

5 s

Unit

dBm

35.7 dBm

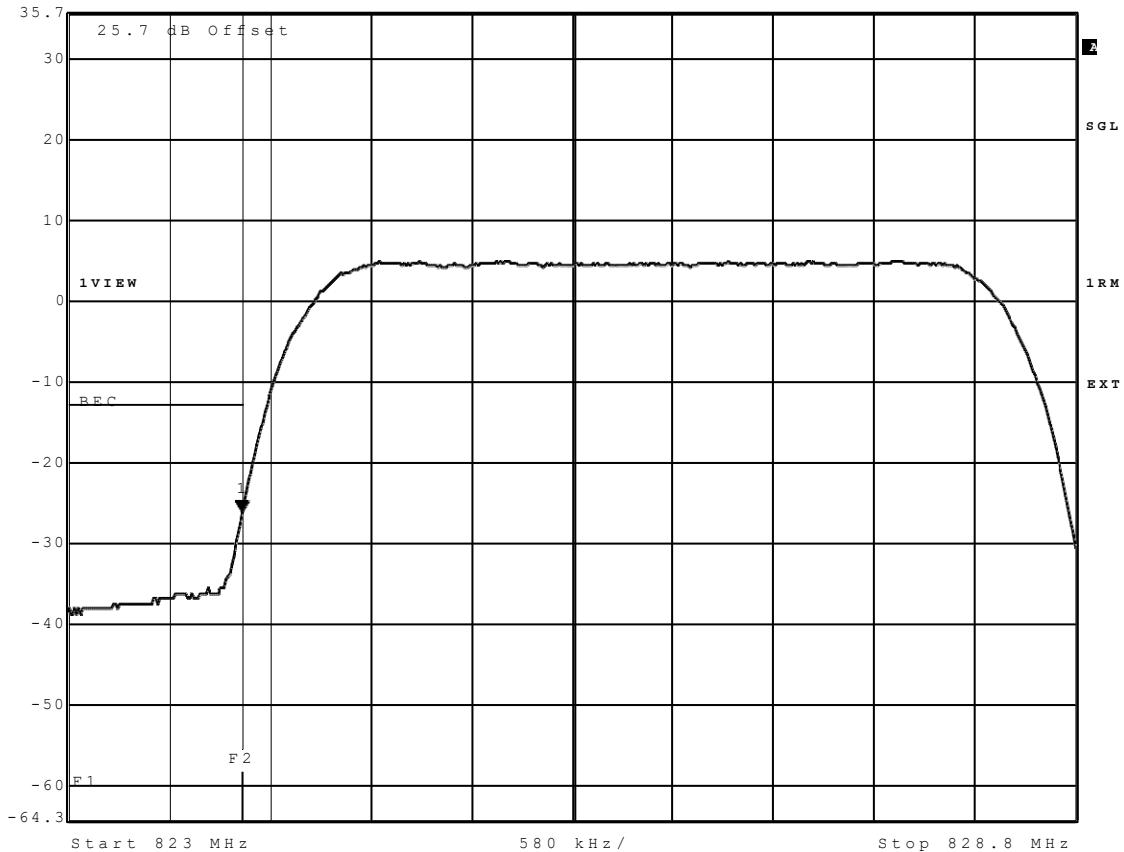
824.00000000 MHz

SWT

5 s

Unit

dBm



Date: 26.JUN.2017 12:49:08

HSDPA FDD5 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 50 kHz

RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-27.82 dBm

VBW 50 kHz

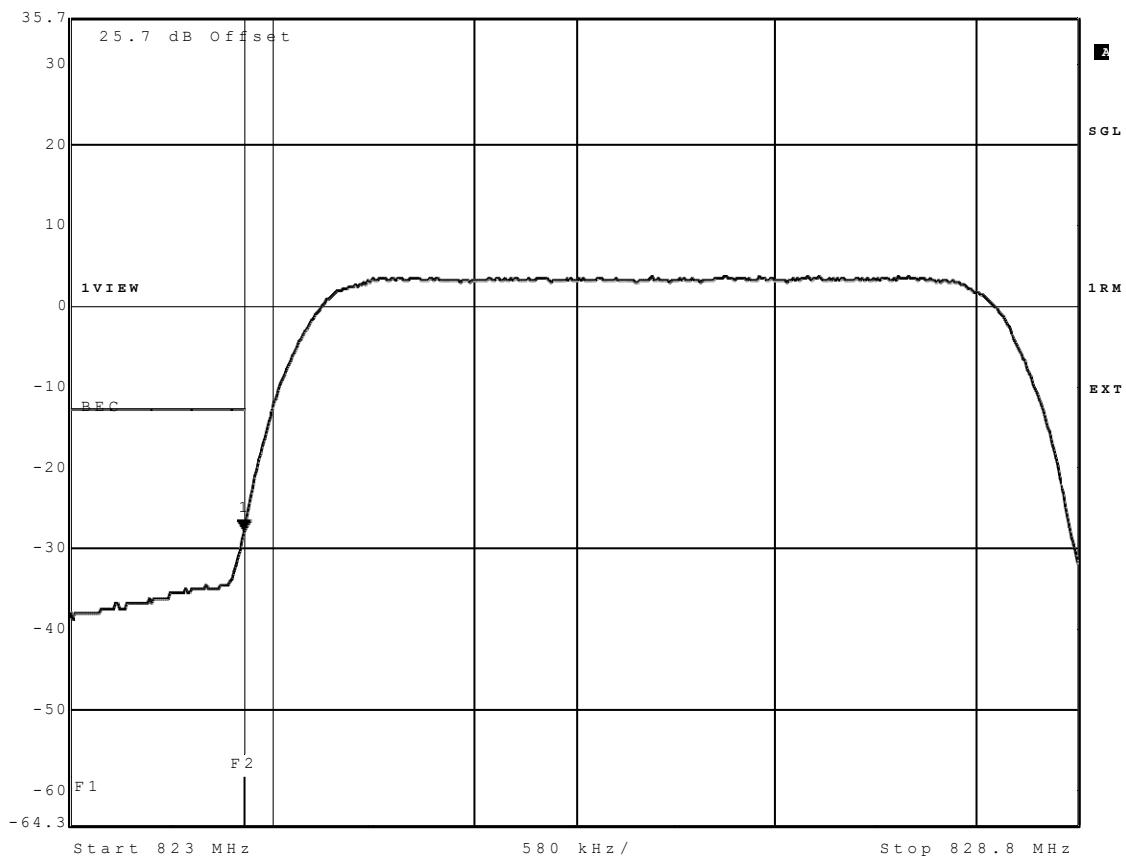
824.00000000 MHz

SWT

5 s

Unit

dBm



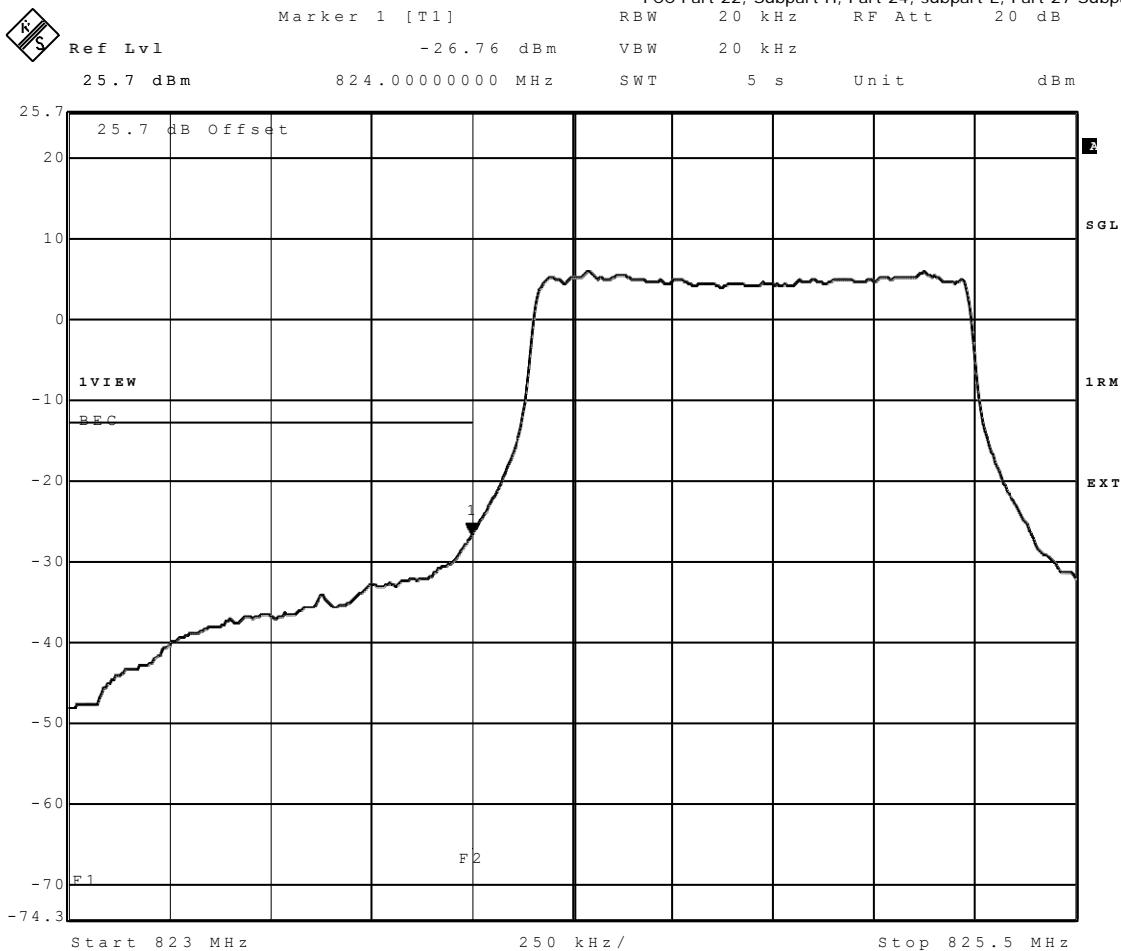
Date: 26.JUN.2017 10:39:55

HSUPA FDD5 SUB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 20 kHz RF Att 20 dB



Date: 23.JUN.2017 11:08:07

eFDD5 QPSK 1.4MHz RB6 Channel=low

3.5.7 22.7 Peak-to-Average Ratio Summary §2.1046

Test: 22.7; Peak-to-Average Ratio Summary §2.1046

Result: Passed
Setup No.: am06
Date of Test: 2017/07/01 9:37
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification: FCC part 2 and 22

Detailed Results:

Radio Technology	Chann el	Ressourc e Blocks	Bandwidt h [MHz]	Peak to Average Ratio [dB]	Limit (IC) [dB]
GSM 850	low	-	0.2	0.05	13
GSM 850	mid	-	0.2	0.03	13
GSM 850	high	-	0.2	0.07	13
GSM 850 GPRS	low	-	0.2	0.03	13
GSM 850 GPRS	mid	-	0.2	0.06	13
GSM 850 GPRS	high	-	0.2	0.06	13
GSM 850 EDGE	low	-	0.2	0.03	13
GSM 850 EDGE	mid	-	0.2	0.04	13
GSM 850 EDGE	high	-	0.2	-0.01	13
FDD V	low	-	5	5.29	13
FDD V	mid	-	5	5.45	13
FDD V	high	-	5	5.52	13
FDD V HSDPA Subtest	low	-	5	4.7	13
FDD V HSDPA Subtest	mid	-	5	4.58	13
FDD V HSDPA Subtest	high	-	5	4.72	13
FDD V HSUPA Subtest	low	-	5	6.32	13
FDD V HSUPA Subtest	mid	-	5	6.53	13
FDD V HSUPA Subtest	high	-	5	6.37	13
FDD V HSUPA Subtest	low	-	5	5.61	13
FDD V HSUPA Subtest	mid	-	5	6.42	13
FDD V HSUPA Subtest	high	-	5	6.16	13
eFDD 5 QPSK	low	6	1.4	5.25	13
eFDD 5 QPSK	mid	6	1.4	5.33	13
eFDD 5 QPSK	high	6	1.4	4.81	13
eFDD 5 16QAM	low	6	1.4	6.09	13
eFDD 5 16QAM	mid	6	1.4	6.09	13
eFDD 5 16QAM	high	6	1.4	5.68	13

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



eFDD5 16QAM 1.4MHz RB6 Channel=low

3.5.8 24.1 RF Power Output §2.1046, §24.232

Test: 24.1; RF Power Output Summary §2.1046, §24.232

Result: Passed

Setup No.: am06

Date of Test: 2017/06/23 15:55

Body: FCC47CFRCh1PART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

Detailed Results:

Radio Technology	Channel	Resource Blocks	Band width [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC / IC EIRP Limit [W]	Maximum Antenna Gain [dBi]
GSM 1900	low	-	0.2	30.29	30.29	30.12	2	2.71
GSM 1900	mid	-	0.2	30.25	30.12	30.18	2	2.75
GSM 1900	high	-	0.2	30.03	29.95	29.98	2	2.97
GSM 1900 GPRS	low	-	0.2	29.71	29.7	29.71	2	3.29
GSM 1900 GPRS	mid	-	0.2	29.66	29.66	29.67	2	3.34
GSM 1900 GPRS	high	-	0.2	29.6	29.57	29.57	2	3.4
GSM 1900 EDGE	low	-	0.2	28.79	28.77	28.73	2	4.21
GSM 1900 EDGE	mid	-	0.2	28.63	28.57	28.58	2	4.37
GSM 1900 EDGE	high	-	0.2	28.34	28.28	28.26	2	4.66
UMTS FDD II	low	-	5	29.01	23.61	23.79	2	9.21
UMTS FDD II	mid	-	5	29.3	23.56	23.72	2	9.28
UMTS FDD II	high	-	5	29.01	23.43	23.63	2	9.37
FDD II HSDPA Subtest 1	low	-	5	28.76	23.83	24.09	2	8.91
FDD II HSDPA Subtest 1	mid	-	5	29.16	23.84	24.02	2	8.98
FDD II HSDPA Subtest 1	high	-	5	28.76	23.71	23.84	2	9.16
FDD II HSDPA Subtest 2	low	-	5	29.54	23.44	23.85	2	9.15
FDD II HSDPA Subtest 2	mid	-	5	29.79	23.19	23.76	2	9.24
FDD II HSDPA Subtest 2	high	-	5	29.41	23.37	23.84	2	9.16
FDD II HSDPA Subtest 3	low	-	5	29.16	22.96	23.68	2	9.32
FDD II HSDPA Subtest 3	mid	-	5	29.54	22.89	23.65	2	9.35
FDD II HSDPA Subtest 3	high	-	5	29.54	23.04	23.72	2	9.28
FDD II HSDPA Subtest 4	low	-	5	28.76	22.67	23.5	2	9.5
FDD II HSDPA Subtest 4	mid	-	5	29.01	22.69	23.44	2	9.56
FDD II HSDPA Subtest 4	high	-	5	29.16	22.56	23.36	2	9.64
FDD II HSUPA Subtest 1	low	-	5	29.16	22.49	22.93	2	10.07
FDD II HSUPA Subtest 1	mid	-	5	29.54	22.36	22.75	2	10.25
FDD II HSUPA Subtest 1	high	-	5	29.3	22.28	22.7	2	10.3
FDD II HSUPA Subtest 2	low	-	5	29.79	21.46	22.44	2	10.56
FDD II HSUPA Subtest 2	mid	-	5	29.79	21.26	22.32	2	10.68
FDD II HSUPA Subtest 2	high	-	5	29.67	21.23	22.3	2	10.7
FDD II HSUPA Subtest 3	low	-	5	29.91	22.46	23.24	2	9.76
FDD II HSUPA Subtest 3	mid	-	5	30.06	21.57	22.43	2	10.57
FDD II HSUPA Subtest 3	high	-	5	30.31	22.2	22.91	2	10.09
FDD II HSUPA Subtest 4	low	-	5	29.41	21.52	22.32	2	10.68
FDD II HSUPA Subtest 4	mid	-	5	29.54	21.3	22.29	2	10.71
FDD II HSUPA Subtest 4	high	-	5	29.3	21.26	22.19	2	10.81
FDD II HSUPA Subtest 5	low	-	5	29.16	22.64	22.86	2	10.14
FDD II HSUPA Subtest 5	mid	-	5	29.16	22.39	22.73	2	10.27
FDD II HSUPA Subtest 5	high	-	5	29.16	22.32	22.69	2	10.31
eFDD 2 QPSK	low	1	1.4	-	-	22.14	2	10.86
eFDD 2 QPSK	low	3	1.4	-	-	22.21	2	10.79
eFDD 2 QPSK	low	6	1.4	-	-	20.94	2	12.06
eFDD 2 QPSK	mid	1	1.4	-	-	22.65	2	10.35
eFDD 2 QPSK	mid	3	1.4	-	-	22.38	2	10.62
eFDD 2 QPSK	mid	6	1.4	-	-	21.38	2	11.62
eFDD 2 QPSK	high	1	1.4	-	-	22.33	2	10.67
eFDD 2 QPSK	high	3	1.4	-	-	22.19	2	10.81
eFDD 2 QPSK	high	6	1.4	-	-	21	2	12
eFDD 2 16QAM	low	1	1.4	-	-	21.04	2	11.96
eFDD 2 16QAM	low	6	1.4	-	-	20.3	2	12.7
eFDD 2 16QAM	mid	1	1.4	-	-	21.45	2	11.55
eFDD 2 16QAM	mid	6	1.4	-	-	20.77	2	12.23
eFDD 2 16QAM	high	1	1.4	-	-	21.29	2	11.71
eFDD 2 16QAM	high	6	1.4	-	-	20.33	2	12.67
eFDD 2 QPSK	low	1	3	-	-	23.16	2	9.84
eFDD 2 QPSK	low	15	3	-	-	20.89	2	12.11
eFDD 2 QPSK	mid	1	3	-	-	23.5	2	9.5
eFDD 2 QPSK	mid	15	3	-	-	21.18	2	11.82
eFDD 2 QPSK	high	1	3	-	-	22.98	2	10.02
eFDD 2 QPSK	high	15	3	-	-	20.91	2	12.09
eFDD 2 16QAM	low	1	3	-	-	22.06	2	10.94
eFDD 2 16QAM	low	15	3	-	-	19.9	2	13.1
eFDD 2 16QAM	mid	1	3	-	-	22.38	2	10.62
eFDD 2 16QAM	mid	15	3	-	-	20.21	2	12.79
eFDD 2 16QAM	high	1	3	-	-	22.18	2	10.82
eFDD 2 16QAM	high	15	3	-	-	19.92	2	13.08

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	Resource Blocks	Band width [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC / IC EIRP Limit [W]	Maximum Antenna Gain [dBi]
eFDD 2 QPSK	low	1	5	-	-	22.86	2	10.14
eFDD 2 QPSK	low	12	5	-	-	20.73	2	12.27
eFDD 2 QPSK	low	25	5	-	-	20.77	2	12.23
eFDD 2 QPSK	mid	1	5	-	-	23.17	2	9.83
eFDD 2 QPSK	mid	12	5	-	-	21.09	2	11.91
eFDD 2 QPSK	mid	25	5	-	-	21.04	2	11.96
eFDD 2 QPSK	high	1	5	-	-	22.79	2	10.21
eFDD 2 QPSK	high	12	5	-	-	20.77	2	12.23
eFDD 2 QPSK	high	25	5	-	-	20.75	2	12.25
eFDD 2 16QAM	low	1	5	-	-	21.96	2	11.04
eFDD 2 16QAM	low	25	5	-	-	19.79	2	13.21
eFDD 2 16QAM	mid	1	5	-	-	22.26	2	10.74
eFDD 2 16QAM	mid	25	5	-	-	20.1	2	12.9
eFDD 2 16QAM	high	1	5	-	-	22.02	2	10.98
eFDD 2 16QAM	high	25	5	-	-	19.76	2	13.24
eFDD 2 QPSK	low	1	10	-	-	23.31	2	9.69
eFDD 2 QPSK	low	50	10	-	-	21.27	2	11.73
eFDD 2 QPSK	mid	1	10	-	-	23.52	2	9.48
eFDD 2 QPSK	mid	50	10	-	-	21.54	2	11.46
eFDD 2 QPSK	high	1	10	-	-	23.18	2	9.82
eFDD 2 QPSK	high	50	10	-	-	21.26	2	11.74
eFDD 2 16QAM	low	1	10	-	-	22.4	2	10.6
eFDD 2 16QAM	low	50	10	-	-	20.24	2	12.76
eFDD 2 16QAM	mid	1	10	-	-	22.48	2	10.52
eFDD 2 16QAM	mid	50	10	-	-	20.57	2	12.43
eFDD 2 16QAM	high	1	10	-	-	22.39	2	10.61
eFDD 2 16QAM	high	50	10	-	-	20.29	2	12.71
eFDD 2 QPSK	low	1	15	-	-	23.14	2	9.86
eFDD 2 QPSK	low	36	15	-	-	21.47	2	11.53
eFDD 2 QPSK	low	75	15	-	-	21.36	2	11.64
eFDD 2 QPSK	mid	1	15	-	-	23.33	2	9.67
eFDD 2 QPSK	mid	36	15	-	-	21.74	2	11.26
eFDD 2 QPSK	mid	75	15	-	-	21.6	2	11.4
eFDD 2 QPSK	high	1	15	-	-	23.08	2	9.92
eFDD 2 QPSK	high	36	15	-	-	21.52	2	11.48
eFDD 2 QPSK	high	75	15	-	-	21.39	2	11.61
eFDD 2 16QAM	low	1	15	-	-	22.02	2	10.98
eFDD 2 16QAM	low	75	15	-	-	20.4	2	12.6
eFDD 2 16QAM	mid	1	15	-	-	22.36	2	10.64
eFDD 2 16QAM	mid	75	15	-	-	20.64	2	12.36
eFDD 2 16QAM	high	1	15	-	-	22.14	2	10.86
eFDD 2 16QAM	high	75	15	-	-	20.35	2	12.65
eFDD 2 QPSK	low	1	20	-	-	23.22	2	9.78
eFDD 2 QPSK	low	100	20	-	-	21.6	2	11.4
eFDD 2 QPSK	mid	1	20	-	-	23.42	2	9.58
eFDD 2 QPSK	mid	100	20	-	-	21.69	2	11.31
eFDD 2 QPSK	high	1	20	-	-	23.12	2	9.88
eFDD 2 QPSK	high	100	20	-	-	21.57	2	11.43
eFDD 2 16QAM	low	1	20	-	-	22.3	2	10.7
eFDD 2 16QAM	low	100	20	-	-	20.53	2	12.47
eFDD 2 16QAM	mid	1	20	-	-	22.3	2	10.7
eFDD 2 16QAM	mid	100	20	-	-	20.68	2	12.32
eFDD 2 16QAM	high	1	20	-	-	21.88	2	11.12
eFDD 2 16QAM	high	100	20	-	-	20.46	2	12.54

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 300 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

30.29 dBm

1.85012685 GHz

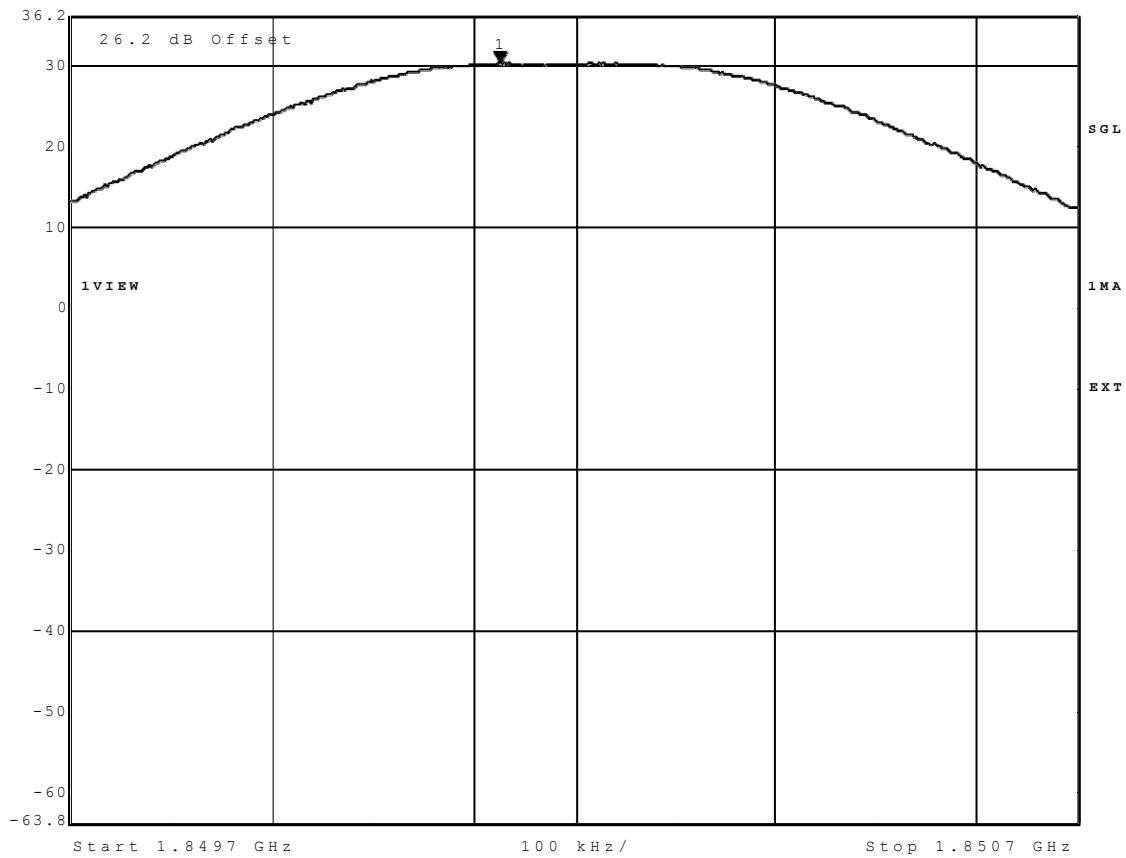
VBW 1 MHz

SWT

5 ms

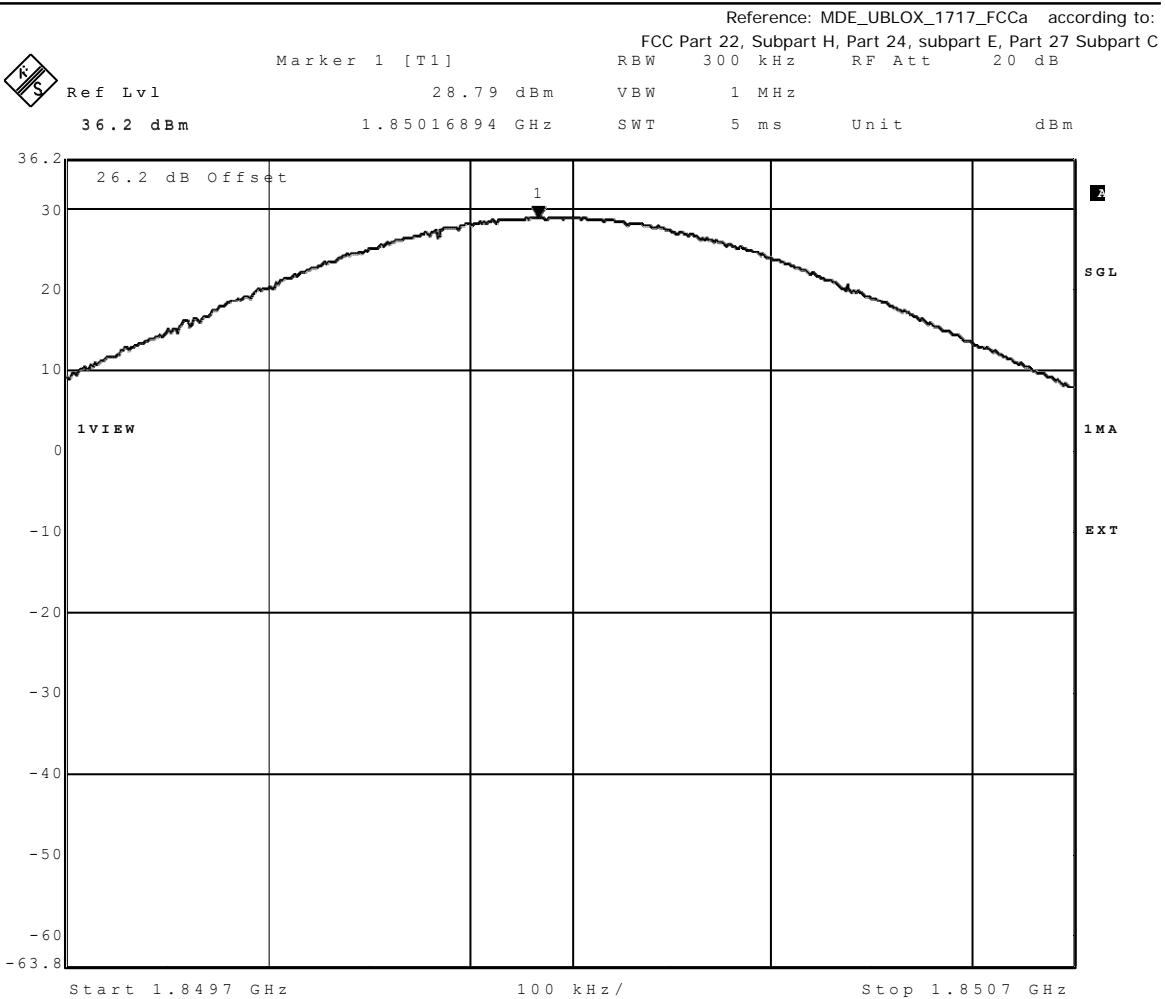
Unit

dBm



Date: 23.JUN.2017 10:04:41

GSM1900 Channel=low



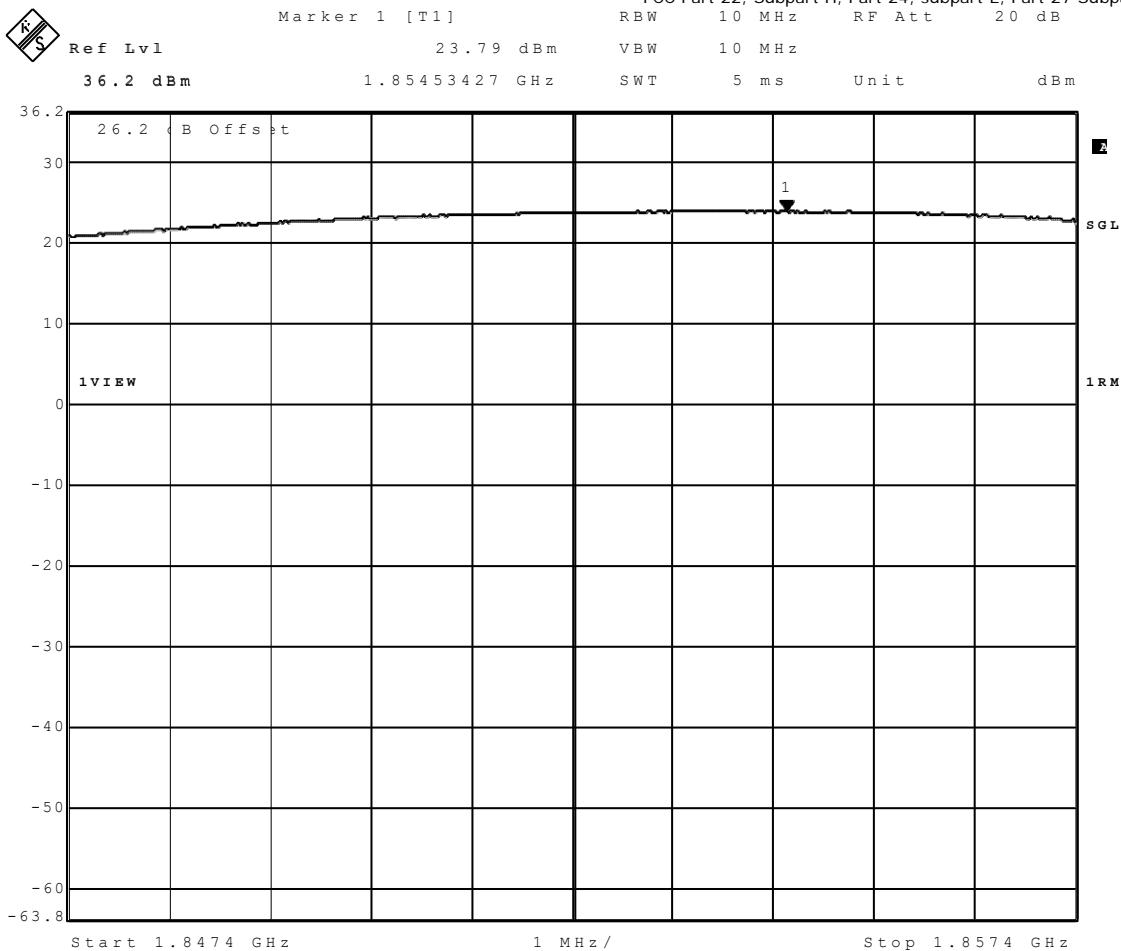
Date: 26.JUN.2017 15:21:02

EDGE1900 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



Date: 14.JUL.2017 16:15:09

WCDMA FDD2 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

24.09 dBm

1.85393307 GHz

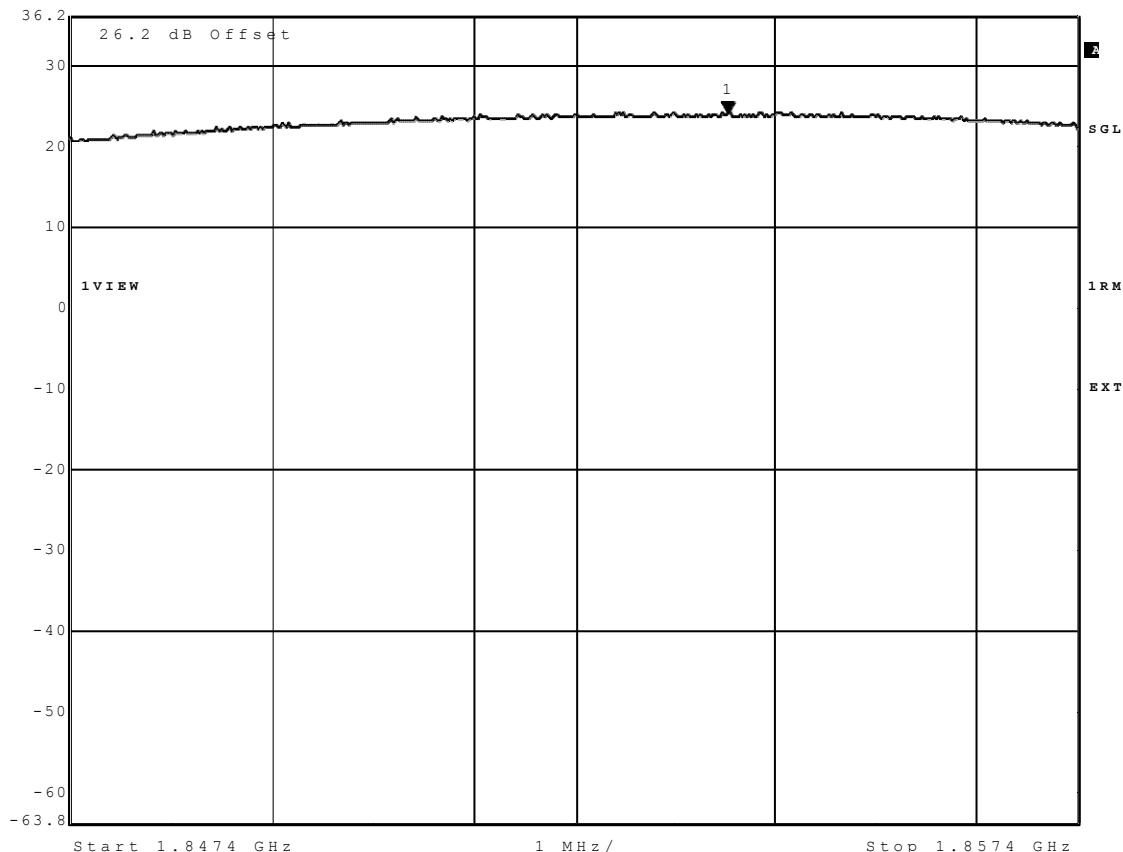
VBW 10 MHz

SWT 5 ms

Unit

dBm

36.2 dBm



Start 1.8474 GHz

1 MHz /

Stop 1.8574 GHz

Date: 26.JUN.2017 12:59:16

HSDPA FDD2 SUB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

23.24 dBm

VBW 10 MHz

SWT

5 ms

Unit

dBm

36.2 dBm

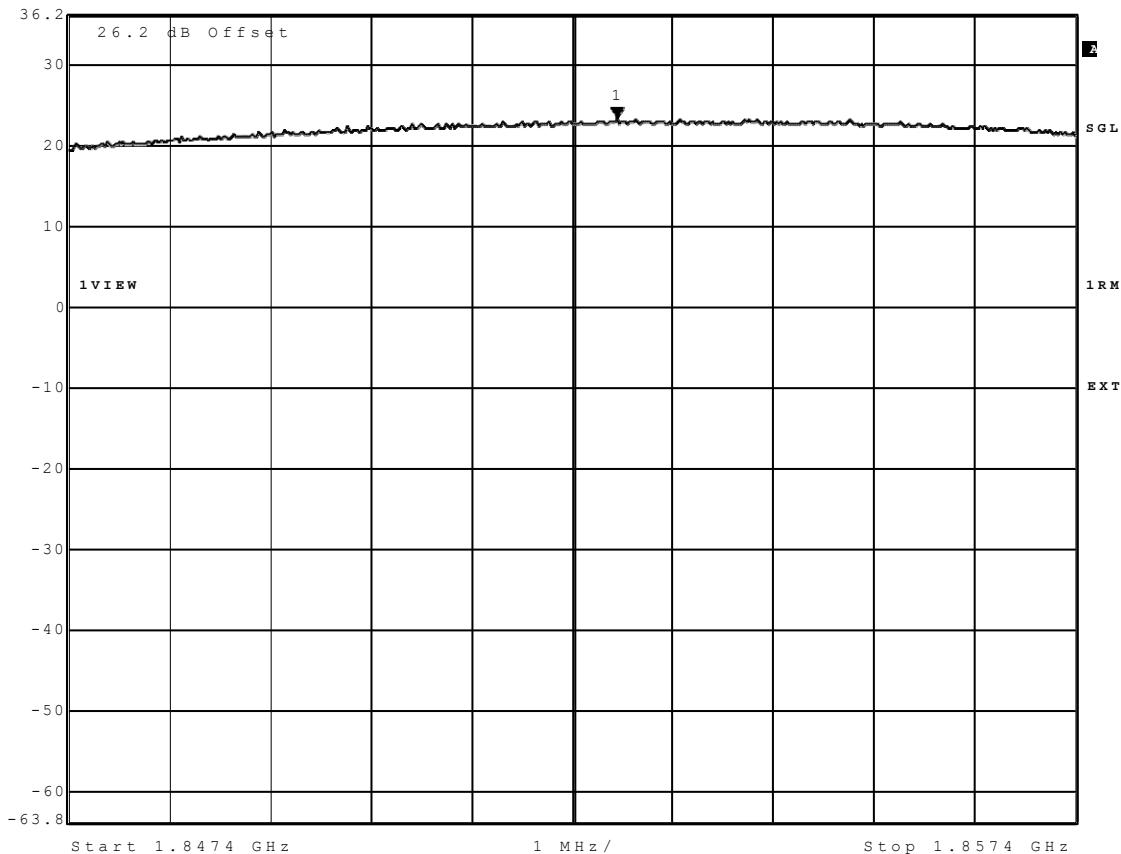
1.85285090 GHz

SWT

5 ms

Unit

dBm



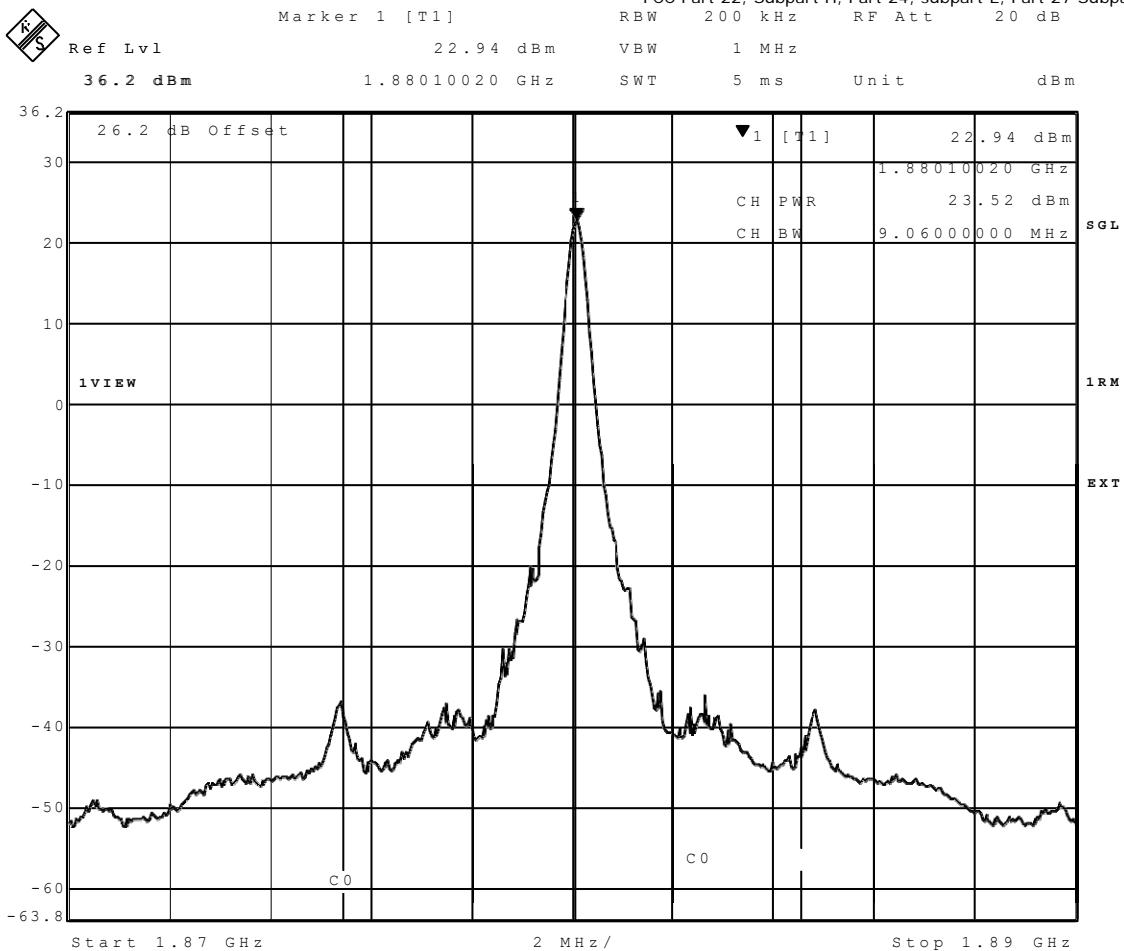
Date: 26.JUN.2017 11:54:37

HSUPA FDD2 SUB3 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 200 kHz RF Att 20 dB



Date: 23.JUN.2017 14:01:53

eFDD2 QPSK 10MHz RB1 Channel=mid

3.5.9 24.2 Frequency stability §2.1055, §24.235
Test: 24.2; Frequency stability Summary §2.1055, 24.235

Result: Passed
Setup No.: am06
Date of Test: 2017/06/24 14:31
Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification: FCC part 2 and 24

Detailed Results:

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	0	12	passed
-30	5			6	18	passed
-30	10			-9	-19	passed
-20	0	normal	4700	-8	13	passed
-20	5			7	-10	passed
-20	10			5	14	passed
-10	0	normal	4700	4	23	passed
-10	5			10	29	passed
-10	10			7	29	passed
0	0	normal	4700	10	19	passed
0	5			6	13	passed
0	10			12	17	passed
10	0	normal	4700	1	21	passed
10	5			12	28	passed
10	10			9	24	passed
20	0	low	4700	2	18	passed
20	5			14	22	passed
20	10			6	16	passed
20	0	normal = high ¹⁾	4700	16	-21	passed
20	5			12	16	passed
20	10			-9	13	passed
20	0	high	4700	-4	-12	passed
20	5			8	14	passed
20	10			10	16	passed
30	0	normal	4700	7	-12	passed
30	5			3	17	passed
30	10			-4	18	passed
40	0	normal	4700	3	-17	passed
40	5			7	-12	passed
40	10			16	22	passed
50	0	normal	4700	-1	-19	passed
50	5			-4	-18	passed
50	10			-6	-19	passed

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	-5	15	passed
-30	5			-4	10	passed
-30	10			-5	19	passed
-20	0	normal	4700	-3	-18	passed
-20	5			-1	-14	passed
-20	10			-5	-16	passed
-10	0	normal	4700	-2	-12	passed
-10	5			-2	-12	passed
-10	10			0	-16	passed
0	0	normal	4700	-2	22	passed
0	5			2	20	passed
0	10			-3	13	passed
10	0	normal	4700	-4	-24	passed
10	5			3	-12	passed
10	10			5	-13	passed
20	0	low	4700	-2	-20	passed
20	5			3	18	passed
20	10			6	-17	passed
20	0	normal = high ¹⁾	4700	2	-9	passed
20	5			1	-2	passed
20	10			-2	-11	passed
20	0	high	4700	2	-11	passed
20	5			0	24	passed
20	10			6	12	passed
30	0	normal	4700	0	14	passed
30	5			2	-16	passed
30	10			0	-6	passed
40	0	normal	4700	-2	21	passed
40	5			-3	14	passed
40	10			0	16	passed
50	0	normal	4700	-4	16	passed
50	5			-3	-21	passed
50	10			1	-17	passed

EDGE1900

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	0	-11	passed
-30	5			-1	-7	passed
-30	10			-1	-9	passed
-20	0	normal	4700	0	-8	passed
-20	5			-1	-10	passed
-20	10			0	-9	passed
-10	0	normal	4700	1	-9	passed
-10	5			2	-14	passed
-10	10			1	-10	passed
0	0	normal	4700	1	-14	passed
0	5			0	-13	passed
0	10			-1	-12	passed
10	0	normal	4700	0	-12	passed
10	5			1	-11	passed
10	10			0	-13	passed
20	0	low	4700	1	10	passed
20	5			1	-11	passed
20	10			0	10	passed
20	0	normal = high ¹⁾	4700	-1	-8	passed
20	5			0	-8	passed
20	10			1	11	passed
20	0	high	4700	0	8	passed
20	5			-1	10	passed
20	10			-1	-9	passed
30	0	normal	4700	0	-17	passed
30	5			0	-12	passed
30	10			1	-13	passed
40	0	normal	4700	-1	-19	passed
40	5			-1	-10	passed
40	10			0	-11	passed
50	0	normal	4700	1	-13	passed
50	5			0	-14	passed
50	10			1	-14	passed

WCDMa FDD2

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	-38	-80	passed
-30	5			-24	-49	passed
-30	10			26	-38	passed
-20	0	normal	4700	31	47	passed
-20	5			16	51	passed
-20	10			-10	-69	passed
-10	0	normal	4700	-17	42	passed
-10	5			-23	30	passed
-10	10			-23	34	passed
0	0	normal	4700	33	-70	passed
0	5			19	-68	passed
0	10			-17	-23	passed
10	0	normal	4700	-29	11	passed
10	5			17	19	passed
10	10			26	37	passed
20	0	low	4700	-22	24	passed
20	5			-20	34	passed
20	10			18	42	passed
20	0	normal = high ¹⁾	4700	35	-17	passed
20	5			18	-12	passed
20	10			-19	25	passed
20	0	high	4700	-8	47	passed
20	5			12	52	passed
20	10			-16	34	passed
30	0	normal	4700	8	54	passed
30	5			12	59	passed
30	10			-27	-11	passed
40	0	normal	4700	24	76	passed
40	5			-16	-55	passed
40	10			-27	-24	passed
50	0	normal	4700	1	9	passed
50	5			19	36	passed
50	10			-18	-34	passed

HSDPA FDD2

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	-18	-37	passed
-30	5			-3	-42	passed
-30	10			16	-25	passed
-20	0	normal	4700	-17	36	passed
-20	5			-15	-27	passed
-20	10			-15	-29	passed
-10	0	normal	4700	3	10	passed
-10	5			-18	-26	passed
-10	10			13	-18	passed
0	0	normal	4700	-14	-22	passed
0	5			-16	0	passed
0	10			-22	-15	passed
10	0	normal	4700	-4	33	passed
10	5			14	-40	passed
10	10			13	-34	passed
20	0	low	4700	12	24	passed
20	5			16	36	passed
20	10			-8	41	passed
20	0	normal = high ¹⁾	4700	9	20	passed
20	5			-10	23	passed
20	10			-13	28	passed
20	0	high	4700	8	-14	passed
20	5			12	24	passed
20	10			-9	36	passed
30	0	normal	4700	-10	-4	passed
30	5			-6	-20	passed
30	10			-14	-10	passed
40	0	normal	4700	5	-16	passed
40	5			8	-33	passed
40	10			-7	-37	passed
50	0	normal	4700	18	-19	passed
50	5			15	-19	passed
50	10			17	-21	passed

HSUPA FDD2

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	2	-8	passed
-30	5			2	10	passed
-30	10			-1	-8	passed
-20	0	normal	4700	0	10	passed
-20	5			2	8	passed
-20	10			4	16	passed
-10	0	normal	4700	4	11	passed
-10	5			4	13	passed
-10	10			2	12	passed
0	0	normal	4700	3	10	passed
0	5			2	8	passed
0	10			2	13	passed
10	0	normal	4700	1	7	passed
10	5			2	14	passed
10	10			1	10	passed
20	0	low	4700	3	10	passed
20	5			4	8	passed
20	10			6	7	passed
20	0	normal = high ¹⁾	4700	3	11	passed
20	5			0	-6	passed
20	10			2	12	passed
20	0	high	4700	2	10	passed
20	5			3	6	passed
20	10			0	8	passed
30	0	normal	4700	3	13	passed
30	5			3	8	passed
30	10			2	18	passed
40	0	normal	4700	2	-12	passed
40	5			1	9	passed
40	10			1	-10	passed
50	0	normal	4700	3	8	passed
50	5			1	12	passed
50	10			2	8	passed

eFDD2

3.5.10 24.3 Spurious emissions at antenna terminals §2.1051, §24.238**Test: 24.3; Spurious emissions at antenna terminals Summary §2.1051, §24.238***Result:* Passed*Setup No.:* am06*Date of Test:* 2017/06/23 12:02*Body:* FCC47CFRCh1PART24PERSONAL COMMUNICATIONS SERVICES*Test Specification:* FCC part 2 and 24

Detailed Results:

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
GSM 1900	low	peak	maxhold	3	1849.9	-18.38	-13	5.38
GSM 1900	mid	-	-	-	-	-	-13	>20
GSM 1900	high	peak	maxhold	3	1910	-18.26	-13	5.26

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
EDGE 1900	low	-	-	-	-	-	-13	>20
EDGE 1900	mid	-	-	-	-	-	-13	>20
EDGE 1900	high	-	-	-	-	-	-13	>20

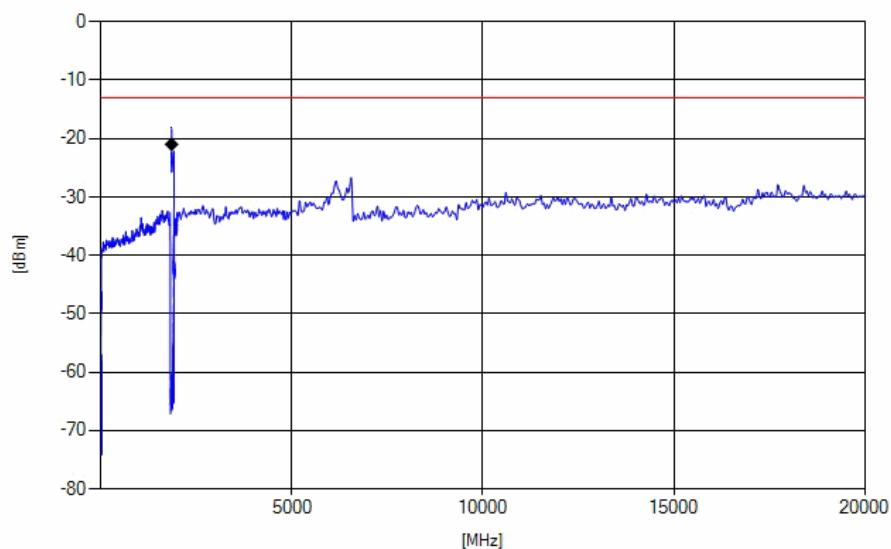
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
WCDMa FDD2	low	-	-	-	-	-	-13	>20
WCDMa FDD2	mid	-	-	-	-	-	-13	>20
WCDMa FDD2	high	-	-	-	-	-	-13	>20

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSDPA FDD2	low	-	-	-	-	-	-13	>20
HSDPA FDD2	mid	-	-	-	-	-	-13	>20
HSDPA FDD2	high	-	-	-	-	-	-13	>20

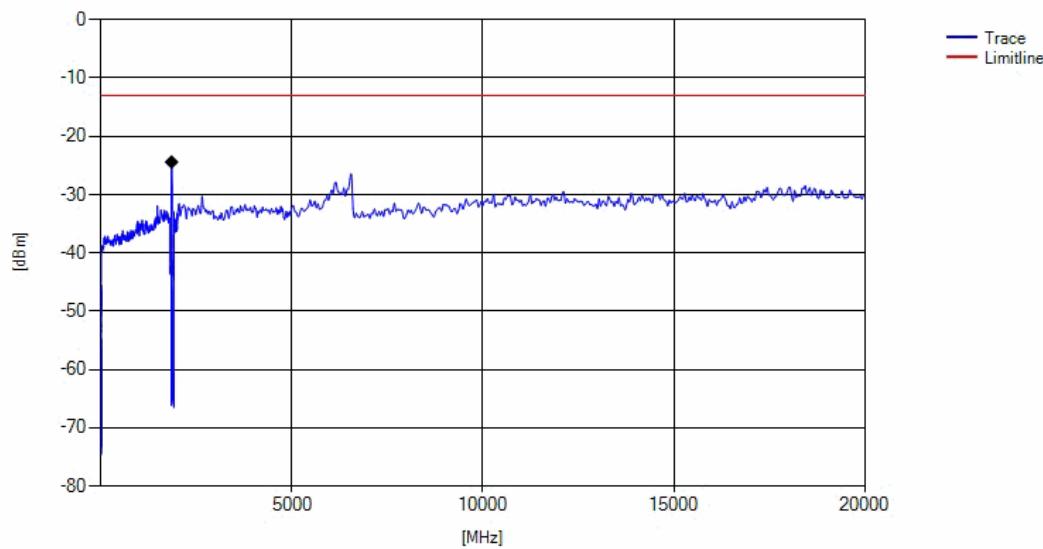
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSUPA FDD2	low	-	-	-	-	-	-13	>20
HSUPA FDD2	mid	-	-	-	-	-	-13	>20
HSUPA FDD2	high	-	-	-	-	-	-13	>20

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD2	low	rms	maxhold	5	1850	-25.56	-13	12.56
eFDD2	mid	-	-	-	-	-	-13	>20
eFDD2	high	rms	maxhold	5	1910	-25.31	-13	12.31

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

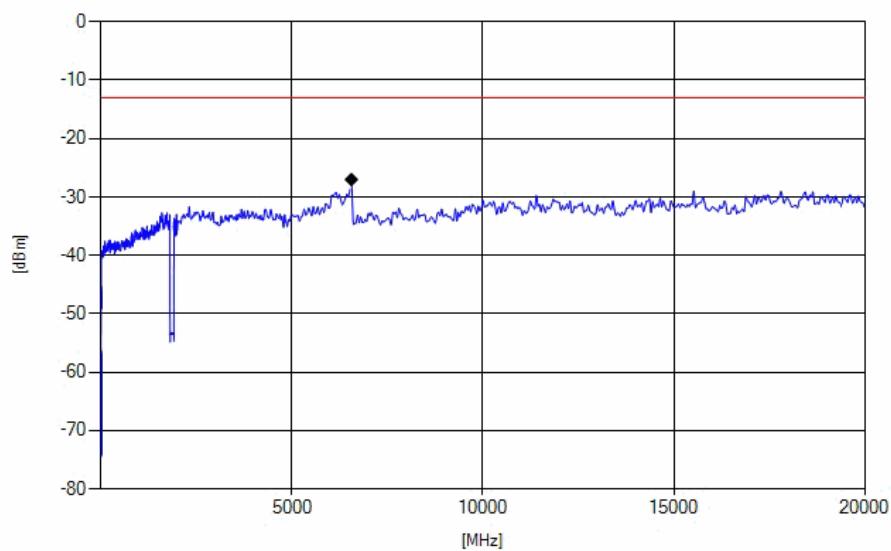


GSM1900 Channel=high

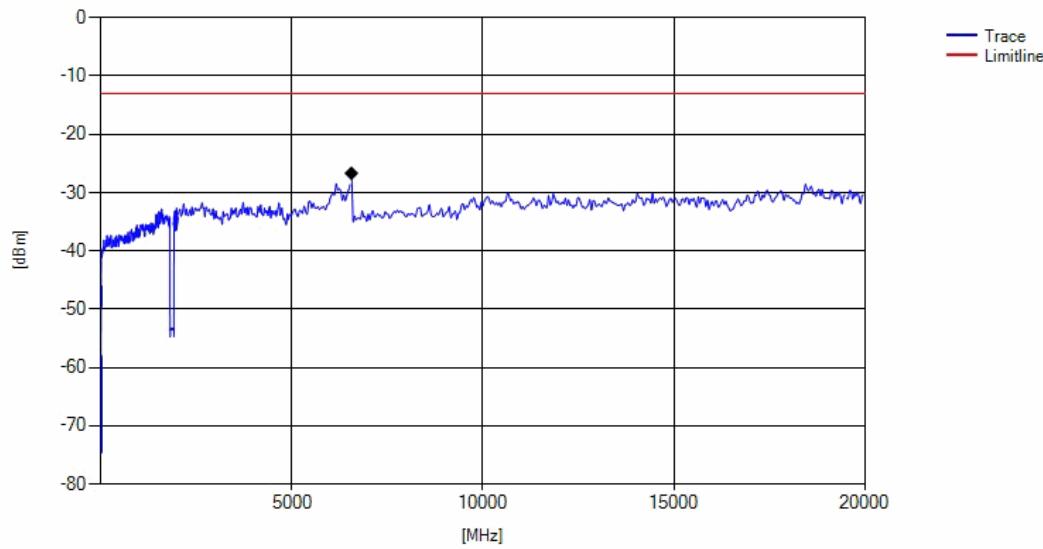


EDGE1900 Channel=high

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C

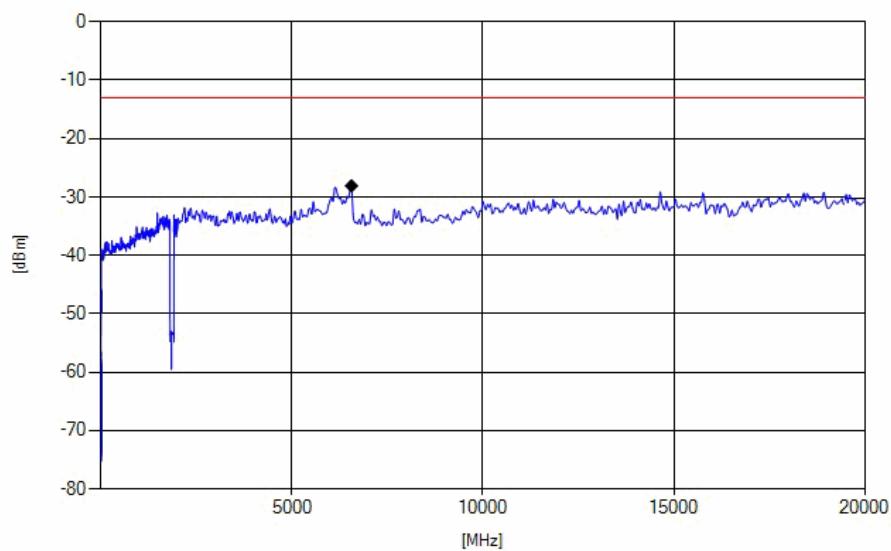


WCDMA FDD2 Channel=mid

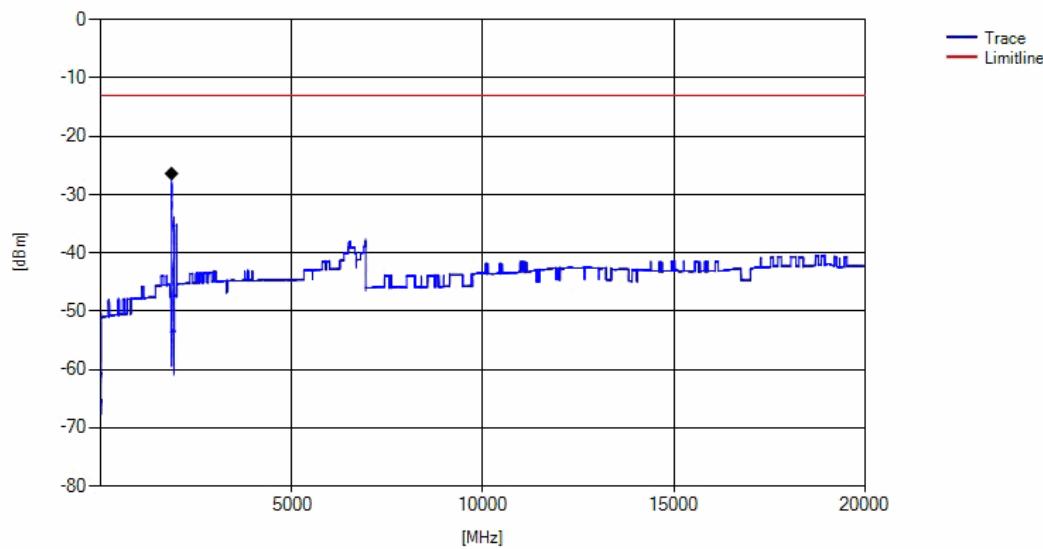


HSDPA FDD2 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



HSUPA FDD2 Channel=mid



eFDD2 Channel=high

3.5.11 24.4 Field strength of spurious radiation §2.1053, §24.238
Test: 24.4; Field strength of spurious radiation Summary §2.1053, §24.238

Result: Passed

Setup No.: am06

Date of Test: 2017/06/17 14:54

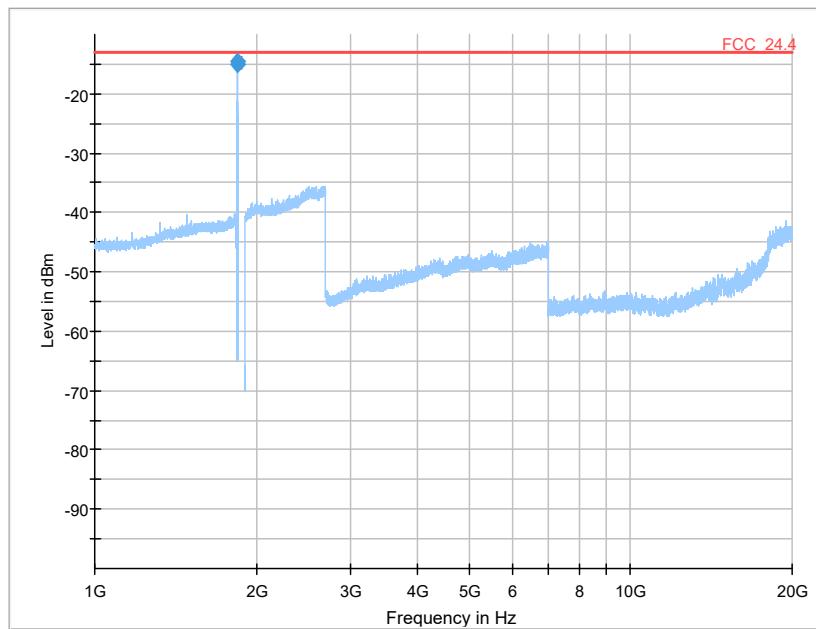
Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

Detailed Results:

Mode: Test: 24.4; Frequency Band = 1900, Mode = EDGE, Channel = 512, Frequency = 1850.2MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
1849.979	-14.98	-13	1.98	2000	3	150	V	-135	90	-63.6
1849.98	-14.61	-13	1.61	2000	3	150	V	-135	90	-63.6
Mode: Test: 24.4; Frequency Band = 1900, Mode = EDGE, Channel = 661, Frequency = 1880.0MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 24.4; Frequency Band = 1900, Mode = EDGE, Channel = 810, Frequency = 1909.8MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
1849.974	-14.92	-13	1.92	2000	3	150	H	-90	0	-63.6
Mode: Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 24.4; Frequency Band = eFDD2, Mode = QPSK5MHz, Channel = 18625, Frequency = 1852.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
1850	-27.65	-23	4.65	3000	3	150	H	-90	0	-63.6
Mode: 24.4; Frequency Band = eFDD2, Mode = QPSK5MHz, Channel = 18900, Frequency = 1880MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---
Mode: 24.4; Frequency Band = eFDD2, Mode = QPSK5MHz, Channel = 19175, Frequency = 1907.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---		---	---	---

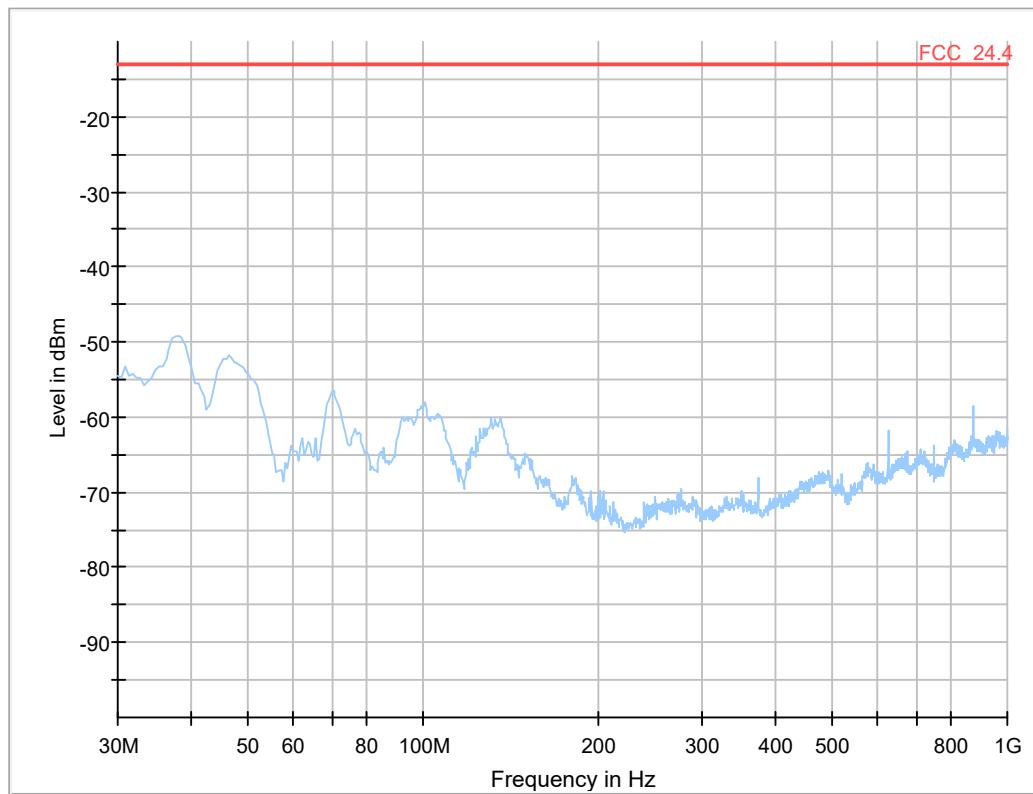
Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9262, Frequency = 1852.4MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9538, Frequency = 1907.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency = 1852.4MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9538, Frequency = 1907.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency = 1852.4MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---
Mode: Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9538, Frequency = 1907.6MHz										
Frequency (MHz)	MaxPeak (dBm)	Limit(dBm)	Margin(dB)	Meas. Time (ms)	Bandwidth (kHz)	Height(cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr.(dB)
---	---	---	---	---	---	---	---	---	---	---



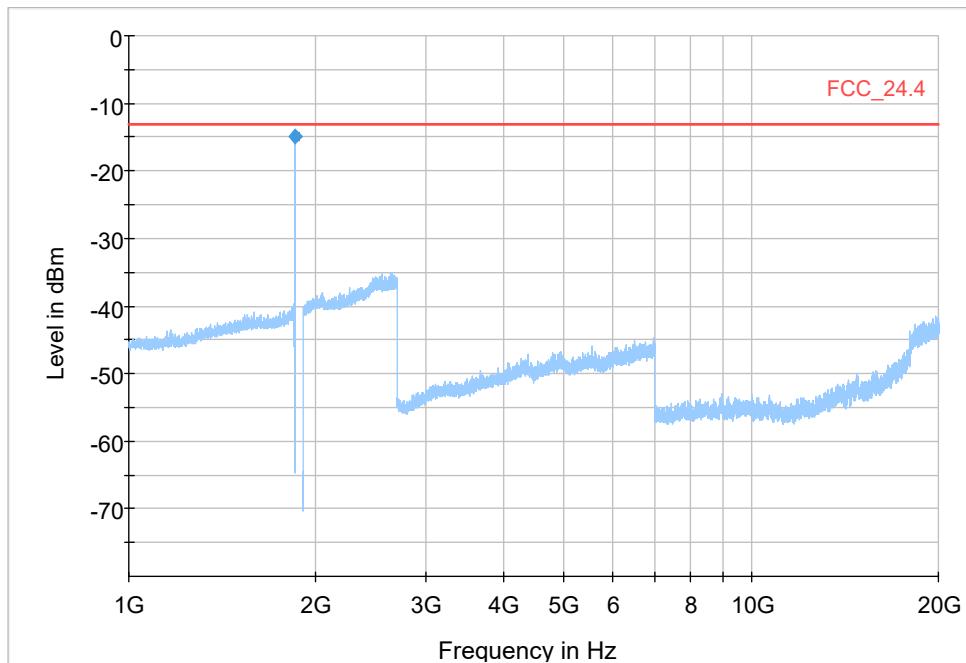
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1849.979000	-14.98	-13.00	1.98	2000.0	3.000	150.0	V	-135.0	90.0	-63.6
1849.980000	-14.61	-13.00	1.61	2000.0	3.000	150.0	V	-135.0	90.0	-63.6

Mode: Test: 24.4; Frequency Band = 1900, Mode = EDGE, Channel = 512, Frequency = 1850.2MHz



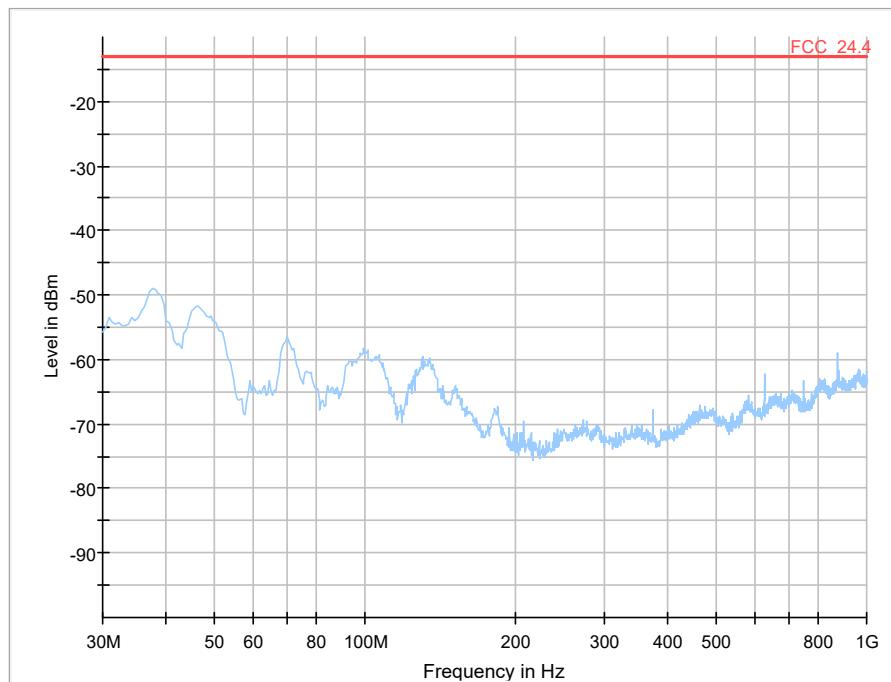
Mode: Test: 24.4; Frequency Band = 1900, Mode = EDGE, Channel = 512, Frequency = 1850.2MHz



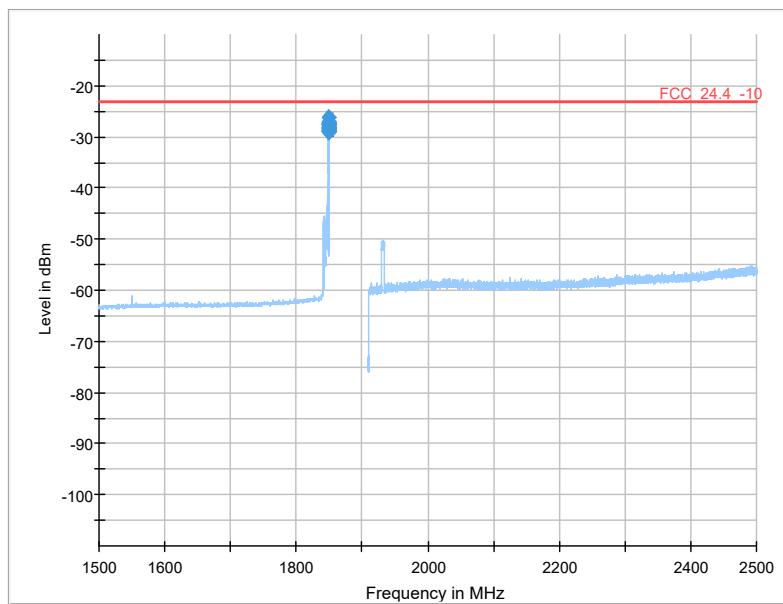
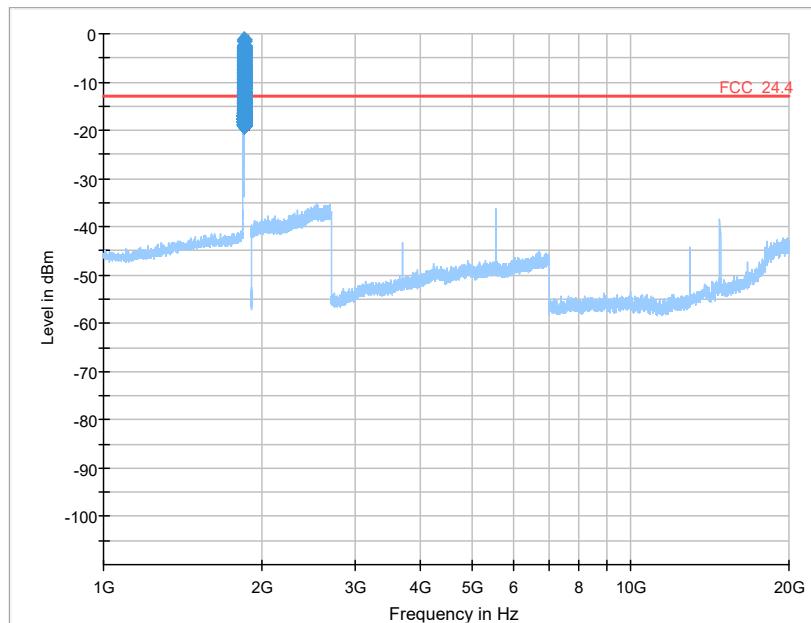
Final Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1849.974000	-14.92	-13.00	1.92	2000.0	3.000	150.0	H	-90.0	0.0	-63.6

Mode: Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz

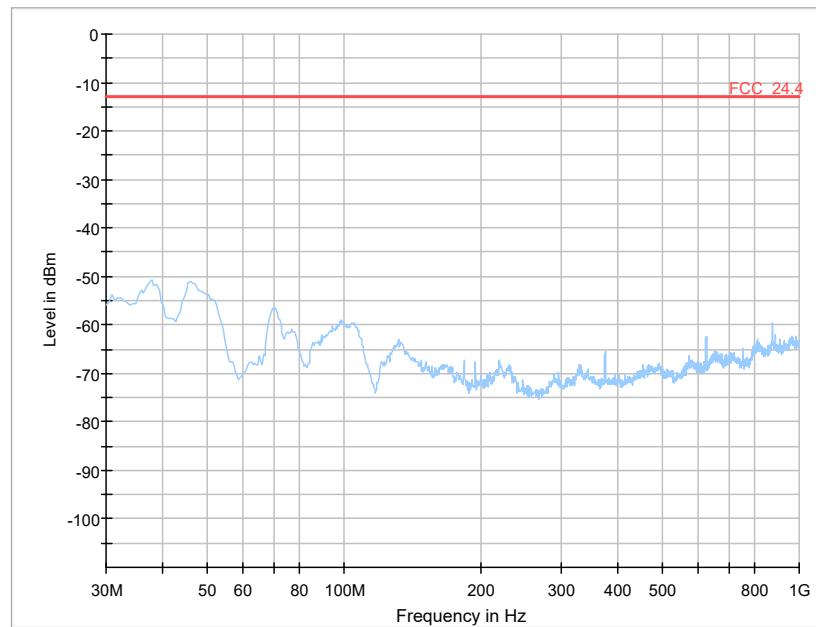


Mode: Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz

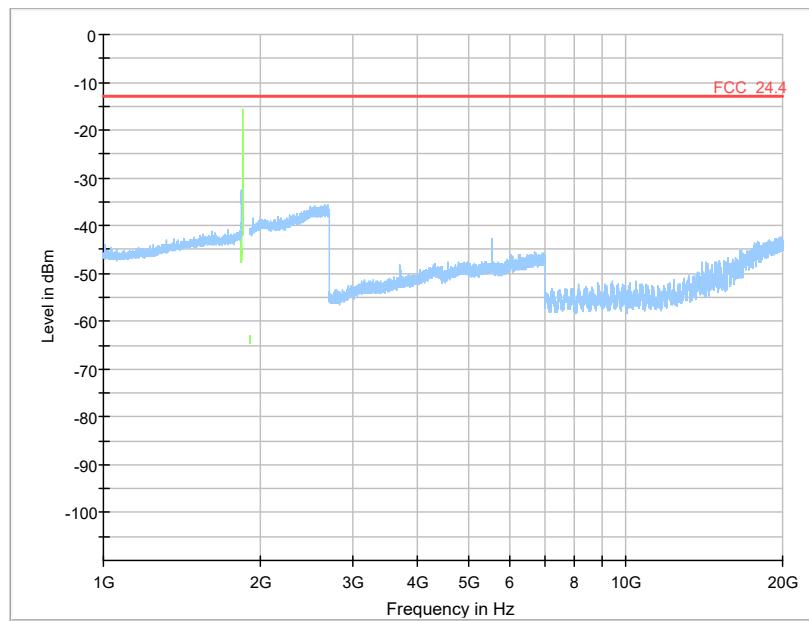


Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1850.000000	-27.65	-23.00	4.65	3000.0	3.000	150.0	H	-90.0	0.0	-63.6

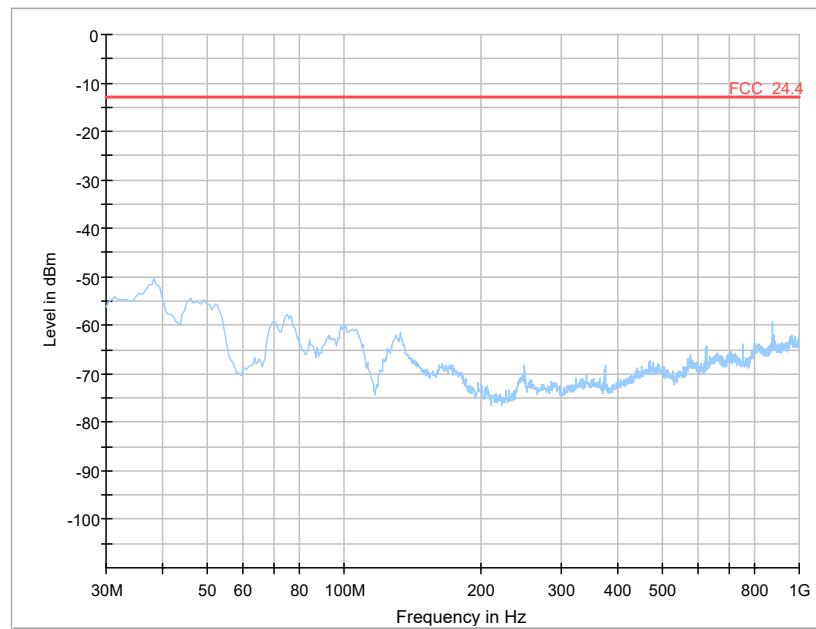
Mode: Test: 24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 18625, Frequency = 1852.5MHz, Method = radiated



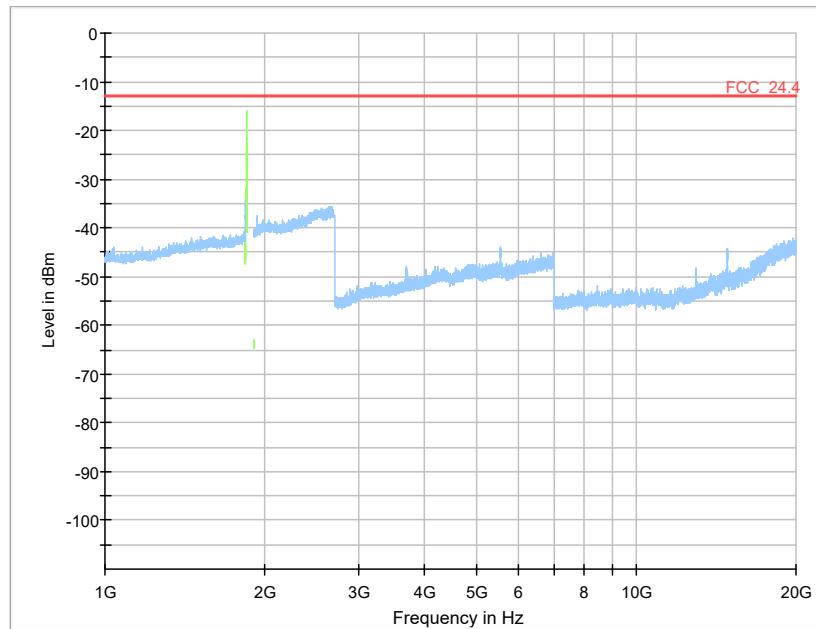
Mode: Test: 24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 18625, Frequency = 1852.5MHz, Method = radiated



Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9262, Frequency = 1852.4MHz

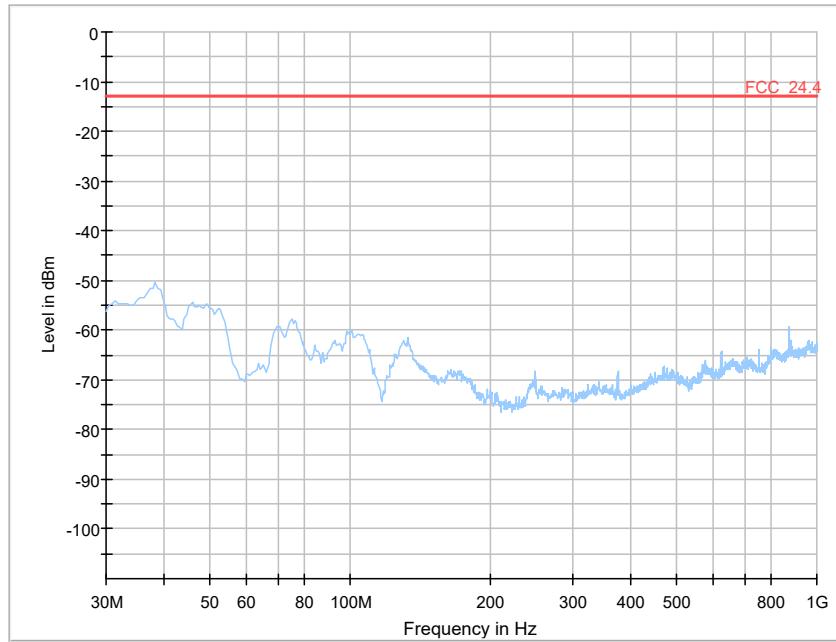


Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9262, Frequency =
1852.4MHz

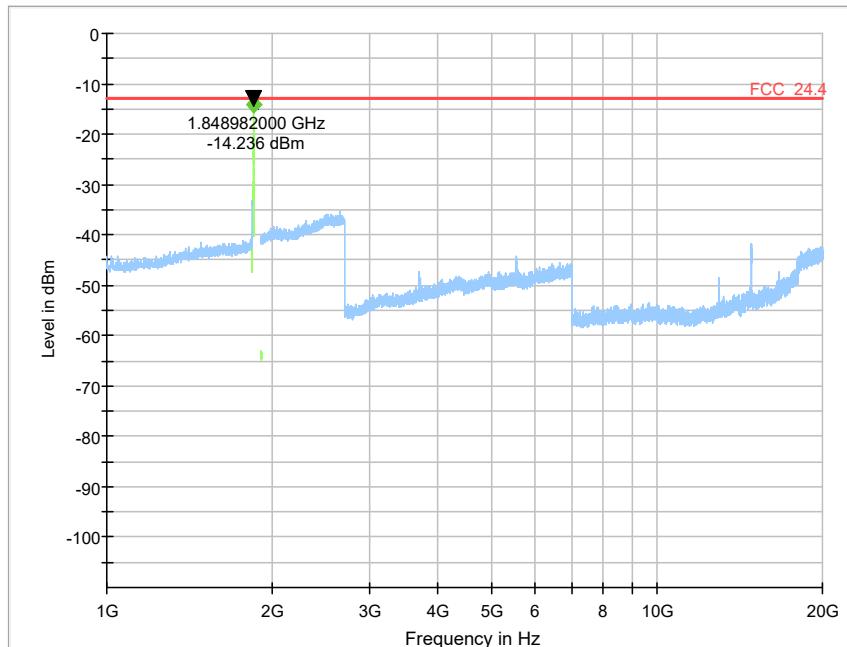


Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency =
1852.4MHz

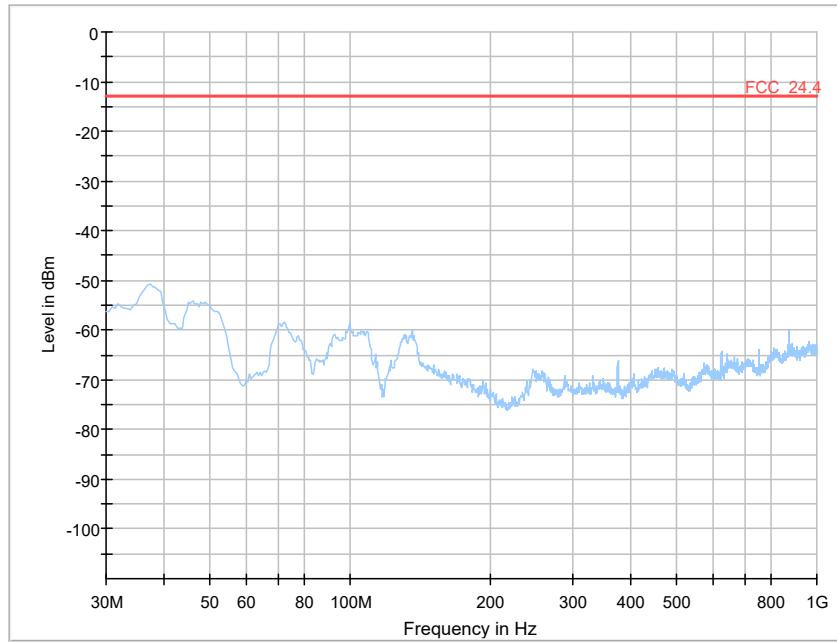
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



Mode: Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency =
1852.4MHz



Mode: Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency =
1852.4MHz **Peak seen is DL signal



Mode:Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency =
1852.4MHz

3.5.12 24.5 Emission and Occupied Bandwidth §2.1049, §24.238**Test: 24.5; Emission and Occupied Bandwidth Summary §2.1049, §24.238**

Result: Passed

Setup No.: am06

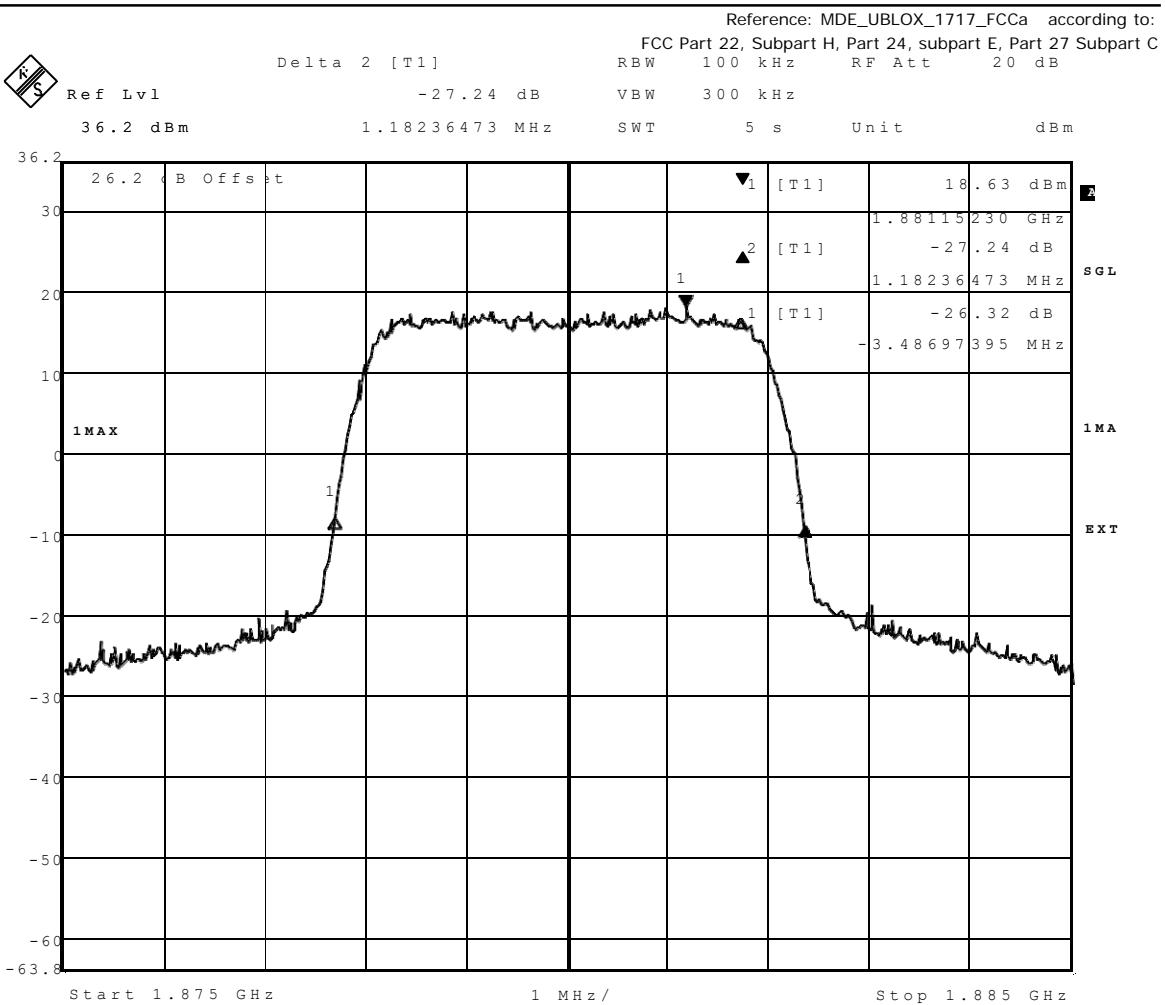
Date of Test: 2017/06/23 16:23

Body: FCC47CFRCh1PART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

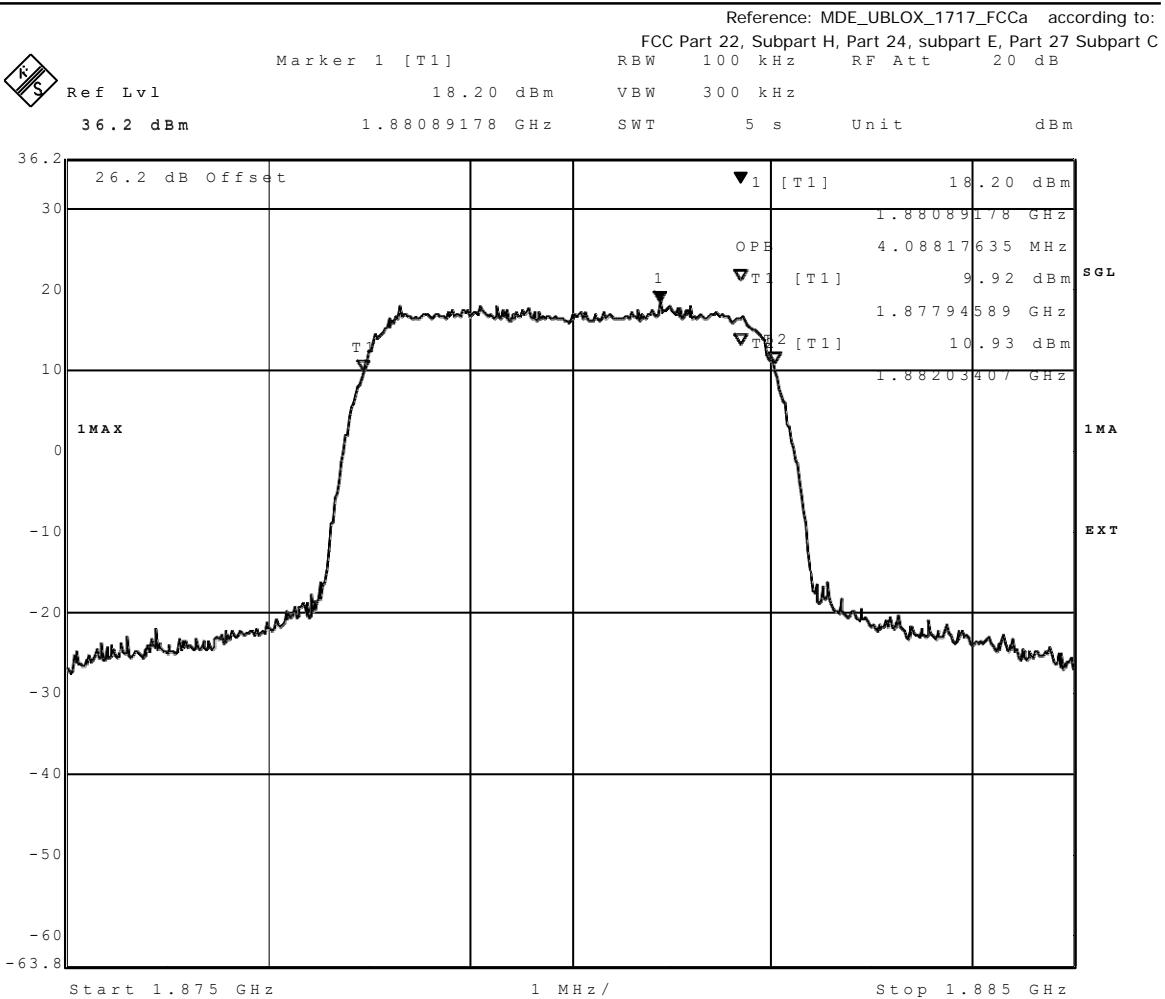
Detailed Results:

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	Nominal BW [MHz]	26 dB BW [kHz]	99 % BW [kHz]
GSM 1900	low	-	0.2	0.2	312.63	244.49
GSM 1900	mid	-	0.2	0.2	312.62	244.49
GSM 1900	high	-	0.2	0.2	310.62	246.49
GSM 1900 GPRS	low	-	0.2	0.2	314.63	246.49
GSM 1900 GPRS	mid	-	0.2	0.2	314.63	246.49
GSM 1900 GPRS	high	-	0.2	0.2	316.63	248.5
GSM 1900 EDGE	low	-	0.2	0.2	282.57	236.47
GSM 1900 EDGE	mid	-	0.2	0.2	278.56	236.47
GSM 1900 EDGE	high	-	0.2	0.2	282.57	238.48
FDD II	low	-	5	5	4689.38	4068.14
FDD II	mid	-	5	5	4689.38	4088.18
FDD II	high	-	5	5	4689.38	4088.18
FDD II HSDPA Subtest 1	low	-	5	5	4649.30	4068.14
FDD II HSDPA Subtest 1	mid	-	5	5	4669.34	4088.18
FDD II HSDPA Subtest 1	high	-	5	5	4669.34	4088.18
FDD II HSUPA Subtest 1	low	-	5	5	4689.38	4088.18
FDD II HSUPA Subtest 1	mid	-	5	5	4669.34	4088.18
FDD II HSUPA Subtest 1	high	-	5	5	4689.38	4088.18
FDD II HSUPA Subtest 5	low	-	5	5	4689.38	4088.18
FDD II HSUPA Subtest 5	mid	-	5	5	4669.34	4088.18
FDD II HSUPA Subtest 5	high	-	5	5	4669.34	4088.18
eFDD 2 QPSK	low	6	1.4	1.4	-	1112.22
eFDD 2 QPSK	mid	6	1.4	1.4	-	1112.22
eFDD 2 QPSK	high	6	1.4	1.4	-	1112.22
eFDD 2 16QAM	low	6	1.4	1.4	-	1106.21
eFDD 2 16QAM	mid	6	1.4	1.4	-	1106.21
eFDD 2 16QAM	high	6	1.4	1.4	-	1118.24
eFDD 2 QPSK	low	15	3	3	-	2753.51
eFDD 2 QPSK	mid	15	3	3	-	2741.48
eFDD 2 QPSK	high	15	3	3	-	2741.48
eFDD 2 16QAM	low	15	3	3	-	2753.51
eFDD 2 16QAM	mid	15	3	3	-	2741.48
eFDD 2 16QAM	high	15	3	3	-	2753.51
eFDD 2 16QAM	low	25	5	5	-	4529.06
eFDD 2 16QAM	mid	25	5	5	-	4529.06
eFDD 2 16QAM	high	25	5	5	-	4529.06
eFDD 2 16QAM	low	25	5	5	-	4549.1
eFDD 2 16QAM	mid	25	5	5	-	4549.1
eFDD 2 16QAM	high	25	5	5	-	4529.06
eFDD 2 QPSK	low	50	10	10	-	9018.04
eFDD 2 QPSK	mid	50	10	10	-	9058.12
eFDD 2 QPSK	high	50	10	10	-	9058.12
eFDD 2 16QAM	low	50	10	10	-	9058.12
eFDD 2 16QAM	mid	50	10	10	-	9058.12
eFDD 2 16QAM	high	50	10	10	-	9018.04
eFDD 2 QPSK	low	75	15	15	-	13527.05
eFDD 2 QPSK	mid	75	15	15	-	13587.17
eFDD 2 QPSK	high	75	15	15	-	13647.29
eFDD 2 16QAM	low	75	15	15	-	13587.17
eFDD 2 16QAM	mid	75	15	15	-	13647.29
eFDD 2 16QAM	high	75	15	15	-	13647.29
eFDD 2 QPSK	low	100	20	20	-	18116.23
eFDD 2 QPSK	mid	100	20	20	-	18276.55
eFDD 2 QPSK	high	100	20	20	-	18116.23
eFDD 2 16QAM	low	100	20	20	-	18116.23
eFDD 2 16QAM	mid	100	20	20	-	18276.55
eFDD 2 16QAM	high	100	20	20	-	18276.55



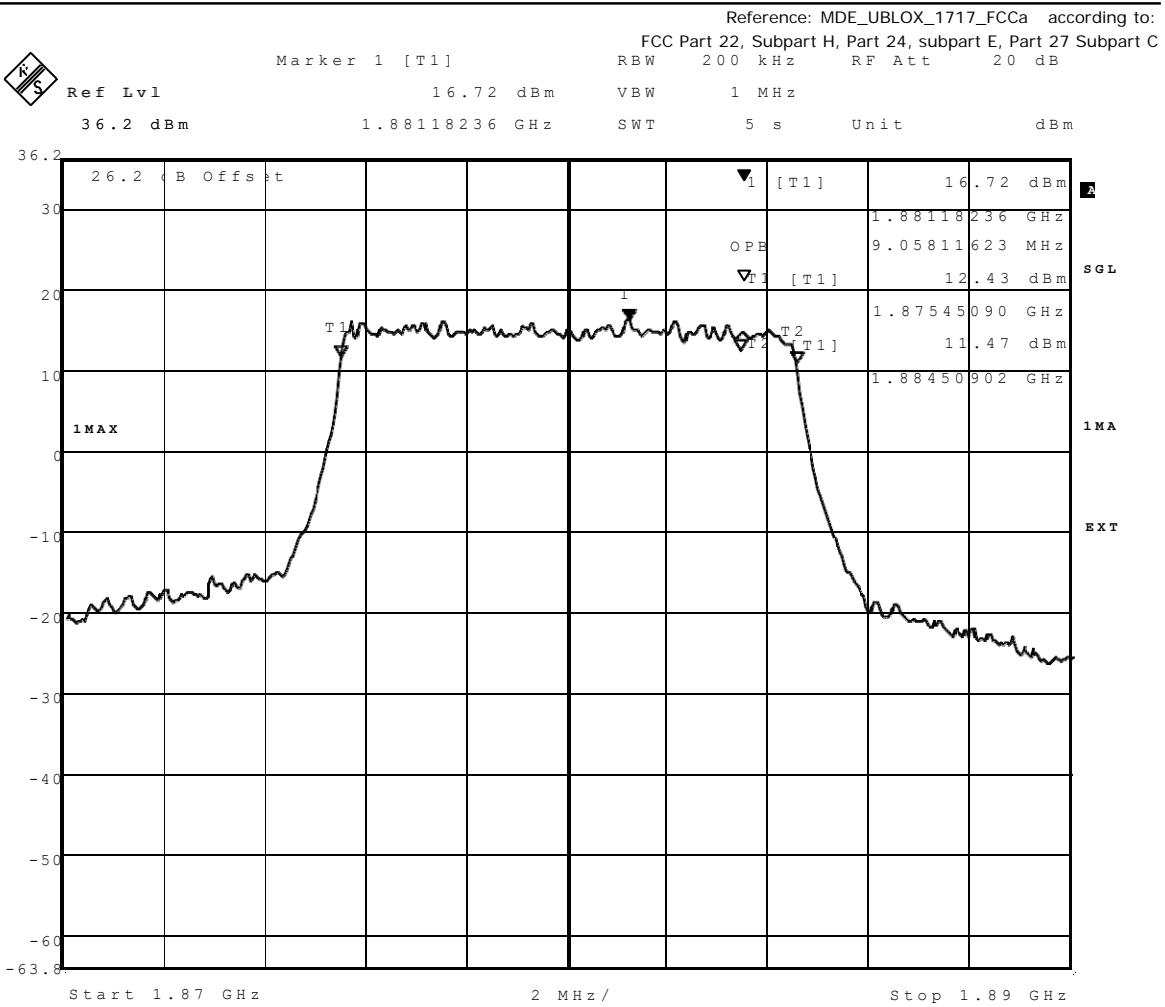
Date: 26.JUN.2017 09:10:32

26dB: HSUPA FDD2 SUB1 Channel=mid



Date: 26.JUN.2017 09:10:01

99%: HSUPA FDD2 SUB1 Channel=mid



99%: eFDD2 QPSK 10MHz Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



Ref Lvl

Delta 2 [T1]

-27.00 dB

RBW 3 kHz

RF

Att

20 dB

VBW 10 kHz

SWT

5 s

Unit

dBm

36.2 dBm

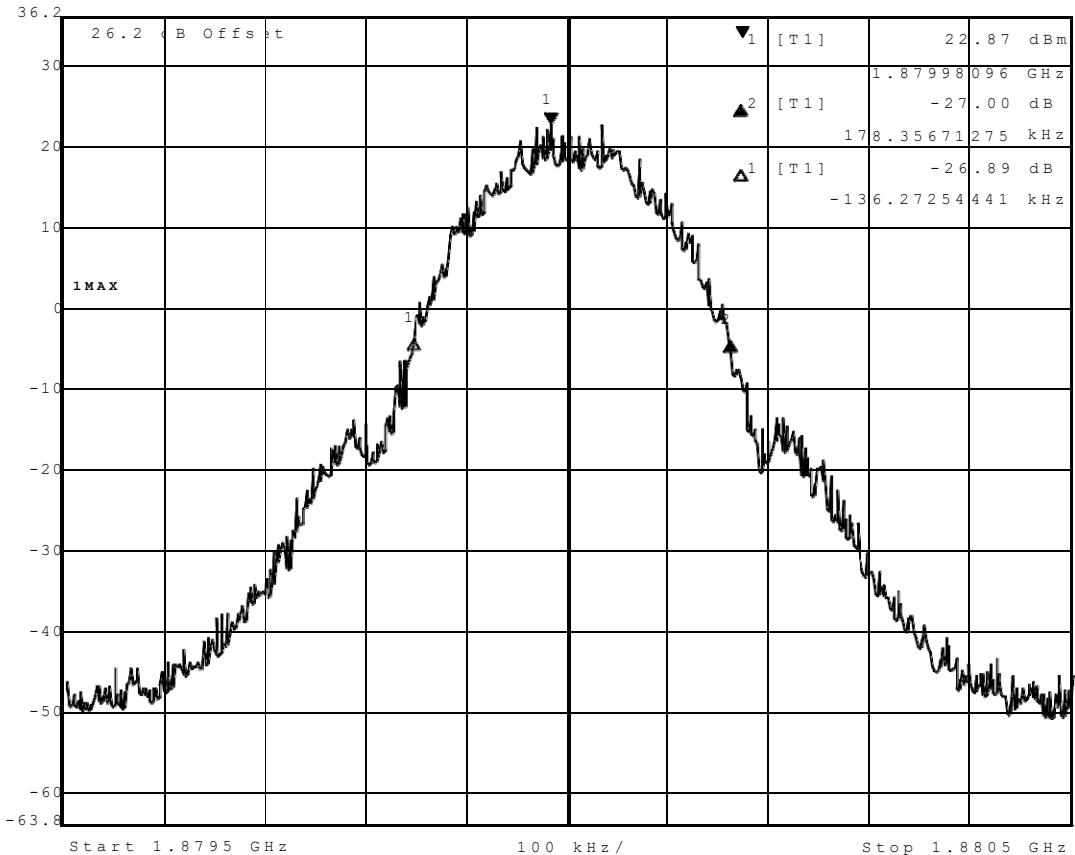
178.35671275 kHz

SWT

5 s

Unit

dBm

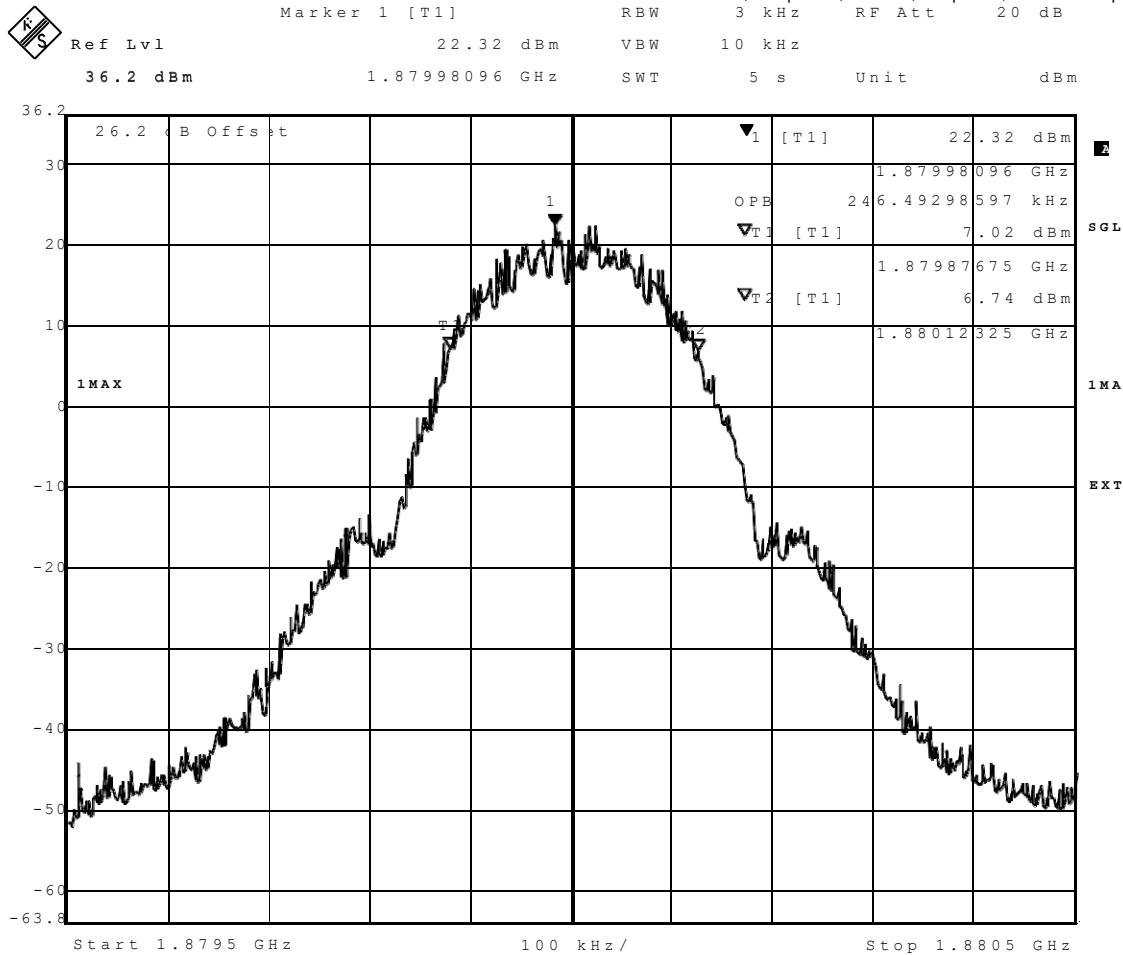


Date:

23.JUN.2017 10:02:40

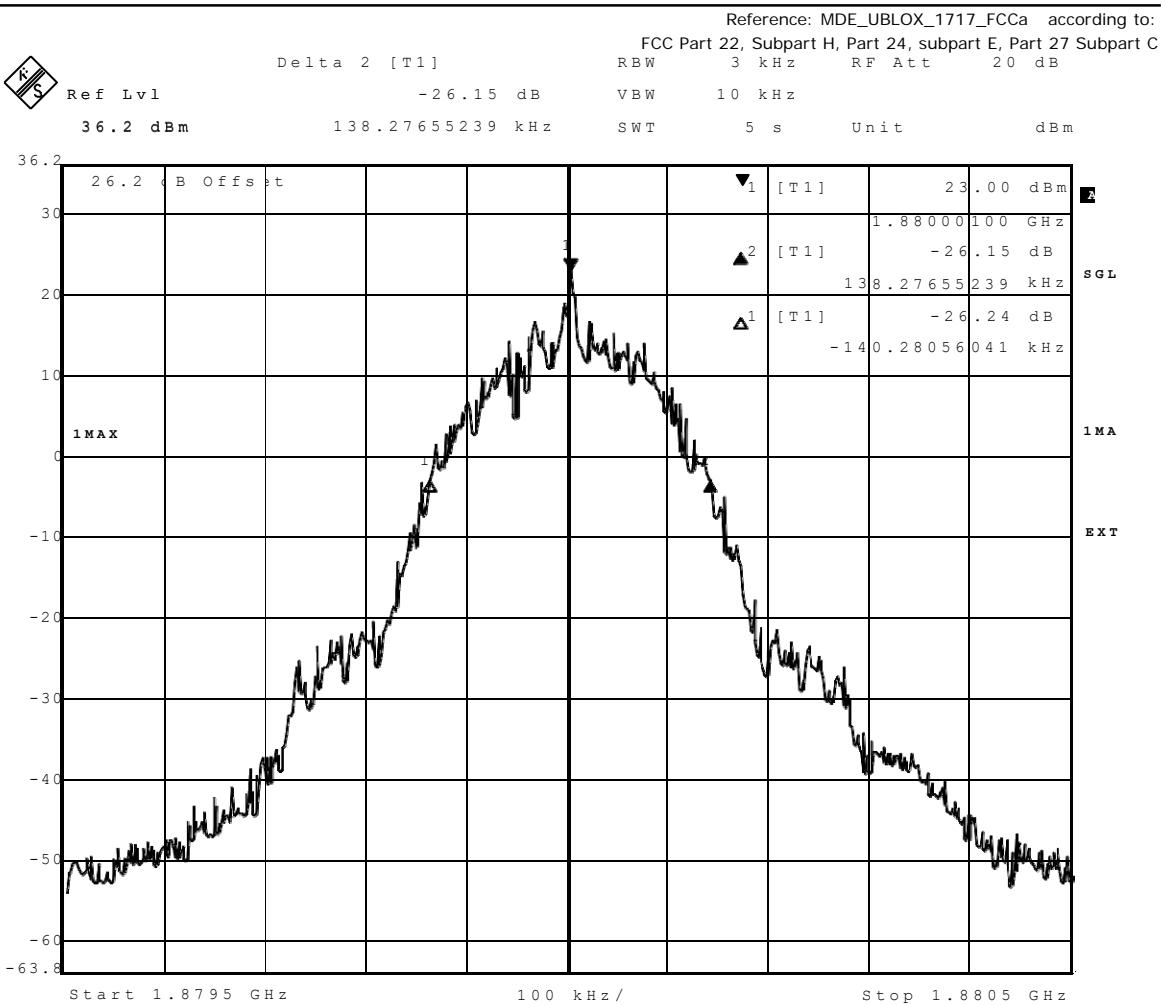
26dB: GSM1900 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



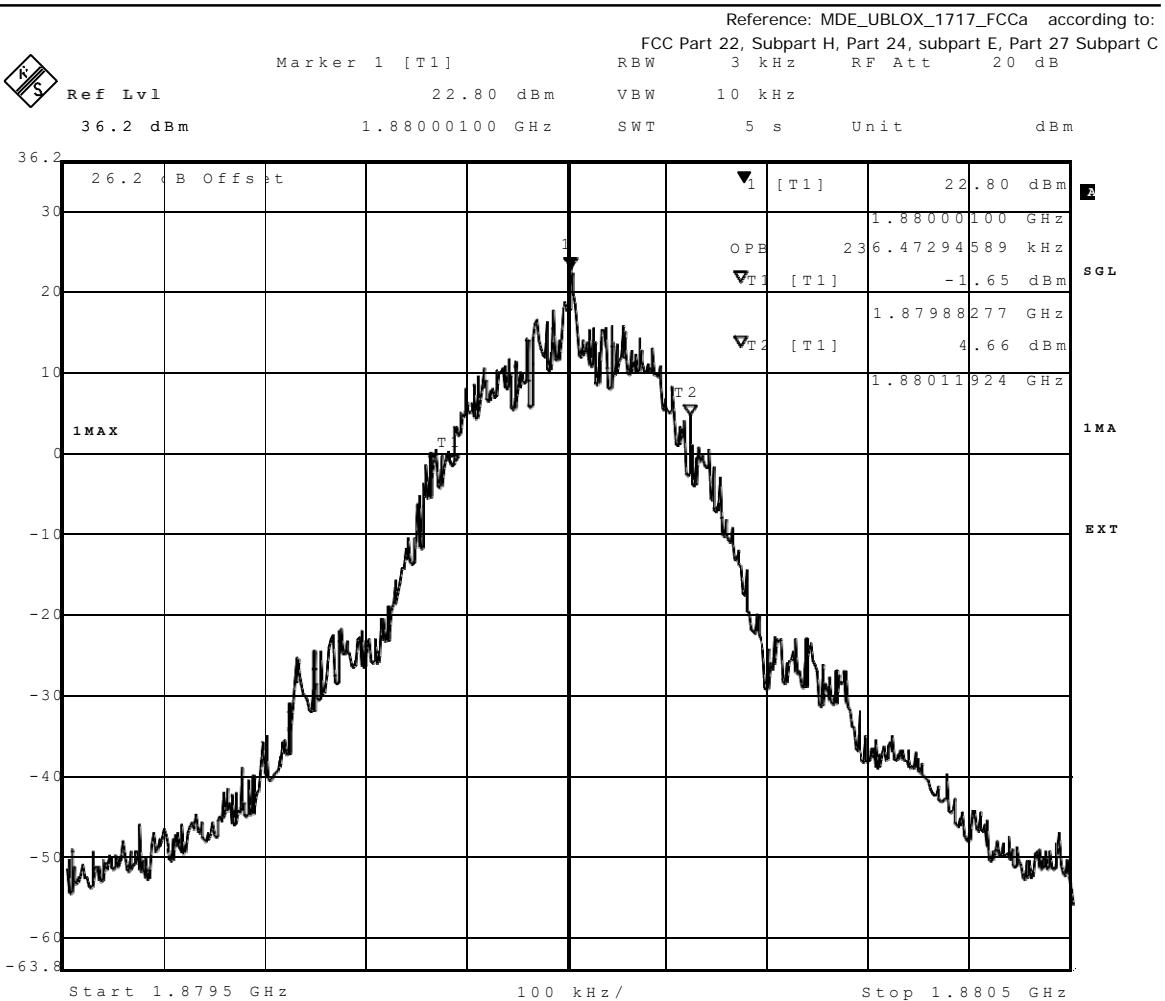
Date: 23.JUN.2017 10:02:04

99%: GSM1900 Channel=mid



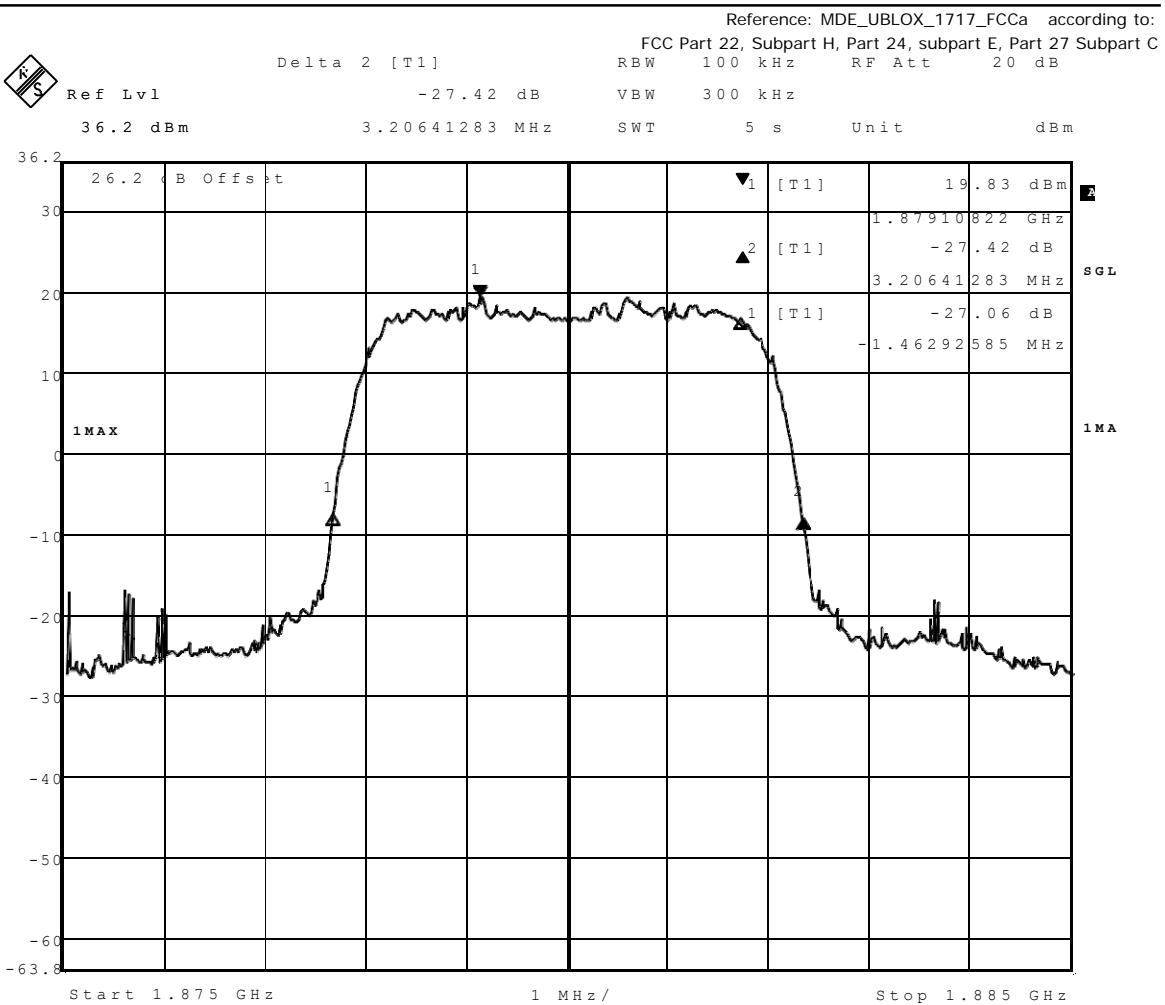
Date: 26.JUN.2017 13:56:42

26dB: EDGE1900 Channel=mid



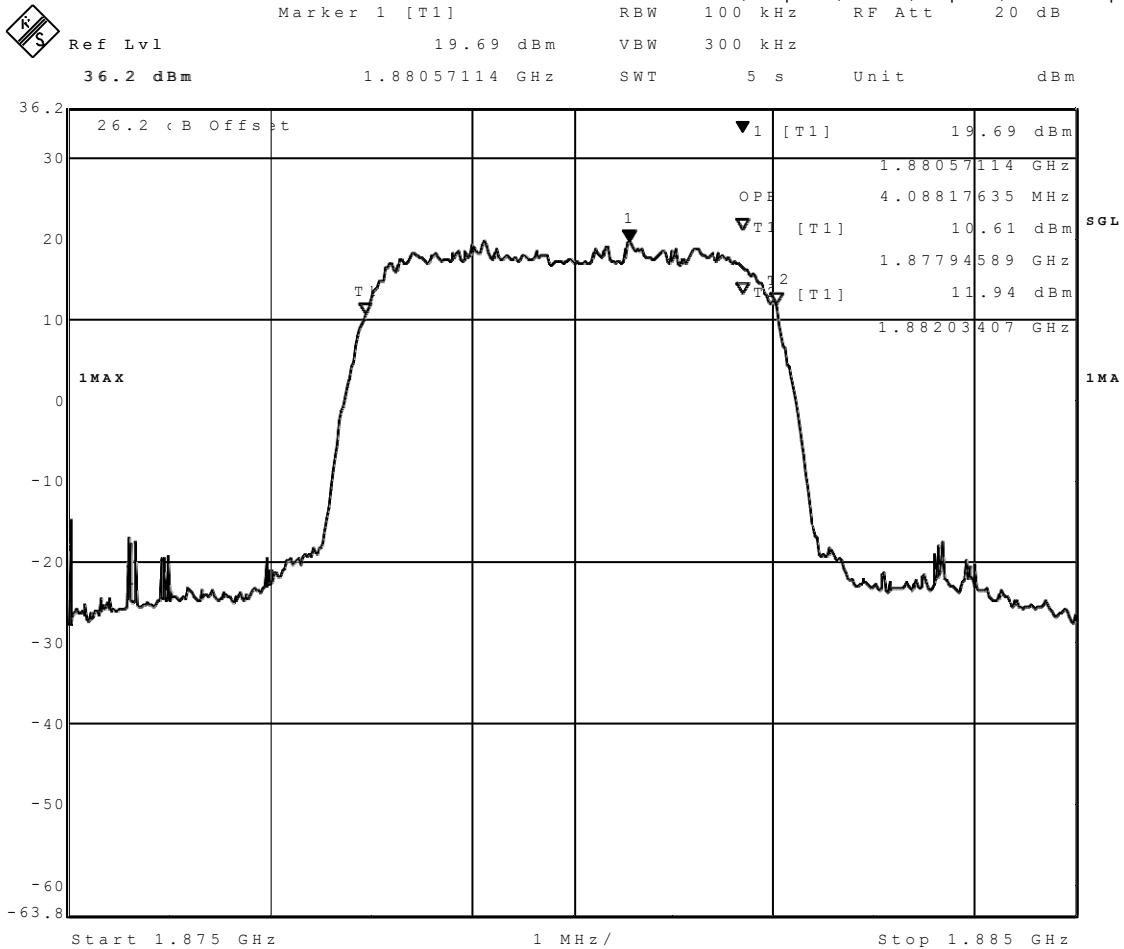
Date: 26.JUN.2017 13:56:08

99%: EDGE1900 Channel=mid



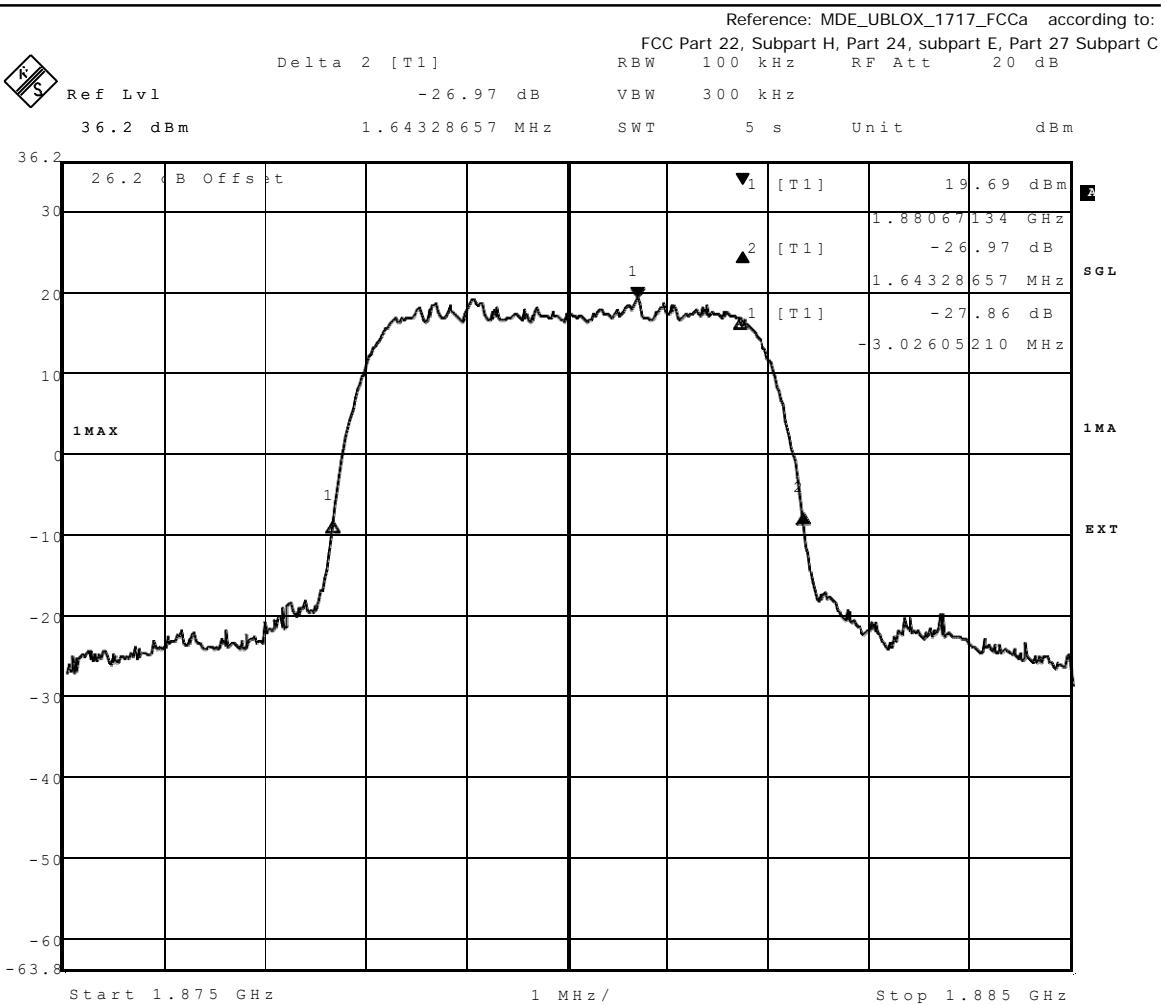
26dB: WCDMA FDD2 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C
 RBW 100 kHz RF Att 20 dB



Date: 14.JUL.2017 16:22:32

99%: WCDMA FDD2 Channel=mid



Date: 26.JUN.2017 12:45:53

26dB: HSDPA FDD2 SUB1 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C
 RBW 100 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

19.70 dBm

VBW 300 kHz

SWT

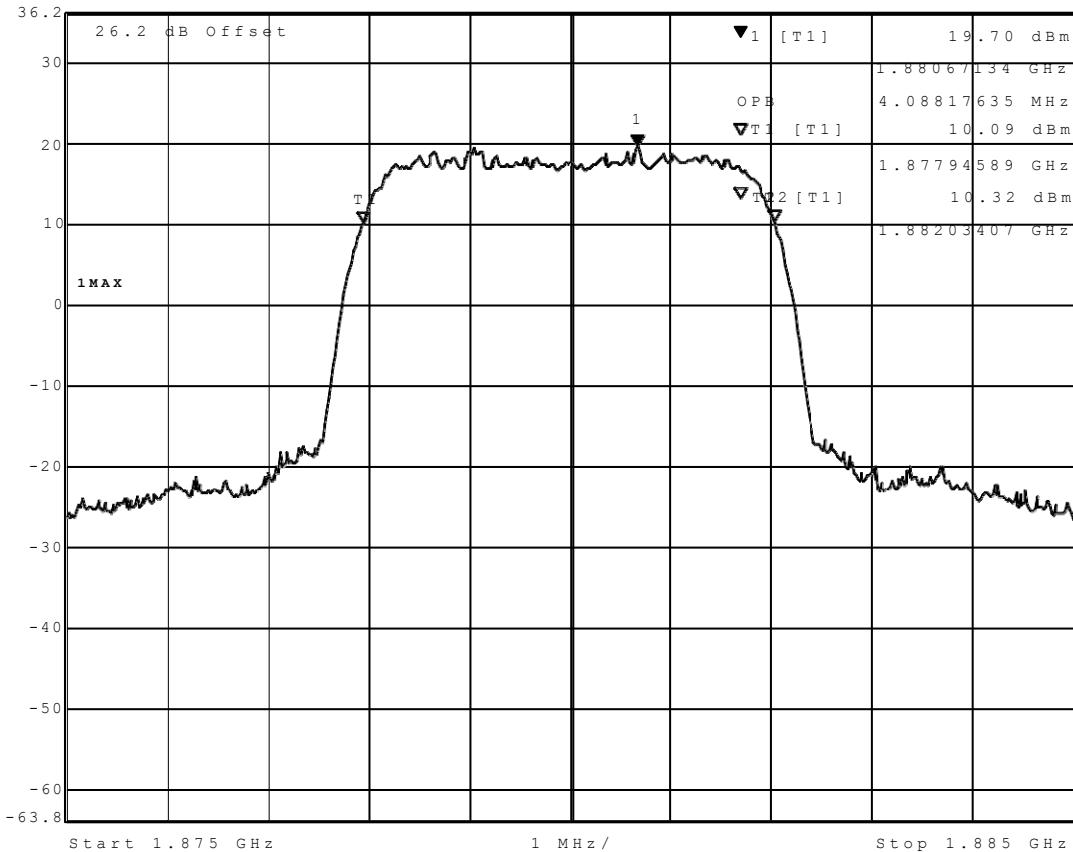
5 s

Unit

dBm

36.2 dBm

1.88067134 GHz



Date: 26.JUN.2017 12:45:22

99%: HSDPA FDD2 SUB1 Channel=mid

3.5.13 24.6 Band edge compliance §2.1053, §24.238
Test: 24.6; Band edge compliance summary §2.1053, §24.238

Result: Passed
Setup No.: am06
Date of Test: 2017/06/23 12:18
Body: FCC47CFRCh1PART24PERSONAL COMMUNICATIONS SERVICES
Test Specification: FCC part 2 and 24

Detailed Results:

Radio Technology	Channel	Nominal BW	Resource Blocks	Peak [dBm]	Average [dBm]	RMS [dBm]	Limit [dBm]	Margin to Limit [dB]
GSM 1900	low	0.2	-	-18.78	-39.37	-30.7	-13	5.78
GSM 1900	high	0.2	-	-18.89	-37.78	-32.5	-13	5.89
GSM 1900 GPRS	low	0.2	-	-20.77	-38.54	-29.8	-13	7.77
GSM 1900 GPRS	high	0.2	-	-17.45	-41.3	-29	-13	4.45
GSM 1900 EDGE	low	0.2	-	-26.98	-45.39	-37.78	-13	13.98
GSM 1900 EDGE	high	0.2	-	-27.51	-47.32	-39.37	-13	14.51
FDD II	low	5	-	-20.33	-29.26	-28.48	-13	15.48
FDD II	high	5	-	-23.72	-32.92	-32.13	-13	19.13
FDD II HSDPA Subtest 1	low	5	-	-19.88	-29.26	-28.48	-13	15.48
FDD II HSDPA Subtest 1	high	5	-	-23.01	-32.92	-32.13	-13	19.13
FDD II HSUPA Subtest 1	low	5	-	-21.17	-29	-28.48	-13	15.48
FDD II HSUPA Subtest 1	high	5	-	-22.95	-32.92	-32.13	-13	19.13
FDD II HSUPA Subtest 5	low	5	-	-21.69	-29.26	-28.48	-13	15.48
FDD II HSUPA Subtest 5	high	5	-	-26.77	-37.78	-36.44	-13	23.44
eFDD 2 QPSK	low	1.4	6	-15.15	-25.92	-24.9	-13	11.88
eFDD 2 QPSK	high	1.4	6	-16.67	-27.54	-26.3	-13	13.3
eFDD 2 16QAM	low	1.4	6	-15.46	-27.11	-25.9	-13	12.92
eFDD 2 16QAM	high	1.4	6	-17.43	-28	-26.5	-13	13.5
eFDD 2 QPSK	low	3	15	-15.78	-27.77	-26.1	-13	13.11
eFDD 2 QPSK	high	3	15	-16.64	-29	-27.3	-13	14.32
eFDD 2 16QAM	low	3	15	-15.42	-29	-27.3	-13	14.32
eFDD 2 16QAM	high	3	15	-18.29	-30.42	-29	-13	16
eFDD 2 QPSK	low	5	25	-12.88	-28	-26.1	-13	13.11
eFDD 2 QPSK	high	5	25	-13.76	-29.82	-28	-13	15
eFDD 2 16QAM	low	5	25	-15.15	-29.82	-28	-13	15
eFDD 2 16QAM	high	5	25	-14.81	-31.07	-29	-13	16
eFDD 2 QPSK	low	10	50	-13.48	-29	-27.1	-13	14.11
eFDD 2 QPSK	high	10	50	-14.96	-31.41	-29.3	-13	16.26
eFDD 2 16QAM	low	10	50	-14.53	-30.74	-28.7	-13	15.74
eFDD 2 16QAM	high	10	50	-14.33	-32.92	-30.7	-13	17.74
eFDD 2 QPSK	low	15	75	-10.63	-28.74	-27.1	-13	14.11
eFDD 2 QPSK	high	15	75	-10.83	-30.74	-28.2	-13	15.24
eFDD 2 16QAM	low	15	75	-10.83	-29.82	-28	-13	15
eFDD 2 16QAM	high	15	75	-11.53	-32.13	-29.5	-13	16.54
eFDD 2 QPSK	low	20	100	-15.29	-30.42	-29	-13	16
eFDD 2 QPSK	high	20	100	-14.69	-32.92	-30.7	-13	17.74
eFDD 2 16QAM	low	20	100	-16.38	-31.76	-30.4	-13	17.42
eFDD 2 16QAM	high	20	100	-15.98	-34.76	-32.5	-13	19.52

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 3 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-17.45 dBm

VBW 3 kHz

36.2 dBm

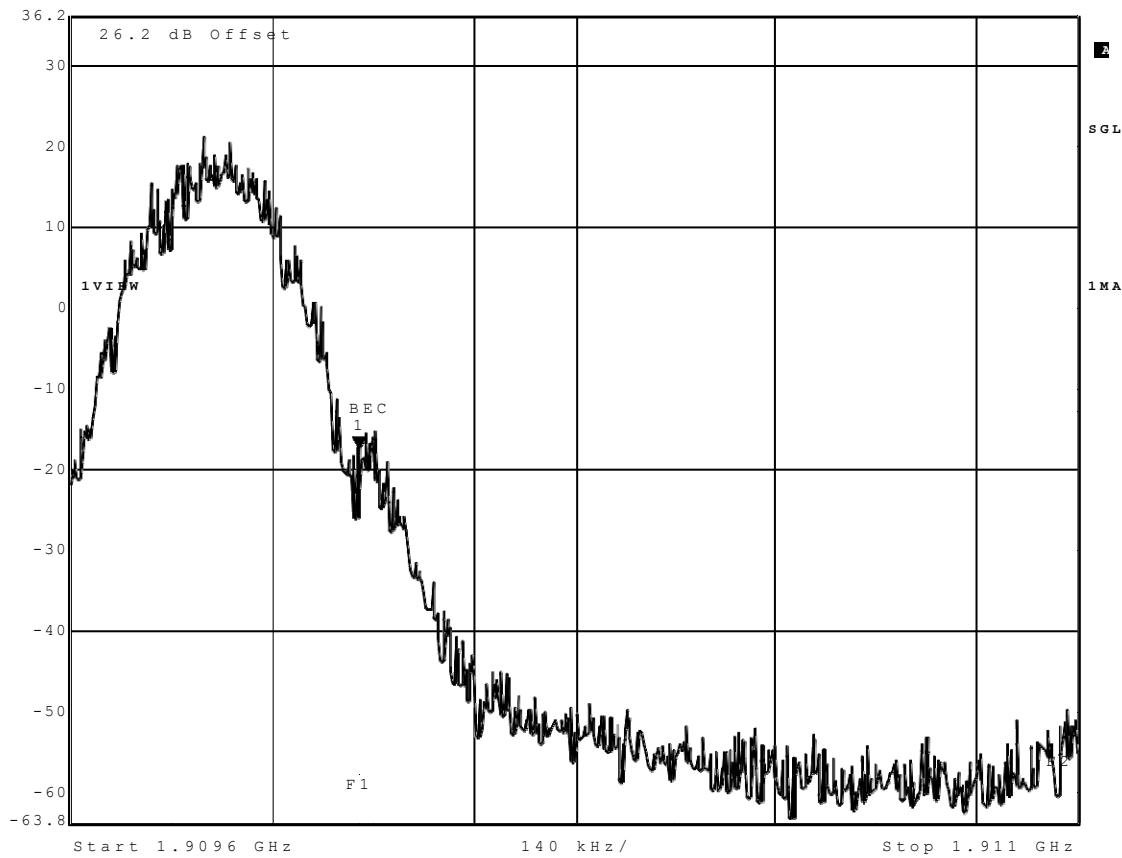
1.91000000 GHz

SWT

5 s

Unit

dBm



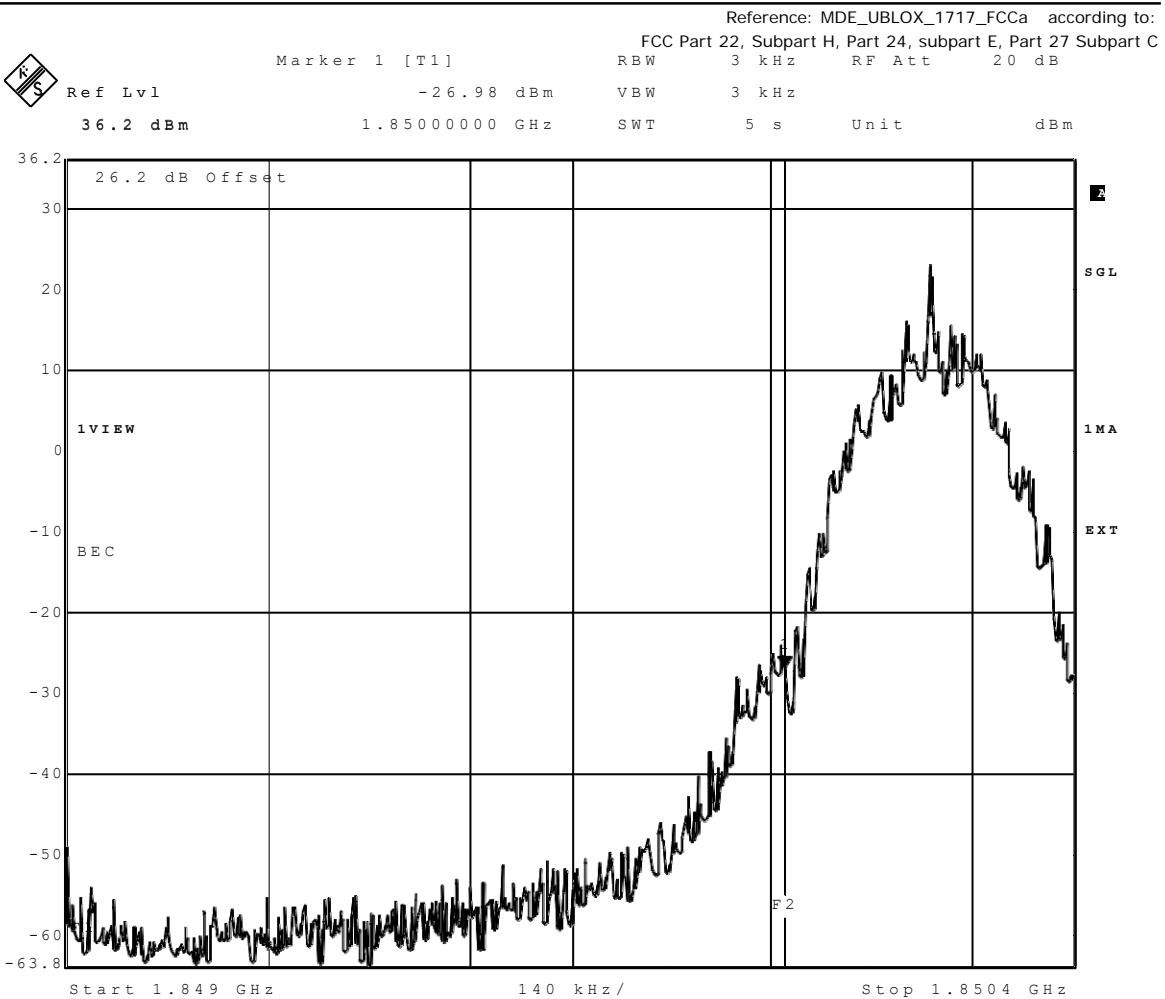
Start 1.9096 GHz

140 kHz /

Stop 1.911 GHz

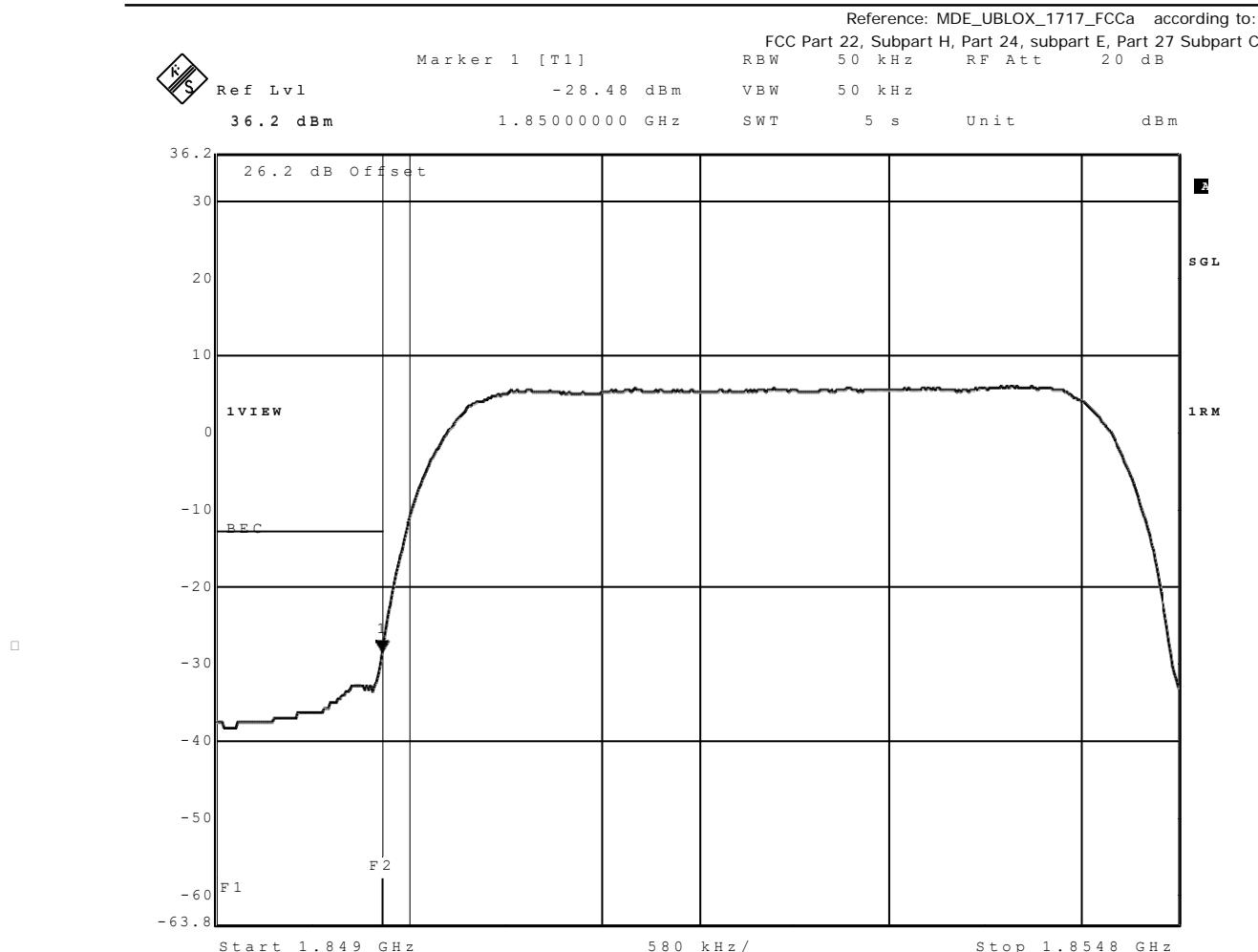
Date: 15.JUL.2017 16:56:14

GSM1900 Channel=low



Date: 26.JUN.2017 14:49:05

EDGE1900 Channel=low



Date: 14.JUL.2017 16:18:19

WCDMA FDD2 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 50 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-28.48 dBm

VBW 50 kHz

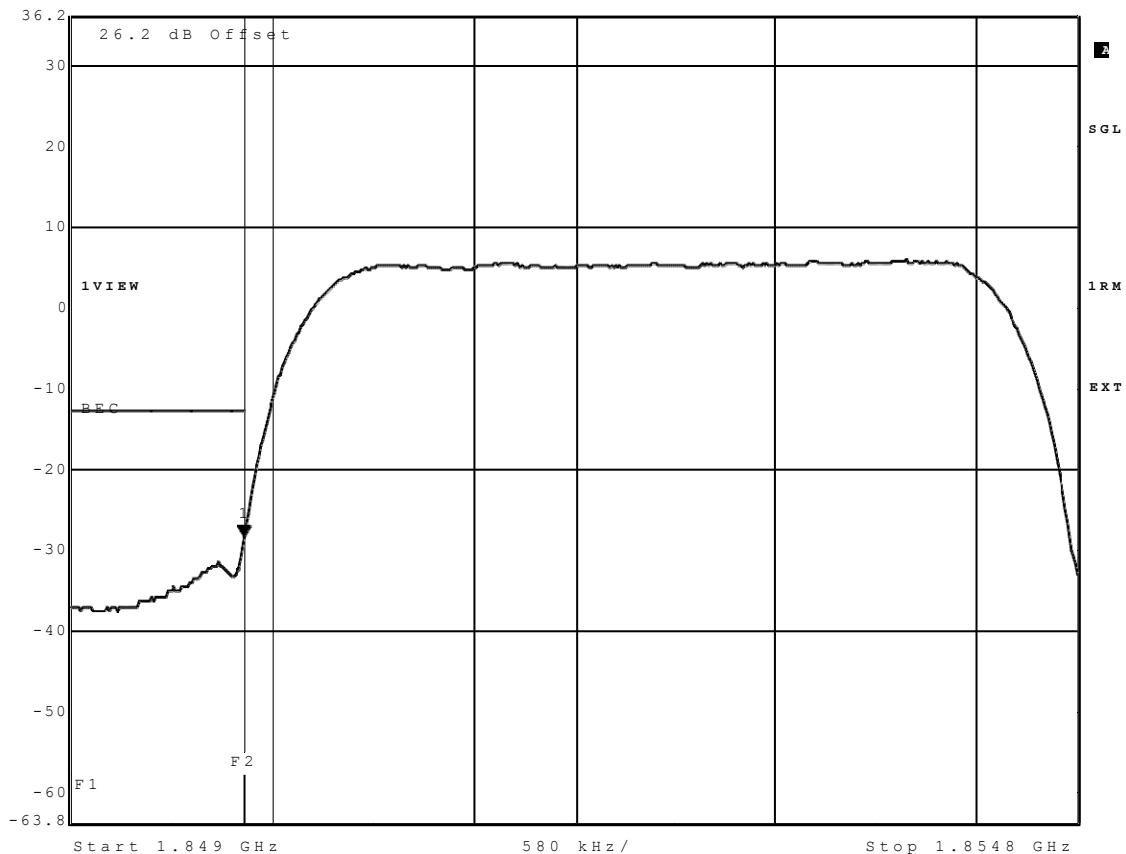
SWT

5 s

Unit

dBm

36.2 dBm



Date: 26.JUN.2017 12:52:06

HSDPA FDD2 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 50 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-28.48 dBm

1.85000000 GHz

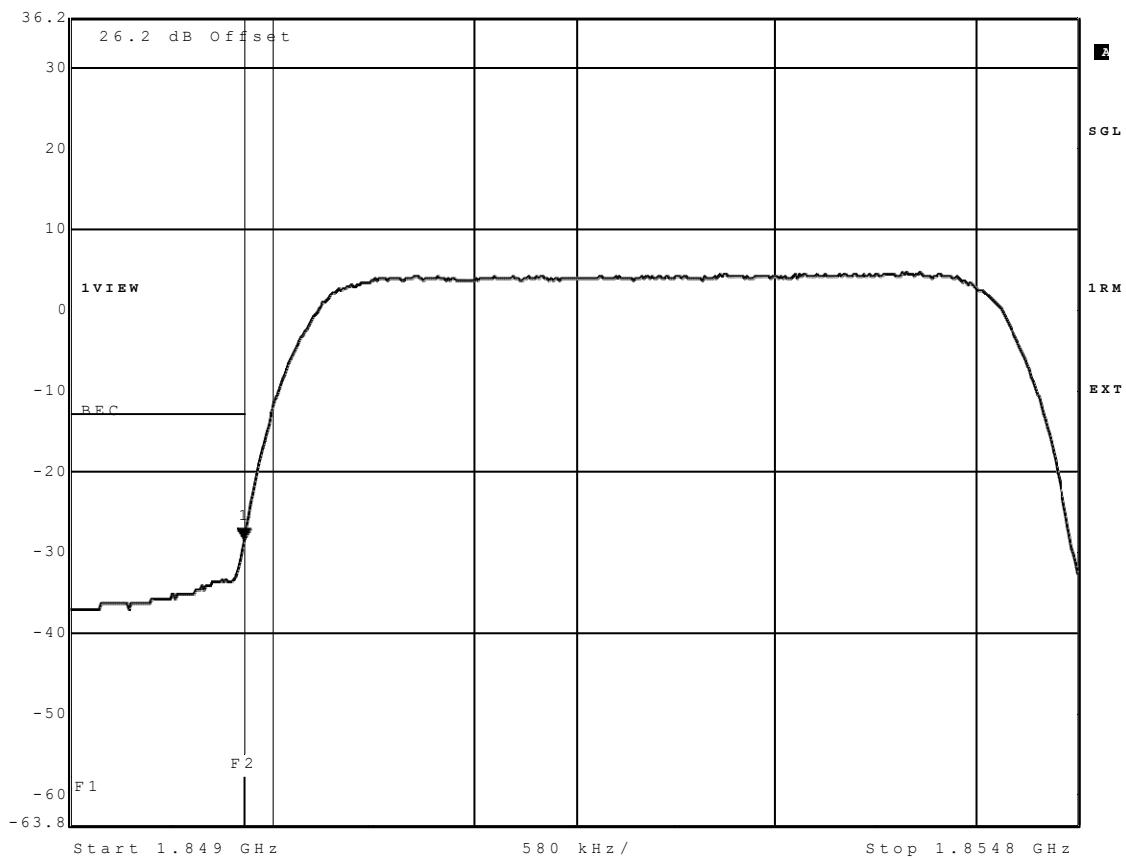
VBW 50 kHz

SWT

5 s

Unit

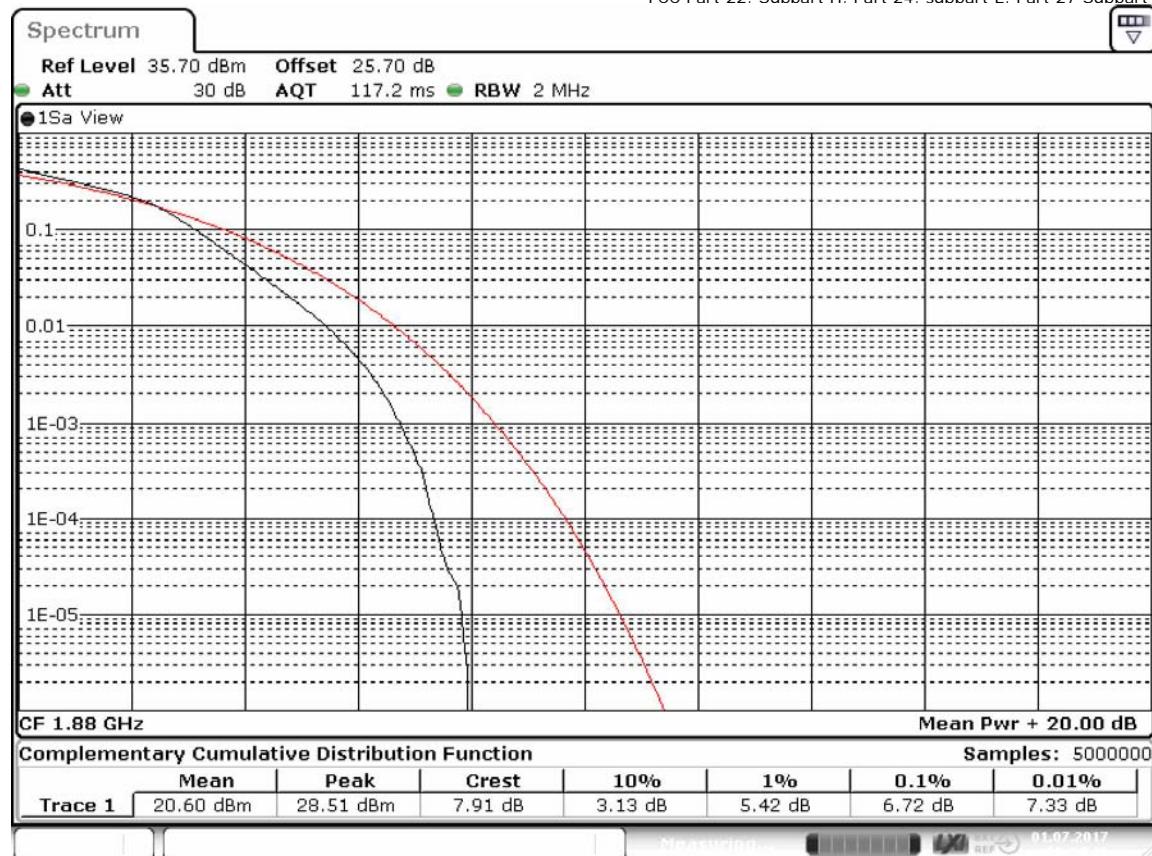
dBm



Date: 26.JUN.2017 10:43:36

HSUPA FDD2 SUB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



eFDD2 QPSK 1.4MHz RB6 Channel=low

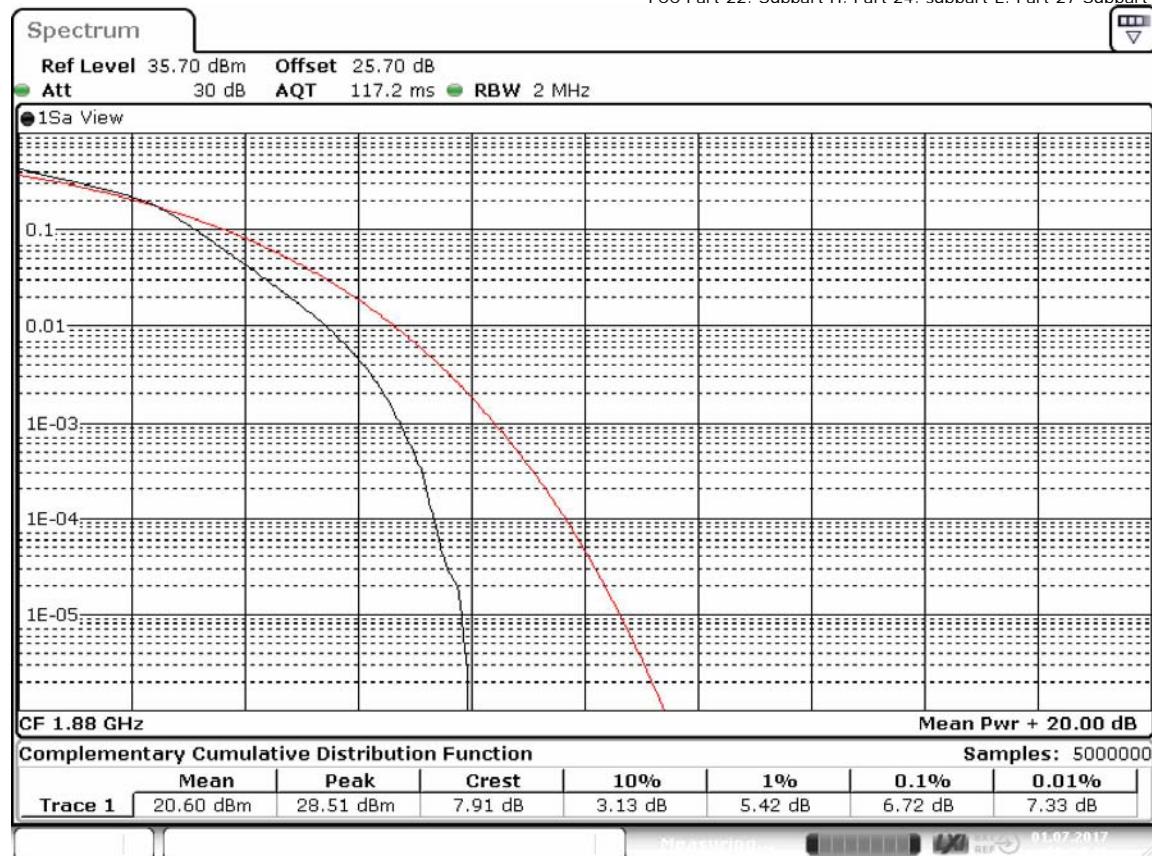
3.5.14 24.7 Peak-to-Average ratio §2.1046, §24.232
Test: 24.7; Peak-to-Average Ratio Summary §2.1046, §24.232

Result: Passed
Setup No.: am06
Date of Test: 2017/06/23 12:08
Body: FCC47CFRCh1PART24PERSONAL COMMUNICATIONS SERVICES
Test Specification: FCC part 2 and 24

Detailed Results:

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	Peak to Average Ratio [dB]	Limit (IC) [dB]
GSM 1900	low	-	0.2	0	13
GSM 1900	mid	-	0.2	0.13	13
GSM 1900	high	-	0.2	0.08	13
GSM 1900 GPRS	low	-	0.2	0.01	13
GSM 1900 GPRS	mid	-	0.2	0	13
GSM 1900 GPRS	high	-	0.2	0.03	13
GSM 1900 EDGE	low	-	0.2	0.02	13
GSM 1900 EDGE	mid	-	0.2	0.06	13
GSM 1900 EDGE	high	-	0.2	0.06	13
FDD II	low	-	5	5.25	13
FDD II	mid	-	5	5.36	13
FDD II	high	-	5	5.05	13
FDD II HSDPA Subtest 1	low	-	5	4.93	13
FDD II HSDPA Subtest 1	mid	-	5	5.32	13
FDD II HSDPA Subtest 1	high	-	5	5.05	13
FDD II HSUPA Subtest 1	low	-	5	6.1	13
FDD II HSUPA Subtest 1	mid	-	5	6.6	13
FDD II HSUPA Subtest 1	high	-	5	6.04	13
FDD II HSUPA Subtest 5	low	-	5	6.2	13
FDD II HSUPA Subtest 5	mid	-	5	6.65	13
FDD II HSUPA Subtest 5	high	-	5	6.5	13
eFDD 2 QPSK	low	6	1.4	5.97	13
eFDD 2 QPSK	mid	6	1.4	5.94	13
eFDD 2 QPSK	high	6	1.4	5.59	13
eFDD 2 16QAM	low	6	1.4	6.58	13
eFDD 2 16QAM	mid	6	1.4	6.72	13
eFDD 2 16QAM	high	6	1.4	6.32	13

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



eFDD2 16QAM 1.4MHz RB6 Channel=mid



Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

3.5.15 27.1 RF Power Output §2.1046, §27.250

Test: 27.1; RF Power Output Summary §2.1046, §27.250

Result: Passed

Setup No.: am06

Date of Test: 2017/06/23 11:31

Body: FCC47CFRCh1PART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 27

Detailed Results:

Radio Technology	Channel	Resource Blocks	BW [MHz]	Peak Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC Limit	IC EIRP Limit [W]	Max. Antenna Gain FCC	Max. Antenna Gain IC [dBi]
eFDD 4 QPSK	low	1	1.4	-	22.02	1 W EIRP	1	8.0 dBi	8.0
eFDD 4 QPSK	low	3	1.4	-	21.9	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 QPSK	low	6	1.4	-	20.92	1 W EIRP	1	9.1 dBi	9.1
eFDD 4 QPSK	mid	1	1.4	-	21.91	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 QPSK	mid	3	1.4	-	21.97	1 W EIRP	1	8.0 dBi	8.0
eFDD 4 QPSK	mid	6	1.4	-	20.77	1 W EIRP	1	9.2 dBi	9.2
eFDD 4 QPSK	high	1	1.4	-	22.15	1 W EIRP	1	7.9 dBi	7.9
eFDD 4 QPSK	high	3	1.4	-	21.88	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 QPSK	high	6	1.4	-	20.89	1 W EIRP	1	9.1 dBi	9.1
eFDD 4 16QAM	low	1	1.4	-	21.05	1 W EIRP	1	9.0 dBi	9.0
eFDD 4 16QAM	low	6	1.4	-	20	1 W EIRP	1	10.0 dBi	10.0
eFDD 4 16QAM	mid	1	1.4	-	21.08	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 16QAM	mid	6	1.4	-	19.8	1 W EIRP	1	10.2 dBi	10.2
eFDD 4 16QAM	high	1	1.4	-	20.96	1 W EIRP	1	9.0 dBi	9.0
eFDD 4 16QAM	high	6	1.4	-	19.97	1 W EIRP	1	10.0 dBi	10.0
eFDD 4 QPSK	low	1	3	-	23.09	1 W EIRP	1	6.9 dBi	6.9
eFDD 4 QPSK	low	15	3	-	20.68	1 W EIRP	1	9.3 dBi	9.3
eFDD 4 QPSK	mid	1	3	-	22.92	1 W EIRP	1	7.1 dBi	7.1
eFDD 4 QPSK	mid	15	3	-	20.54	1 W EIRP	1	9.5 dBi	9.5
eFDD 4 QPSK	high	1	3	-	22.95	1 W EIRP	1	7.1 dBi	7.1
eFDD 4 QPSK	high	15	3	-	20.65	1 W EIRP	1	9.4 dBi	9.4
eFDD 4 16QAM	low	1	3	-	22.19	1 W EIRP	1	7.8 dBi	7.8
eFDD 4 16QAM	low	15	3	-	19.66	1 W EIRP	1	10.3 dBi	10.3
eFDD 4 16QAM	mid	1	3	-	21.92	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 16QAM	mid	15	3	-	19.61	1 W EIRP	1	10.4 dBi	10.4
eFDD 4 16QAM	high	1	3	-	22.07	1 W EIRP	1	7.9 dBi	7.9
eFDD 4 16QAM	high	15	3	-	19.61	1 W EIRP	1	10.4 dBi	10.4
eFDD 4 QPSK	low	1	5	-	22.82	1 W EIRP	1	7.2 dBi	7.2
eFDD 4 QPSK	low	12	5	-	20.54	1 W EIRP	1	9.5 dBi	9.5
eFDD 4 QPSK	low	25	5	-	20.57	1 W EIRP	1	9.4 dBi	9.4
eFDD 4 QPSK	mid	1	5	-	22.69	1 W EIRP	1	7.3 dBi	7.3
eFDD 4 QPSK	mid	12	5	-	20.43	1 W EIRP	1	9.6 dBi	9.6
eFDD 4 QPSK	mid	25	5	-	20.4	1 W EIRP	1	9.6 dBi	9.6
eFDD 4 QPSK	high	1	5	-	22.67	1 W EIRP	1	7.3 dBi	7.3
eFDD 4 QPSK	high	12	5	-	20.48	1 W EIRP	1	9.5 dBi	9.5
eFDD 4 QPSK	high	25	5	-	20.46	1 W EIRP	1	9.5 dBi	9.5
eFDD 4 16QAM	low	1	5	-	21.98	1 W EIRP	1	8.0 dBi	8.0
eFDD 4 16QAM	low	25	5	-	19.52	1 W EIRP	1	10.5 dBi	10.5
eFDD 4 16QAM	mid	1	5	-	22.04	1 W EIRP	1	8.0 dBi	8.0
eFDD 4 16QAM	mid	25	5	-	19.37	1 W EIRP	1	10.6 dBi	10.6
eFDD 4 16QAM	high	1	5	-	21.88	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 16QAM	high	25	5	-	19.38	1 W EIRP	1	10.6 dBi	10.6
eFDD 4 QPSK	low	1	10	-	23.24	1 W EIRP	1	6.8 dBi	6.8
eFDD 4 QPSK	low	50	10	-	20.96	1 W EIRP	1	9.0 dBi	9.0
eFDD 4 QPSK	mid	1	10	-	23.03	1 W EIRP	1	7.0 dBi	7.0
eFDD 4 QPSK	mid	50	10	-	20.86	1 W EIRP	1	9.1 dBi	9.1
eFDD 4 QPSK	high	1	10	-	23.01	1 W EIRP	1	7.0 dBi	7.0
eFDD 4 QPSK	high	50	10	-	20.92	1 W EIRP	1	9.1 dBi	9.1
eFDD 4 16QAM	low	1	10	-	22.08	1 W EIRP	1	7.9 dBi	7.9
eFDD 4 16QAM	low	50	10	-	19.91	1 W EIRP	1	10.1 dBi	10.1
eFDD 4 16QAM	mid	1	10	-	21.94	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 16QAM	mid	50	10	-	19.8	1 W EIRP	1	10.2 dBi	10.2
eFDD 4 16QAM	high	1	10	-	22.27	1 W EIRP	1	7.7 dBi	7.7
eFDD 4 16QAM	high	50	10	-	19.81	1 W EIRP	1	10.2 dBi	10.2
eFDD 4 QPSK	low	1	15	-	23.07	1 W EIRP	1	6.9 dBi	6.9
eFDD 4 QPSK	low	36	15	-	21.32	1 W EIRP	1	8.7 dBi	8.7
eFDD 4 QPSK	low	75	15	-	21.14	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 QPSK	mid	1	15	-	22.86	1 W EIRP	1	7.1 dBi	7.1
eFDD 4 QPSK	mid	36	15	-	21.2	1 W EIRP	1	8.8 dBi	8.8
eFDD 4 QPSK	mid	75	15	-	21.08	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 QPSK	high	1	15	-	22.96	1 W EIRP	1	7.0 dBi	7.0
eFDD 4 QPSK	high	36	15	-	21.2	1 W EIRP	1	8.8 dBi	8.8
eFDD 4 QPSK	high	75	15	-	21.14	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 16QAM	low	1	15	-	21.9	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 16QAM	low	75	15	-	20.07	1 W EIRP	1	9.9 dBi	9.9
eFDD 4 16QAM	mid	1	15	-	21.92	1 W EIRP	1	8.1 dBi	8.1
eFDD 4 16QAM	mid	75	15	-	19.98	1 W EIRP	1	10.0 dBi	10.0
eFDD 4 16QAM	high	1	15	-	22.07	1 W EIRP	1	7.9 dBi	7.9
eFDD 4 16QAM	high	75	15	-	20.02	1 W EIRP	1	10.0 dBi	10.0
eFDD 4 QPSK	low	1	20	-	22.89	1 W EIRP	1	7.1 dBi	7.1
eFDD 4 QPSK	low	100	20	-	21.1	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 QPSK	mid	1	20	-	22.77	1 W EIRP	1	7.2 dBi	7.2
eFDD 4 QPSK	mid	100	20	-	21.07	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 QPSK	high	1	20	-	22.87	1 W EIRP	1	7.1 dBi	7.1
eFDD 4 QPSK	high	100	20	-	21.08	1 W EIRP	1	8.9 dBi	8.9
eFDD 4 16QAM	low	1	20	-	21.82	1 W EIRP	1	8.2 dBi	8.2
eFDD 4 16QAM	low	100	20	-	20.03	1 W EIRP	1	10.0 dBi	10.0
eFDD 4 16QAM	mid	1	20	-	21.84	1 W EIRP	1	8.2 dBi	8.2
eFDD 4 16QAM	mid	100	20	-	21.97	1 W EIRP	1	10.0 dBi	10.0
eFDD 4 16QAM	high	1	20	-	22.06	1 W EIRP	1	7.9 dBi	7.9
eFDD 4 16QAM	high	100	20	-	21.97	1 W EIRP	1	10.0 dBi	10.0

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	Resource Blocks	BW [MHz]	Peak Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC Limit	IC EIRP Limit [W]	Max. Antenna Gain FCC	Max. Antenna Gain IC [dBi]
eFDD 7 QPSK	low	1	5	28.77	22.75	2 W EIRP	2	7.3 dBi	1.2
eFDD 7 QPSK	low	12	5	28.62	20.18	2 W EIRP	2	9.8 dBi	1.4
eFDD 7 QPSK	low	25	5	29.41	20.67	2 W EIRP	2	9.3 dBi	0.6
eFDD 7 QPSK	mid	1	5	28.68	22.63	2 W EIRP	2	7.4 dBi	1.3
eFDD 7 QPSK	mid	12	5	28.91	20.4	2 W EIRP	2	9.6 dBi	1.1
eFDD 7 QPSK	mid	25	5	28.88	20.2	2 W EIRP	2	9.8 dBi	1.1
eFDD 7 QPSK	high	1	5	28.71	22.74	2 W EIRP	2	7.3 dBi	1.3
eFDD 7 QPSK	high	12	5	29.14	20.58	2 W EIRP	2	9.4 dBi	0.9
eFDD 7 QPSK	high	25	5	29.17	20.58	2 W EIRP	2	9.4 dBi	0.8
eFDD 7 16QAM	low	1	5	29.1	21.78	2 W EIRP	2	8.2 dBi	0.9
eFDD 7 16QAM	low	25	5	28.51	19.81	2 W EIRP	2	10.2 dBi	1.5
eFDD 7 16QAM	mid	1	5	29.33	21.96	2 W EIRP	2	8.0 dBi	0.7
eFDD 7 16QAM	mid	25	5	28.43	19.56	2 W EIRP	2	10.4 dBi	1.6
eFDD 7 16QAM	high	1	5	29.04	22.16	2 W EIRP	2	7.8 dBi	1.0
eFDD 7 16QAM	high	25	5	28.26	19.72	2 W EIRP	2	10.3 dBi	1.7
eFDD 7 QPSK	low	1	10	29.51	23.3	2 W EIRP	2	6.7 dBi	0.5
eFDD 7 QPSK	low	50	10	29.8	21.15	2 W EIRP	2	8.9 dBi	0.2
eFDD 7 QPSK	mid	1	10	29.13	23.18	2 W EIRP	2	6.8 dBi	0.9
eFDD 7 QPSK	mid	50	10	29.67	20.96	2 W EIRP	2	9.0 dBi	0.3
eFDD 7 QPSK	high	1	10	29.18	23.15	2 W EIRP	2	6.9 dBi	0.8
eFDD 7 QPSK	high	50	10	29.89	21.03	2 W EIRP	2	9.0 dBi	0.1
eFDD 7 16QAM	low	1	10	29.44	22.42	2 W EIRP	2	7.6 dBi	0.6
eFDD 7 16QAM	low	50	10	29.03	20.26	2 W EIRP	2	9.7 dBi	1.0
eFDD 7 16QAM	mid	1	10	29.35	22.22	2 W EIRP	2	7.8 dBi	0.6
eFDD 7 16QAM	mid	50	10	28.82	20.12	2 W EIRP	2	9.9 dBi	1.2
eFDD 7 16QAM	high	1	10	29.06	22.33	2 W EIRP	2	7.7 dBi	0.9
eFDD 7 16QAM	high	50	10	28.97	20.18	2 W EIRP	2	9.8 dBi	1.0
eFDD 7 QPSK	low	1	15	29.49	23.12	2 W EIRP	2	6.9 dBi	0.5
eFDD 7 QPSK	low	36	15	30	21.46	2 W EIRP	2	8.5 dBi	0.0
eFDD 7 QPSK	low	75	15	29.96	21.22	2 W EIRP	2	8.8 dBi	0.0
eFDD 7 QPSK	mid	1	15	29.47	22.97	2 W EIRP	2	7.0 dBi	0.5
eFDD 7 QPSK	mid	36	15	29.67	21.22	2 W EIRP	2	8.8 dBi	0.3
eFDD 7 QPSK	mid	75	15	29.87	21.08	2 W EIRP	2	8.9 dBi	0.1
eFDD 7 QPSK	high	1	15	28.98	23.02	2 W EIRP	2	7.0 dBi	1.0
eFDD 7 QPSK	high	36	15	29.63	21.14	2 W EIRP	2	8.9 dBi	0.4
eFDD 7 QPSK	high	75	15	29.94	21.14	2 W EIRP	2	8.9 dBi	0.1
eFDD 7 16QAM	low	1	15	29.64	22.25	2 W EIRP	2	7.8 dBi	0.4
eFDD 7 16QAM	low	75	15	29.13	20.3	2 W EIRP	2	9.7 dBi	0.9
eFDD 7 16QAM	mid	1	15	29.49	21.97	2 W EIRP	2	8.0 dBi	0.5
eFDD 7 16QAM	mid	75	15	28.96	20.16	2 W EIRP	2	9.8 dBi	1.0
eFDD 7 16QAM	high	1	15	29.08	22.26	2 W EIRP	2	7.7 dBi	0.9
eFDD 7 16QAM	high	75	15	29.06	20.19	2 W EIRP	2	9.8 dBi	0.9
eFDD 7 QPSK	low	1	20	28.92	23.04	2 W EIRP	2	7.0 dBi	1.1
eFDD 7 QPSK	low	100	20	29.8	20.88	2 W EIRP	2	9.1 dBi	0.2
eFDD 7 QPSK	mid	1	20	29.33	23.06	2 W EIRP	2	6.9 dBi	0.7
eFDD 7 QPSK	mid	100	20	29.62	20.71	2 W EIRP	2	9.3 dBi	0.4
eFDD 7 QPSK	high	1	20	28.9	22.99	2 W EIRP	2	7.0 dBi	1.1
eFDD 7 QPSK	high	100	20	29.97	21.16	2 W EIRP	2	8.8 dBi	0.0
eFDD 7 16QAM	low	1	20	29.03	22.36	2 W EIRP	2	7.6 dBi	1.0
eFDD 7 16QAM	low	100	20	29.41	20.34	2 W EIRP	2	9.7 dBi	0.6
eFDD 7 16QAM	mid	1	20	29.29	21.99	2 W EIRP	2	8.0 dBi	0.7
eFDD 7 16QAM	mid	100	20	29.21	20.25	2 W EIRP	2	9.8 dBi	0.8
eFDD 7 16QAM	high	1	20	29.17	21.9	2 W EIRP	2	8.1 dBi	0.8
eFDD 7 16QAM	high	100	20	29.26	20.24	2 W EIRP	2	9.8 dBi	0.7

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	Resource Blocks	BW [MHz]	Peak Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC Limit	IC EIRP Limit [W]	Max. Antenna Gain FCC	Max. Antenna Gain IC [dBi]
eFDD 12 QPSK	low	1	1.4	-	21.78	3 W ERP	5	13.0 dBd	15.2
eFDD 12 QPSK	low	3	1.4	-	21.61	3 W ERP	5	13.2 dBd	15.4
eFDD 12 QPSK	low	6	1.4	-	20.58	3 W ERP	5	14.2 dBd	16.4
eFDD 12 QPSK	mid	1	1.4	-	21.61	3 W ERP	5	13.2 dBd	15.4
eFDD 12 QPSK	mid	3	1.4	-	21.53	3 W ERP	5	13.2 dBd	15.5
eFDD 12 QPSK	mid	6	1.4	-	20.37	3 W ERP	5	14.4 dBd	16.6
eFDD 12 QPSK	high	1	1.4	-	21.54	3 W ERP	5	13.2 dBd	15.5
eFDD 12 QPSK	high	3	1.4	-	21.51	3 W ERP	5	13.3 dBd	15.5
eFDD 12 QPSK	high	6	1.4	-	20.42	3 W ERP	5	14.4 dBd	16.6
eFDD 12 16QAM	low	1	1.4	-	20.75	3 W ERP	5	14.0 dBd	16.2
eFDD 12 16QAM	low	6	1.4	-	19.75	3 W ERP	5	15.0 dBd	17.2
eFDD 12 16QAM	mid	1	1.4	-	20.6	3 W ERP	5	14.2 dBd	16.4
eFDD 12 16QAM	mid	6	1.4	-	19.44	3 W ERP	5	15.3 dBd	17.6
eFDD 12 16QAM	high	1	1.4	-	20.78	3 W ERP	5	14.0 dBd	16.2
eFDD 12 16QAM	high	6	1.4	-	19.45	3 W ERP	5	15.3 dBd	17.5
eFDD 12 QPSK	low	1	3	-	22.73	3 W ERP	5	12.0 dBd	14.3
eFDD 12 QPSK	low	15	3	-	20.21	3 W ERP	5	14.6 dBd	16.8
eFDD 12 QPSK	mid	1	3	-	22.63	3 W ERP	5	12.1 dBd	14.4
eFDD 12 QPSK	mid	15	3	-	20.06	3 W ERP	5	14.7 dBd	16.9
eFDD 12 QPSK	high	1	3	-	22.56	3 W ERP	5	12.2 dBd	14.4
eFDD 12 QPSK	high	15	3	-	20.08	3 W ERP	5	14.7 dBd	16.9
eFDD 12 16QAM	low	1	3	-	21.68	3 W ERP	5	13.1 dBd	15.3
eFDD 12 16QAM	low	15	3	-	19.28	3 W ERP	5	15.5 dBd	17.7
eFDD 12 16QAM	mid	1	3	-	21.74	3 W ERP	5	13.0 dBd	15.3
eFDD 12 16QAM	mid	15	3	-	19.11	3 W ERP	5	15.7 dBd	17.9
eFDD 12 16QAM	high	1	3	-	21.57	3 W ERP	5	13.2 dBd	15.4
eFDD 12 16QAM	high	15	3	-	19.16	3 W ERP	5	15.6 dBd	17.8
eFDD 12 QPSK	low	1	5	-	22.48	3 W ERP	5	12.3 dBd	14.5
eFDD 12 QPSK	low	12	5	-	20.05	3 W ERP	5	14.7 dBd	16.9
eFDD 12 QPSK	low	25	5	-	20.01	3 W ERP	5	14.8 dBd	17.0
eFDD 12 QPSK	mid	1	5	-	22.52	3 W ERP	5	12.3 dBd	14.5
eFDD 12 QPSK	mid	12	5	-	19.95	3 W ERP	5	14.8 dBd	17.0
eFDD 12 QPSK	mid	25	5	-	19.94	3 W ERP	5	14.8 dBd	17.1
eFDD 12 QPSK	high	1	5	-	22.22	3 W ERP	5	12.6 dBd	14.8
eFDD 12 QPSK	high	12	5	-	19.88	3 W ERP	5	14.9 dBd	17.1
eFDD 12 QPSK	high	25	5	-	19.89	3 W ERP	5	14.9 dBd	17.1
eFDD 12 16QAM	low	1	5	-	21.52	3 W ERP	5	13.3 dBd	15.5
eFDD 12 16QAM	low	25	5	-	19.07	3 W ERP	5	15.7 dBd	17.9
eFDD 12 16QAM	mid	1	5	-	21.57	3 W ERP	5	13.2 dBd	15.4
eFDD 12 16QAM	mid	25	5	-	19.16	3 W ERP	5	15.6 dBd	17.8
eFDD 12 QPSK	low	1	10	-	22.48	3 W ERP	5	12.3 dBd	14.5
eFDD 12 QPSK	mid	10	10	-	20.05	3 W ERP	5	14.7 dBd	16.9
eFDD 12 QPSK	mid	50	10	-	20.01	3 W ERP	5	14.8 dBd	17.0
eFDD 12 QPSK	high	1	10	-	22.22	3 W ERP	5	12.6 dBd	14.8
eFDD 12 QPSK	high	12	10	-	19.88	3 W ERP	5	14.9 dBd	17.1
eFDD 12 QPSK	high	25	10	-	19.89	3 W ERP	5	14.9 dBd	17.1
eFDD 12 16QAM	low	1	10	-	21.52	3 W ERP	5	13.3 dBd	15.5
eFDD 12 16QAM	low	25	10	-	19.07	3 W ERP	5	15.7 dBd	17.9
eFDD 12 16QAM	mid	1	10	-	21.57	3 W ERP	5	13.2 dBd	15.4
eFDD 12 16QAM	mid	25	10	-	19.16	3 W ERP	5	15.6 dBd	17.8
eFDD 12 QPSK	low	1	50	-	20.44	3 W ERP	5	14.3 dBd	16.6
eFDD 12 QPSK	mid	1	10	-	22.7	3 W ERP	5	14.8 dBd	17.1
eFDD 12 QPSK	mid	50	10	-	20.44	3 W ERP	5	14.3 dBd	16.6
eFDD 12 QPSK	high	1	10	-	22.65	3 W ERP	5	12.1 dBd	14.3
eFDD 12 QPSK	high	50	10	-	20.46	3 W ERP	5	14.3 dBd	16.5
eFDD 12 16QAM	low	1	10	-	21.96	3 W ERP	5	12.8 dBd	15.0
eFDD 12 16QAM	low	50	10	-	19.46	3 W ERP	5	15.3 dBd	17.5
eFDD 12 16QAM	mid	1	10	-	21.96	3 W ERP	5	12.8 dBd	15.0
eFDD 12 16QAM	mid	50	10	-	19.46	3 W ERP	5	15.3 dBd	17.5
eFDD 12 16QAM	high	1	10	-	21.67	3 W ERP	5	13.1 dBd	15.3
eFDD 12 16QAM	high	50	10	-	19.46	3 W ERP	5	15.3 dBd	17.5
eFDD 13 QPSK	low	1	5	-	22.13	3 W ERP	5	12.6 dBd	14.9
eFDD 13 QPSK	low	12	5	-	19.92	3 W ERP	5	14.9 dBd	17.1
eFDD 13 QPSK	low	25	5	-	19.85	3 W ERP	5	14.9 dBd	17.1
eFDD 13 QPSK	mid	1	5	-	21.95	3 W ERP	5	12.8 dBd	15.0
eFDD 13 QPSK	mid	12	5	-	19.8	3 W ERP	5	15.0 dBd	17.2
eFDD 13 QPSK	mid	25	5	-	19.72	3 W ERP	5	15.1 dBd	17.3
eFDD 13 QPSK	high	1	5	-	21.98	3 W ERP	5	12.8 dBd	15.0
eFDD 13 QPSK	high	12	5	-	19.65	3 W ERP	5	15.1 dBd	17.3
eFDD 13 QPSK	high	25	5	-	19.62	3 W ERP	5	15.2 dBd	17.4
eFDD 13 16QAM	low	1	5	-	21.06	3 W ERP	5	13.7 dBd	15.9
eFDD 13 16QAM	low	25	5	-	18.72	3 W ERP	5	16.1 dBd	18.3
eFDD 13 16QAM	mid	1	5	-	21.08	3 W ERP	5	13.7 dBd	15.9
eFDD 13 16QAM	mid	25	5	-	18.67	3 W ERP	5	16.1 dBd	18.3
eFDD 13 16QAM	high	1	5	-	21.09	3 W ERP	5	13.7 dBd	15.9
eFDD 13 16QAM	high	25	5	-	18.63	3 W ERP	5	16.1 dBd	18.4
eFDD 13 QPSK	mid	1	10	-	22.12	3 W ERP	5	12.7 dBd	14.9
eFDD 13 QPSK	mid	50	10	-	20.18	3 W ERP	5	14.6 dBd	16.8
eFDD 13 16QAM	mid	1	10	-	21.2	3 W ERP	5	13.6 dBd	15.8
eFDD 13 16QAM	mid	50	10	-	19.1	3 W ERP	5	15.7 dBd	17.9

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	BW [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]	FCC Limit	IC EIRP Limit [W]	Max. Antenna Gain FCC
FDD IV	low	5	29.63	24.07	24.18	1 W EIRP	1	5.8 dBi
FDD IV	mid 1	5	29.52	24.09	24.22	1 W EIRP	1	5.8 dBi
FDD IV	mid 2	5	29.77	24.17	24.36	1 W EIRP	1	5.6 dBi
FDD IV	high	5	29.52	24.21	24.3	1 W EIRP	1	5.7 dBi
FDD IV HSDPA Subtest 1	low	5	29.17	24.33	24.45	1 W EIRP	1	5.6 dBi
FDD IV HSDPA Subtest 1	mid 1	5	29.63	24.28	24.38	1 W EIRP	1	5.6 dBi
FDD IV HSDPA Subtest 1	mid 2	5	29.17	24.28	24.53	1 W EIRP	1	5.5 dBi
FDD IV HSDPA Subtest 1	high	5	29.28	24.37	24.44	1 W EIRP	1	5.6 dBi
FDD IV HSDPA Subtest 2	low	5	29.77	23.57	24.24	1 W EIRP	1	5.8 dBi
FDD IV HSDPA Subtest 2	mid 1	5	29.77	23.9	24.39	1 W EIRP	1	5.6 dBi
FDD IV HSDPA Subtest 2	mid 2	5	29.91	23.94	24.38	1 W EIRP	1	5.6 dBi
FDD IV HSDPA Subtest 2	high	5	29.91	23.93	24.46	1 W EIRP	1	5.5 dBi
FDD IV HSDPA Subtest 3	low	5	29.4	23.33	24.13	1 W EIRP	1	5.9 dBi
FDD IV HSDPA Subtest 3	mid 1	5	29.91	23.28	24.08	1 W EIRP	1	5.9 dBi
FDD IV HSDPA Subtest 3	mid 2	5	30.12	23.47	24.25	1 W EIRP	1	5.8 dBi
FDD IV HSDPA Subtest 3	high	5	30.12	23.68	24.22	1 W EIRP	1	5.8 dBi
FDD IV HSDPA Subtest 4	low	5	29.4	23.03	23.87	1 W EIRP	1	6.1 dBi
FDD IV HSDPA Subtest 4	mid 1	5	29.52	23.1	23.92	1 W EIRP	1	6.1 dBi
FDD IV HSDPA Subtest 4	mid 2	5	29.52	23.3	24.04	1 W EIRP	1	6.0 dBi
FDD IV HSDPA Subtest 4	high	5	29.52	23.08	23.92	1 W EIRP	1	6.1 dBi
FDD IV HSUPA Subtest 1	low	5	29.28	23.16	23.4	1 W EIRP	1	6.6 dBi
FDD IV HSUPA Subtest 1	mid 1	5	29.91	23.12	23.5	1 W EIRP	1	6.5 dBi
FDD IV HSUPA Subtest 1	mid 2	5	20.51	14.39	14.78	1 W EIRP	1	15.2 dBi
FDD IV HSUPA Subtest 1	high	5	29.63	23.27	23.68	1 W EIRP	1	6.3 dBi
FDD IV HSUPA Subtest 2	low	5	28.75	21.15	21.75	1 W EIRP	1	8.3 dBi
FDD IV HSUPA Subtest 2	mid 1	5	30.89	21.83	22.6	1 W EIRP	1	7.4 dBi
FDD IV HSUPA Subtest 2	mid 2	5	30.59	21.82	22.71	1 W EIRP	1	7.3 dBi
FDD IV HSUPA Subtest 2	high	5	31.07	21.92	22.74	1 W EIRP	1	7.3 dBi
FDD IV HSUPA Subtest 3	low	5	29.4	22.45	23.05	1 W EIRP	1	7.0 dBi
FDD IV HSUPA Subtest 3	mid 1	5	30.59	22.7	23.43	1 W EIRP	1	6.6 dBi
FDD IV HSUPA Subtest 3	mid 2	5	30.75	22.71	23.4	1 W EIRP	1	6.6 dBi
FDD IV HSUPA Subtest 3	high	5	30.59	22.94	23.46	1 W EIRP	1	6.5 dBi
FDD IV HSUPA Subtest 4	low	5	27.85	21.68	21.91	1 W EIRP	1	8.1 dBi
FDD IV HSUPA Subtest 4	mid 1	5	27.85	19.5	20.66	1 W EIRP	1	9.3 dBi
FDD IV HSUPA Subtest 4	mid 2	5	28.25	19.99	21.16	1 W EIRP	1	8.8 dBi
FDD IV HSUPA Subtest 4	high	5	30.12	22.25	23	1 W EIRP	1	7.0 dBi
FDD IV HSUPA Subtest 5	low	5	29.17	23.18	23.46	1 W EIRP	1	6.5 dBi
FDD IV HSUPA Subtest 5	mid 1	5	29.28	23.15	23.43	1 W EIRP	1	6.6 dBi
FDD IV HSUPA Subtest 5	mid 2	5	30.36	23.27	23.62	1 W EIRP	1	6.4 dBi
FDD IV HSUPA Subtest 5	high	5	29.63	23.23	23.49	1 W EIRP	1	6.5 dBi

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 200 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

22.51 dBm

VBW 1 MHz

36.2 dBm

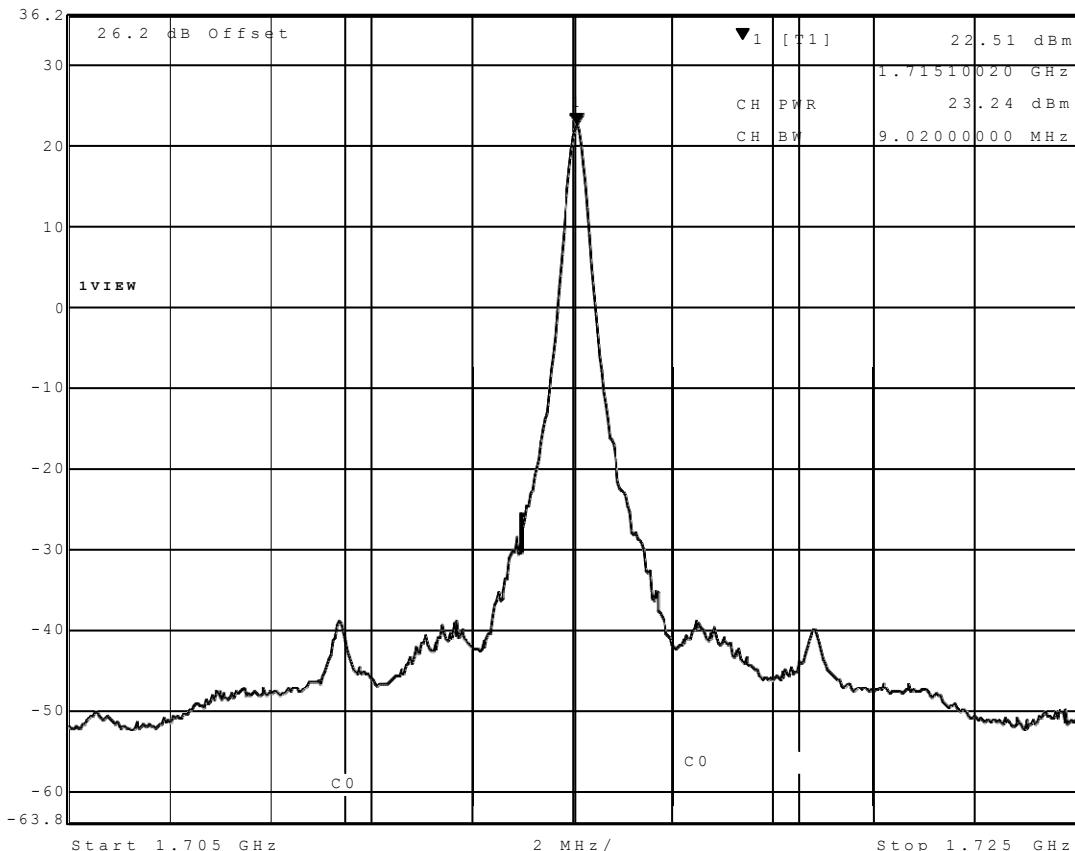
1.71510020 GHz

SWT

5 ms

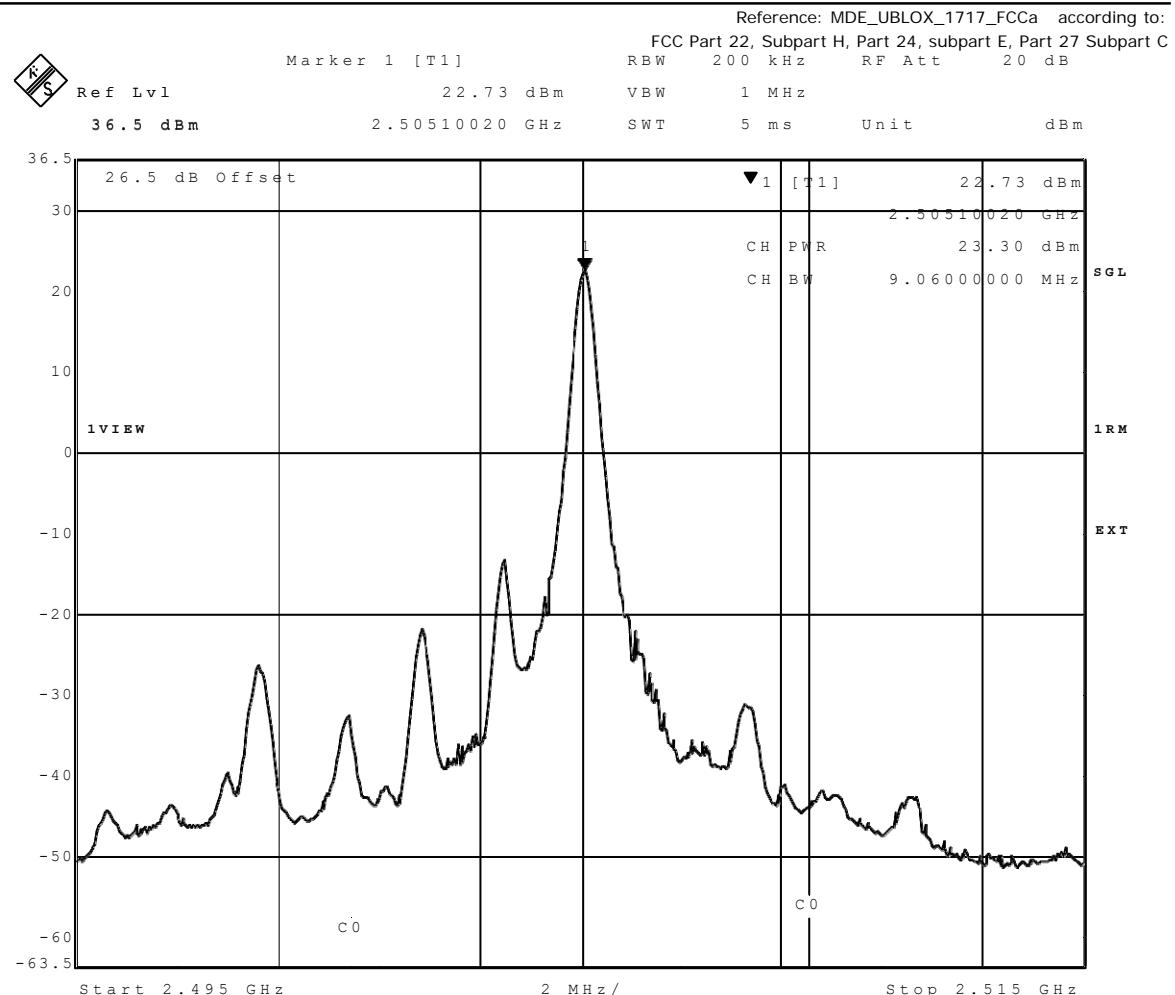
Unit

dBm



Date: 23.JUN.2017 16:13:31

eFDD4 QPSK 10MHz RB1 Channel=low



Date: 22.JUN.2017 10:38:17

eFDD7 QPSK 10MHz RB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 200 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

21.99 dBm

VBW 1 MHz

35.6 dBm

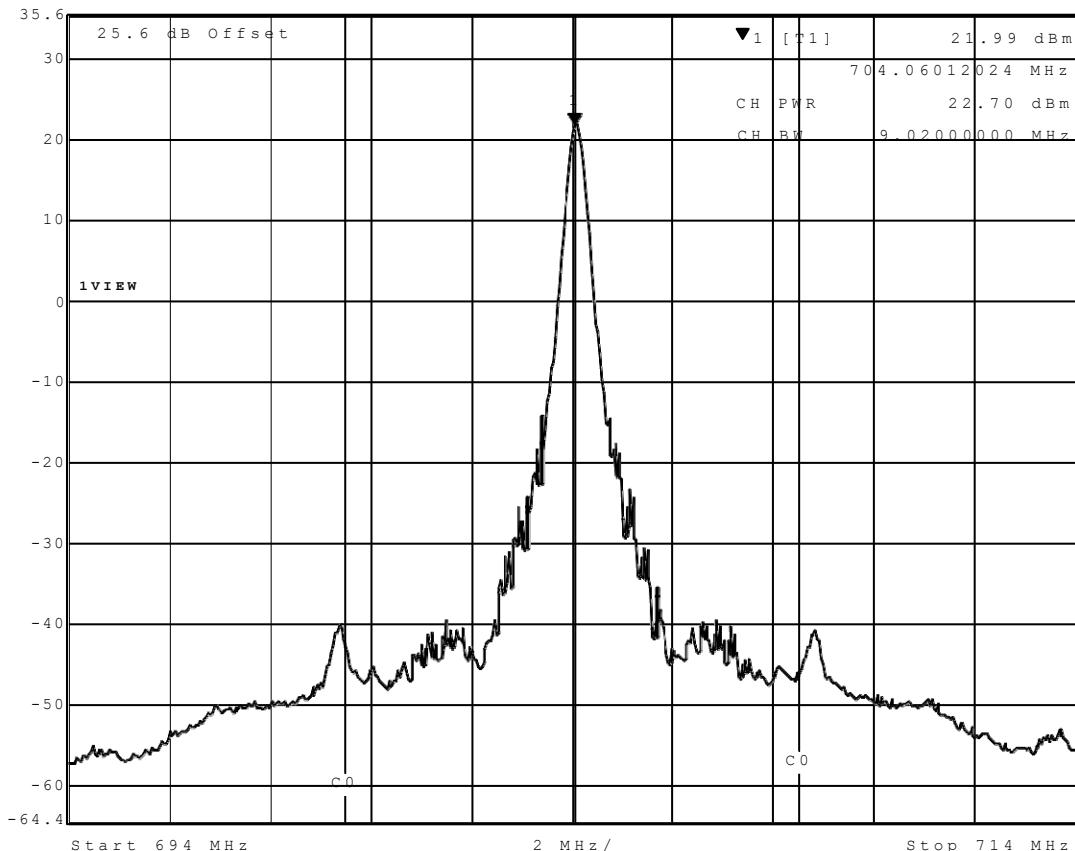
704.06012024 MHz

SWT

5 ms

Unit

dBm

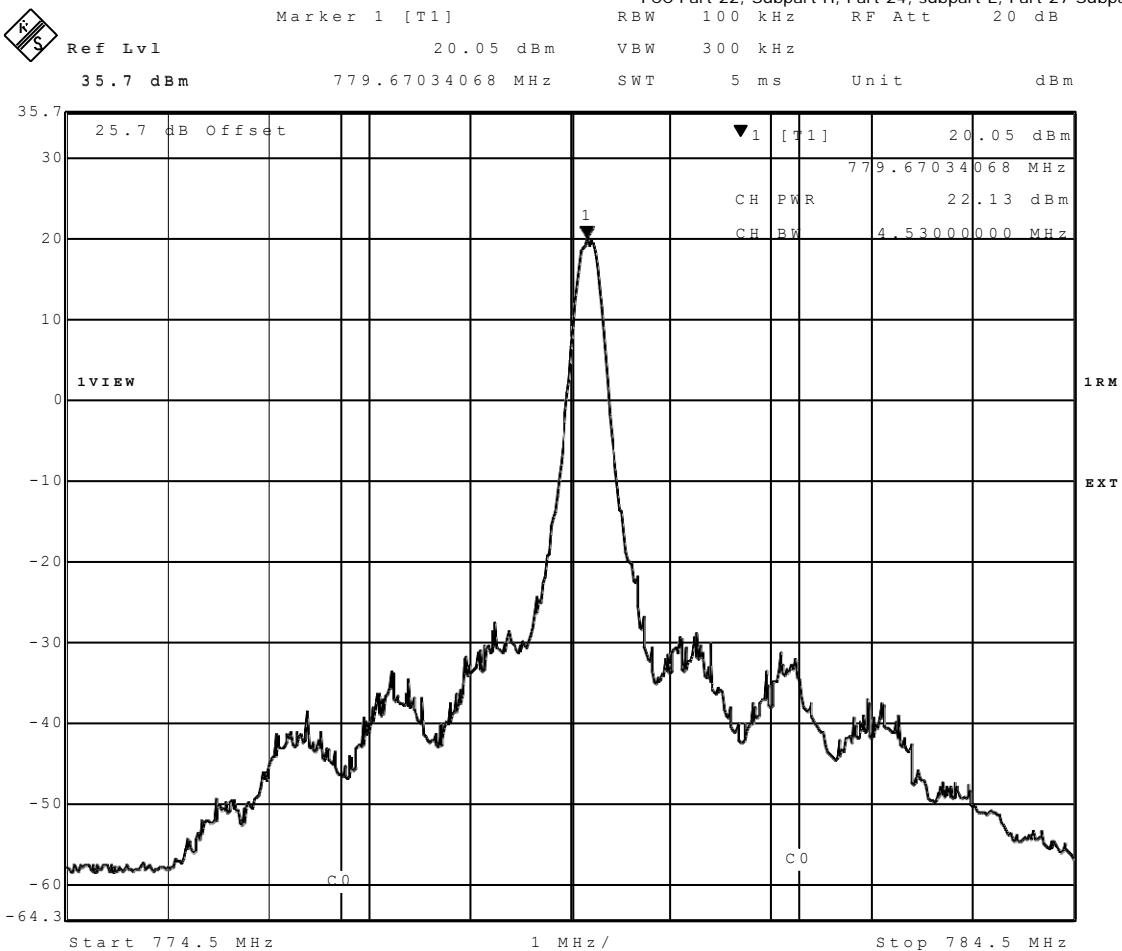


Date: 27.JUN.2017 10:52:08

eFDD12 QPSK 10MHz RB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



Date: 27.JUN.2017 11:27:31

eFDD13 QPSK 5MHz RB1 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

24.36 dBm

VBW 10 MHz

SWT

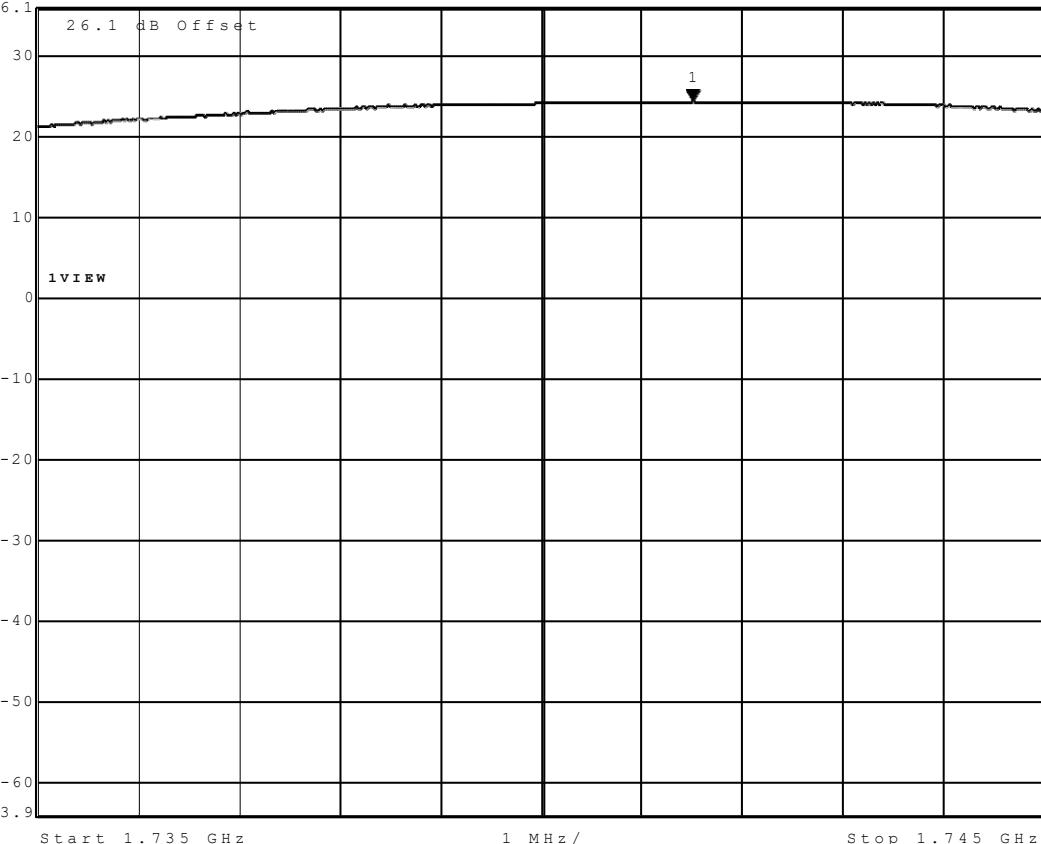
5 ms

Unit

dBm

36.1 dBm

1.74151303 GHz



Start 1.735 GHz

1 MHz /

Stop 1.745 GHz

Date: 9.AUG.2017 16:47:18

WCDMA Channel 1450

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 10 MHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

24.53 dBm

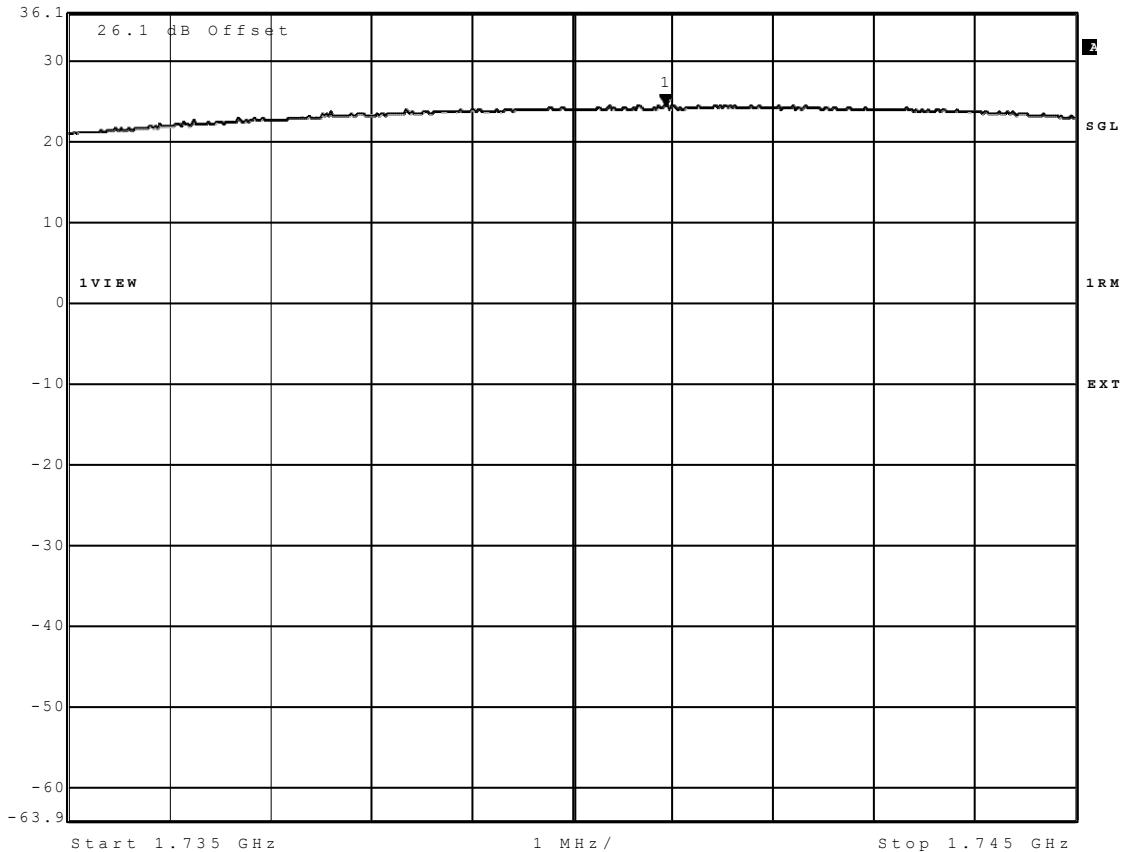
VBW 10 MHz

SWT5 ms

Unit

dBm

36.1 dBm



Start 1.735 GHz

1 MHz /

Stop 1.745 GHz

Date: 4.AUG.2017 15:58:10

WCDMA - HSDPA Channel 1450



Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

3.5.16 27.2 Frequency stability §2.1055, §27.54

Test: 27.2; Frequency stability Summary §2.1055, §27.54

Result: Passed

Setup No.: am06

Date of Test: 2017/06/23 14:54

Body: FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 27

Detailed Results:

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4331.25	2	12	passed
-30	5			2	9	passed
-30	10			2	8	passed
-20	0	normal	4331.25	5	13	passed
-20	5			2	14	passed
-20	10			1	12	passed
-10	0	normal	4331.25	2	-10	passed
-10	5			3	10	passed
-10	10			2	-10	passed
0	0	normal	4331.25	3	14	passed
0	5			1	10	passed
0	10			3	12	passed
10	0	normal	4331.25	1	15	passed
10	5			4	11	passed
10	10			3	7	passed
20	0	low	4331.25	3	10	passed
20	5			4	15	passed
20	10			2	7	passed
20	0	normal = high ¹⁾	4331.25	3	15	passed
20	5			0	10	passed
20	10			1	10	passed
20	0	high	4331.25	4	10	passed
20	5			3	12	passed
20	10			3	13	passed
30	0	normal	4331.25	3	13	passed
30	5			4	13	passed
30	10			2	12	passed
40	0	normal	4331.25	2	8	passed
40	5			4	11	passed
40	10			2	9	passed
50	0	normal	4331.25	4	10	passed
50	5			2	11	passed
50	10			3	12	passed

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4350	-10	25	passed
-30	5			-6	21	passed
-30	10			-7	12	passed
-20	0	normal	4350	-12	17	passed
-20	5			-3	10	passed
-20	10			-1	15	passed
-10	0	normal	4350	0	11	passed
-10	5			-2	16	passed
-10	10			3	14	passed
0	0	normal	4350	4	-9	passed
0	5			-6	-8	passed
0	10			-8	12	passed
10	0	normal	4350	-3	20	passed
10	5			-3	16	passed
10	10			10	19	passed
20	0	low	4350	1	15	passed
20	5			4	11	passed
20	10			3	7	passed
20	0	normal = high ¹⁾	4350	11	16	passed
20	5			-1	11	passed
20	10			2	16	passed
20	0	high	4350	4	10	passed
20	5			3	12	passed
20	10			3	13	passed
30	0	normal	4350	-6	-5	passed
30	5			8	9	passed
30	10			9	16	passed
40	0	normal	4350	-1	14	passed
40	5			-9	19	passed
40	10			-3	18	passed
50	0	normal	4350	-9	22	passed
50	5			-6	13	passed
50	10			5	19	passed

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	6337.5	1	21	passed
-30	5			3	20	passed
-30	10			2	18	passed
-20	0	normal	6337.5	6	10	passed
-20	5			4	16	passed
-20	10			2	23	passed
-10	0	normal	6337.5	4	14	passed
-10	5			1	12	passed
-10	10			3	9	passed
0	0	normal	6337.5	5	16	passed
0	5			2	22	passed
0	10			2	23	passed
10	0	normal	6337.5	3	15	passed
10	5			6	16	passed
10	10			5	7	passed
20	0	low	6337.5	3	10	passed
20	5			2	7	passed
20	10			4	12	passed
20	0	normal = high ¹⁾	6337.5	2	16	passed
20	5			3	17	passed
20	10			3	12	passed
20	0	high	6337.5	4	10	passed
20	5			2	12	passed
20	10			4	15	passed
30	0	normal	6337.5	4	15	passed
30	5			0	7	passed
30	10			3	10	passed
40	0	normal	6337.5	5	13	passed
40	5			2	16	passed
40	10			2	17	passed
50	0	normal	6337.5	6	18	passed
50	5			1	13	passed
50	10			2	11	passed

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

LTE eFDD7						
BW (MHz) / Resource Blocks	f _L (MHz)	f _H (MHz)	Max. Frequency Error (Hz)	Resulting Freq. (MHz)	Limit (MHz)	Result
5 / 25	2500.1	-	23	2500.10	2500	Passed
	-	2569.9	8	2569.90	2570	Passed

eFDD7

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	1768.75	2	9	passed
-30	5			2	8	passed
-30	10			3	10	passed
-20	0	normal	1768.75	2	8	passed
-20	5			4	10	passed
-20	10			3	9	passed
-10	0	normal	1768.75	3	8	passed
-10	5			3	8	passed
-10	10			3	9	passed
0	0	normal	1768.75	2	9	passed
0	5			2	8	passed
0	10			3	9	passed
10	0	normal	1768.75	2	9	passed
10	5			3	8	passed
10	10			4	10	passed
20	0	low	1768.75	4	8	passed
20	5			4	12	passed
20	10			2	10	passed
20	0	normal = high ¹⁾	1768.75	2	7	passed
20	5			3	8	passed
20	10			2	7	passed
20	0	high	1768.75	3	8	passed
20	5			2	10	passed
20	10			2	10	passed
30	0	normal	1768.75	3	10	passed
30	5			2	9	passed
30	10			2	9	passed
40	0	normal	1768.75	2	7	passed
40	5			1	8	passed
40	10			2	8	passed
50	0	normal	1768.75	1	7	passed
50	5			2	8	passed
50	10			4	9	passed

eFDD12

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

LTE eFDD12						
BW (MHz) / Resource Blocks	f _L (MHz)	f _H (MHz)	Max. Frequency Error (Hz)	Resulting Freq. (MHz)	Limit (MHz)	Result
5 / 25	699.06	-	12	699.06	698	Passed
	-	715.914	12	715.91	716	Passed

eFDD12

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	1955	3	11	passed
-30	5			4	8	passed
-30	10			4	11	passed
-20	0	normal	1955	2	10	passed
-20	5			2	9	passed
-20	10			2	9	passed
-10	0	normal	1955	1	7	passed
-10	5			4	9	passed
-10	10			4	10	passed
0	0	normal	1955	3	10	passed
0	5			4	11	passed
0	10			4	10	passed
10	0	normal	1955	3	8	passed
10	5			3	10	passed
10	10			3	10	passed
20	0	low	1955	4	11	passed
20	5			4	11	passed
20	10			3	12	passed
20	0	normal = high ¹⁾	1955	4	10	passed
20	5			4	9	passed
20	10			4	11	passed
20	0	high	1955	3	10	passed
20	5			3	12	passed
20	10			3	14	passed
30	0	normal	1955	2	-7	passed
30	5			2	6	passed
30	10			3	8	passed
40	0	normal	1955	2	8	passed
40	5			3	9	passed
40	10			3	9	passed
50	0	normal	1955			passed
50	5					passed
50	10					passed

eFDD13

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

LTE eFDD13						
BW (MHz) / Resource Blocks	f _L (MHz)	f _H (MHz)	Max. Frequency Error (Hz)	Resulting Freq. (MHz)	Limit (MHz)	Result
5 / 25	777.12	-	14	777.12	777	Passed
	-	786.919	14	786.92	787	Passed

eFDD13

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4350	-1	-10	passed
-30	5			-78	-110	passed
-30	10			-1	-9	passed
-20	0	normal	4350	-73	-145	passed
-20	5			-77	-124	passed
-20	10			-12	-29	passed
-10	0	normal	4350	-1	-9	passed
-10	5			-1	-13	passed
-10	10			-1	13	passed
0	0	normal	4350	-1	-11	passed
0	5			-12	-27	passed
0	10			0	-13	passed
10	0	normal	4350	0	-11	passed
10	5			-1	12	passed
10	10			-1	-11	passed
20	0	low	4350	0	-15	passed
20	5			3	15	passed
20	10			-4	-12	passed
20	0	normal = high ¹⁾	4350	-70	-116	passed
20	5			-66	-117	passed
20	10			-1	-11	passed
20	0	high	4350	-5	-9	passed
20	5			-12	-27	passed
20	10			-2	-14	passed
30	0	normal	4350	-50	-90	passed
30	5			-1	10	passed
30	10			-1	10	passed
40	0	normal	4350	0	11	passed
40	5			1	-7	passed
40	10			-1	-10	passed
50	0	normal	4350	0	-10	passed
50	5			-10	-23	passed
50	10			-50	-95	passed

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4350	4	-12	passed
-30	5			1	-11	passed
-30	10			2	-13	passed
-20	0	normal	4350	4	-10	passed
-20	5			0	-13	passed
-20	10			3	-9	passed
-10	0	normal	4350	3	-14	passed
-10	5			1	-11	passed
-10	10			5	-11	passed
0	0	normal	4350	2	10	passed
0	5			4	8	passed
0	10			1	-14	passed
10	0	normal	4350	0	-10	passed
10	5			-3	-8	passed
10	10			-2	-13	passed
20	0	low	4350	-1	-12	passed
20	5			3	8	passed
20	10			3	13	passed
20	0	normal = high ¹⁾	4350	3	-10	passed
20	5			1	-13	passed
20	10			5	-16	passed
20	0	high	4350	8	24	passed
20	5			-2	-10	passed
20	10			0	5	passed
30	0	normal	4350	1	10	passed
30	5			-2	7	passed
30	10			-4	-12	passed
40	0	normal	4350	3	-14	passed
40	5			3	-16	passed
40	10			3	-13	passed
50	0	normal	4350	2	-13	passed
50	5			-1	10	passed
50	10			2	-13	passed

HSDPA WCDMA FDD IV

3.5.17 27.3 Spurious emissions at antenna terminals §2.1051, §27.53
Test: 27.3; Spurious emissions at antenna terminals Summary §2.1051, §27.53

Result: Passed
Setup No.: am06
Date of Test: 2017/06/23 13:37
Body: FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES
Test Specification: FCC part 2 and 27

Detailed Results:

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD4	low	rms	maxhold	5	1709	-36.54	-13	23.54
eFDD4	mid	-	-	-	-	-	-13	>20
eFDD4	high	rms	maxhold	5	1755	-26.5	-13	13.5

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD7	low	rms	maxhold	5	2500	-25.26	-10	15.26
eFDD7	low	rms	maxhold	1000	5000	-32.41	-25	7.41
eFDD7	mid	peak	maxhold	100	2531	-23.55	-10	13.55
eFDD7	high	rms	maxhold	5	2570	-24.66	-10	14.66
eFDD7	high	rms	maxhold	1000	5135	-37.75	-25	12.75

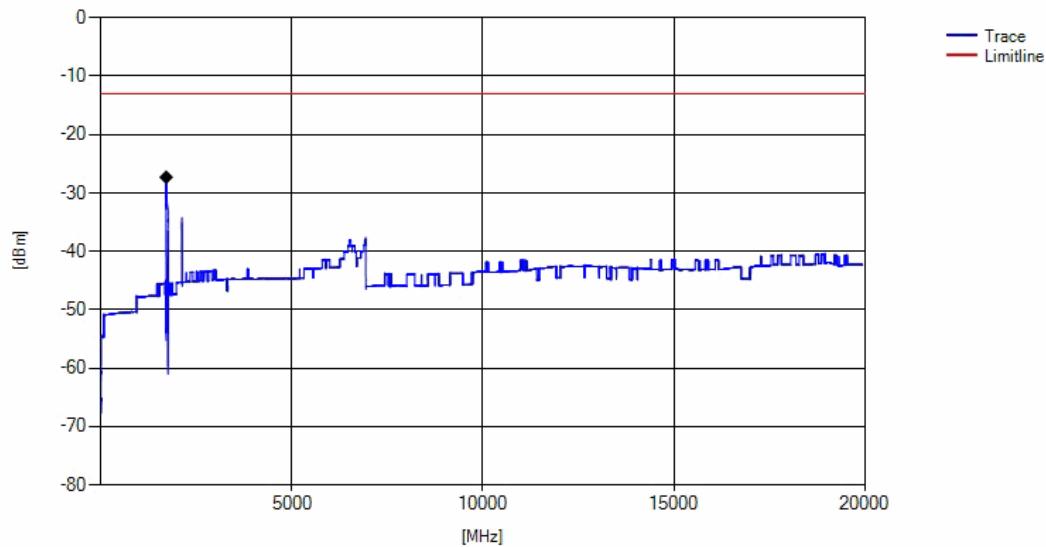
Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD12	low	-	-	-	-	-	-13	>20
eFDD12	mid	-	-	-	-	-	-13	>20
eFDD12	high	-	-	-	-	-	-13	>20

Radio Technology	Channel	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD13	low	rms	maxhold	30	775.99	-45.99	-13	32.99
eFDD13	mid	-	-	-	-	-	-13	>20
eFDD13	high	rms	maxhold	30	787	-18.83	-13	5.83

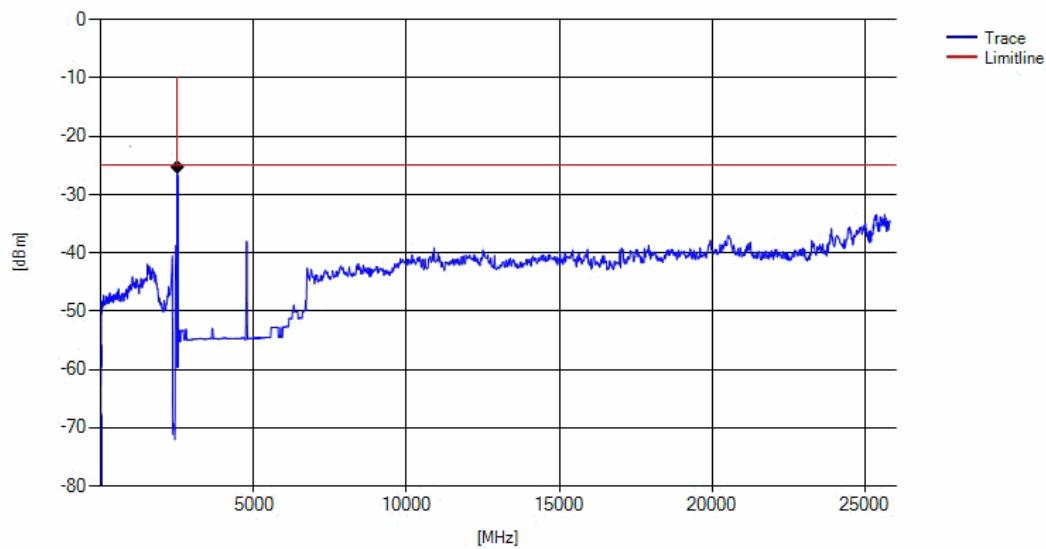
Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Mode	Channel	detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm
UMTS FDD IV	Low	peak	maxhold	1000	6584.2	-25.3	12.3	-13.0
	Low	peak	maxhold	1000	6967.1	-26.1	13.1	-13.0
	Mid	peak	maxhold	1000	6591.6	-25.1	12.1	-13.0
	Mid	peak	maxhold	1000	17741.5	-27.7	14.7	-13.0
	Mid 2	peak	maxhold	1000	6601.5	-25.7	12.7	-13.0
	Mid 2	peak	maxhold	1000	17761.3	-28.1	15.1	-13.0
	Mid 2	peak	maxhold	1000	16296.0	-28.5	15.5	-13.0
	High	peak	maxhold	1000	17427.1	-28.1	15.1	-13.0
	High	peak	maxhold	1000	17983.1	-27.9	14.9	-13.0
	High	peak	maxhold	1000	6983.1	-25.8	12.8	-13.0
Channel	Channel	detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm
HSDPA UMTS FDD IV	rms	maxhold	100	1708.98	-24.2	11.2	-13.0	-13.0
	peak	maxhold	1000	6601.1	-24.7	11.7	-13.0	-13.0
	peak	maxhold	1000	6967.1	-25.3	12.3	-13.0	-13.0
	Mid	peak	maxhold	1000	6588.3	-25.4	12.4	-13.0
	Mid	peak	maxhold	1000	17923.7	-27.5	14.5	-13.0
	Mid 2	peak	maxhold	1000	6882.6	-25.4	12.4	-13.0
	Mid 2	peak	maxhold	1000	17762.4	-27.9	14.9	-13.0
	High	rms	maxhold	100	1756.32	-19.2	6.2	-13.0
	High	rms	maxhold	50	1755.00	-24.9	11.9	-13.0
	High	peak	maxhold	1000	6972.8	-26.0	13.0	-13.0
detector	Channel	detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm
HSUPA UMTS FDD IV	Low	rms	maxhold	100	1708.98	-24.2	11.2	-13.0
	Low	peak	maxhold	1000	6601.1	-24.7	11.7	-13.0
	Low	peak	maxhold	1000	6967.1	-25.3	12.3	-13.0
	Mid	peak	maxhold	1000	6588.3	-25.6	12.6	-13.0
	Mid	peak	maxhold	1000	15975.8	-28.3	15.3	-13.0
	Mid 2	peak	maxhold	1000	6696.3	-25.3	12.3	-13.0
	Mid 2	peak	maxhold	1000	17915.5	-27.6	14.6	-13.0
	High	rms	maxhold	100	1756.00	-17.3	4.3	-13.0
	High	peak	maxhold	1000	6990.0	-26.4	13.4	-13.0
	High	rms	maxhold	50	1755.01	-26.5	13.5	-13.0

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

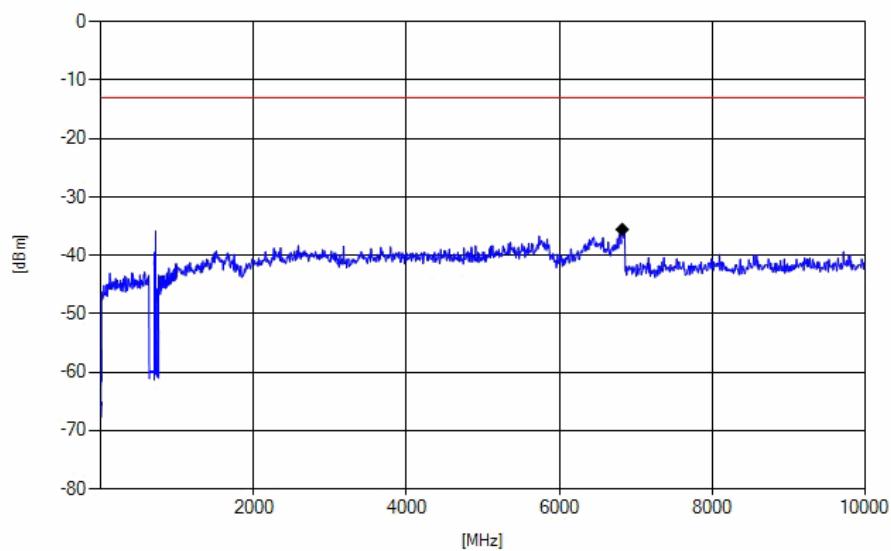


eFDD4 Channel=high

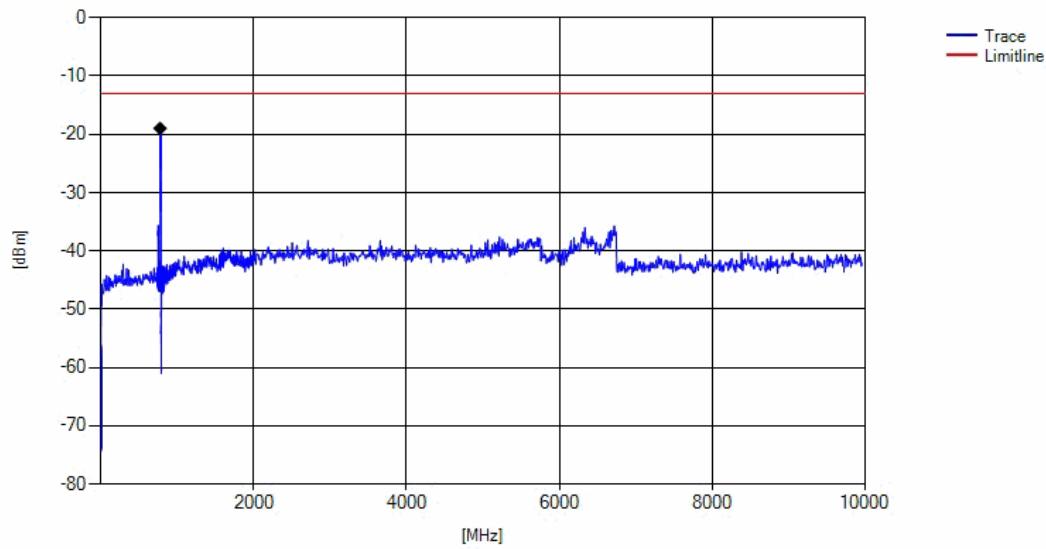


eFDD7 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C

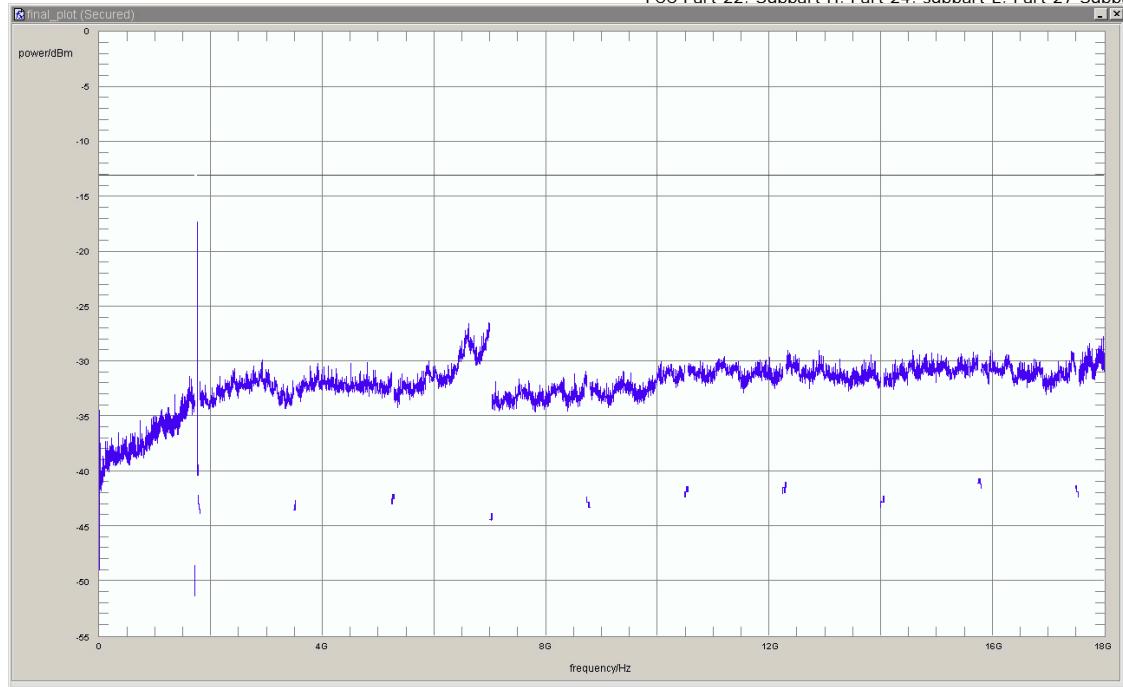


eFDD12 Channel=high



eFDD13 Channel=high

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



HSUPA_FDD4_ch1513

3.5.18 27.4 Field strength of spurious radiation §2.1053, §27.53
Test: 27.4; Field strength of spurious radiation Summary §2.1053, §27.53

Result: Passed

Setup No.: am06

Date of Test: 2017/07/17 15:15

Body: FCC47CFRChI PART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 27

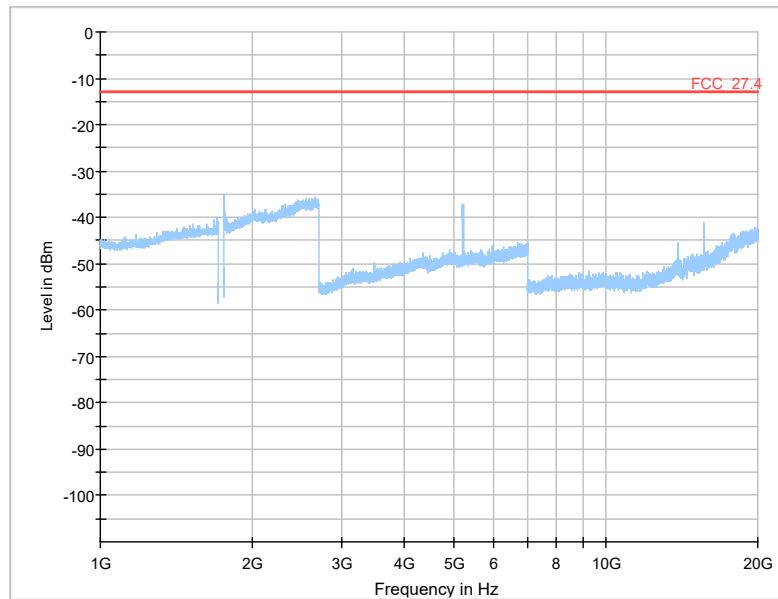
Detailed Results:

Mode: 27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20375, Frequency = 1752.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 20775, Frequency = 2502.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21100, Frequency = 2535MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2531.3228	- 28.28	- 10	18.28	1000	1000	150	H	- 178	88.9	- 60.4
2538.5	- 26.99	- 10	16.99	1000	1000	150	H	- 180	89	- 60.4
10141	- 30.2	- 25	5.21	1000	1000	150	V	- 30	108.9	- 113.2
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21425, Frequency = 2567.5MHz, Method = radiated										
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dBm)	Corr.(dB)	Comment					
2571	- 10.52	- 10	0.52	- 60.4	measured with power integration method					
Mode: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23035, Frequency = 7015MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23095, Frequency = 707.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23155, Frequency = 713.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
716.179	- 16.8	- 13	3.8	1000	100	150	H	- 135	0	- 73.8
716.199	- 16.65	- 13	3.65	1000	100	150	H	- 135	0	- 73.8
716.219	- 16.72	- 13	3.72	1000	100	150	H	- 135	0	- 73.8
Mode: 27.4; Frequency Band = eFDD13, Mode = QPSK 5MHz, Channel = 23205, Frequency = 779.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: 27.4; Frequency Band = eFDD13, Mode = QPSK 5MHz, Channel = 23230, Frequency = 782MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: 27.4; Frequency Band = eFDD13, Mode = QPSK 5MHz, Channel = 23255, Frequency = 784.5MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---

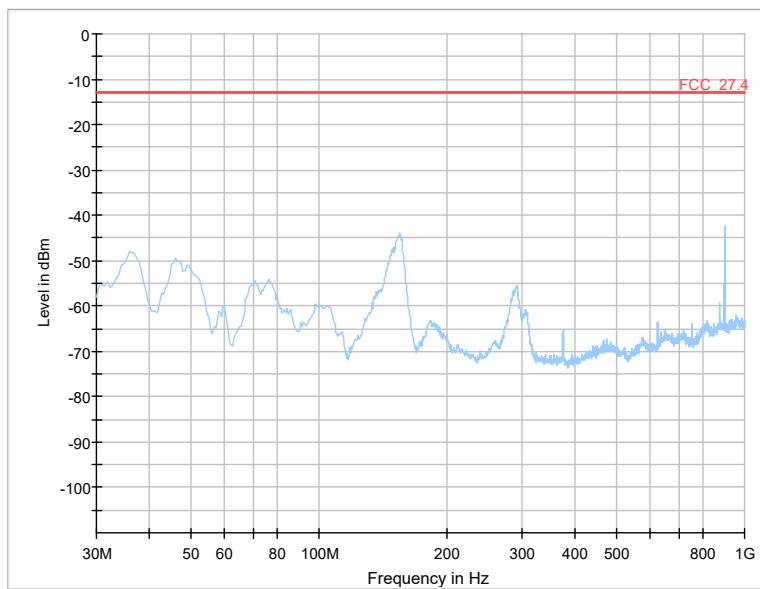
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSDPA_subtest_1, Channel = 1312, Frequency = 1712.4MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSDPA_subtest_1, Channel = 1412, Frequency = 1732.4MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSDPA_subtest_1, Channel = 1450, Frequency = 1740.0MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSDPA_subtest_1, Channel = 1513, Frequency = 1752.6MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSUPA_subtest_1, Channel = 1312, Frequency = 1712.4MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSUPA_subtest_1, Channel = 1412, Frequency = 1732.4MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSUPA_subtest_1, Channel = 1450, Frequency = 1740.0MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSUPA_subtest_1, Channel = 1513, Frequency = 1752.6MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = W- CDMA, Channel = 1312, Frequency = 1712.4MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = W- CDMA, Channel = 1412, Frequency = 1732.4MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = W- CDMA, Channel = 1450, Frequency = 1740.0MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---
Mode: Test: 27.1; Frequency Band = FDD4, Mode = W- CDMA, Channel = 1513, Frequency = 1752.6MHz, Method = radiated										
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---

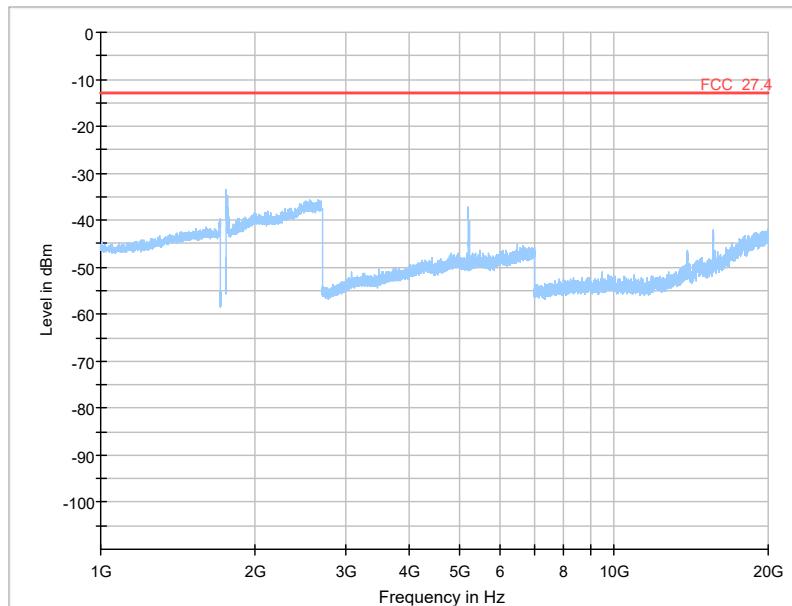
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



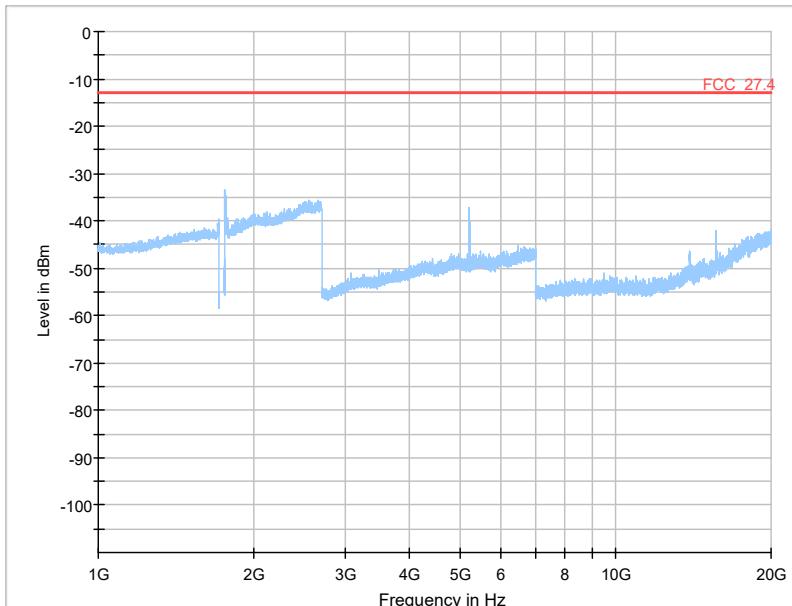
Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSDPA_subtest_1, Channel = 1450, Frequency = 1740.0MHz, Method = radiated



Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSDPA_subtest_1, Channel = 1450, Frequency = 1740.0MHz, Method = radiated

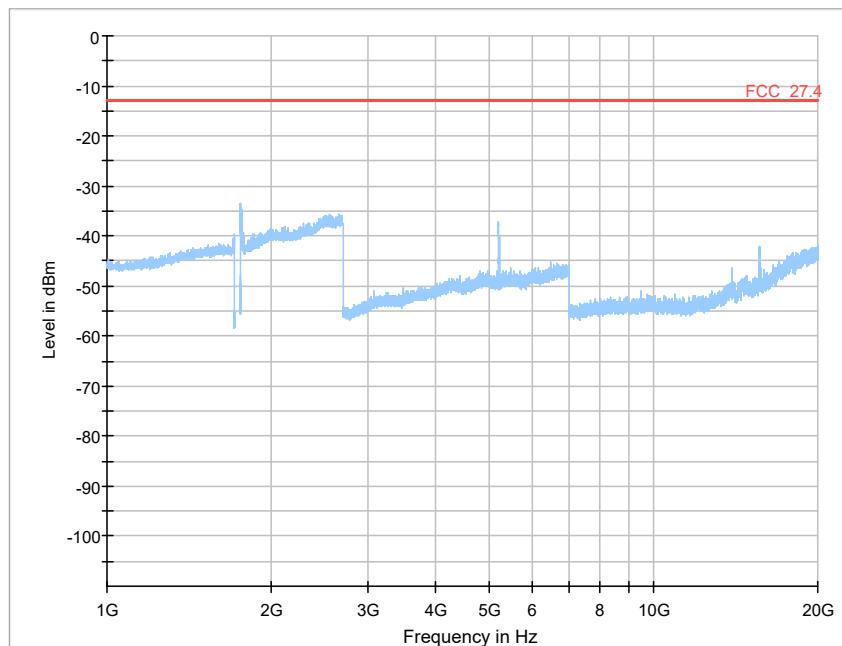


Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSUPA_subtest_1, Channel = 1450, Frequency = 1740.0MHz, Method = radiated

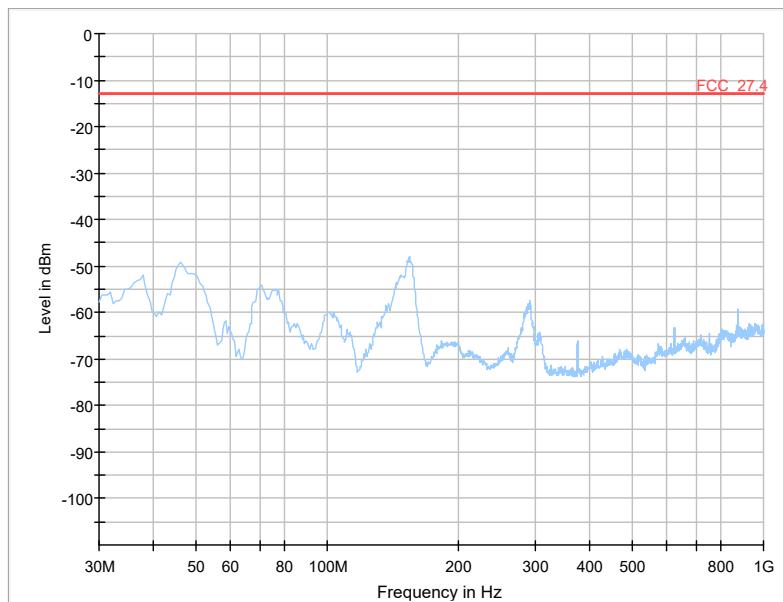


Mode: Test: 27.1; Frequency Band = FDD4, Mode = HSUPA_subtest_1, Channel = 1450, Frequency = 1740.0MHz, Method = radiated

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

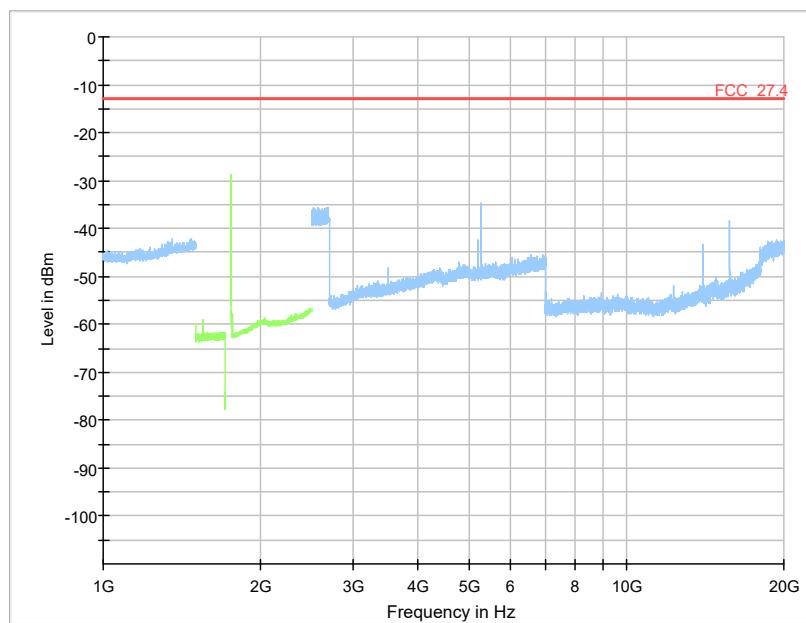


Mode: Test: 27.1; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1450, Frequency = 1740.0MHz, Method = radiated

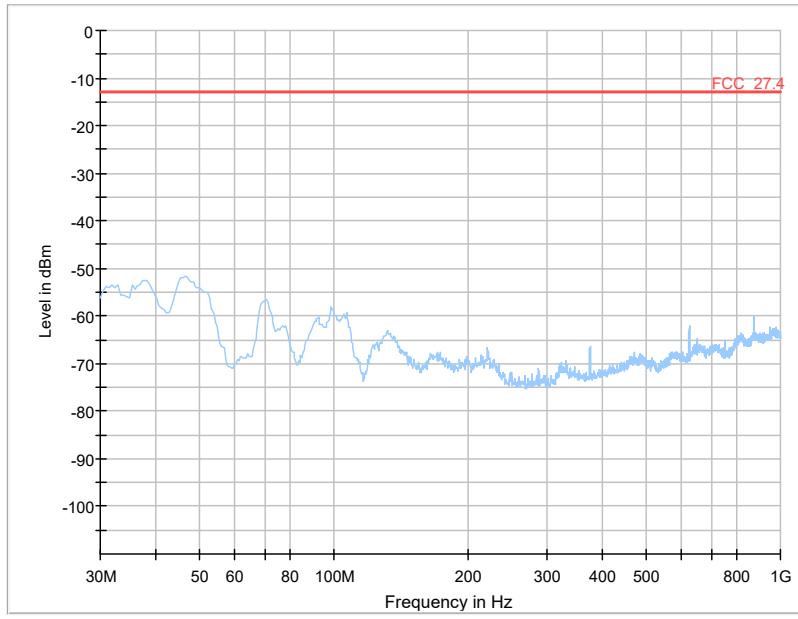


Mode: Test: 27.1; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1450, Frequency = 1740.0MHz, Method = radiated

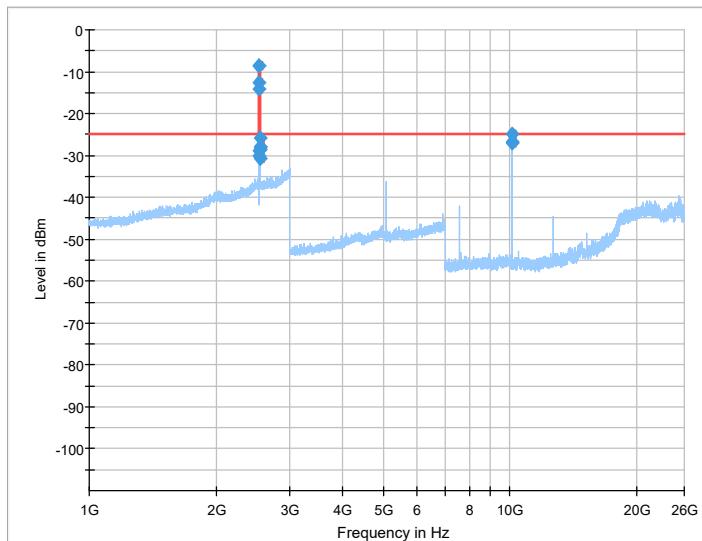
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



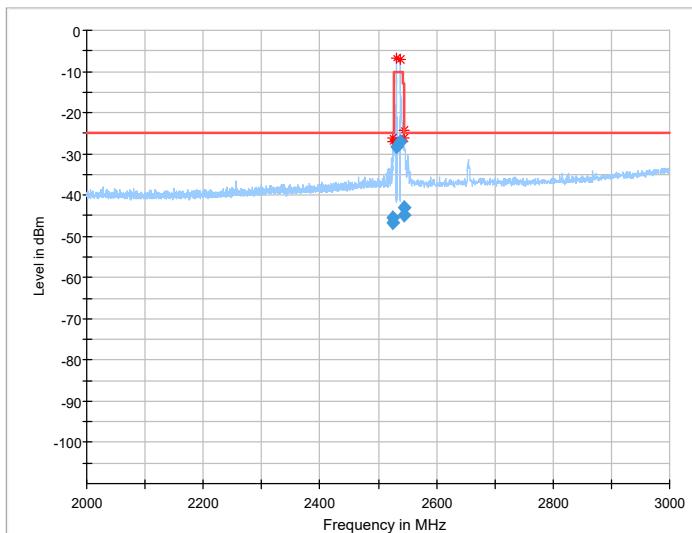
Mode: 27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20375, Frequency = 1752.5MHz, Method = radiated



Mode: 27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20375, Frequency = 1752.5MHz, Method = radiated



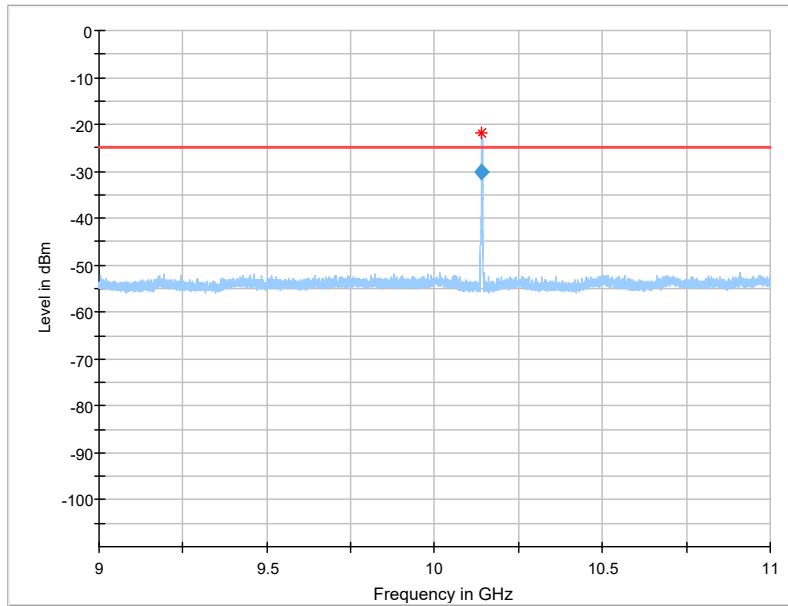
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21100, Frequency =
 2535MHz, Method = radiated *** **PRE-SCAN** ***



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2524.944833	-46.70	-25.00	21.70	1000.0	1000.000	150.0	H	-10.0	95.8	-60.5
2525.476333	-45.37	-25.00	20.37	1000.0	1000.000	150.0	H	-175.0	85.8	-60.5
2531.322833	-28.28	-10.00	18.28	1000.0	1000.000	150.0	H	-178.0	88.9	-60.4
2538.500000	-26.99	-10.00	16.99	1000.0	1000.000	150.0	H	-180.0	89.0	-60.4
2543.576500	-42.95	-25.00	17.95	1000.0	1000.000	150.0	H	-181.0	86.8	-60.4
2544.499500	-44.71	-25.00	19.71	1000.0	1000.000	150.0	H	-180.0	83.9	-60.4

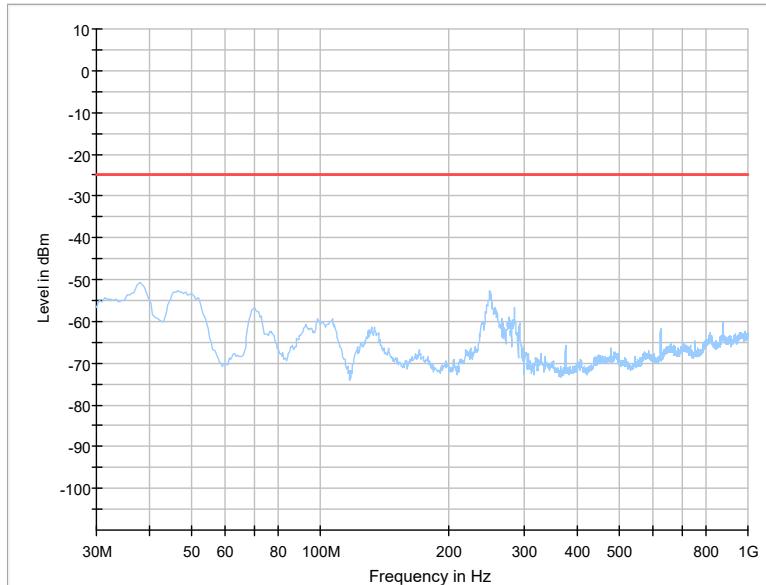
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21100, Frequency =
 2535MHz, Method = radiated ** Final Scan 1st peak **



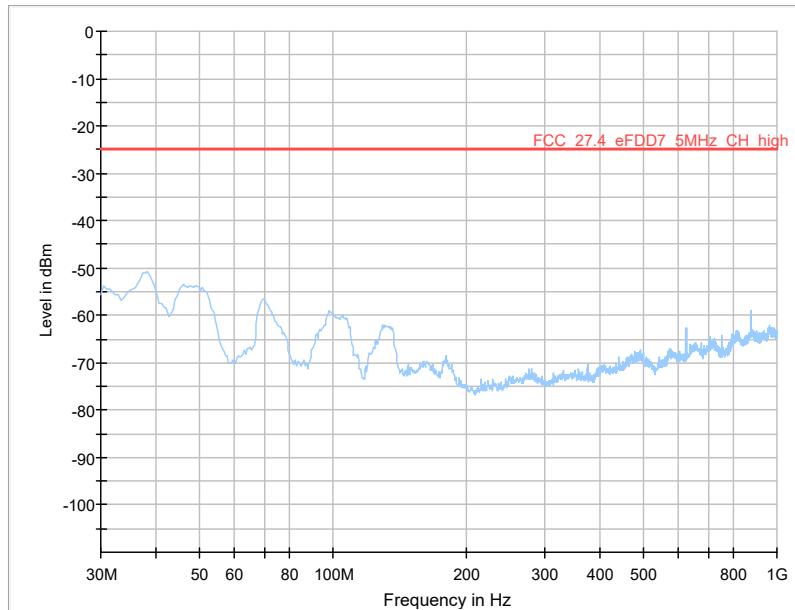
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
10141.000000	-30.20	-25.00	5.21	1000.0	1000.000	150.0	V	-30.0	108.9	-113.2

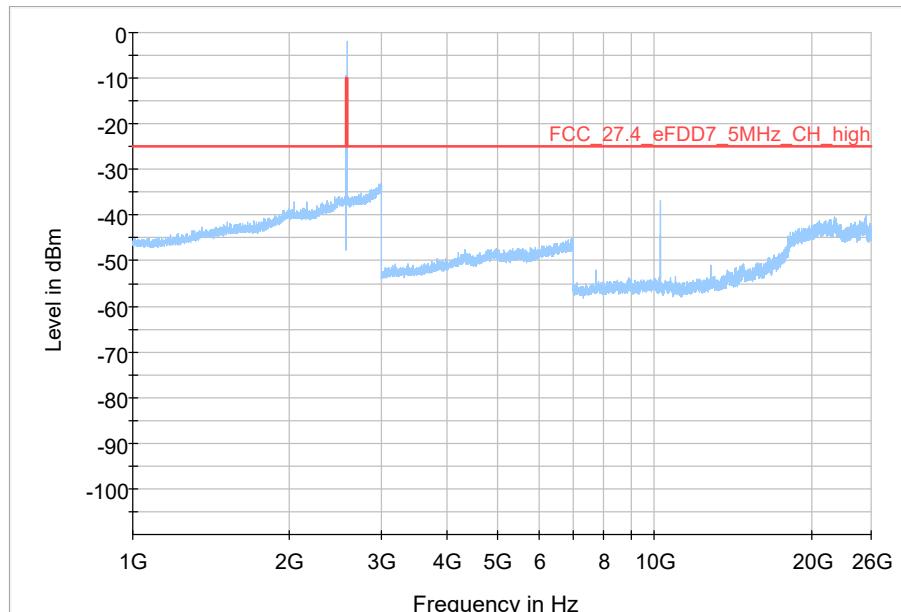
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21100, Frequency = 2535MHz, Method = radiated ** Final Scan 2nd peak **



Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21100, Frequency = 2535MHz, Method = radiated



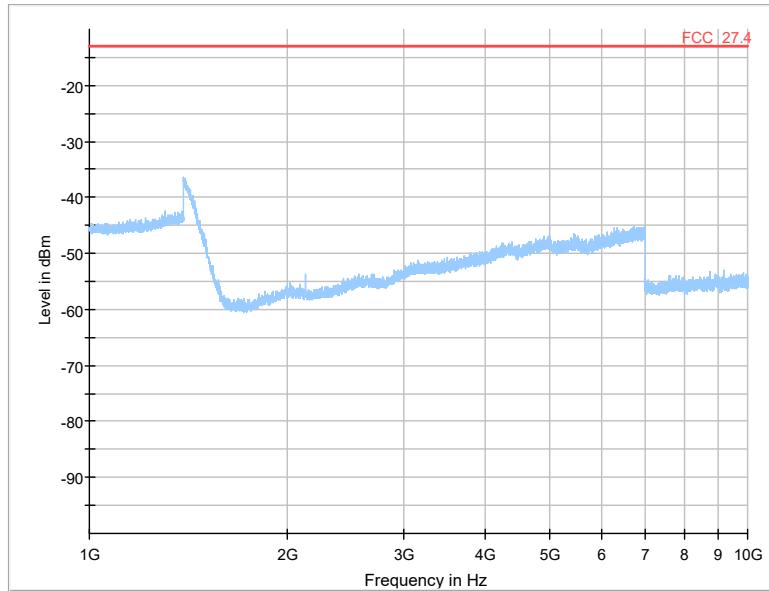
Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21425, Frequency = 2567.5MHz, Method = radiated



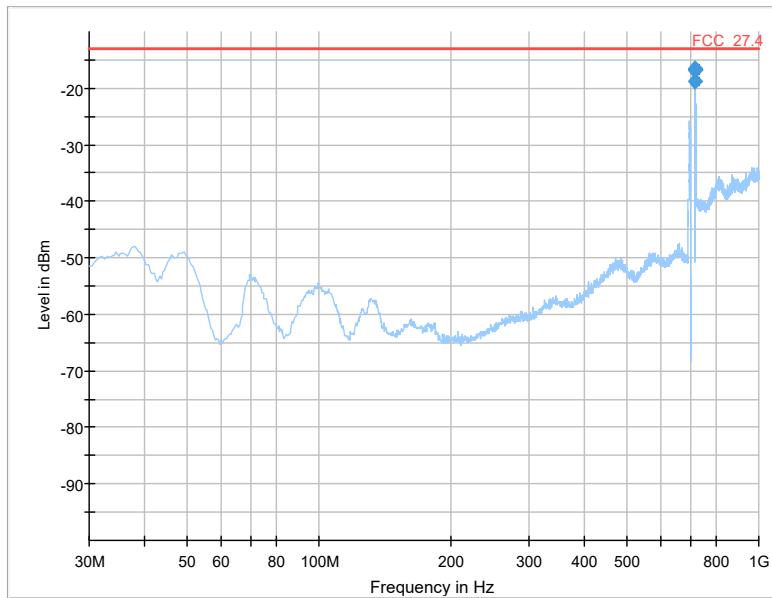
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Corr. (dB)	Comment
2571	-10.52---	-10	0.52	-60.4	measured with power integration method

Mode: 27.4; Frequency Band = eFDD7, Mode = QPSK 5MHz, Channel = 21425, Frequency = 2567.5MHz, Method = radiated



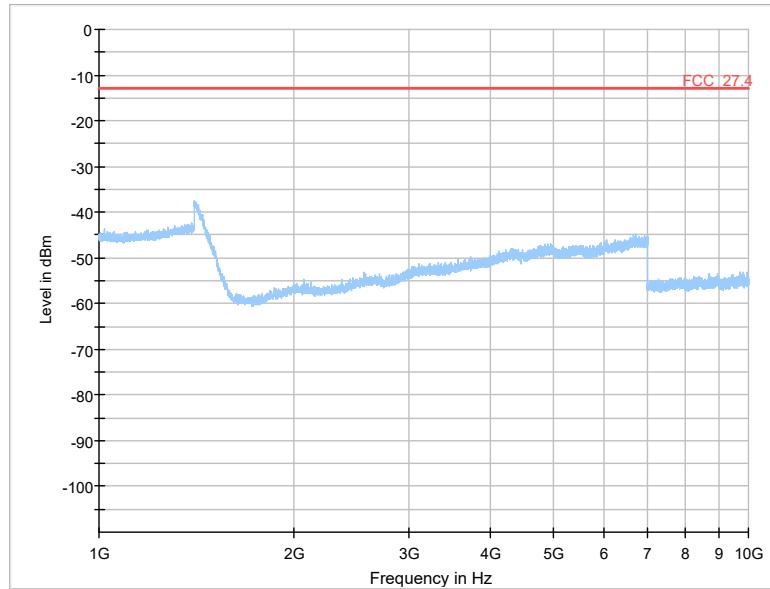
Mode: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23155, Frequency = 713.5MHz, Method = radiated



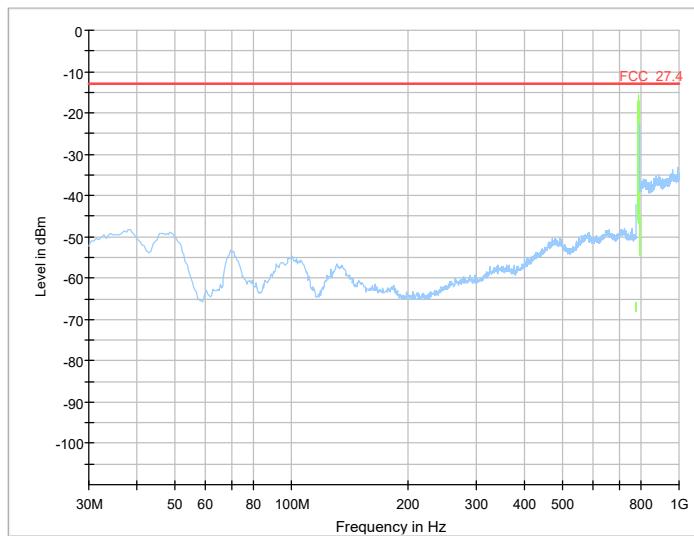
Final Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
716.100000	-16.68	-13.00	3.68	1000.0	100.000	150.0	H	-135.0	0.0	-73.8
716.114000	-16.81	-13.00	3.81	1000.0	100.000	150.0	H	-135.0	0.0	-73.8
716.179000	-16.80	-13.00	3.80	1000.0	100.000	150.0	H	-135.0	0.0	-73.8
716.199000	-16.65	-13.00	3.65	1000.0	100.000	150.0	H	-135.0	0.0	-73.8
716.219000	-16.72	-13.00	3.72	1000.0	100.000	150.0	H	-135.0	0.0	-73.8
716.924000	-18.69	-13.00	5.69	1000.0	100.000	150.0	H	-135.0	0.0	-73.8

Mode: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23155, Frequency = 713.5MHz, Method = radiated



Mode: 27.4; Frequency Band = eFDD13, Mode = QPSK 5MHz, Channel = 23255, Frequency = 784.5MHz, Method = radiated



Mode: 27.4; Frequency Band = eFDD13, Mode = QPSK 5MHz, Channel = 23255, Frequency = 784.5MHz, Method = radiated



Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

3.5.19 27.5 Emission and Occupied Bandwidth §2.1049

Test: 27.5; Emission and Occupied Bandwidth Summary §2.1049

Result: Passed

Setup No.: am06

Date of Test: 2017/06/23 17:32

Body: FCC47CFRCh1PART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 27

Detailed Results:

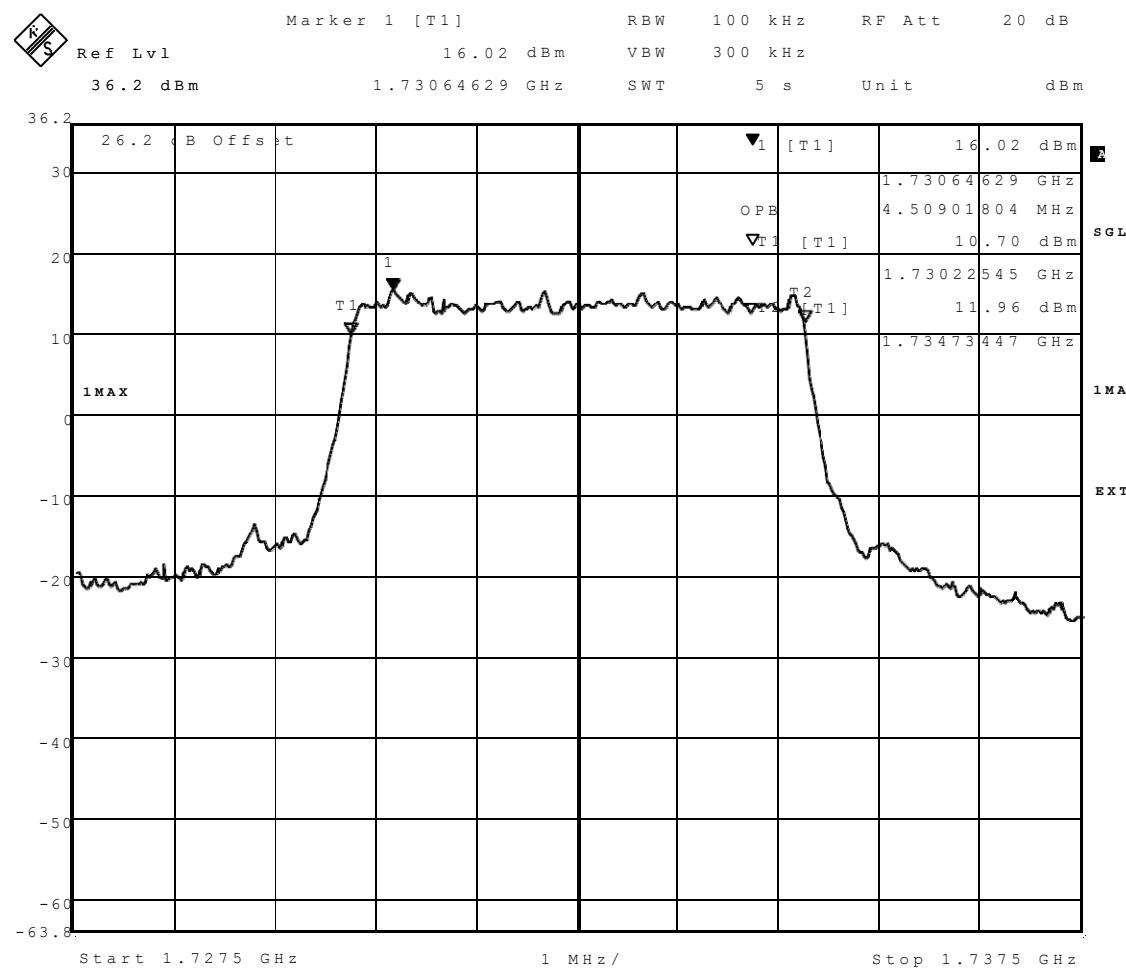
Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	Nominal BW [MHz]	99 % BW [kHz]
eFDD 4 QPSK	low	6	1.4	1.4	1112.22
eFDD 4 QPSK	mid	6	1.4	1.4	1118.24
eFDD 4 QPSK	high	6	1.4	1.4	1112.22
eFDD 4 16QAM	low	6	1.4	1.4	1106.21
eFDD 4 16QAM	mid	6	1.4	1.4	1106.21
eFDD 4 16QAM	high	6	1.4	1.4	1118.24
eFDD 4 QPSK	low	15	3	3	2741.48
eFDD 4 QPSK	mid	15	3	3	2741.48
eFDD 4 QPSK	high	15	3	3	2741.48
eFDD 4 16QAM	low	15	3	3	2741.48
eFDD 4 16QAM	mid	15	3	3	2741.48
eFDD 4 16QAM	high	15	3	3	2753.51
eFDD 4 QPSK	low	25	5	5	4549.1
eFDD 4 QPSK	mid	25	5	5	4509.02
eFDD 4 QPSK	high	25	5	5	4549.1
eFDD 4 16QAM	low	25	5	5	4569.14
eFDD 4 16QAM	mid	25	5	5	4549.1
eFDD 4 16QAM	high	25	5	5	4529.06
eFDD 4 QPSK	low	50	10	10	9018.04
eFDD 4 QPSK	mid	50	10	10	9058.12
eFDD 4 QPSK	high	50	10	10	9058.12
eFDD 4 16QAM	low	50	10	10	9018.04
eFDD 4 16QAM	mid	50	10	10	9058.12
eFDD 4 16QAM	high	50	10	10	9018.04
eFDD 4 QPSK	low	75	15	15	13527.05
eFDD 4 QPSK	mid	75	15	15	13587.17
eFDD 4 QPSK	high	75	15	15	13587.17
eFDD 4 16QAM	low	75	15	15	13527.05
eFDD 4 16QAM	mid	75	15	15	13587.17
eFDD 4 16QAM	high	75	15	15	13587.17
eFDD 4 QPSK	low	100	20	20	18196.39
eFDD 4 QPSK	mid	100	20	20	18276.55
eFDD 4 QPSK	high	100	20	20	18116.23
eFDD 4 16QAM	low	100	20	20	18116.23
eFDD 4 16QAM	mid	100	20	20	18276.55
eFDD 4 16QAM	high	100	20	20	18196.39
eFDD 7 QPSK	low	25	5	5	4549.1
eFDD 7 QPSK	mid	25	5	5	4549.1
eFDD 7 QPSK	high	25	5	5	4529.06
eFDD 7 16QAM	low	25	5	5	4549.1
eFDD 7 16QAM	mid	25	5	5	4529.06
eFDD 7 16QAM	high	25	5	5	4549.1
eFDD 7 QPSK	low	50	10	10	9058.12
eFDD 7 QPSK	mid	50	10	10	9018.04
eFDD 7 QPSK	high	50	10	10	9058.12
eFDD 7 16QAM	low	50	10	10	9058.12
eFDD 7 16QAM	mid	50	10	10	9058.12
eFDD 7 16QAM	high	50	10	10	9058.12
eFDD 7 QPSK	low	75	15	15	13587.17
eFDD 7 QPSK	mid	75	15	15	13587.17
eFDD 7 QPSK	high	75	15	15	13587.17
eFDD 7 16QAM	low	75	15	15	13587.17
eFDD 7 16QAM	mid	75	15	15	13647.29
eFDD 7 16QAM	high	75	15	15	13587.17
eFDD 7 QPSK	low	100	20	20	18116.23
eFDD 7 QPSK	mid	100	20	20	18196.39
eFDD 7 QPSK	high	100	20	20	18116.23
eFDD 7 16QAM	low	100	20	20	18196.39
eFDD 7 16QAM	mid	100	20	20	18276.55
eFDD 7 16QAM	high	100	20	20	18196.39

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	Nominal BW [MHz]	99 % BW [kHz]
eFDD 12 QPSK	low	6	1.4	1.4	1106.21
eFDD 12 QPSK	mid	6	1.4	1.4	1112.22
eFDD 12 QPSK	high	6	1.4	1.4	1112.22
eFDD 12 16QAM	low	6	1.4	1.4	1106.21
eFDD 12 16QAM	mid	6	1.4	1.4	1100.2
eFDD 12 16QAM	high	6	1.4	1.4	1118.24
eFDD 12 QPSK	low	15	3	3	2753.51
eFDD 12 QPSK	mid	15	3	3	2741.48
eFDD 12 QPSK	high	15	3	3	2741.48
eFDD 12 16QAM	low	15	3	3	2753.51
eFDD 12 16QAM	mid	15	3	3	2729.46
eFDD 12 16QAM	high	15	3	3	2741.48
eFDD 12 QPSK	low	25	5	5	4529.06
eFDD 12 QPSK	mid	25	5	5	4529.06
eFDD 12 QPSK	high	25	5	5	4529.06
eFDD 12 16QAM	low	25	5	5	4549.1
eFDD 12 16QAM	mid	25	5	5	4549.1
eFDD 12 16QAM	high	25	5	5	4509.02
eFDD 12 QPSK	low	50	10	10	9018.04
eFDD 12 QPSK	mid	50	10	10	9018.04
eFDD 12 QPSK	high	50	10	10	9058.12
eFDD 12 16QAM	low	50	10	10	9058.12
eFDD 12 16QAM	mid	50	10	10	9058.12
eFDD 12 16QAM	high	50	10	10	9058.12
eFDD 13 QPSK	low	25	5	5	4529.06
eFDD 13 QPSK	mid	25	5	5	4529.06
eFDD 13 QPSK	high	25	5	5	4529.06
eFDD 13 16QAM	low	25	5	5	4509.02
eFDD 13 16QAM	mid	25	5	5	4529.06
eFDD 13 16QAM	high	25	5	5	4569.14
eFDD 13 QPSK	mid	50	10	10	9018.04
eFDD 13 16QAM	mid	50	10	10	9018.04

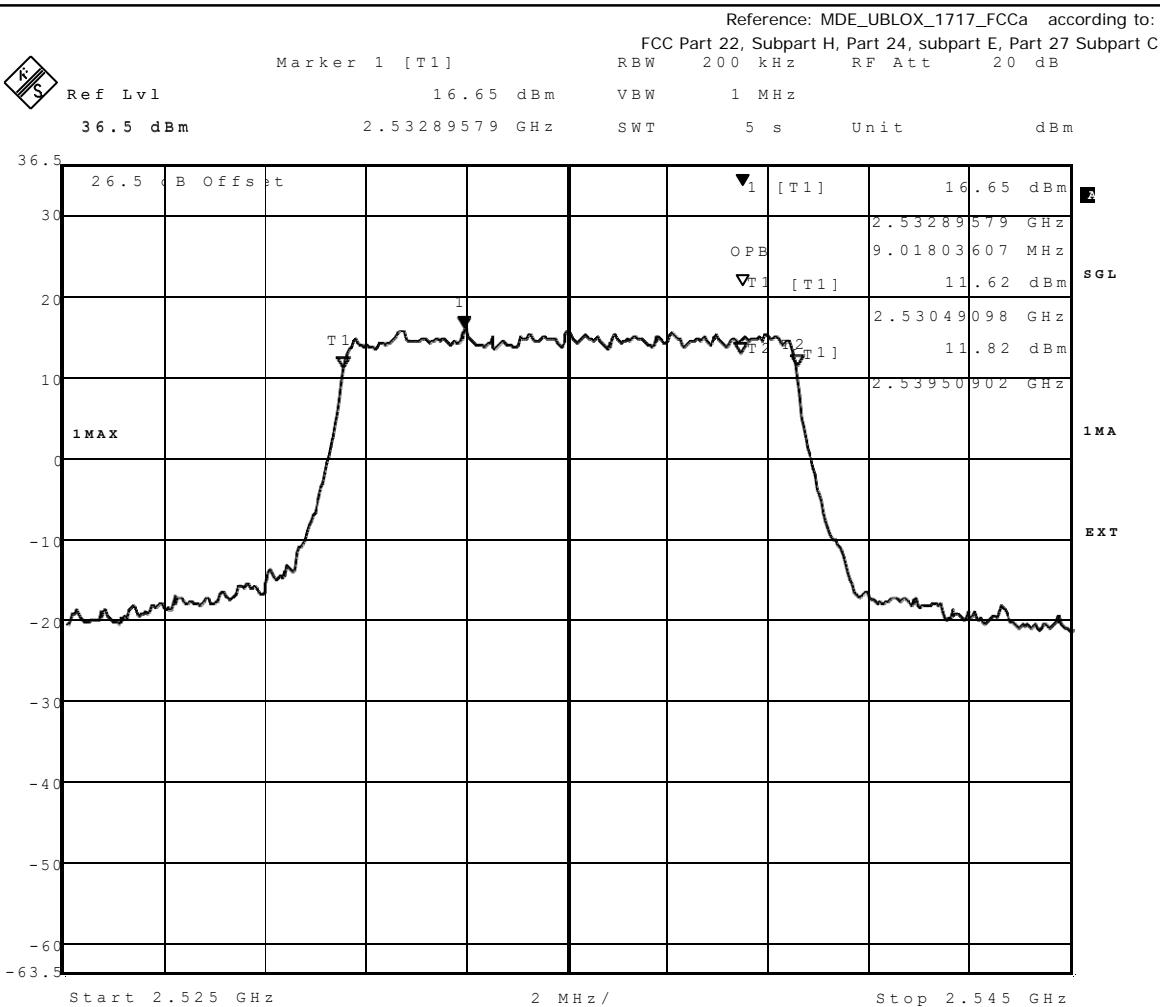
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	Nominal BW [MHz]	99 % BW [kHz]	26 dB BW [kHz]
FDD IV	low	-	5	5	4088.18	4709.42
FDD IV	mid	-	5	5	4088.18	4709.42
FDD IV	high	-	5	5	4088.18	4689.38
FDD IV HSDPA Subtest 1	low	-	5	5	4068.14	4689.38
FDD IV HSDPA Subtest 1	mid	-	5	5	4088.18	4689.38
FDD IV HSDPA Subtest 1	high	-	5	5	4088.18	4709.42
FDD IV HSUPA Subtest 1	low	-	5	5	4088.18	4689.38
FDD IV HSUPA Subtest 1	mid	-	5	5	4088.18	4689.38
FDD IV HSUPA Subtest 1	high	-	5	5	4088.18	4729.46



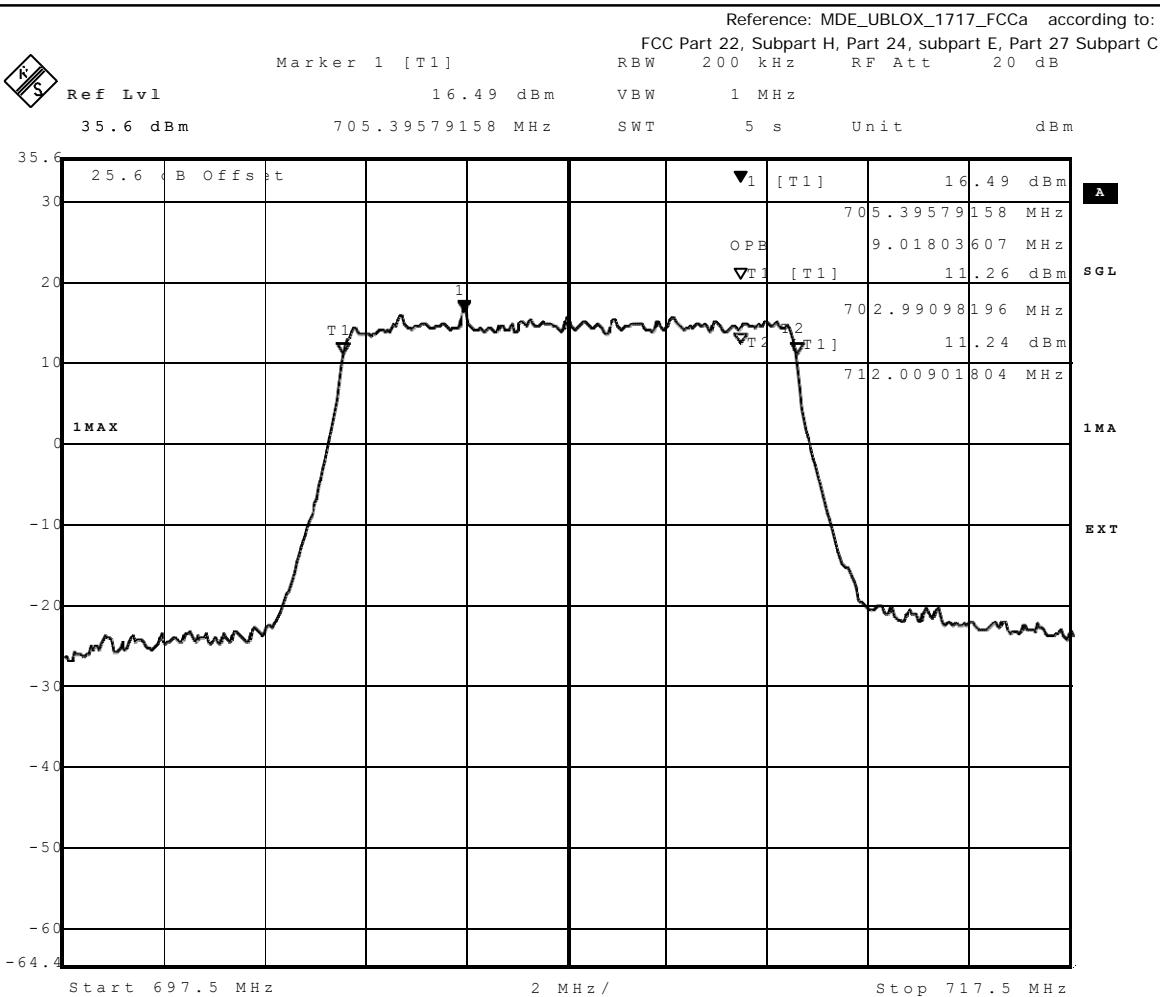
Date: 22.JUN.2017 13:36:08

eFDD4 QPSK 10MHz Channel=mid



Date: 22.JUN.2017 09:40:25

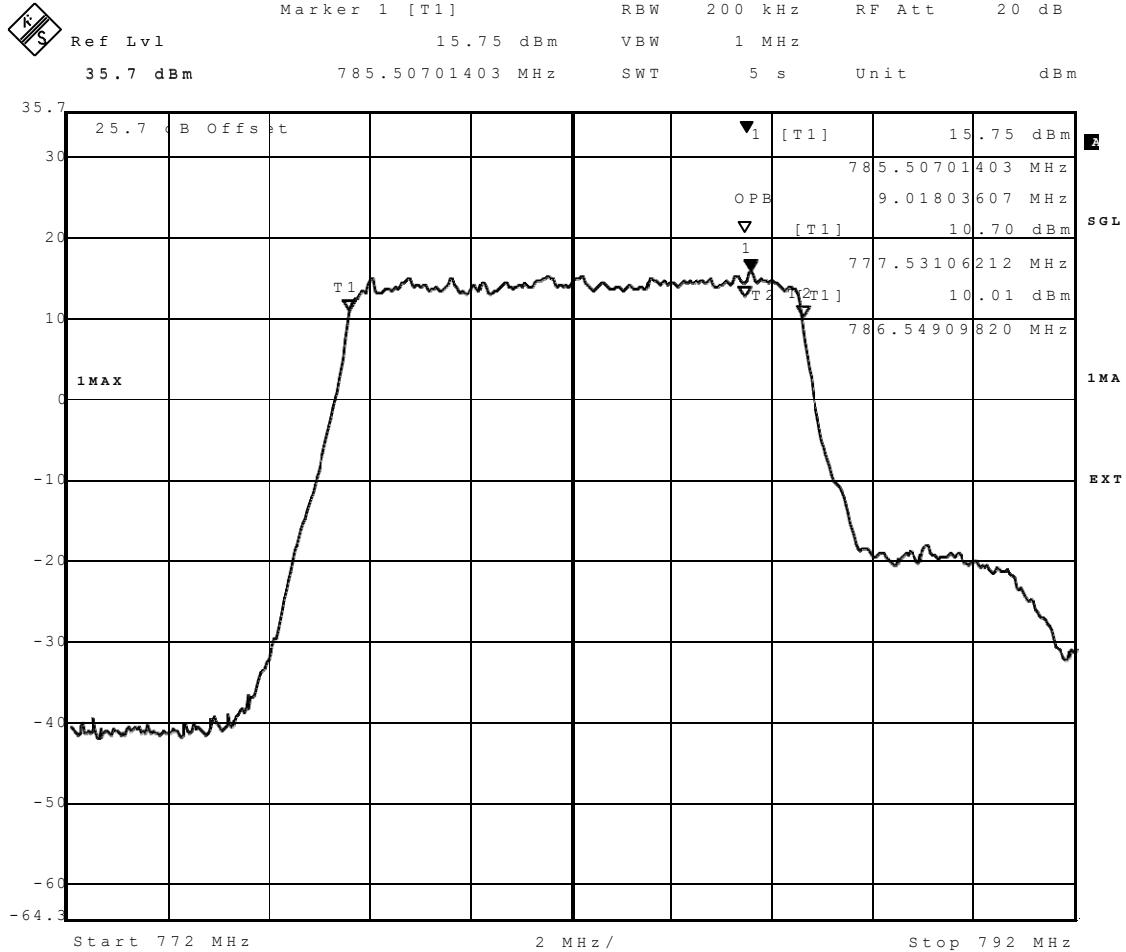
eFDD7 QPSK 10MHz Channel=mid



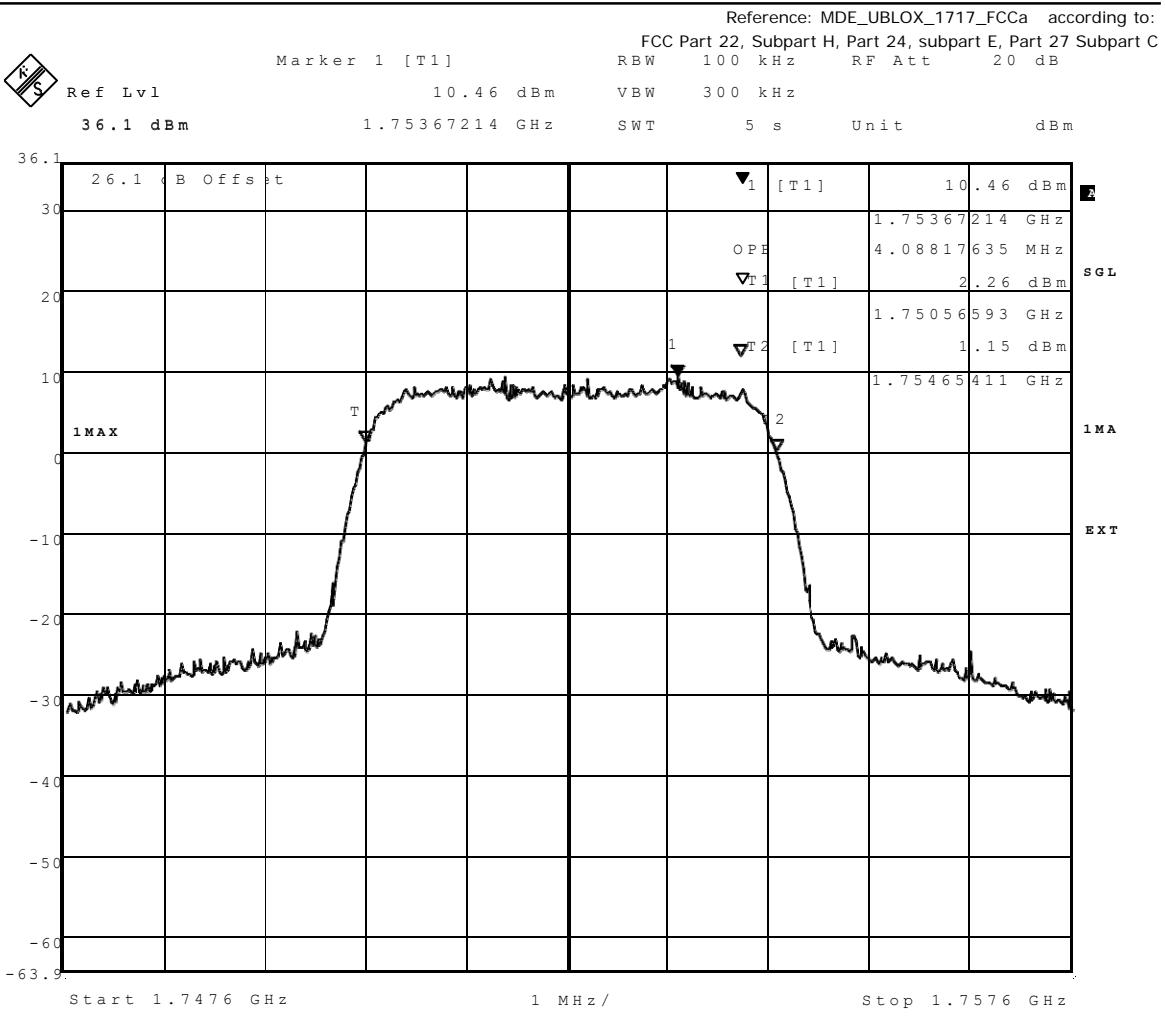
Date: 22.JUN.2017 14:59:40

eFDD12 QPSK 10MHz Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C
 RBW 200 kHz RF Att 20 dB

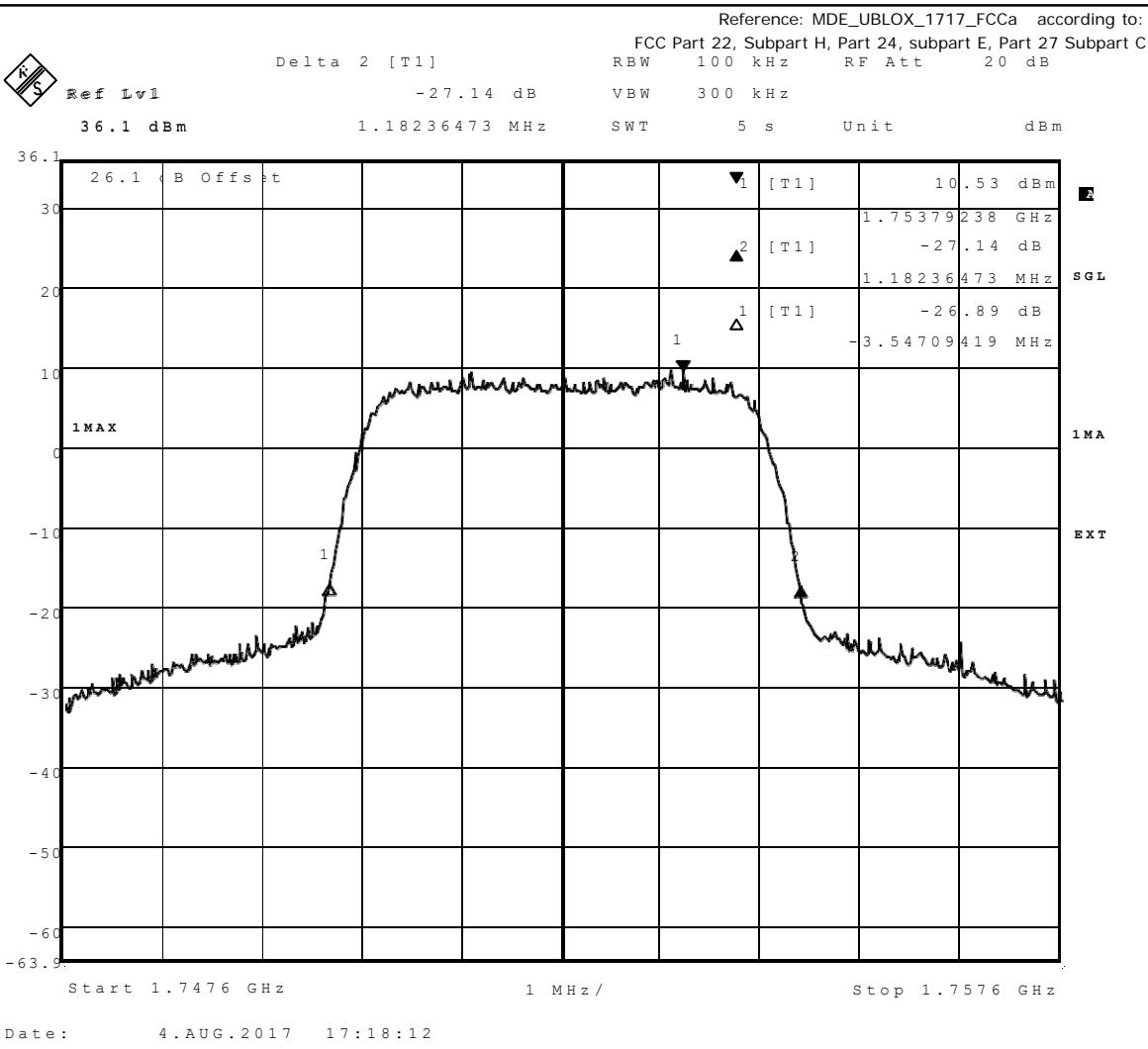


eFDD13 QPSK 10MHz Channel=mid

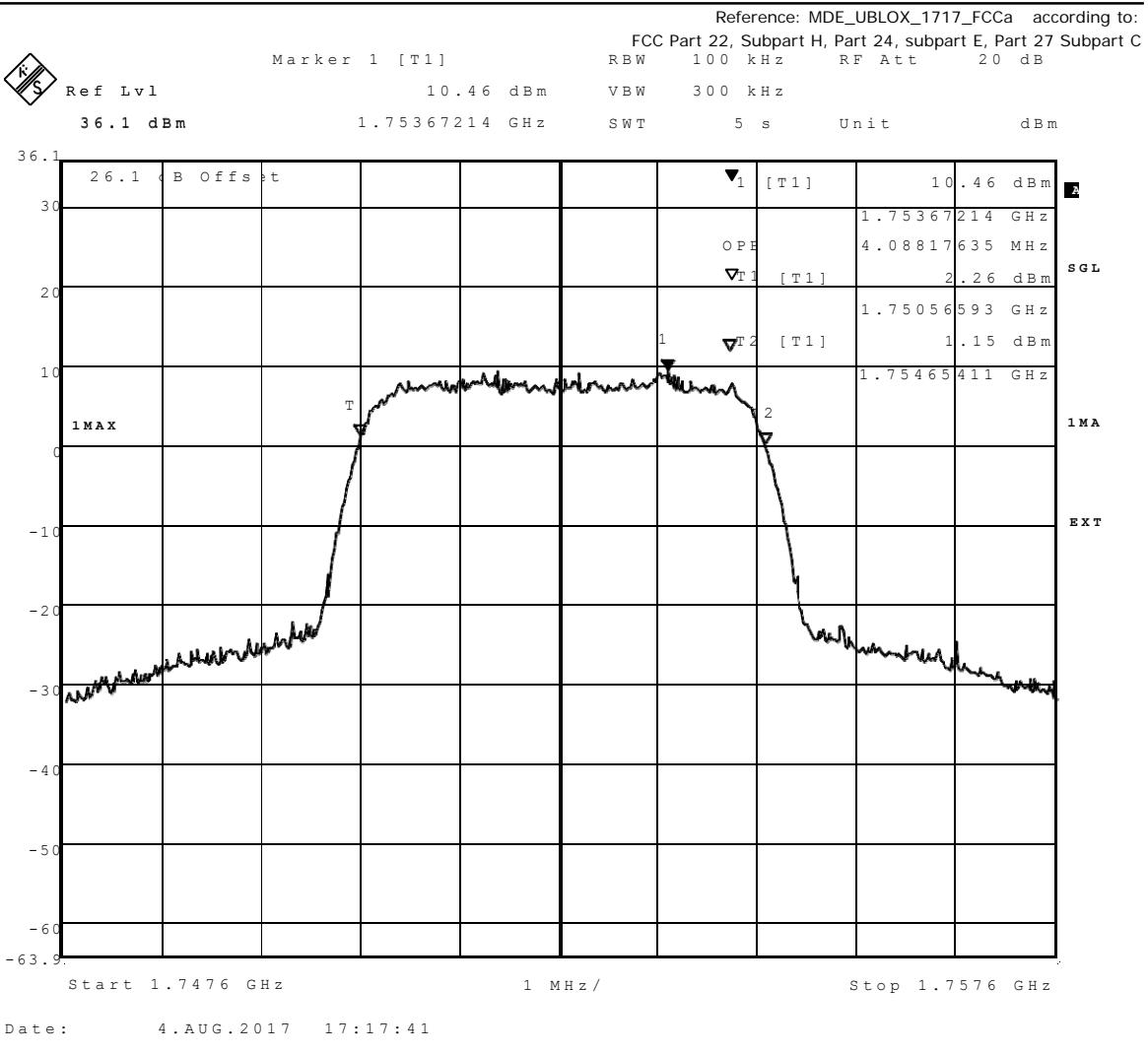


Date: 4.AUG.2017 17:17:41

WCDMA FDD IV Low channel



WCDMA FDD IV Low channel



HSUPA FDD IV High channel

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 100 kHz RF Att 20 dB



Ref Lvl

Delta 2 [T1]

-27.14 dB

VBW 300 kHz

36.1 dBm

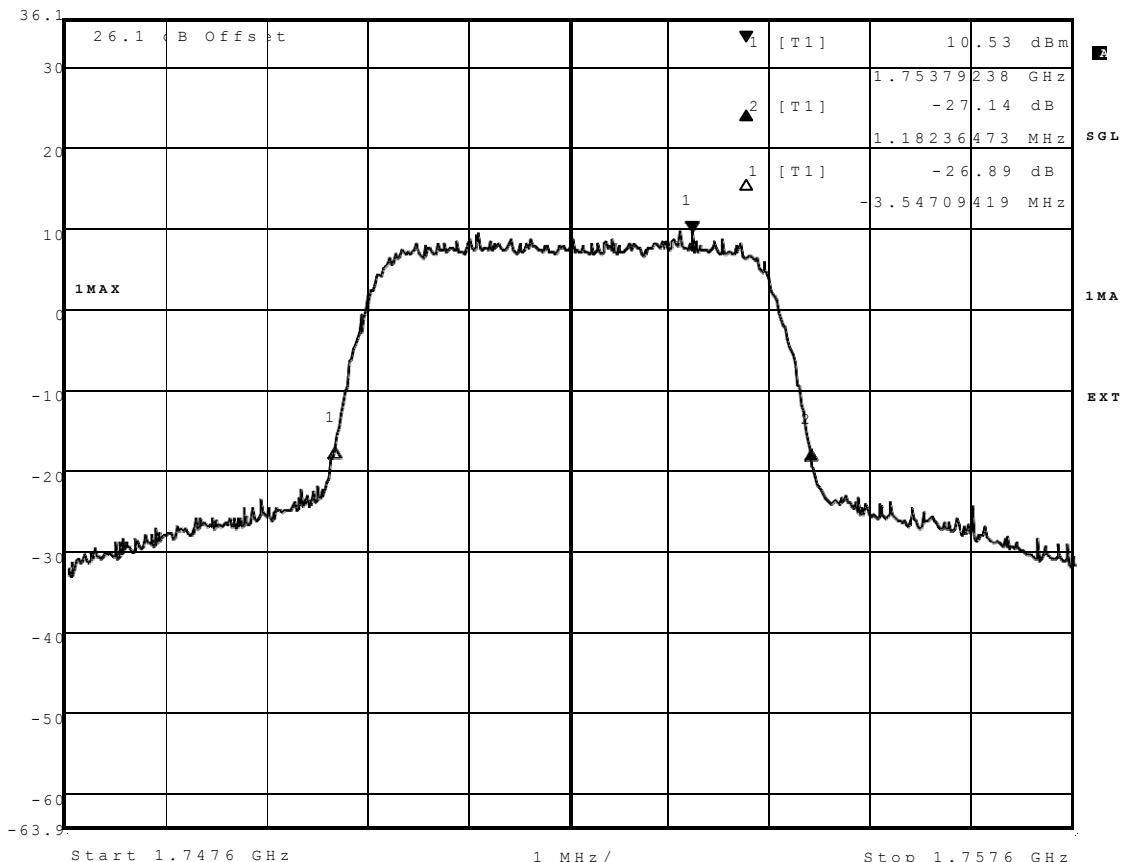
1.18236473 MHz

SWT

5 s

Unit

dBm



Date:

4.AUG.2017 17:18:12

1 MHz /

Stop 1.7576 GHz

HSUPA FDD IV High channel

3.5.20 27.6 Band edge compliance §2.1053, §27.53
Test: 27.6; Band edge compliance summary §2.1053, §27.53
Result: Passed

Setup No.: am06

Date of Test: 2017/06/23 14:05

Body: FCC47CFRCh1PART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

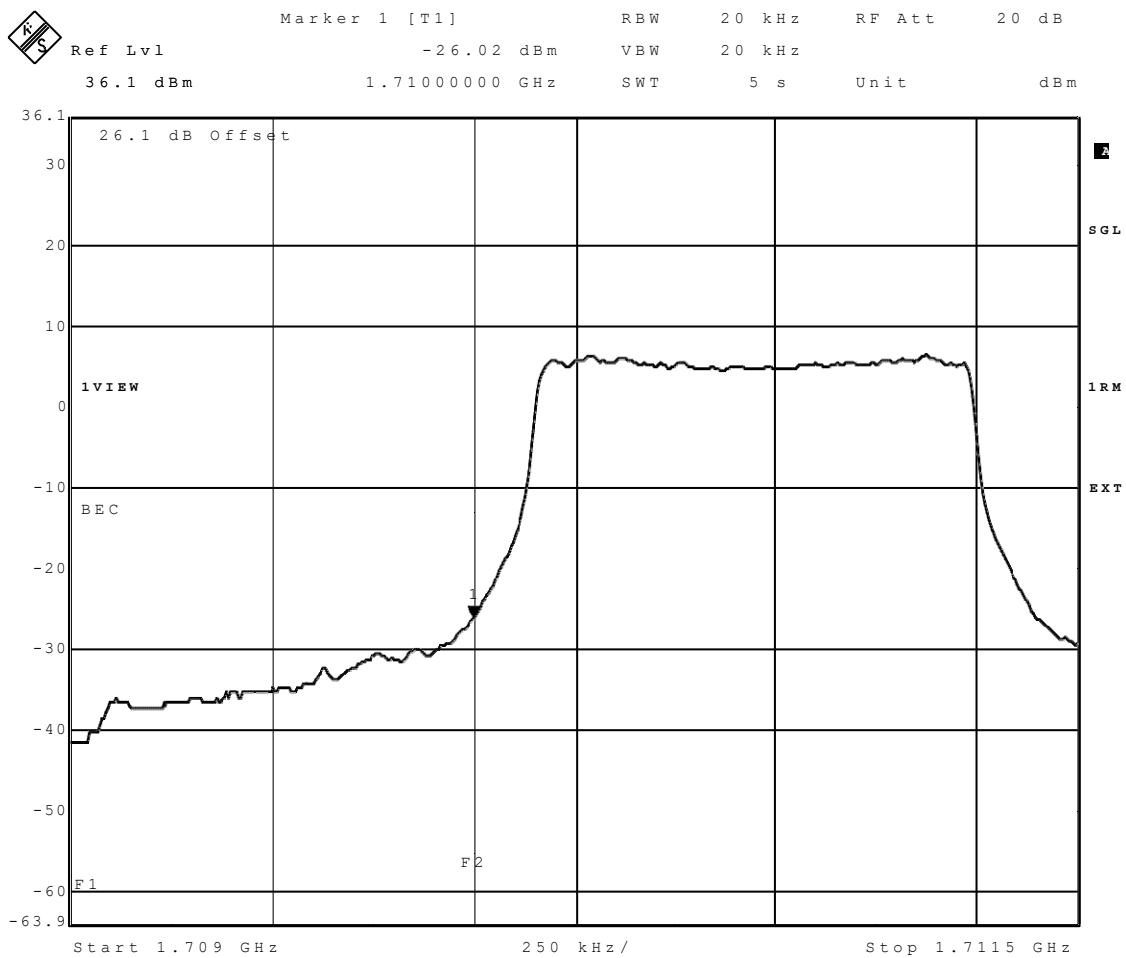
Test Specification: FCC part 2 and 27

Radio Technology	Channel	Nominal BW	Peak [dBm]	Average [dBm]	RMS [dBm]	Limit [dBm]	Margin to Limit [dB]
FDD IV	low	5	-27.63	-36.54	-35.38	-13	22.38
FDD IV	high	5	-23.2	-32.23	-31.51	-13	18.51
FDD IV HSDPA Subtest 1	low	5	-18.48	-28.1	-27.21	-13	14.21
FDD IV HSDPA Subtest 1	high	5	-14.1	-24.82	-23.9	-13	10.9
FDD IV HSUPA Subtest 1	low	5	-20.54	-29.36	-28.58	-13	15.58
FDD IV HSUPA Subtest 1	high	5	-23.18	-33.02	-31.86	-13	18.86
FDD IV HSUPA Subtest 5	low	5	-20.37	-29.36	-28.58	-13	15.58
FDD IV HSUPA Subtest 5	high	5	-23.68	-33.89	-33.02	-13	20.02

Detailed Results:

Radio Technology	Channel	Band Edge	Nominal BW	Resource Blocks	RMS [dBm]	Limit [dBm]
eFDD 4 QPSK	low	lower	1.4	6	-26.02	-13
eFDD 4 QPSK	high	higher	1.4	6	-26.6	-13
eFDD 4 16QAM	low	lower	1.4	6	-26.4	-13
eFDD 4 16QAM	high	higher	1.4	6	-27.21	-13
eFDD 4 OPSK	low	lower	3	15	-27	-13
eFDD 4 QPSK	high	higher	3	15	-28.58	-13
eFDD 4 16QAM	low	lower	3	15	-28.1	-13
eFDD 4 16QAM	high	higher	3	15	-29.92	-13
eFDD 4 QPSK	low	lower	5	25	-27.42	-13
eFDD 4 QPSK	high	higher	5	25	-29.64	-13
eFDD 4 16QAM	low	lower	5	25	-28.58	-13
eFDD 4 16QAM	high	higher	5	25	-29.92	-13
eFDD 4 OPSK	low	lower	10	50	-28.1	-13
eFDD 4 QPSK	high	higher	10	50	-30.52	-13
eFDD 4 16QAM	low	lower	10	50	-29.36	-13
eFDD 4 16QAM	high	higher	10	50	-31.86	-13
eFDD 4 QPSK	low	lower	15	75	-27.87	-13
eFDD 4 QPSK	high	higher	15	75	-29.36	-13
eFDD 4 16QAM	low	lower	15	75	-28.34	-13
eFDD 4 16QAM	high	higher	15	75	-29.92	-13
eFDD 4 OPSK	low	lower	20	100	-29.64	-13
eFDD 4 QPSK	high	higher	20	100	-31.17	-13
eFDD 4 16QAM	low	lower	20	100	-30.22	-13
eFDD 4 16QAM	high	higher	20	100	-32.62	-13
eFDD 7 QPSK	low	lower	5	25	-26.5	-25
eFDD 7 QPSK	high	higher	5	25	-25.16	-25
eFDD 7 16QAM	low	lower	5	25	-26.92	-25
eFDD 7 16QAM	high	higher	5	25	-25.55	-25
eFDD 7 OPSK	low	lower	10	50	-26.06	-25
eFDD 7 QPSK	high	higher	10	50	-27.2	-25
eFDD 7 16QAM	low	lower	10	50	-27	-25
eFDD 7 16QAM	high	higher	10	50	-27.82	-25
eFDD 7 QPSK	low	lower	15	75	-27.14	-25
eFDD 7 QPSK	high	higher	15	75	-26.1	-25
eFDD 7 16QAM	low	lower	15	75	-27.14	-25
eFDD 7 16QAM	high	higher	15	75	-26.92	-25
eFDD 7 OPSK	low	lower	20	100	-25.55	-25
eFDD 7 QPSK	high	higher	20	100	-25.22	-25
eFDD 7 16QAM	low	lower	20	100	-26.24	-25
eFDD 7 16QAM	high	higher	20	100	-25.55	-25
eFDD 12 QPSK	low	lower	1.4	1	-25.16	-13
eFDD 12 QPSK	high	higher	1.4	1	-24.12	-13
eFDD 12 16QAM	low	lower	1.4	1	-25.81	-13
eFDD 12 16QAM	high	higher	1.4	1	-25.65	-13
eFDD 12 QPSK	low	lower	3	1	-28.84	-13
eFDD 12 QPSK	high	higher	3	1	-29.34	-13
eFDD 12 16QAM	low	lower	3	1	-29.6	-13
eFDD 12 16QAM	high	higher	3	1	-31.02	-13
eFDD 12 QPSK	low	lower	5	1	-29.34	-13
eFDD 12 QPSK	high	higher	5	1	-30.42	-13
eFDD 12 16QAM	low	lower	5	1	-31.02	-13
eFDD 12 16QAM	high	higher	5	1	-31.02	-13
eFDD 12 QPSK	low	lower	10	1	-26.71	-13
eFDD 12 QPSK	high	higher	10	1	-26.9	-13
eFDD 12 16QAM	low	lower	10	1	-27.92	-13
eFDD 12 16QAM	high	higher	10	1	-27.92	-13
eFDD 13 QPSK	low	lower	5	1	-34.92	-13
eFDD 13 QPSK	high	higher	5	1	-31.24	-13
eFDD 13 16QAM	low	lower	5	1	-35.78	-13
eFDD 13 16QAM	high	higher	5	1	-32.63	-13
eFDD 13 QPSK	mid	lower	10	1	-38.28	-13
eFDD 13 QPSK	mid	higher	10	1	-35.26	-13
eFDD 13 16QAM	mid	lower	10	1	-40.78	-13
eFDD 13 16QAM	mid	higher	10	1	-36.94	-13

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



Date: 23.JUN.2017 11:59:10

eFDD12 QPSK 1.4MHz RB6 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 100 kHz RF Att 20 dB

Marker 1 [T1]

-25.16 dBm

VBW 100 kHz

SWT 5 s

Unit

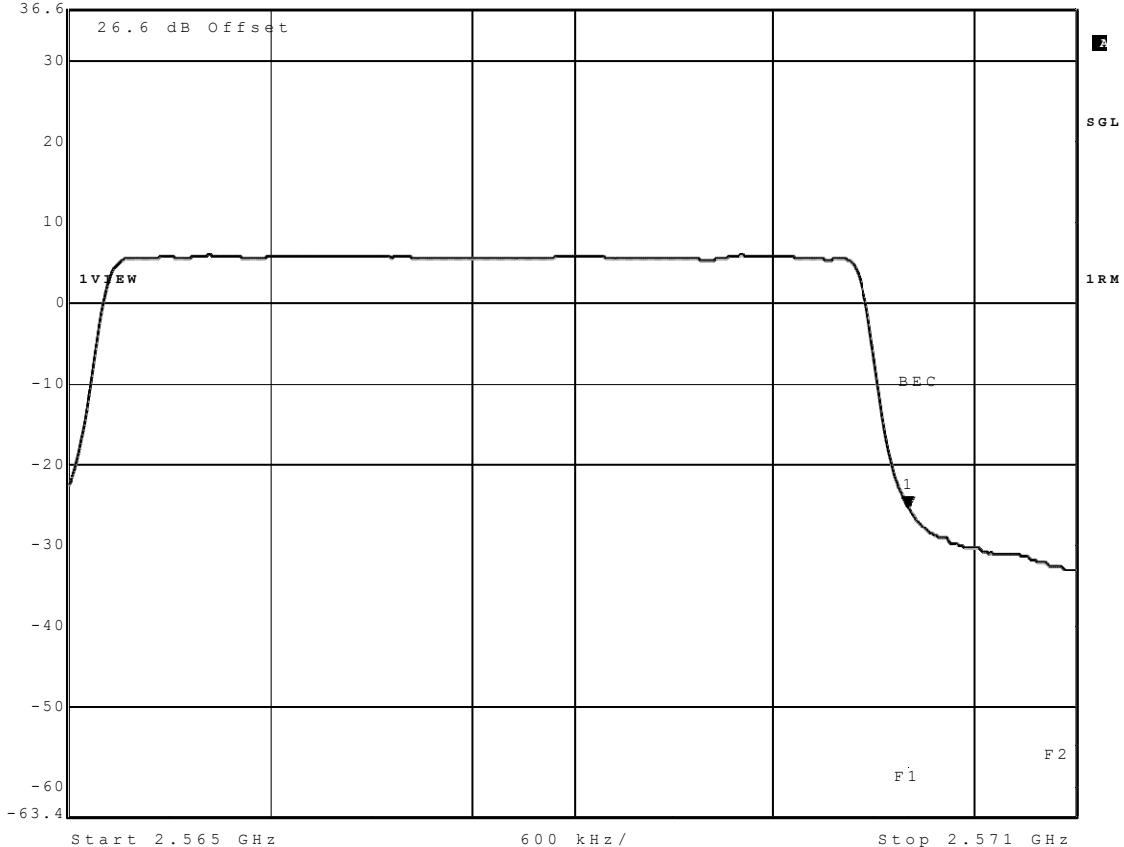
dBm

36.6 dBm

2.57000000 GHz

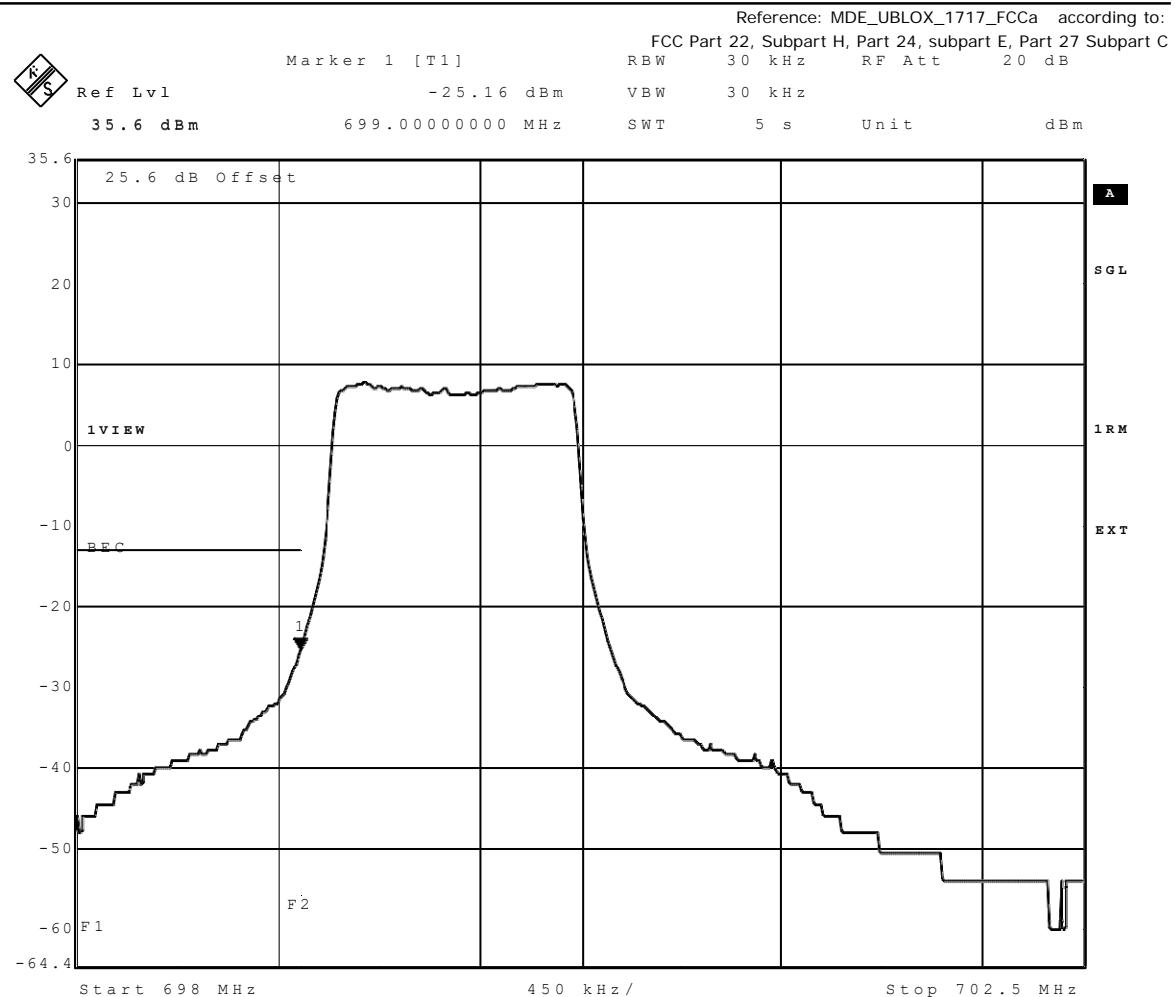


Ref Lvl



Date: 15.JUL.2017 14:56:31

eFDD7 QPSK 5MHz RB25 Channel=high



Date: 23.JUN.2017 12:46:57

eFDD12 QPSK 1.4MHz RB6 Channel=low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

RBW 30 kHz RF Att 20 dB



Ref Lvl

Marker 1 [T1]

-31.24 dBm

VBW 30 kHz

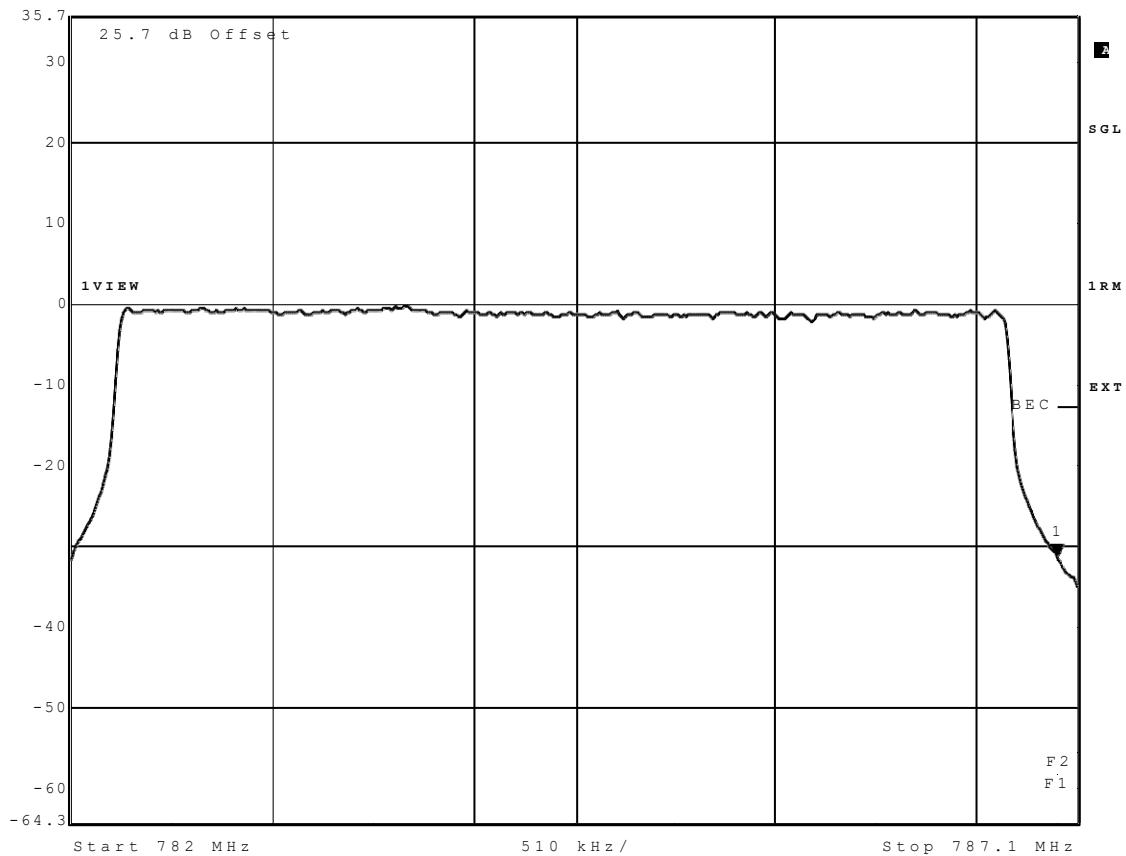
787.00000000 MHz

SWT 5 s

Unit

dBm

35.7 dBm



Date: 29.JUN.2017 11:08:27

eFDD13 QPSK 5MHz RB25 Channel=high

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



Ref Lvl

Marker 1 [T1]

-23.90 dBm

R BW

50 kHz

R F Att

20 dB

V BW

50 kHz

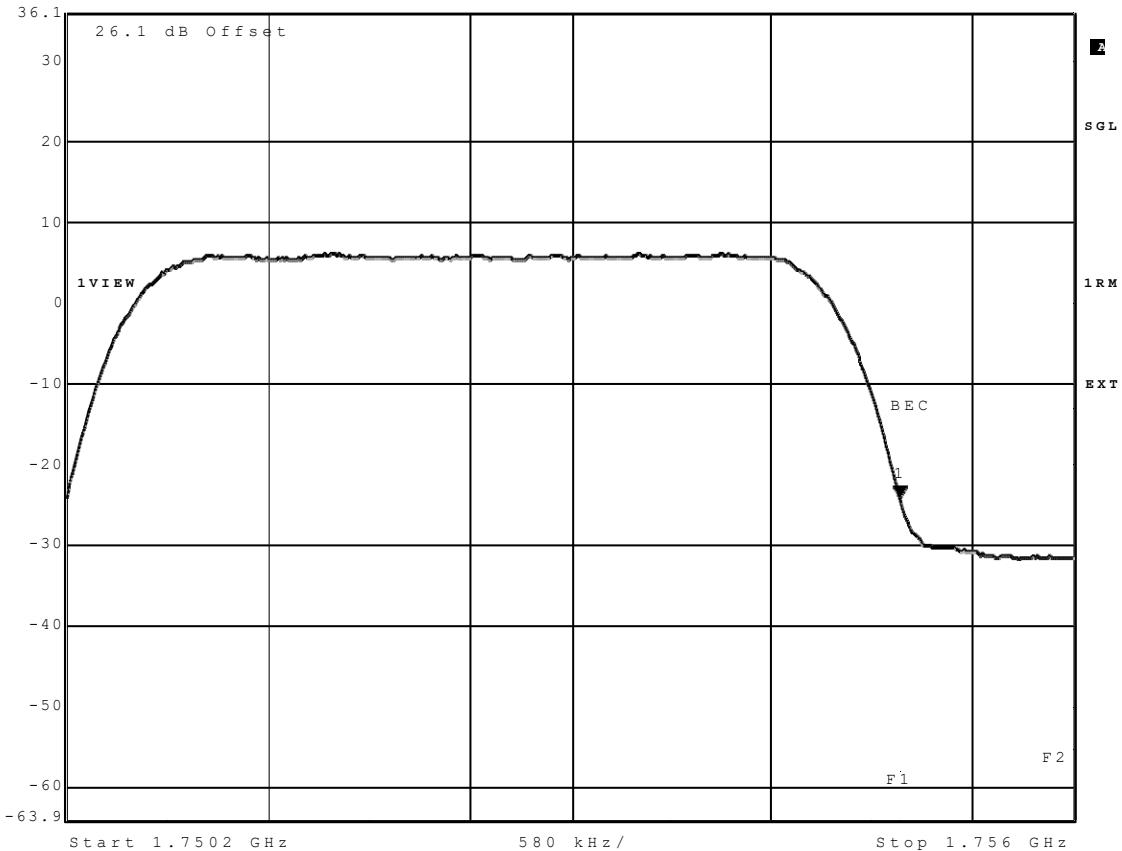
S WT

5 s

U nit

dBm

36.1 dB



Date: 4.AUG.2017 16:44:33

HSDPA FDD IV Channel 1312 / Low

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C



Ref Lvl

Marker 1 [T1]

-23.90 dBm

RBW

50 kHz

RF Att

20 dB

VBW

50 kHz

SWT

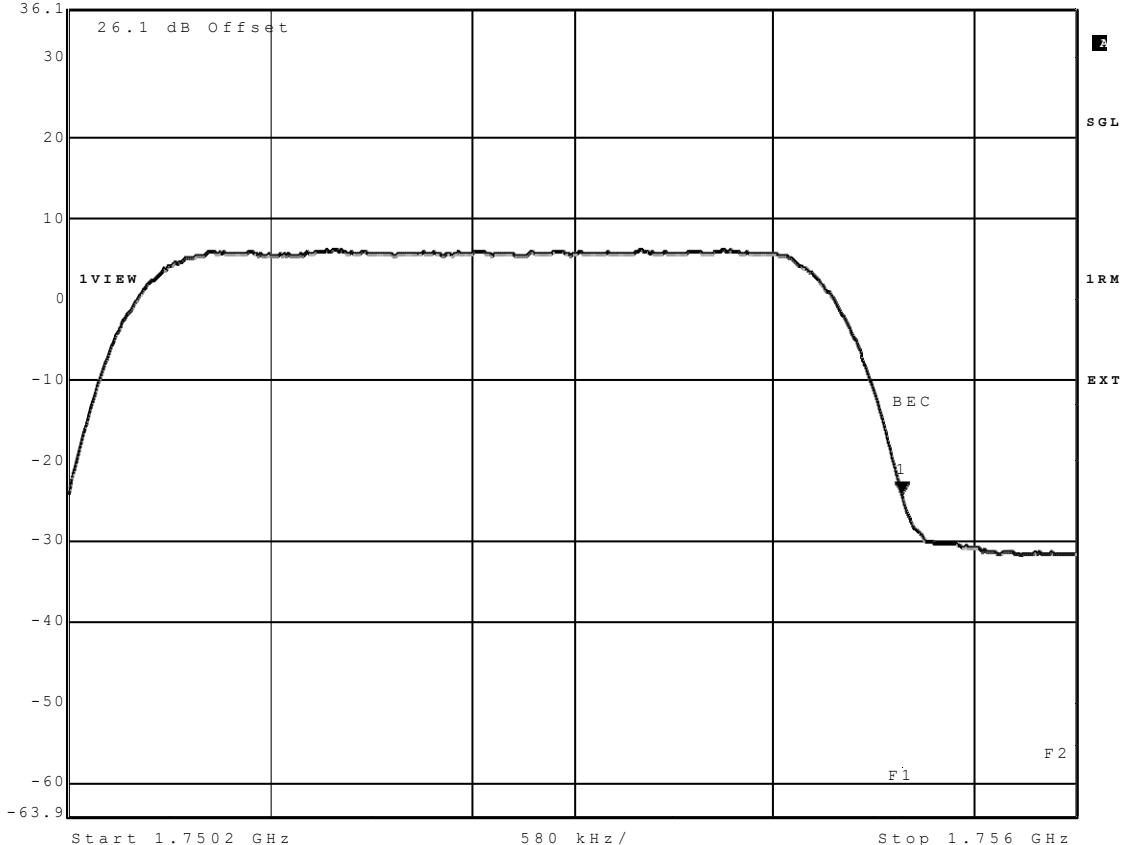
5 s

Unit

dBm

36.1 dB

26.1 dB Offset



Start 1.7502 GHz

580 kHz /

Stop 1.756 GHz

Date: 4.AUG.2017 16:44:33

HSDPA FDD IV Channel 1513 / High

3.5.21 27.7 Peak-to-Average ratio §2.1046, §27.50
Test: 27.7; Peak-to-Average Ratio Summary §2.1046, §27.50

Result: Passed
Setup No.: am06
Date of Test: 2017/06/23 11:44
Body: FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES
Test Specification: FCC part 2 and 27

Detailed Results:

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	Peak to Average Ratio [dB]	Limit (FCC) [dB]	Limit (IC) [dB]
eFDD 4 QPSK	low	6	1.4	5.59	13	13
eFDD 4 QPSK	mid	6	1.4	5.86	13	13
eFDD 4 QPSK	high	6	1.4	5.22	13	13
eFDD 4 16QAM	low	6	1.4	6.43	13	13
eFDD 4 16QAM	mid	6	1.4	6.64	13	13
eFDD 4 16QAM	high	6	1.4	5.94	13	13
eFDD 7 QPSK	low	6	1.4	5.74	-	-
eFDD 7 QPSK	mid	6	1.4	6	-	-
eFDD 7 QPSK	high	6	1.4	5.57	-	-
eFDD 7 16QAM	low	6	1.4	6.52	-	-
eFDD 7 16QAM	mid	6	1.4	6.84	-	-
eFDD 7 16QAM	high	6	1.4	6.26	-	-
eFDD 12 QPSK	low	6	1.4	5.33	-	13
eFDD 12 QPSK	mid	6	1.4	5.13	-	13
eFDD 12 QPSK	high	6	1.4	4.49	-	13
eFDD 12 16QAM	low	6	1.4	5.97	-	13
eFDD 12 16QAM	mid	6	1.4	5.97	-	13
eFDD 12 16QAM	high	6	1.4	5.33	-	13
eFDD 13 QPSK	low	25	5	5.51	-	13
eFDD 13 QPSK	mid	25	5	5.3	-	13
eFDD 13 QPSK	high	25	5	5.48	-	13
eFDD 13 16QAM	low	25	5	6.23	-	13
eFDD 13 16QAM	mid	25	5	6.12	-	13
eFDD 13 16QAM	high	25	5	6.09	-	13

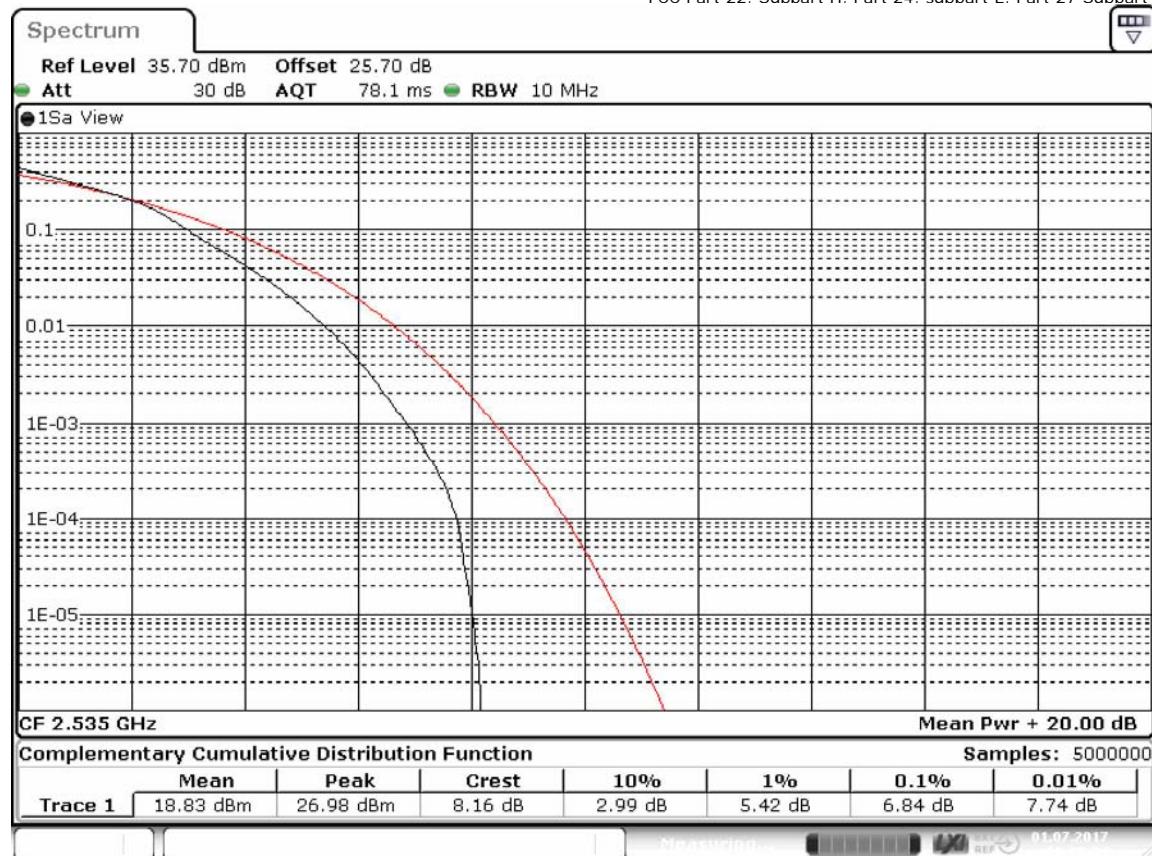
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



Date: 1.JUL.2017 09:46:28

eFDD4 16QAM 1.4MHz RB6 Channel=mid

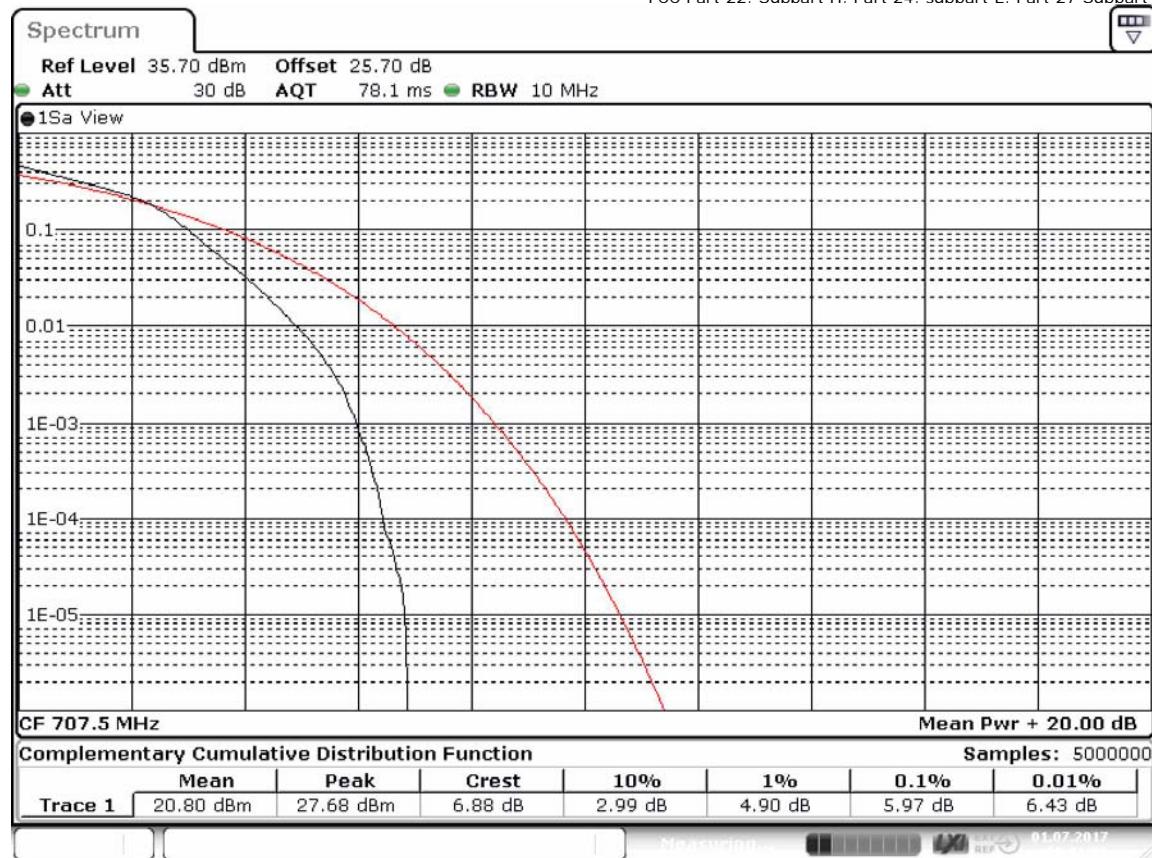
Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



Date: 1.JUL.2017 09:50:25

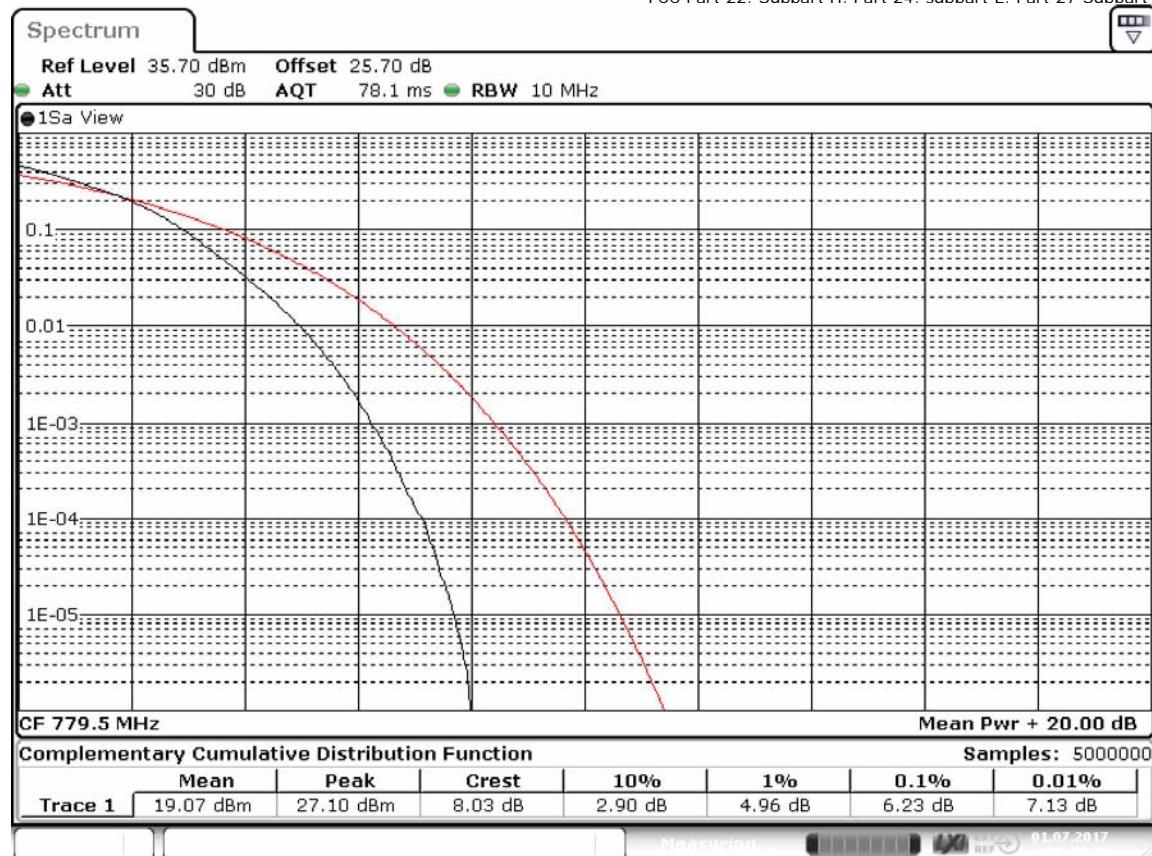
eFDD7 16QAM 1.4MHz RB6 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



eFDD7 16QAM 1.4MHz RB6 Channel=mid

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22. Subpart H. Part 24. subpart E. Part 27 Subpart C



Date: 1.JUL.2017 09:53:13

eFDD7 16QAM 5MHz RB25 Channel=low

4 Test Equipment Details

4.1 List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

Test Equipment Anechoic Chamber

Lab ID: Lab 1
Description: Anechoic Chamber for radiated testing

Single Devices for Anechoic Chamber

Single Device Name	Type	Serial Number	Manufacturer
Air compressor	none	-	
Anechoic Chamber	10.58 x 6.38 x 6.00 m ³	none	
Anechoic Chamber	8.8m x 4.6m x 4.05 m	B83117-S40-X191	Albatross Projects GmbH
Controller Maturo	MCU	961208	Maturo GmbH
EMC camera	CE-CAM/1	-	
EMC camera Nr.2	CCD-400E	0005033	
Filter ISDN	B84312-C110-E1		
Filter Universal 1A	BB4312-C30-H3	-	

Test Equipment Auxiliary Equipment for Radiated emissions

Lab ID: Lab 1
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Auxiliary Equipment for Radiated emissions

Single Device Name	Type	Serial Number	Manufacturer
Antenna mast	AM 4.0	AM4.0/180/11920 513	Maturo GmbH
Biconical Broadband Antenna	SBA 9119	9119-005	
Biconical dipole	VUBA 9117	9117-108	
Broadband Amplifier 1 GHz - 4 GHz	AFS4-01000400-1Q-10P-4	-	
Broadband Amplifier 18 GHz - 26 GHz	JS4-18002600-32-5P	849785	
Broadband Amplifier 30 MHz - 18 GHz	JS4-00101800-35-5P	896037	
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01-2+W38.01-2	
Cable "ESI to Horn Antenna"	SucoFlex	W18.02-2+W38.02-2	
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz GmbH & Co. KG
<i>Calibration Details</i>			<i>Last Execution</i> <i>Next Execution</i>
Standard Calibration			2015/06/23 2018/06/22
Double-ridged horn	HF 907	102444	Rohde & Schwarz GmbH & Co. KG
<i>Calibration Details</i>			<i>Last Execution</i> <i>Next Execution</i>

Reference: MDE_UBLOX_1717_FCCa according to:
 FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

Single Device Name	Type	Serial Number	Manufacturer	
	Standard Calibration		2015/05/11	2018/05/10
Double-ridged horn-duplicated 2015-07-15 10:47:55	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG	
High Pass Filter	4HC1600/12750-1.5-KK	9942011		
High Pass Filter	5HC2700/12750-1.5-KK	9942012		
High Pass Filter	5HC3500/18000-1.2-KK	200035008		
High Pass Filter	WHKX 7.0/18G-8SS	09		
Horn Antenna Schwarzbeck 15-26.5 GHz BBHA 9170	BBHA 9170	BBHA9170262		
Log.-per. Antenna	HL 562 Ultralog	100609	Rohde & Schwarz GmbH & Co. KG	
Log.-per. Antenna (upgraded)	HL 562 Ultralog new biconicals	830547/003	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Execution</i>
	Standard Calibration		2015/06/30	2018/06/29
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Execution</i>
	DKD Calibration		2014/11/27	2017/11/27
Standard Gain / Pyramidal Horn Antenna 40 GHz	3160-10	00086675		
Tilt device Maturo (Rohacell)	Antrieb TD1.5-10kg	TD1.5-10kg/024/379070 9	Maturo GmbH	

Test Equipment Auxiliary Test Equipment

Lab ID:	Lab 1, Lab 2
Description:	Single Devices for various Test Equipment
Type:	various
Serial Number:	none

Single Devices for Auxiliary Test Equipment

Single Device Name	Type	Serial Number	Manufacturer
Broadband Power Divider N (Aux)	1506A / 93459	LM390	
Broadband Power Divider SMA	WA1515	A855	
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	DAkkS Calibration		2016/02/04 2018/02/28
Digital Multimeter 13 (Clamp Meter)	Fluke 325	31270091WS	FLUKE
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	DAkkS-Calibration		2016/02/04 2019/02/28
Fibre optic link Satellite (Aux)	FO RS232 Link	181-018	
Fibre optic link Transceiver (Aux)	FO RS232 Link	182-018	
Isolating Transformer	LTS 604	1888	
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	
Signal Analyzer	FSV30	103005	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	DKD calibration		2016/02/25 2018/02/24
Spectrum Analyser	FSU26	200418	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Standard calibration		2016/11/03 2017/11/02
Spectrum Analyzer	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	DKD calibration		2015/06/23 2018/06/22
Vector Signal Generator	SMIQ 03B	832492/061	

Test Equipment Digital Signalling Devices
Lab ID:
Lab 1, Lab 2
Description:

Signalling equipment for various wireless technologies.

Single Devices for Digital Signalling Devices

Single Device Name	Type	Serial Number	Manufacturer	
CMW500	CMW500	107500	<i>Last Execution</i>	<i>Next Execution</i>
	<i>Calibration Details</i>	Standard calibration		
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>	DKD calibration	<i>Last Execution</i>	<i>Next Execution</i>
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>	DKD calibration	<i>Last Execution</i>	<i>Next Execution</i>
Vector Signal Generator	SMU200A	100912	Rohde & Schwarz GmbH & Co. KG	

Test Equipment Emission measurement devices
Lab ID:
Lab 1
Description:

Equipment for emission measurements

Serial Number:

see single devices

Single Devices for Emission measurement devices

Single Device Name	Type	Serial Number	Manufacturer	
EMI Receiver / Spectrum Analyzer	ESR 7	101424	<i>Last Execution</i>	<i>Next Execution</i>
	<i>Calibration Details</i>	DKD Calibration		
Personal Computer	Dell	30304832059	<i>Last Execution</i>	<i>Next Execution</i>
	<i>Calibration Details</i>	Standard calibration		
Power Meter	NRVD	828110/016	<i>Last Execution</i>	<i>Next Execution</i>
	<i>Calibration Details</i>	Standard calibration		
Sensor Head A	NRV-Z1	827753/005	<i>Last Execution</i>	<i>Next Execution</i>
	<i>Calibration Details</i>	Standard calibration		
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>	Standard Calibration	<i>Last Execution</i>	<i>Next Execution</i>
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>	DAkkS Calibration (DK)	<i>Last Execution</i>	<i>Next Execution</i>
Spectrum Analyzer	<i>HW/SW Status</i>	Firmware-Update 4.34.4 from 3.45 during calibration	<i>Date of Start</i>	<i>Date of End</i>
			2009/12/03	
Spectrum Analyzer	FSW 43	103779	<i>Last Execution</i>	<i>Next Execution</i>
	<i>Calibration Details</i>	DKD calibration		



Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Test Equipment Multimeter 03

Lab ID: **Lab 1, Lab 2**
Description: Fluke 177
Serial Number: 86670383

Single Devices for Multimeter 03

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	
<i>Calibration Details</i>			
	DAkkS Calibration	2016/02/04	2018/02/28

Test Equipment Radio Lab Test Equipment
Lab ID:
Lab 2
Description:

Radio Lab Test Equipment

Single Devices for Radio Lab Test Equipment

Single Device Name	Type	Serial Number	Manufacturer
Broadband Power Divider SMA	WA1515	A856	
Coax Attenuator 10dB SMA 2W	4T-10	F9401	
Coax Attenuator 10dB SMA 2W	56-10	W3702	
Coax Attenuator 10dB SMA 2W	56-10	W3711	
Coax Cable Huber&Suhner	Sucotest 2,0m		Huber&Suhner
Coax Cable Rosenberger Micro Coax FA210A0010003030 SMA/SMA 1,0m	FA210A0010003030	54491-2	
Power Meter	NRVD	828110/016	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Standard calibration		2017/05/17 2018/05/16
RF Step Attenuator RSP	RSP	833695/001	
Rubidium Frequency Standard	Datum, Model: MFS	5489/001	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Standard calibration		2016/06/22 2017/07/10
	Standard calibration		2017/07/11 2018/07/10
Sensor Head A	NRV-Z1	827753/005	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Standard calibration		2017/05/18 2018/05/17
Signal Generator SME	SME03	827460/016	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Standard calibration		2014/12/02 2017/12/01
Signal Generator SMP	SMP02	833286/0014	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Standard calibration		2016/05/24 2019/05/23
Spectrum Analyzer	FSIQ26	840061/005	Rohde & Schwarz GmbH & Co. KG

Test Equipment T/A Logger 13

Lab ID:	Lab 1, Lab 2
Description:	Lufft Opus10 TPR
Type:	Opus10 TPR
Serial Number:	13936

Single Devices for T/A Logger 13

Single Device Name	Type	Serial Number	Manufacturer
ThermoAirpressure Datalogger 13 (Environ)	Opus10 TPR (8253.00)	13936	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Customized calibration		2017/04/10 2019/04/09

Test Equipment T/H Logger 03

Lab ID:	Lab 2
Description:	Lufft Opus10
Serial Number:	7482

Single Devices for T/H Logger 03

Single Device Name	Type	Serial Number	Manufacturer
ThermoHygro Datalogger 03 (Environ)	Opus10 THI (8152.00)	7482	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Customized calibration		2017/03/30 2019/03/29

Test Equipment T/H Logger 12

Lab ID:	Lab 1
Description:	Lufft Opus10
Serial Number:	12482

Single Devices for T/H Logger 12

Single Device Name	Type	Serial Number	Manufacturer
ThermoHygro Datalogger 12 (Environ)	Opus10 THI (8152.00)	12482	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Customized calibration		2017/03/30 2019/03/29

Test Equipment Temperature Chamber 05

Lab ID:	Lab 2
Description:	Temperature Chamber VT4002
Type:	Vötsch
Serial Number:	see single devices

Single Devices for Temperature Chamber 05

Single Device Name	Type	Serial Number	Manufacturer
Temperature Chamber Vötsch 05	VT 4002	58566080550010	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Execution</i>
	Customized calibration		2016/03/09 2018/03/08

5 Annex
5.1 Additional Information for Report
Correlation of measurement requirements for Cellular Equipment from FCC and IC

FCC Rule / IC Standard	Part 22	RSS-132	Part 24	RSS-133	Part 27	RSS-139	RSS-130
		Issue 3, 2016		Issue 6, 2013		Issue 3, 2015	Issue 1, 2013
Effective (isotropic) Radiated Power	§2.1046 §22.913	RSS-GEN, §6.12 RSS-132, §5.4	§2.1046 §24.232	RSS-GEN, §6.12 RSS-133, §6.4	§2.1046 §27.50	RSS-GEN, §6.12 RSS-139; §6.4	RSS-GEN, §6.12 RSS-130; §4.4
Emission and Occupied Bandwidth	§2.1049	RSS-GEN §6.6	§2.1049	RSS-GEN §6.6	§2.1049	RSS-GEN §6.6	RSS-GEN §6.6
“Spuri” at Antenna Terminal	§2.1051 §22.917	RSS-GEN, §6.13 RSS-132, §5.5	§2.1051 §24.238	RSS-GEN, §6.13 RSS-132, §6.5	§2.1051 §27.53	RSS-GEN, §6.13 RSS-139, §6.5	RSS-GEN, §6.13 RSS-130, §4.6
Band Edge compliance	§2.1051 §22.917	RSS-GEN, §6.13	§2.1051 §24.238	RSS-GEN, §6.13	§2.1051 §27.53	RSS-GEN, §6.13	RSS-GEN, §6.13
Frequency Stability	§2.1055 §22.355	RSS-GEN, §6.11	§2.1055 §24.235	RSS-GEN, §6.11 RSS-132, §6.3	§2.1055 §27.51	RSS-GEN, §6.11 RSS-139, §6.3	RSS-GEN, §6.11 RSS-130, §4.3
Peak to Average Ratio	N/A	RSS-132, §5.3	§2.1046 §24.232	RSS-133, §6.4	§2.1046 §27.50	RSS-139, §6.4	RSS-130; §4.4
Field Strength of Spurious Radiation	§2.1053 §22.917	RSS-GEN, §6.13 RSS-132, §5.2	§2.1053 §24.235	RSS-GEN, §6.13 RSS-133, §6.5	§2.1053 §27.51	RSS-GEN, §6.13 RSS-139, §6.5	RSS-GEN, §6.13 RSS-130, §4.6

*) Receivers which are part of Transceivers are exempted with respect to Notice 2012-DRS0126.



testing for a smarter world

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

Summary of Test Results

The EUT complied with all performed tests as listed in the summary section of this report.

Technical Report Summary

Type of Authorization :

Certification for a GSM/WCDMA/CDMA2000 cellular radiotelephone device

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 69. The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

- § 2.1046 Measurement required: RF power output
- § 2.1049 Measurement required: Occupied bandwidth
- § 2.1051 Measurement required: Spurious emissions at antenna terminals
- § 2.1053 Measurement required: Field strength of spurious radiation
- § 2.1055 Measurement required: Frequency stability
- § 2.1057 Frequency spectrum to be investigated

Part 22, Subpart C – Operational and Technical Requirements

- § 22.355 Frequency tolerance

Part 22, Subpart H – Cellular Radiotelephone Service

- § 22.913 Effective radiated power limits
- § 22.917 Emission limitations for cellular equipment

additional documents

ANSI C63.26-D

Description of Methods of Measurements

RF Power Output

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §2.1046

Test Description (conducted measurement procedure)

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
 - Channel (Frequency): please refer to the detailed results
- 4) The transmitted power of the EUT was recorded by using a spectrum analyser.

§2.1046 Measurements Required: RF Power Output

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the output terminals when this test is made shall be stated.

§22.913 Effective radiated power limits

(a)(2) Maximum ERP. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Emission and Occupied Bandwidth

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §2.1049

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

4) Important Analyser Settings:

- Resolution Bandwidth: >1% of the manufacturer's stated occupied bandwidth

5) The maximum spectral level of the modulated signal was recorded as the reference.

6) The emission bandwidth is measured as follows:

the two furthest frequencies above and below the frequency of the maximum reference level where the spectrum is -26 dB down have to be found.

7) The occupied bandwidth (99% Bandwidth) is measured as follows:

the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 percent of the total mean power.

Test Requirements / Limits

§ 2.1049 Measurements required: Occupied bandwidth

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.

Spurious emissions at antenna terminals

Standard FCC Part 22, Subpart H

The test was performed according to FCC §2.1051

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

4) Important Analyser Settings

- [Resolution Bandwidth]:

a) [>=1% of wanted signal bandwidth] in the Span of 1 MHz directly below and above the PCS-Band,

b) otherwise [100 kHz] (or [1 MHz] for accelerated sweep times)

c) [reduced resolution bandwidth] in case the curve of the analyser IF-Filter or the wanted EUT signal leads to an exceeding of the limit, in this case a correction factor was used

- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth

5) The spurious emissions peaks were measured in the frequency range from 9 kHz to 10 GHz (up to the 10th harmonic) during the call was established

Test Requirements / Limits

§ 2.1051 Spurious emissions at antenna terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 2.1057 Frequency spectrum to be investigated.

- (a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
- (1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
 - (b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
 - (c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
 - (d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 22.917 Emission limitations for cellular equipment

- (a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
- Remark of the test laboratory: This is calculated to be -13 dBm.
- (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). 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.
- (c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].
- (d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Field strength of spurious radiation

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §2.1053

Test Description

- 1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
 - 2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:
- Output Power: Maximum
 - Channel: please refer to the detailed results
 - 3) A pre-calibration procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lambda/2 dipole).
 - 4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antennas for the frequency range of 30 MHz to 10 GHz (up to the 10th harmonic of the transmit frequency). The frequency range from 9 kHz to 30 MHz has been examined during the conducted spurious emission measurements.
 - 5) Important Analyser Settings
 - [Resolution Bandwidth / Video Bandwidth]:
 - a) [3 kHz / 10 kHz] in the Span of 1 MHz directly below and above the Band,
 - b) [10 kHz / 30 kHz] in case the curve of the analyser IF-Filter leads to an exceeding of the limit, in this case a worst case correction factor of 20 dB (1 MHz -> 10 kHz) was used
 - c) [1 MHz / 3 MHz] otherwise
 - Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
 - 6) The spurious emissions peaks were measured in both vertical and horizontal antenna polarization during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y, Z) of the EUT have been measured.
 - 7) After this initial test, a final test according to ANSI C63.26-D 2.2.12 Unwanted Emissions is performed on signals which are identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal substitution measurement is performed at the frequency of the emission to determine the exact e.i.r.p. value.

Test Requirements / Limits

§ 2.1053 Measurements required: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

- (b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:
- (2) All equipment operating on frequencies higher than 25 MHz.

§ 2.1057 Frequency spectrum to be investigated.

- (a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
- (1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
- (c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
- (d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 22.917 Emission limitations for cellular equipment

- (a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dB μ V/m (field strength) in a distance of 3 m.
- (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). 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.
- (c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].
- (d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Frequency stability

Standard FCC Part 22, Subpart H

The test was performed according to FCC §2.1055

Test Description

- 1) The EUT was placed inside a temperature chamber.
- 2) The EUT was coupled to a Digital Communication Tester. Refer to chapter "Setup Drawings".
- 3) The climatic chamber was cycled down/up to a certain temperature, starting with the EUT minimum temperature.
- 4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Mid Channel

- 5) The frequency error of the EUT was recorded by using an internal measurement function of the Digital Communication Tester immediately after the call was established, five minutes after the call was established and ten minutes after the call was established.
- 6) This measurement procedure was performed for temperature variation from -30°C to +50°C in increments of 10°C, if not otherwise stated in the detailed results.

When the EUT did not operate at certain temperature levels, these measurements were left out.

Test Requirements / Limits

§2.1055 Measurements required: Frequency stability

- (a) The frequency stability shall be measured with variation of ambient temperature as follows:
 - (1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
 - (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) The frequency stability shall be measured with variation of primary supply voltage as follows:
 - (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
 - (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
 - (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

§22.355 Frequency tolerance

...the carrier frequency of each transmitter in the Public Mobile Service must be maintained within the tolerances given in table C-1 of this section.

Table C-1.- Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile up to 3 watts (ppm)	Mobile above 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

tolerance is 2.5 ppm (2091.5 Hz).

aFor the mid channel (836.6 MHz) the frequency

Band edge compliance

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §22.913

Test Description

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Channel: please refer to the detailed results
- 4) Important Analyser Settings:
- Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer's stated occupied bandwidth

Test Requirements / Limits

§ 22.917 Emission limitations for cellular equipment

Refer to chapter "Field strength of spurious radiation".

Summary of Test Results

The EUT complied with all performed tests as listed in the summary section of this report.

Technical Report Summary

Type of Authorization :

Certification for a GSM/WCDMA/CDMA2000 cellular radiotelephone device

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in
47 CFR Ch.1 Parts 0 to 69. The following subparts
are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

- § 2.1046 Measurement required: RF power output
- § 2.1049 Measurement required: Occupied bandwidth
- § 2.1051 Measurement required: Spurious emissions at antenna terminals
- § 2.1053 Measurement required: Field strength of spurious radiation

§ 2.1055 Measurement required: Frequency stability
§ 2.1057 Frequency spectrum to be investigated

Part 24, Subpart E - Broadband PCS

§ 24.232 Power and antenna height limits
§ 24.235 Frequency stability
§ 24.236 Field strength limits
§ 24.238 Emission limitations for Broadband PCS equipment

additional documents

ANSI C63.26-D

Description of Methods of Measurements

RF Power Output

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §2.1046

Test Description (conducted measurement procedure)

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Channel (Frequency): please refer to the detailed results
- 4) The transmitted power of the EUT was recorded by using a spectrum analyser.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the output terminals when this test is made shall be stated.

§24.232 Power and antenna height limits

(c) Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an 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, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Emission and Occupied Bandwidth

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §2.1049

Test Description

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Channel: please refer to the detailed results
- 4) Important Analyser Settings:
 - Resolution Bandwidth: >1% of the manufacturer's stated occupied bandwidth
 - 5) The maximum spectral level of the modulated signal was recorded as the reference.
 - 6) The emission bandwidth is measured as follows:
the two furthest frequencies above and below the frequency of the maximum reference level where the spectrum is -26 dB down have to be found.

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

- 7) The occupied bandwidth (99% Bandwidth) is measured as follows:
the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 percent of the total mean power.

Test Requirements / Limits

§ 2.1049 Measurements required: Occupied bandwidth

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.

Spurious emissions at antenna terminals

Standard: FCC Part 24, Subpart E

The test was performed according to FCC §2.1051

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

4) Important Analyser Settings

- [Resolution Bandwidth]:

a) [$\geq 1\%$ of wanted signal bandwidth] in the Span of 1 MHz directly below and above the Band,

b) otherwise [1 MHz]

c) [reduced resolution bandwidth] in case the curve of the analyser IF-Filter or the wanted EUT signal leads to an exceeding of the limit, in this case a correction factor was used

- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth

5) The spurious emissions peaks were measured in the frequency range from 9 kHz to 20 GHz (up to the 10th harmonic) during the call was established

Test Requirements / Limits

§ 2.1051 Spurious emissions at antenna terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 24.238 Emission limitations for Broadband PCS equipment

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

Remark of the test laboratory: This is calculated to be -13 dBm.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.

(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].

(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Field strength of spurious radiation

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §2.1053

Test Description

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.

2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

3) A pre-calibration procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lamda/2 dipole).

4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antennas for the frequency range of 30 MHz to 20 GHz (up to the 10th harmonic of the transmit frequency). The frequency range from 9 kHz to 30 MHz has been examined during the conducted spurious emission measurements.

5) Important Analyser Settings

- [Resolution Bandwidth / Video Bandwidth]:

a) [3 kHz / 10 kHz] in the Span of 1 MHz directly below and above the Band,

b) [10 kHz / 30 kHz] in case the curve of the analyser IF-Filter leads to an exceeding of the limit, in this case a worst case correction factor of 20 dB (1 MHz -> 10 kHz) was used

c) [1 MHz / 3 MHz] otherwise

- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth

6) The spurious emissions peaks were measured in both vertical and horizontal antenna polarisation during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y, Z) of the EUT have been measured.

7) After this initial test, a final test according to ANSI C63.26-D 2.2.12 Unwanted Emissions is performed on signals which are identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal substitution measurement is performed at the frequency of the emission to determine the exact e.i.r.p. value.

Test Requirements / Limits

§ 2.1053 Measurements required: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(2) All equipment operating on frequencies higher than 25 MHz.

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 24.238 Emission limitations for Broadband PCS equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dB μ V/m (field strength) in a distance of 3 m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.

(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].

(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Frequency stability

Standard: FCC Part 24, Subpart E

The test was performed according to FCC §2.1055

Test Description

- 1) The EUT was placed inside a temperature chamber.
- 2) The EUT was coupled to a Digital Communication Tester. Refer to chapter "Setup Drawings".
- 3) The climatic chamber was cycled down/up to a certain temperature, starting with the EUT minimum temperature.
- 4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Mid Channel

5) The frequency error of the EUT was recorded by using an internal measurement function of the Digital Communication Tester immediately after the call was established, five minutes after the call was established and ten minutes after the call was established.

6) This measurement procedure was performed for temperature variation from -30°C to +50°C in increments of 10°C, if not otherwise stated in the detailed results.

When the EUT did not operate at certain temperature levels, these measurements were left out.

Test Requirements / Limits

§2.1055 Measurements required: Frequency stability

- (a) The frequency stability shall be measured with variation of ambient temperature as follows:
- (1) From -30° to +50° centigrade for all equipment except that specified in paragraphs
 - (a) (2) and (3) of this section.
 - (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) The frequency stability shall be measured with variation of primary supply voltage as follows:
 - (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
 - (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
 - (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§24.235 Frequency stability

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block following limit was used:

+/- 2.5 ppm = 4700 Hz for a frequency of 1880.0 MHz

in accordance with FCC Part 22, Subpart H, §22.355, table C-1: Frequency tolerance for the carrier frequency of mobile transmitters in the Public Mobile Service in the frequency range 821 to 896 MHz.

Band edge compliance

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §24.238

Test Description

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Channel: please refer to the detailed results

Reference: MDE_UBLOX_1717_FCCa according to:
FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

4) Important Analyser Settings:

- Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer's stated occupied bandwidth

Test Requirements / Limits

§ 24.238 Effective radiated power limits

Refer to chapter "Field strength of spurious radiation".

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in
47 CFR Ch.1 Parts 0 to 69. The following subparts
are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

- § 2.1046 Measurement required: RF power output
- § 2.1049 Measurement required: Occupied bandwidth
- § 2.1051 Measurement required: Spurious emissions at antenna terminals
- § 2.1053 Measurement required: Field strength of spurious radiation
- § 2.1055 Measurement required: Frequency stability
- § 2.1057 Frequency spectrum to be investigated

Part 27, Subpart C—Technical Standards

- § 27.50 Power and antenna height limits
- § 27.53 Emissions limits
- § 27.54 Frequency stability

additional documents

ANSI C63.26-D

Description of Methods of Measurements

RF Power Output

Standard FCC Part 27, Subpart C

The test was performed according to: FCC §2.1046

Test Description (conducted measurement procedure)

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
 - Channel (Frequency): please refer to the detailed results
- 4) The transmitted power of the EUT was recorded by using a spectrum analyser.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the output terminals when this test is made shall be stated.

§2.50 Power and antenna height limits.

- (d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands:
 - (2) Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to a peak EIRP of 1 watt. Fixed

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C
stations operating in this band are limited to a maximum antenna height of 10 meters above ground, and mobile and portable stations must employ a means for limiting power to the minimum necessary for successful communications.

Emission and Occupied Bandwidth

Standard FCC Part 27, Subpart C

The test was performed according to: FCC §2.1049

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

4) Important Analyser Settings:

- Resolution Bandwidth: >1% of the manufacturer's stated occupied bandwidth

5) The maximum spectral level of the modulated signal was recorded as the reference.

6) The emission bandwidth is measured as follows:

the two furthest frequencies above and below the frequency of the maximum reference level where the spectrum is -26 dB down have to be found.

7) The occupied bandwidth (99% Bandwidth) is measured as follows:
the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 percent of the total mean power.

Test Requirements / Limits

§ 2.1049 Measurements required: Occupied bandwidth

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.

Spurious emissions at antenna terminals

Standard FCC Part 27, Subpart C

The test was performed according to FCC §2.1051

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

4) Important Analyser Settings

- [Resolution Bandwidth]:

a) [\geq 1% of wanted signal bandwidth] in the Span of 1 MHz directly below and above the Band,

b) otherwise [1 MHz]

c) [reduced resolution bandwidth] in case the curve of the analyser IF-Filter or the wanted EUT signal leads to an exceeding of the limit, in this case a correction factor was used

- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth

5) The spurious emissions peaks were measured in the frequency range from 9 kHz to 18 GHz (up to the 10th harmonic) during the call is established

Test Requirements / Limits

§ 2.1051 Spurious emissions at antenna terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be

specified.

§ 2.1057 Frequency spectrum to be investigated.

- (a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
- (1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
- (c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
- (d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 27.53 Emission limits

- (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

Remark of the test laboratory: This is calculated to be -13 dBm.

(1) 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.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(3) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Field strength of spurious radiation

Standard FCC Part 27, Subpart C

The test was performed according to: FCC §2.1053

Test Description

- 1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
- 2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Channel : please refer to the detailed results
- 3) A pre-calibration procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lamda/2 dipole).
- 4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antennas for the frequency range of 30 MHz to 18 GHz (up to the 10th harmonic of the transmit frequency). The frequency range from 9 kHz to 30 MHz has been examined during the conducted spurious emission measurements.
- 5) Important Analyser Settings
 - [Resolution Bandwidth / Video Bandwidth]:
 - a) [3 kHz / 10 kHz] in the Span of 1 MHz directly below and above the Band,
 - b) [10 kHz / 30 kHz] in case the curve of the analyser IF-Filter leads to an exceeding of the limit, in this case a worst case correction factor of 20 dB (1 MHz > 10 kHz) was used
 - c) [1 MHz / 3 MHz] otherwise
- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
- 6) The spurious emissions peaks were measured in both vertical and horizontal antenna polarisation during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y, Z) of the EUT have been measured.
- 7) After this initial test, a final test according to TIA-603-D-2004 2.2.12 Unwanted Emissions is performed on signals which are identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal substitution measurement is performed at the frequency of the emission to determine the exact e.i.r.p. value.

Test Requirements / Limits

§ 2.1053 Measurements required: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

- (b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:
- (2) All equipment operating on frequencies higher than 25 MHz.

§ 2.1057 Frequency spectrum to be investigated.

Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, Part 24, subpart E, Part 27 Subpart C

- (a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
- (1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
 - (b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
 - (c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
 - (d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 27.53 Emission limits

- (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

Remark of the test laboratory: This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dB μ V/m (field strength) in a distance of 3 m.

- (1) 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.
- (2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- (3) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Frequency stability

Standard FCC Part 27, Subpart C

The test was performed according to FCC §2.1055

Test Description

- 1) The EUT was placed inside a temperature chamber.
 - 2) The EUT was coupled to a Digital Communication Tester. Refer to chapter "Setup Drawings".
 - 3) The climatic chamber was cycled down/up to a certain temperature, starting with the EUT minimum temperature.
 - 4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:
- Output Power: Maximum
 - Mid Channel
- 5) The frequency error of the EUT was recorded by using an internal measurement function of the Digital Communication Tester immediately after the call was established, five minutes after the call was established and ten minutes after the call was established.
 - 6) This measurement procedure was performed for temperature variation from -30°C to +50°C in increments of 10°C, if not otherwise stated in the detailed results.
- When the EUT did not operate at certain temperature levels, these measurements were left out.

Test Requirements / Limits

§2.1055 Measurements required: Frequency stability

- (a) The frequency stability shall be measured with variation of ambient temperature as follows:
- (1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
 - (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) The frequency stability shall be measured with variation of primary supply voltage as follows:
- (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
 - (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
- (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§27.54 Frequency stability

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

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block following limit was used:

+/- 2.5 ppm = 4350 Hz for channel 1450, frequency 1740.0 MHz
+/- 2.5 ppm = 4331 Hz for channel 1412, frequency 1732.4 MHz



Reference: MDE_UBLOX_1717_FCCa according to:

FCC Part 22, Subpart H, §22.355, table C-1: Frequency tolerance for the carrier frequency of mobile transmitters in the Public Mobile Service in the frequency range 821 to 896 MHz.

Band edge compliance

Standard FCC Part 27, Subpart C

The test was performed according to: FCC §27.53

Test Description

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
- 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
- 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
 - Channel: please refer to the detailed results
- 4) Important Analyser Settings:
 - Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer's stated occupied bandwidth

For LTE band eFDD13 in the ranges of 765-775MHz and 793-805MHz.

These frequency ranges are part of spurious conducted and measured with 10kHz RBW.

Test Requirements / Limits

§ 27.53 Effective radiated power limits

Refer to chapter "Field strength of spurious radiation".

Subtests HSDPA

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: $\beta_{ACK}, \beta_{NACK}$ and $\beta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, β_{ACK} and $\beta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$, and $\beta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

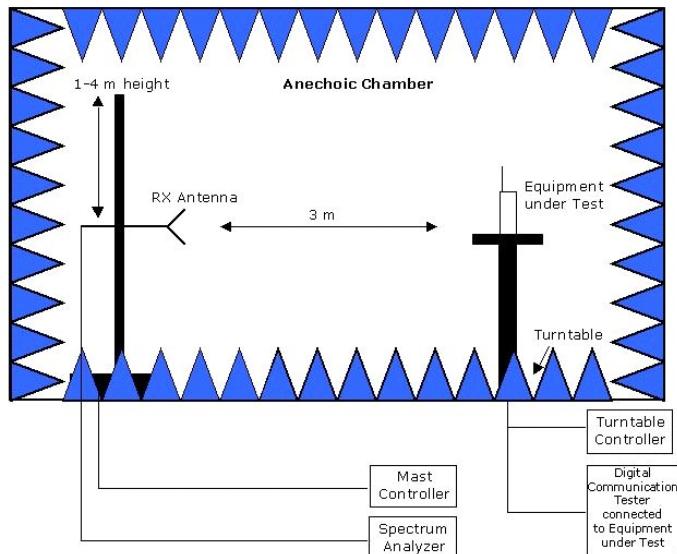
Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Subtests HSUPA

Subtest	Mode	Loopback Mode	Rel99 RMC	HSDPA FRC	HSUPA Test	Number of E-DPDCH Channels
1	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	1
2	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	1
3	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	2
4	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	1
5	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	1

Subtest	Max UL Data Rate (kb/s)	β_c/β_d	β_{hs}	β_{ed}	CM
1	242.1	11/15	22/15	1309/225	1
2	161.3	6/15	12/15	94/75	3
3	524.7	15/9	30/15	47/15	2
4	197.6	2/15	4/15	56/75	3
5	299.6	15/15	30/15	134/15	1

Setup Drawings



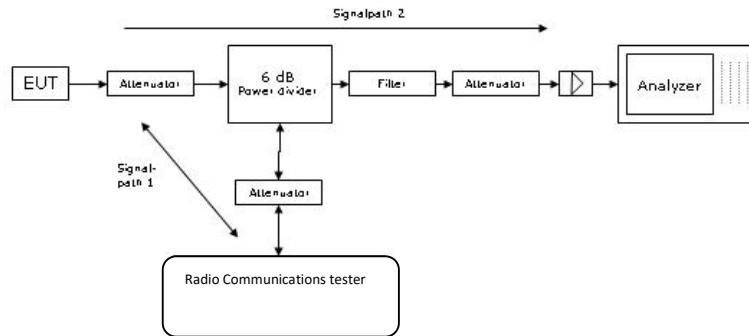
Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Principle set-up for radiated measurements

Measurement Uncertainties

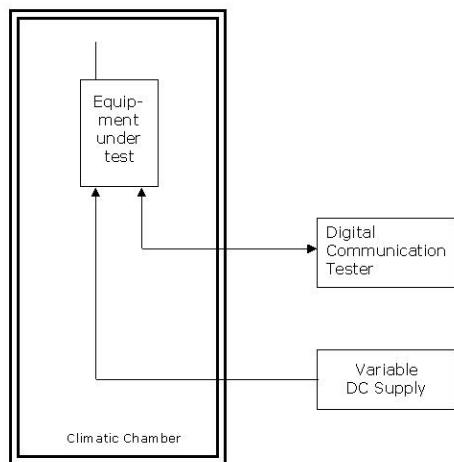
FCC Part 22, 24, 27, 90
 IC RSS-132, RSS-133, RSS-139

Test Case	Parameter	Uncertainty
RF Power Output	Power	± 2.2 dB
Frequency Stability	Frequency	± 25 Hz
Spurious Emissions at antenna terminal	Power	2.2 dB
Field strength of spurious radiation	Power	4.5 dB
Emission and Occupied Bandwidth	Power Frequency	± 2.9 dB GSM: ± 10.6 kHz UMTS, LTE: ± 120.0 kHz
Band Edge Compliance	Power Frequency	± 2.9 dB GSM: ± 14.6 kHz UMTS, LTE: ± 68.0 kHz



Remark: Depending on the frequency range suitable attenuators and/or filters and/or amplifiers are used.

Principle set-up for conducted measurements under nominal conditions



Principle set-up for tests under extreme test conditions

TEST MODE	TX / RX	RF Channel			TEST MODE	TX / RX	RF Channel		
		Low	Mid	High			Low	Mid	High
LTE eFDD 2	TX (1.4M)	18607	18900	19193	LTE eFDD 4	TX (1.4M)	19957	20175	20393
		1850.7MHz	1880MHz	1909.3MHz			1710.7MHz	1732.5MHz	1754.3MHz
	TX (3M)	CH 18615	CH 18900	CH 19185			CH 19965	CH 20175	CH 20385
		1851.5MHz	1880MHz	1908.5MHz			CH 19975	CH 20175	CH 20375
	TX (5M)	CH 18625	CH 18900	CH 19175			1712.50MHz	1732.50MHz	1752.50MHz
		1852.5MHz	1880MHz	1907.5MHz			CH 20000	CH 20175	CH 20350
		CH 18650	CH 18900	CH 19150			1715.00MHz	1732.50MHz	1750.00MHz
		CH 18675	CH 18900	CH 19125			CH 20025	CH 20175	CH 20325
	TX (10)	1857.5MHz	1880MHz	1902.5MHz			1717.50MHz	1732.50MHz	1747.50MHz
		CH 18700	CH 18900	CH 19100			CH 20050	CH 20175	CH 20300
		1860MHz	1880MHz	1900MHz			CH 1957	CH 2175	CH 2393
		CH 607	CH 900	CH 1193			2110.70MHz	2132.50MHz	2154.30MHz
	RX (1.4M)	1930.7MHz	1960MHz	1989.3MHz			CH 1965	CH 2175	CH 2385
		CH 615	CH 900	CH 1185			2111.50MHz	2132.50MHz	2153.50MHz
		1931.5MHz	1960MHz	1988.5MHz			CH 1975	CH 2175	CH 2375
		CH 625	CH 900	CH 1175			2112.50MHz	2132.50MHz	2152.50MHz
	RX (5M)	1932.5MHz	1880.00MHz	1987.5MHz			CH 2000	CH 2175	CH 2350
		CH 650	CH 900	CH 1150			2115.00MHz	2132.50MHz	2150.00MHz
		1935.00MHz	1960.00MHz	1985.00MHz			CH 2025	CH 2175	CH 2325
		CH 675	CH 900	CH 1125			2117.50MHz	2132.50MHz	2147.50MHz
	RX (10M)	1937.50MHz	1960.00MHz	1982.50MHz			CH 2050	CH 2175	CH 2300
		CH 700	CH 900	CH 1100			2120.00MHz	2132.50MHz	2145.00MHz
		1940.00MHz	1960.00MHz	1980.00MHz					
LTE eFDD 5	TEST MODE	RF Channel			LTE eFDD 12	RF Channel			
		TX / RX	Low	Mid		TX / RX	Low	Mid	High
		20407	20525	20643		TX (1.4M)	CH 23017	CH 23095	CH 23173
		824.7	836.5	848.3			699.70MHz	707.50MHz	715.30MHz
	TX (3M)	CH 20415	CH 20525	CH 20635		TX (3M)	CH 23025	CH 23095	CH 23165
		825.50MHz	836.50MHz	847.50MHz			700.50MHz	707.50MHz	714.50MHz
		CH 20425	CH 20525	CH 20625			CH 23035	CH 23095	CH 23155
		826.50MHz	836.50MHz	846.50MHz			701.50MHz	707.50MHz	713.50MHz
	TX (5M)	CH 20450	CH 20525	CH 20600		TX (5M)	CH 23060	CH 23095	CH 23130
		829.00MHz	836.50MHz	844.00MHz			704.00MHz	707.50MHz	711.00MHz
		CH 2407	CH 20525	CH 2643			CH 5017	CH 5095	CH 5173
		869.70MHz	881.50MHz	893.70MHz			729.70MHz	737.50MHz	745.30MHz
	RX (1.4M)	CH 2415	CH 20525	CH 2635			CH 5025	CH 5095	CH 5165
		870.50MHz	881.50MHz	892.50MHz			730.50MHz	737.50MHz	744.50MHz
		CH 2425	CH 2525	CH 2625			CH 5035	CH 5095	CH 5155
		871.50MHz	881.50MHz	891.50MHz			731.50MHz	737.50MHz	743.50MHz
	RX (3M)	CH 2450	CH 2525	CH 2600			CH 5060	CH 5095	CH 5130
		874.00MHz	881.50MHz	889.00MHz			734.00MHz	737.50MHz	741.00MHz
LTE eFDD 7	TEST MODE	RF Channel			LTE eFDD 13	RF Channel			
		TX / RX	Low	Mid		TX / RX	Low	Mid	High
		CH 20775	CH 21100	CH 21425		TX (5M)	CH 23205	CH 23230	CH 23255
		2502.50MHz	2535.00MHz	2567.50MHz			779.50MHz	782.00MHz	784.50MHz
	TX (10)	CH 20800	CH 21100	CH 21400		TX (10)	CH 23230	CH 23230	CH 23230
		2505.00MHz	2535.00MHz	2565.00MHz			782.00MHz	782.00MHz	782.00MHz
		CH 20825	CH 21100	CH 21375					
		2507.50MHz	2535.00MHz	2562.50MHz					
	TX (20M)	CH 20850	CH 21100	CH 21350		TX (15M)			
		2510.00MHz	2535.00MHz	2560.00MHz					
		CH 2775	CH 3100	CH 3425		TX (20M)			
		2622.50MHz	2655.00MHz	2687.50MHz					
	RX (5M)	CH 2800	CH 3100	CH 3400		CH 5205	CH 5230	CH 5255	
		2625.00MHz	2655.00MHz	2685.00MHz			748.50MHz	751.00MHz	753.50MHz
		CH 2825	CH 3100	CH 3375			CH 5230	CH 5230	CH 5230
		2627.50MHz	2655.00MHz	2682.50MHz			751.00MHz	751.00MHz	751.00MHz
	RX (10M)	CH 2850	CH 3100	CH 3350		RX (15M)			
		2630.00MHz	2655.00MHz	2680.00MHz					
	RX (20M)					RX (20M)			

----End of Test report----