InterLab

Final Report on

Datalogger DCM970
FCC ID: 2AD9I-DCM970
ISED:20087-DCM970

Report Reference: MDE_DANLA_1703_FCCa
according to:
FCC Part 22, Subpart H, Part 24, Subpart E, Part 27 Subpart C

Date: August 03, 2018

Test Laboratory:
7layers GmbH
Borsigstraße 11
40880 Ratingen
Germany

Deutsche Akkreditierungsstelle D-PL-12140-01-00

1 Administrative Data

1.1 Project Data

Project Responsible:	Dirk Bratsch
Date Of Test Report:	2018/08/03
Date of first test:	2018/03/29
Date of last test:	2018/04/22

1.2 Applicant Data

Company Name: Danlaw Inc.

Street:	41131 Vincenti Dr
City:	MI Novi 48375
Country:	United States of America

Contact Person: Mr. Eugen Sumskas

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

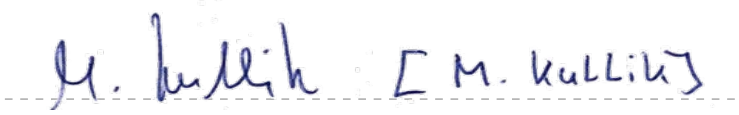
Laboratory Details

Lab ID	*Identification*	*Responsible*	*Accreditation Info*
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 Test firm number: 929146 FCC Designation Number: DE0015
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 Test firm number: 929146 FCC Designation Number: DE0015

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



Accreditation scope responsible person
responsible for Lab 1, Lab 2

2 Test Object Data

2.1 General OUT Description

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

OUT: Datalogger DCM970

Type / Model / Family:	Datalogger DCM970 FCC ID: 2AD9I-DCM970 ISED:20087-DCM970
Product Category:	Others
Manufacturer:	
Company Name:	see applicant data
Contact Person:	see applicant data

Parameter List:

Parameter name	*Value*
Parameter for Scope FCC_v2:	
Antenna gain	700 = 2.4 850 = 1.3 1700 = -0.1 1900 = 2.5 (dBi)
DC Power Supply	12 (V)
highest channel	4233 (846.6MHz) for FDD5, 9538 (1907.6MHz) for FDD2, 1513 (1752.6MHz) for FDD4
lowest channel	4132 (826.4MHz) for FDD5, 9262 (1852.4MHz)for FDD2, 1312 (1712.4MHz) for FDD4
mid channel	4183 (836.6MHz) for FDD5, 9400 (1880MHz) for FDD2, 1412 (1732.4MHz)/1450 (1740.0MHz) for FDD4

2.2 Detailed Description of OUT Samples

Sample : ad01

OUT Identifier	Datalogger DCM970		
Sample Description	FCC conducted Sample #AD01		
Serial No.	S84		
HW Status	1.1		
SW Status	V1.1.1.0		
Low Voltage	3,25 V		
High Voltage	3,45 V		
Nominal Voltage	3,3 V	*Normal Temp.*	23 °C

Sample : af01

OUT Identifier	Datalogger DCM970		
Sample Description	FCC radiated Sample #AF01		
Serial No.	S106		
HW Status	1.1		
SW Status	V1.1.1.0		
Nominal Voltage	12 V	*Normal Temp.*	23 °C

2.3 OUT Features

Features for OUT: Datalogger DCM970

Designation	*Description*	*Supported Value(s)*
Features for scope: FCC_v2		
DC	The OUT is powered by or connected to DC	
eFDD2		
eFDD4		
eFDD5		
eFDD12		
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	
HSDPA-FDD2	EUT supports UMTS FDD2 HSDPA in the band 1850 MHz - 1910 MHz	
HSDPA-FDD4	EUT supports UMTS FDD4 HSDPA in the band 1710 MHz - 1755 MHz	
HSDPA-FDD5	EUT supports UMTS FDD5 HSDPA in the band 824 MHz - 849 MHz	
HSUPA-FDD2	EUT supports UMTS FDD2 HSUPA in the band 1850 MHz - 1910 MHz	
HSUPA-FDD4	EUT supports UMTS FDD4 HSUPA in the band 1710 MHz - 1755 MHz	
HSUPA-FDD5	EUT supports UMTS FDD5 HSUPA in the band 824 MHz - 849 MHz	
Iant	Integral Antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment	
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*
S01_AD01 (Setup #AD01)				
	Sample: ad01	FCC conducted Sample #AD01		
S01_AF01 (Setup #AF01)				
	Sample: af01	FCC radiated Sample #AF01		

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. This report contains the abbreviated information content pertaining to services rendered. Supporting documentation not included herein is maintained and available at the laboratory. 2. 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)

Designation	*Description*
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	10-1-17 Edition
Title:	PART 2 - GENERAL RULES AND REGULATIONS PART 22 - Subpart H, PUBLIC MOBILE SERVICES
Test Specification:	**FCC part 2 and 24**
Version	10-1-17 Edition
Title:	PART 2 - GENERAL RULES AND REGULATIONS PART 24 - Subpart E, PERSONAL COMMUNICATIONS SERVICES
Test Specification:	**FCC part 2 and 27**
Version	10-1-17 Edition
Title:	PART 2 - GENERAL RULES AND REGULATIONS PART 27 - Subpart C, MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

3.4 Summary

Test Case Identifier / Name Test (condition)	Cat	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	2018/04/19	Lab 2	S01_AD01
22.2 Frequency stability §2.1055					
22.2; _Frequency stability Summary §2.1055	-	Passed	2018/04/19	Lab 2	S01_AD01
22.3 Spurious emissions at antenna terminals §2.1051, §22.917					
22.3; Spurious emissions at antenna terminals summary §2.1051, §22.917	-	Passed	2018/04/19	Lab 2	S01_AD01
22.4 Field strength of spurious radiation §2.1053, §22.917					
22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20425, Frequency = 826.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20525, Frequency = 836.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20625, Frequency = 846.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4132, Frequency = 826.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4132, Frequency = 826.4MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4132, Frequency = 826.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4183, Frequency = 836.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4233, Frequency = 846.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
22.5 Emission and Occupied Bandwidth §2.1049, §22.917					
22.5; _Emission and Occupied Bandwidth Summary §2.1049, §22.917	-	Passed	2018/04/19	Lab 2	S01_AD01
22.6 Band edge compliance §2.1053, §22.917					
22.6; _Band edge compliance Summary §2.1053, §22.917	-	Passed	2018/04/19	Lab 2	S01_AD01
22.7 Peak-to-Average Ratio Summary §2.1046					
22.7; Peak-to-Average Ratio Summary §2.1046	-	Passed	2018/04/19	Lab 2	S01_AD01

Test Case Identifier / Name Test (condition)	Cat	Result	Date of Test	Lab Ref.	Setup
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	2018/04/19	Lab 2	S01_AD01
24.2 Frequency stability §2.1055, §24.235					
24.2; Frequency stability Summary §2.1055, 24.235	-	Passed	2018/04/19	Lab 2	S01_AD01
24.3 Spurious emissions at antenna terminals §2.1051, §24.238					
24.3; Spurious emissions at antenna terminals Summary §2.1051, §24.238	-	Passed	2018/04/19	Lab 2	S01_AD01
24.4 Field strength of spurious radiation §2.1053, §24.238					
24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 18625, Frequency = 1852.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 18900, Frequency = 1880MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 19175, Frequency = 1907.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9262, Frequency = 1852.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9538, Frequency = 1907.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency = 1852.4MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9538, Frequency = 1907.6MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency = 1852.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9538, Frequency = 1907.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
24.5 Emission and Occupied Bandwidth §2.1049, §24.238					
24.5; Emission and Occupied Bandwidth Summary §2.1049, §24.238	-	Passed	2018/04/19	Lab 2	S01_AD01
24.6 Band edge compliance §2.1053, §24.238					
24.6; Band edge compliance summary §2.1053, §24.238	-	Passed	2018/04/19	Lab 2	S01_AD01
24.7 Peak-to-Average ratio §2.1046, §24.232					
24.7; Peak-to-Average Ratio Summary §2.1046, §24.232	-	Passed	2018/04/19	Lab 2	S01_AD01
Test Specification: FCC part 2 and 27					

Test Case Identifier / Name Test (condition)	Cat	Result	Date of Test	Lab Ref.	Setup
27.1 RF Power Output §2.1046, §27.250					
27.1; RF Power Output Summary §2.1046, §27.250	-	Passed	2018/04/19	Lab 2	S01_AD01
27.2 Frequency stability §2.1055, §27.54					
27.2; Frequency stability Summary §2.1055, §27.54	-	Passed	2018/04/22	Lab 2	S01_AD01
27.3 Spurious emissions at antenna terminals §2.1051, §27.53					
27.3; Spurious emissions at antenna terminals Summary §2.1051, §27.53	-	Passed	2018/04/19	Lab 2	S01_AD01

Test Case Identifier / Name Test (condition)	Cat	Result	Date of Test	Lab Ref.	Setup
27.4 Field strength of spurious radiation §2.1053, §27.53					
27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23035, Frequency = 701.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23095, Frequency = 707.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23155, Frequency = 713.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 19975, Frequency = 1712.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20175, Frequency = 1732.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20375, Frequency = 1752.5MHz, Method = radiated	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1312, Frequency = 1712.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1412, Frequency = 1732.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1450, Frequency = 1740.0MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1513, Frequency = 1752.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1312, Frequency = 1712.4MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1412, Frequency = 1732.4MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1450, Frequency = 1740.0MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1513, Frequency = 1752.6MHz	-	Passed	2018/04/02	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1312, Frequency = 1712.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1412, Frequency = 1732.4MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1450, Frequency = 1740.0MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1513, Frequency = 1752.6MHz	-	Passed	2018/03/29	Lab 1	S01_AF01
27.5 Emission and Occupied Bandwidth §2.1049					
27.5; Emission and Occupied Bandwidth Summary §2.1049	-	Passed	2018/04/19	Lab 2	S01_AD01
27.6 Band edge compliance §2.1053, §27.53					
27.6; Band edge compliance summary §2.1053, §27.53	-	Passed	2018/04/19	Lab 2	S01_AD01

Test Case Identifier / Name *Test (condition)*	*Cat*	*Result*	*Date of Test*	*Lab* *Ref.*	*Setup*
27.7 Peak-to-Average ratio §2.1046, §27.50					
27.7; Peak-to-Average Ratio Summary §2.1046, §27.50	-	Passed	2018/04/19	Lab 2	S01_AD01

3.5 Detailed Results

3.5.1 22.1 RF Power Output §2.1046, §22.913

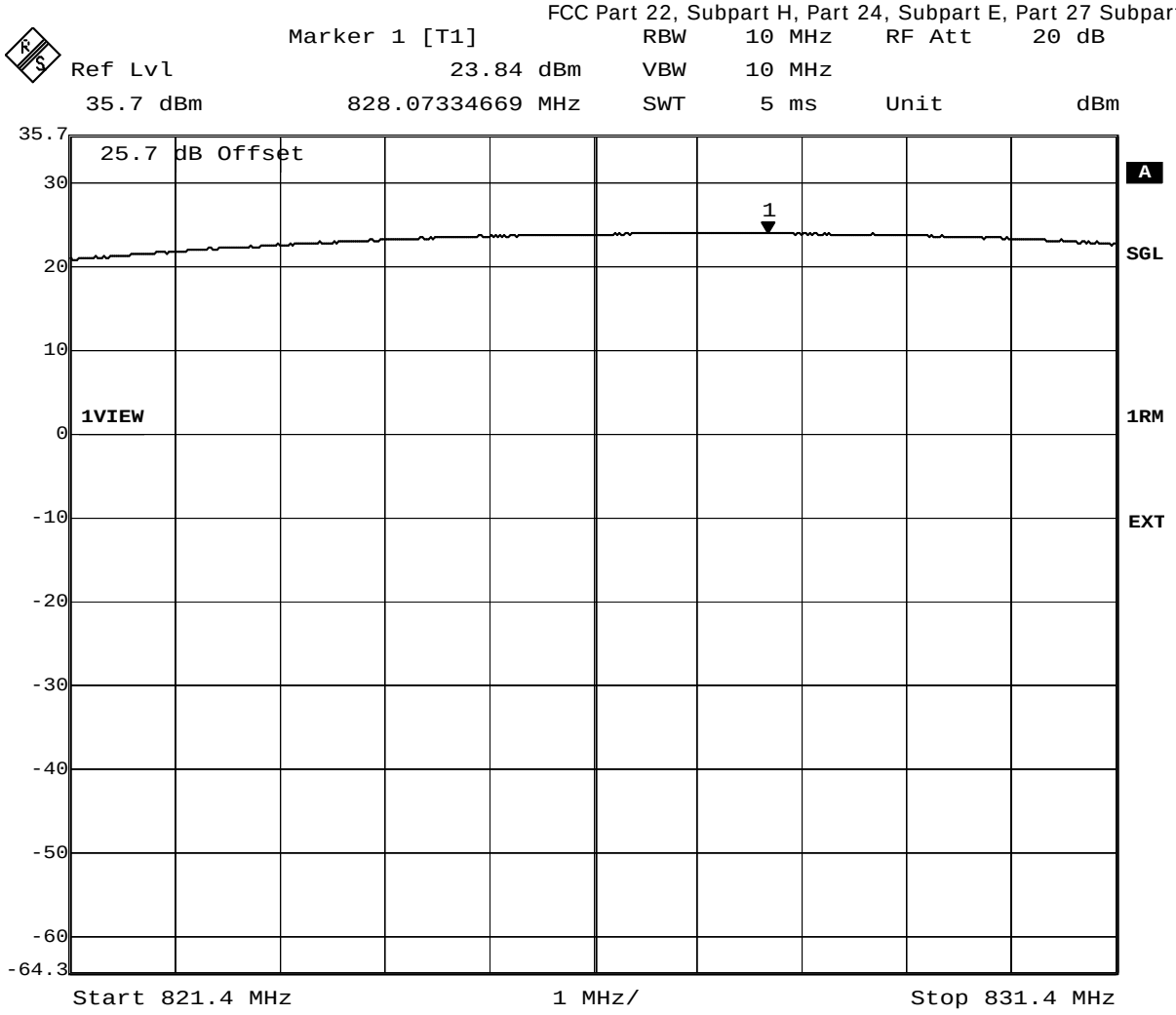
Test: 22.1; _RF Power Output Summary §2.1046, §22.913

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:31
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:

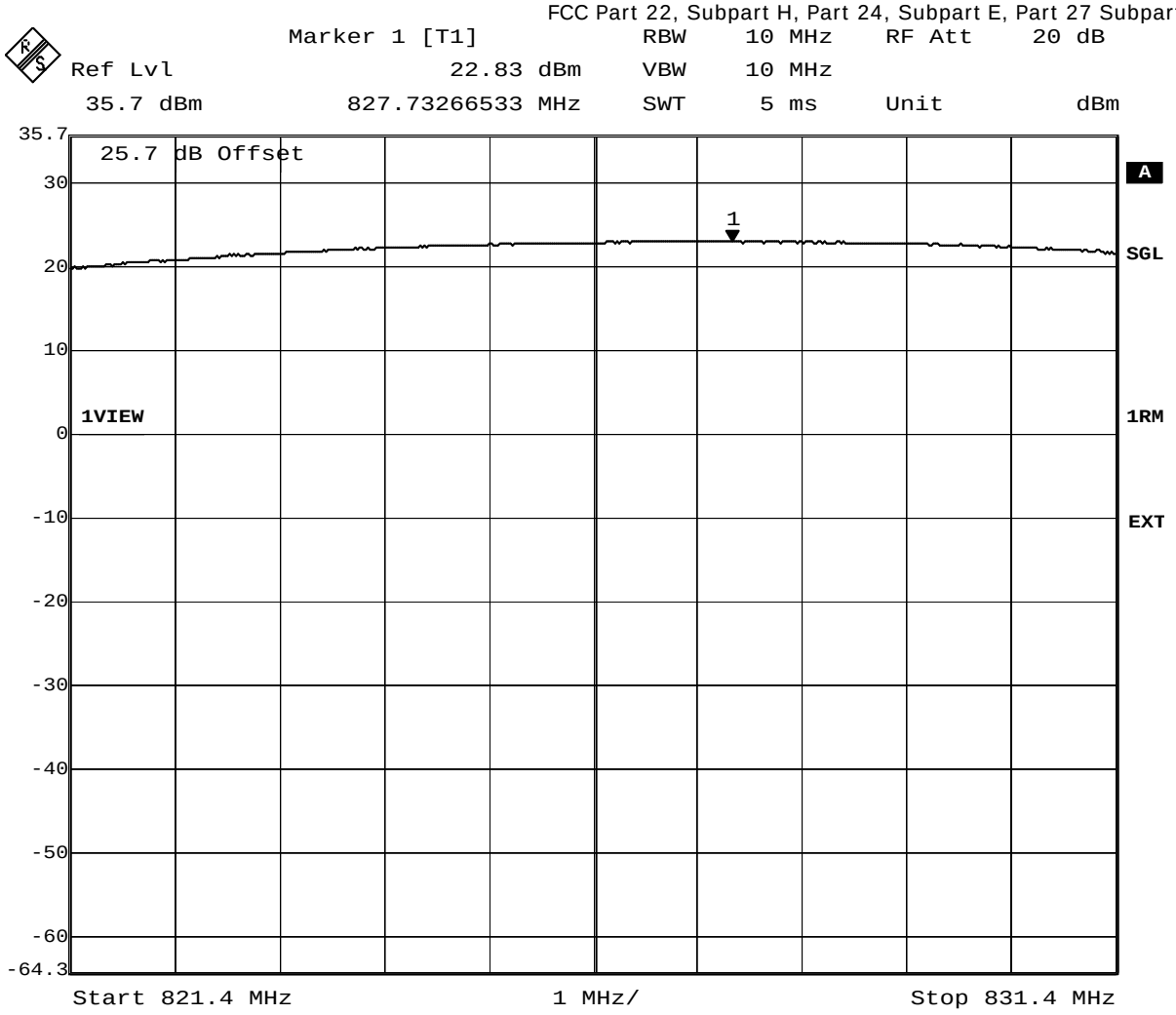
Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
FDD V	low	-	5	29.59	23.67	23.84
FDD V	mid	-	5	29.29	23.53	23.62
FDD V	high	-	5	29.05	23.35	23.4
FDD V HSDPA Subtest 1	low	-	5	28.4	22.75	22.83
FDD V HSDPA Subtest 1	mid	-	5	28.14	22.62	22.73
FDD V HSDPA Subtest 1	high	-	5	28.14	22.48	22.56
FDD V HSDPA Subtest 2	low	-	5	28.91	22.09	22.64
FDD V HSDPA Subtest 2	mid	-	5	28.52	21.87	22.43
FDD V HSDPA Subtest 2	high	-	5	28.67	21.93	22.53
FDD V HSDPA Subtest 3	low	-	5	29.29	21.98	23.48
FDD V HSDPA Subtest 3	mid	-	5	28.67	21.9	22.36
FDD V HSDPA Subtest 3	high	-	5	28.91	21.66	22.32
FDD V HSDPA Subtest 4	low	-	5	29.59	21.81	22.61
FDD V HSDPA Subtest 4	mid	-	5	29.59	21.64	22.41
FDD V HSDPA Subtest 4	high	-	5	28.91	21.63	22.36
FDD V HSUPA Subtest 1	low	-	5	30.4	22.73	22.89
FDD V HSUPA Subtest 1	mid	-	5	29.99	22.55	22.88
FDD V HSUPA Subtest 1	high	-	5	30.51	22.2	22.49
FDD V HSUPA Subtest 2	low	-	5	30.51	21.41	22.02
FDD V HSUPA Subtest 2	mid	-	5	28.91	20.63	21.36
FDD V HSUPA Subtest 2	high	-	5	28.91	20.72	21.25
FDD V HSUPA Subtest 3	low	-	5	29.99	21.48	22.71
FDD V HSUPA Subtest 3	mid	-	5	29.99	21.36	22.06
FDD V HSUPA Subtest 3	high	-	5	29.59	21.04	21.61
FDD V HSUPA Subtest 4	low	-	5	30.11	21.72	22.27
FDD V HSUPA Subtest 4	mid	-	5	29.99	21.7	22.3
FDD V HSUPA Subtest 4	high	-	5	29.84	20.98	21.64
FDD V HSUPA Subtest 5	low	-	5	30.4	22.79	23.07
FDD V HSUPA Subtest 5	mid	-	5	29.84	22.55	22.88
FDD V HSUPA Subtest 5	high	-	5	29.99	22	22.43

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
eFDD 5 QPSK	low	1	1.4	-	-	22.28
eFDD 5 QPSK	low	3	1.4	-	-	21.86
eFDD 5 QPSK	low	6	1.4	-	-	20.98
eFDD 5 QPSK	mid	1	1.4	-	-	22.6
eFDD 5 QPSK	mid	3	1.4	-	-	22.18
eFDD 5 QPSK	mid	6	1.4	-	-	21.21
eFDD 5 QPSK	high	1	1.4	-	-	21.91
eFDD 5 QPSK	high	3	1.4	-	-	21.44
eFDD 5 QPSK	high	6	1.4	-	-	20.44
eFDD 5 16QAM	low	1	1.4	-	-	20.72
eFDD 5 16QAM	low	6	1.4	-	-	19.59
eFDD 5 16QAM	mid	1	1.4	-	-	21.4
eFDD 5 16QAM	mid	6	1.4	-	-	20.03
eFDD 5 16QAM	high	1	1.4	-	-	20.72
eFDD 5 16QAM	high	6	1.4	-	-	19.27
eFDD 5 QPSK	low	1	3	-	-	22.39
eFDD 5 QPSK	low	15	3	-	-	21.14
eFDD 5 QPSK	mid	1	3	-	-	22.51
eFDD 5 QPSK	mid	15	3	-	-	21.63
eFDD 5 QPSK	high	1	3	-	-	22.23
eFDD 5 QPSK	high	15	3	-	-	20.43
eFDD 5 16QAM	low	1	3	-	-	20.58
eFDD 5 16QAM	low	15	3	-	-	20.32
eFDD 5 16QAM	mid	1	3	-	-	20.69
eFDD 5 16QAM	mid	15	3	-	-	20.48
eFDD 5 16QAM	high	1	3	-	-	20.93
eFDD 5 16QAM	high	15	3	-	-	19.37
eFDD 5 QPSK	low	1	5	-	-	22.53
eFDD 5 QPSK	low	12	5	-	-	20.98
eFDD 5 QPSK	low	25	5	-	-	21.14
eFDD 5 QPSK	mid	1	5	-	-	22.51
eFDD 5 QPSK	mid	12	5	-	-	21.6
eFDD 5 QPSK	mid	25	5	-	-	21.57
eFDD 5 QPSK	high	1	5	-	-	22.18
eFDD 5 QPSK	high	12	5	-	-	20.74
eFDD 5 QPSK	high	25	5	-	-	20.53
eFDD 5 16QAM	low	1	5	-	-	20.54
eFDD 5 16QAM	low	25	5	-	-	20.45
eFDD 5 16QAM	mid	1	5	-	-	20.92
eFDD 5 16QAM	mid	25	5	-	-	20.48
eFDD 5 16QAM	high	1	5	-	-	20.98
eFDD 5 16QAM	high	25	5	-	-	19.88
eFDD 5 QPSK	low	1	10	-	-	22.65
eFDD 5 QPSK	low	50	10	-	-	21.53
eFDD 5 QPSK	mid	1	10	-	-	22.81
eFDD 5 QPSK	mid	50	10	-	-	21.66
eFDD 5 QPSK	high	1	10	-	-	22.88
eFDD 5 QPSK	high	50	10	-	-	21.02
eFDD 5 16QAM	low	1	10	-	-	21.48
eFDD 5 16QAM	low	50	10	-	-	20.91
eFDD 5 16QAM	mid	1	10	-	-	20.96
eFDD 5 16QAM	mid	50	10	-	-	20.94
eFDD 5 16QAM	high	1	10	-	-	21.63
eFDD 5 16QAM	high	50	10	-	-	20.95



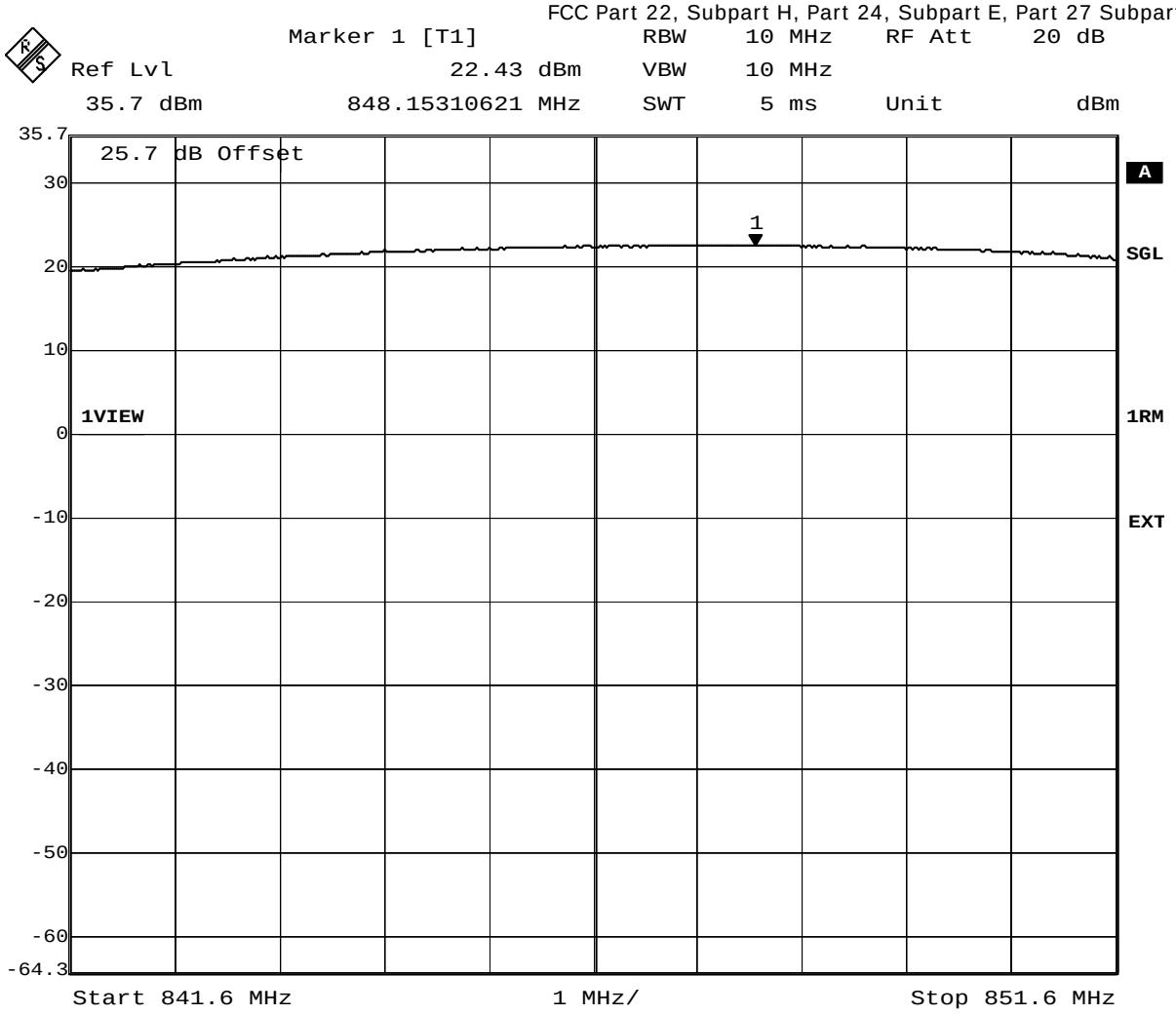
Date: 29.MAR.2018 09:26:16

WCDMA FDD5 Channel=low

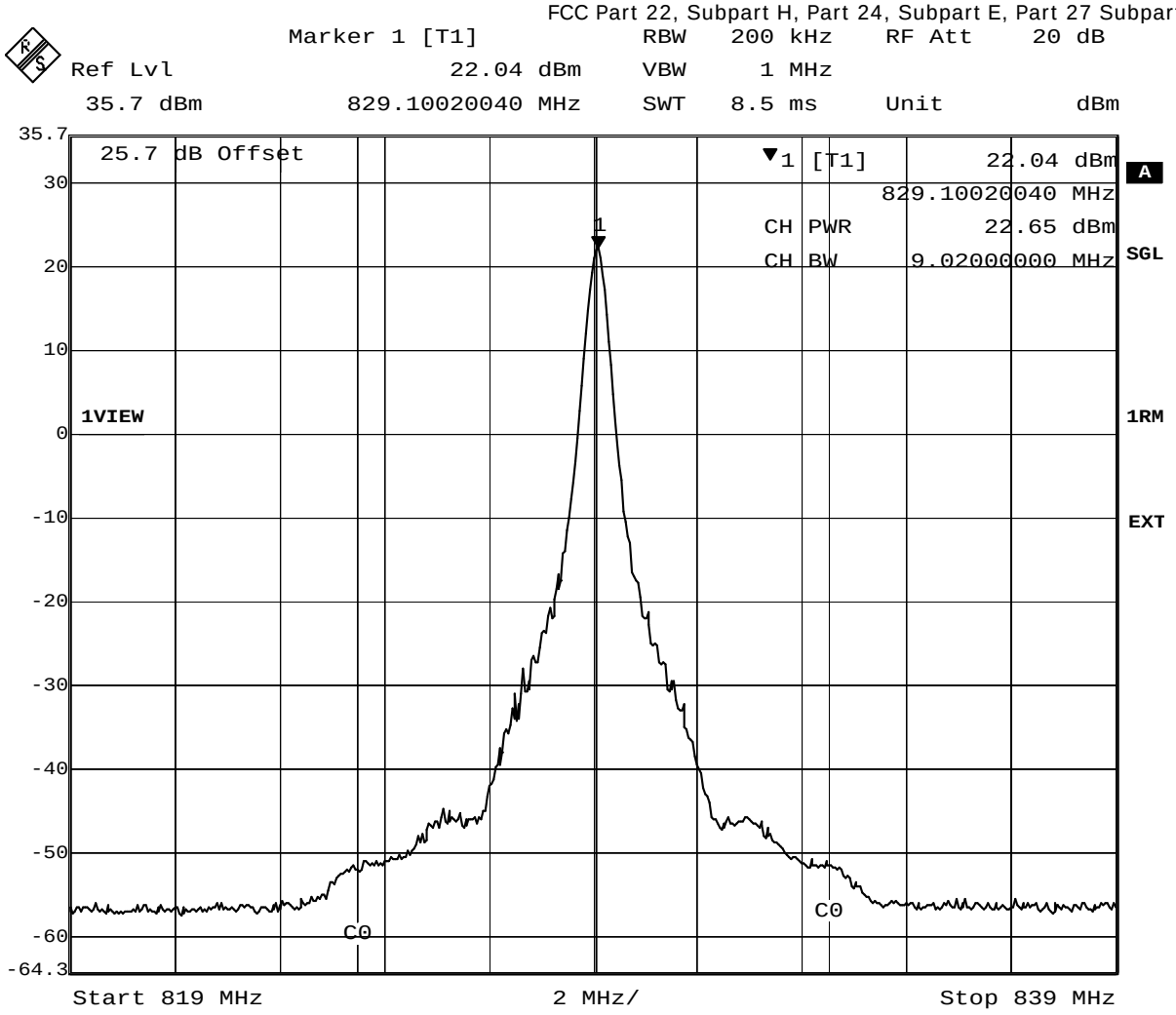


Date: 28.MAR.2018 15:13:08

HSDPA FDD5 Channel=low



HSUPA FDD5 Channel=high



Date: 12.APR.2018 14:22:46

eFDD5 QPSK 10MHz RB1 Channel=high

3.5.2 22.2 Frequency stability §2.1055

Test: 22.2; _Frequency stability Summary §2.1055

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:34
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	-4	passed
-30	5			0	-2	passed
-30	10			1	2	passed
-20	0	normal	2095.5	0	-2	passed
-20	5			0	-2	passed
-20	10			-1	-3	passed
-10	0	normal	2095.5	1	3	passed
-10	5			0	-2	passed
-10	10			-1	-3	passed
0	0	normal	2095.5	-1	-2	passed
0	5			0	1	passed
0	10			0	-2	passed
10	0	normal	2095.5	1	2	passed
10	5			0	-2	passed
10	10			0	-2	passed
20	0	low	2095.5	0	-2	passed
20	5			0	1	passed
20	10			0	-1	passed
20	0	normal = high [1)]	2095.5	0	2	passed
20	5			1	3	passed
20	10			-1	-3	passed
20	0	high	2095.5	1	2	passed
20	5			0	-1	passed
20	10			-1	2	passed
30	0	normal	2095.5	0	2	passed
30	5			1	3	passed
30	10			1	3	passed
40	0	normal	2095.5	0	-2	passed
40	5			0	1	passed
40	10			0	2	passed
50	0	normal	2095.5	1	3	passed
50	5			-1	-2	passed
50	10			0	2	passed

WCDMA FDD5

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	4	13	passed
-30	5			6	15	passed
-30	10			1	16	passed
-20	0	normal	2095.5	5	14	passed
-20	5			2	20	passed
-20	10			2	19	passed
-10	0	normal	2095.5	4	9	passed
-10	5			1	7	passed
-10	10			6	15	passed
0	0	normal	2095.5	7	-26	passed
0	5			1	-4	passed
0	10			-9	6	passed
10	0	normal	2095.5	-5	12	passed
10	5			4	13	passed
10	10			-6	8	passed
20	0	low	2095.5	3	22	passed
20	5			5	20	passed
20	10			-9	19	passed
20	0	normal = high [1)]	2095.5	10	16	passed
20	5			-6	-11	passed
20	10			4	-13	passed
20	0	high	2095.5	-8	4	passed
20	5			0	8	passed
20	10			0	19	passed
30	0	normal	2095.5	1	-5	passed
30	5			2	-8	passed
30	10			-6	-9	passed
40	0	normal	2095.5	7	-10	passed
40	5			-9	12	passed
40	10			4	6	passed
50	0	normal	2095.5	6	-14	passed
50	5			1	18	passed
50	10			-2	-12	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	2095.5			passed
20	5					passed
20	10					passed

1) The manufacturer declared that normal voltage is equivalent with high voltage.
2) The call is established at high voltage and the voltage is then reduced to the battery operating end.
3) The EUT didnt work below -xx °C

HSDPA FDD5

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

HSUPA FDD5

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2091.25	1,2	5.6	passed
-30	5			1.6	5.8	passed
-30	10			1.4	5.8	passed
-20	0	normal	2091.25	2	3.2	passed
-20	5			2.1	4.1	passed
-20	10			1.6	4.2	passed
-10	0	normal	2091.25	1.4	3.2	passed
-10	5			1.5	3.6	passed
-10	10			1.9	3.6	passed
0	0	normal	2091.25	1.2	4.3	passed
0	5			0.3	4.9	passed
0	10			0.9	5.1	passed
10	0	normal	2091.25	1.4	5.6	passed
10	5			2.3	5.7	passed
10	10			1.6	6.2	passed
20	0	low	2091.25	1.4	3	passed
20	5			1.5	3.4	passed
20	10			1.8	3.9	passed
20	0	normal = high [1)]	2091.25	1.8	3.1	passed
20	5			1	11.2	passed
20	10			2.3	12.3	passed
20	0	high	2091.25	2.1	8.9	passed
20	5			0	9.3	passed
20	10			2.7	9.5	passed
30	0	normal	2091.25	4	7.2	passed
30	5			2.6	7.4	passed
30	10			3.1	8.5	passed
40	0	normal	2091.25	1.8	6.4	passed
40	5			1.6	6.8	passed
40	10			1.7	6.8	passed
50	0	normal	2091.25	1.9	4.3	passed
50	5			1.4	9.2	passed
50	10			2	9.4	passed

LTE eFDD5

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:36
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

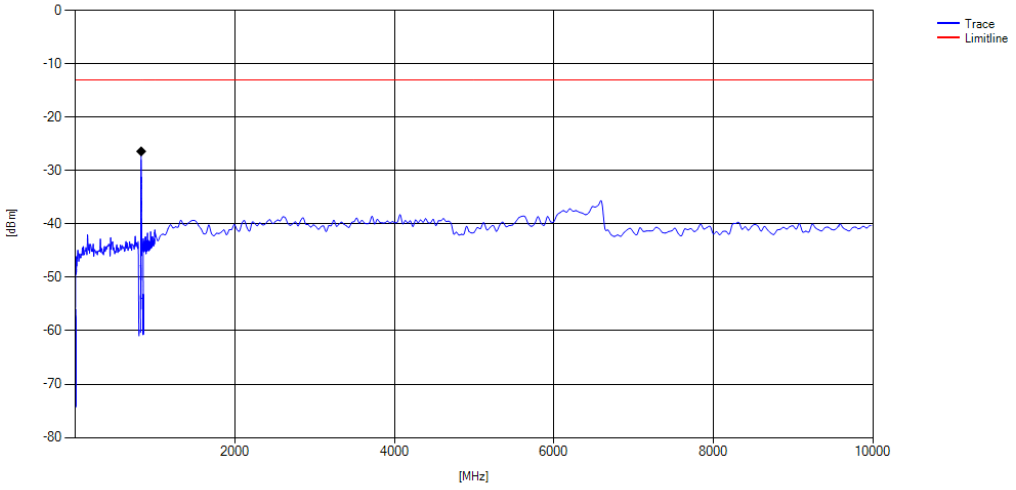
Detailed Results:

Radio Technology	CH	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

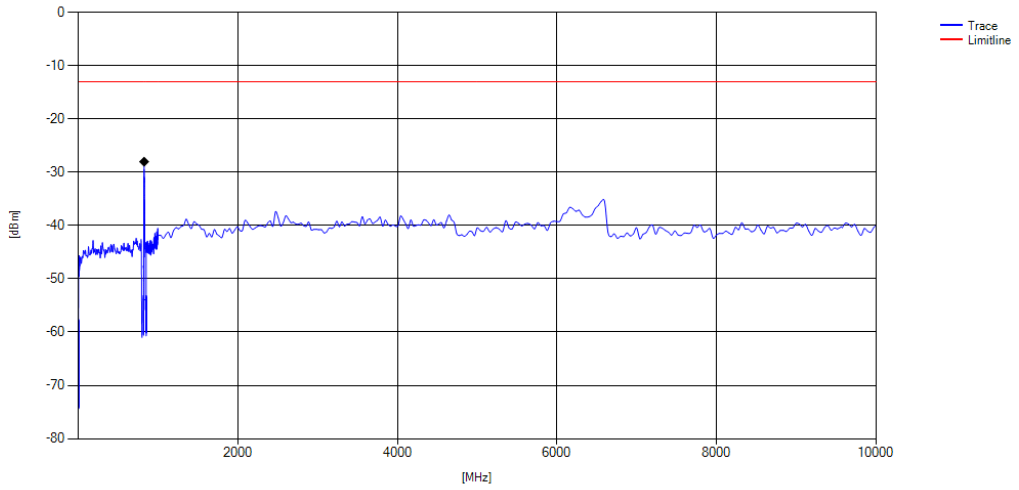
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSDPA FDD5	low	rms	maxhold	50	824	-26.42	-13	13.42
HSDPA FDD5	mid	-	-	-	-	-	-13	>20
HSDPA FDD5	high	rms	maxhold	50	849	-29.86	-13	16.86

Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSUPA FDD5	low	rms	maxhold	50	824	-28.04	-13	15.04
HSUPA FDD5	mid	-	-	-	-	-	-13	>20
HSUPA FDD5	high	rms	maxhold	50	850.1	-34.86	-13	21.86

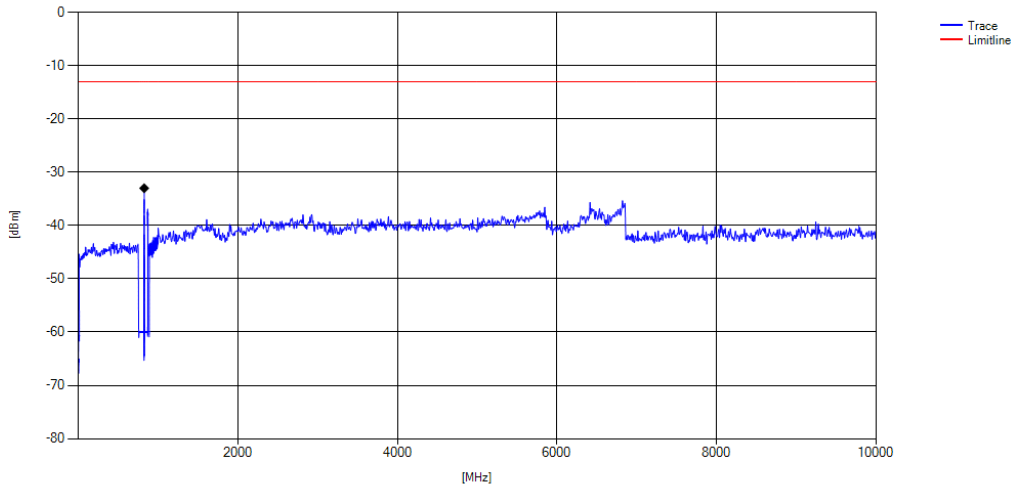
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD5	low	rms	maxhold	5	823.9	-31.91	-23	8.91
eFDD5	mid	-	-	-	-	-	-23	>20
eFDD5	high	rms	maxhold	5	849	-32.01	-23	9.01



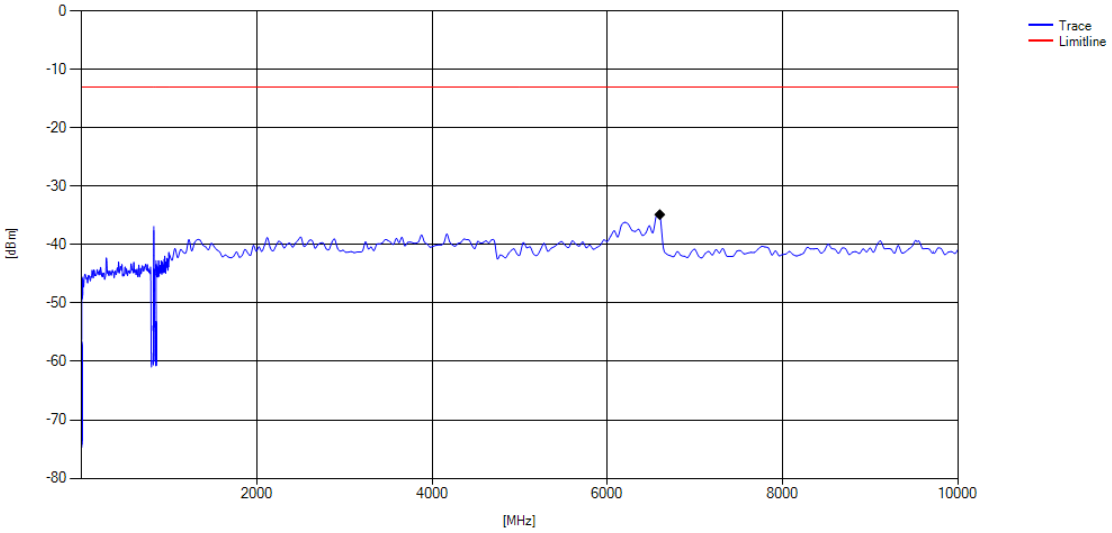
HSDPA_FDD5_SUB1_CH-low



HSUPA_FDD5_SUB1_CH-low



LTE_eFDD5_QPSK-5MHz-RB1-CH-low



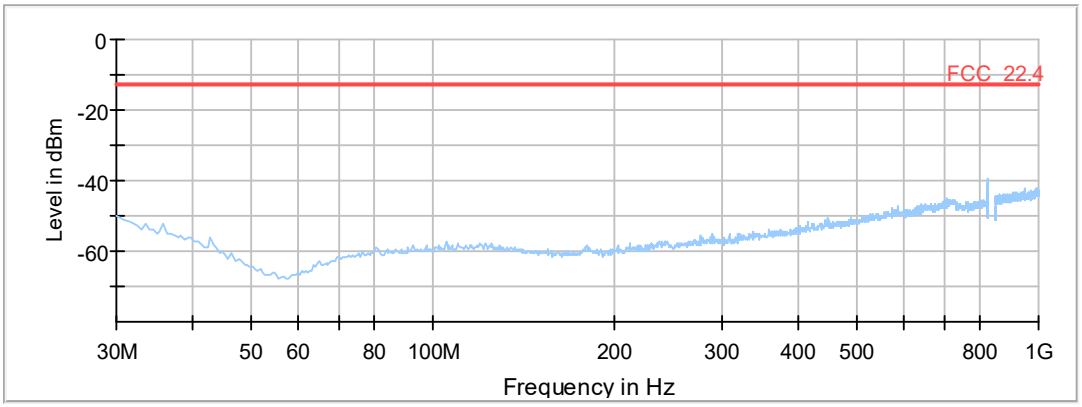
WCDMa_FDD5_CH-mid

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

Test: 22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20425, Frequency = 826.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:36
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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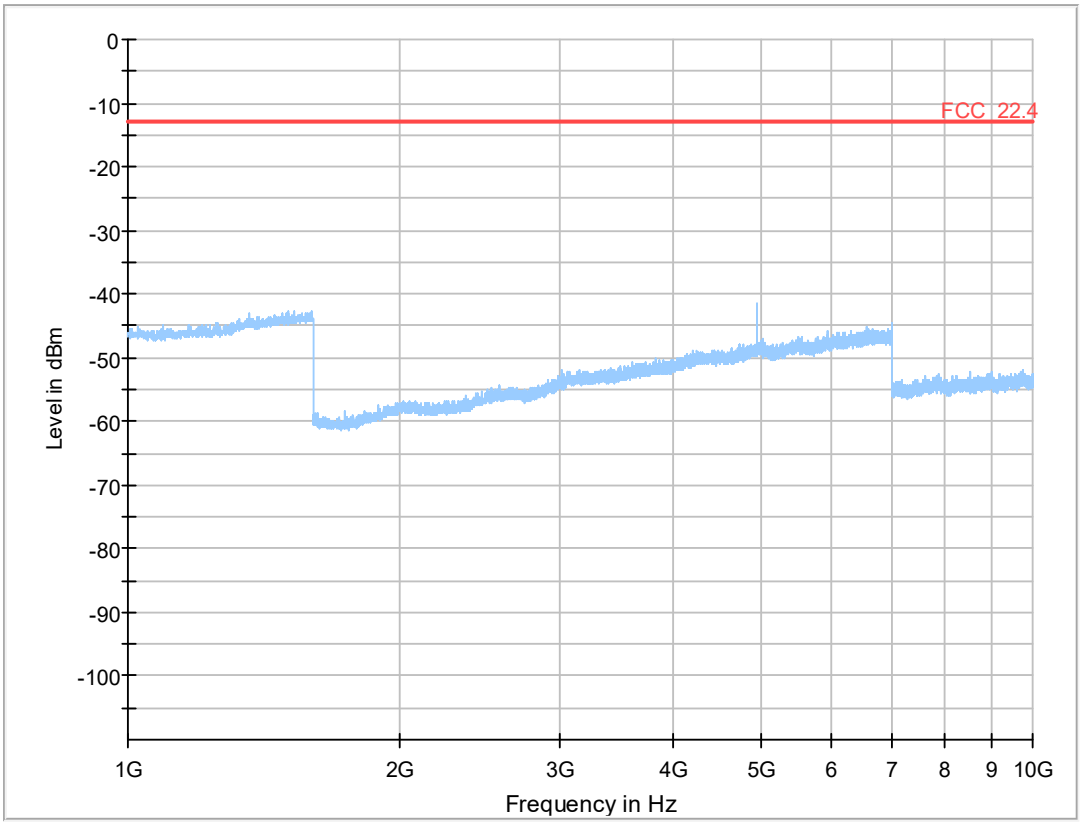

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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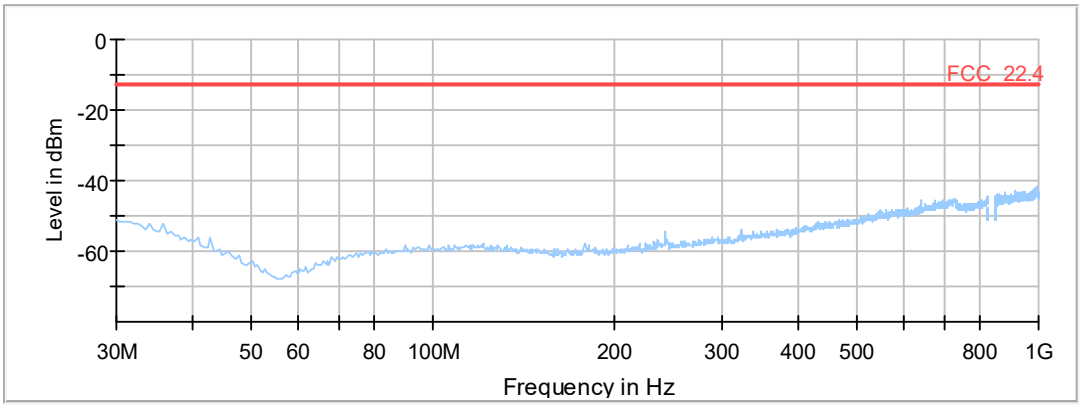
Test: 22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20525, Frequency = 836.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:38
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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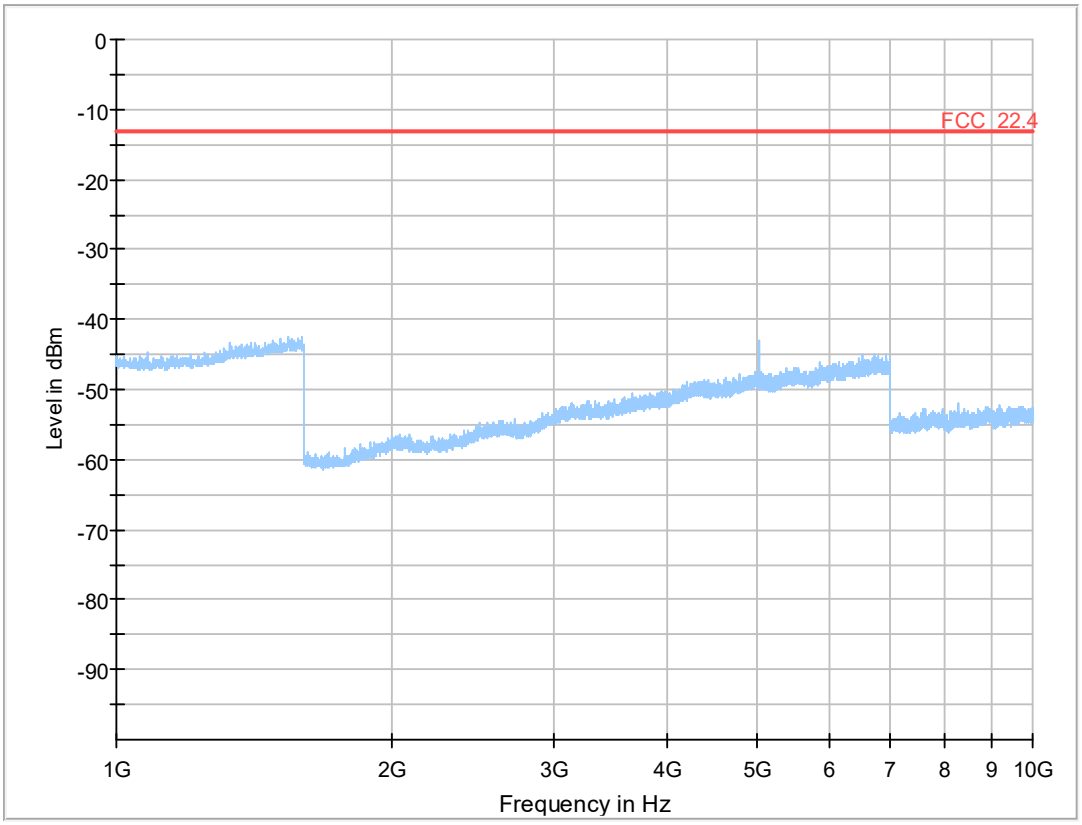

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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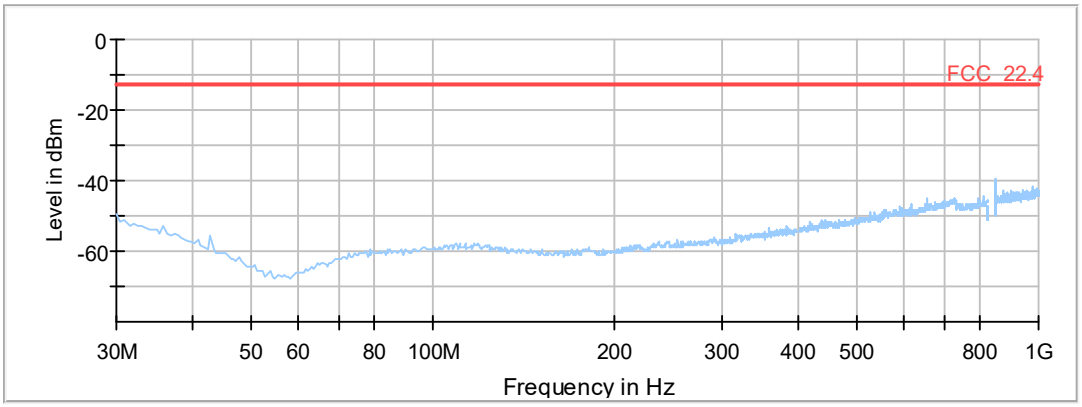
Test: 22.4; Frequency Band = eFDD5, Mode = QPSK 5MHz, Channel = 20625, Frequency = 846.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:40
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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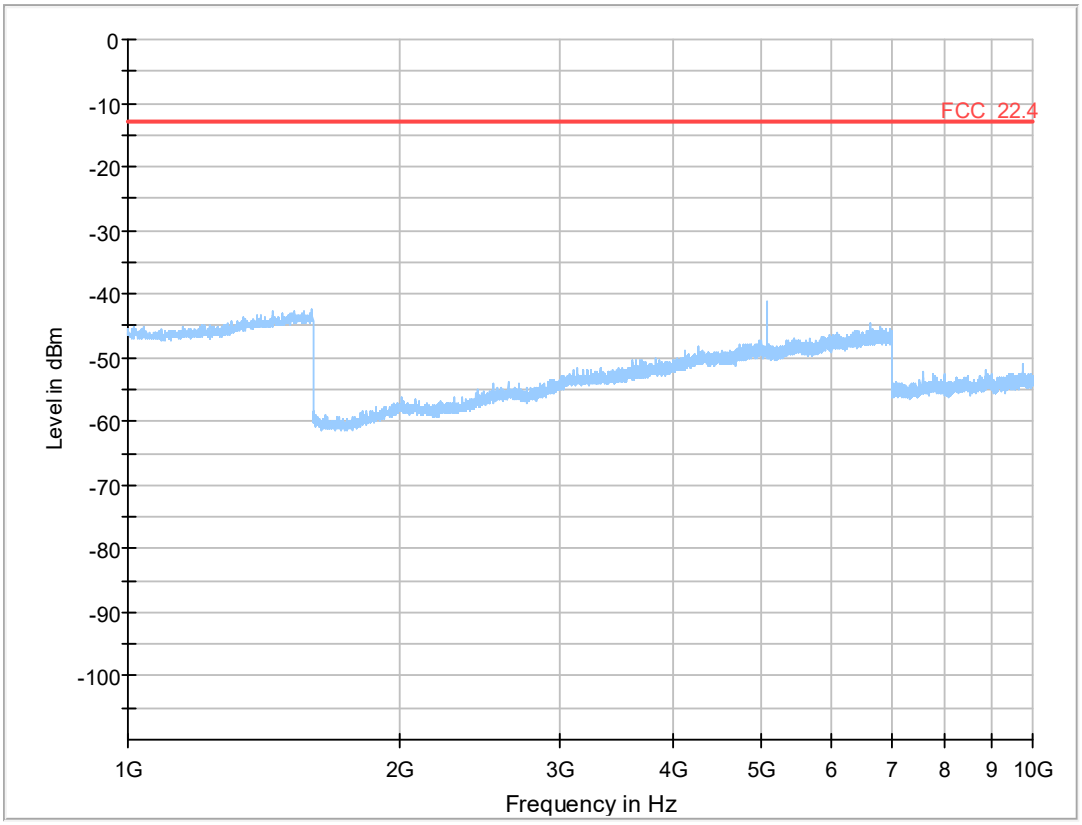

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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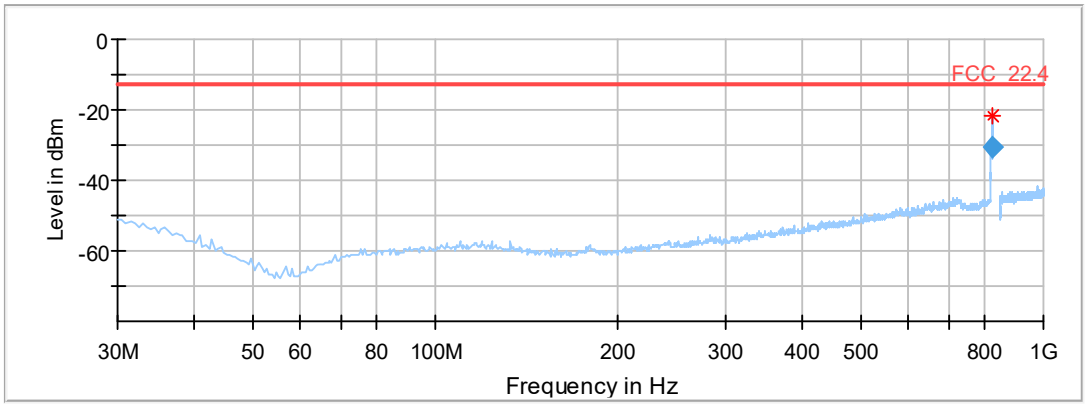
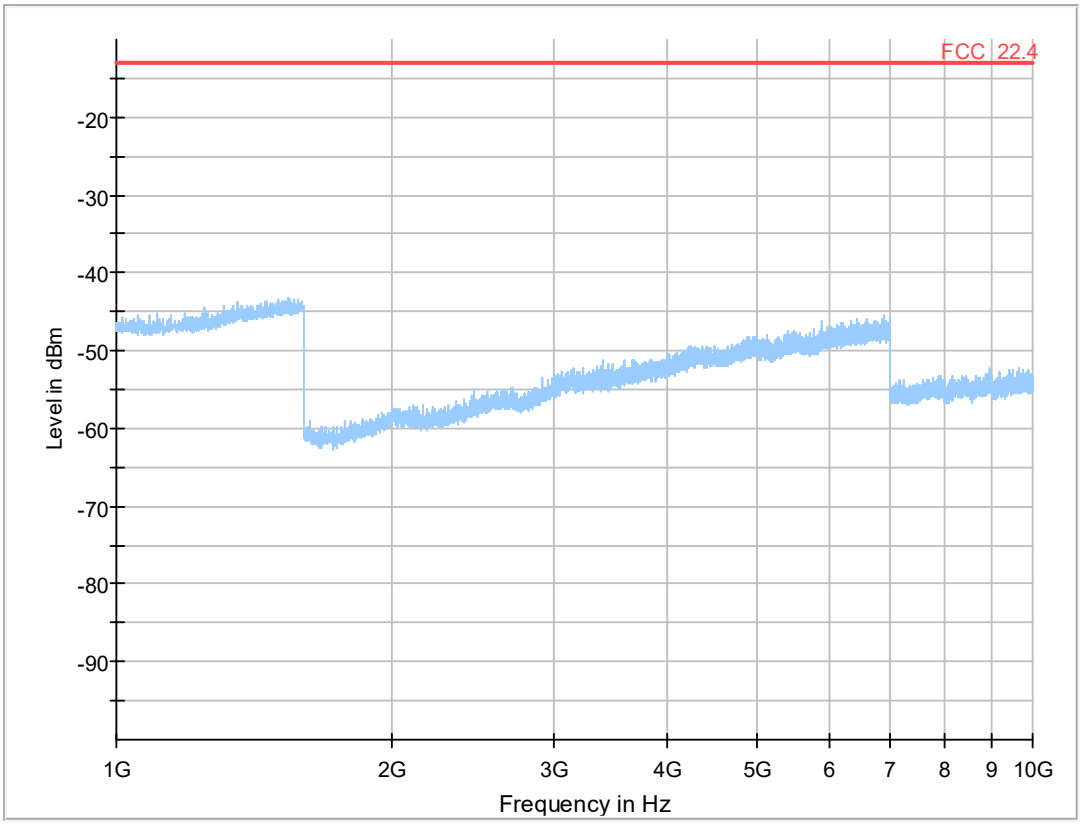
Test: 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4132, Frequency = 826.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:06
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:





Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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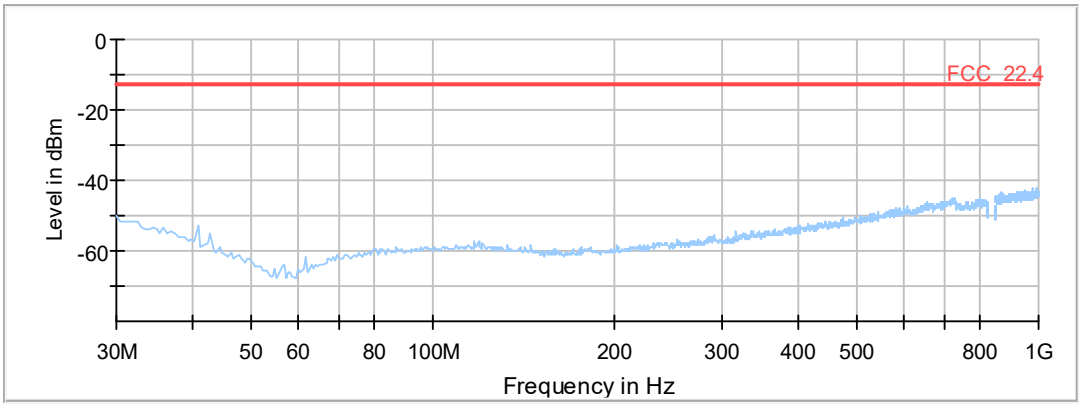
Test: 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:07
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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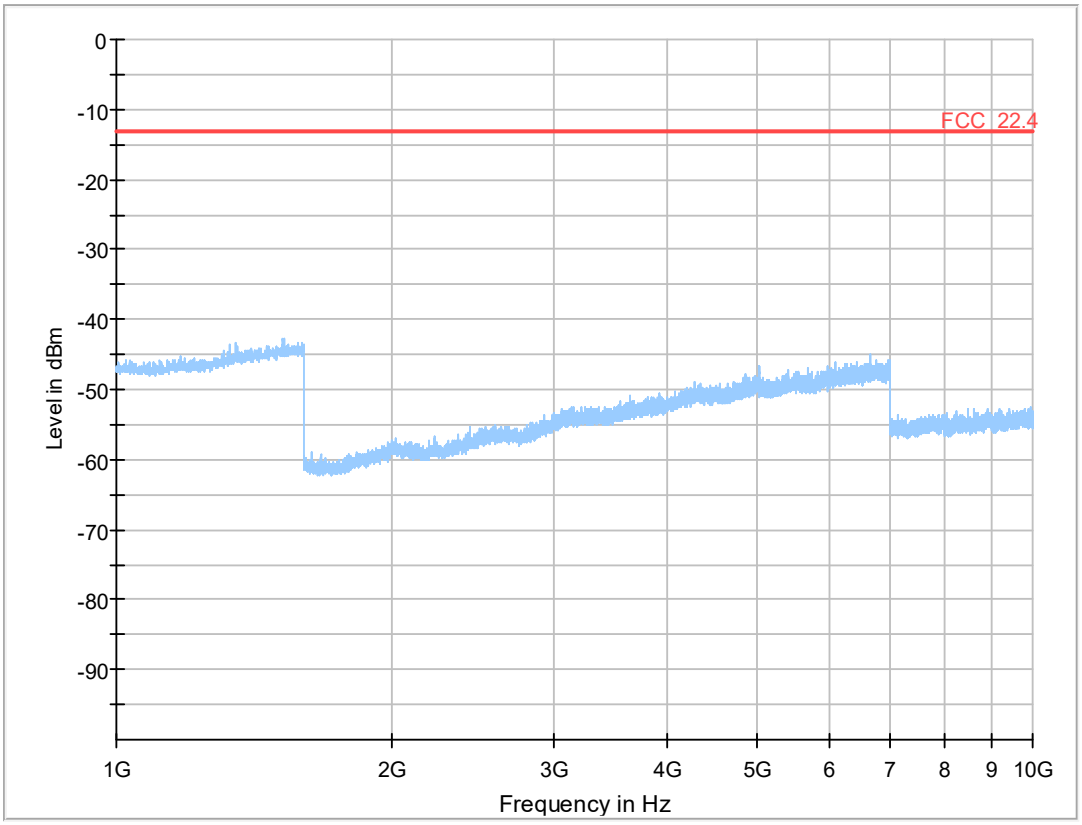

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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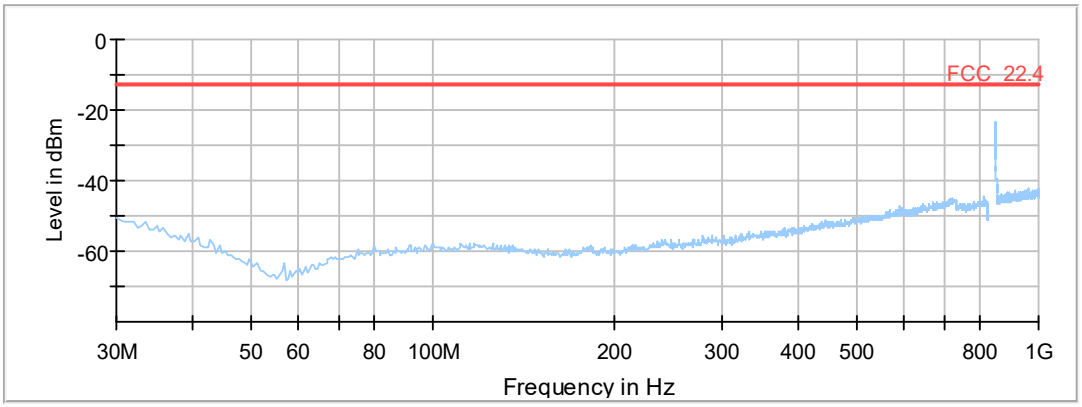
Test: 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:08
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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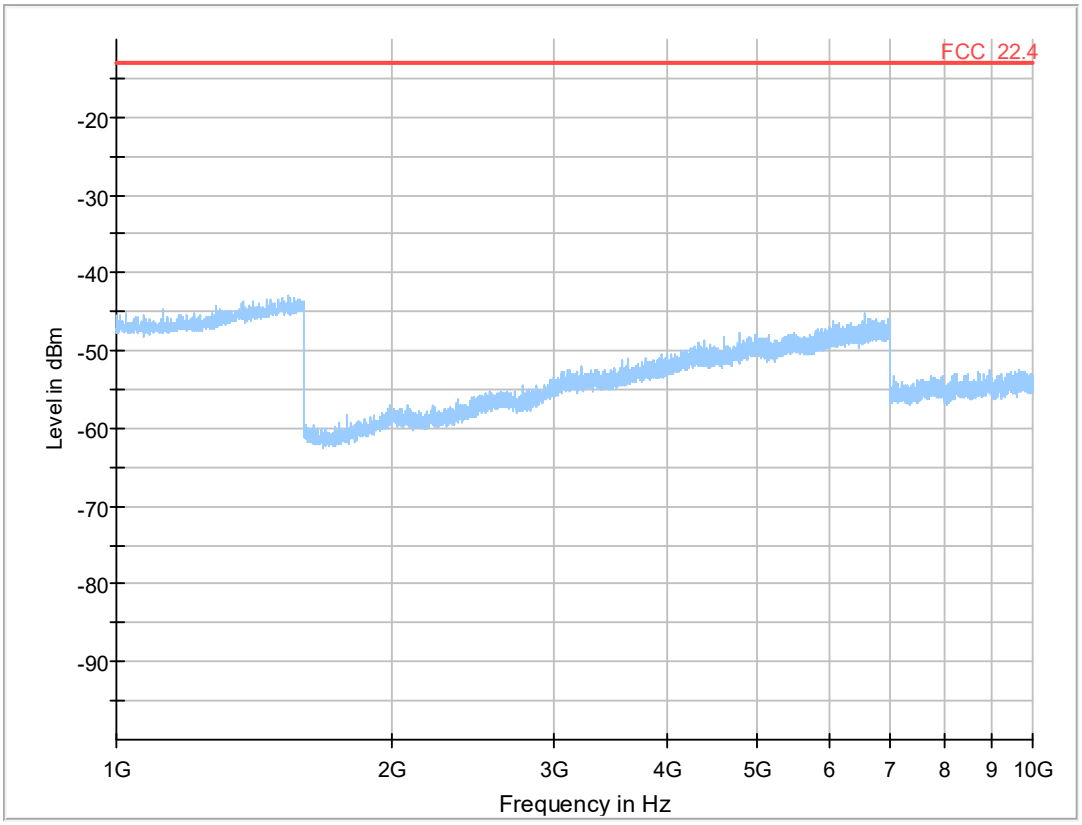

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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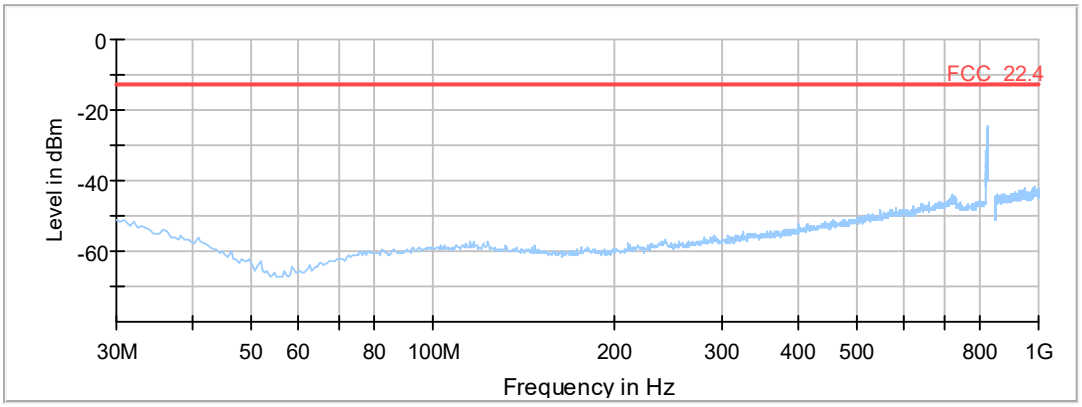
Test: 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4132, Frequency = 826.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 7:53
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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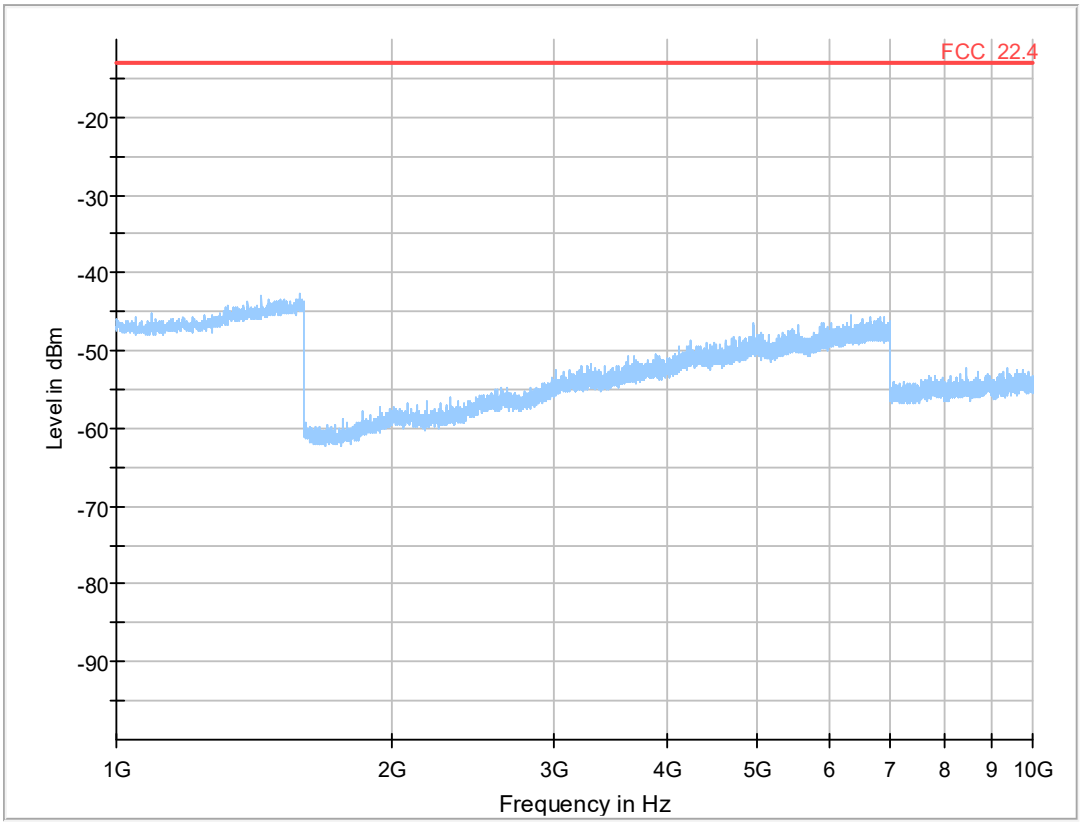

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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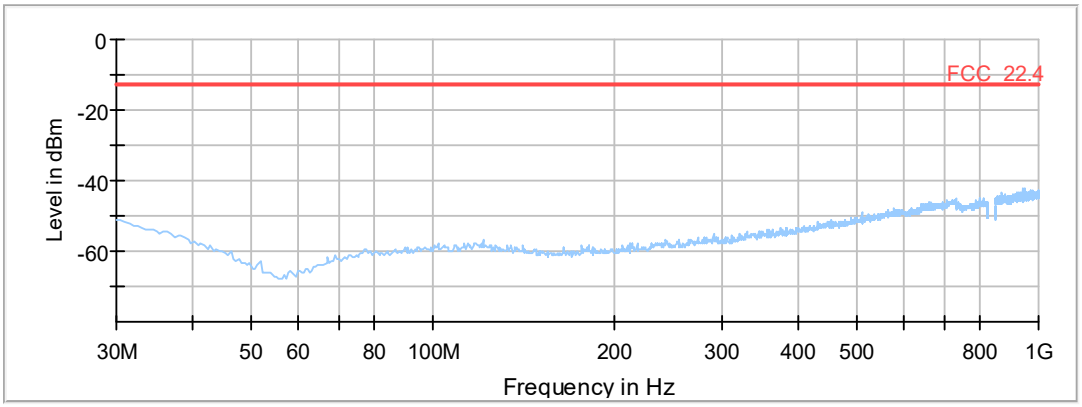
Test: 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 7:51
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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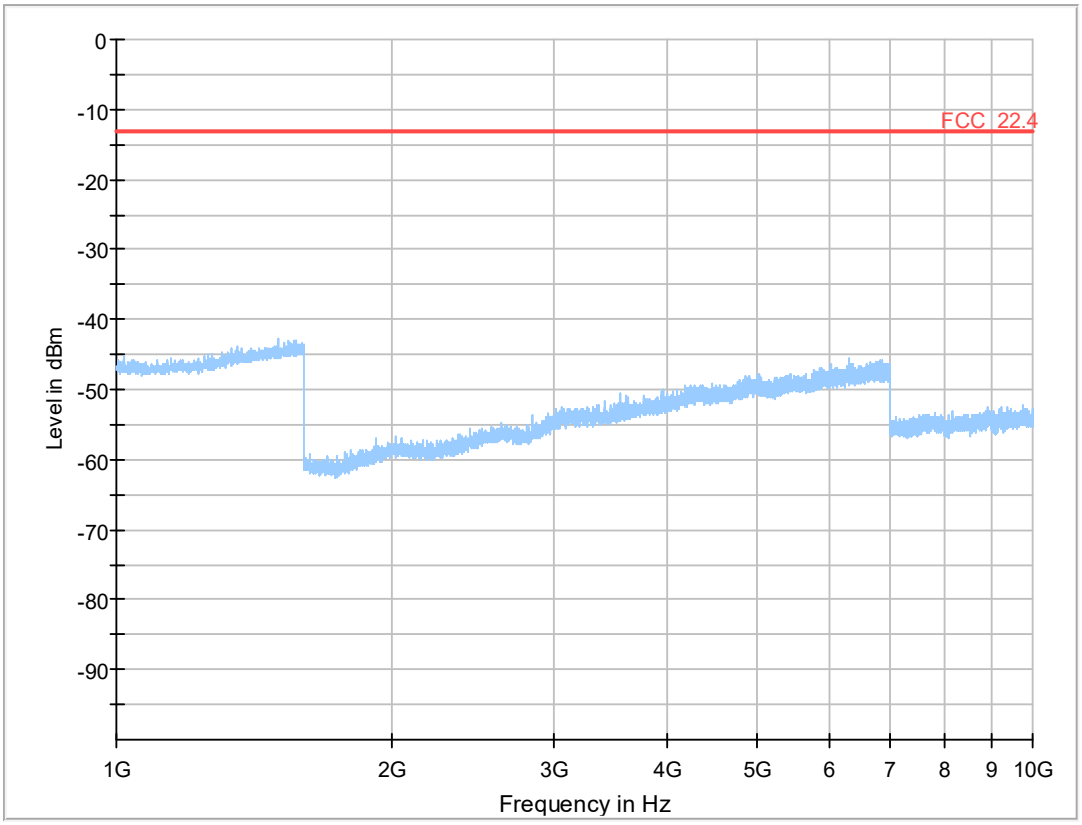

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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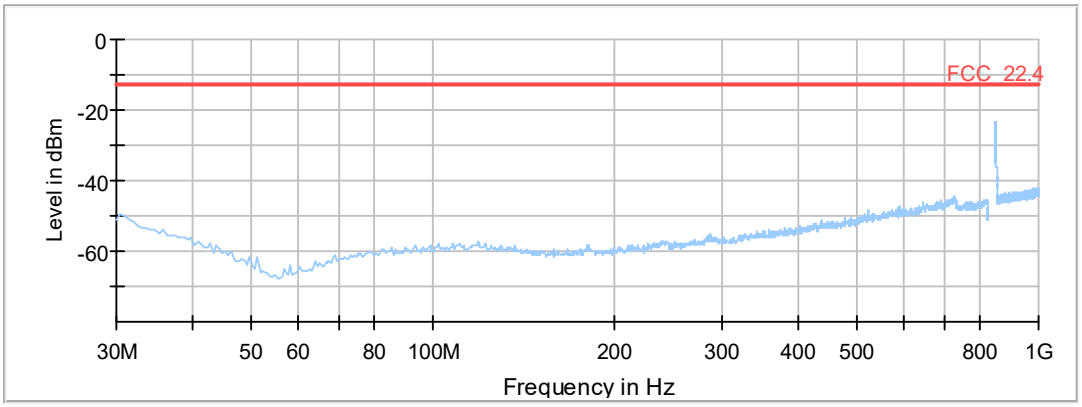
Test: 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 7:54
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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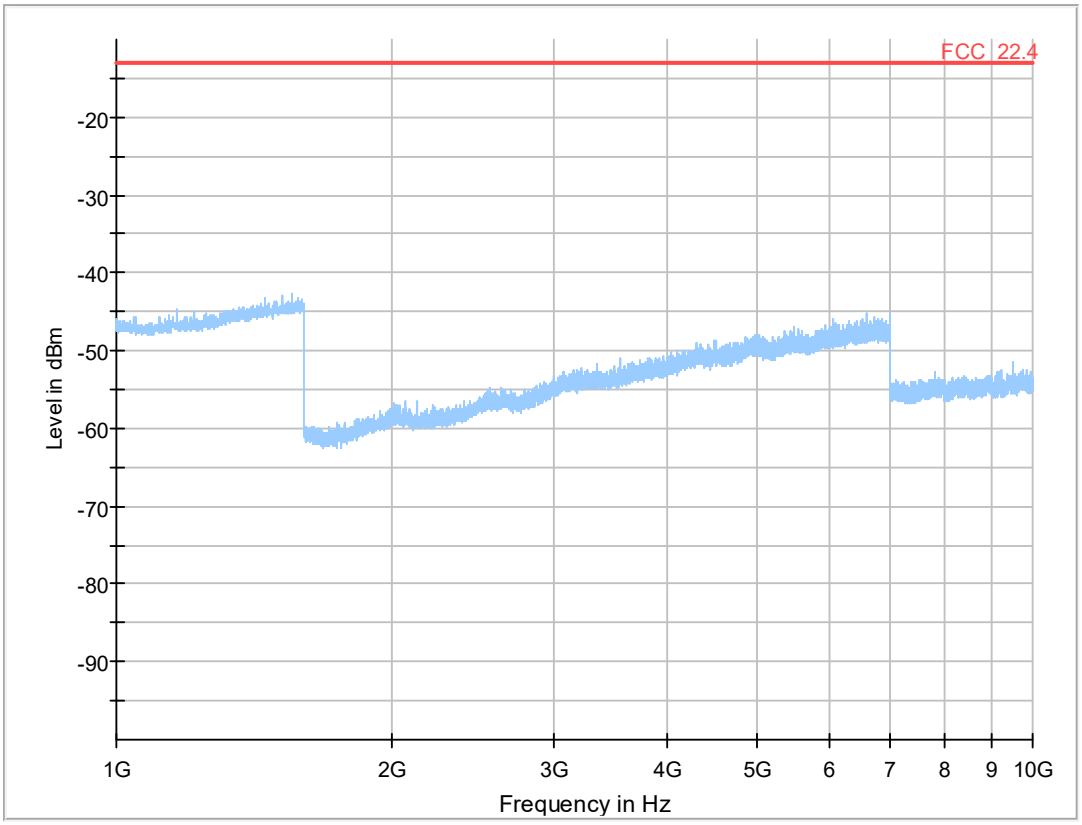

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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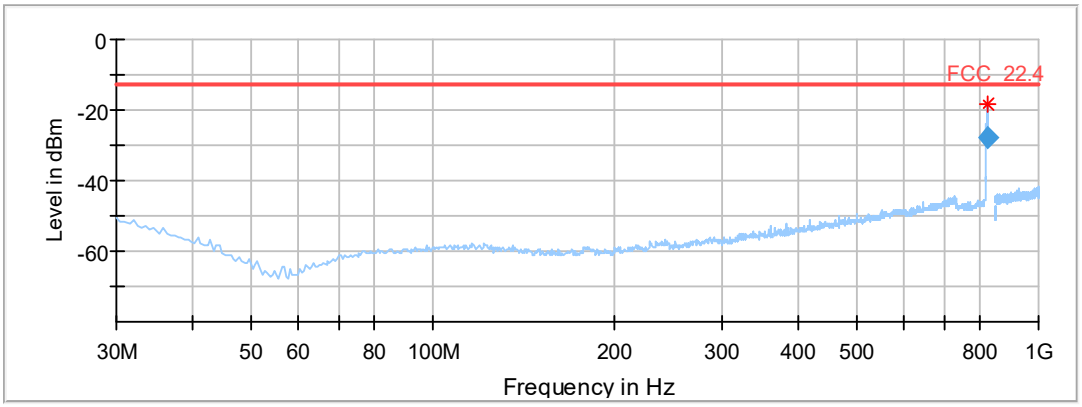
Test: 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4132, Frequency = 826.4MHz

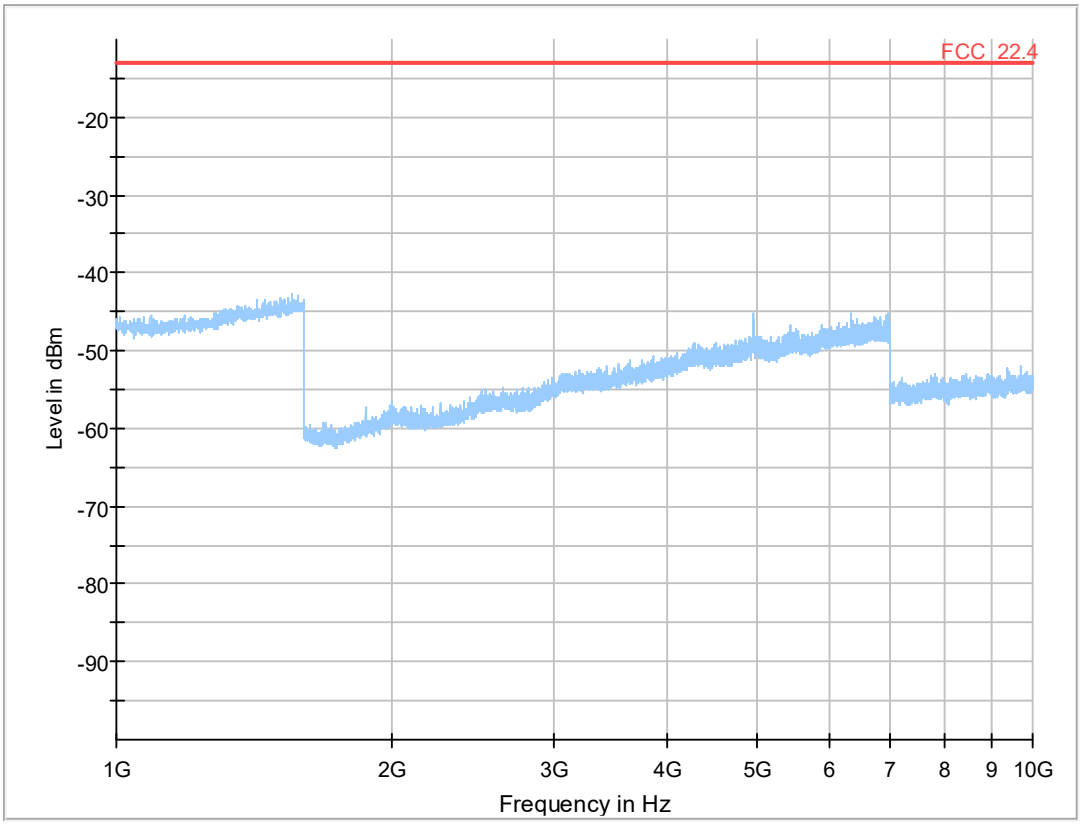
Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:28
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
823.896000	-28.05	-13.00	15.05	1000.0	50.000	100.0	V	-87.0	-74	18:06:32 - 2018-03-30



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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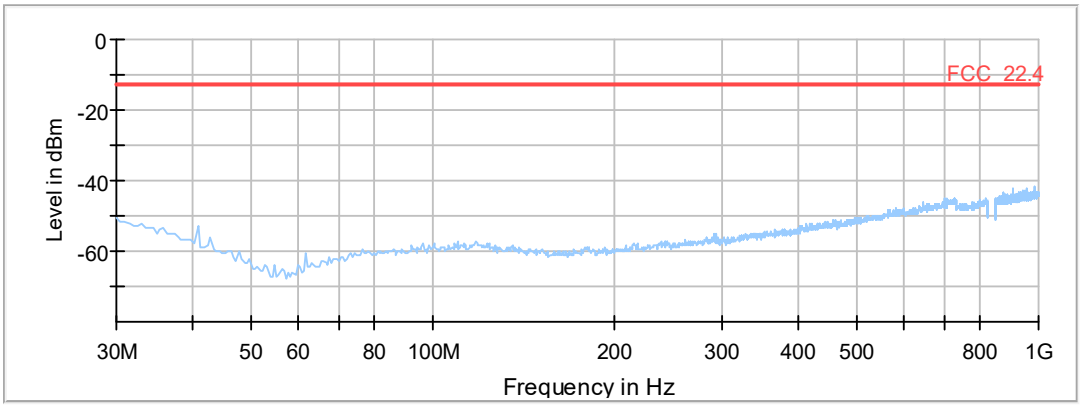
Test: 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4183, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:30
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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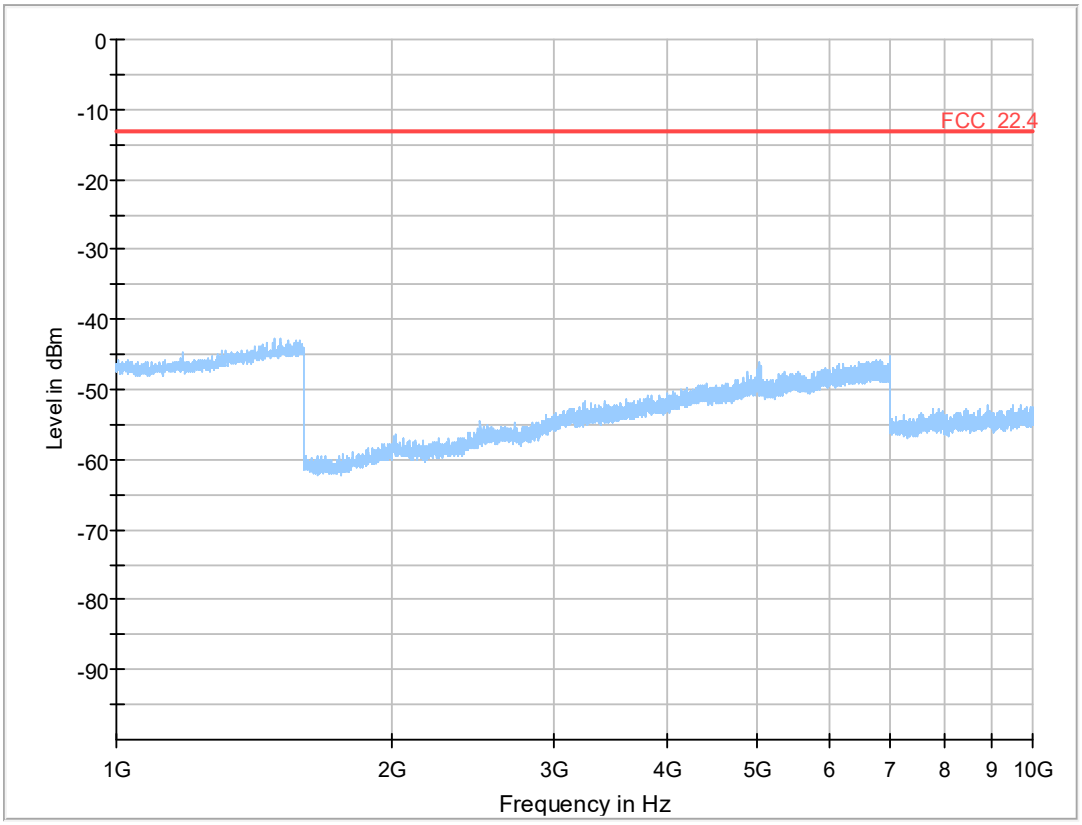

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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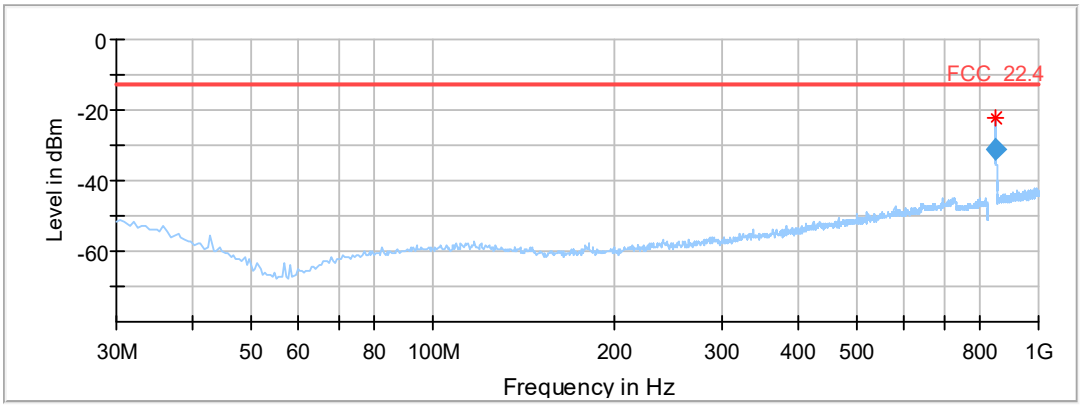
Test: 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4233, Frequency = 846.6MHz

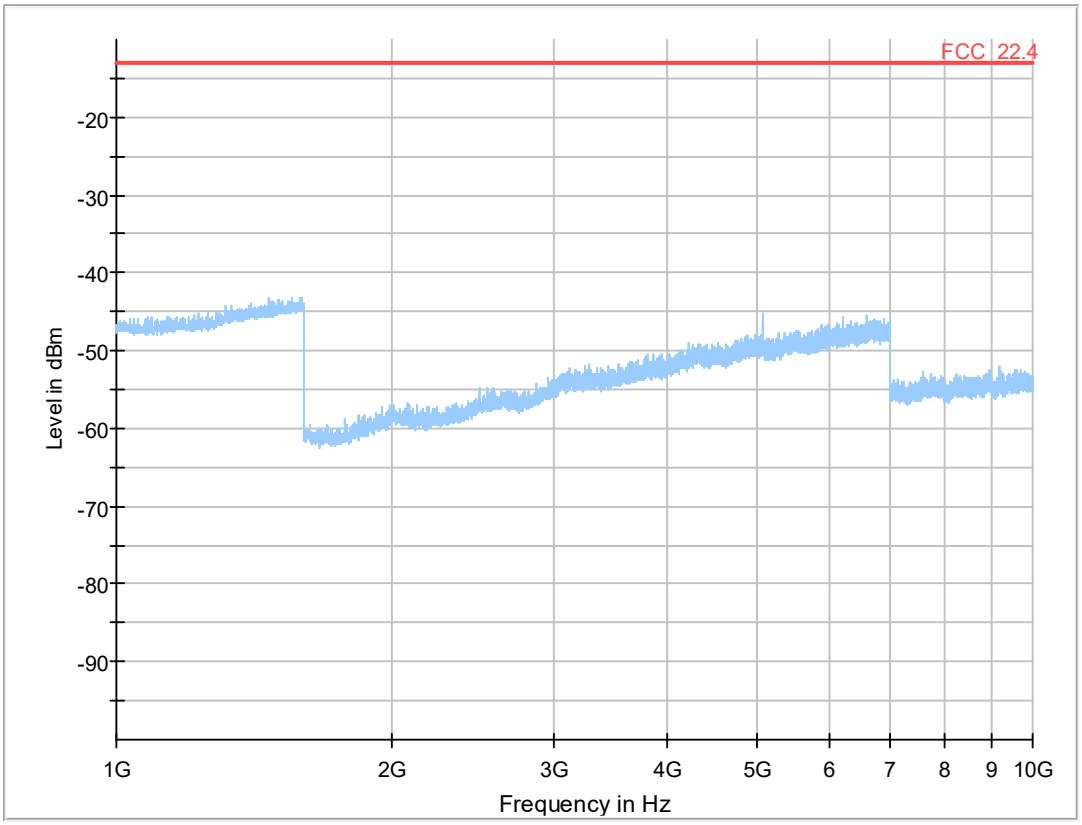
Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:31
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
849.000000	-31.05	-13.00	18.05	1000.0	50.000	100.0	V	-89.0	-74	17:37:34 - 2018-03-30



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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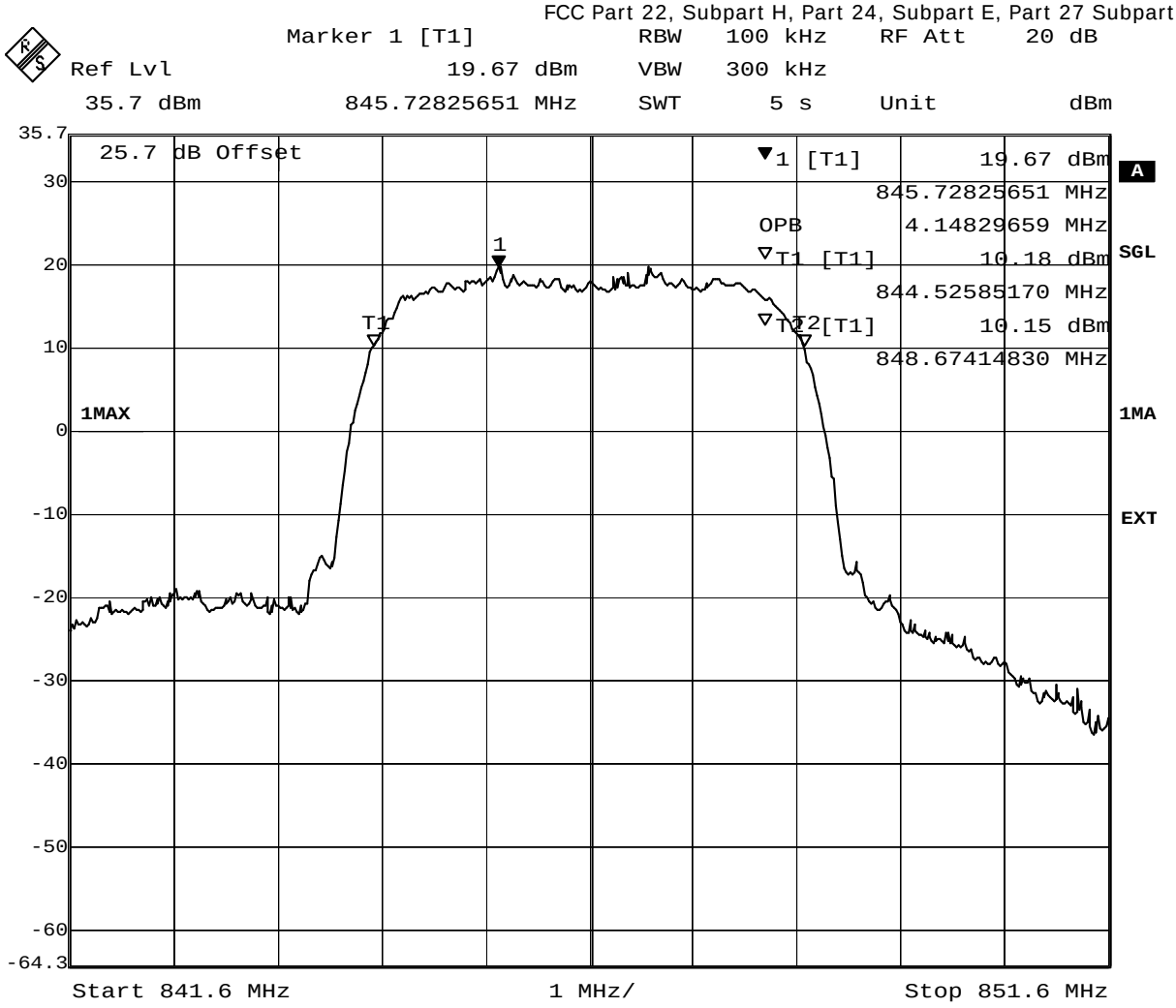
3.5.5 22.5 Emission and Occupied Bandwidth §2.1049, §22.917

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:38
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

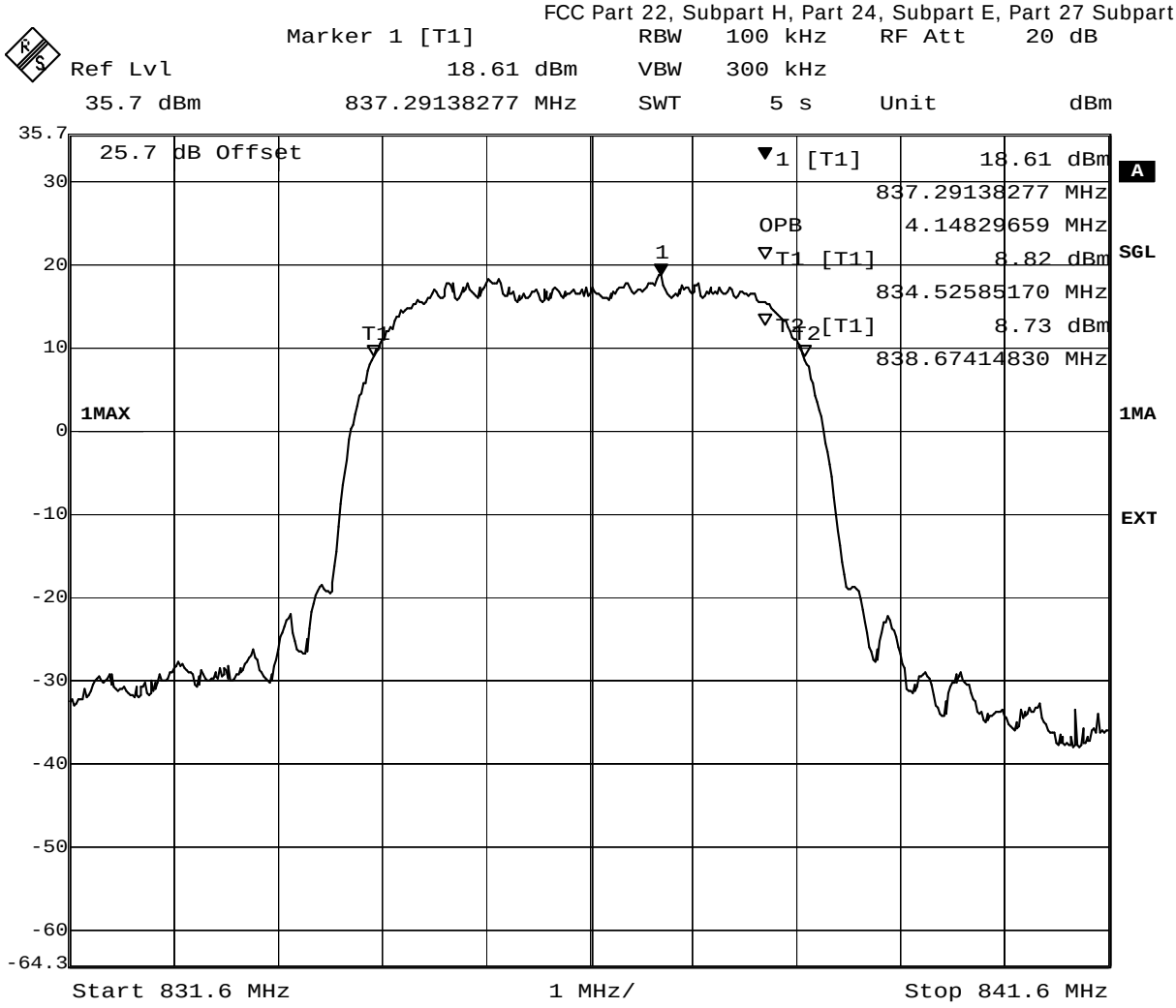
Detailed Results:

Radio Technology	Channel	Res-source Blocks	Band-width [MHz]	Nominal BW [MHz]	26 dB BW [kHz]	99 % BW [kHz]
FDD V	low	-	5	5	4769.54	4148.3
FDD V	mid	-	5	5	4769.54	4128.3
FDD V	high	-	5	5	4749.5	4148.3
FDD V HSDPA Subtest 1	low	-	5	5	4749.5	4128.3
FDD V HSDPA Subtest 1	mid	-	5	5	4749.5	4148.3
FDD V HSDPA Subtest 1	high	-	5	5	4769.54	4128.3
FDD V HSUPA Subtest 1	low	-	5	5	4769.54	4148.3
FDD V HSUPA Subtest 1	mid	-	5	5	4769.54	4148.3
FDD V HSUPA Subtest 1	high	-	5	5	4769.54	4148.3
FDD V HSUPA Subtest 5	low	-	5	5	4769.54	4148.3
FDD V HSUPA Subtest 5	mid	-	5	5	4769.54	4148.3
FDD V HSUPA Subtest 5	high	-	5	5	4769.54	4148.3
eFDD 5 QPSK	low	6	1.4	1.4	-	1100.2
eFDD 5 QPSK	mid	6	1.4	1.4	-	1106.2
eFDD 5 QPSK	high	6	1.4	1.4	-	1106.2
eFDD 5 16QAM	low	6	1.4	1.4	-	1100.2
eFDD 5 16QAM	mid	6	1.4	1.4	-	1100.2
eFDD 5 16QAM	high	6	1.4	1.4	-	1106.2
eFDD 5 QPSK	low	15	3	3	-	5951.9
eFDD 5 QPSK	mid	15	3	3	-	2753.5
eFDD 5 QPSK	high	15	3	3	-	2753.5
eFDD 5 16QAM	low	15	3	3	-	2765.5
eFDD 5 16QAM	mid	15	3	3	-	2741.5
eFDD 5 16QAM	high	15	3	3	-	2753.5
eFDD 5 QPSK	low	25	5	5	-	4529.1
eFDD 5 QPSK	mid	25	5	5	-	4529.1
eFDD 5 QPSK	high	25	5	5	-	4529.1
eFDD 5 16QAM	low	25	5	5	-	4529.1
eFDD 5 16QAM	mid	25	5	5	-	4549.1
eFDD 5 16QAM	high	25	5	5	-	4529.1
eFDD 5 QPSK	low	50	10	10	-	9018
eFDD 5 QPSK	mid	50	10	10	-	9018
eFDD 5 QPSK	high	50	10	10	-	8978
eFDD 5 16QAM	low	27	10	10	-	5050.1
eFDD 5 16QAM	mid	27	10	10	-	5050.1
eFDD 5 16QAM	high	27	10	10	-	5050



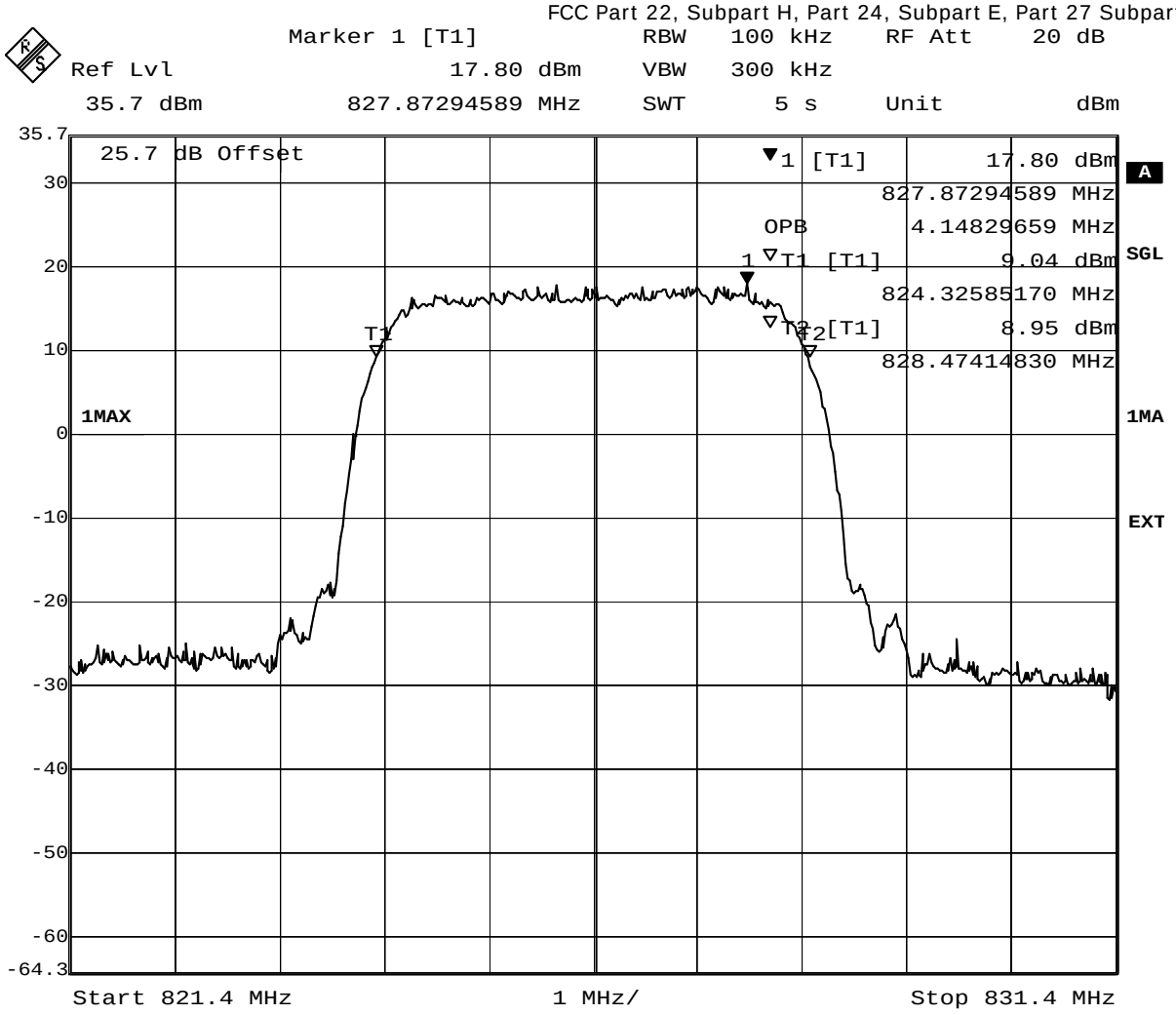
Date: 28.MAR.2018 11:00:53

WCDMA FDD5 Channel=high



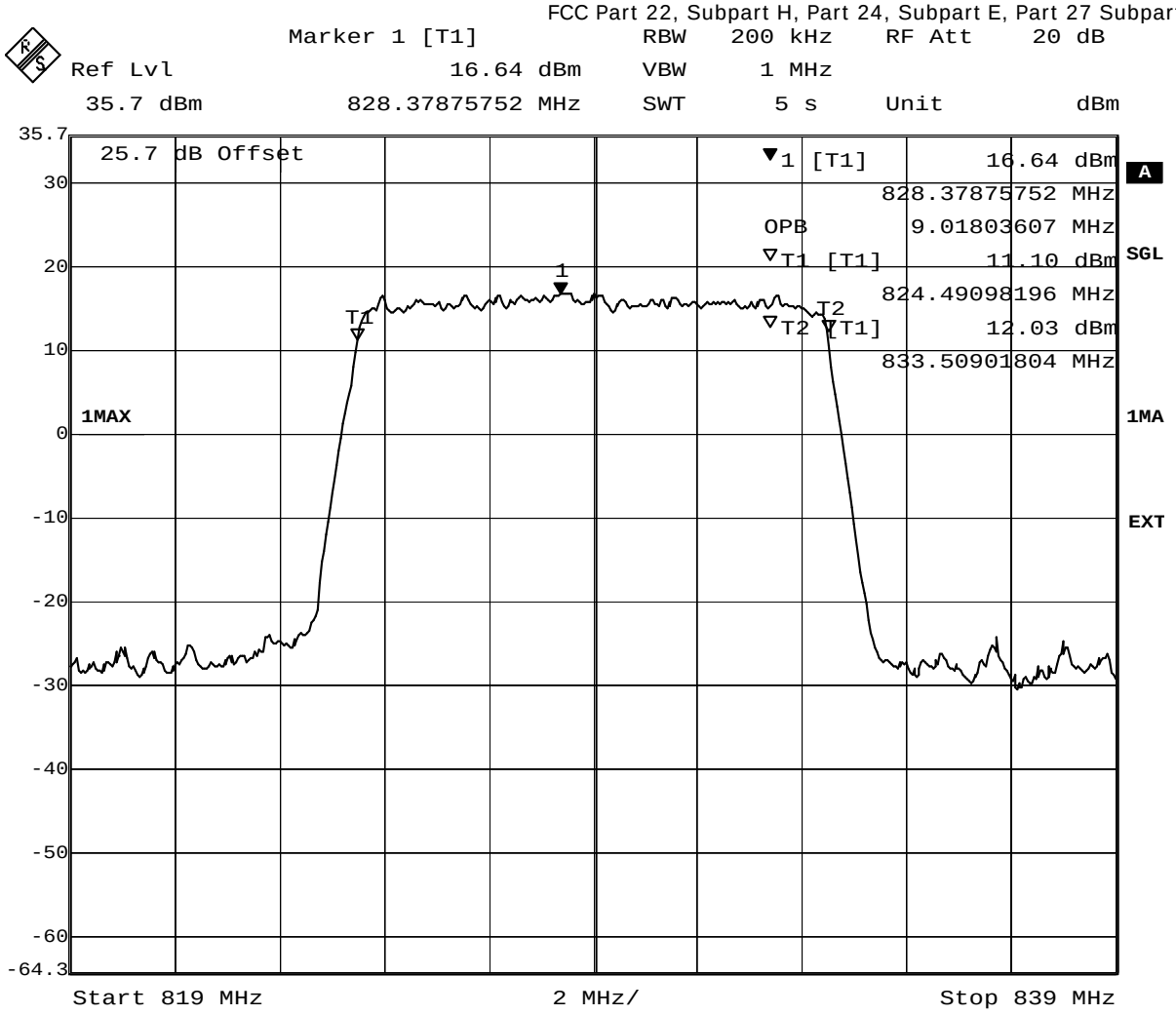
Date: 28.MAR.2018 14:54:20

HSDPA FDD5 Channel=high



Date: 28.MAR.2018 13:04:11

HSUPA FDD5 Channel=low



Date: 5.APR.2018 14:27:30

eFDD5 QPSK 10MHz Channel=mid

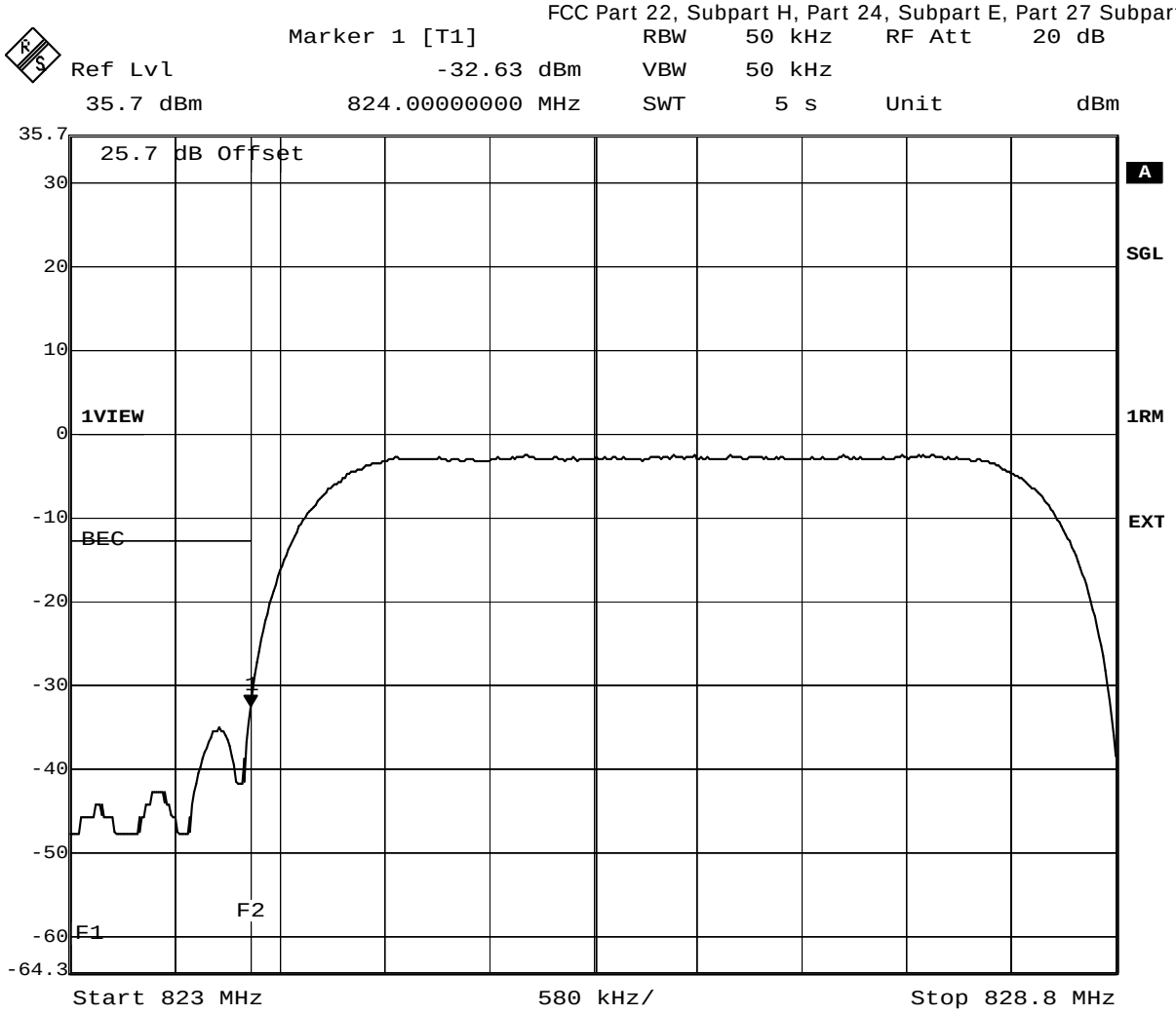
3.5.6 22.6 Band edge compliance §2.1053, §22.917

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:48
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

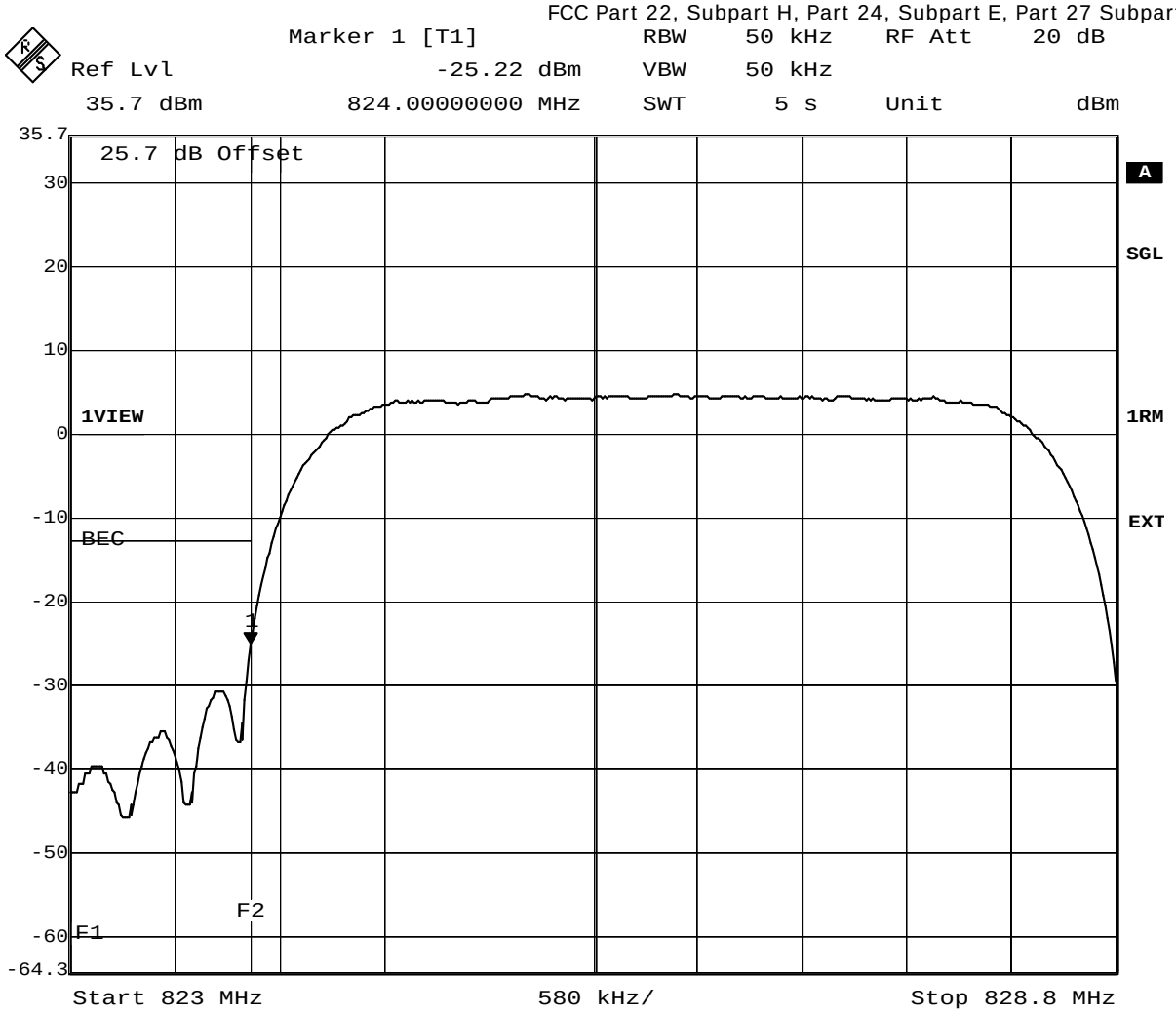
Detailed Results:

Radio Technology	Channel	Nominal BW	Res-source Blocks	Peak [dBm]	Average [dBm]	RMS [dBm]
FDD V	low	5	-	-24.4	-33.84	-32.63
FDD V	high	5	-	-27.82	-38.28	-36.94
FDD V HSDPA Subtest 1	low	5	-	-17.99	-26.42	-25.22
FDD V HSDPA Subtest 1	high	5	-	-18.2	-28.98	-27.82
FDD V HSUPA Subtest 1	low	5	-	-18.57	-27.2	-26.42
FDD V HSUPA Subtest 1	high	5	-	-18.35	-28.04	-27.2
FDD V HSUPA Subtest 5	low	5	-	-18.39	-27.4	-26.61
FDD V HSUPA Subtest 5	high	5	-	-18.94	-28.27	-27.61
eFDD 5 QPSK	low	1.4	6	-18.45	-30.13	-29.28
eFDD 5 QPSK	high	1.4	6	-15.74	-25.46	-21.94
eFDD 5 16QAM	low	1.4	6	-22.47	-31.57	-29.24
eFDD 5 16QAM	high	1.4	6	-19.57	-27.2	-26.42
eFDD 5 QPSK	low	3	15	-17.04	-32.11	-28.62
eFDD 5 QPSK	high	3	15	-18.64	-26.8	-24.9
eFDD 5 16QAM	low	3	15	-19.05	-33.42	-30.32
eFDD 5 16QAM	high	3	15	-18.51	-28.27	-27
eFDD 5 QPSK	low	5	25	-16.47	-33.42	-30.04
eFDD 5 QPSK	high	5	25	-19.44	-32.63	-27.2
eFDD 5 16QAM	low	5	25	-16.28	-34.76	-30.62
eFDD 5 16QAM	high	5	25	-19.7	-31.57	-30.32
eFDD 5 QPSK	low	10	50	-18.33	-34.29	-32.63
eFDD 5 QPSK	high	10	50	-17.68	-34.29	-32.63
eFDD 5 16QAM	low	10	50	-18.57	-36.34	-33.42
eFDD 5 16QAM	high	10	50	-18.24	-34.29	-32.26



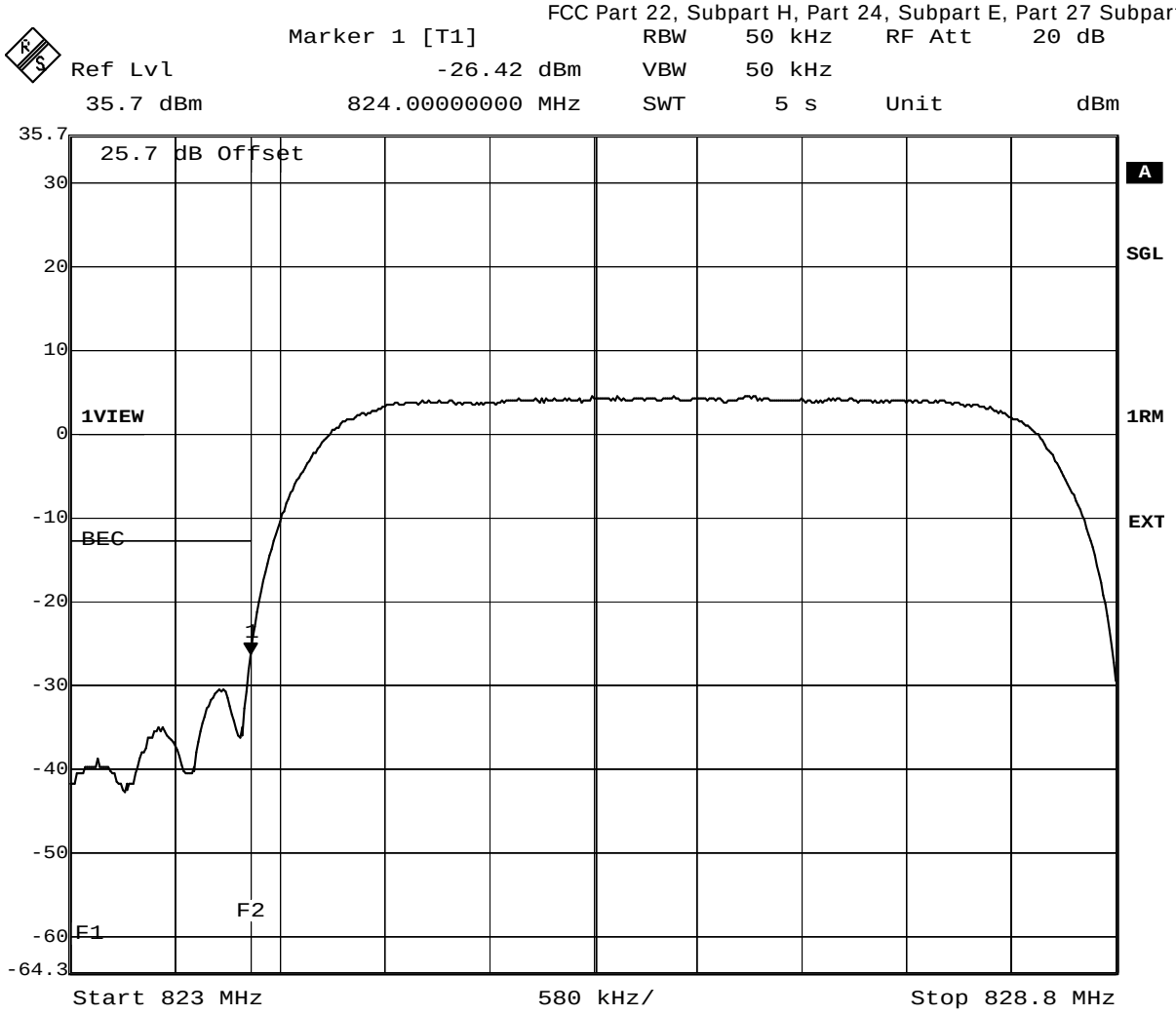
Date: 5.APR.2018 13:14:03

WCDMA FDD5 Channel=low



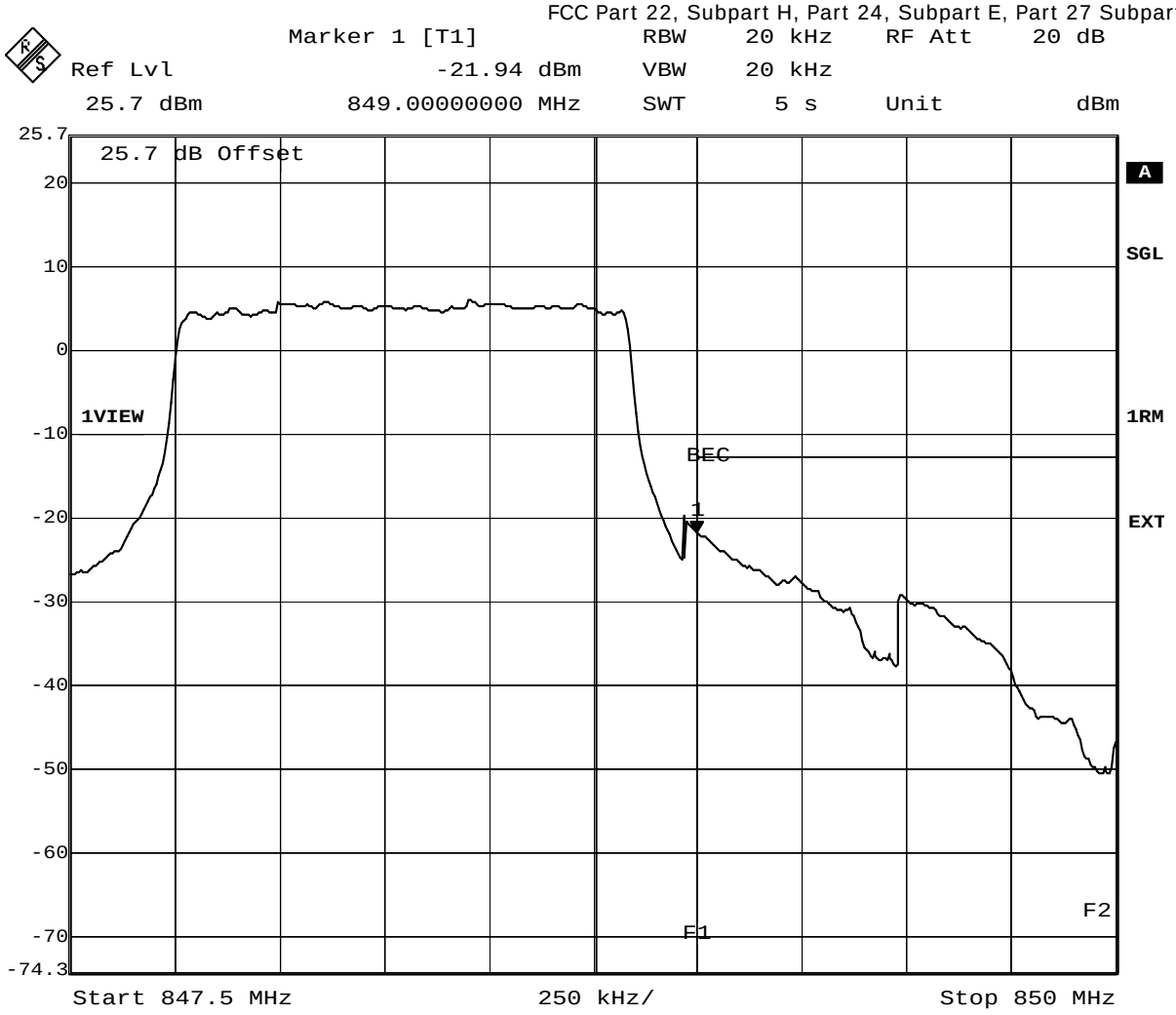
Date: 29.MAR.2018 13:02:53

HSDPA FDD5 Channel=low



Date: 29.MAR.2018 10:01:40

HSUPA FDD5 Channel=low



Date: 13.APR.2018 11:52:04

eFDD5 QPSK 1.4MHz RB6 Channel=high

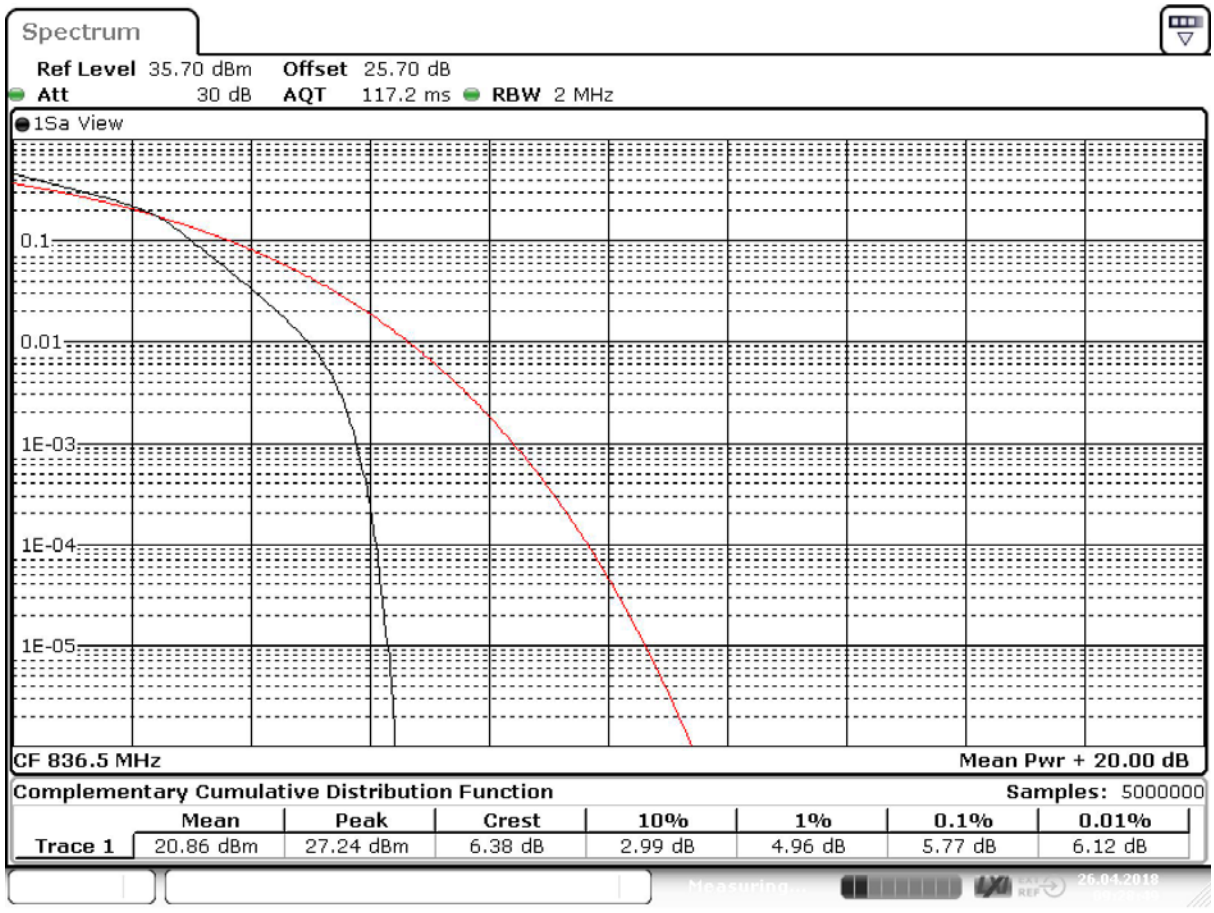
3.5.7 22.7 Peak-to-Average Ratio Summary §2.1046

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:20
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak to Average Ratio [dB]	Limit (IC) [dB]		
FDD V	low	-	5	5.92	13		
FDD V	mid	-	5	5.76	13		
FDD V	high	-	5	5.7	13		
FDD V HSUPA Subtest 1	low	-	5	5.65	13		
FDD V HSUPA Subtest 1	mid	-	5	5.52	13		
FDD V HSUPA Subtest 1	high	-	5	5.66	13		
FDD V HSUPA Subtest 5	low	-	5	7.67	13		
FDD V HSUPA Subtest 5	mid	-	5	7.44	13		
FDD V HSUPA Subtest 5	high	-	5	8.31	13		
FDD V HSDPA Subtest 1	low	-	5	7.61	13		
FDD V HSDPA Subtest 1	mid	-	5	7.29	13		
FDD V HSDPA Subtest 1	high	-	5	7.99	13		
eFDD 5 QPSK	low	6	1.4	4.78	13		
eFDD 5 QPSK	mid	6	1.4	4.84	13		
eFDD 5 QPSK	high	6	1.4	4.72	13		
eFDD 5 16QAM	low	6	1.4	5.59	13		
eFDD 5 16QAM	mid	6	1.4	5.77	13		
eFDD 5 16QAM	high	6	1.4	5.77	13		



Date: 26.APR.2018 09:28:49

eFDD5 16QAM 1.4MHz RB6 Channel=mid

3.5.8 24.1 RF Power Output §2.1046, §24.232

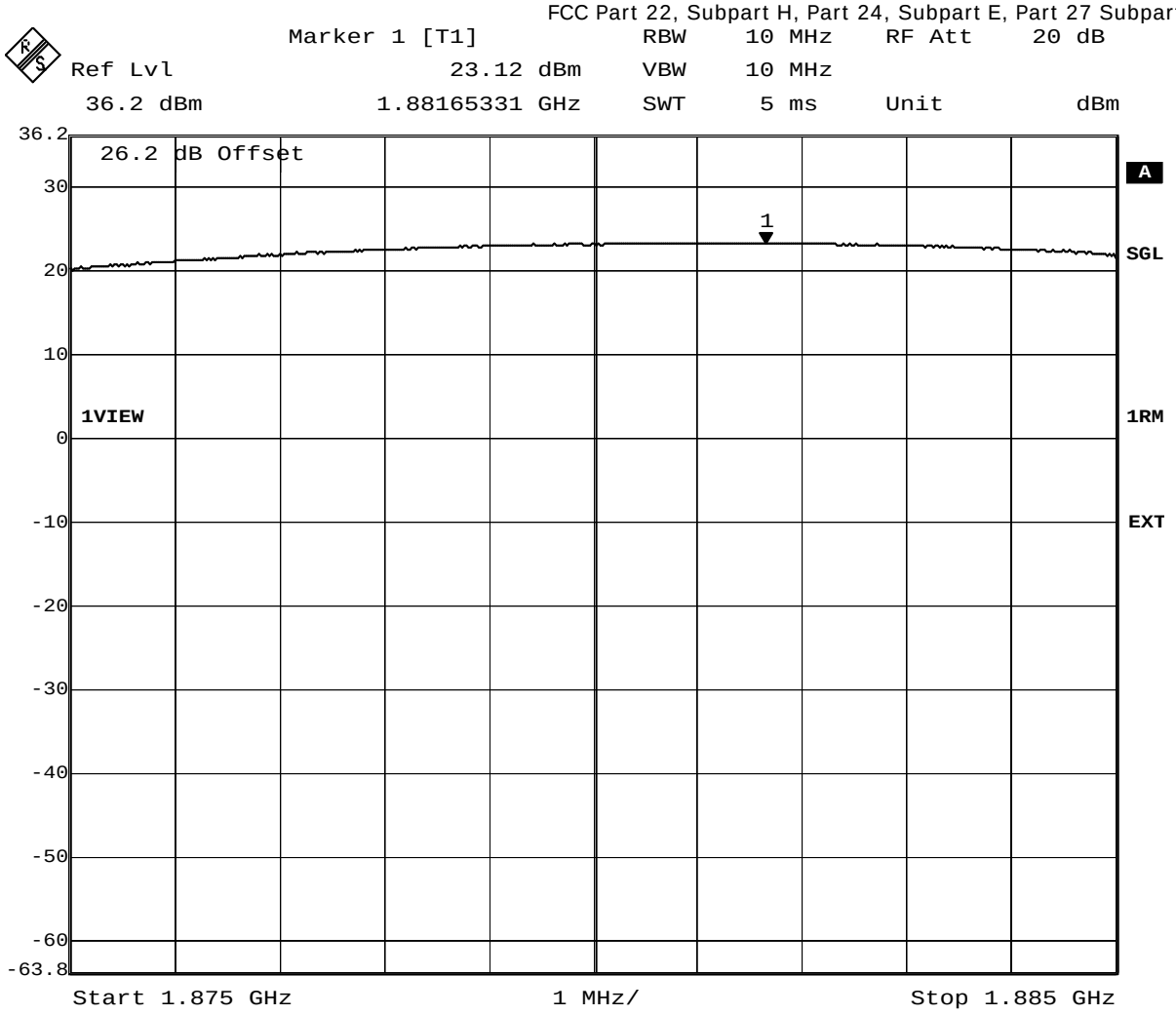
Test: 24.1; RF Power Output Summary §2.1046, §24.232

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 10:07
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

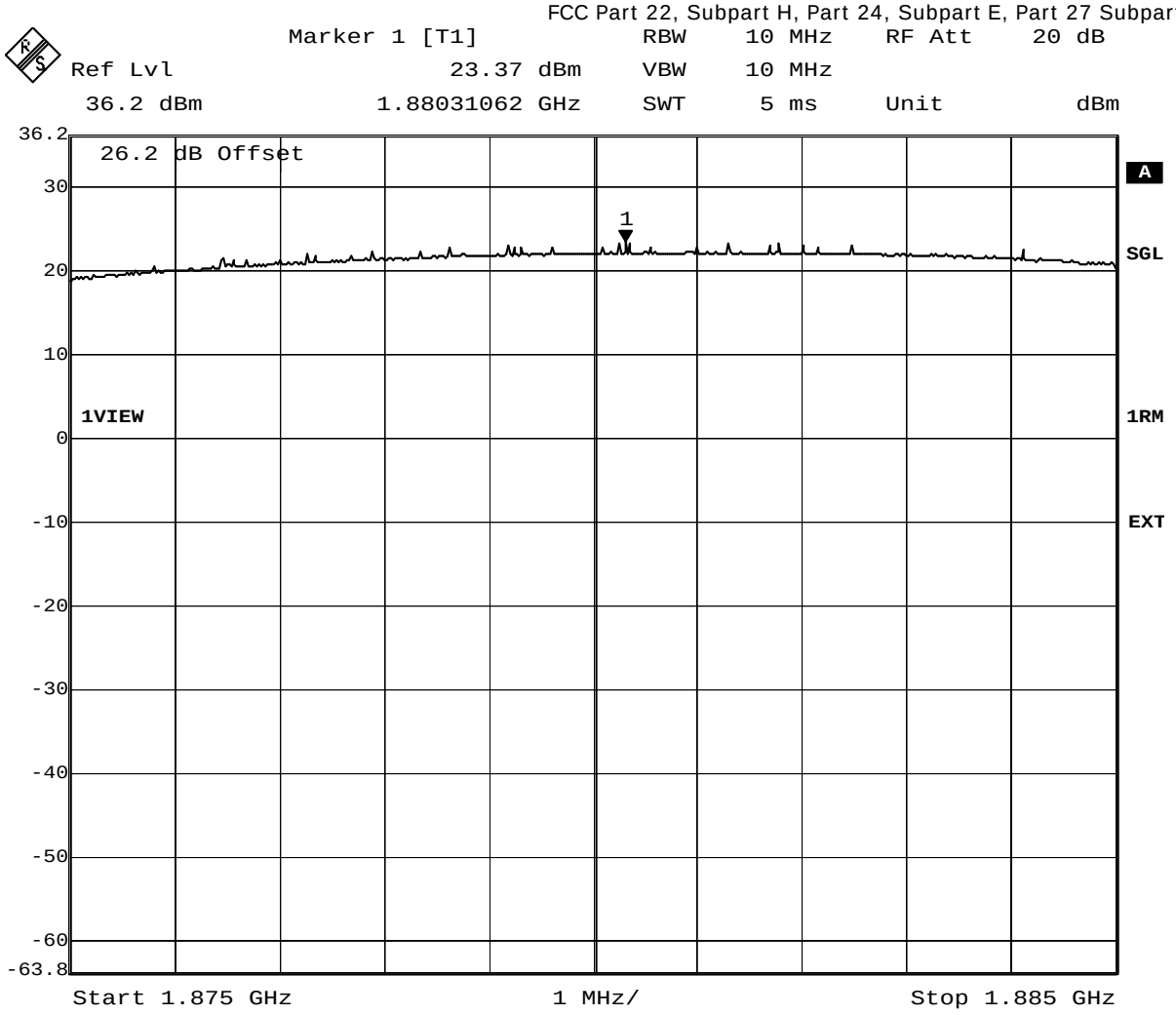
Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
FDD II	low	-	5	28.27	22.82	23.07
FDD II	mid	-	5	28.39	22.92	23.12
FDD II	high	-	5	27.99	22.26	22.46
FDD II HSDPA Subtest 1	low	-	5	27.47	22.03	22.24
FDD II HSDPA Subtest 1	mid	-	5	27.47	22.15	22.28
FDD II HSDPA Subtest 1	high	-	5	27.47	21.84	21.93
FDD II HSDPA Subtest 2	low	-	5	28.64	22.56	23.17
FDD II HSDPA Subtest 2	mid	-	5	29.17	22.66	23.37
FDD II HSDPA Subtest 2	high	-	5	28.27	20.91	21.51
FDD II HSDPA Subtest 3	low	-	5	27.99	21.05	21.85
FDD II HSDPA Subtest 3	mid	-	5	28.14	21.63	22.22
FDD II HSDPA Subtest 3	high	-	5	27.99	20.77	21.54
FDD II HSDPA Subtest 4	low	-	5	28.14	20.89	21.86
FDD II HSDPA Subtest 4	mid	-	5	28.14	21.25	22
FDD II HSDPA Subtest 4	high	-	5	28.39	20.68	21.57
FDD II HSUPA Subtest 1	low	-	5	29.41	21.91	22.34
FDD II HSUPA Subtest 1	mid	-	5	29.02	21.72	22.12
FDD II HSUPA Subtest 1	high	-	5	28.64	21.02	21.52
FDD II HSUPA Subtest 2	low	-	5	29.17	20.66	21.34
FDD II HSUPA Subtest 2	mid	-	5	28.14	20.51	21.21
FDD II HSUPA Subtest 2	high	-	5	28.39	20.2	20.86
FDD II HSUPA Subtest 3	low	-	5	28.9	20.41	21.06
FDD II HSUPA Subtest 3	mid	-	5	29.02	20.72	21.37
FDD II HSUPA Subtest 3	high	-	5	29.17	21.03	21.55
FDD II HSUPA Subtest 4	low	-	5	29.29	21.14	21.63
FDD II HSUPA Subtest 4	mid	-	5	29.41	21.44	22.07
FDD II HSUPA Subtest 4	high	-	5	28.64	19.83	20.7
FDD II HSUPA Subtest 5	low	-	5	28.9	22.07	22.23
FDD II HSUPA Subtest 5	mid	-	5	28.9	21.66	22.01
FDD II HSUPA Subtest 5	high	-	5	28.9	21.29	21.65
eFDD 2 QPSK	low	1	1.4	-	-	22.32
eFDD 2 QPSK	low	3	1.4	-	-	20.3
eFDD 2 QPSK	low	6	1.4	-	-	20.95
eFDD 2 QPSK	mid	1	1.4	-	-	21.67
eFDD 2 QPSK	mid	3	1.4	-	-	21.21
eFDD 2 QPSK	mid	6	1.4	-	-	21.19
eFDD 2 QPSK	high	1	1.4	-	-	19.99
eFDD 2 QPSK	high	3	1.4	-	-	19.38
eFDD 2 QPSK	high	6	1.4	-	-	19.55
eFDD 2 16QAM	low	1	1.4	-	-	21.07
eFDD 2 16QAM	low	6	1.4	-	-	20.5
eFDD 2 16QAM	mid	1	1.4	-	-	20.85
eFDD 2 16QAM	mid	6	1.4	-	-	20.27
eFDD 2 16QAM	high	1	1.4	-	-	19.1
eFDD 2 16QAM	high	6	1.4	-	-	18.97
eFDD 2 QPSK	low	1	3	-	-	22.43
eFDD 2 QPSK	low	15	3	-	-	21
eFDD 2 QPSK	mid	1	3	-	-	22.13
eFDD 2 QPSK	mid	15	3	-	-	21.22
eFDD 2 QPSK	high	1	3	-	-	20.28
eFDD 2 QPSK	high	15	3	-	-	19.44
eFDD 2 16QAM	low	1	3	-	-	21.73
eFDD 2 16QAM	low	15	3	-	-	20.36
eFDD 2 16QAM	mid	1	3	-	-	21.18
eFDD 2 16QAM	mid	15	3	-	-	20.55
eFDD 2 16QAM	high	1	3	-	-	19.58
eFDD 2 16QAM	high	15	3	-	-	18.34

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
eFDD 2 QPSK	low	1	5	-	-	22.26
eFDD 2 QPSK	low	12	5	-	-	21.07
eFDD 2 QPSK	low	25	5	-	-	20.89
eFDD 2 QPSK	mid	1	5	-	-	22.06
eFDD 2 QPSK	mid	12	5	-	-	21.13
eFDD 2 QPSK	mid	25	5	-	-	21.23
eFDD 2 QPSK	high	1	5	-	-	20.4
eFDD 2 QPSK	high	12	5	-	-	19.11
eFDD 2 QPSK	high	25	5	-	-	19.32
eFDD 2 16QAM	low	1	5	-	-	21.04
eFDD 2 16QAM	low	25	5	-	-	20.21
eFDD 2 16QAM	mid	1	5	-	-	21.48
eFDD 2 16QAM	mid	25	5	-	-	20.34
eFDD 2 16QAM	high	1	5	-	-	19.91
eFDD 2 16QAM	high	25	5	-	-	18.33
eFDD 2 QPSK	low	1	10	-	-	22.51
eFDD 2 QPSK	low	50	10	-	-	21.11
eFDD 2 QPSK	mid	1	10	-	-	22.43
eFDD 2 QPSK	mid	50	10	-	-	21.46
eFDD 2 QPSK	high	1	10	-	-	20.6
eFDD 2 QPSK	high	50	10	-	-	19.4
eFDD 2 16QAM	low	1	10	-	-	21.88
eFDD 2 16QAM	low	27	10	-	-	20.8
eFDD 2 16QAM	mid	1	10	-	-	21.49
eFDD 2 16QAM	mid	50	10	-	-	20.74
eFDD 2 16QAM	high	1	10	-	-	19.75
eFDD 2 16QAM	high	50	10	-	-	18.51
eFDD 2 QPSK	low	1	15	-	-	22.4
eFDD 2 QPSK	low	36	15	-	-	21.49
eFDD 2 QPSK	low	75	15	-	-	21.23
eFDD 2 QPSK	mid	1	15	-	-	22.28
eFDD 2 QPSK	mid	36	15	-	-	21.46
eFDD 2 QPSK	mid	75	15	-	-	21.82
eFDD 2 QPSK	high	1	15	-	-	20.46
eFDD 2 QPSK	high	36	15	-	-	19.64
eFDD 2 QPSK	high	75	15	-	-	20.04
eFDD 2 16QAM	low	1	15	-	-	21.98
eFDD 2 16QAM	low	27	15	-	-	21.08
eFDD 2 16QAM	mid	1	15	-	-	21.3
eFDD 2 16QAM	mid	27	15	-	-	20.65
eFDD 2 16QAM	high	1	15	-	-	19.63
eFDD 2 16QAM	high	27	15	-	-	18.99
eFDD 2 QPSK	low	1	20	-	-	22.6
eFDD 2 QPSK	low	100	20	-	-	21.19
eFDD 2 QPSK	mid	1	20	-	-	22.37
eFDD 2 QPSK	mid	100	20	-	-	21.83
eFDD 2 QPSK	high	1	20	-	-	20.47
eFDD 2 QPSK	high	100	20	-	-	20.43
eFDD 2 16QAM	low	1	20	-	-	22.2
eFDD 2 16QAM	low	27	20	-	-	21.12
eFDD 2 16QAM	mid	1	20	-	-	21.31
eFDD 2 16QAM	mid	27	20	-	-	20.47
eFDD 2 16QAM	high	1	20	-	-	19.38
eFDD 2 16QAM	high	27	20	-	-	20.03



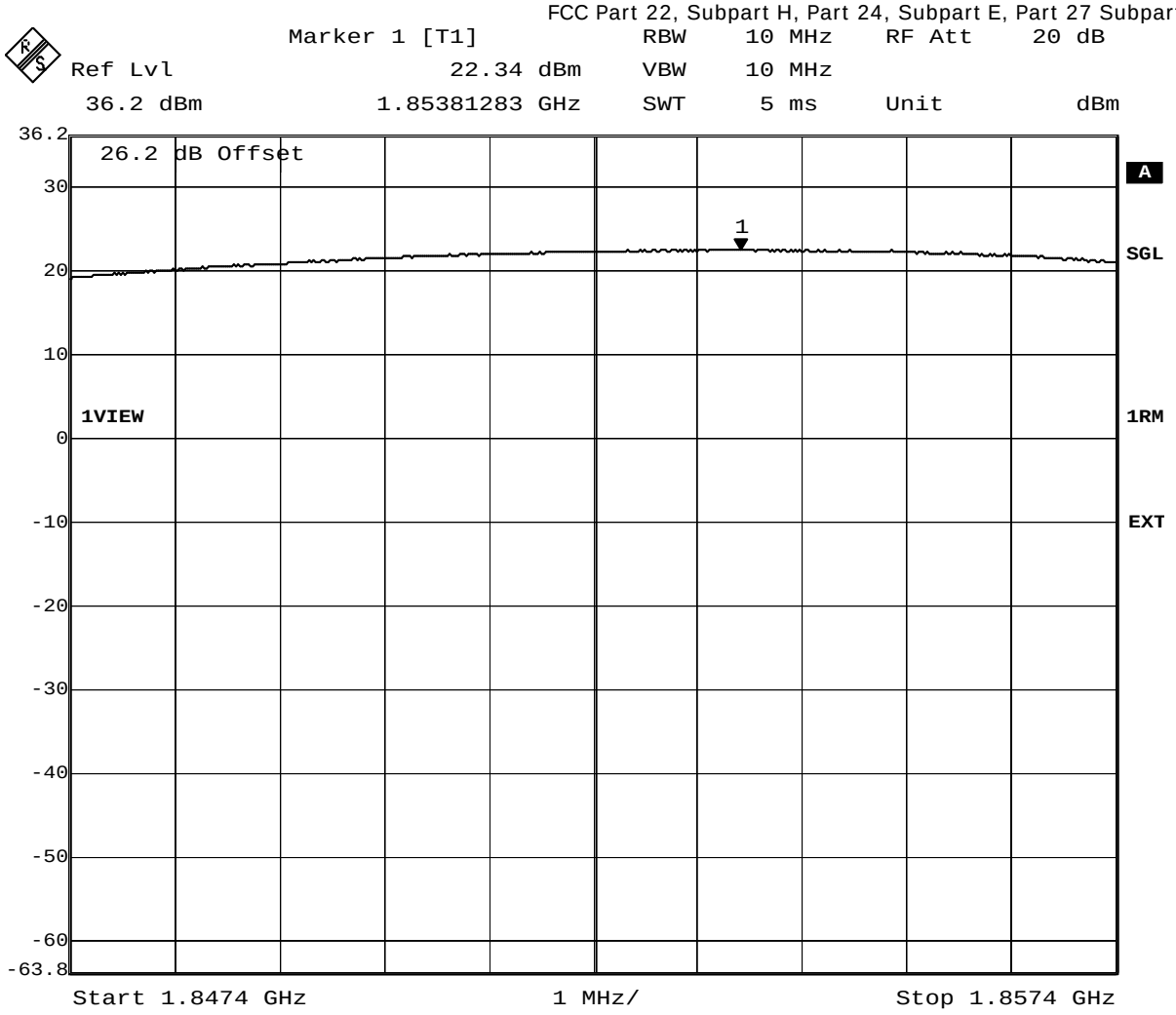
Date: 29.MAR.2018 09:37:07

WCDMA FDD2 Channel=mid

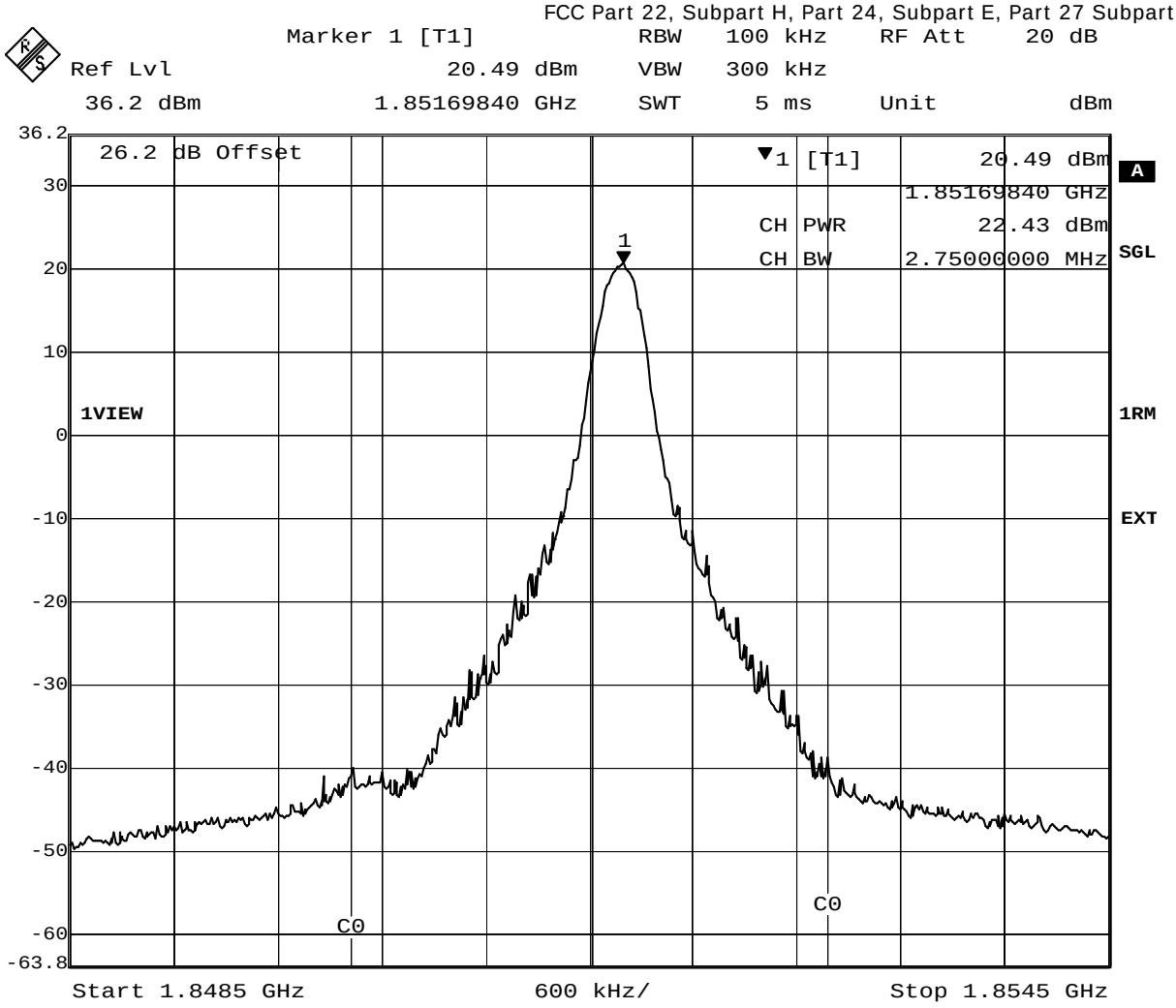


Date: 28.MAR.2018 15:41:04

HSDPA FDD2 Channel=mid



HSUPA FDD2 Channel=low



Date: 12.APR.2018 12:43:51

eFDD2 QPSK 3MHz RB1 Channel=low

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.:	S01_AD01
Date of Test:	2018/04/19 10:10
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	-4	passed
-30	5			-1	-5	passed
-30	10			0	4	passed
-20	0	normal	4700	0	5	passed
-20	5			1	3	passed
-20	10			1	3	passed
-10	0	normal	4700	0	-3	passed
-10	5			-1	-2	passed
-10	10			1	4	passed
0	0	normal	4700	1	4	passed
0	5			-2	-3	passed
0	10			-2	-4	passed
10	0	normal	4700	1	4	passed
10	5			1	3	passed
10	10			2	4	passed
20	0	low	4700	-1	-4	passed
20	5			-1	-4	passed
20	10			1	5	passed
20	0	normal = high [1)]	4700	0	-2	passed
20	5			-1	-3	passed
20	10			-1	2	passed
20	0	high	4700	0	-5	passed
20	5			-1	3	passed
20	10			1	3	passed
30	0	normal	4700	0	3	passed
30	5			0	2	passed
30	10			0	-3	passed
40	0	normal	4700	0	-5	passed
40	5			0	4	passed
40	10			-1	-2	passed
50	0	normal	4700	6	8	passed
50	5			6	9	passed
50	10			7	9	passed

WCDMA FDD2

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

HSDPA FDD2

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	0	-6	passed
-30	5			0	-7	passed
-30	10			1	-4	passed
-20	0	normal	4700	0	-6	passed
-20	5			2	-2	passed
-20	10			2	-4	passed
-10	0	normal	4700	1	-6	passed
-10	5			0	-5	passed
-10	10			0	0	passed
0	0	normal	4700	1	-6	passed
0	5			0	-3	passed
0	10			2	-5	passed
10	0	normal	4700	1	-1	passed
10	5			1	-3	passed
10	10			0	0	passed
20	0	low	4700	2	3	passed
20	5			1	-5	passed
20	10			1	-4	passed
20	0	normal = high [1)]	4700	1	-1	passed
20	5			0	-3	passed
20	10			0	-5	passed
20	0	high	4700	1	-2	passed
20	5			2	-6	passed
20	10			1	-4	passed
30	0	normal	4700	0	-4	passed
30	5			1	-3	passed
30	10			1	-1	passed
40	0	normal	4700	2	0	passed
40	5			0	0	passed
40	10			1	-2	passed
50	0	normal	4700	0	3	passed
50	5			0	-4	passed
50	10			2	-2	passed

HSUPA FDD2

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	-0.3	3.6	passed
-30	5			-0.5	3.9	passed
-30	10			-0.6	3.9	passed
-20	0	normal	4700	1.3	-2.6	passed
-20	5			0.6	-2.4	passed
-20	10			-0.5	-2.6	passed
-10	0	normal	4700	-0.4	3	passed
-10	5			0.9	3.4	passed
-10	10			1.4	3.9	passed
0	0	normal	4700	1.6	7.2	passed
0	5			2	4	passed
0	10			3.6	5.6	passed
10	0	normal	4700	-0.4	5.8	passed
10	5			-1.3	4.6	passed
10	10			-2.6	4.7	passed
20	0	low	4700	-2.3	3.9	passed
20	5			3.1	-3.6	passed
20	10			-2.5	-3.3	passed
20	0	normal = high [1)]	4700	-3.6	-2.8	passed
20	5			-1.3	-2.4	passed
20	10			-2.6	-3.1	passed
20	0	high	4700	0.3	3.9	passed
20	5			0.4	3.7	passed
20	10			1.9	3.8	passed
30	0	normal	4700	-2.3	2.4	passed
30	5			-3.1	-2.7	passed
30	10			-0.2	-2.2	passed
40	0	normal	4700	-1.3	-3.6	passed
40	5			-0.1	3.9	passed
40	10			-0.9	3.4	passed
50	0	normal	4700	1.3	3.2	passed
50	5			-0.5	-4.2	passed
50	10			2.2	-5.6	passed

LTE 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.:	S01_AD01
Date of Test:	2018/04/19 10:05
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

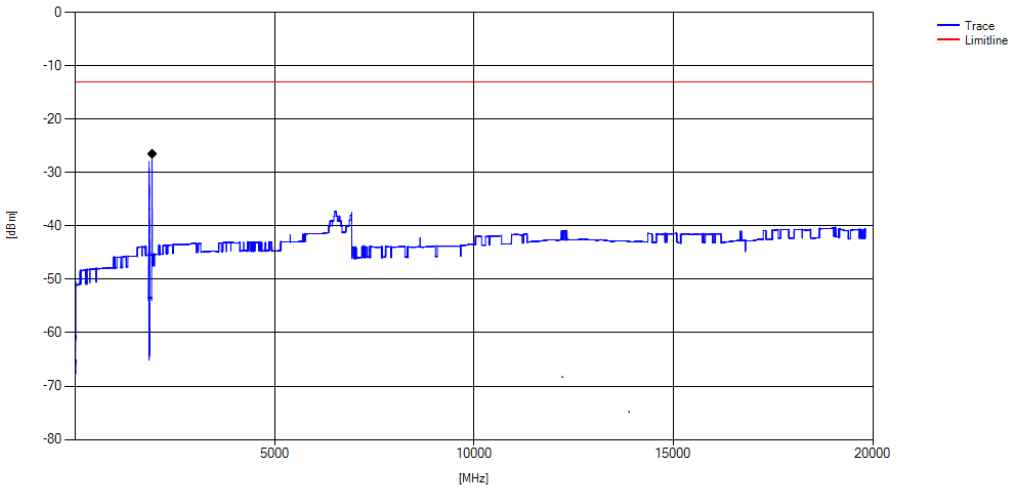
Detailed Results:

Radio Technology	CH	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

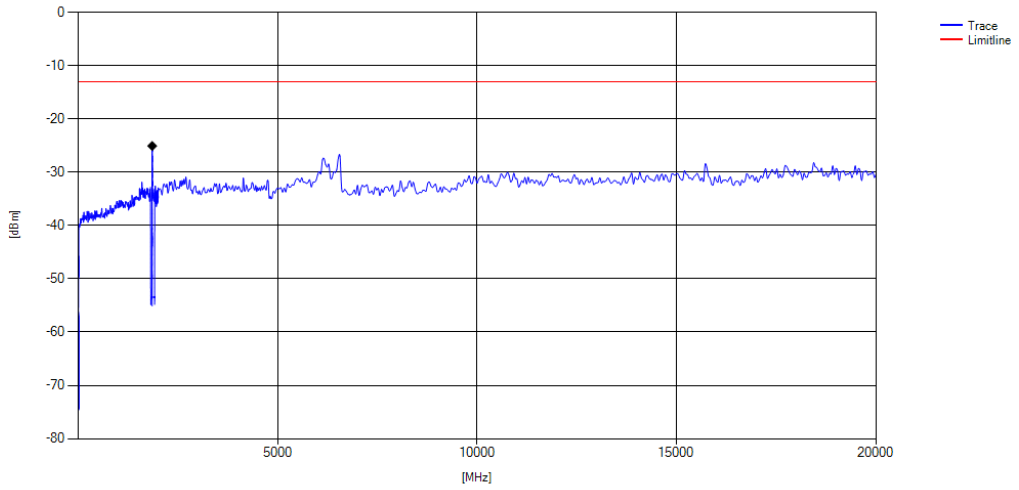
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSDPA FDD2	low	rms	maxhold	50	1849.8	-25.1	-13	12.1
HSDPA FDD2	mid	-	-	-			-13	>20
HSDPA FDD2	high	rms	maxhold	50	1910.1	-25.58	-13	12.58

Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSUPA FDD2	low	rms	maxhold	50	1849.8	-25.62	-13	12.62
HSUPA FDD2	mid	-	-	-			-13	>20
HSUPA FDD2	high	rms	maxhold	50	1910	-27.87	-13	14.87

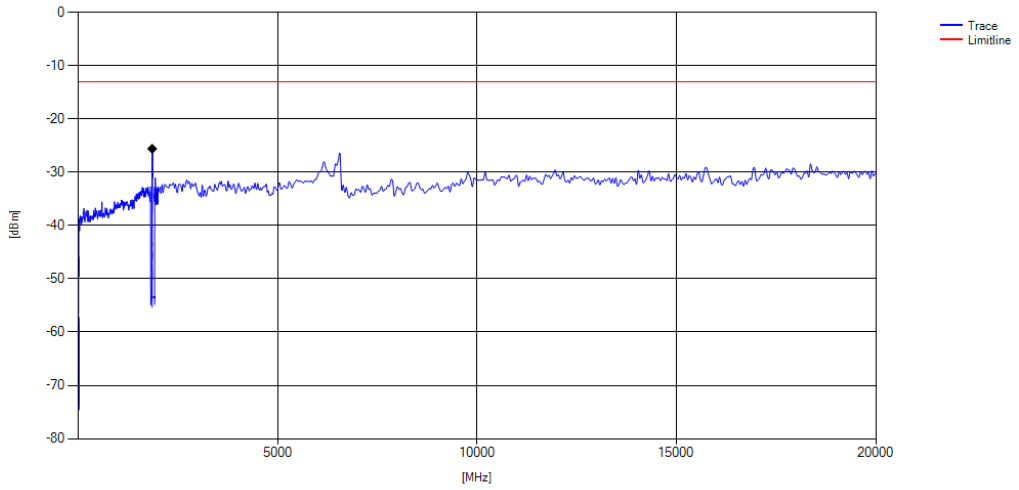
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD2	low	rms	maxhold	5	1849.5	-29.26	-23	6.26
eFDD2	mid	-	-	-			-23	>20
eFDD2	high	rms	maxhold	5	1910.3	-31.17	-23	8.17



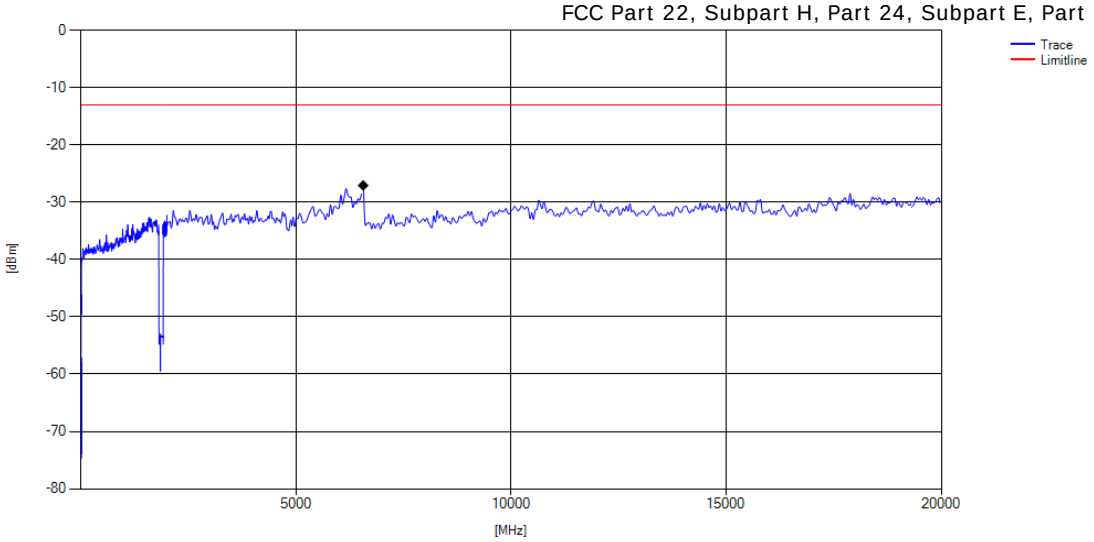
eFDD2_QPSK_CH-low



HSDPA_FDD2_CH-low



HSUPA_FDD2_CH-low



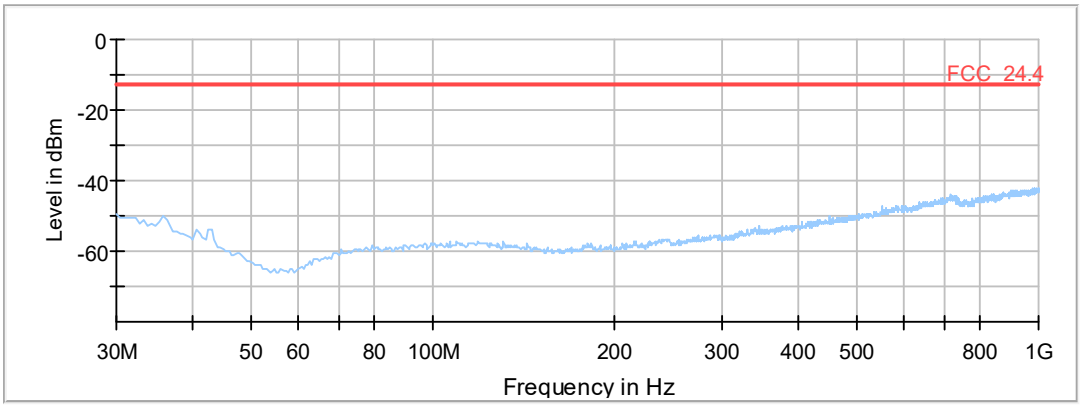
WCDMa_FDD2_CH-mid

3.5.11 24.4 Field strength of spurious radiation §2.1053, §24.238

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

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:50
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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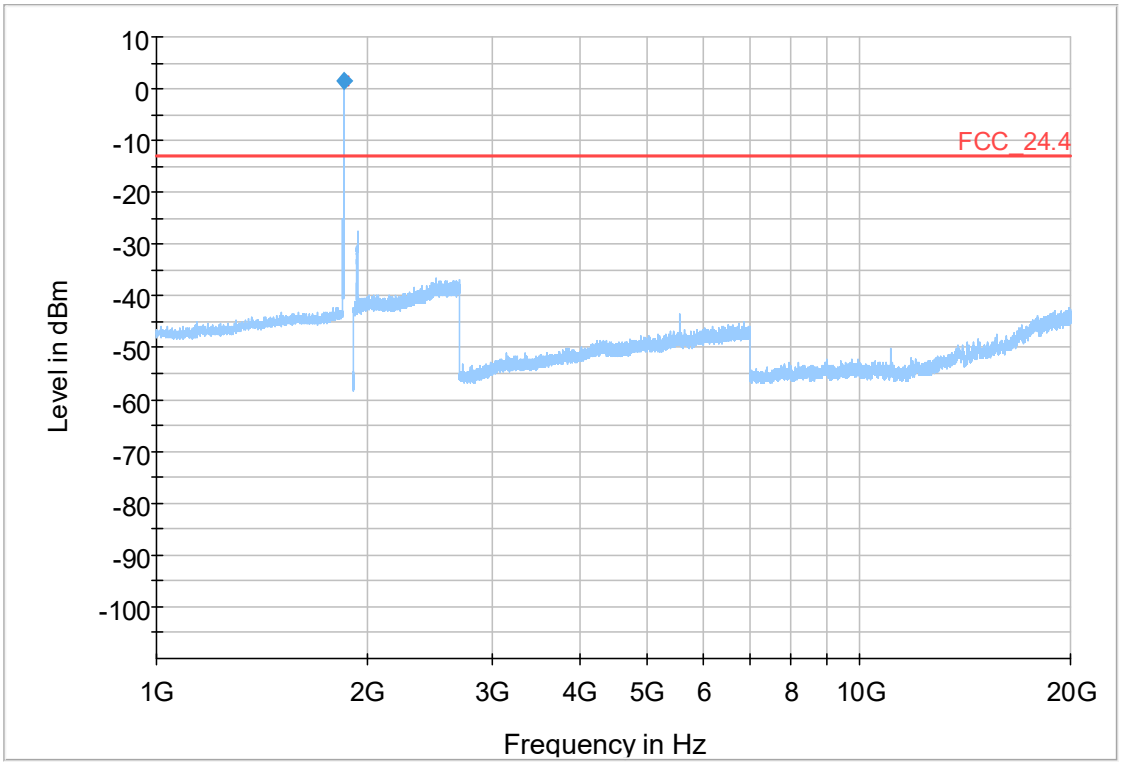
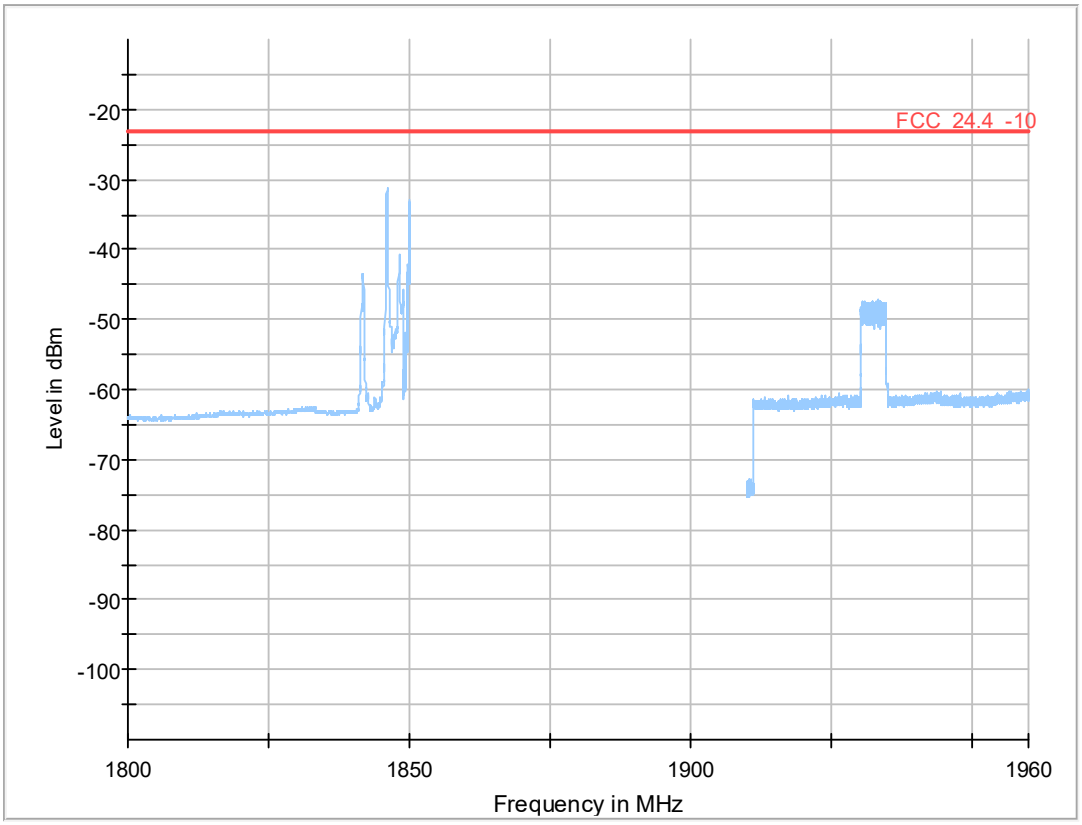


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1849.000000	1.58	-13.00	-14.58	1000.	1000.000	150.0	V	0.0	90.0	-65

Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1849.000000	1.58	-13.00	-14.58	1000.	1000.000	150.0	V	0.0	90.0	-65



Critical_Freqs

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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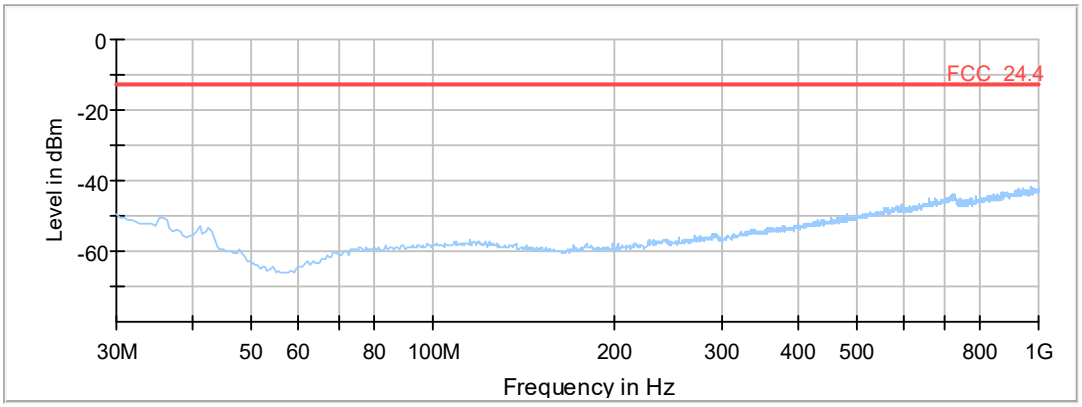
remeasurement at carrier

Test: 24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 18900, Frequency = 1880MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:54
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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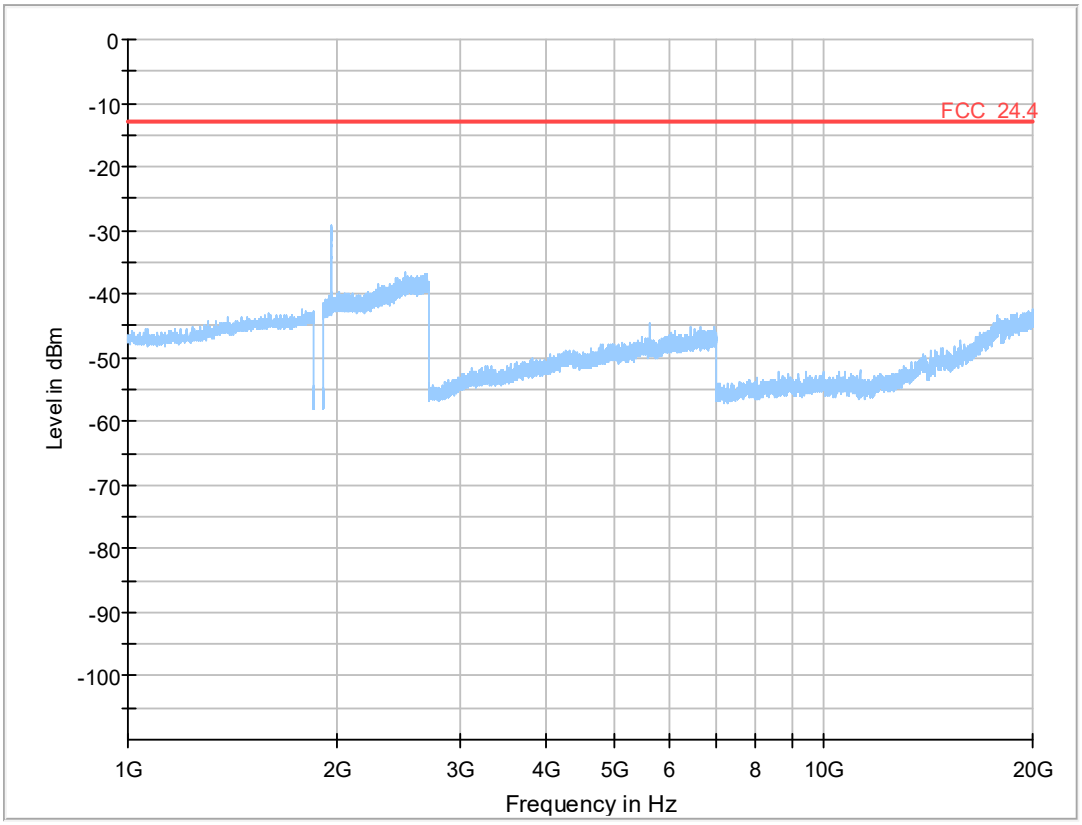

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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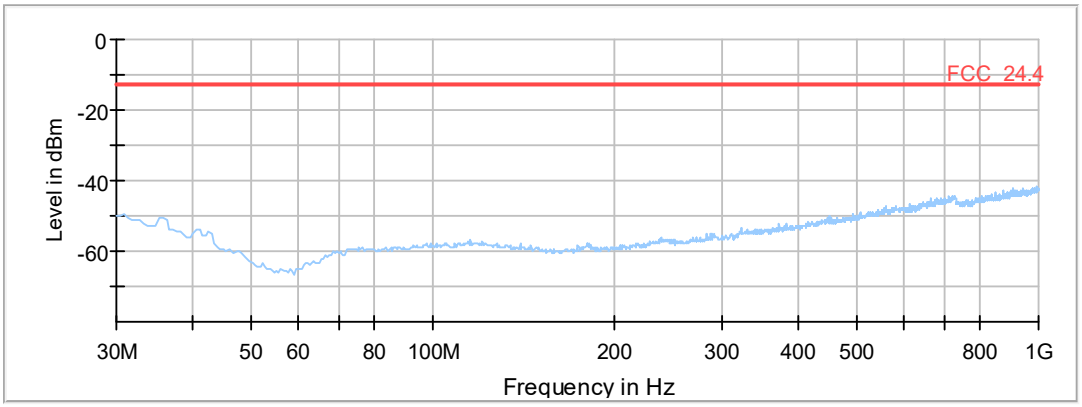
Test: 24.4; Frequency Band = eFDD2, Mode = QPSK 5MHz, Channel = 19175, Frequency = 1907.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:56
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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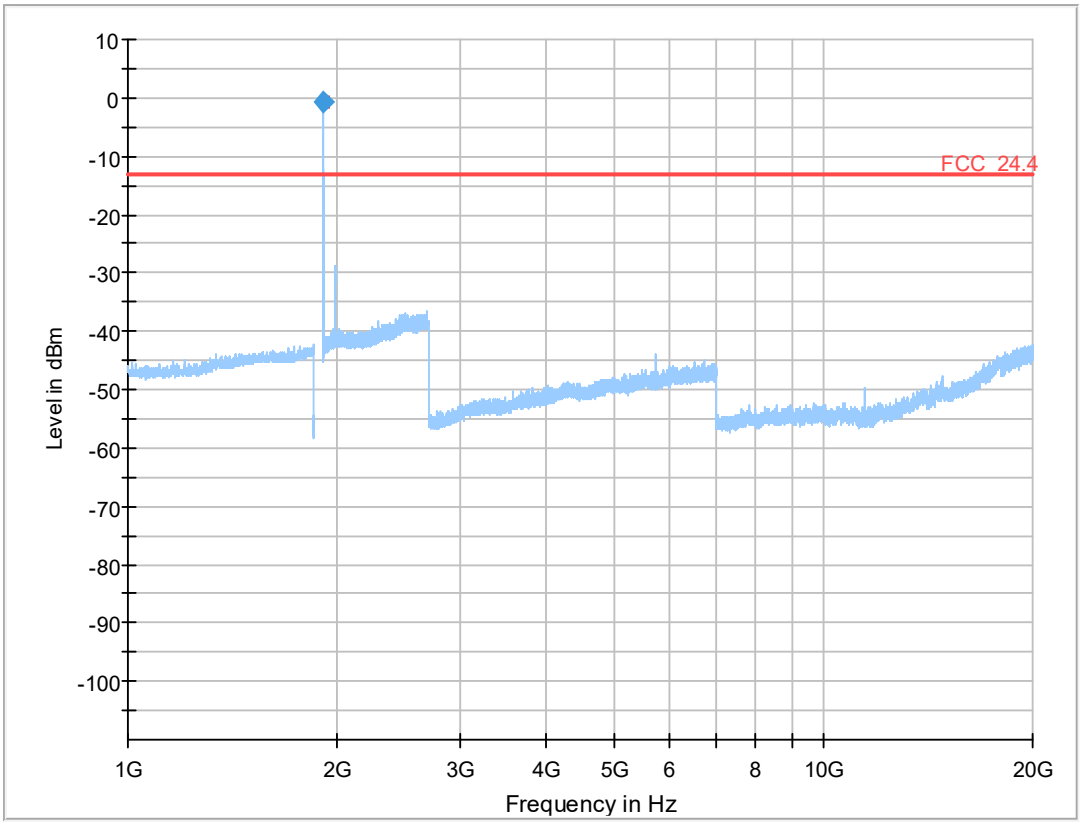
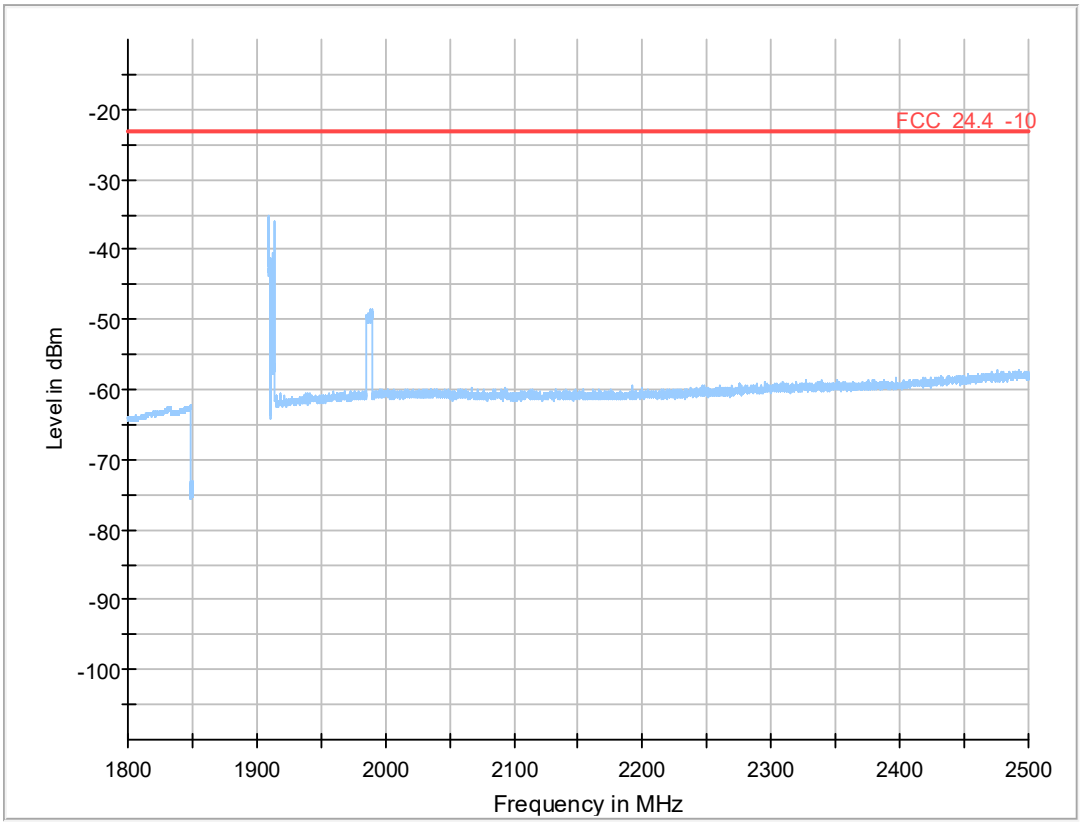


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1911.000000	-0.71	-13.00	-12.29	3000.0	1000.000	150.0	V	45.0	0.0	-65

Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1911.000000	-0.71	-13.00	-12.29	3000.0	1000.000	150.0	V	45.0	0.0	-65



Critical_Freqs

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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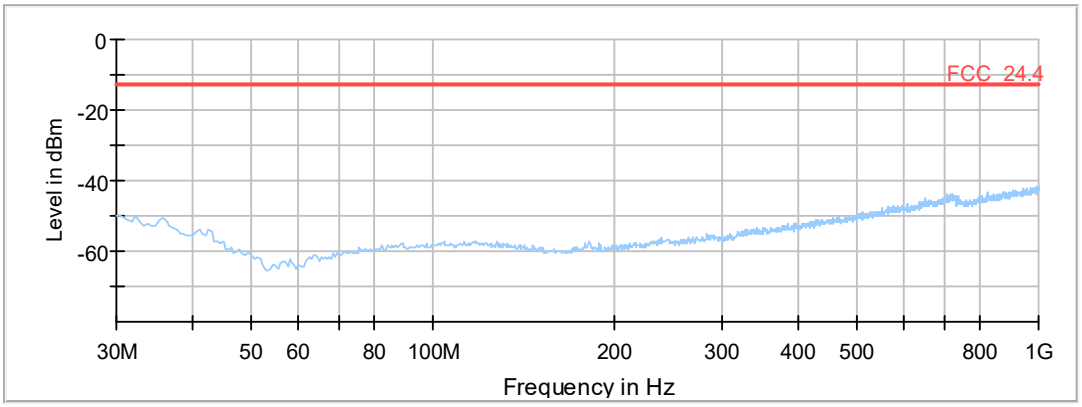
remeasurement at carrier

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

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:23
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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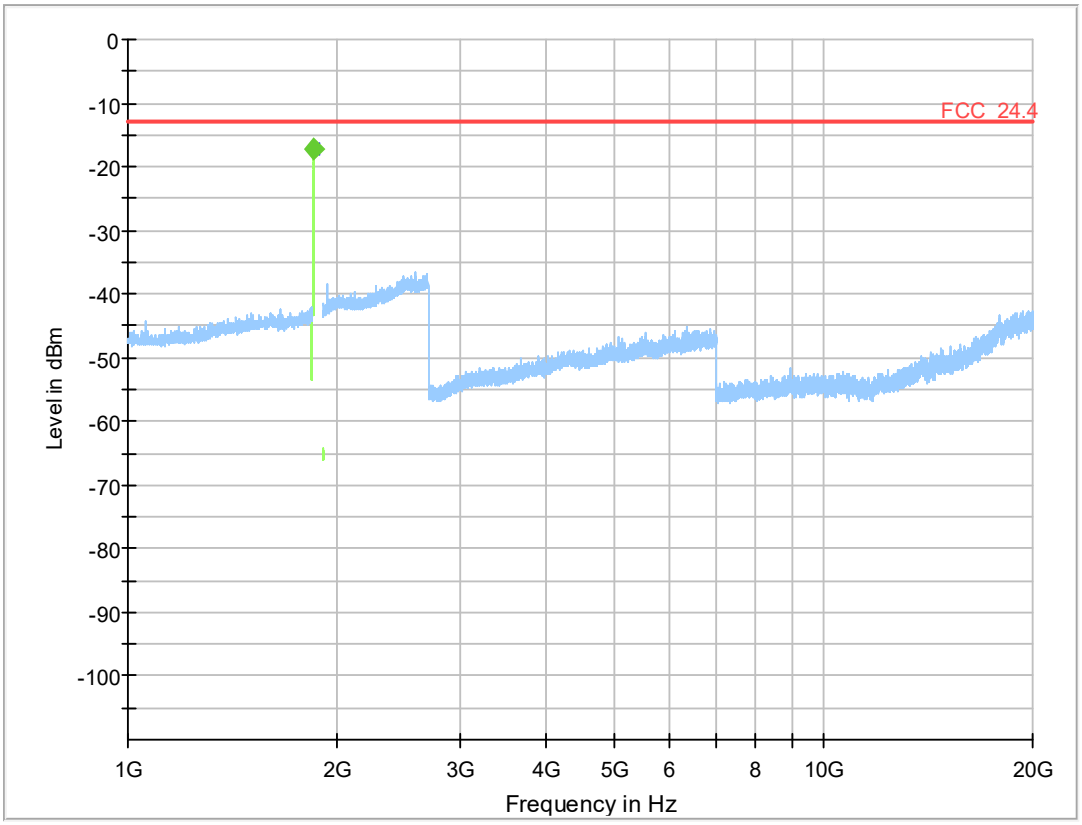


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1849.000000	---	---	---	1000.0	1000.000	150.0	V	0.0	90.0	-65

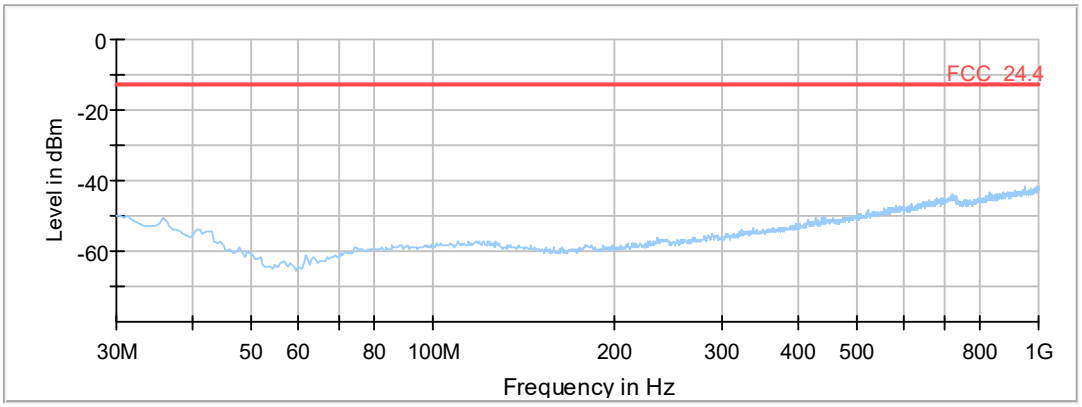
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1849.000000	---	---	---	1000.0	1000.000	150.0	V	0.0	90.0	-65

Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:24
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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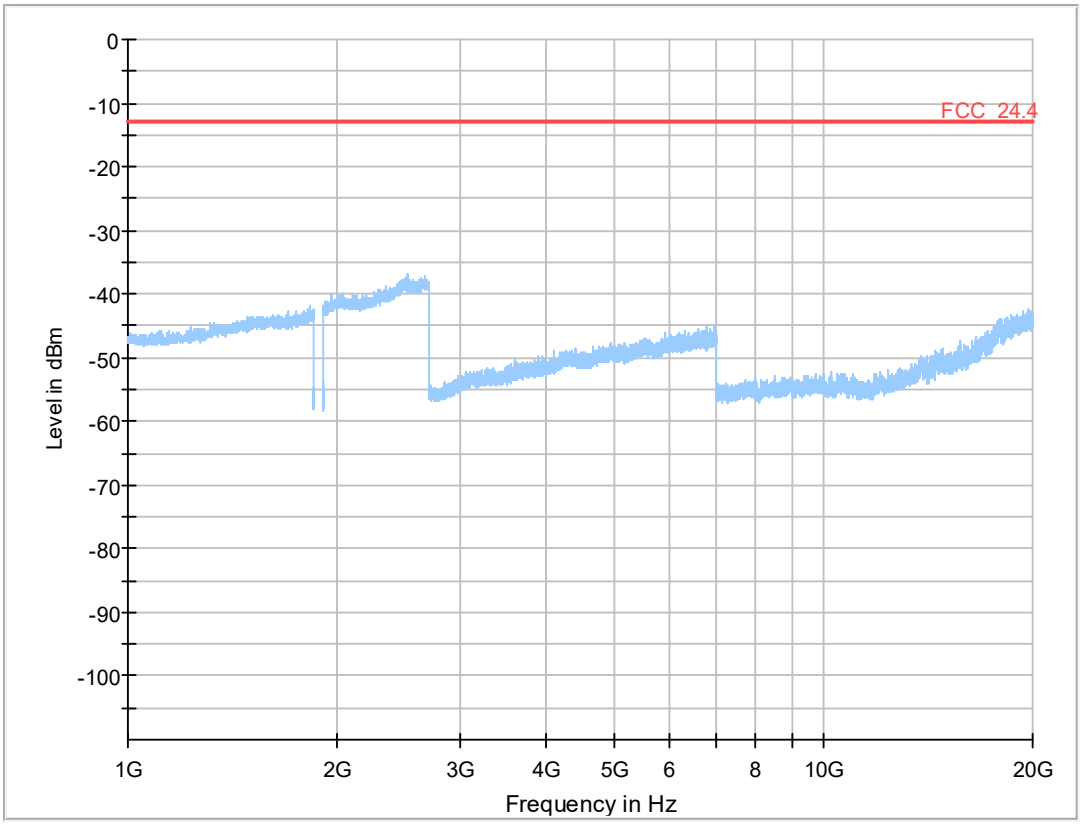

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

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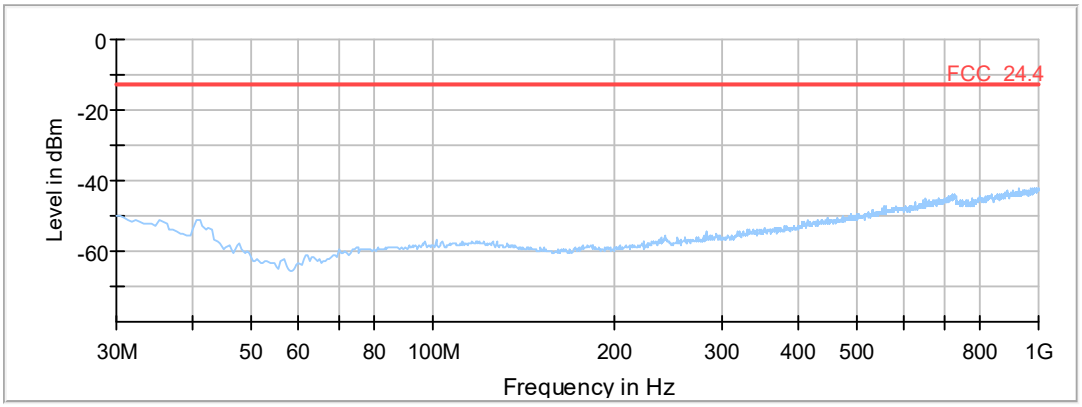
Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9538, Frequency = 1907.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:22
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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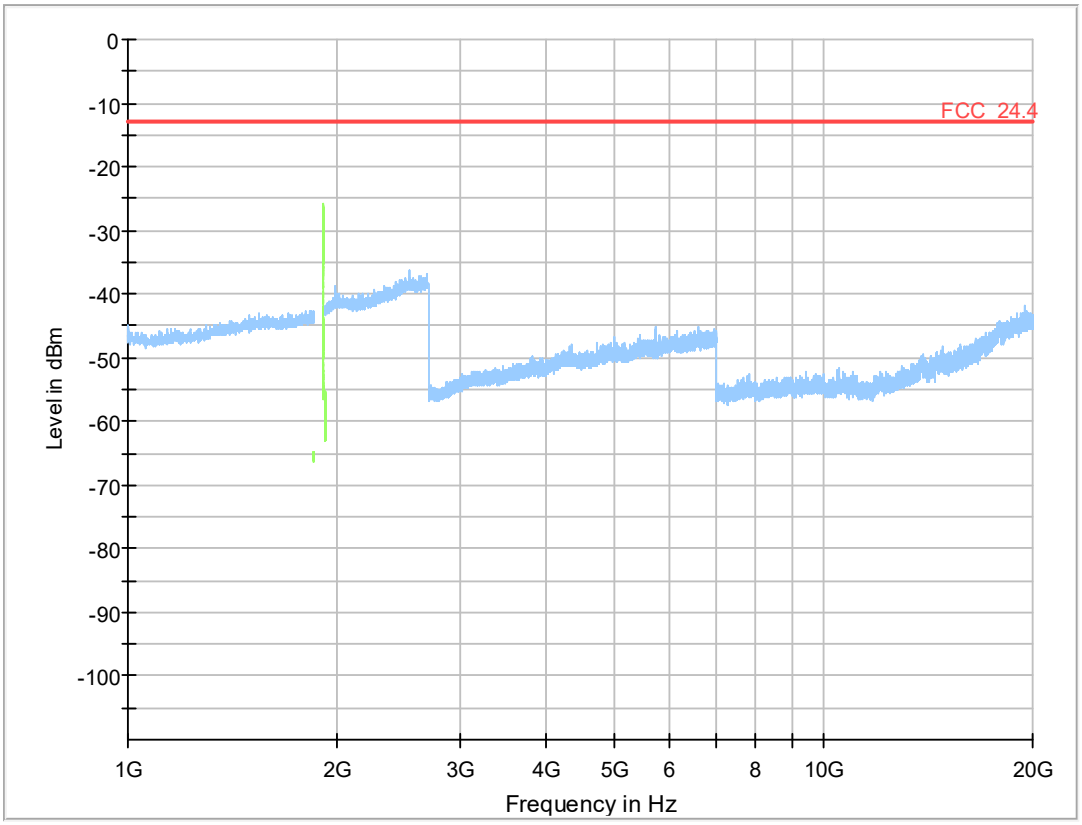

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

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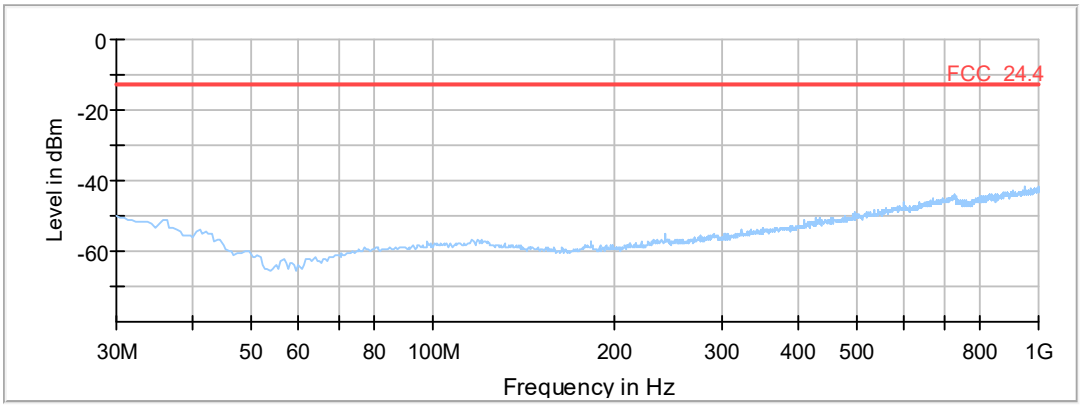
Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency = 1852.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 7:59
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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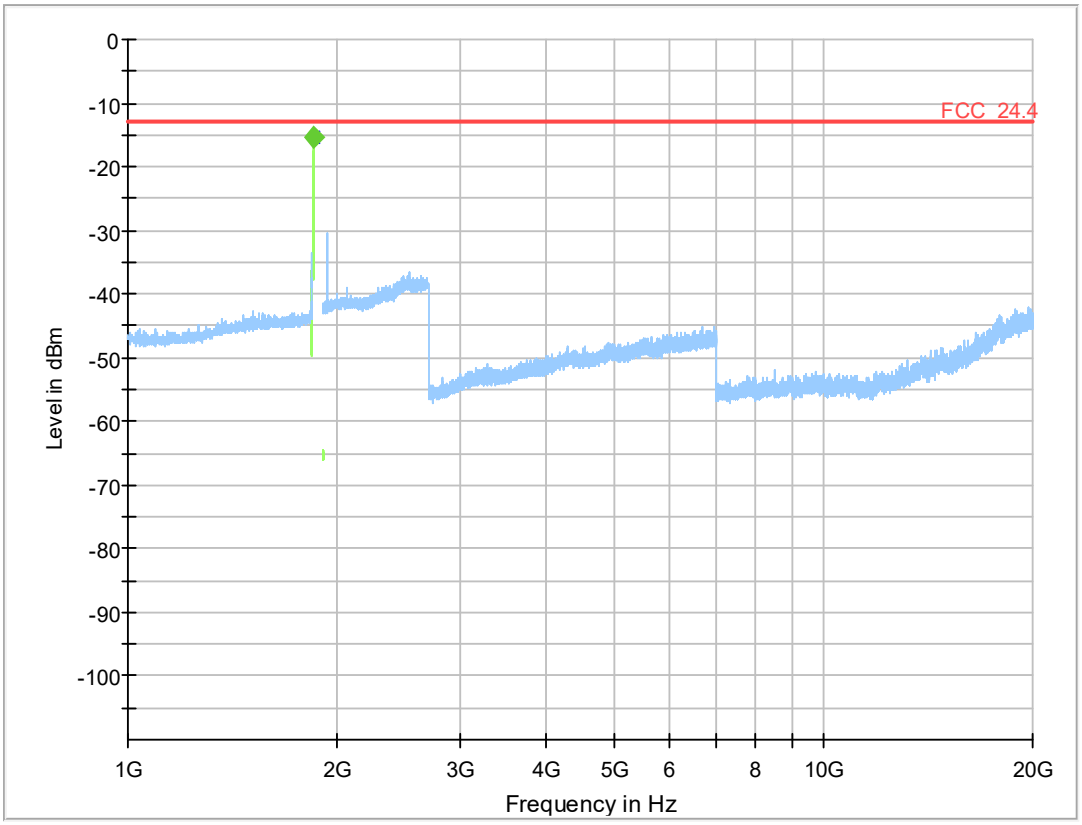


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1848.991000	---	---	---	1000.0	1000.000	150.0	V	0.0	90.0	-65

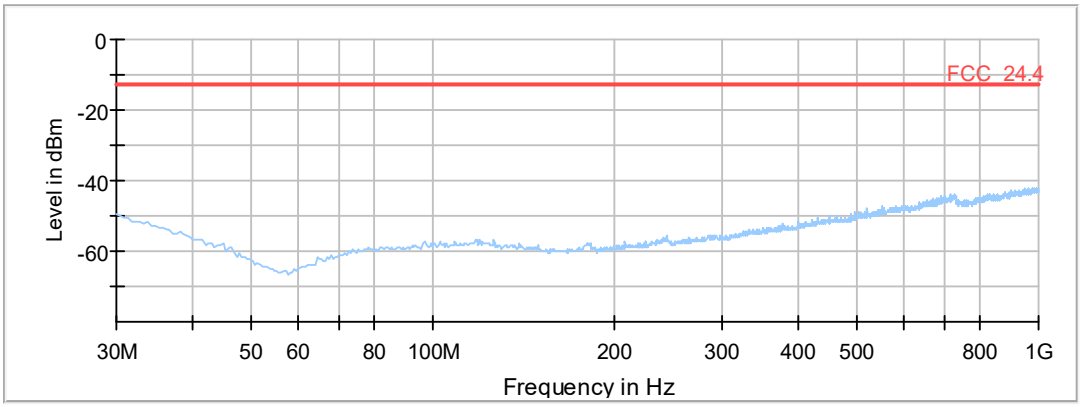
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1848.991000	---	---	---	1000.0	1000.000	150.0	V	0.0	90.0	-65

Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:00
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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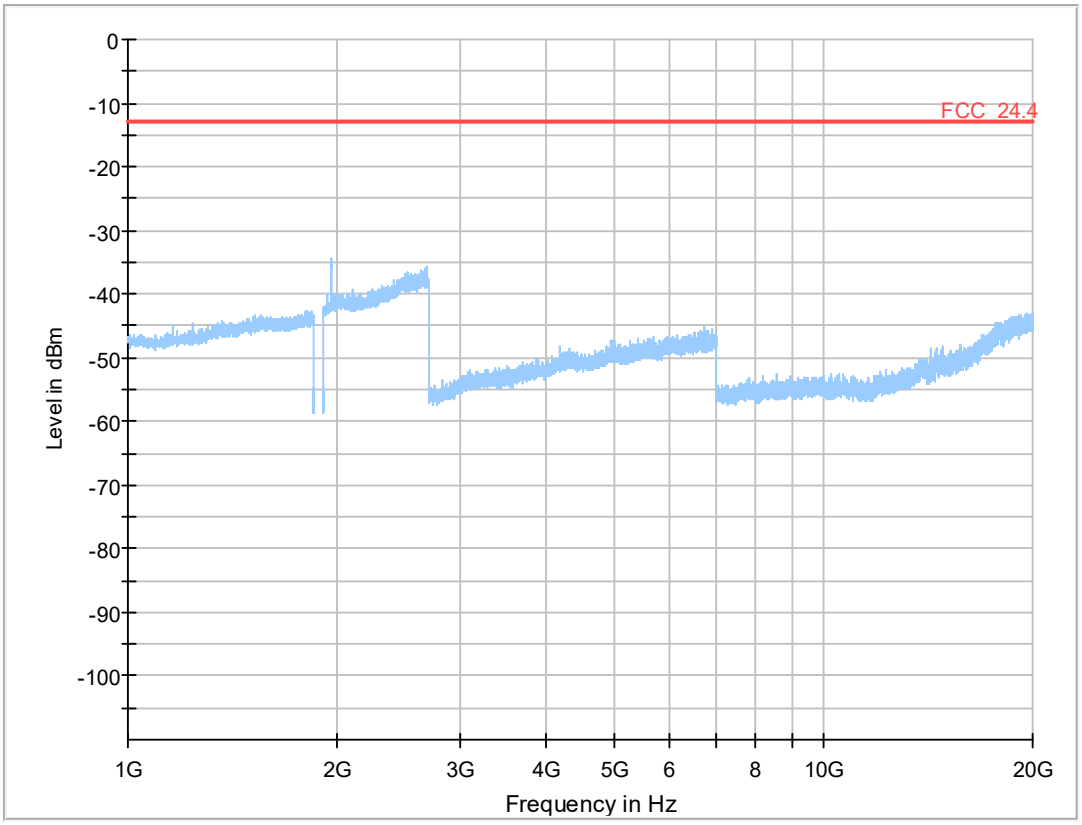

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

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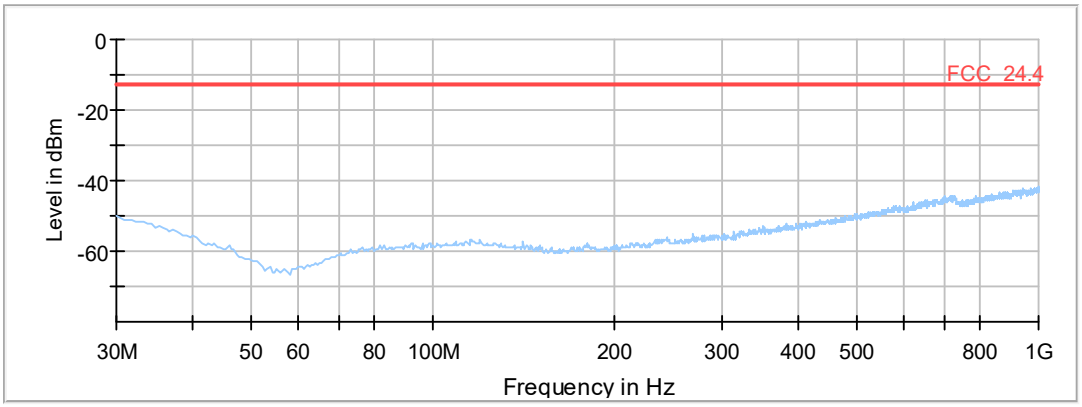
Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9538, Frequency = 1907.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 7:57
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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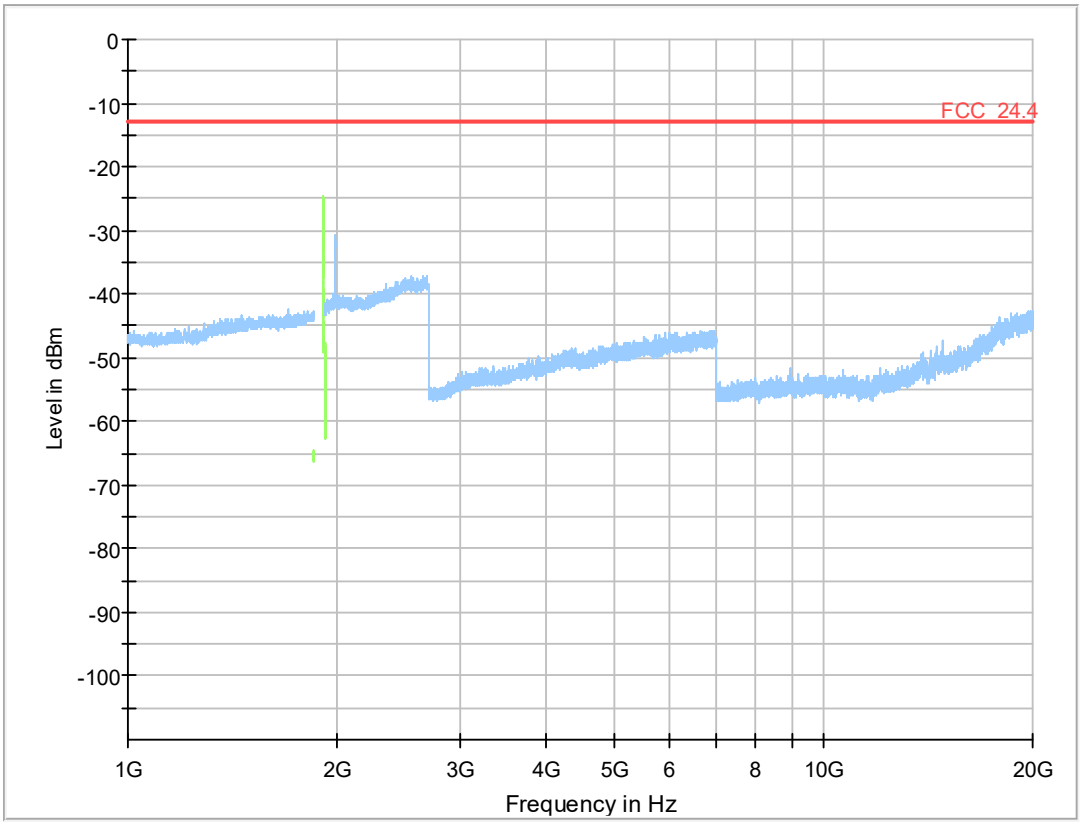

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

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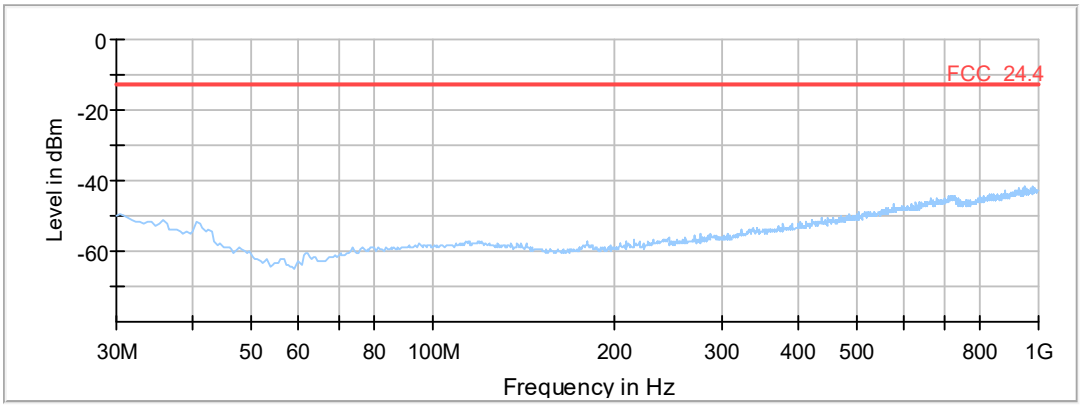
Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency = 1852.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:40
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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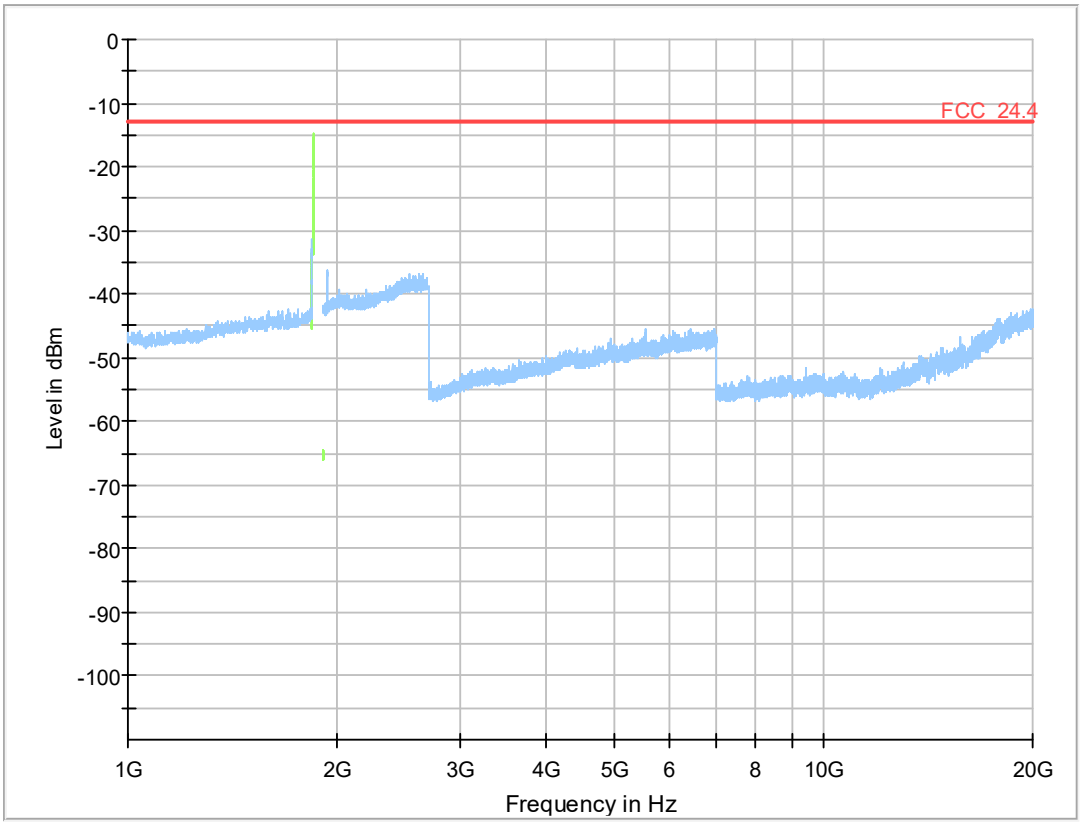

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

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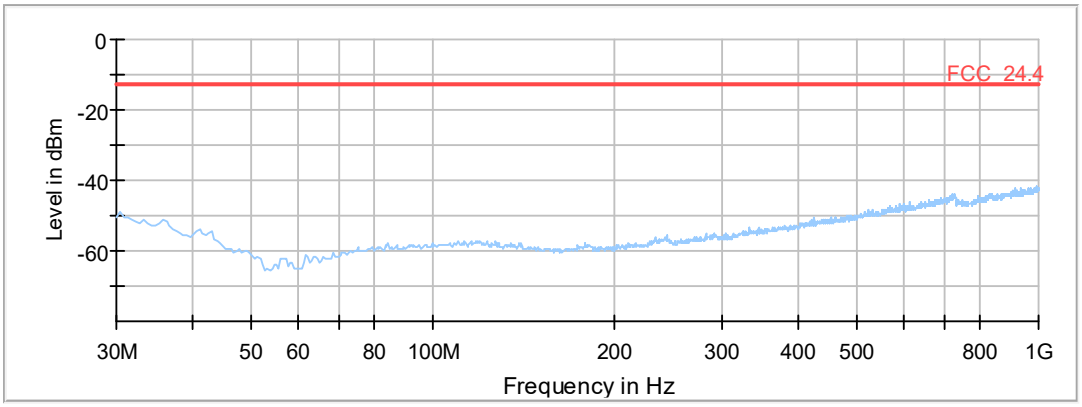
Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:43
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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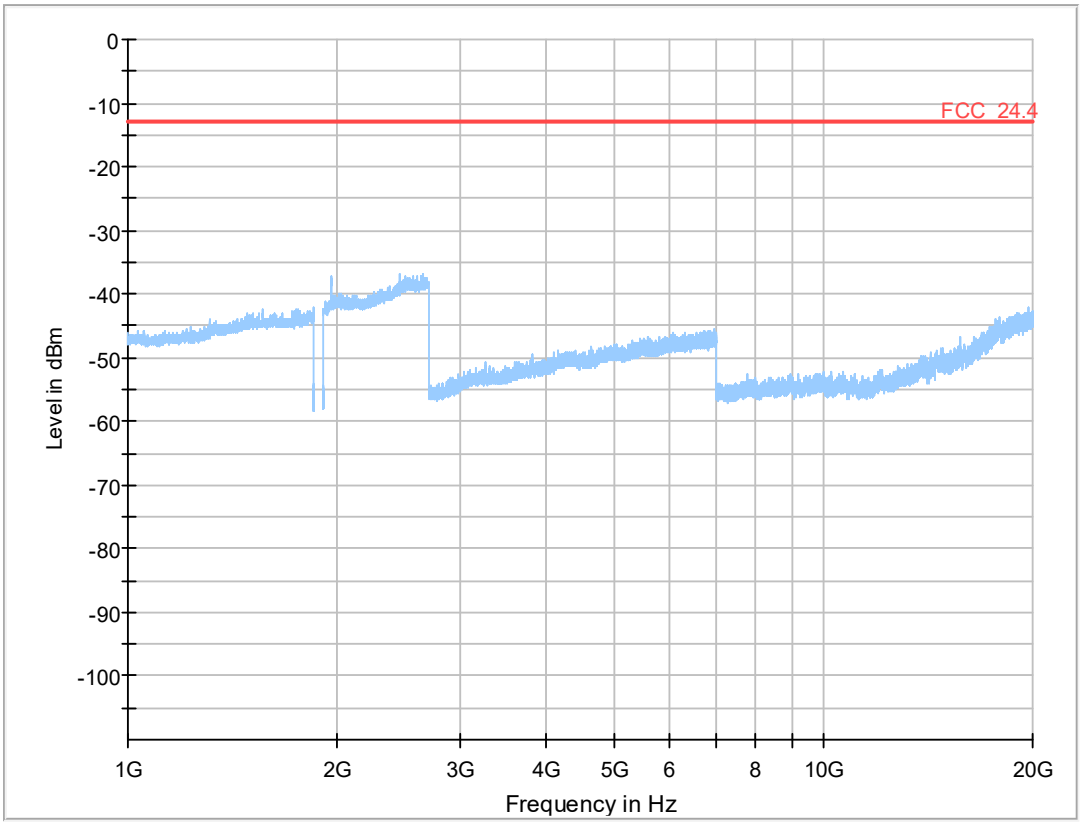

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

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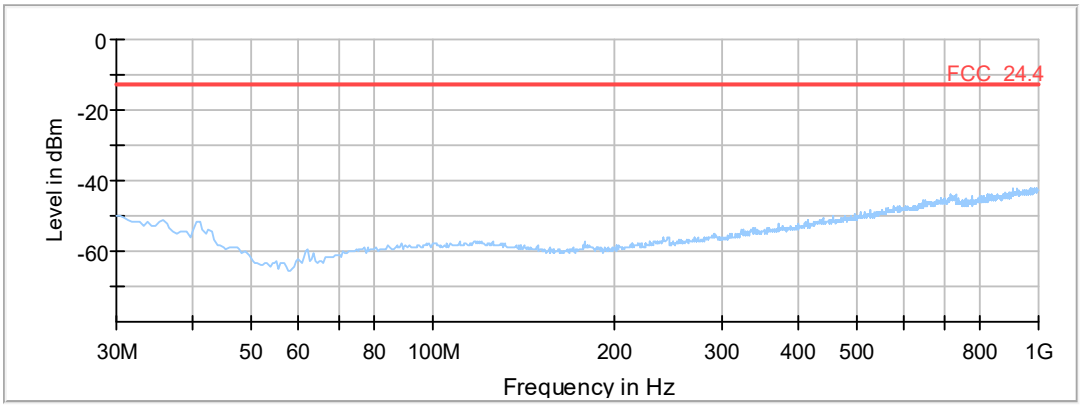
Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9538, Frequency = 1907.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:38
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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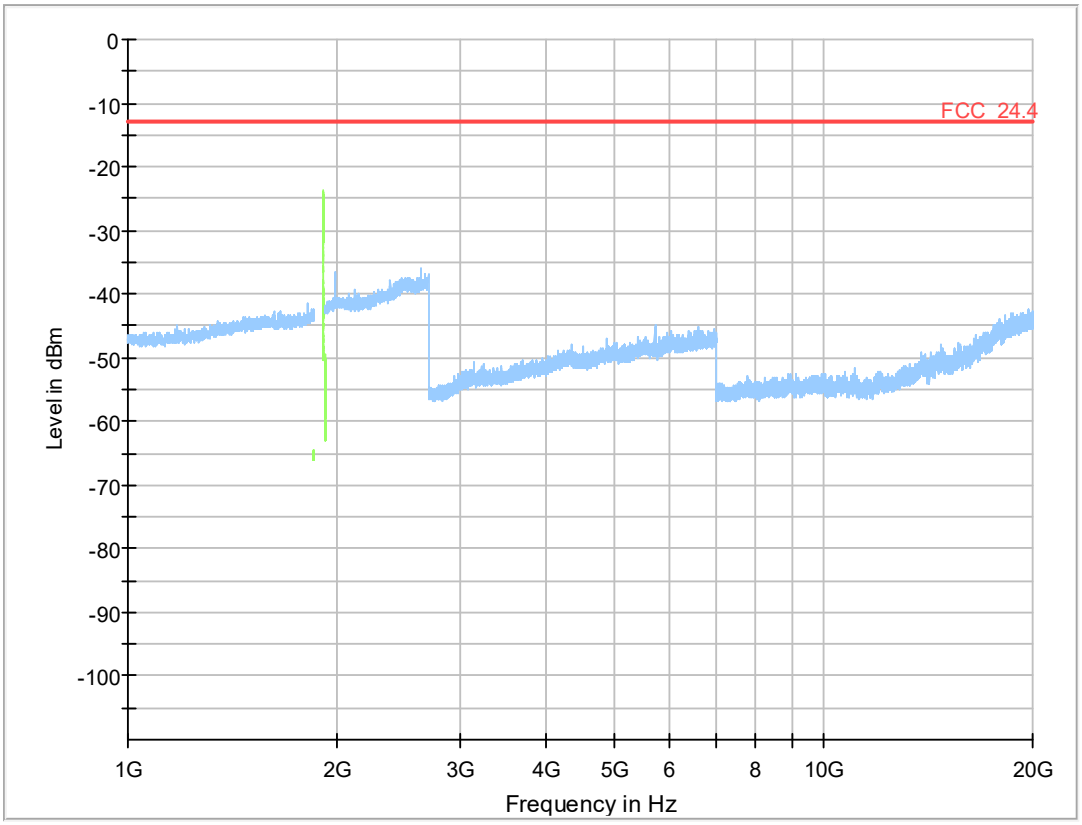

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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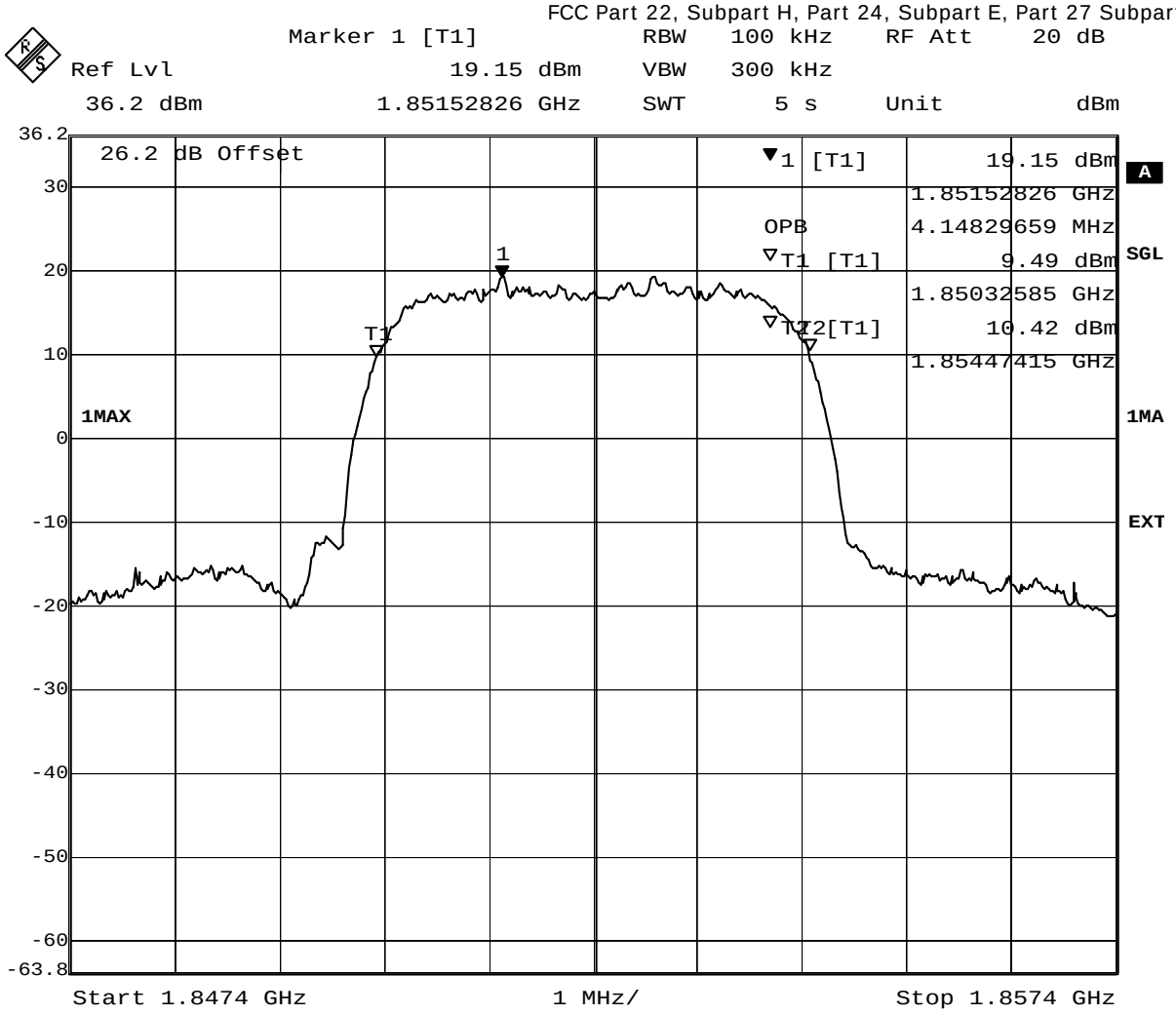
3.5.12 24.5 Emission and Occupied Bandwidth §2.1049, §24.238

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

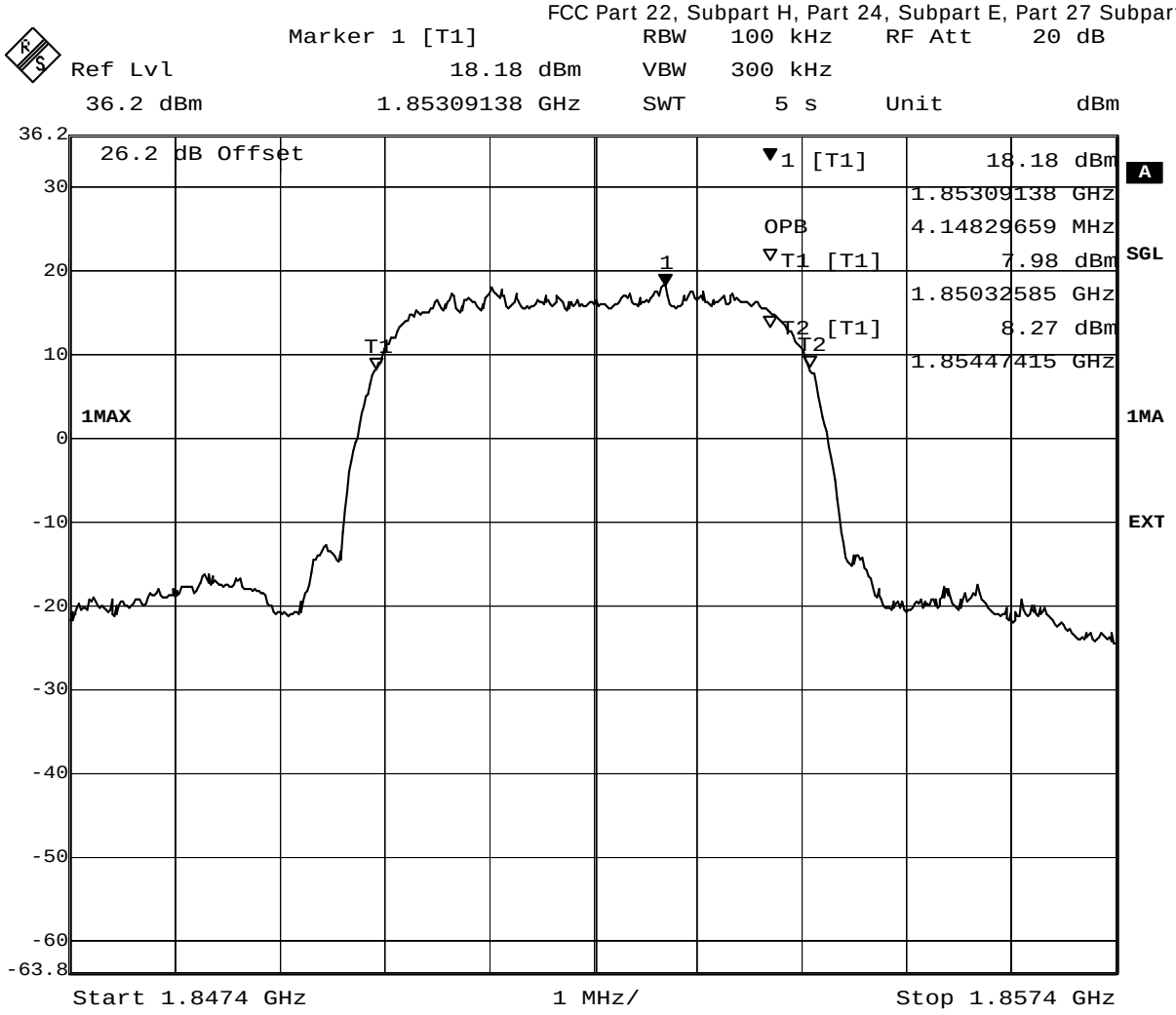
Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:45
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

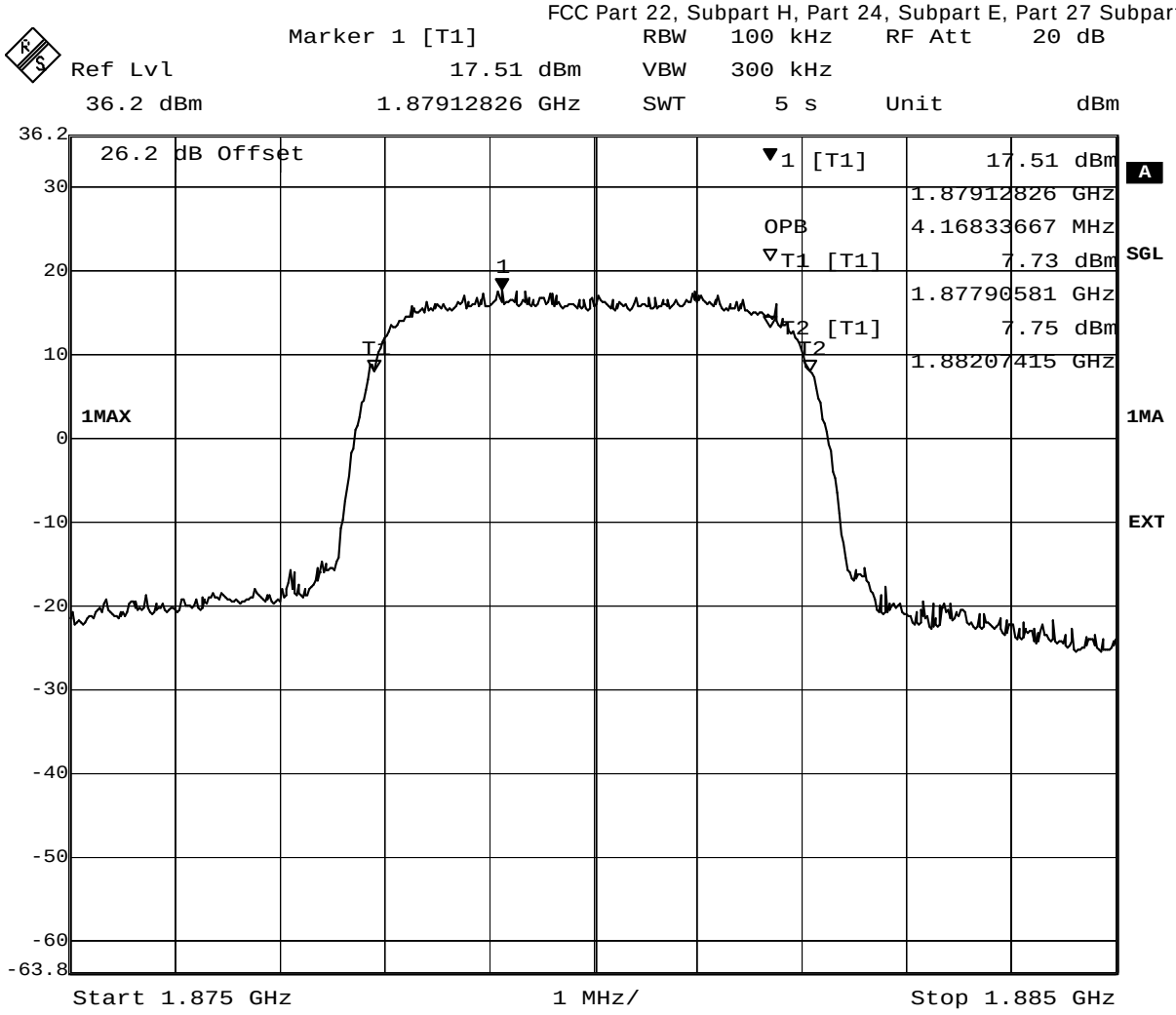
Radio Technology	Channel	Res-source Blocks	Band-width [MHz]	Nominal BW [MHz]	26 dB BW [kHz]	99 % BW [kHz]
FDD II	low	-	5	5	4749.5	4148.3
FDD II	mid	-	5	5	4749.5	4128.3
FDD II	high	-	5	5	4789.58	4148.3
FDD II HSDPA Subtest 1	low	-	5	5	4749.5	4148.3
FDD II HSDPA Subtest 1	mid	-	5	5	4749.5	4128.3
FDD II HSDPA Subtest 1	high	-	5	5	4749.5	4128.3
FDD II HSUPA Subtest 1	low	-	5	5	4749.5	4148.3
FDD II HSUPA Subtest 1	mid	-	5	5	4769.54	4168.3
FDD II HSUPA Subtest 1	high	-	5	5	4769.54	4168.3
FDD II HSUPA Subtest 5	low	-	5	5	4749.5	4148.3
FDD II HSUPA Subtest 5	mid	-	5	5	4769.54	4168.3
FDD II HSUPA Subtest 5	high	-	5	5	4769.54	4168.3
eFDD 2 QPSK	low	6	1.4	1.4	-	1112.2
eFDD 2 QPSK	mid	6	1.4	1.4	-	1112.2
eFDD 2 QPSK	high	6	1.4	1.4	-	1118.2
eFDD 2 16QAM	low	6	1.4	1.4	-	1112.2
eFDD 2 16QAM	mid	6	1.4	1.4	-	1112.2
eFDD 2 16QAM	high	6	1.4	1.4	-	1112.2
eFDD 2 QPSK	low	15	3	3	-	2753.5
eFDD 2 QPSK	mid	15	3	3	-	2765.5
eFDD 2 QPSK	high	15	3	3	-	2765.5
eFDD 2 16QAM	low	15	3	3	-	2765.5
eFDD 2 16QAM	mid	15	3	3	-	2753.5
eFDD 2 16QAM	high	15	3	3	-	2753.5
eFDD 2 QPSK	low	25	5	5	-	4549.1
eFDD 2 QPSK	mid	25	5	5	-	4529.1
eFDD 2 QPSK	high	25	5	5	-	4529.1
eFDD 2 16QAM	low	25	5	5	-	4529.1
eFDD 2 16QAM	mid	25	5	5	-	4549.1
eFDD 2 16QAM	high	25	5	5	-	4529.1
eFDD 2 QPSK	low	50	10	10	-	9018
eFDD 2 QPSK	mid	50	10	10	-	8978
eFDD 2 QPSK	high	50	10	10	-	9058.1
eFDD 2 16QAM	low	27	10	10	-	5090.2
eFDD 2 16QAM	mid	27	10	10	-	5050.1
eFDD 2 16QAM	high	27	10	10	-	5090.2
eFDD 2 QPSK	low	75	15	15	-	13527
eFDD 2 QPSK	mid	75	15	15	-	13467
eFDD 2 QPSK	high	75	15	15	-	13527
eFDD 2 16QAM	low	27	15	15	-	5230.5
eFDD 2 16QAM	mid	27	15	15	-	5170.3
eFDD 2 16QAM	high	27	15	15	-	5170.3
eFDD 2 QPSK	low	100	20	20	-	18036
eFDD 2 QPSK	mid	100	20	20	-	18116
eFDD 2 QPSK	high	100	20	20	-	18036
eFDD 2 16QAM	low	27	20	20	-	5771.5
eFDD 2 16QAM	mid	27	20	20	-	5851.7
eFDD 2 16QAM	high	27	20	20	-	6092.2



WCDMA FDD2 Channel=low

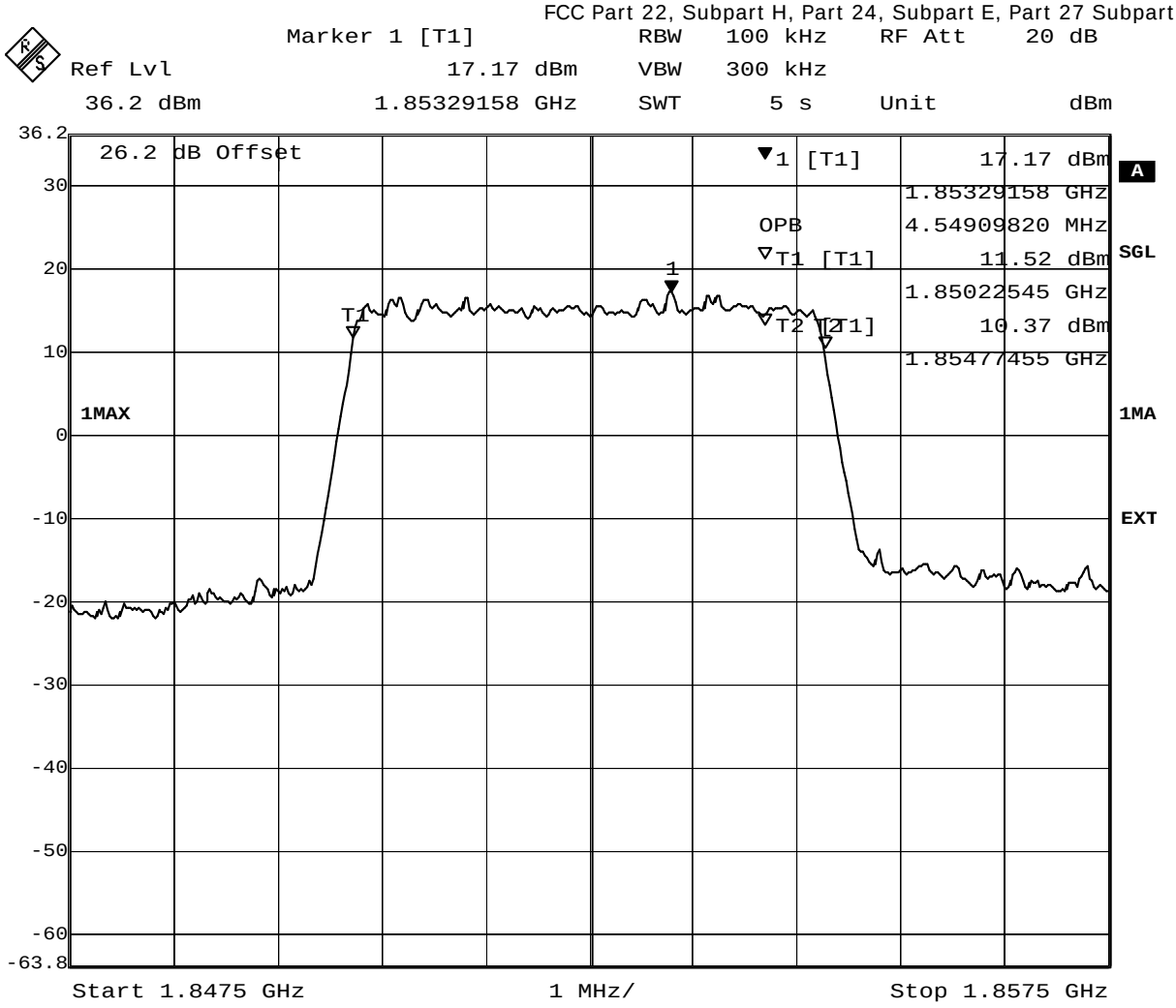


HSDPA FDD2 Channel=low



Date: 28.MAR.2018 13:17:54

HSUPA FDD2 Channel=low



Date: 5.APR.2018 13:53:28

eFDD2 QPSK 5MHz Channel=low

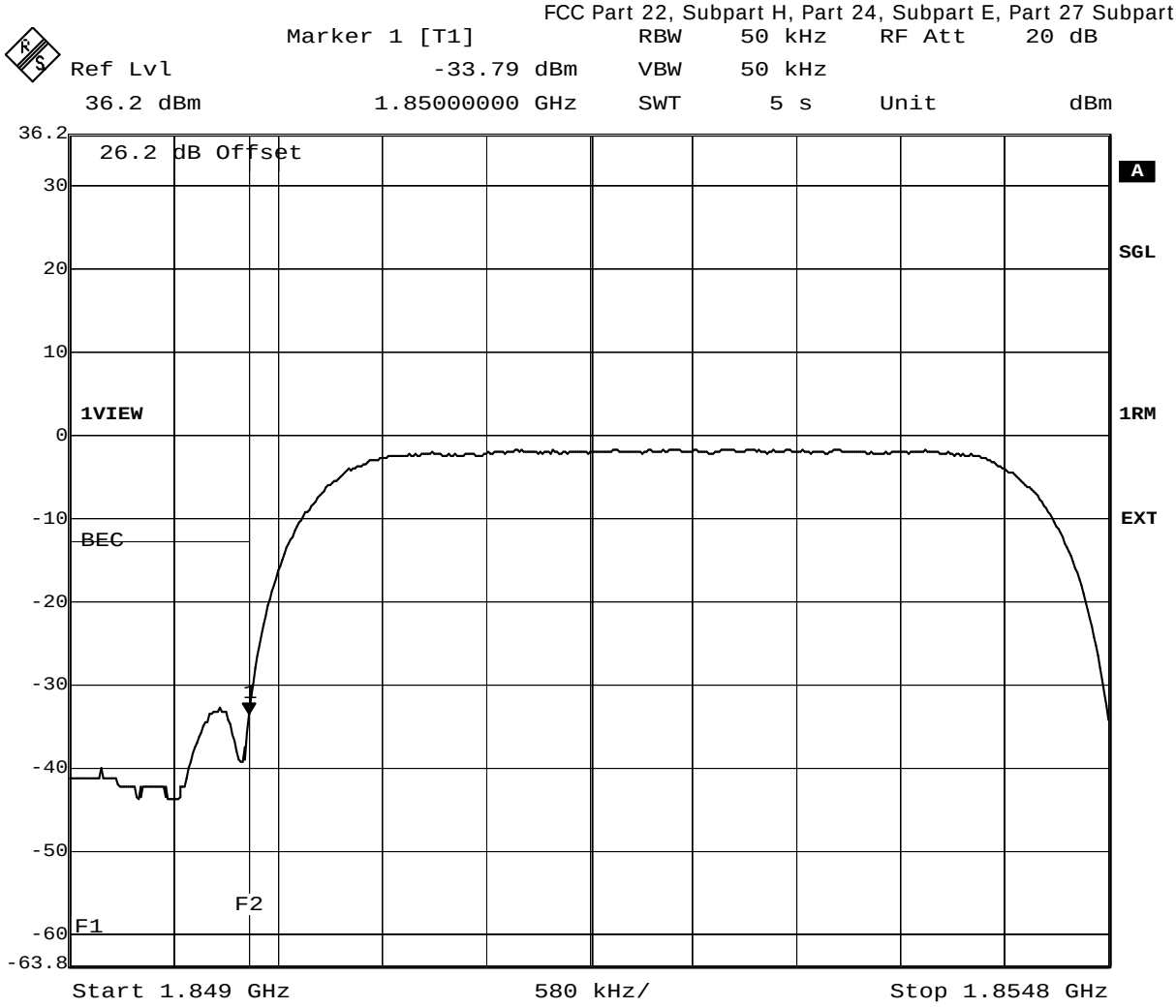
3.5.13 24.6 Band edge compliance §2.1053, §24.238

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

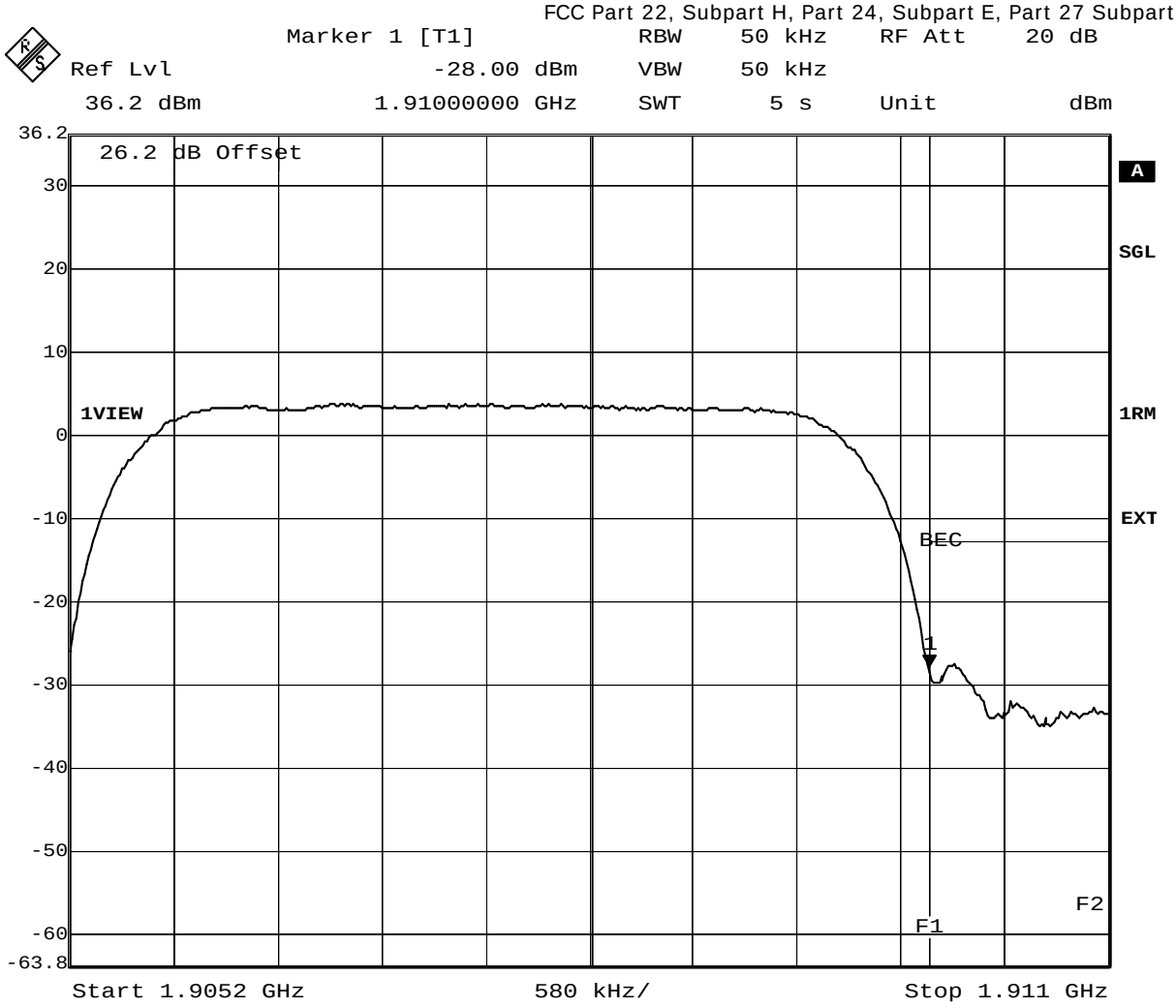
Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:22
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

Radio Technology	Channel	Nominal BW	Res-source Blocks	Peak [dBm]	Average [dBm]	RMS [dBm]
FDD II	low	5	-	**-24.38**	**-34.76**	**-33.79**
FDD II	high	5	-	**-24.76**	**-34.26**	**-33.79**
FDD II HSDPA Subtest 1	low	5	-	**-21.36**	**-30.42**	**-29.54**
FDD II HSDPA Subtest 1	high	5	-	**-17.56**	**-28.74**	**-28**
FDD II HSUPA Subtest 1	low	5	-	**-18.62**	**-27.32**	**-26.7**
FDD II HSUPA Subtest 1	high	5	-	**-18.24**	**-28.48**	**-27.77**
FDD II HSUPA Subtest 5	low	5	-	**-18.62**	**-27.11**	**-26.3**
FDD II HSUPA Subtest 5	high	5	-	**-18.52**	**-27.77**	**-27.32**
eFDD 2 QPSK	low	1.4	6	**-14.43**	**-23.8**	**-23.52**
eFDD 2 QPSK	high	1.4	6	**-15.31**	**-23.38**	**-22.46**
eFDD 2 16QAM	low	1.4	6	**-15.91**	**-25.39**	**-24.4**
eFDD 2 16QAM	high	1.4	6	**-15.18**	**-23.38**	**-22.59**
eFDD 2 QPSK	low	3	15	**-14.81**	**-27.32**	**-25.92**
eFDD 2 QPSK	high	3	15	**-17.66**	**-28.48**	**-26.7**
eFDD 2 16QAM	low	3	15	**-14.44**	**-28.48**	**-27.11**
eFDD 2 16QAM	high	3	15	**-18.1**	**-30.12**	**-29**
eFDD 2 QPSK	low	5	25	**-15.74**	**-29**	**-27.54**
eFDD 2 QPSK	high	5	25	**-18.7**	**-29.82**	**-28.74**
eFDD 2 16QAM	low	5	25	**-15.8**	**-29.54**	**-28**
eFDD 2 16QAM	high	5	25	**-19.07**	**-32.13**	**-30.74**
eFDD 2 QPSK	low	10	50	**-18.36**	**-31.41**	**-30.12**
eFDD 2 QPSK	high	10	50	**-21.25**	**-29**	**-30.74**
eFDD 2 16QAM	low	10	50	**-17.85**	**-29.26**	**-28**
eFDD 2 16QAM	high	10	50	**-18.44**	**-31.07**	**-29.54**
eFDD 2 QPSK	low	15	75	**-17.52**	**-28.74**	**-27.11**
eFDD 2 QPSK	high	15	75	**-14.9**	**-22.84**	**-23.24**
eFDD 2 16QAM	low	15	75	**-13.75**	**-26.3**	**-25.21**
eFDD 2 16QAM	high	15	75	**-13.73**	**-27.32**	**-25.92**
eFDD 2 QPSK	low	20	100	**-20.27**	**-31.41**	**-29.54**
eFDD 2 QPSK	high	20	100	**-17.98**	**-21.3**	**-24.4**
eFDD 2 16QAM	low	20	100	**-15.24**	**-26.9**	**-25.39**
eFDD 2 16QAM	high	20	100	**-13.19**	**-27.11**	**-23.66**

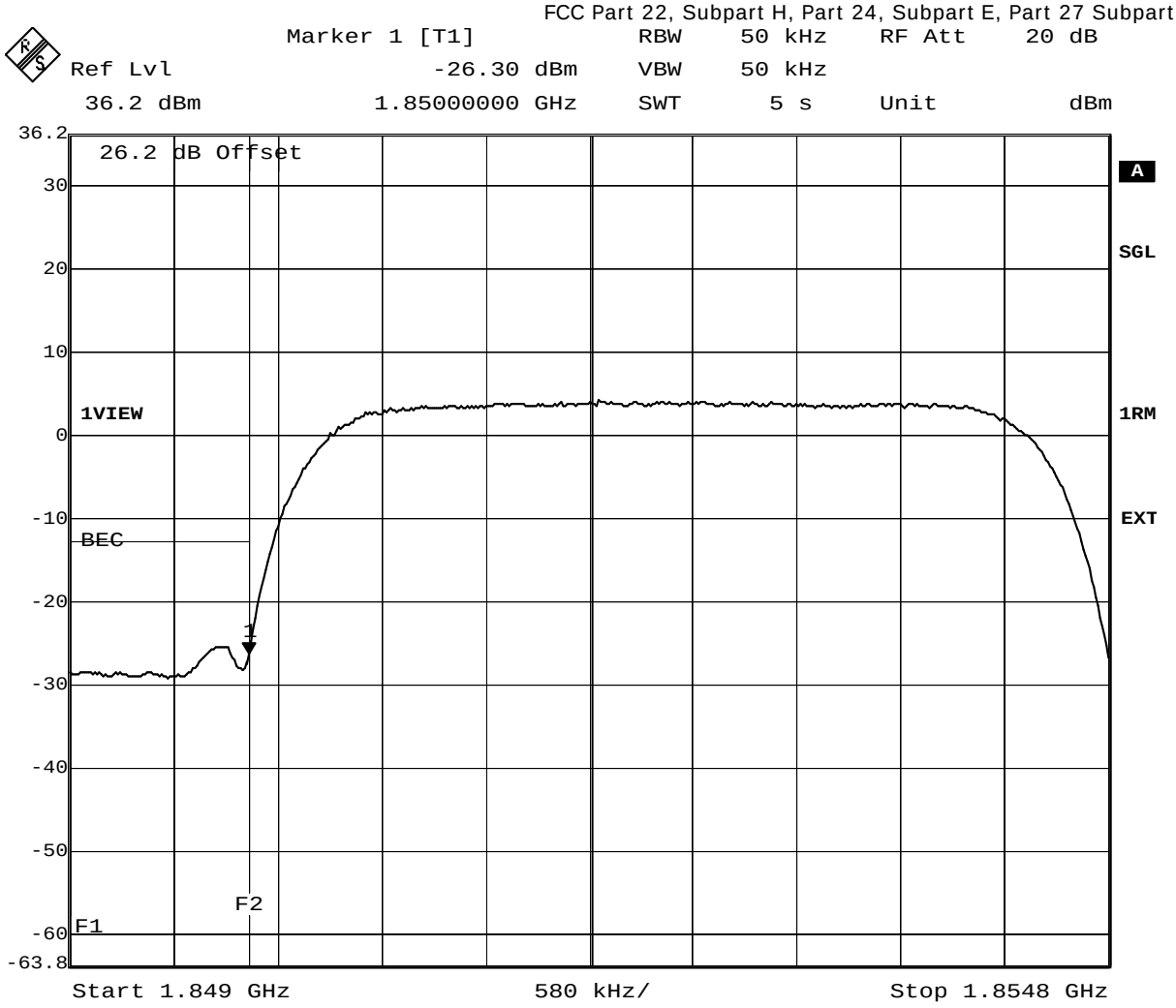


WCDMA FDD2 Channel=low

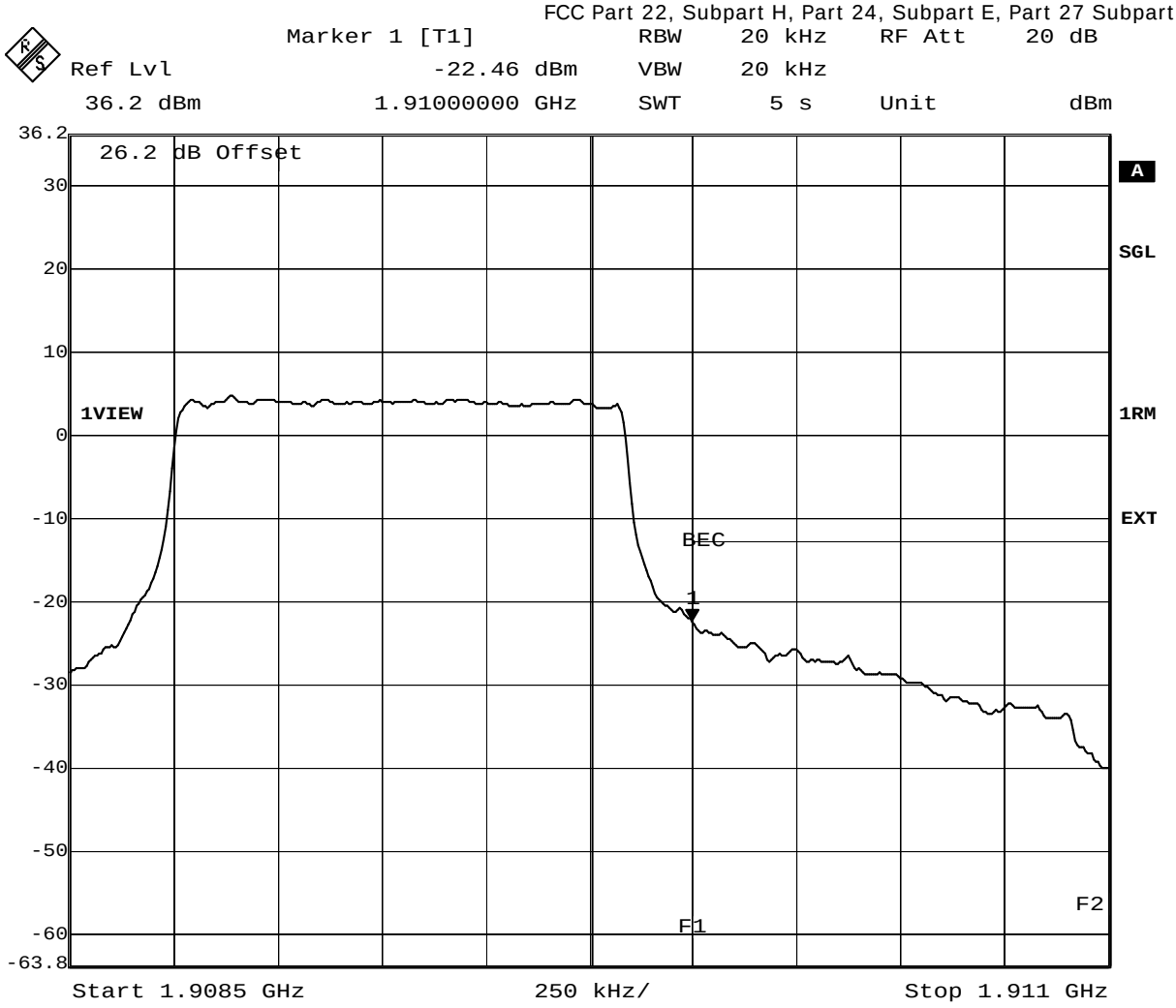


Date: 29.MAR.2018 13:18:18

HSDPA FDD2 Channel=high



HSUPA FDD2 Channel=low



Date: 12.APR.2018 15:00:45

eFDD2 QPSK 1.4MHz RB6 Channel=high

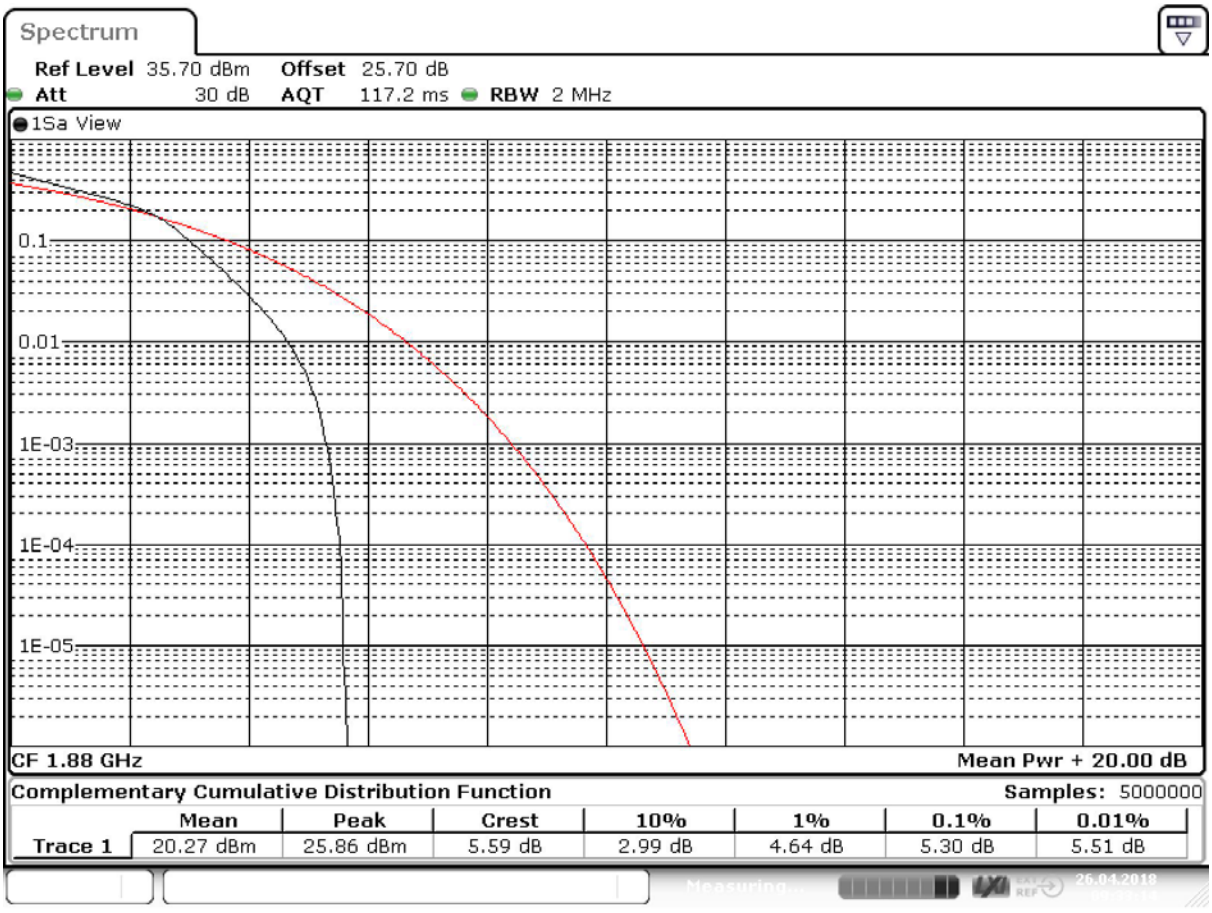
3.5.14 24.7 Peak-to-Average ratio §2.1046, §24.232

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:26
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak to Average Ratio [dB]	Limit (IC) [dB]		
FDD II	low	-	5	5.45	13		
FDD II	mid	-	5	5.47	13		
FDD II	high	-	5	5.73	13		
FDD II HSDPA Subtest 1	low	-	5	5.44	13		
FDD II HSDPA Subtest 1	mid	-	5	5.32	13		
FDD II HSDPA Subtest 1	high	-	5	5.63	13		
FDD II HSUPA Subtest 1	low	-	5	6.08	13		
FDD II HSUPA Subtest 1	mid	-	5	6.51	13		
FDD II HSUPA Subtest 1	high	-	5	7.36	13		
FDD II HSUPA Subtest 5	low	-	5	6.94	13		
FDD II HSUPA Subtest 5	mid	-	5	6.51	13		
FDD II HSUPA Subtest 5	high	-	5	7.22	13		
eFDD 2 QPSK	low	6	1.4	4.29	13		
eFDD 2 QPSK	mid	6	1.4	4.32	13		
eFDD 2 QPSK	high	6	1.4	4.12	13		
eFDD 2 16QAM	low	6	1.4	4.99	13		
eFDD 2 16QAM	mid	6	1.4	5.3	13		
eFDD 2 16QAM	high	6	1.4	4.81	13		



Date: 26.APR.2018 09:33:14

eFDD2 16QAM 1.4MHz RB6 Channel=mid

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.:	S01_AD01
Date of Test:	2018/04/19 9:50
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

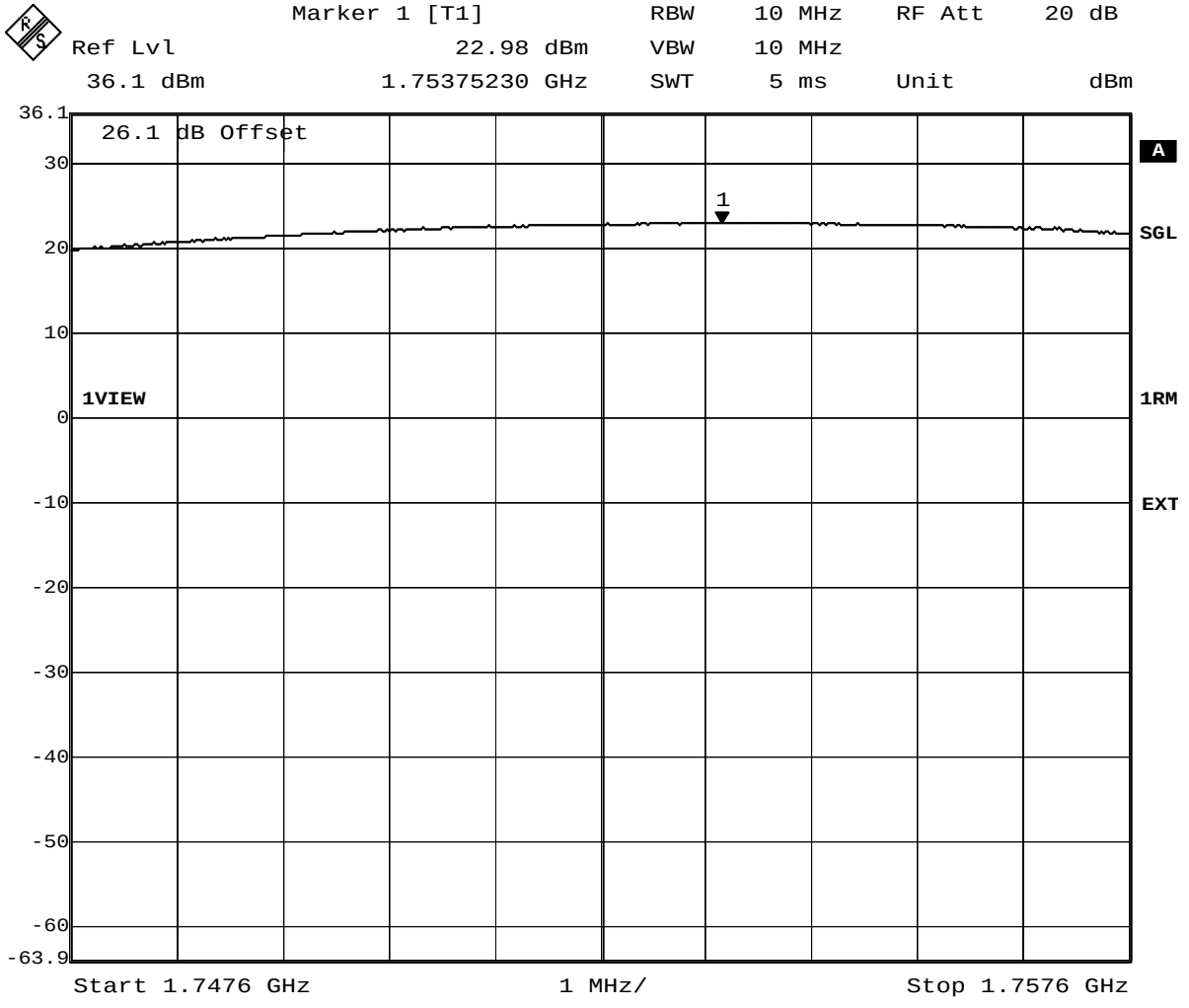
Detailed Results:

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
FDD IV	low	-	5	27.37	21.84	21.97
FDD IV	mid 1	-	5	27.76	22.26	22.39
FDD IV	mid 2	-	5	27.09	21.42	21.52
FDD IV	high	-	5	28.66	22.81	22.98
FDD IV HSDPA Subtest 1	low	-	5	26.83	21.44	21.63
FDD IV HSDPA Subtest 1	mid 1	-	5	26.7	21.52	21.74
FDD IV HSDPA Subtest 1	mid 2	-	5	26.32	20.96	21.06
FDD IV HSDPA Subtest 1	high	-	5	27.72	22.41	22.61
FDD IV HSDPA Subtest 2	low	-	5	27.62	20.6	21.11
FDD IV HSDPA Subtest 2	mid 1	-	5	27.89	20.97	21.51
FDD IV HSDPA Subtest 2	mid 2	-	5	26.98	20.26	20.79
FDD IV HSDPA Subtest 2	high	-	5	28.25	21.83	22.25
FDD IV HSDPA Subtest 3	low	-	5	28.17	20.51	21.25
FDD IV HSDPA Subtest 3	mid 1	-	5	28.17	20.88	21.53
FDD IV HSDPA Subtest 3	mid 2	-	5	26.98	20.08	20.8
FDD IV HSDPA Subtest 3	high	-	5	28.92	21.58	22.38
FDD IV HSDPA Subtest 4	low	-	5	27.37	20.26	21.09
FDD IV HSDPA Subtest 4	mid 1	-	5	27.89	20.8	21.49
FDD IV HSDPA Subtest 4	mid 2	-	5	26.83	19.74	20.58
FDD IV HSDPA Subtest 4	high	-	5	28.11	21.2	22.06
FDD IV HSUPA Subtest 1	low	-	5	28.04	20.46	20.85
FDD IV HSUPA Subtest 1	mid 1	-	5	28.92	21.36	21.78
FDD IV HSUPA Subtest 1	mid 2	-	5	27.62	20.08	20.51
FDD IV HSUPA Subtest 1	high	-	5	29.19	21.9	22.3
FDD IV HSUPA Subtest 2	low	-	5	28.29	20.26	20.74
FDD IV HSUPA Subtest 2	mid 1	-	5	28.66	19.95	20.71
FDD IV HSUPA Subtest 2	mid 2	-	5	27.37	19.66	20.27
FDD IV HSUPA Subtest 2	high	-	5	29.31	20.99	21.77
FDD IV HSUPA Subtest 3	low	-	5	27.89	19.79	20.53
FDD IV HSUPA Subtest 3	mid 1	-	5	23.23	14.76	15.63
FDD IV HSUPA Subtest 3	mid 2	-	5	27.21	19.36	19.86
FDD IV HSUPA Subtest 3	high	-	5	29.81	21.76	22.24
FDD IV HSUPA Subtest 4	low	-	5	28.17	20.22	20.72
FDD IV HSUPA Subtest 4	mid 1	-	5	28.66	20.08	20.74
FDD IV HSUPA Subtest 4	mid 2	-	5	27.89	19.98	20.5
FDD IV HSUPA Subtest 4	high	-	5	29.31	20.87	21.62
FDD IV HSUPA Subtest 5	low	-	5	27.5	20.48	20.83
FDD IV HSUPA Subtest 5	mid 1	-	5	28.8	21.19	21.56
FDD IV HSUPA Subtest 5	mid 2	-	5	27.5	20.11	20.5
FDD IV HSUPA Subtest 5	high	-	5	29.31	21.98	22.34
eFDD 4 QPSK	low	1	1.4	-	-	20.9
eFDD 4 QPSK	low	3	1.4	-	-	19.88
eFDD 4 QPSK	low	6	1.4	-	-	18.99
eFDD 4 QPSK	mid	1	1.4	-	-	20.74
eFDD 4 QPSK	mid	3	1.4	-	-	20.4
eFDD 4 QPSK	mid	6	1.4	-	-	19.36
eFDD 4 QPSK	high	1	1.4	-	-	20.79
eFDD 4 QPSK	high	3	1.4	-	-	20.56
eFDD 4 QPSK	high	6	1.4	-	-	20.32
eFDD 4 16QAM	low	1	1.4	-	-	19.5
eFDD 4 16QAM	low	6	1.4	-	-	19.19
eFDD 4 16QAM	mid	1	1.4	-	-	20.77
eFDD 4 16QAM	mid	6	1.4	-	-	19.61
eFDD 4 16QAM	high	1	1.4	-	-	20.38
eFDD 4 16QAM	high	6	1.4	-	-	20.21

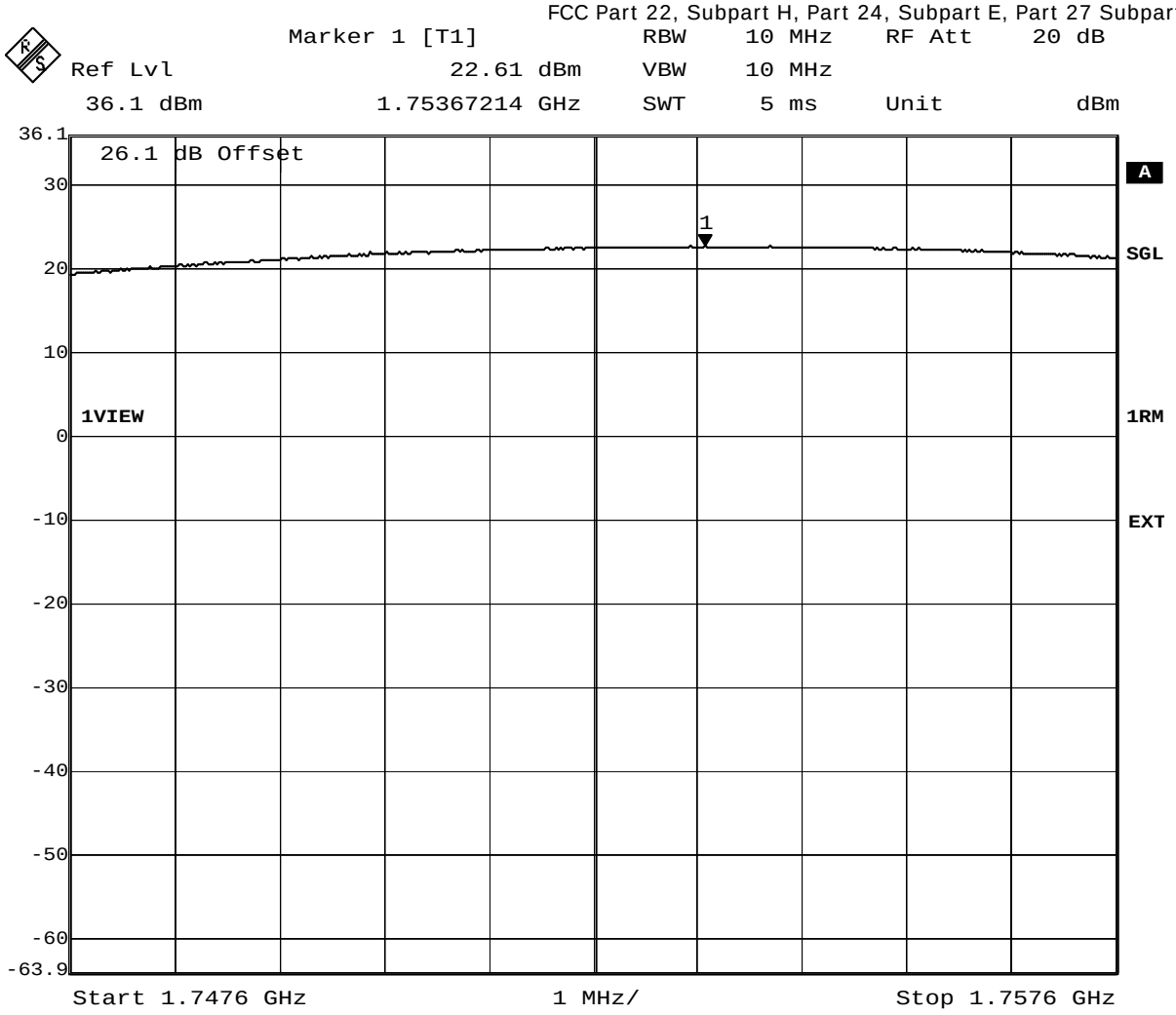
Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
eFDD 4 QPSK	low	1	3	-	-	20.48
eFDD 4 QPSK	low	15	3	-	-	19.16
eFDD 4 QPSK	mid	1	3	-	-	21.18
eFDD 4 QPSK	mid	15	3	-	-	19.36
eFDD 4 QPSK	high	1	3	-	-	20.95
eFDD 4 QPSK	high	15	3	-	-	20.38
eFDD 4 16QAM	low	1	3	-	-	19.94
eFDD 4 16QAM	low	15	3	-	-	18.66
eFDD 4 16QAM	mid	1	3	-	-	20.68
eFDD 4 16QAM	mid	15	3	-	-	18.91
eFDD 4 16QAM	high	1	3	-	-	21.11
eFDD 4 16QAM	high	15	3	-	-	20
eFDD 4 QPSK	low	1	5	-	-	20.73
eFDD 4 QPSK	low	12	5	-	-	19.31
eFDD 4 QPSK	low	25	5	-	-	19.3
eFDD 4 QPSK	mid	1	5	-	-	21.21
eFDD 4 QPSK	mid	12	5	-	-	19.66
eFDD 4 QPSK	mid	25	5	-	-	19.41
eFDD 4 QPSK	high	1	5	-	-	20.93
eFDD 4 QPSK	high	12	5	-	-	20.33
eFDD 4 QPSK	high	25	5	-	-	20.33
eFDD 4 16QAM	low	1	5	-	-	19.99
eFDD 4 16QAM	low	25	5	-	-	18.77
eFDD 4 16QAM	mid	1	5	-	-	20.61
eFDD 4 16QAM	mid	25	5	-	-	18.66
eFDD 4 16QAM	high	1	5	-	-	20.29
eFDD 4 16QAM	high	25	5	-	-	19.67
eFDD 4 QPSK	low	1	10	-	-	21.93
eFDD 4 QPSK	low	50	10	-	-	20.56
eFDD 4 QPSK	mid	1	10	-	-	21.48
eFDD 4 QPSK	mid	50	10	-	-	19.84
eFDD 4 QPSK	high	1	10	-	-	21.17
eFDD 4 QPSK	high	50	10	-	-	20.49
eFDD 4 16QAM	low	1	10	-	-	20.94
eFDD 4 16QAM	low	27	10	-	-	19.27
eFDD 4 16QAM	mid	1	10	-	-	20.6
eFDD 4 16QAM	mid	27	10	-	-	19.42
eFDD 4 16QAM	high	1	10	-	-	20.21
eFDD 4 16QAM	high	27	10	-	-	19.48
eFDD 4 QPSK	low	1	15	-	-	22.75
eFDD 4 QPSK	low	36	15	-	-	20.73
eFDD 4 QPSK	low	75	15	-	-	21.29
eFDD 4 QPSK	mid	1	15	-	-	21.29
eFDD 4 QPSK	mid	36	15	-	-	20.85
eFDD 4 QPSK	mid	75	15	-	-	20.59
eFDD 4 QPSK	high	1	15	-	-	20.93
eFDD 4 QPSK	high	36	15	-	-	19.89
eFDD 4 QPSK	high	75	15	-	-	20.37
eFDD 4 16QAM	low	1	15	-	-	20.94
eFDD 4 16QAM	low	27	15	-	-	19.71
eFDD 4 16QAM	mid	1	15	-	-	20.91
eFDD 4 16QAM	mid	27	15	-	-	20.23
eFDD 4 16QAM	high	1	15	-	-	20.05
eFDD 4 16QAM	high	27	15	-	-	19.04

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
eFDD 4 QPSK	low	1	20	-	-	22.76
eFDD 4 QPSK	low	100	20	-	-	21.78
eFDD 4 QPSK	mid	1	20	-	-	21.78
eFDD 4 QPSK	mid	100	20	-	-	20.89
eFDD 4 QPSK	high	1	20	-	-	20.83
eFDD 4 QPSK	high	100	20	-	-	20.55
eFDD 4 16QAM	low	1	20	-	-	21.49
eFDD 4 16QAM	low	27	20	-	-	19.94
eFDD 4 16QAM	mid	1	20	-	-	20.51
eFDD 4 16QAM	mid	27	20	-	-	20.97
eFDD 4 16QAM	high	1	20	-	-	19.86
eFDD 4 16QAM	high	27	20	-	-	18.98
eFDD 12 QPSK	low	1	1.4	-	-	21.38
eFDD 12 QPSK	low	3	1.4	-	-	20.79
eFDD 12 QPSK	low	6	1.4	-	-	19.89
eFDD 12 QPSK	mid	1	1.4	-	-	22.01
eFDD 12 QPSK	mid	3	1.4	-	-	21.39
eFDD 12 QPSK	mid	6	1.4	-	-	20.61
eFDD 12 QPSK	high	1	1.4	-	-	20.88
eFDD 12 QPSK	high	3	1.4	-	-	20.37
eFDD 12 QPSK	high	6	1.4	-	-	19.75
eFDD 12 16QAM	low	1	1.4	-	-	20.11
eFDD 12 16QAM	low	6	1.4	-	-	19.62
eFDD 12 16QAM	mid	1	1.4	-	-	20.75
eFDD 12 16QAM	mid	6	1.4	-	-	20.03
eFDD 12 16QAM	high	1	1.4	-	-	19.79
eFDD 12 16QAM	high	6	1.4	-	-	19.61
eFDD 12 QPSK	low	1	3	-	-	21.36
eFDD 12 QPSK	low	15	3	-	-	19.8
eFDD 12 QPSK	mid	1	3	-	-	22.26
eFDD 12 QPSK	mid	15	3	-	-	20.73
eFDD 12 QPSK	high	1	3	-	-	21.18
eFDD 12 QPSK	high	15	3	-	-	19.44
eFDD 12 16QAM	low	1	3	-	-	20.58
eFDD 12 16QAM	low	15	3	-	-	19.03
eFDD 12 16QAM	mid	1	3	-	-	20.94
eFDD 12 16QAM	mid	15	3	-	-	19.92
eFDD 12 16QAM	high	1	3	-	-	20.04
eFDD 12 16QAM	high	15	3	-	-	18.23
eFDD 12 QPSK	low	1	5	-	-	21.4
eFDD 12 QPSK	low	12	5	-	-	19.47
eFDD 12 QPSK	low	25	5	-	-	19.94
eFDD 12 QPSK	mid	1	5	-	-	22.23
eFDD 12 QPSK	mid	12	5	-	-	20.59
eFDD 12 QPSK	mid	25	5	-	-	20.45
eFDD 12 QPSK	high	1	5	-	-	21.29
eFDD 12 QPSK	high	12	5	-	-	19.45
eFDD 12 QPSK	high	25	5	-	-	19.46
eFDD 12 16QAM	low	1	5	-	-	20.98
eFDD 12 16QAM	low	25	5	-	-	19.38
eFDD 12 16QAM	mid	1	5	-	-	21.16
eFDD 12 16QAM	mid	25	5	-	-	19.78
eFDD 12 16QAM	high	1	5	-	-	20.39
eFDD 12 16QAM	high	25	5	-	-	18.79

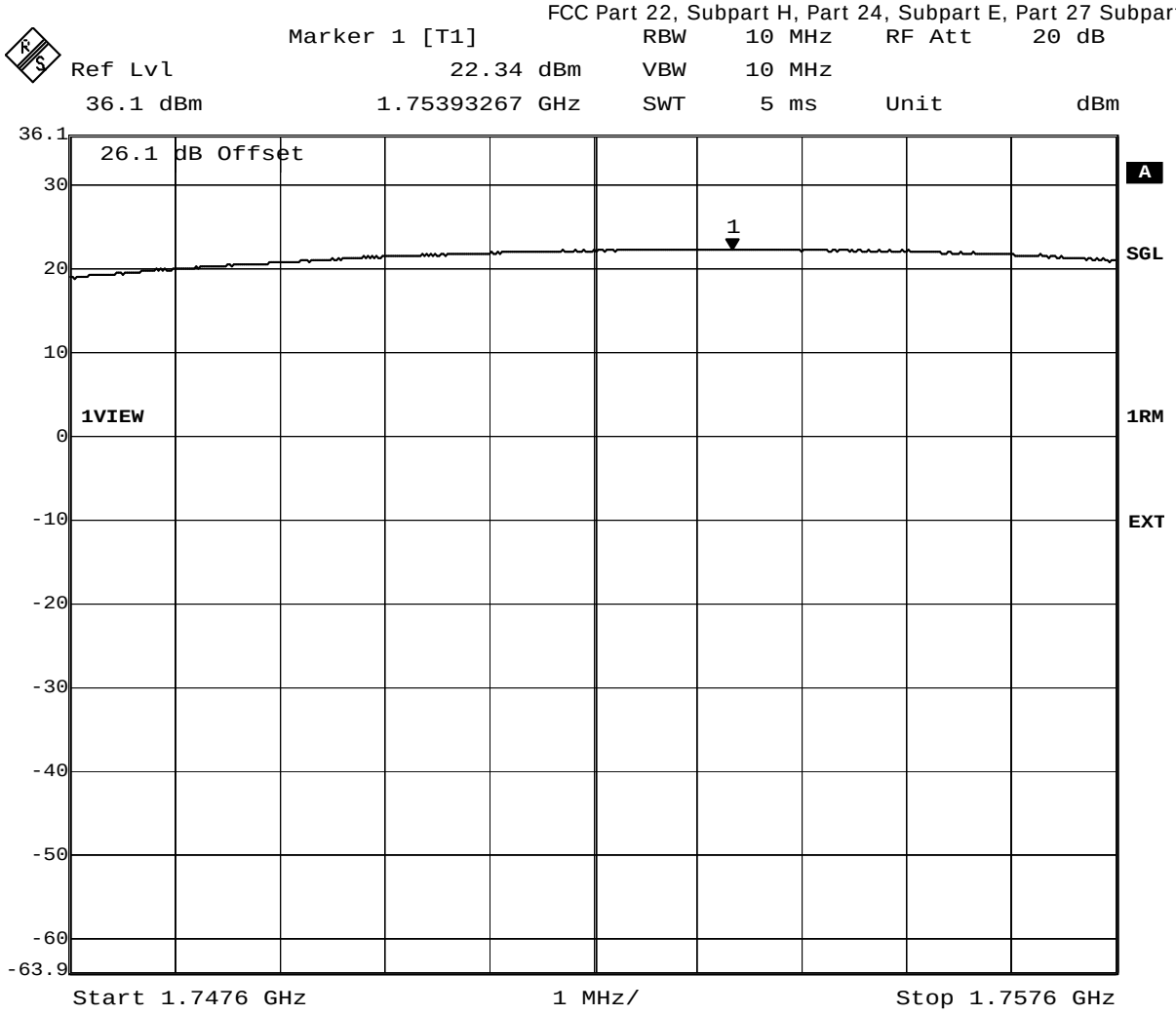
Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak Cond. Power [dBm]	Average Cond. Power [dBm]	RMS Cond. Power [dBm]
eFDD 12 QPSK	low	1	10	-	-	22.22
eFDD 12 QPSK	low	50	10	-	-	20.5
eFDD 12 QPSK	mid	1	10	-	-	22.54
eFDD 12 QPSK	mid	50	10	-	-	20.31
eFDD 12 QPSK	high	1	10	-	-	22.23
eFDD 12 QPSK	high	50	10	-	-	20.08
eFDD 12 16QAM	low	1	10	-	-	21.59
eFDD 12 16QAM	low	27	10	-	-	19.76
eFDD 12 16QAM	mid	1	10	-	-	21.21
eFDD 12 16QAM	mid	27	10	-	-	20.22
eFDD 12 16QAM	high	1	10	-	-	21.05
eFDD 12 16QAM	high	27	10	-	-	20.13



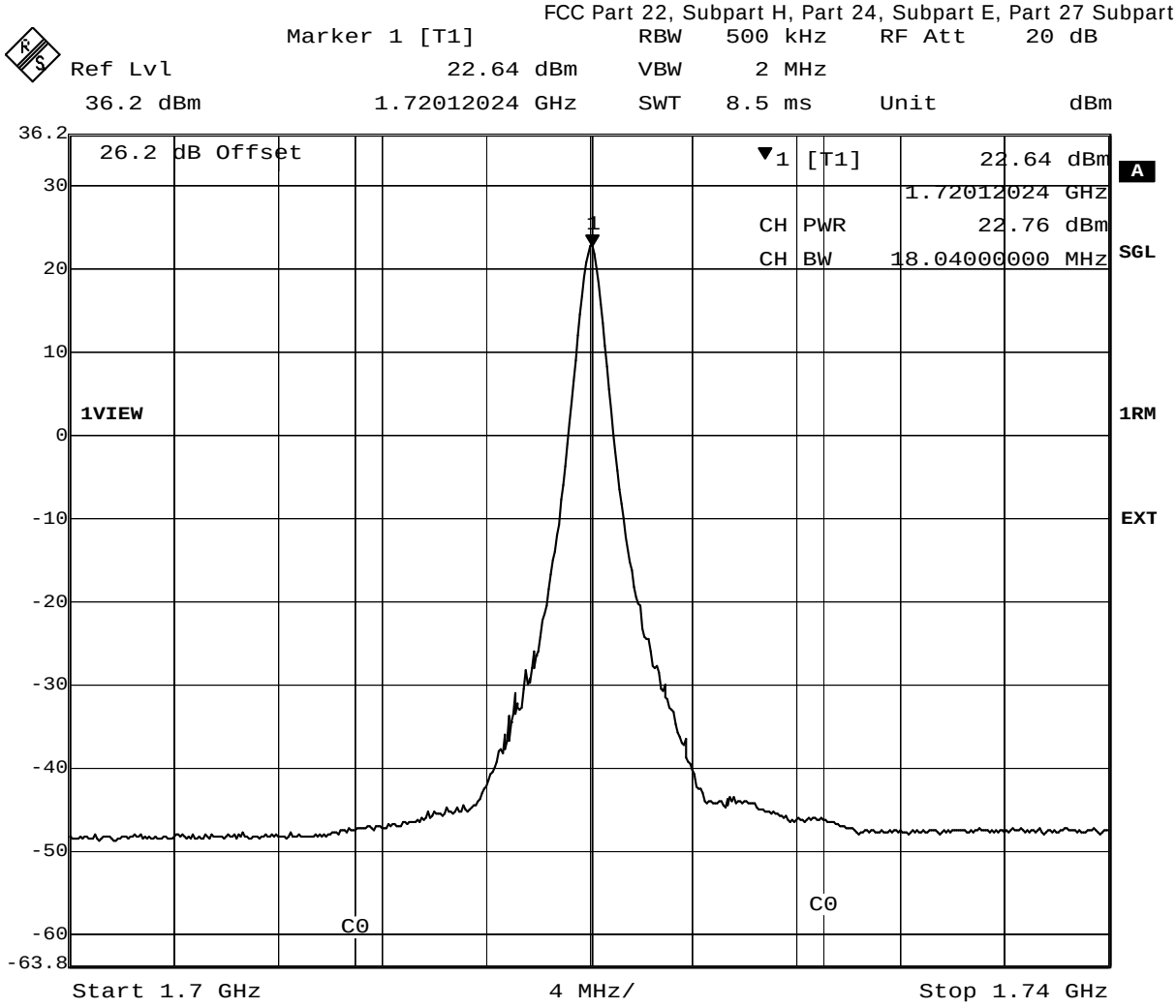
WCDMA FDD4 Channel=high



HSDPA FDD4 Channel=high

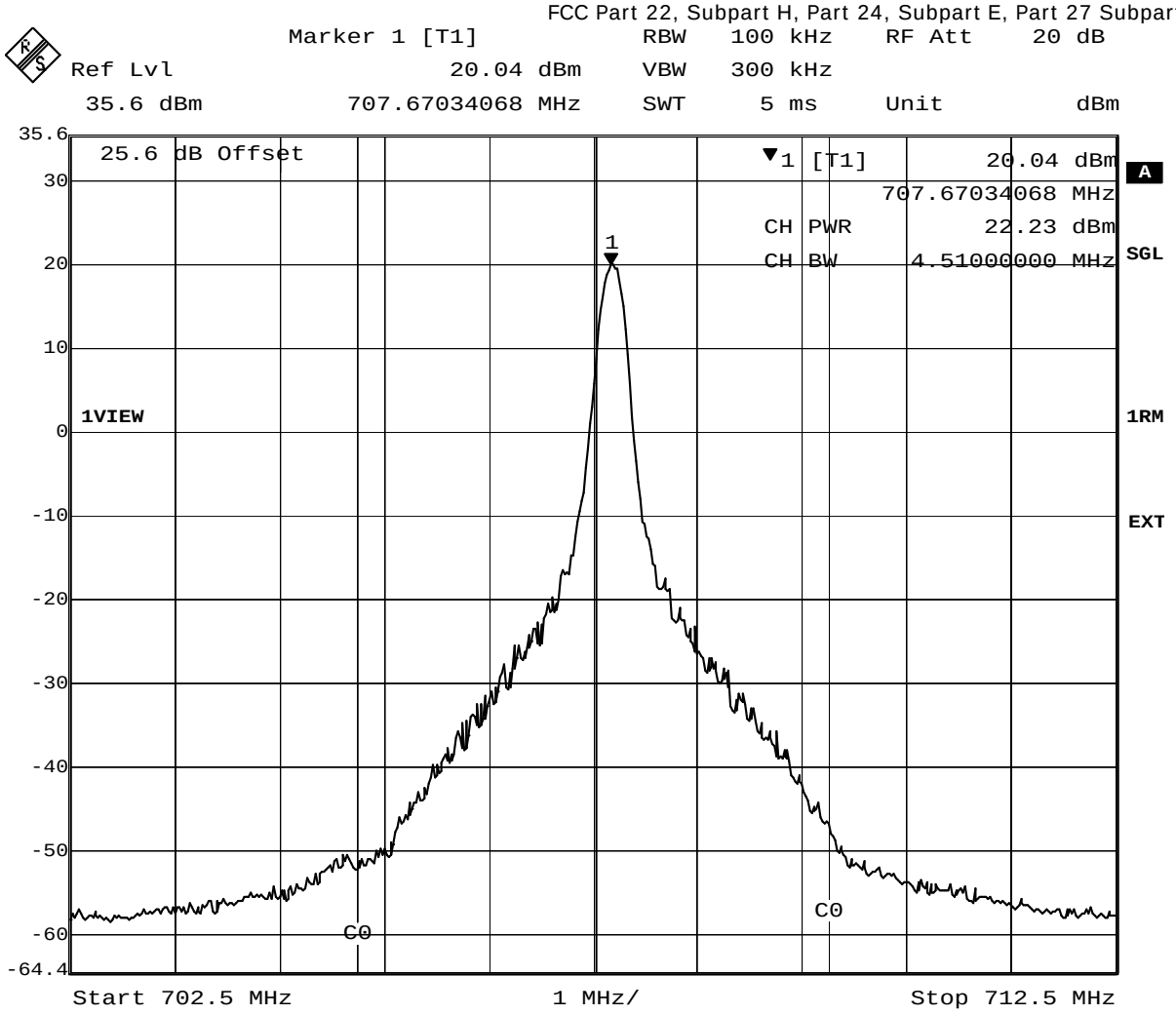


HSUPA FDD4 Channel=high



Date: 19.APR.2018 15:48:47

eFDD4 QPSK 20MHz RB1 Channel=low



Date: 12.APR.2018 14:40:30

eFDD12 QPSK 5MHz RB1 Channel=mid

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.:	S01_AD01
Date of Test:	2018/04/22 9:54
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
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	4350	10	12	passed
-30	5			10	13	passed
-30	10			8	11	passed
-20	0	normal	4350	10	13	passed
-20	5			7	9	passed
-20	10			8	11	passed
-10	0	normal	4350	9	11	passed
-10	5			10	11	passed
-10	10			9	12	passed
0	0	normal	4350	9	11	passed
0	5			10	13	passed
0	10			11	13	passed
10	0	normal	4350	8	11	passed
10	5			10	11	passed
10	10			10	13	passed
20	0	low	4350	3	7	passed
20	5			4	7	passed
20	10			5	9	passed
20	0	normal = high [1)]	4350	5	7	passed
20	5			5	8	passed
20	10			4	7	passed
20	0	high	4350	5	9	passed
20	5			4	6	passed
20	10			5	8	passed
30	0	normal	4350	0	3	passed
30	5			1	-3	passed
30	10			1	3	passed
40	0	normal	4350	1	5	passed
40	5			0	3	passed
40	10			-1	-2	passed
50	0	normal	4350	-6	-9	passed
50	5			-5	-8	passed
50	10			-6	-8	passed

WCDMa FDD4

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

HSDPA FDD4

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

HSUPA FDD4

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4331.25	1	5	passed
-30	5			0	-3	passed
-30	10			-1	-4	passed
-20	0	normal	4331.25	0	-4	passed
-20	5			-2	-6	passed
-20	10			-1	-4	passed
-10	0	normal	4331.25	-2	-7	passed
-10	5			1	4	passed
-10	10			1	4	passed
0	0	normal	4331.25	1	4	passed
0	5			0	-4	passed
0	10			1	3	passed
10	0	normal	4331.25	1	5	passed
10	5			0	-4	passed
10	10			0	-6	passed
20	0	low	4331.25	0	-3	passed
20	5			0	4	passed
20	10			0	-3	passed
20	0	normal = high [1)]	4331.25	0	-4	passed
20	5			0	-5	passed
20	10			-1	-4	passed
20	0	high	4331.25	0	-5	passed
20	5			0	5	passed
20	10			0	5	passed
30	0	normal	4331.25	0	-5	passed
30	5			1	3	passed
30	10			1	5	passed
40	0	normal	4331.25	-2	-5	passed
40	5			1	6	passed
40	10			1	4	passed
50	0	normal	4331.25	0	4	passed
50	5			1	5	passed
50	10			0	2	passed

LTE eFDD4

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	1775	2	4.6	passed
-30	5			1.2	6.3	passed
-30	10			1.6	-5.8	passed
-20	0	normal	1775	-2	-4.9	passed
-20	5			-1.3	-0.3	passed
-20	10			1.7	-1.8	passed
-10	0	normal	1775	1.6	-6	passed
-10	5			2.3	5	passed
-10	10			0.4	-4.8	passed
0	0	normal	1775	0.9	-2.6	passed
0	5			1.6	3.7	passed
0	10			-2.8	2.9	passed
10	0	normal	1775	-3.1	2.6	passed
10	5			3.5	-6.3	passed
10	10			4	-4.8	passed
20	0	low	1775	3.6	5.9	passed
20	5			2.8	12.3	passed
20	10			2.4	5.1	passed
20	0	normal = high [1)]	1775	1.6	-4.6	passed
20	5			1.4	-5.2	passed
20	10			1.9	-6.8	passed
20	0	high	1775	1.7	9.4	passed
20	5			-1.9	9.8	passed
20	10			-4.3	10.1	passed
30	0	normal	1775	-2.6	-4.5	passed
30	5			-0.6	-4.8	passed
30	10			-1.3	4.1	passed
40	0	normal	1775	-0.5	2.9	passed
40	5			-0.4	-1.8	passed
40	10			2.3	-3.6	passed
50	0	normal	1775	-1.2	-4.8	passed
50	5			-3	3.9	passed
50	10			-1.9	4	passed

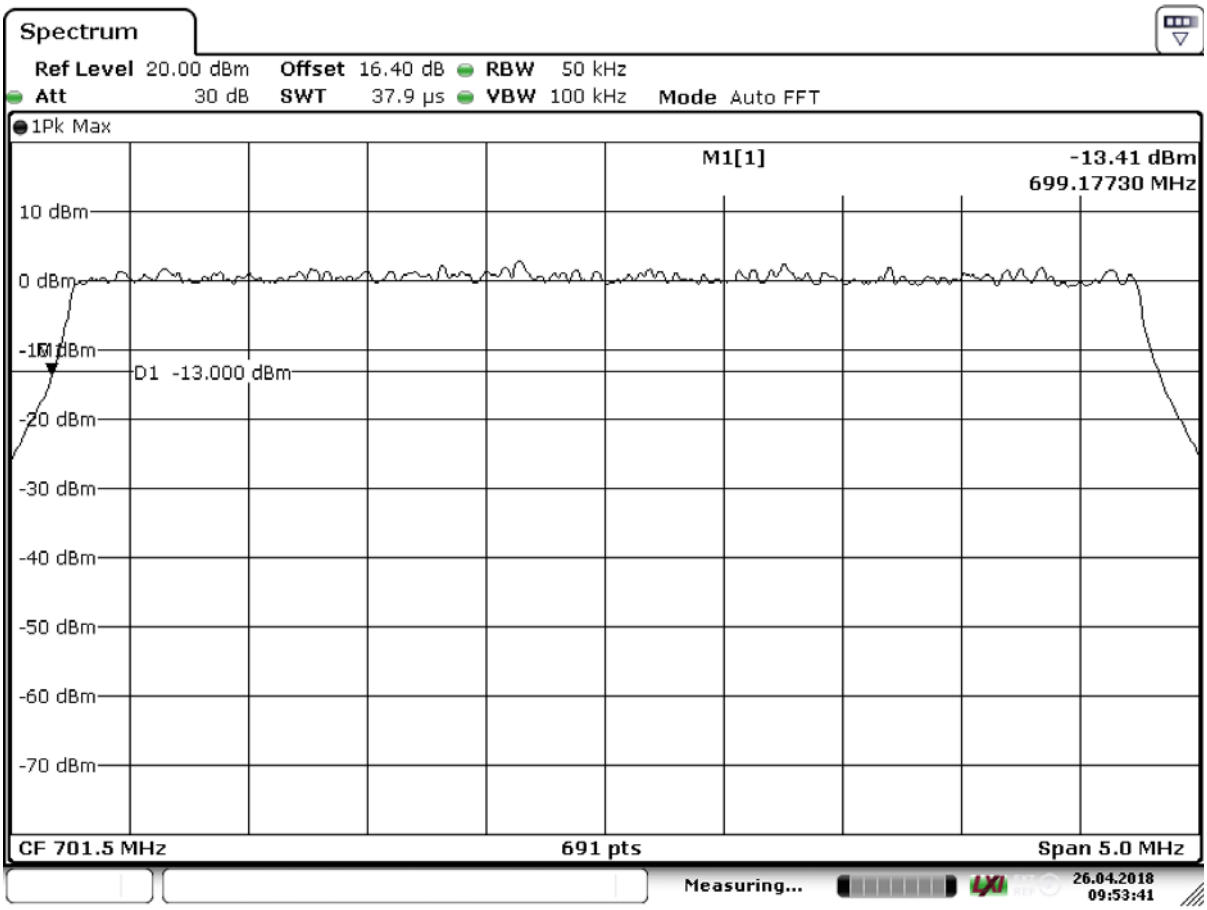
x

LTE eFDD12

RSS-130 4.3

LTE eFDD12						
BW (MHz) / Resource Blocks	f_L (MHz)	f_H (MHz)	Max. Frequency Error (Hz)	Resulting Freq. (MHz)	Limit (MHz)	Result
5 / 25	699.1773	-	12	699.18	698	Passed
	-	715.83	12	715.83	716	Passed

LTE eFDD12



Date: 26.APR.2018 09:53:40

eFDD12 QPSK 5MHz RB6 Channel=low

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.:	S01_AD01
Date of Test:	2018/04/19 9:59
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:

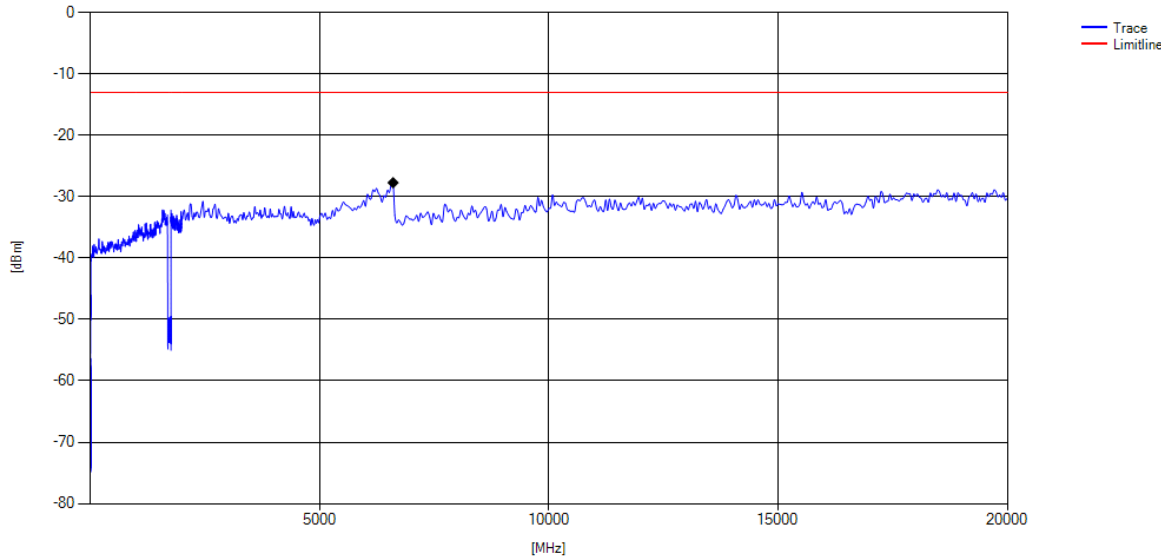
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
WCDMa FDD4	low	-	-	-	-	-	-13	>20
WCDMa FDD4	mid 1	-	-	-	-	-	-13	>20
WCDMa FDD4	mid 2	-	-	-	-	-	-13	>20
WCDMa FDD4	high	-	-	-	-	-	-13	>20

Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSDPA FDD4	low	rms	maxhold	50	1709.8	-26.21	-13	13.21
HSDPA FDD4	mid 1	-	-	-			-13	>20
HSDPA FDD4	mid 2	-	-	-			-13	>20
HSDPA FDD4	high	rms	maxhold	50	1755.1	-27.52	-13	14.52

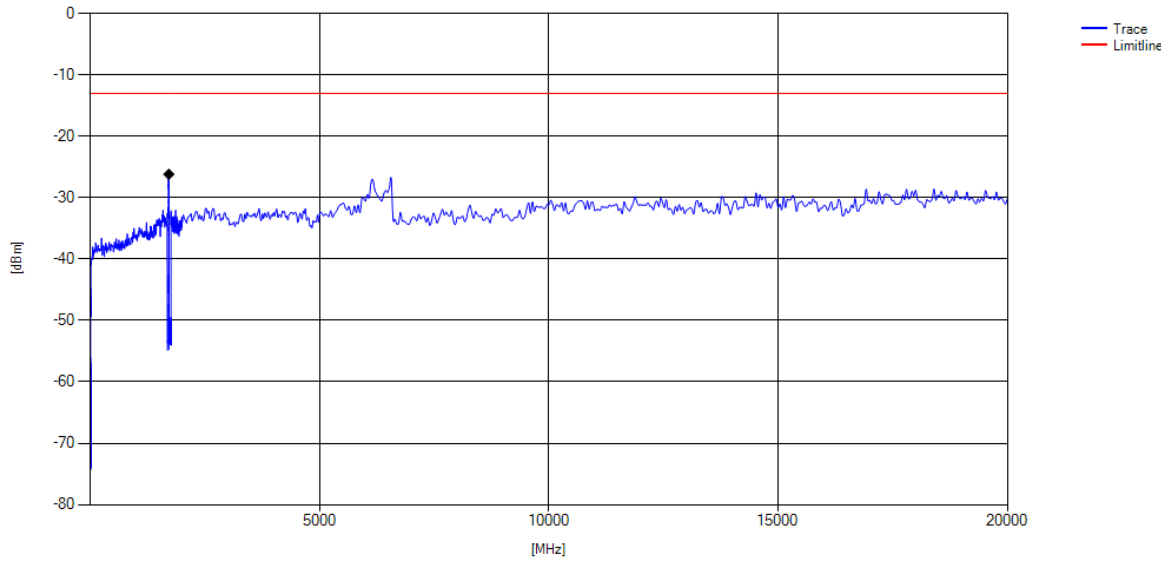
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
HSUPA FDD4	low	-	-	-	-	-	-13	>20
HSUPA FDD4	mid 1	-	-	-	-	-	-13	>20
HSUPA FDD4	mid 2	-	-	-	-	-	-13	>20
HSUPA FDD4	high	-	-	-	-	-	-13	>20

Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD4	low	-	-	-	-	-	-13	>20
eFDD4	mid	rms	maxhold	1000	2132.6	-31.3	-13	18.3
eFDD4	high	rms	maxhold	5	1755	-32.33	-23	9.33

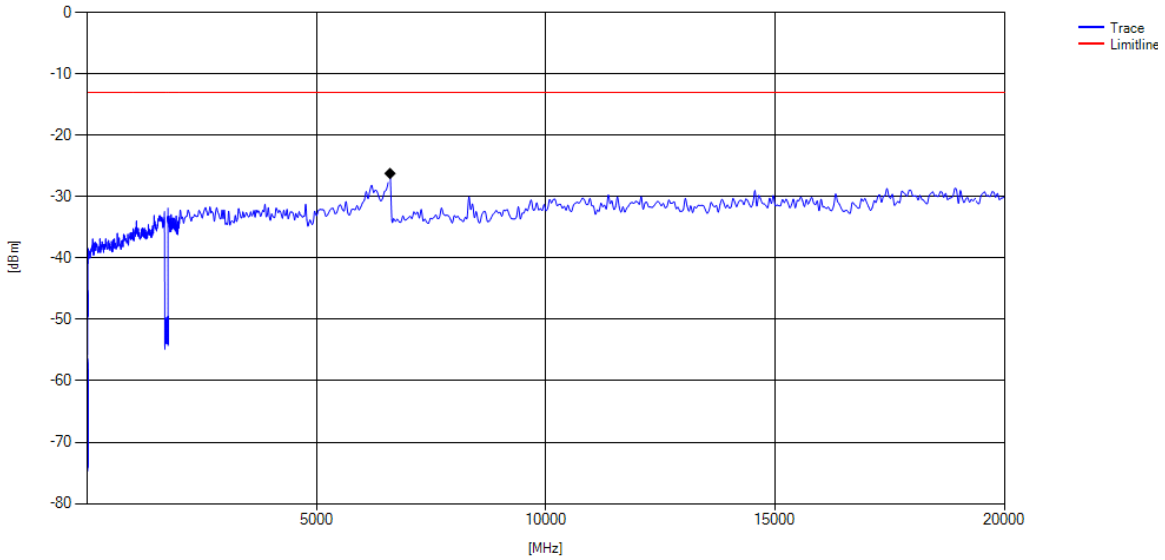
Radio Technology	CH	Detector	Trace	Resolution Bandwidth /kHz	Frequency /MHz	Peak Value /dBm	Limit /dBm	Margin to Limit /dB
eFDD12	low	-	-	-			-13	>20
eFDD12	mid	-	-	-			-13	>20
eFDD12	high	-	-	-			-13	>20



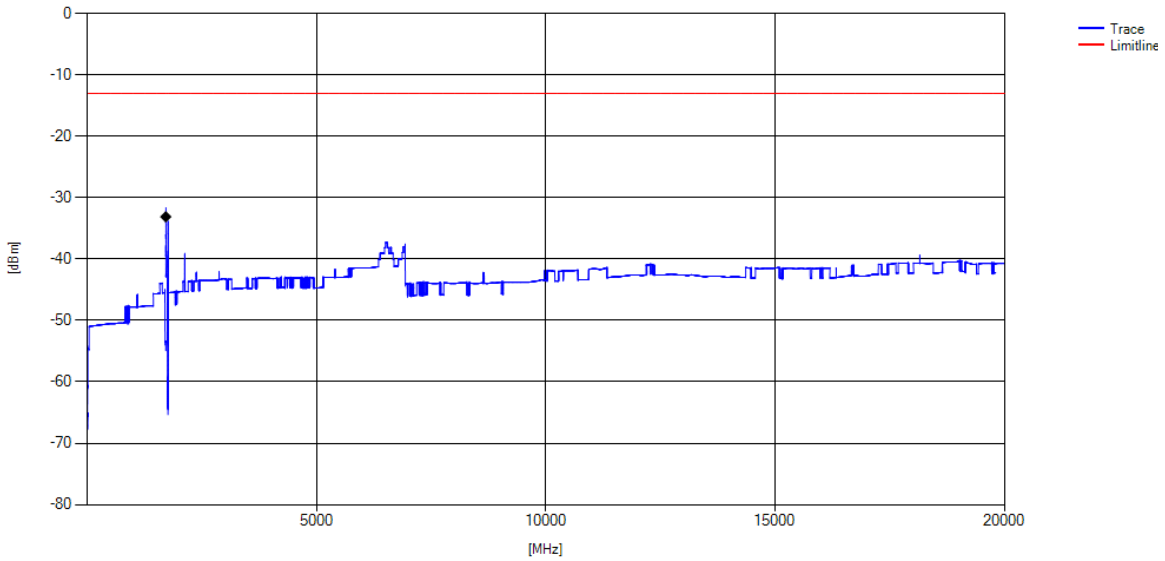
WCDMA FDD4 Channel=mid1



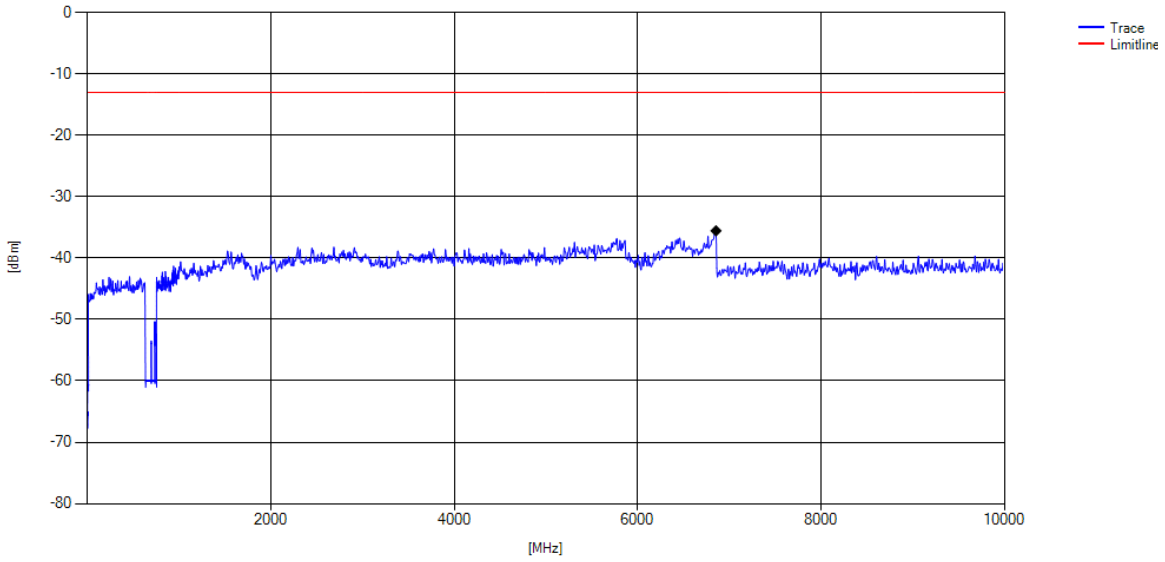
HSDPA_FDD4_CH-low



HSUPA FDD4 Channel=mid1



LTE eFDD4 Channel=high



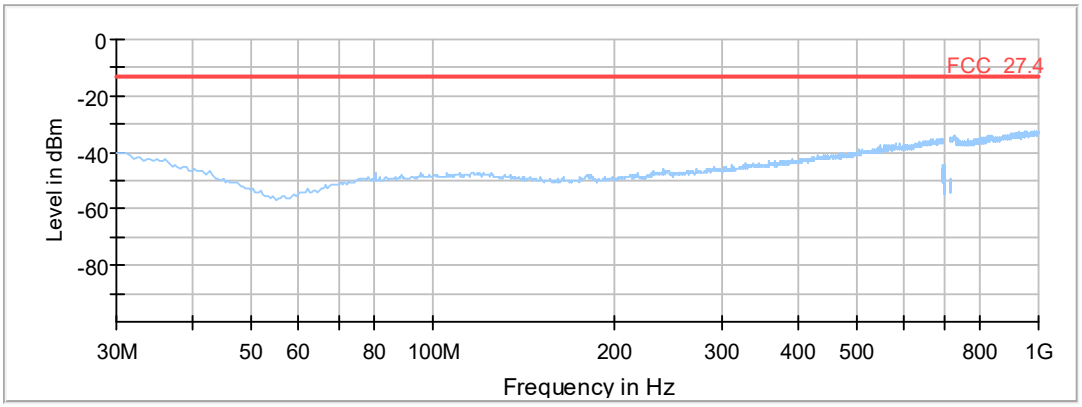
LTE eFDD12 Channel=mid

3.5.18 27.4 Field strength of spurious radiation §2.1053, §27.53

Test: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23035, Frequency = 701.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 9:09
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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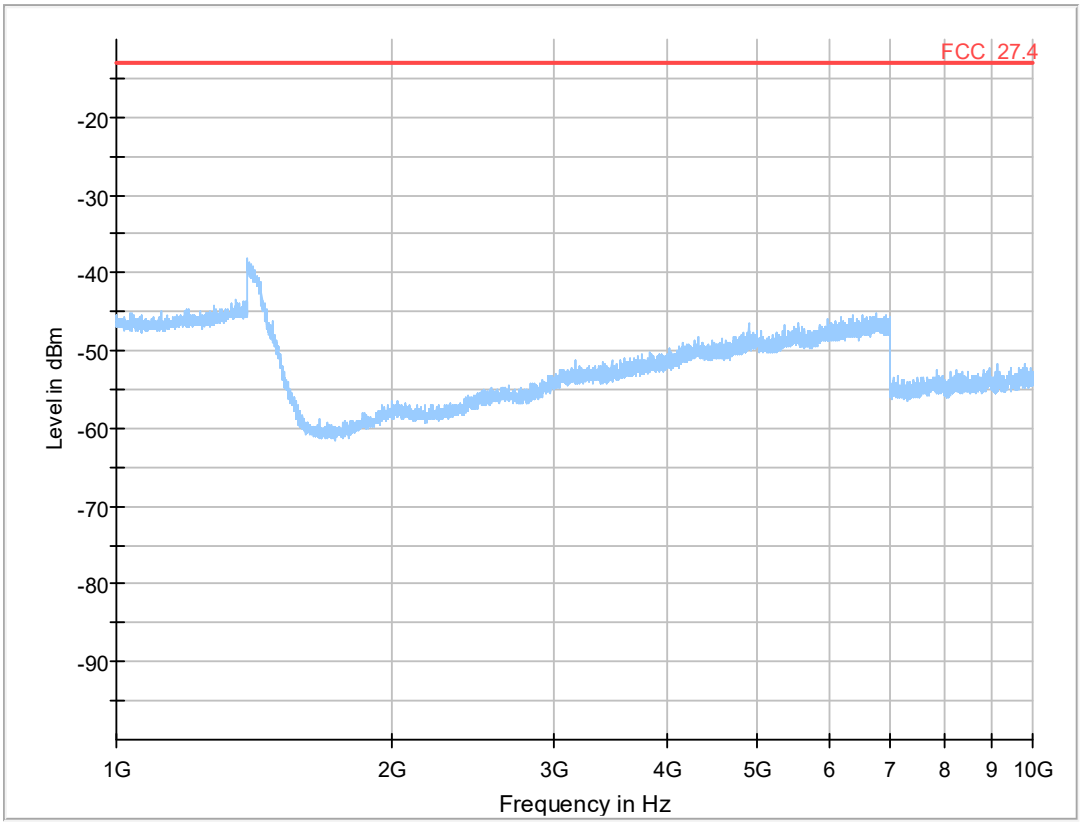

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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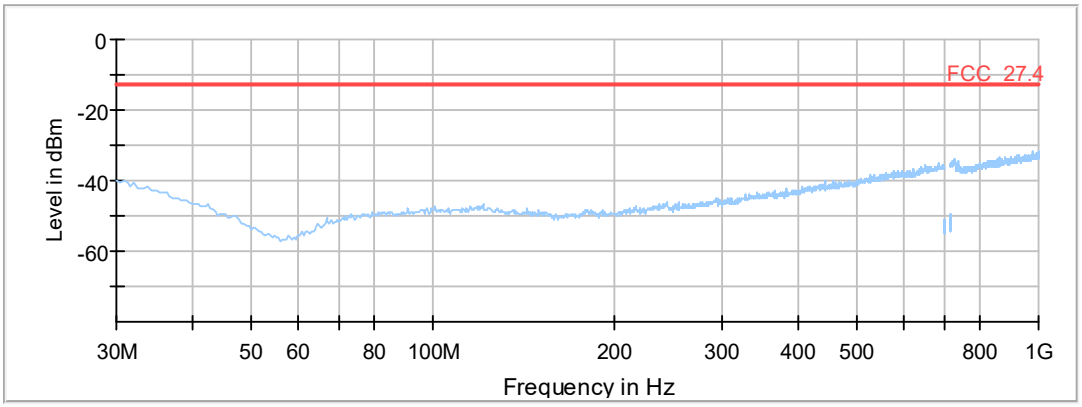
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---

Test: 27.4; Frequency Band = eFDD12, Mode = QPSK 5MHz, Channel = 23095, Frequency = 707.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 9:09
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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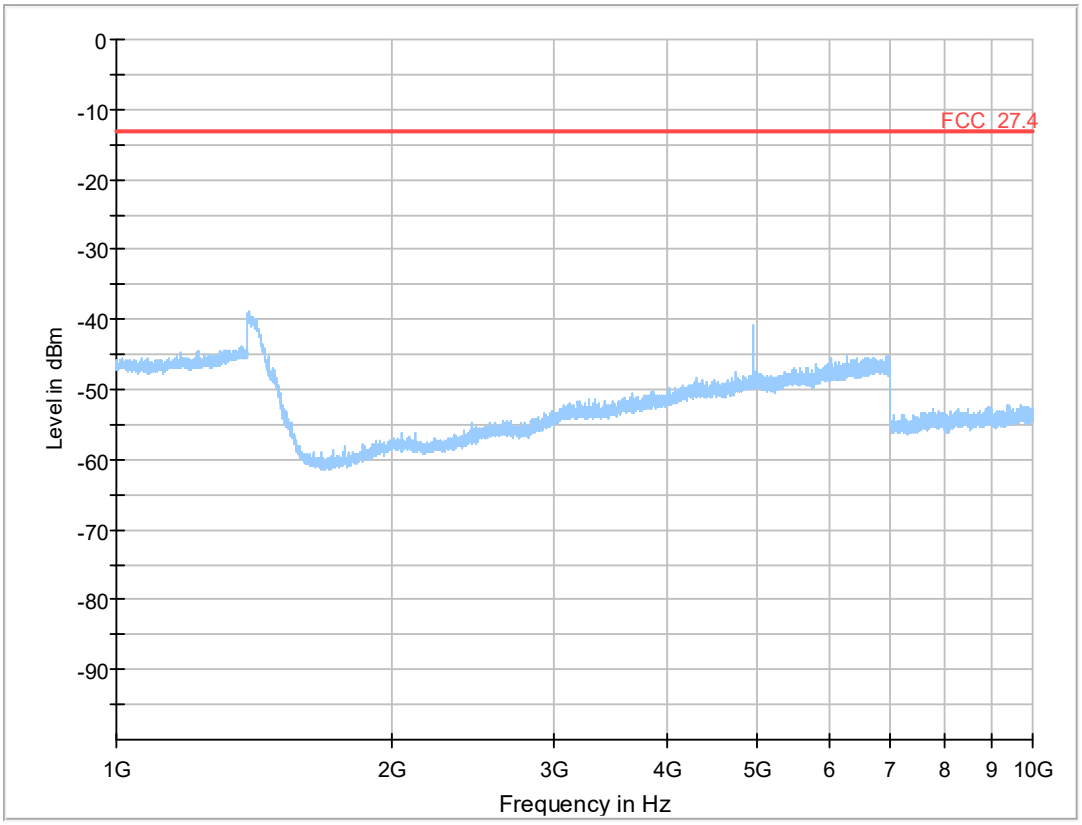


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---

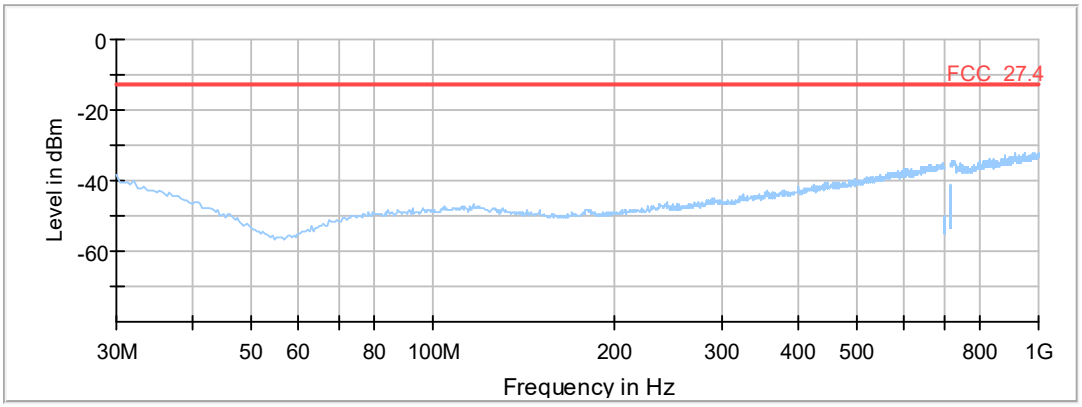
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---	---

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

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 9:10
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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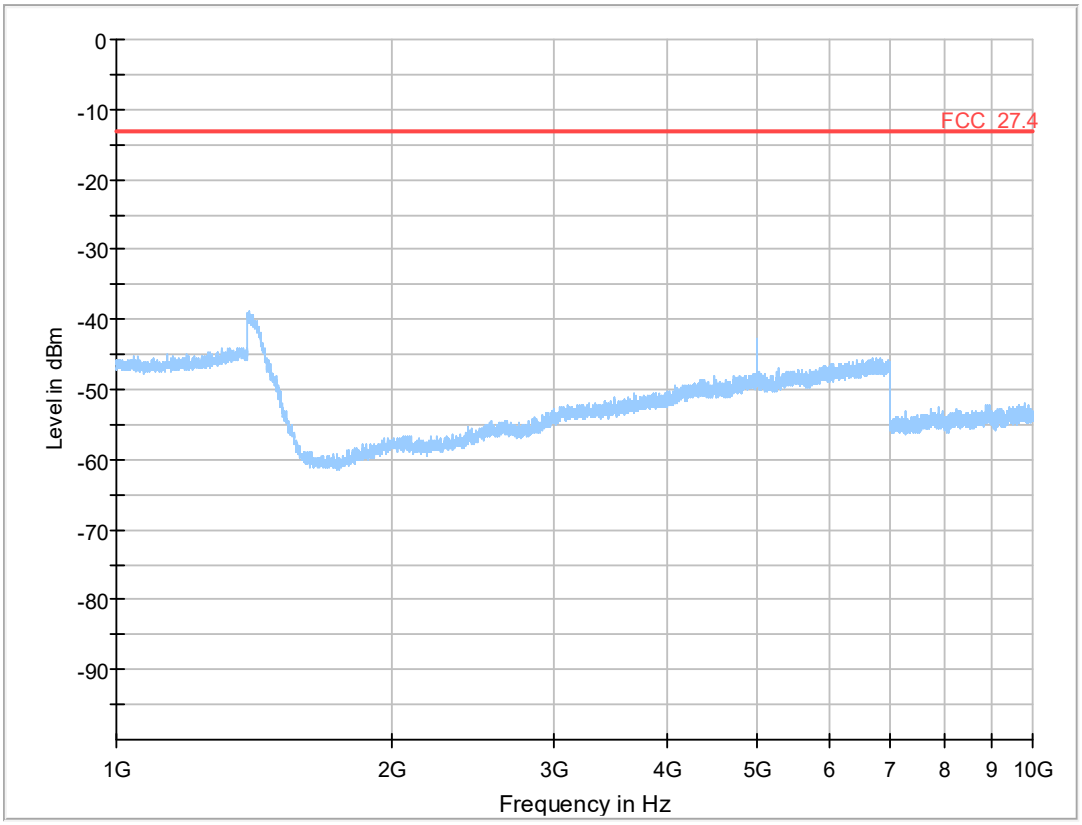

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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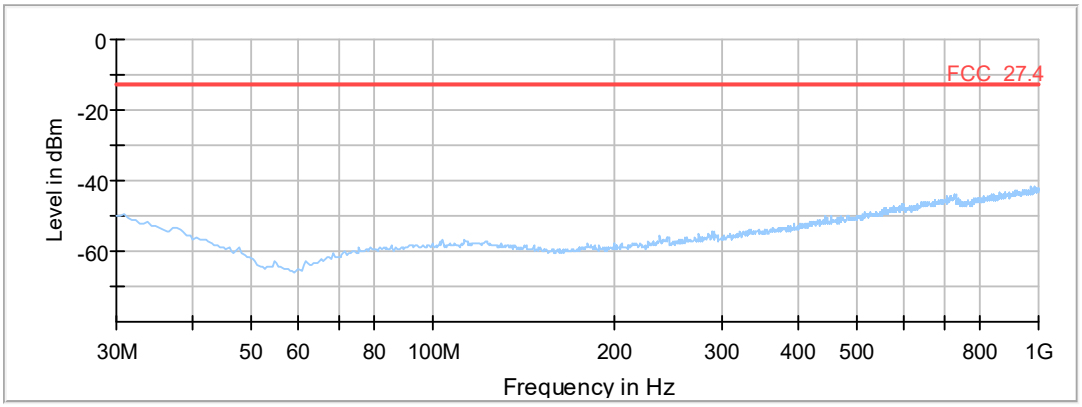
Test: 27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 19975, Frequency = 1712.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 9:03
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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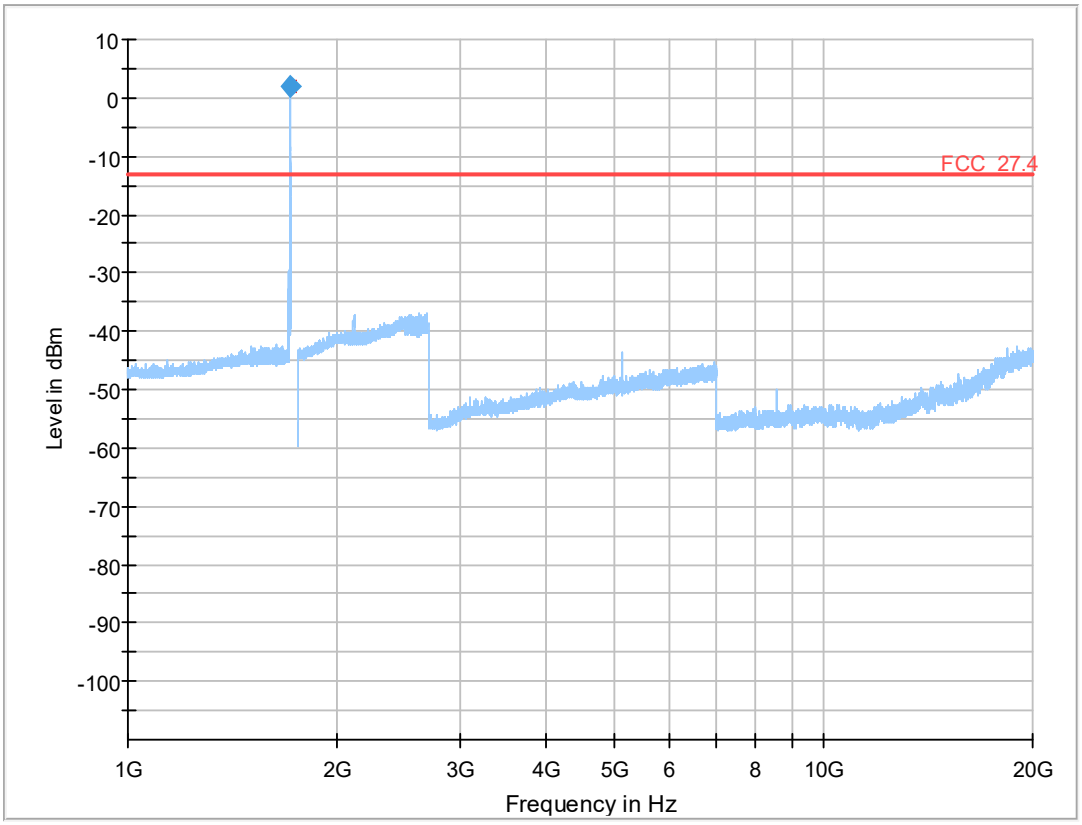
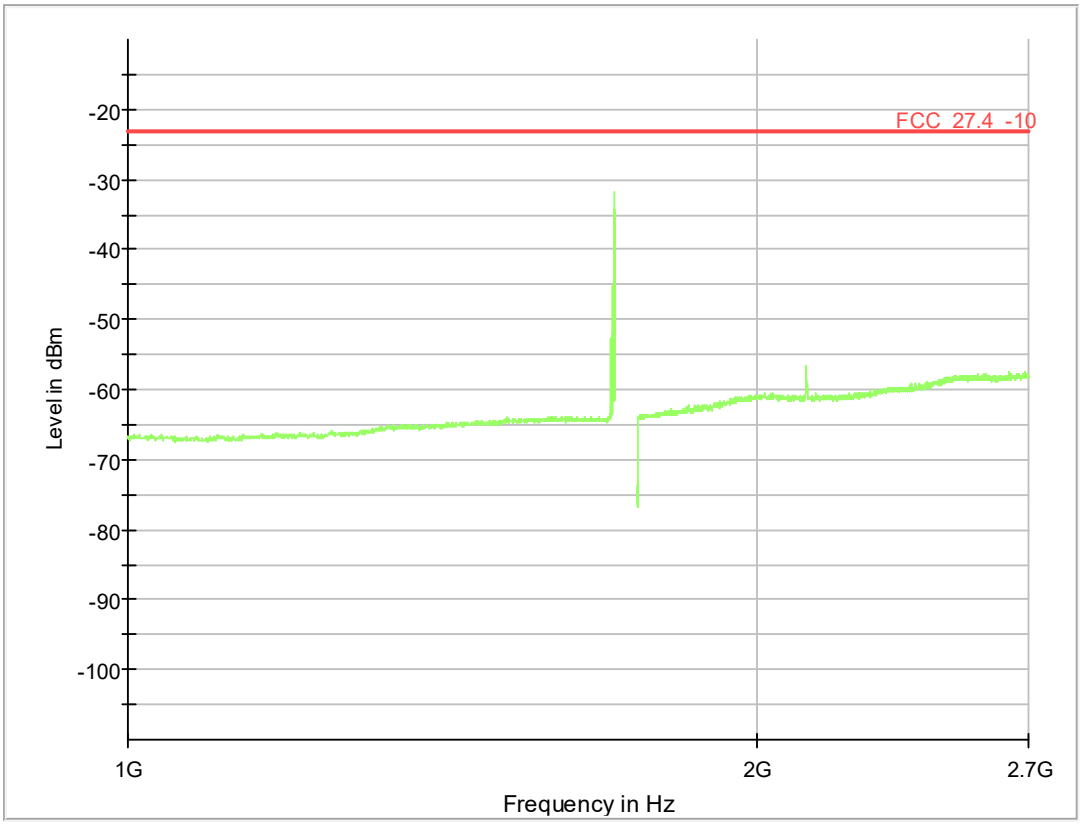


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.000000	1.93	-13.00	-14.93	2000.0	1000.000	150.0	V	0.0	90.0	-67

Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.000000	1.93	-13.00	-14.93	2000.0	1000.000	150.0	V	0.0	90.0	-67



Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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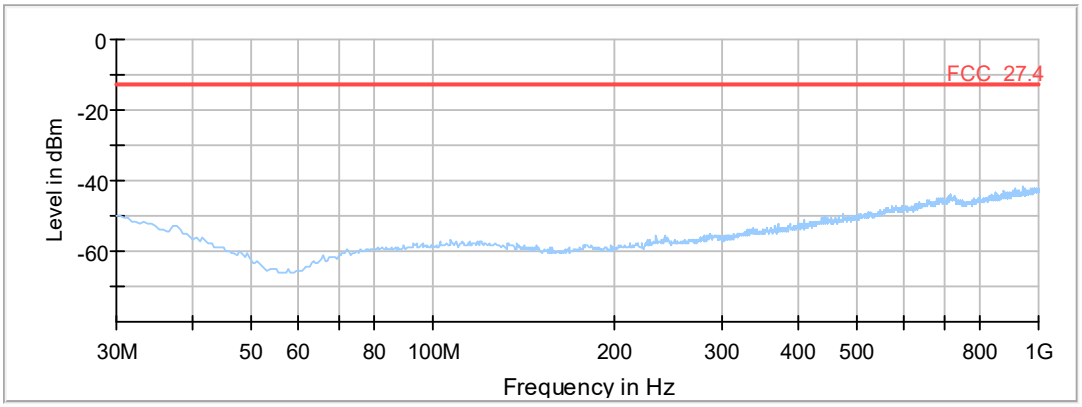
remeasurement at carrier

Test: 27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20175, Frequency = 1732.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 9:04
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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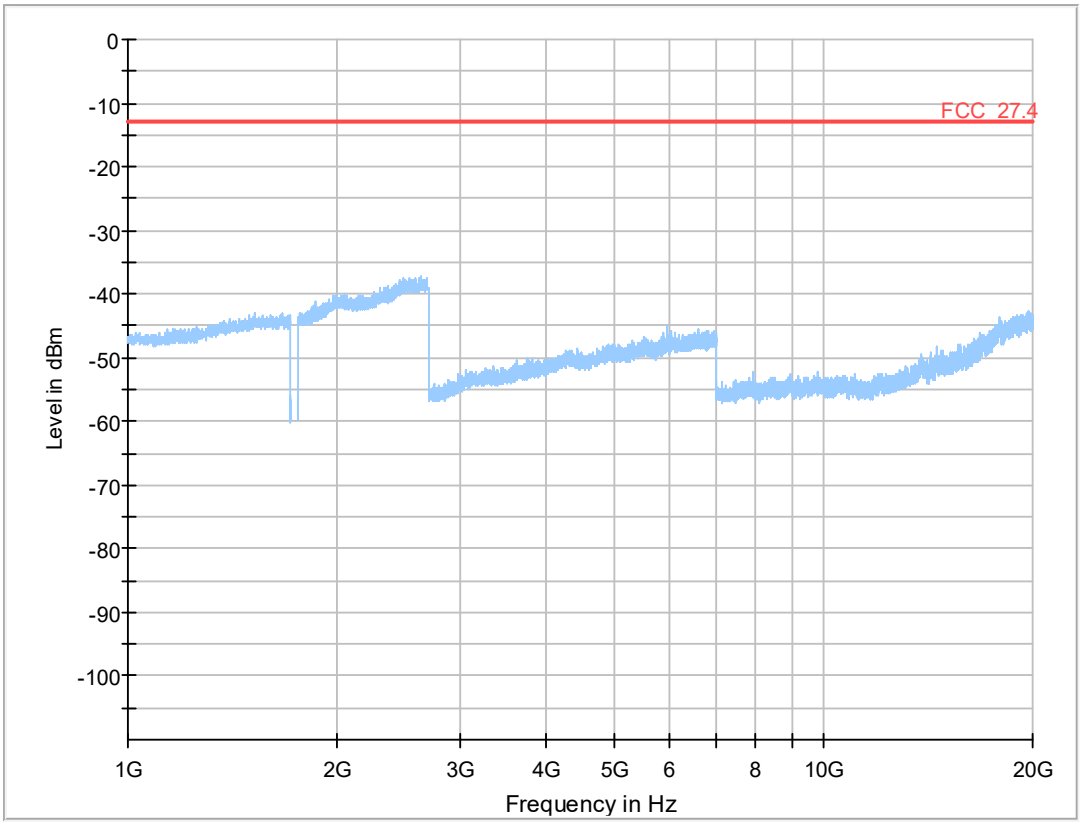

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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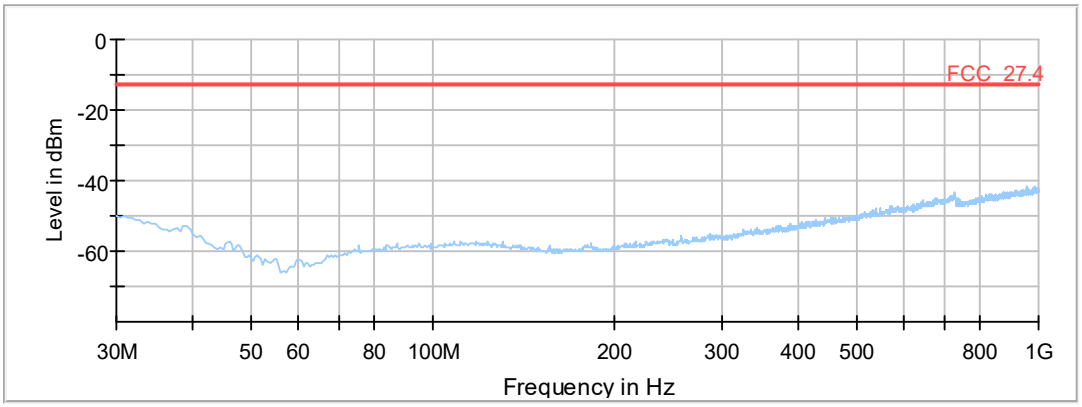
Test: 27.4; Frequency Band = eFDD4, Mode = QPSK 5MHz, Channel = 20375, Frequency = 1752.5MHz, Method = radiated

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 9:05
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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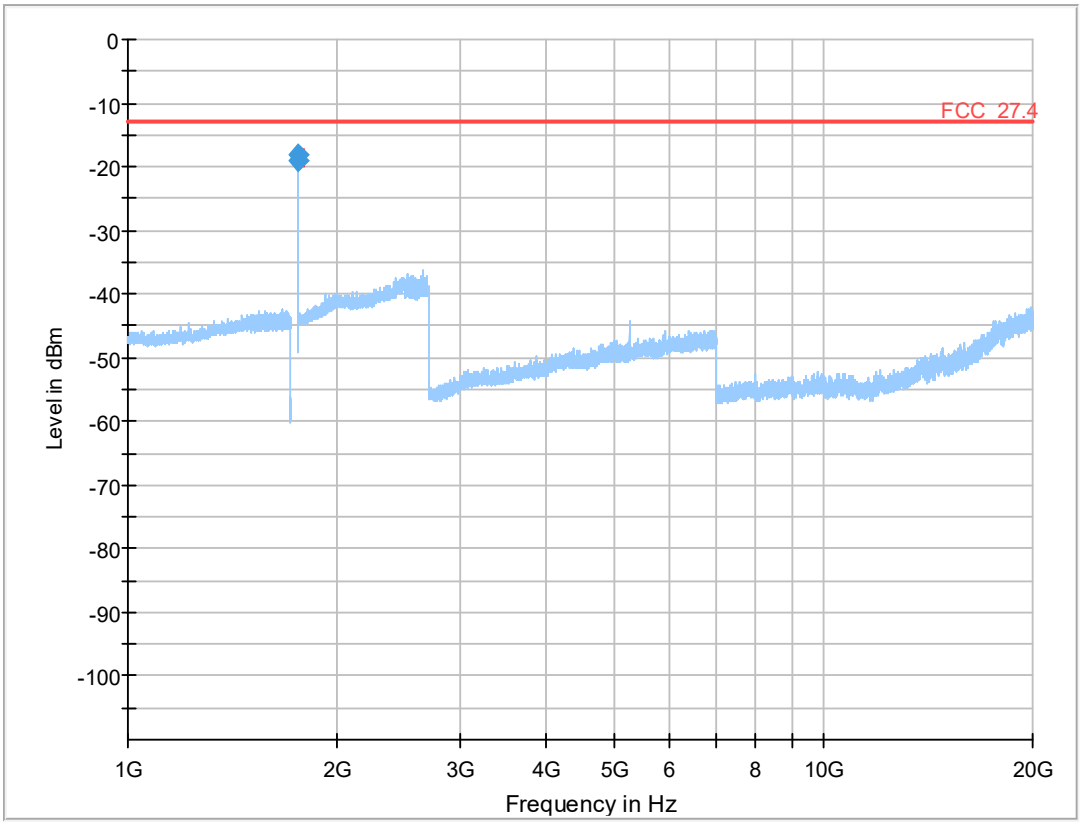


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1756.000000	-18.05	-13.00	5.05	2000.0	1000.000	150.0	V	90.0	90.0	-66
1756.372000	-18.99	-13.00	5.99	2000.0	1000.000	150.0	V	0.0	90.0	-66

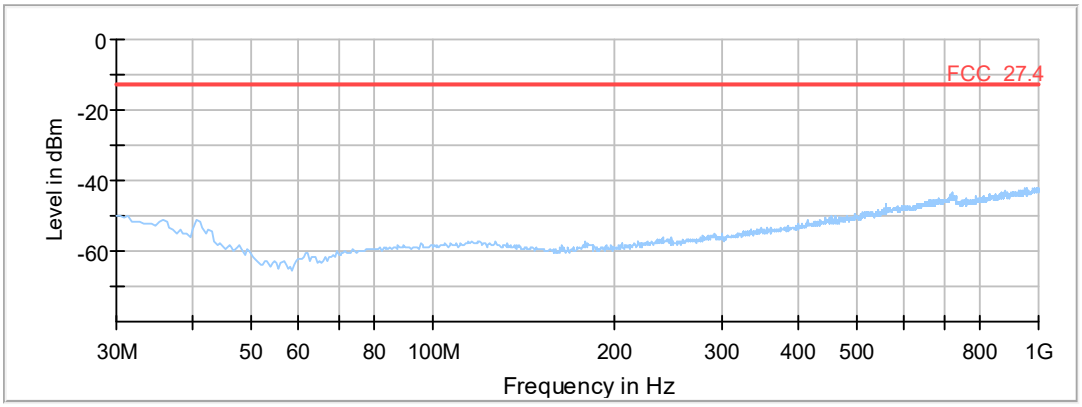
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1756.000000	-18.05	-13.00	5.05	2000.0	1000.000	150.0	V	90.0	90.0	-66
1756.372000	-18.99	-13.00	5.99	2000.0	1000.000	150.0	V	0.0	90.0	-66

Test: 27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1312, Frequency = 1712.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:31
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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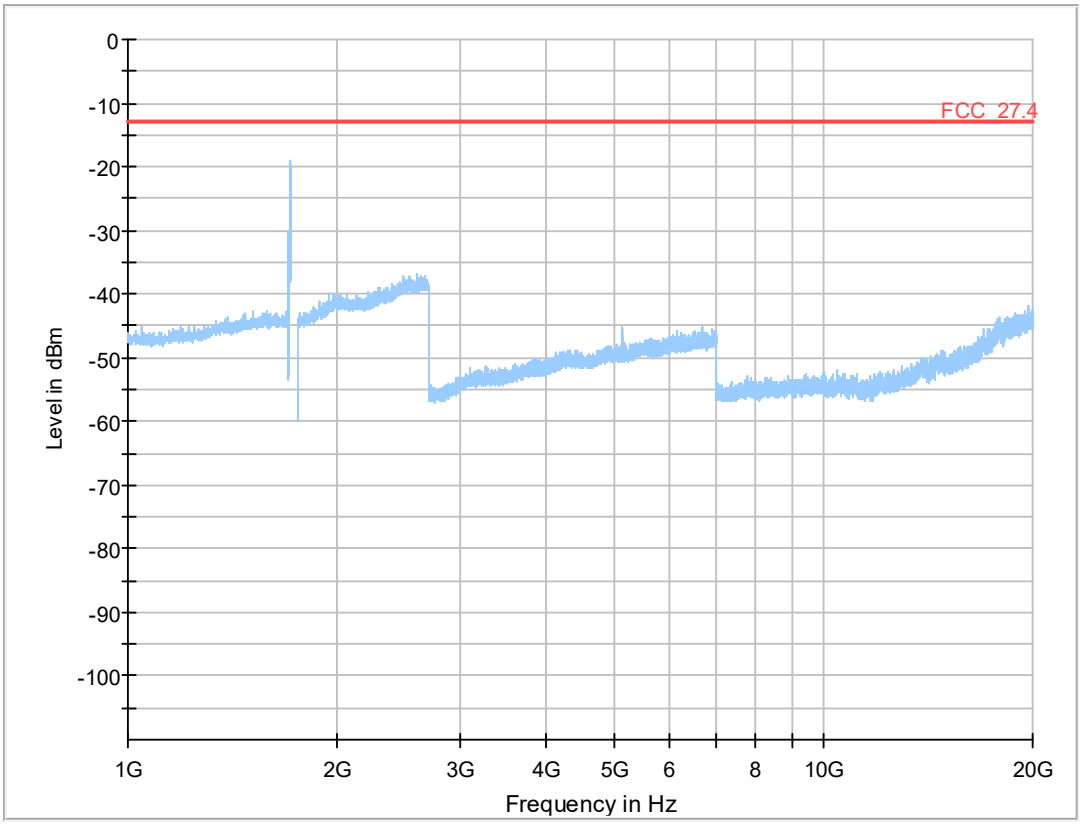

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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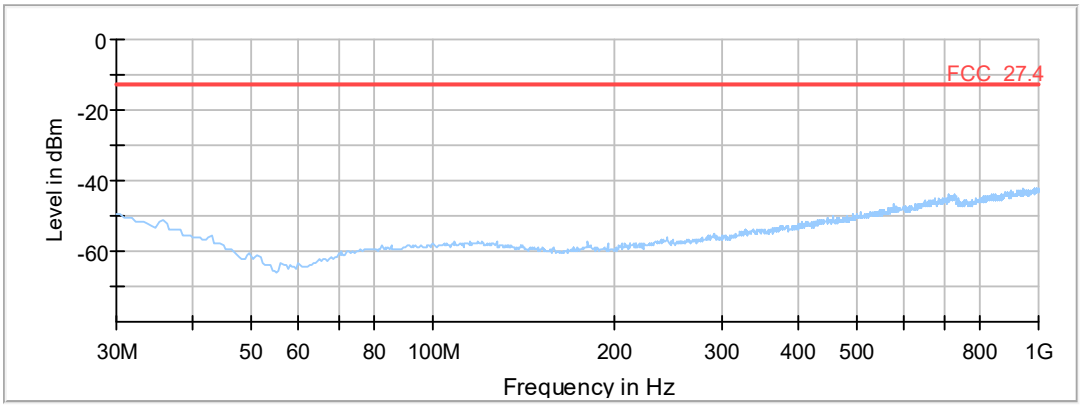
Test: 27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1412, Frequency = 1732.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:32
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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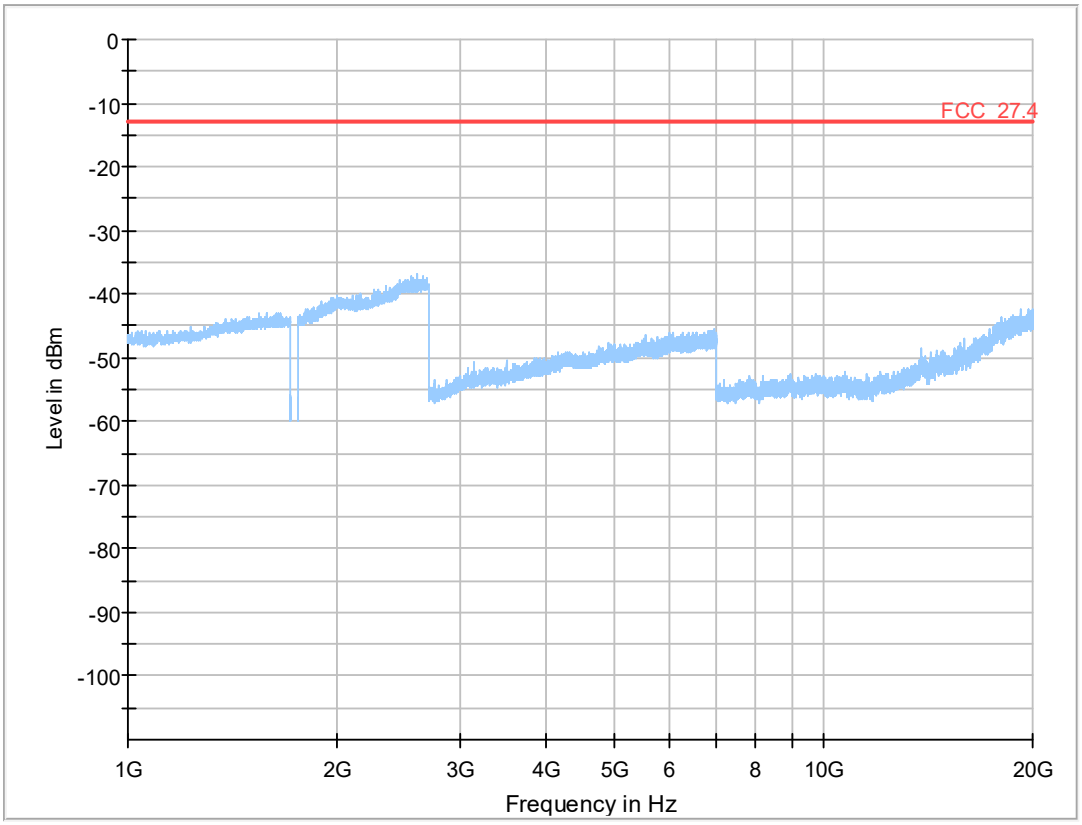

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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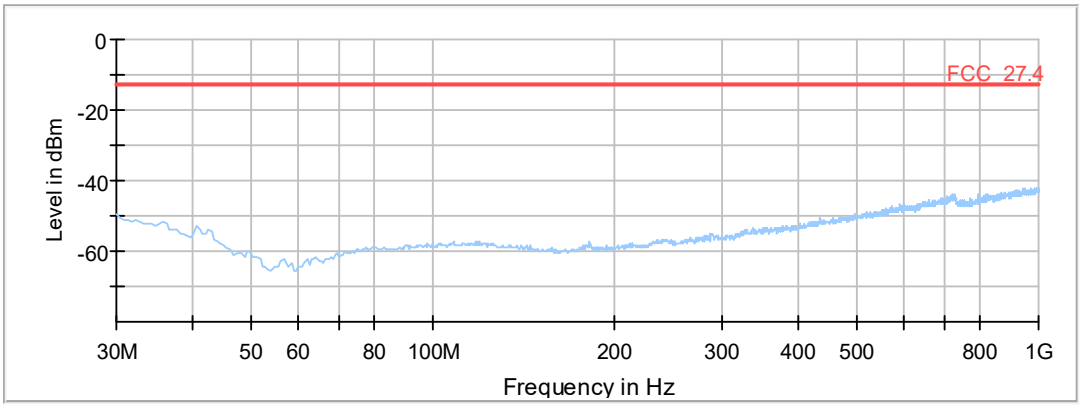
Test: 27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1450, Frequency = 1740.0MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:33
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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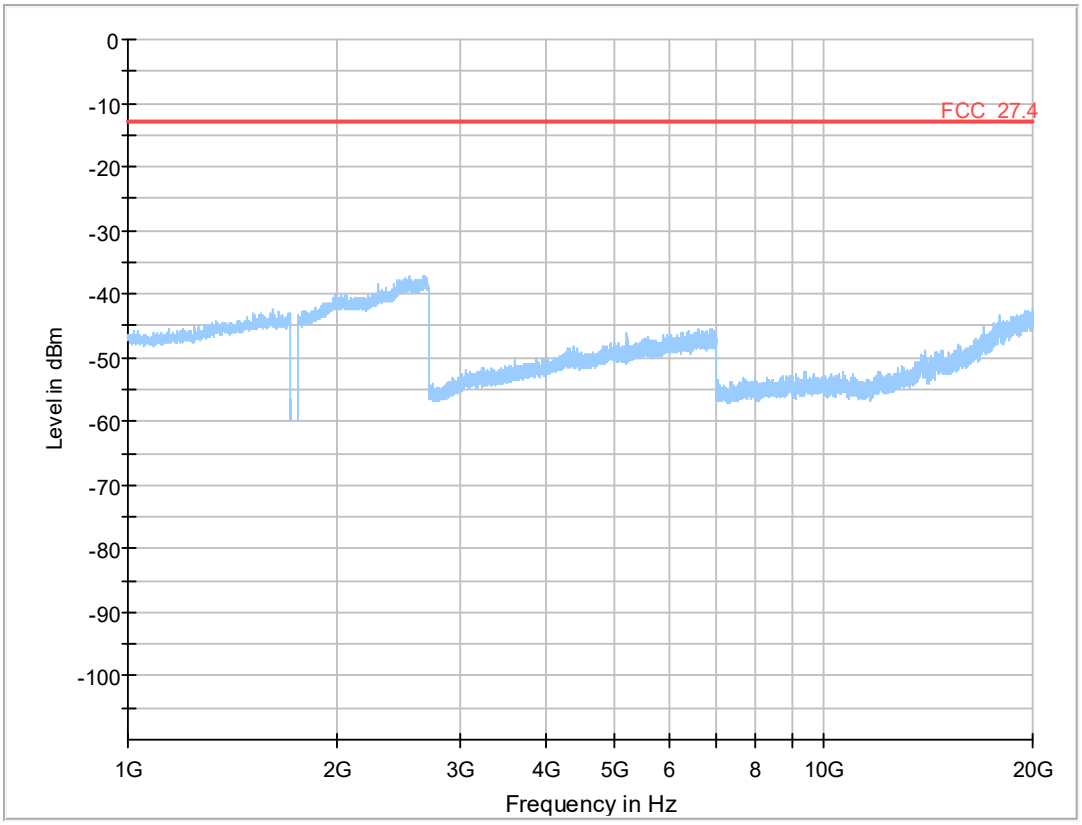

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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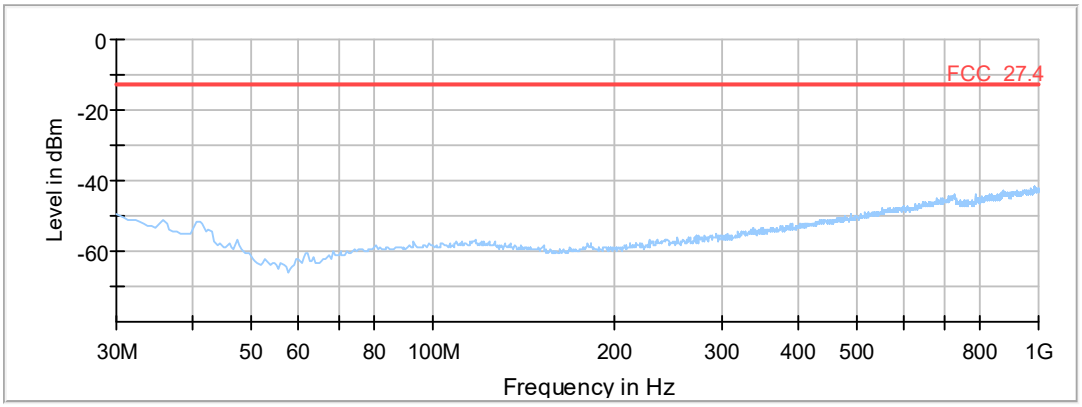
Test: 27.4; Frequency Band = FDD4, Mode = HSDPA, Channel = 1513, Frequency = 1752.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:29
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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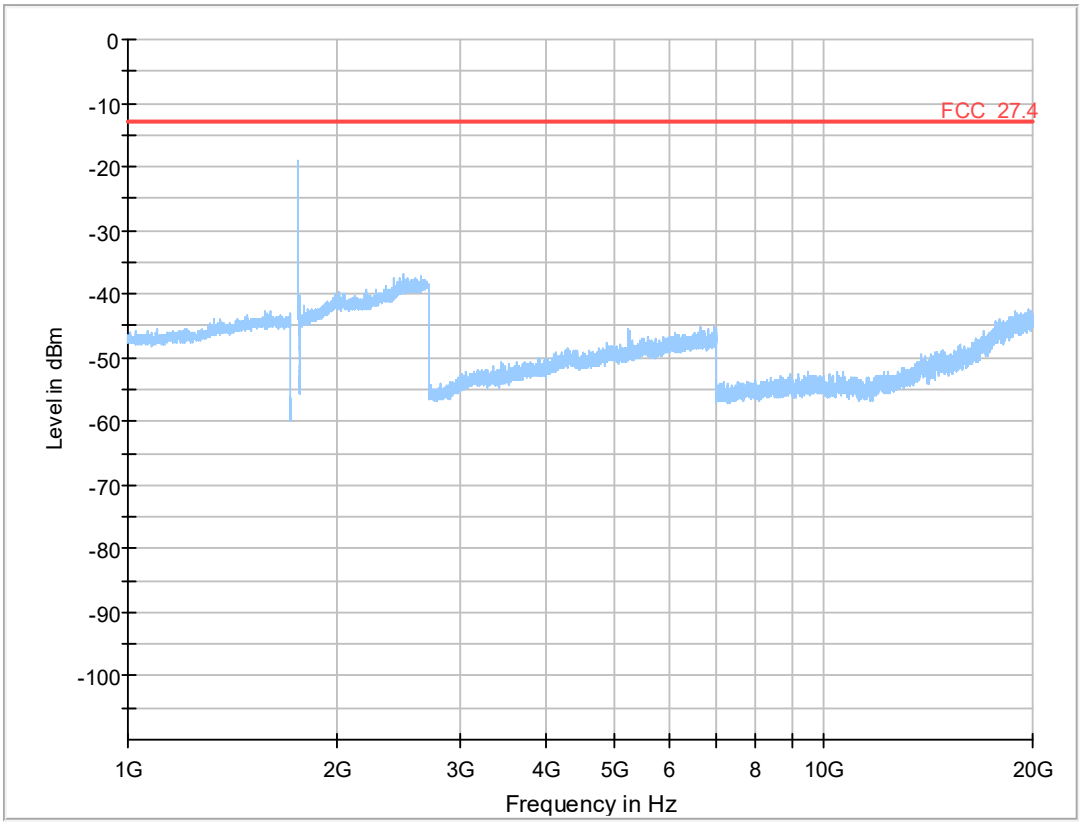

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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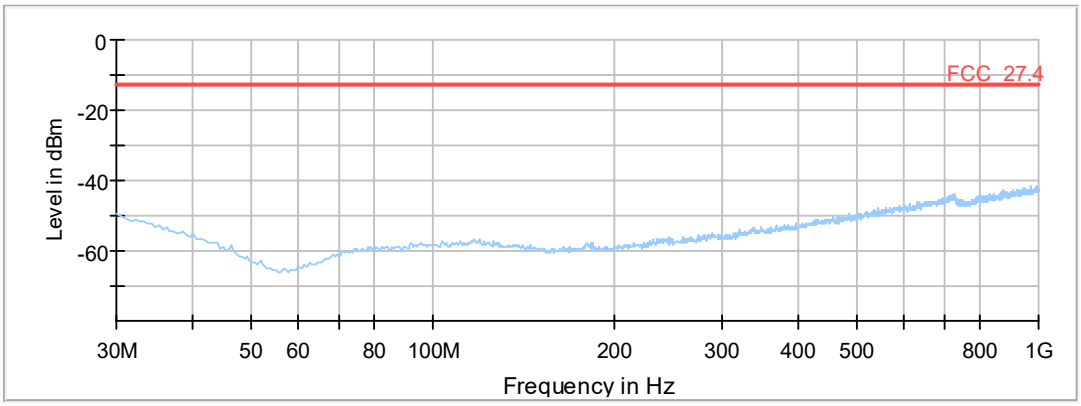
Test: 27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1312, Frequency = 1712.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:07
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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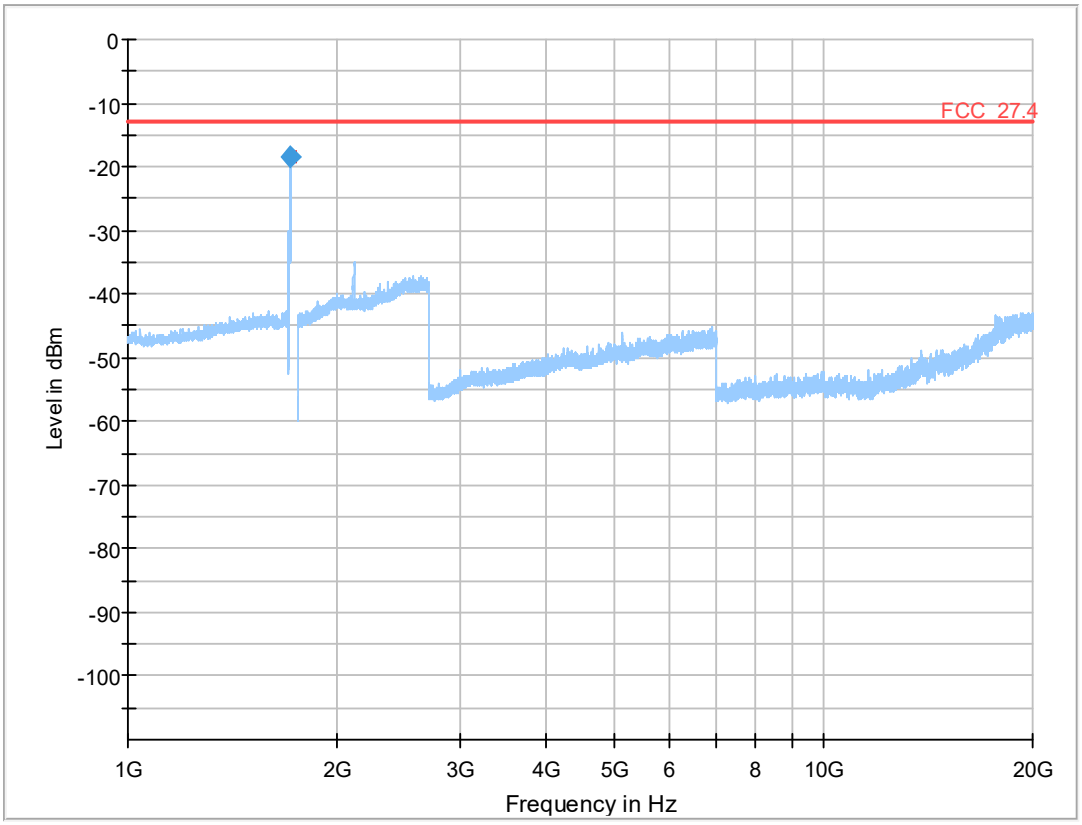


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.843000	-18.43	-13.00	5.43	1000.0	50.000	150.0	V	0.0	90.0	-67

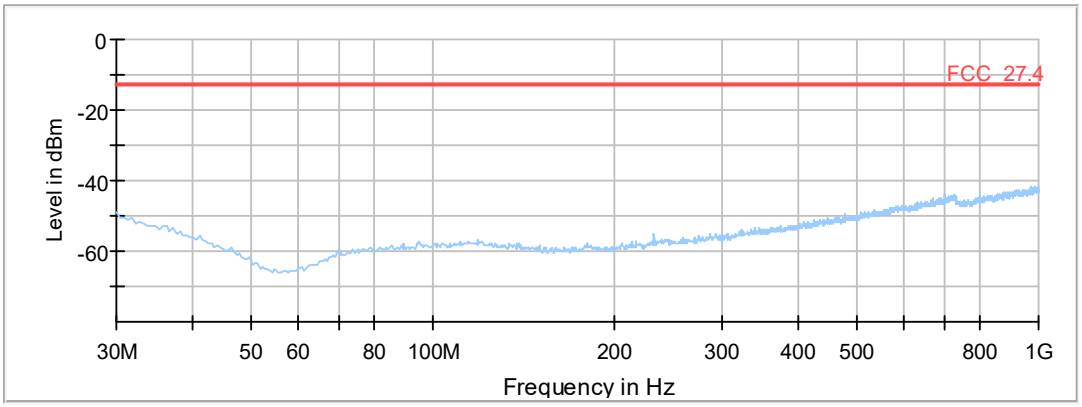
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.843000	-18.43	-13.00	5.43	1000.0	50.000	150.0	V	0.0	90.0	-67

Test: 27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1412, Frequency = 1732.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:08
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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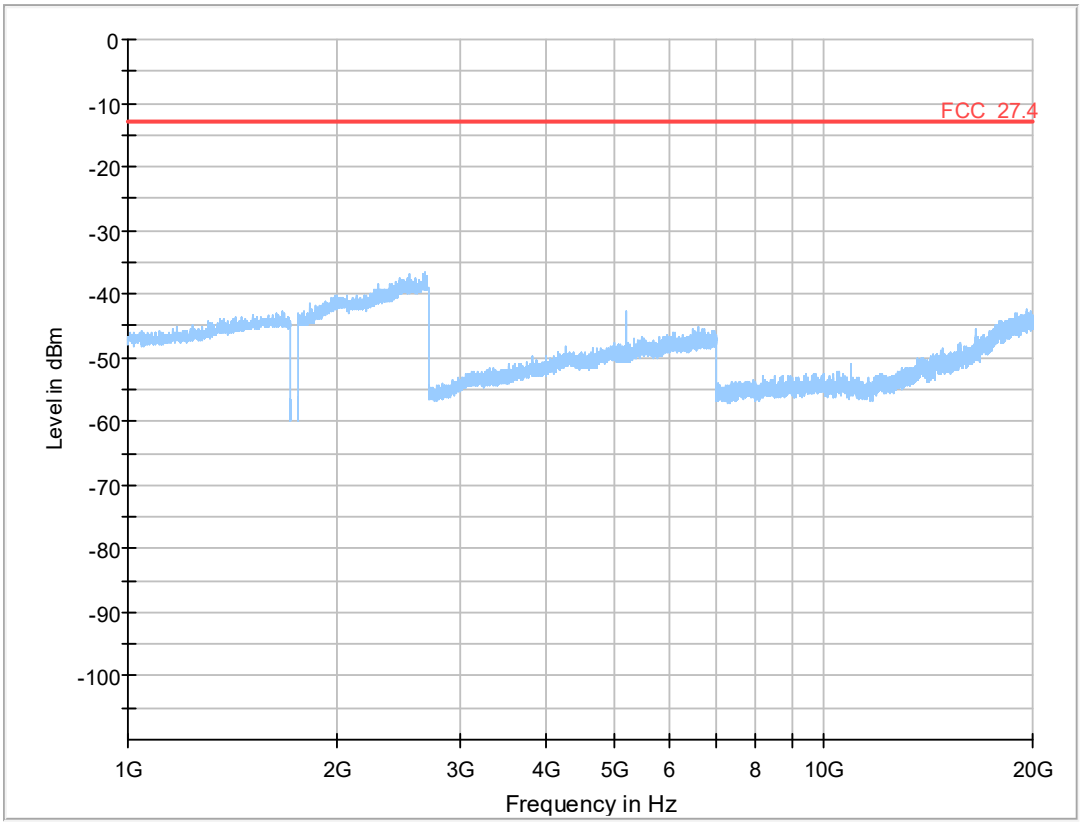

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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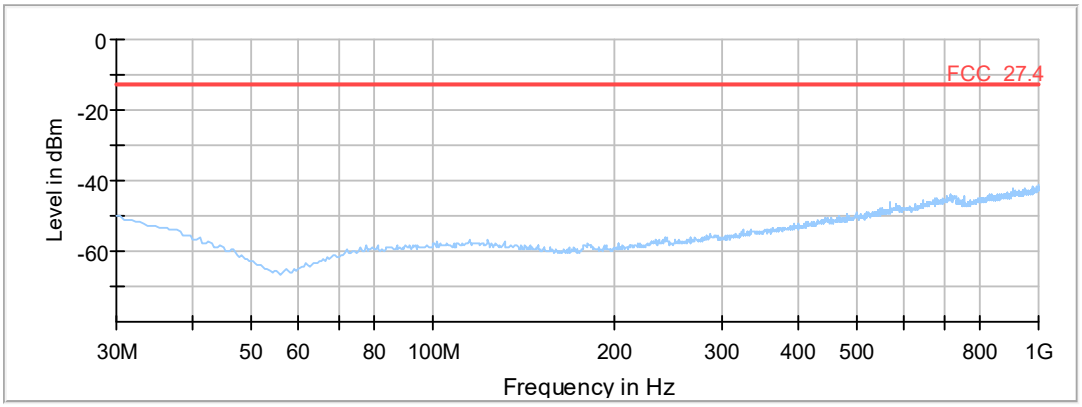
Test: 27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1450, Frequency = 1740.0MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:09
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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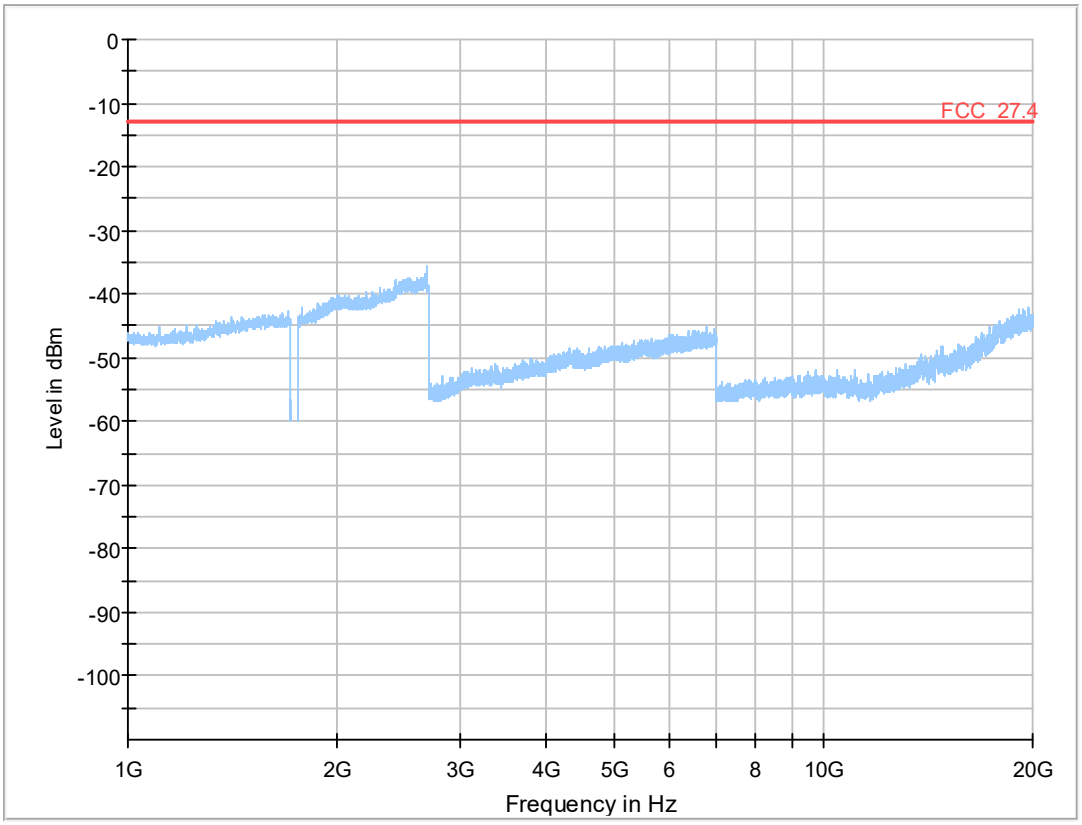

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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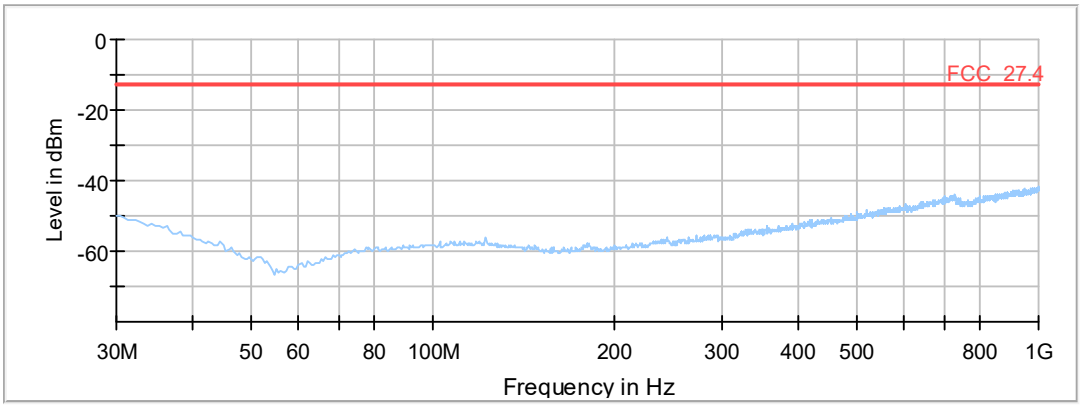
Test: 27.4; Frequency Band = FDD4, Mode = HSUPA, Channel = 1513, Frequency = 1752.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/04/02 8:06
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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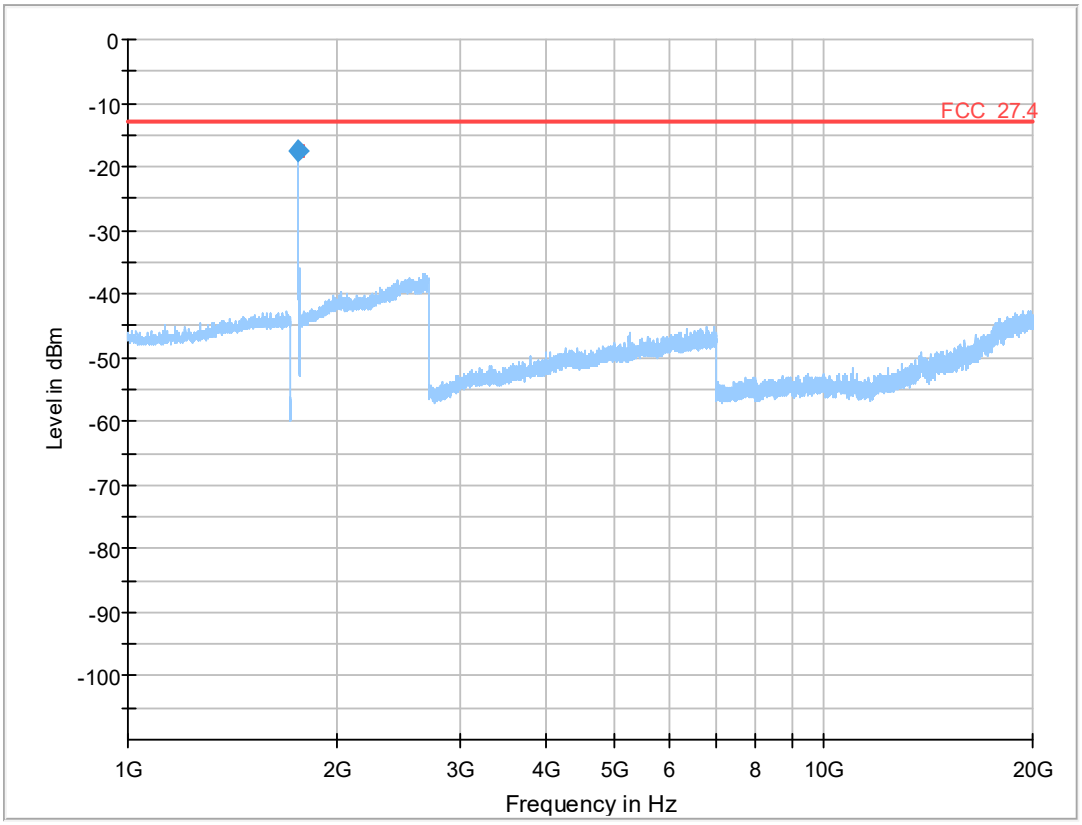


Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.009000	-17.61	-13.00	4.61	1000.0	50.000	150.0	V	0.0	90.0	-66

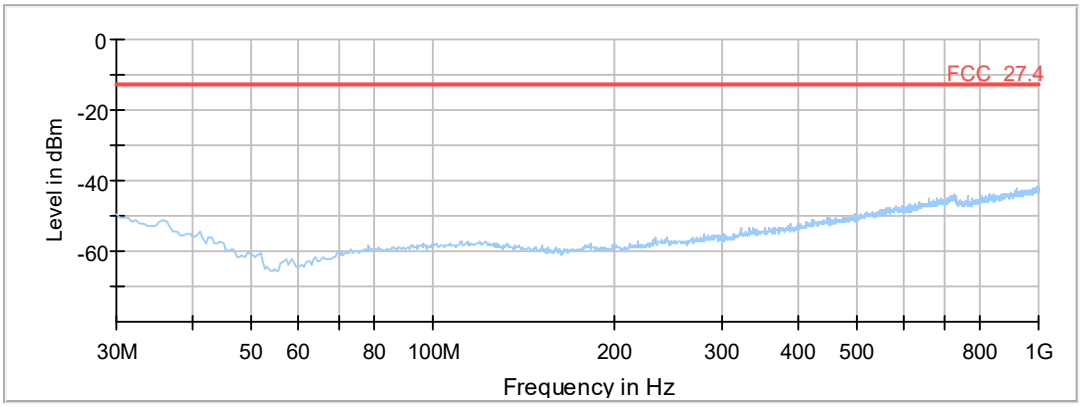
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.009000	-17.61	-13.00	4.61	1000.0	50.000	150.0	V	0.0	90.0	-66

Test: 27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1312, Frequency = 1712.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:59
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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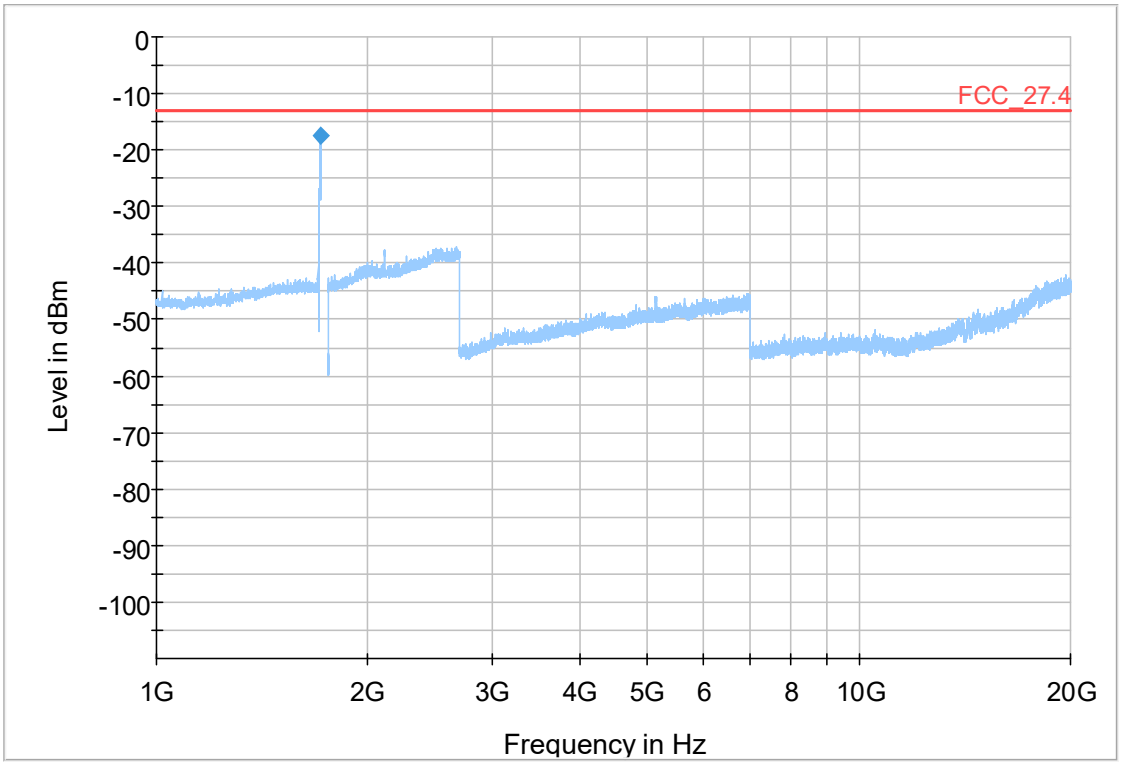

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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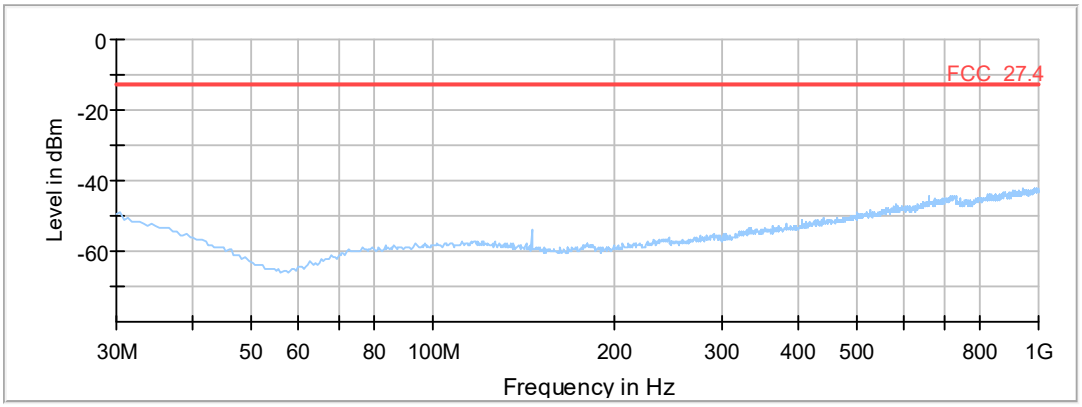
Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.976000	-17.42	-13.00	4.42	1000.0	50.000	150.0	V	0.0	90.0	-67

Test: 27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1412, Frequency = 1732.4MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:00
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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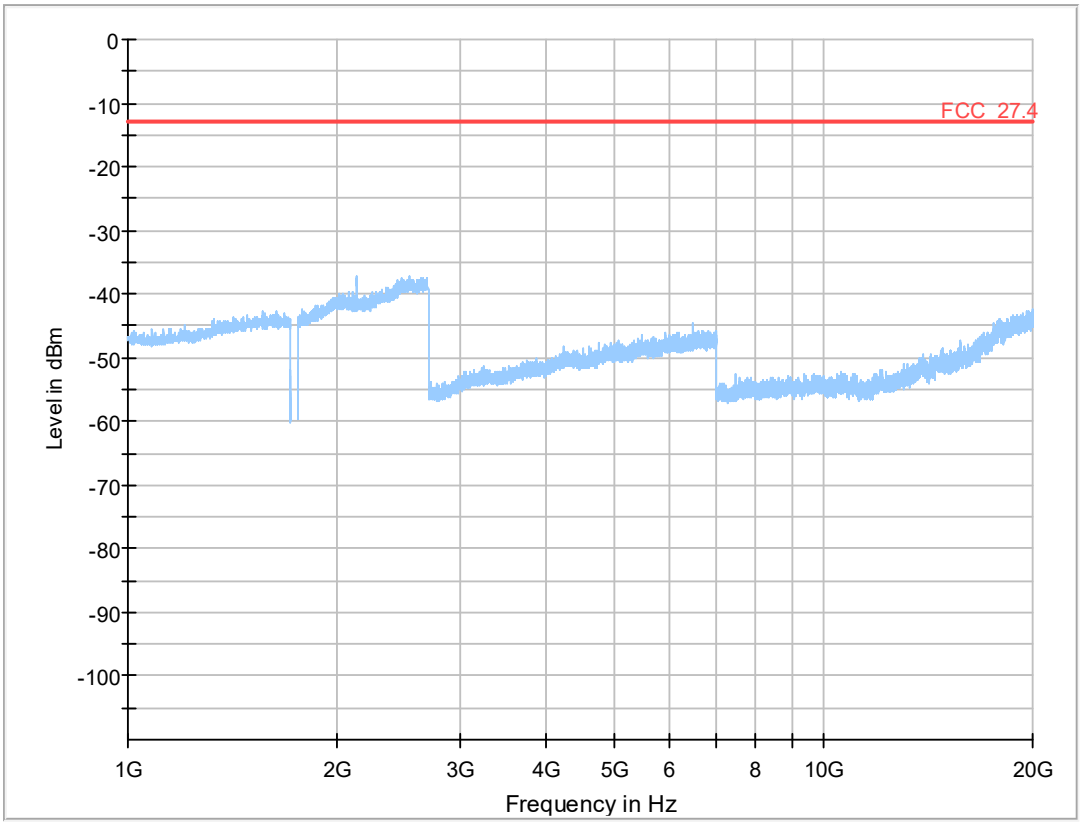

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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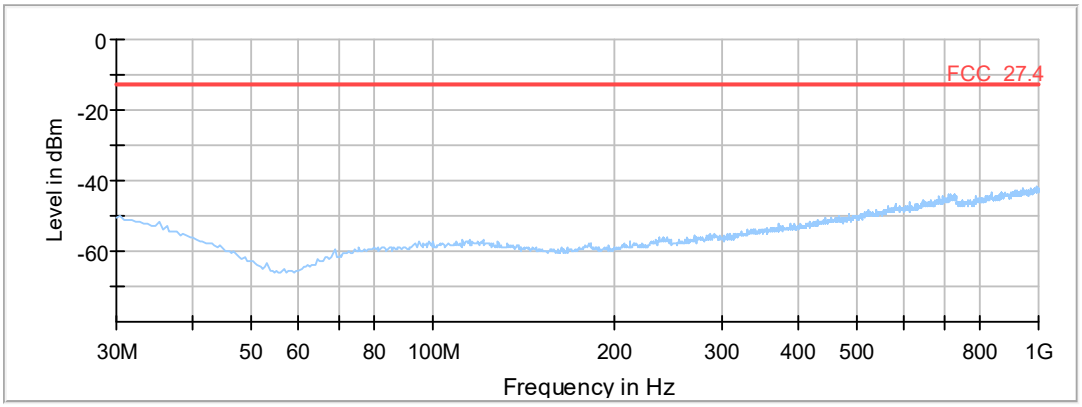
Test: 27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1450, Frequency = 1740.0MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 17:01
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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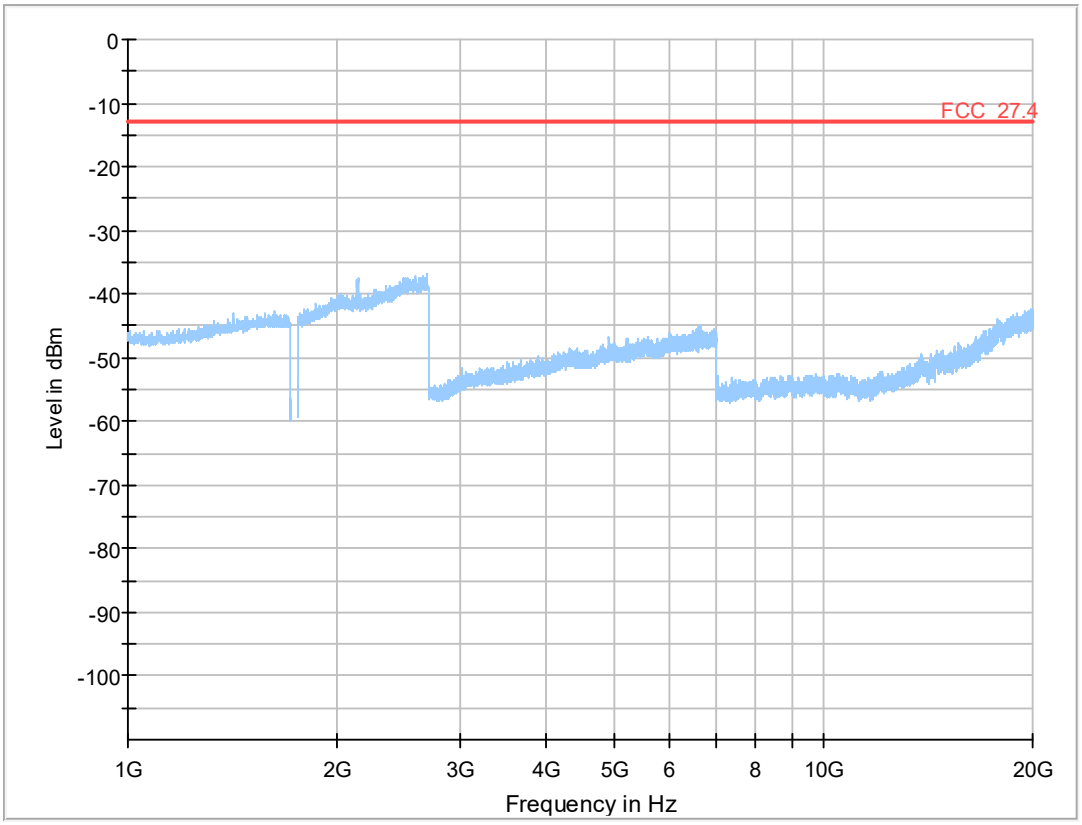

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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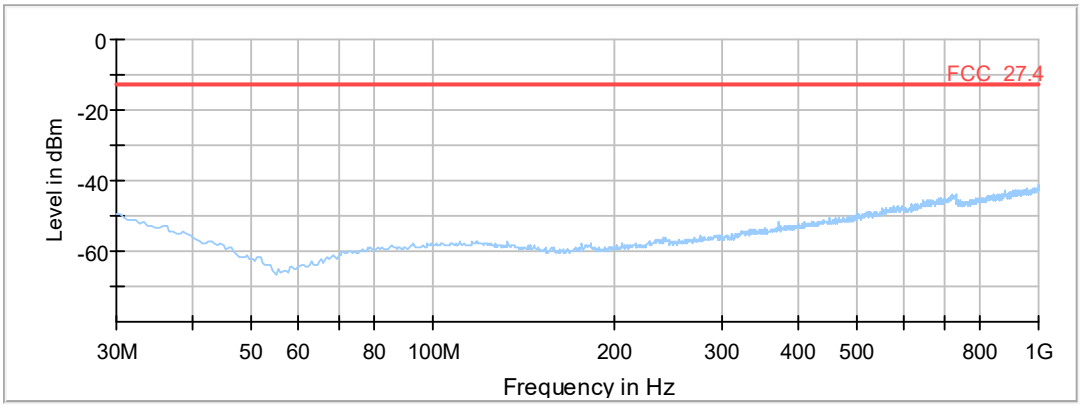
Test: 27.4; Frequency Band = FDD4, Mode = W-CDMA, Channel = 1513, Frequency = 1752.6MHz

Result:	Passed
Setup No.:	S01_AF01
Date of Test:	2018/03/29 16:58
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

Detailed Results:



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
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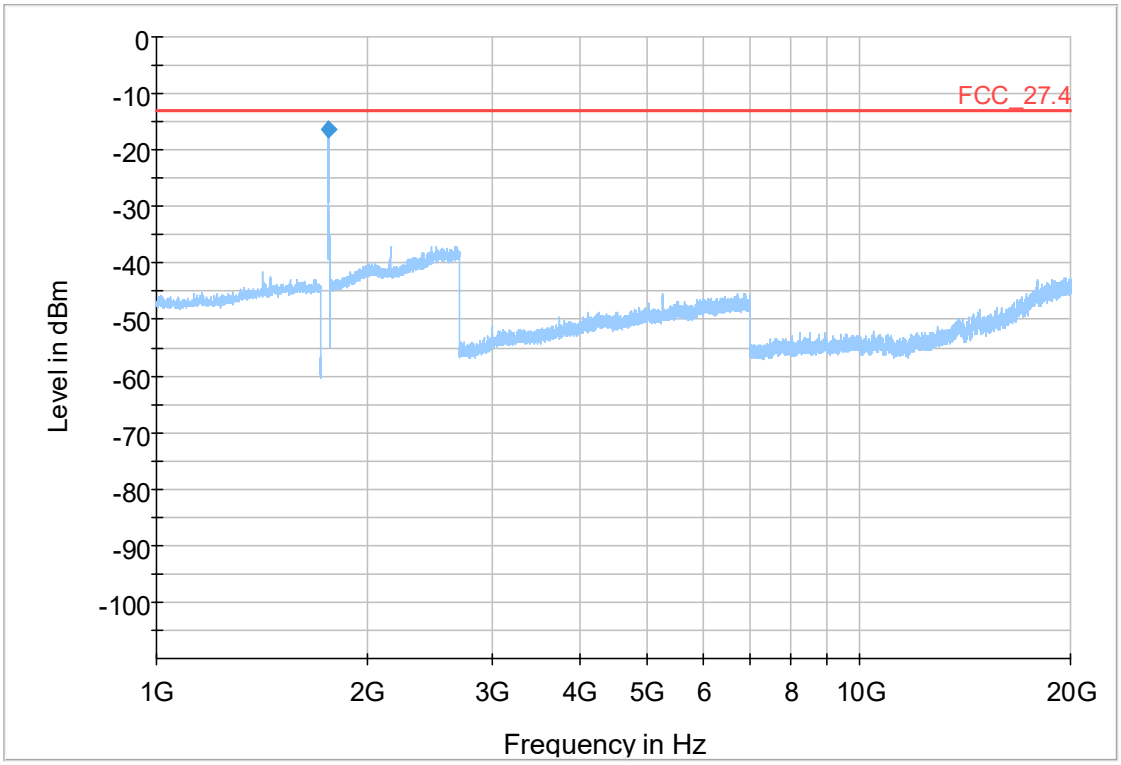

Critical_Freqs

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
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Final_Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.001000	-16.23	-13.00	3.23	1000.0	50.000	150.0	V	0.0	90.0	-66

3.5.19 27.5 Emission and Occupied Bandwidth §2.1049

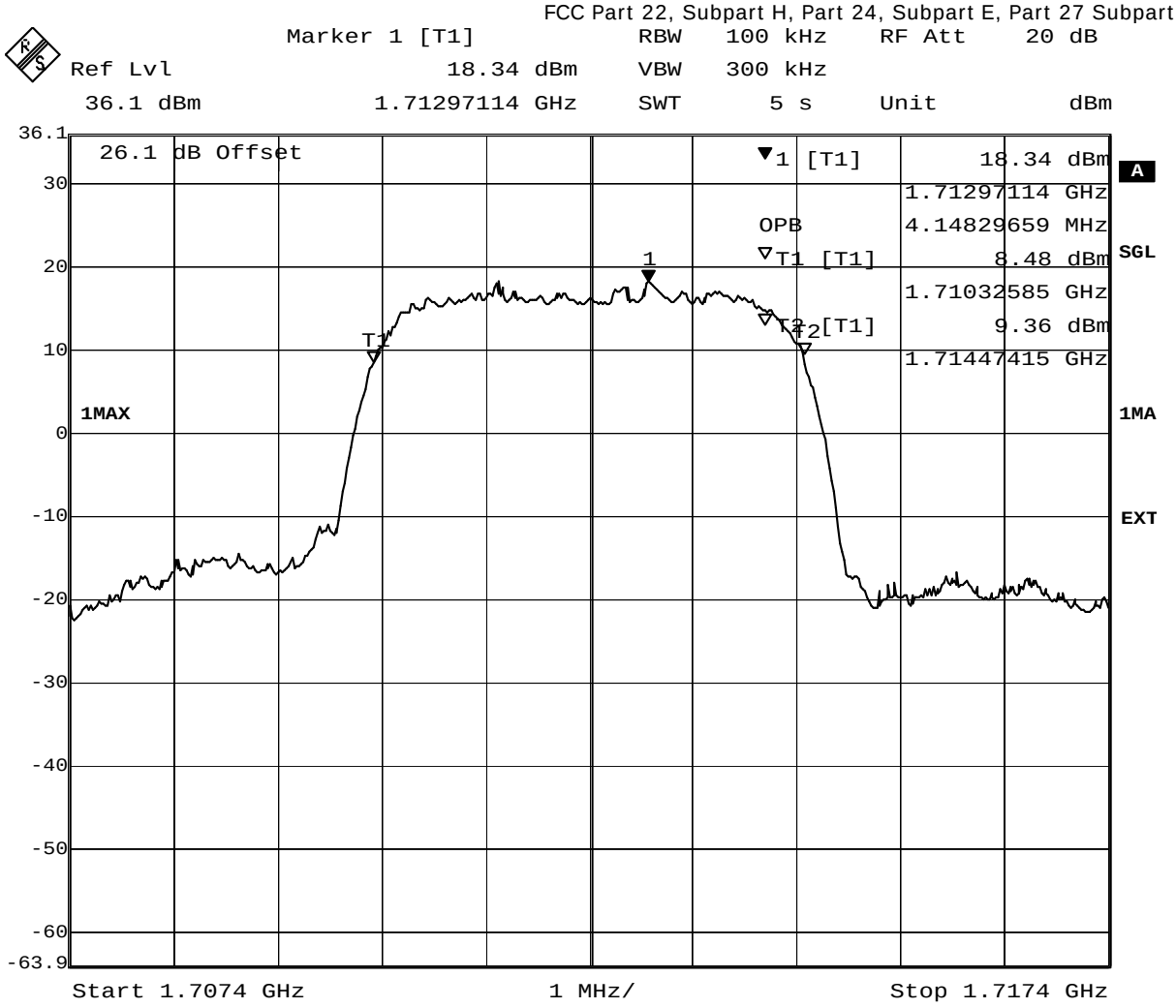
Test: 27.5; Emission and Occupied Bandwidth Summary §2.1049

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:42
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

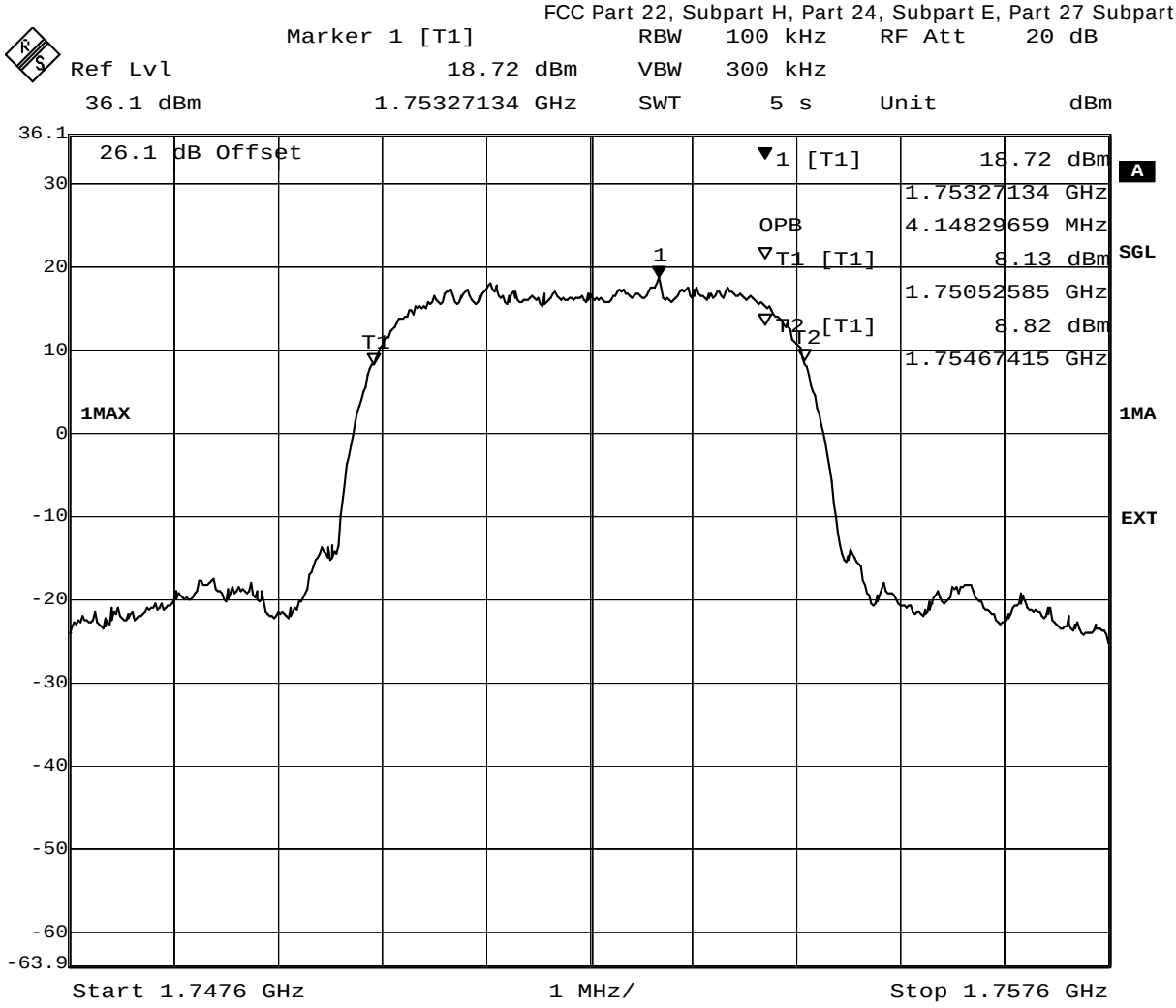
Detailed Results:

Radio Technology	Channel	Res-source Blocks	Band-width [MHz]	Nominal BW [MHz]	26 dB BW [kHz]	99 % BW [kHz]
FDD IV	low	-	5	5	4749.5	4148.3
FDD IV	mid	-	5	5	4769.54	4128.3
FDD IV	high	-	5	5	4749.5	4148.3
FDD IV HSDPA Subtest 1	low	-	5	5	4749.5	4128.3
FDD IV HSDPA Subtest 1	mid	-	5	5	4769.54	4148.3
FDD IV HSDPA Subtest 1	high	-	5	5	4749.5	4148.3
FDD IV HSUPA Subtest 1	low	-	5	5	4809.62	4168.3
FDD IV HSUPA Subtest 1	mid	-	5	5	4809.62	4188.4
FDD IV HSUPA Subtest 1	high	-	5	5	4769.54	4168.3
FDD IV HSUPA Subtest 5	low	-	5	5	4809.62	4168.3
FDD IV HSUPA Subtest 5	mid	-	5	5	4769.54	4168.3
FDD IV HSUPA Subtest 5	high	-	5	5	4769.54	4168.3
eFDD 4 QPSK	low	6	1.4	1.4	-	1112.2
eFDD 4 QPSK	mid	6	1.4	1.4	-	1118.2
eFDD 4 QPSK	high	6	1.4	1.4	-	1112.2
eFDD 4 16QAM	low	6	1.4	1.4	-	1124.3
eFDD 4 16QAM	mid	6	1.4	1.4	-	1106.2
eFDD 4 16QAM	high	6	1.4	1.4	-	1118.2
eFDD 4 QPSK	low	15	3	3	-	2765.5
eFDD 4 QPSK	mid	15	3	3	-	2765.5
eFDD 4 QPSK	high	15	3	3	-	2777.6
eFDD 4 16QAM	low	15	3	3	-	2813.6
eFDD 4 16QAM	mid	15	3	3	-	2753.5
eFDD 4 16QAM	high	15	3	3	-	2765.5
eFDD 4 QPSK	low	25	5	5	-	4549.1
eFDD 4 QPSK	mid	25	5	5	-	4509
eFDD 4 QPSK	high	25	5	5	-	4549.1
eFDD 4 16QAM	low	25	5	5	-	4549.1
eFDD 4 16QAM	mid	25	5	5	-	4549.1
eFDD 4 16QAM	high	25	5	5	-	4569.1
eFDD 4 QPSK	low	50	10	10	-	9058.1
eFDD 4 QPSK	mid	50	10	10	-	9018
eFDD 4 QPSK	high	50	10	10	-	9018
eFDD 4 16QAM	low	27	10	10	-	5090.2
eFDD 4 16QAM	mid	27	10	10	-	5010
eFDD 4 16QAM	high	27	10	10	-	5130.3
eFDD 4 QPSK	low	75	15	15	-	13587
eFDD 4 QPSK	mid	75	15	15	-	13527
eFDD 4 QPSK	high	27	15	15	-	13647
eFDD 4 16QAM	low	27	15	15	-	5170.3
eFDD 4 16QAM	mid	27	15	15	-	5170.3
eFDD 4 16QAM	high	75	15	15	-	5230.5
eFDD 4 QPSK	low	100	20	20	-	18036
eFDD 4 QPSK	mid	100	20	20	-	17956
eFDD 4 QPSK	high	100	20	20	-	18277
eFDD 4 16QAM	low	27	20	20	-	5771.5
eFDD 4 16QAM	mid	27	20	20	-	5851.7
eFDD 4 16QAM	high	27	20	20	-	5691.4

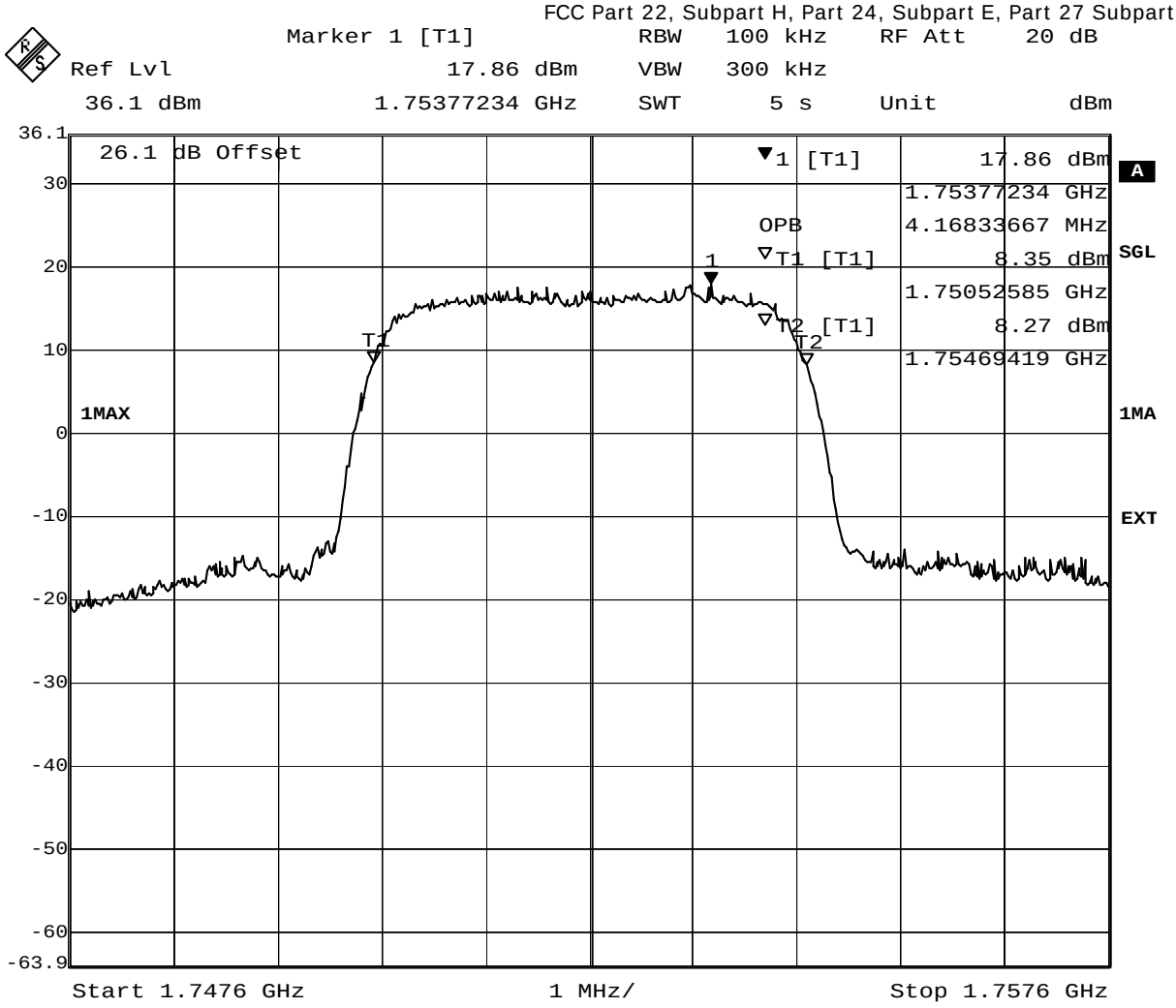
Radio Technology	Channel	Res-source Blocks	Band-width [MHz]	Nominal BW [MHz]	26 dB BW [kHz]	99 % BW [kHz]
eFDD 12 QPSK	low	6	1.4	1.4	-	1100.2
eFDD 12 QPSK	mid	6	1.4	1.4	-	1106.2
eFDD 12 QPSK	high	6	1.4	1.4	-	1106.2
eFDD 12 16QAM	low	6	1.4	1.4	-	1160.3
eFDD 12 16QAM	mid	6	1.4	1.4	-	1118.2
eFDD 12 16QAM	high	6	1.4	1.4	-	1118.2
eFDD 12 QPSK	low	15	3	3	-	2753.5
eFDD 12 QPSK	mid	15	3	3	-	2741.5
eFDD 12 QPSK	high	15	3	3	-	2765.5
eFDD 12 16QAM	low	15	3	3	-	2861.7
eFDD 12 16QAM	mid	15	3	3	-	2801.6
eFDD 12 16QAM	high	15	3	3	-	2777.6
eFDD 12 QPSK	low	25	5	5	-	4529.1
eFDD 12 QPSK	mid	25	5	5	-	4509
eFDD 12 QPSK	high	25	5	5	-	4549.1
eFDD 12 16QAM	low	25	5	5	-	4569.1
eFDD 12 16QAM	mid	25	5	5	-	4629.3
eFDD 12 16QAM	high	25	5	5	-	4589.2
eFDD 12 QPSK	low	50	10	10	-	9018
eFDD 12 QPSK	mid	50	10	10	-	8978
eFDD 12 QPSK	high	50	10	10	-	9178.4
eFDD 12 16QAM	low	27	10	10	-	5050.1
eFDD 12 16QAM	mid	27	10	10	-	5050.1
eFDD 12 16QAM	high	27	10	10	-	5010



WCDMA FDD4 Channel=low

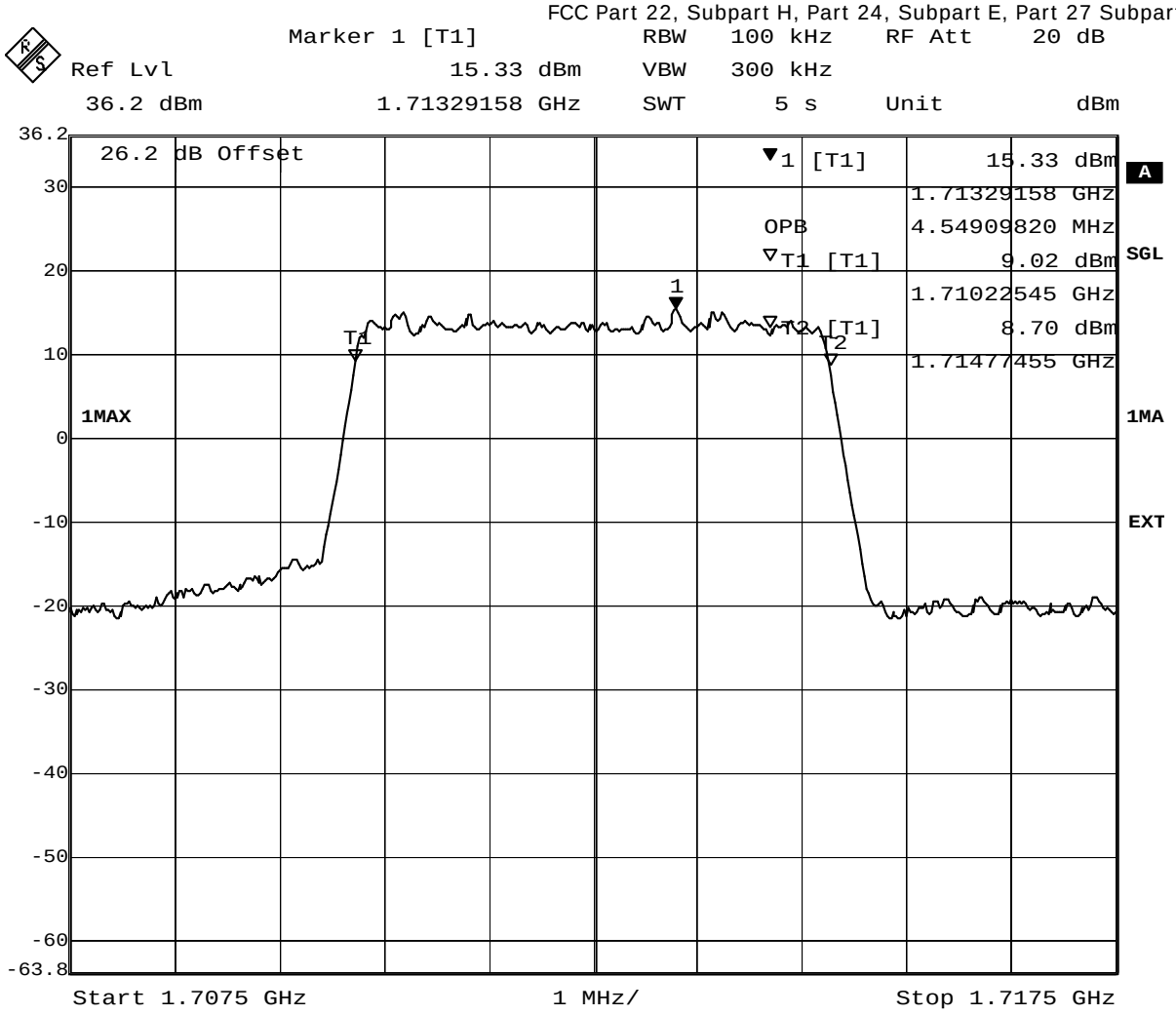


HSDPA FDD4 Channel=high



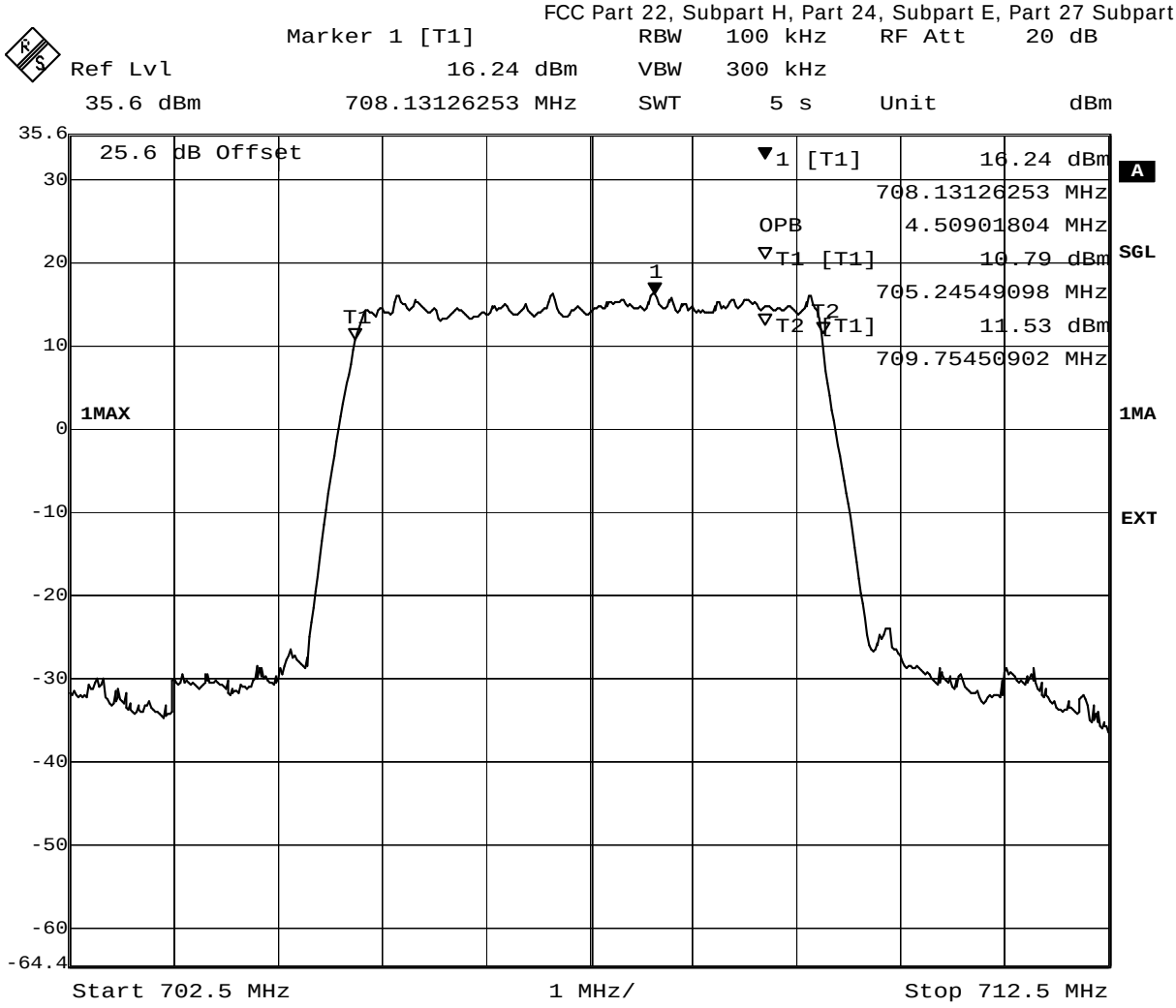
Date: 28.MAR.2018 13:28:50

HSUPA FDD4 Channel=high



Date: 11.APR.2018 15:45:41

eFDD4 QPSK 5MHz Channel=low



Date: 5.APR.2018 14:34:17

eFDD12 QPSK 5MHz Channel=mid

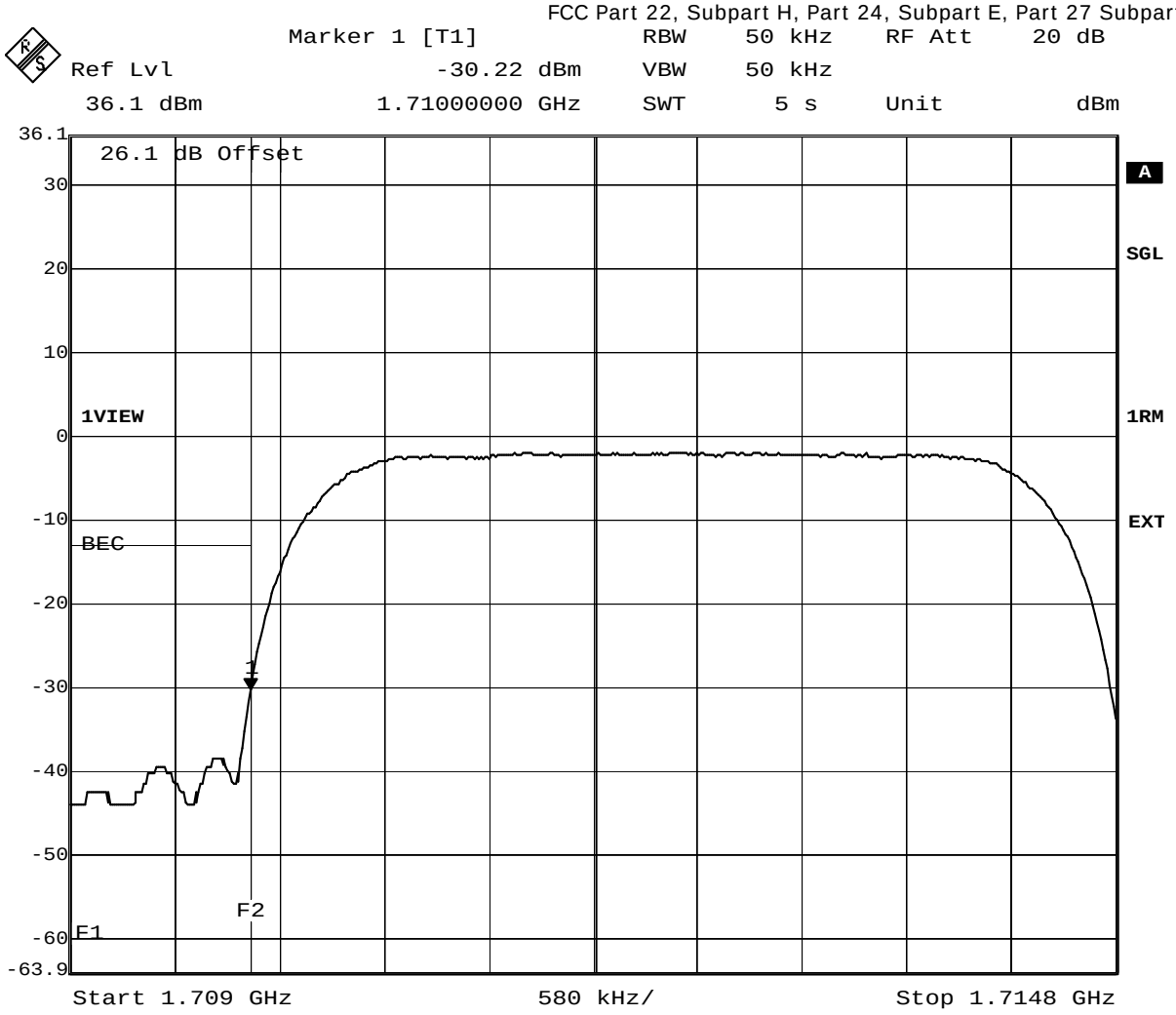
3.5.20 27.6 Band edge compliance §2.1053, §27.53

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:27
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

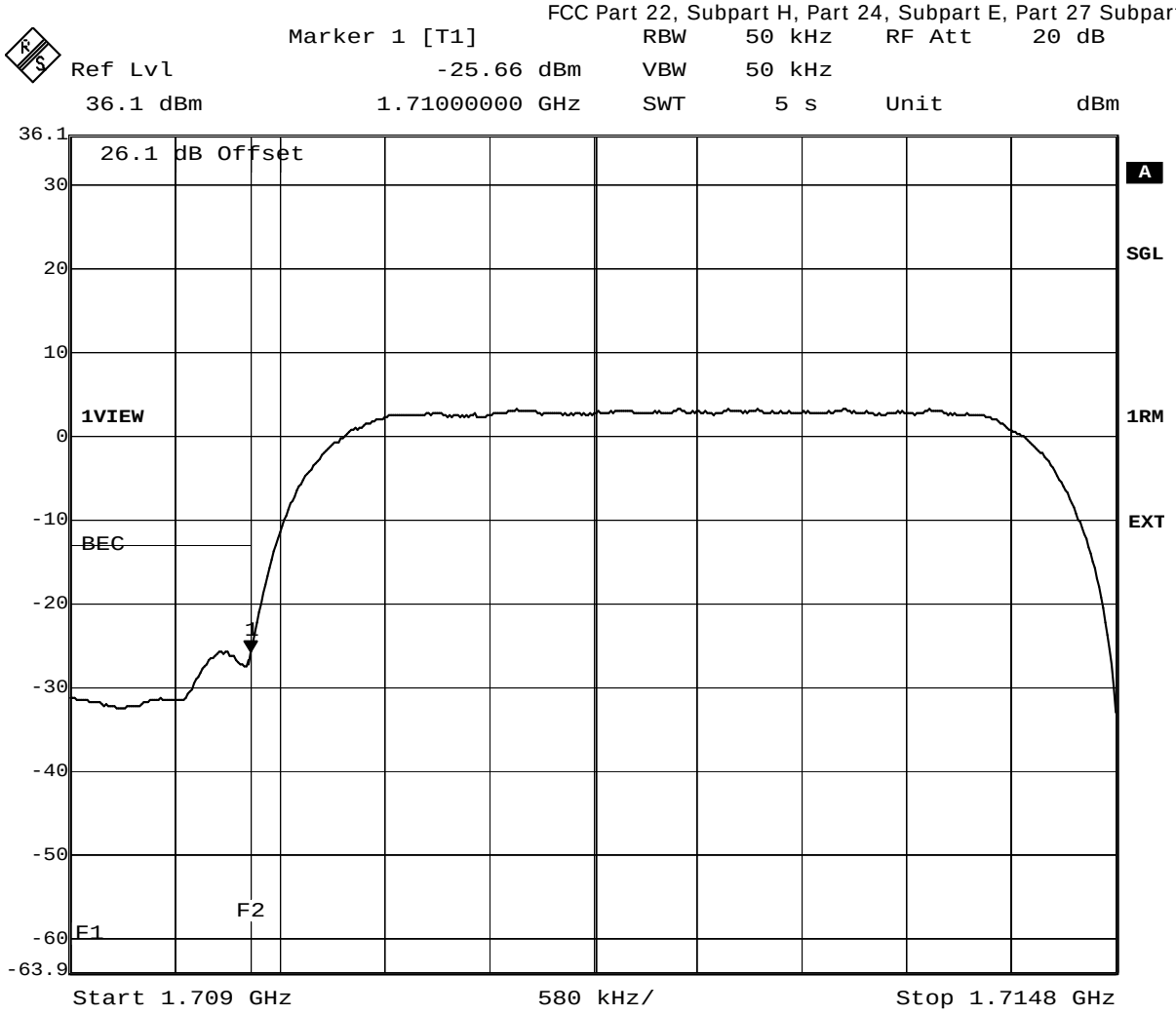
Detailed Results:

Radio Technology	Channel	Nominal BW	Res-source Blocks	Peak [dBm]	Average [dBm]	RMS [dBm]
FDD IV	low	5	-	-22.22	-30.84	-30.22
FDD IV	high	5	-	-26.59	-37.19	-36.54
FDD IV HSDPA Subtest 1	low	5	-	-17.26	-26.4	-25.66
FDD IV HSDPA Subtest 1	high	5	-	-18.79	-29.1	-28.58
FDD IV HSUPA Subtest 1	low	5	-	-15.55	-25.15	-24.35
FDD IV HSUPA Subtest 1	high	5	-	-27.54	-37.19	-36.54
FDD IV HSUPA Subtest 5	low	5	-	-14.68	-24.35	-23.9
FDD IV HSUPA Subtest 5	high	5	-	-16.13	-27	-26.6
eFDD 4 QPSK	low	1.4	6	-17.37	-28.58	-27.87
eFDD 4 QPSK	high	1.4	6	-18.48	-15.38	-14.56
eFDD 4 16QAM	low	1.4	6	-19.52	-29.92	-28.58
eFDD 4 16QAM	high	1.4	6	-17.06	-21.96	-21.62
eFDD 4 QPSK	low	3	15	-17.63	-27.42	-26.4
eFDD 4 QPSK	high	3	15	-15.91	-23.07	-19.82
eFDD 4 16QAM	low	3	15	-19.72	-29.36	-28.34
eFDD 4 16QAM	high	3	15	-17.61	-26.8	-26.21
eFDD 4 QPSK	low	5	25	-15.85	-28.1	-26.8
eFDD 4 QPSK	high	5	25	-7.03	-16.86	-16
eFDD 4 16QAM	low	5	25	-17.14	-29.64	-28.1
eFDD 4 16QAM	high	5	25	-18.04	-20.1	-19.04
eFDD 4 QPSK	low	10	50	-17.83	-28.34	-27.21
eFDD 4 QPSK	high	10	50	-8.22	-18.18	-17.19
eFDD 4 16QAM	low	10	50	-17.06	-28.34	-27
eFDD 4 16QAM	high	10	50	-16.25	-17.46	-19.64
eFDD 4 QPSK	low	15	75	-14.29	-24.5	-23.48
eFDD 4 QPSK	high	15	75	-6.13	-19.91	-16
eFDD 4 16QAM	low	15	75	-13.26	-24.98	-23.9
eFDD 4 16QAM	high	15	75	-9.39	-13.32	-16.79
eFDD 4 QPSK	low	20	100	-15.52	-26.21	-25.15
eFDD 4 QPSK	high	20	100	-9.05	-22.94	-17.88
eFDD 4 16QAM	low	20	100	-12.55	-25.15	-24.2
eFDD 4 16QAM	high	20	100	-19.96	-15.6	-16.86
eFDD 12 QPSK	low	1.4	6	-15.85	-29.34	-27.92
eFDD 12 QPSK	high	1.4	6	-14.72	-25	-25
eFDD 12 16QAM	low	1.4	6	-19.65	-33.12	-30.72
eFDD 12 16QAM	high	1.4	6	-17.82	-26.9	-26.16
eFDD 12 QPSK	low	3	15	-17.19	-31.02	-28.84
eFDD 12 QPSK	high	3	15	-18.45	-31.67	-29.6
eFDD 12 16QAM	low	3	15	-20.28	-34.86	-31.67
eFDD 12 16QAM	high	3	15	-19.55	-33.52	-32.73
eFDD 12 QPSK	low	5	25	-16.52	-32.36	-29.86
eFDD 12 QPSK	high	5	25	-18.67	-32.36	-30.42
eFDD 12 16QAM	low	5	25	-17.3	-35.36	-31.67
eFDD 12 16QAM	high	5	25	-19.63	-35.36	-33.52
eFDD 12 QPSK	low	10	50	-10.81	-30.42	-28.6
eFDD 12 QPSK	high	10	50	-13.06	-32.36	-30.72
eFDD 12 16QAM	low	10	50	-12.15	-30.72	-28.84
eFDD 12 16QAM	high	10	50	-13.23	-30.72	-28.84

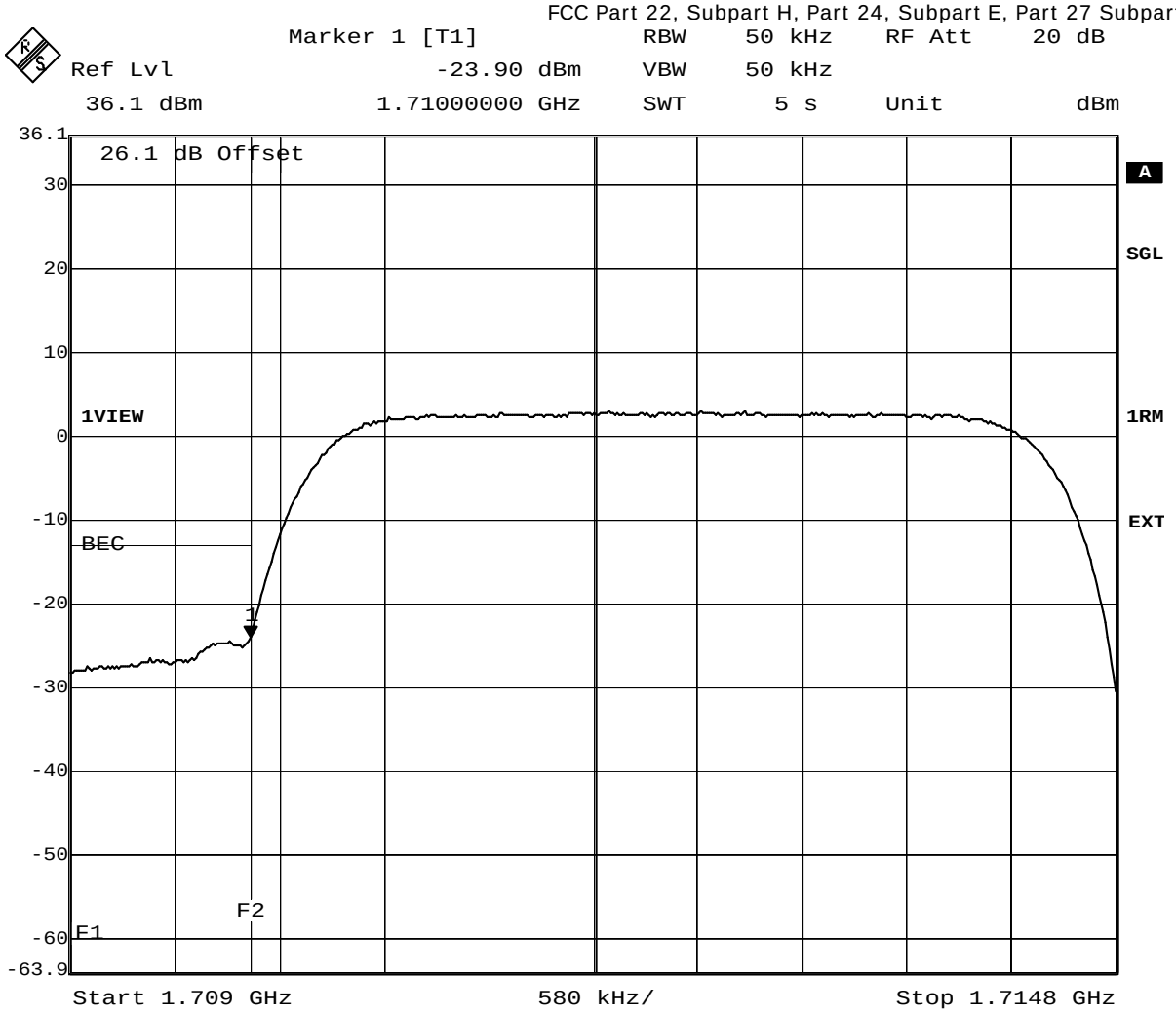


Date: 5.APR.2018 13:21:34

WCDMA FDD4 Channel=low

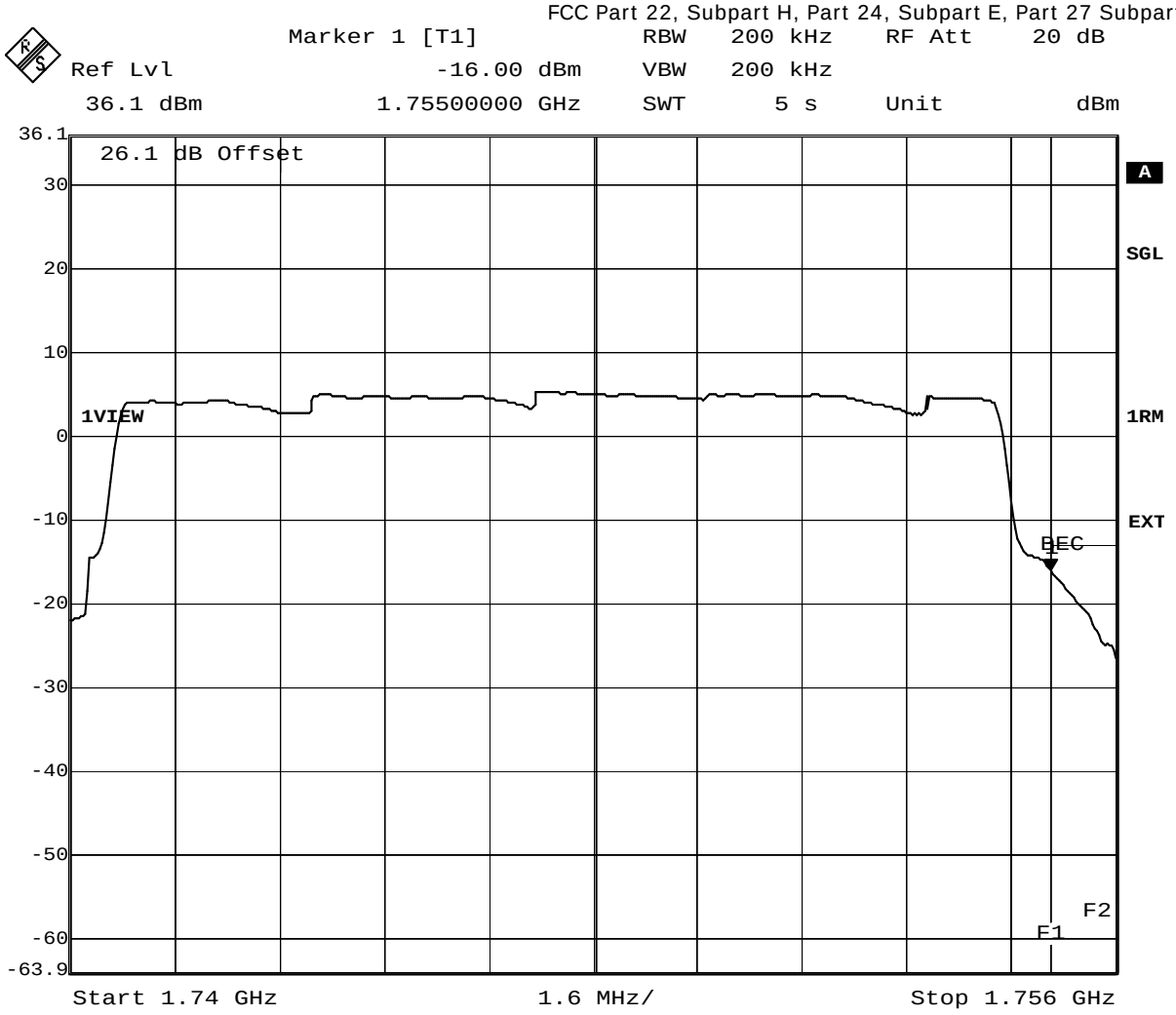


HSDPA FDD4 Channel=low

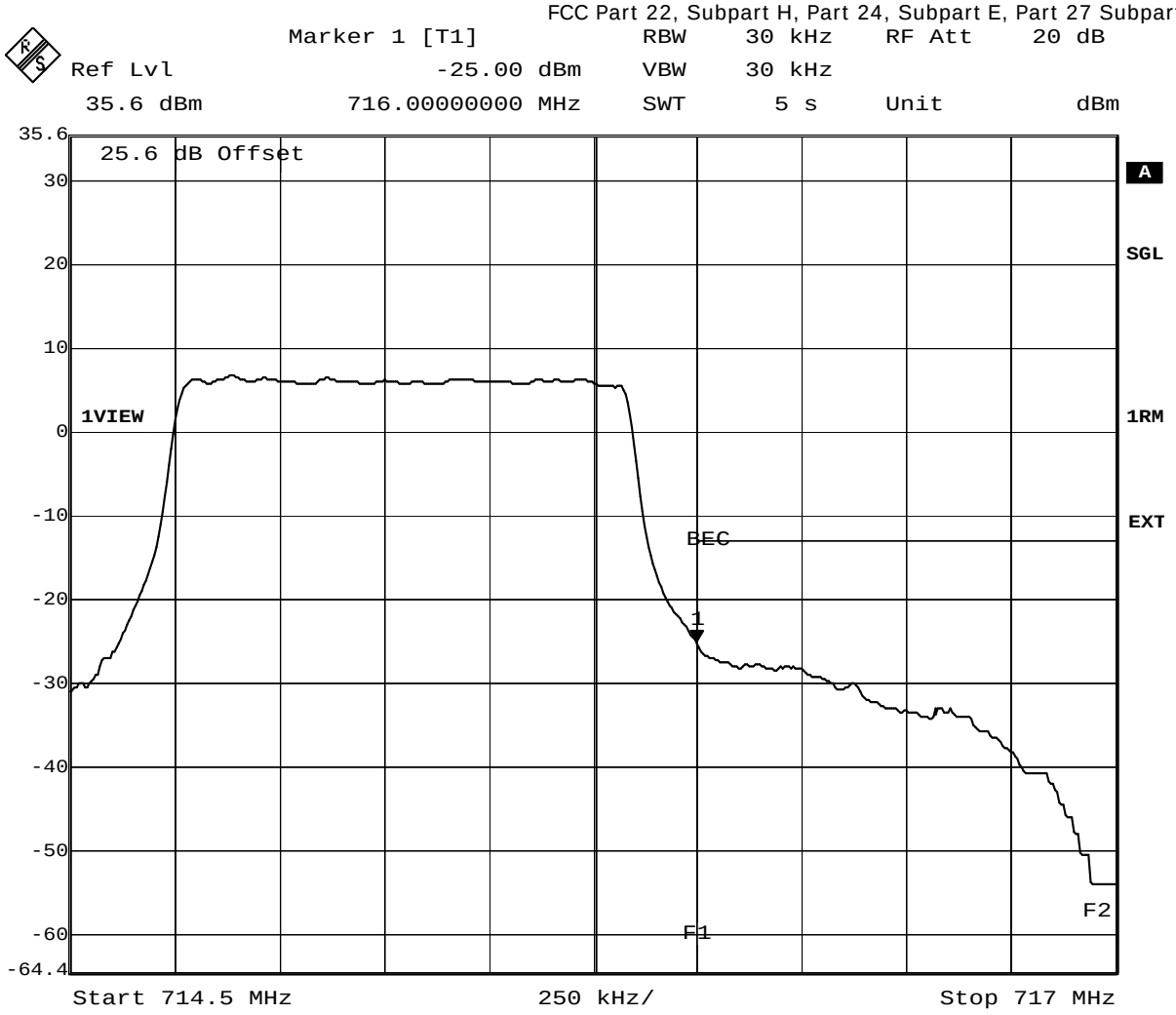


Date: 29.MAR.2018 12:10:21

HSUPA FDD4 Channel=low



eFDD4 QPSK 15MHz RB75 Channel=high



Date: 13.APR.2018 12:24:06

eFDD12 QPSK 1.4MHz RB6 Channel=high

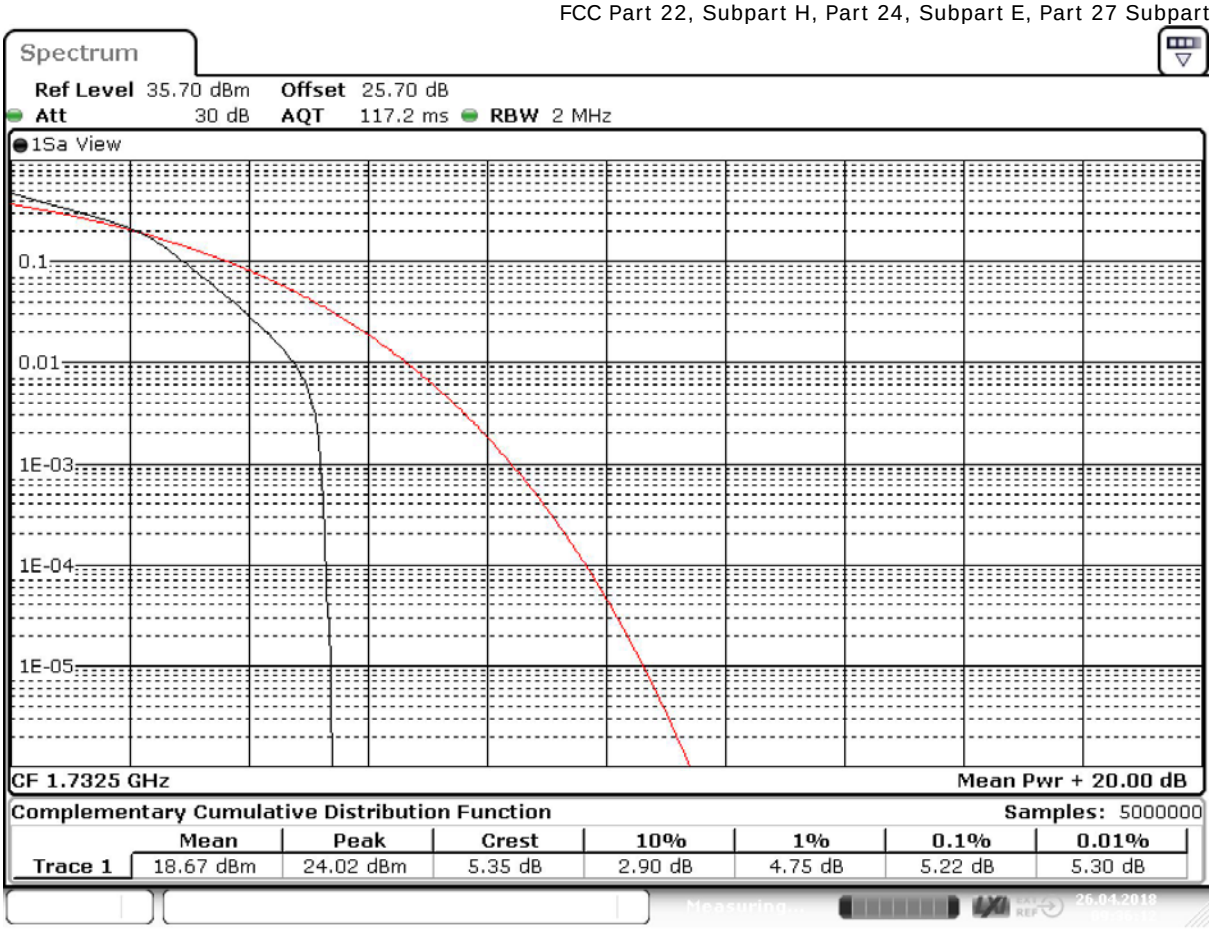
3.5.21 27.7 Peak-to-Average ratio §2.1046, §27.50

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

Result:	Passed
Setup No.:	S01_AD01
Date of Test:	2018/04/19 9:30
Body:	FCC47CFRChIPART27MISCELLANEOUS WIRELESS COMMUNICATIONS SERV
Test Specification:	FCC part 2 and 27

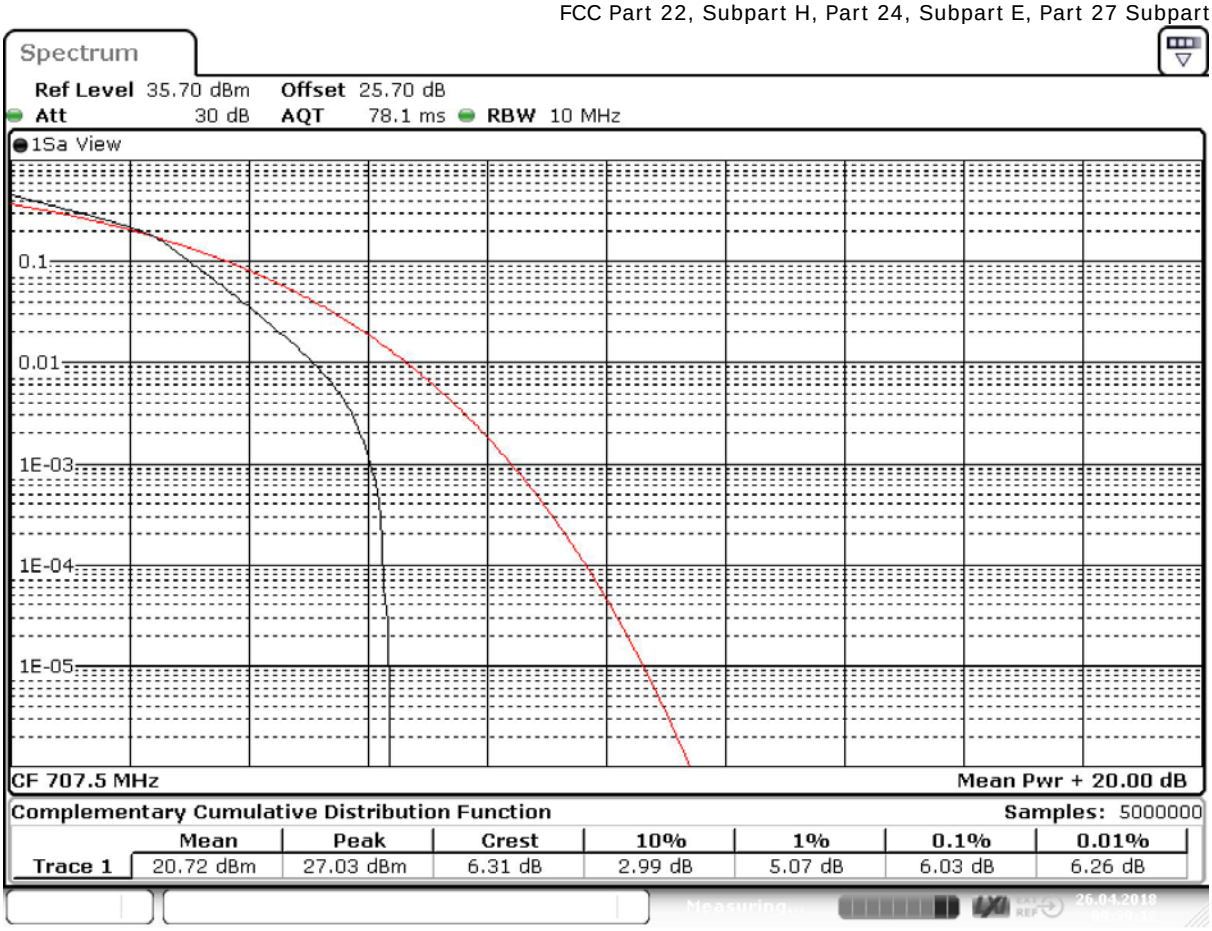
Detailed Results:

Radio Technology	Channel	Ressource Blocks	Bandwidth [MHz]	Peak to Average Ratio [dB]	Limit (IC) [dB]		
FDD IV	low	-	5	5.53	13		
FDD IV	mid	-	5	5.5	13		
FDD IV	high	-	5	5.67	13		
FDD IV HSDPA Subtest 1	low	-	5	5.85	13		
FDD IV HSDPA Subtest 1	mid	-	5	5.39	13		
FDD IV HSDPA Subtest 1	high	-	5	5.18	13		
FDD IV HSUPA Subtest 1	low	-	5	5.36	13		
FDD IV HSUPA Subtest 1	mid	-	5	5.31	13		
FDD IV HSUPA Subtest 1	high	-	5	7.02	13		
FDD IV HSUPA Subtest 5	low	-	5	6.92	13		
FDD IV HSUPA Subtest 5	mid	-	5	6.72	13		
FDD IV HSUPA Subtest 5	high	-	5	6.42	13		
eFDD 4 QPSK	low	6	1.4	4.23	13		
eFDD 4 QPSK	mid	6	1.4	4.23	13		
eFDD 4 QPSK	high	6	1.4	5.3	13		
eFDD 4 16QAM	low	6	1.4	5.01	13		
eFDD 4 16QAM	mid	6	1.4	5.22	13		
eFDD 4 16QAM	high	6	1.4	3.3	13		
eFDD 12 QPSK	low	6	1.4	5.28	13		
eFDD 12 QPSK	mid	6	1.4	5.33	13		
eFDD 12 QPSK	high	6	1.4	5.07	13		
eFDD 12 16QAM	low	6	1.4	5.74	13		
eFDD 12 16QAM	mid	6	1.4	6.03	13		
eFDD 12 16QAM	high	6	1.4	5.54	13		



Date: 26.APR.2018 09:36:13

eFDD4 16QAM 1.4MHz RB6 Channel=mid



Date: 26.APR.2018 09:39:11

eFDD12 16QAM 1.4MHz RB6 Channel=mid

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 m³	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	AM4.0/180/11920513	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
	Calibration Details		*Last Execution* *Next Exec.*
	Standard Calibration		2015/06/23 2018/06/22
Double-ridged horn	HF 907	102444	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution* *Next Exec.*

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	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2015/06/30	2018/06/29
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG	
Standard Gain / Pyramidal Horn Antenna 40 GHz	3160-10	00086675		
Tilt device Maturo (Rohacell)	Antrieb TD1.5-10kg	TD1.5-10kg/024/3790709	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	
Digital Multimeter 13 (Clamp Meter)	Fluke 325	31270091WS	FLUKE
	Calibration Details		*Last Execution* *Next Exec.*
	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
Spectrum Analyser	FSU26	200418	
	Calibration Details		*Last Execution* *Next Exec.*
	Standard calibration		2017/11/27 2018/11/26
Spectrum Analyzer	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution* *Next Exec.*
	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	
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz GmbH & Co. KG
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		
	Calibration Details		*Last Execution*	*Next Exec.*
	DKD Calibration		2016/11/29	2018/11/28
Personal Computer	Dell	30304832059		
Power Meter	NRVD	828110/016		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2017/05/17	2018/07/17
Sensor Head A	NRV-Z1	827753/005		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2017/05/18	2018/07/16
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG	
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG	
	HW/SW Status		*Date of Start*	*Date of End*
	Firmware-Update 4.34.4 from 3.45 during calibration		2009/12/03	
Spectrum Analyzer	FSW 43	103779		
	Calibration Details		*Last Execution*	*Next Exec.*
	DKD calibration		2016/12/02	2018/12/01

Test Equipment Multimeter 03

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

Single Devices for Multimeter 03

Single Device Name	*Type*	*Serial Number*	*Manufacturer*
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	

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		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2017/05/17	2018/07/17
RF Step Attenuator RSP	RSP	833695/001		
Rubidium Frequency Standard	Datum, Model: MFS	5489/001		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2017/07/11	2018/07/24
Sensor Head A	NRV-Z1	827753/005		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2017/05/18	2018/07/16
Signal Generator SME	SME03	827460/016		
Signal Generator SMP	SMP02	833286/0014	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	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	

Calibration Details	*Last Execution*	*Next Exec.*
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	

Calibration Details	*Last Execution*	*Next Exec.*
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	

Calibration Details	*Last Execution*	*Next Exec.*
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	

Calibration Details	*Last Execution*	*Next Exec.*
Customized calibration	2016/03/09	2018/04/26

5 Annex

5.1 Additional Information for Report

TEST MODE	TX / RX	RF Channel		
		Low	Mid	High
LTE eFDD 2		18607	18900	19193
	TX (1.4M)	1850.7 MHz	1880 MHz	1909.3 MHz
		CH 18615	CH 18900	CH 19185
	TX (3M)	1851.5 MHz	1880 MHz	1908.5 MHz
		CH 18625	CH 18900	CH 19175
	TX (5M)	1852.5 MHz	1880 MHz	1907.5 MHz
		CH 18650	CH 18900	CH 19150
	TX (10)	1855 MHz	1880 MHz	1905 MHz
		CH 18675	CH 18900	CH 19125
	TX (15M)	1857.5 MHz	1880 MHz	1902.5 MHz
		CH 18700	CH 18900	CH 19100
	TX (20M)	1860 MHz	1880 MHz	1900 MHz
		CH 607	CH 900	CH 1193
	RX (1.4M)	1930.7 MHz	1960 MHz	1989.3 MHz
		CH 615	CH 900	CH 1185
	RX (3M)	1931.5 MHz	1960 MHz	1988.5 MHz
		CH 625	CH 900	CH 1175
	RX (5M)	1932.50 MHz	1880.00 MHz	1987.5 MHz
		CH 650	CH 900	CH 1150
	RX (10M)	1935.00 MHz	1960.00 MHz	1985.00 MHz
		CH 675	CH 900	CH 1125
	RX (15M)	1937.50 MHz	1960.00 MHz	1982.50 MHz
		CH 700	CH 900	CH 1100
	RX (20M)	1940.00 MHz	1960.00 MHz	1980.00 MHz

TEST MODE	TX / RX	RF Channel		
		Low	Mid	High
LTE eFDD 4		19957	20175	20393
	TX (1.4M)	1710.7	1732.5	1754.3
		CH 19965	CH 20175	CH 20385
	TX (3M)	1711.50 MHz	1732.50 MHz	1753.50 MHz
		CH 19975	CH 20175	CH 20375
	TX (5M)	1712.50 MHz	1732.50 MHz	1752.50 MHz
		CH 20000	CH 20175	CH 20350
	TX (10)	1715.00 MHz	1732.50 MHz	1750.00 MHz
		CH 20025	CH 20175	CH 20325
	TX (15M)	1717.50 MHz	1732.50 MHz	1747.50 MHz
		CH 20050	CH 20175	CH 20300
	TX (20M)	1720.00 MHz	1732.50 MHz	1745.00 MHz
		CH 1957	CH 2175	CH 2393
	RX (1.4M)	2110.70 MHz	2132.50 MHz	2154.30 MHz
		CH 1965	CH 2175	CH 2385
	RX (3M)	2111.50 MHz	2132.50 MHz	2153.50 MHz
		CH 1975	CH 2175	CH 2375
	RX (5M)	2112.50 MHz	2132.50 MHz	2152.50 MHz
		CH 2000	CH 2175	CH 2350
	RX (10M)	2115.00 MHz	2132.50 MHz	2150.00 MHz
		CH 2025	CH 2175	CH 2325
	RX (15M)	2117.50 MHz	2132.50 MHz	2147.50 MHz
		CH 2050	CH 2175	CH 2300
	RX (20M)	2120.00 MHz	2132.50 MHz	2145.00 MHz

TEST MODE	TX / RX	RF Channel		
		Low	Mid	High
LTE eFDD 5		20407	20525	20643
	TX (1.4M)	824.7	836.5	848.3
		CH 20415	CH 20525	CH 20635
	TX (3M)	825.50 MHz	836.50 MHz	847.50 MHz
		CH 20425	CH 20525	CH 20625
	TX (5M)	826.50 MHz	836.50 MHz	846.50 MHz
		CH 20450	CH 20525	CH 20600
	TX (10)	829.00 MHz	836.50 MHz	844.00 MHz
		CH 2407	CH 20525	CH 2643
	RX (1.4M)	869.70 MHz	881.50 MHz	893.70 MHz
		CH 2415	CH 20525	CH 2635
	RX (3M)	870.50 MHz	881.50 MHz	892.50 MHz
		CH 2425	CH 2525	CH 2625
	RX (5M)	871.50 MHz	881.50 MHz	891.50 MHz
		CH 2450	CH 2525	CH 2600
	RX (10M)	874.00 MHz	881.50 MHz	889.00 MHz

TEST MODE	TX / RX	RF Channel		
		Low	Mid	High
LTE eFDD 12		CH 23017	CH 23095	CH 23173
	TX (1.4M)	699.7 MHz	707.5 MHz	715.3 MHz
		CH 23025	CH 23095	CH 23165
	TX (3M)	700.50 MHz	707.5 MHz	714.50 MHz
		CH 23035	CH 23095	CH 23155
	TX (5M)	701.50 MHz	707.5 MHz	713.50 MHz
		CH 23060	CH 23095	CH 23130
	TX (10)	704.00 MHz	707.5 MHz	711.00 MHz
		CH 5017	CH 5095	CH 5173
	RX (1.4M)	729.70 MHz	737.50 MHz	745.30 MHz
		CH 5025	CH 5095	CH 5165
	RX (3M)	730.50 MHz	737.50 MHz	744.50 MHz
		CH 5035	CH 5095	CH 5155
	RX (5M)	731.50 MHz	737.50 MHz	743.50 MHz
		CH 5060	CH 5095	CH 5130
	RX (10M)	734.00 MHz	737.50 MHz	741.00 MHz

LTE Test channels

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 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 TIA-603-D-2004

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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a
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 substitution procedure is used so that the readings from the spectrum analyser are corrected and represent
equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is establish
channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the E
measured.
5) The test procedure according to TIA-603-C-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, pow
be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedu
values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of
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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 frequenc
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 frequenc
mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall b
under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its ampl
rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be ap
any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occu
shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at
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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 ha
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 sha
the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data
magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated u
conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated mo
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those

removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below th 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 ban kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwi one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narro bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission b defined as the width of the signal between two points, one below the carrier center frequency and one above the 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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 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 represe equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antenn frequency range of 30 MHz to 10 GHz (up to the 10th harmonic of the transmit frequency). The frequency range 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 w 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 ca on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y have been measured.
7) After this initial test, a final test according to TIA-603-C 2.2.12 Unwanted Emissions is performed on signals w identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal subs 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 leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalen supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, ind sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) o as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, v measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical o make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accept equipment as installed. Such measurements must be accompanied by a description of the site where the measure made showing the location of any possible source of reflections which might distort the field strength measureme submitted shall include the relative radiated power of each spurious emission with reference to the rated power o 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 frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4 whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below th 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 dBµV/m (field strength) in m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution ban kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwi one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narro bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission b defined as the width of the signal between two points, one below the carrier center frequency and one above the 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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.

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Frequency stability

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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 temperatu
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel b 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 Commu immediately after the call was established, five minutes after the call was established and ten minutes after the c established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of 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 sec
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals o 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator cir temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequ transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency de 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
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end po 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 th terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast tra any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§22.355 Frequency tolerance

...the carrier frequency of each transmitter in the Public Mobile Service must be maintained within the tolerances 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/aFor the mid channel

frequency tolerance is 2.5 ppm (2091.5 Hz).

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Band edge compliance

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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. Re "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t 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".

appendix1_FCC22

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 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 TIA-603-D-2004

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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a
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 substitution procedure is used so that the readings from the spectrum analyser are corrected and represent
equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is establish
channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the E
measured.
5) The test procedure according to TIA-603-C-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, pow
be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedu
values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of
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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 frequenc
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 frequenc
mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall b
under the following conditions (as applicable):

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

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Spurious emissions at antenna terminals

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 ha
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 sha
the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data
magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated u
conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated mo
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those

removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below th 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 ban kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwi one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narro bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission b defined as the width of the signal between two points, one below the carrier center frequency and one above the 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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 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 represe equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antenn frequency range of 30 MHz to 10 GHz (up to the 10th harmonic of the transmit frequency). The frequency range 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 w 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 ca on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y have been measured.
7) After this initial test, a final test according to TIA-603-C 2.2.12 Unwanted Emissions is performed on signals w identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal subs 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 leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalen supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, ind sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) o as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, v measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical o make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accept equipment as installed. Such measurements must be accompanied by a description of the site where the measure made showing the location of any possible source of reflections which might distort the field strength measureme submitted shall include the relative radiated power of each spurious emission with reference to the rated power o 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 frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4 whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below th 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 dBµV/m (field strength) in m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution ban kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwi one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narro bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission b defined as the width of the signal between two points, one below the carrier center frequency and one above the 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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.

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Frequency stability

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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 temperatu
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel b 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 Commu immediately after the call was established, five minutes after the call was established and ten minutes after the c established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of 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 sec
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator cir temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequ transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency de 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
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end po 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 th terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast tra any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§22.355 Frequency tolerance

...the carrier frequency of each transmitter in the Public Mobile Service must be maintained within the tolerances 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/aFor the mid channel

frequency tolerance is 2.5 ppm (2091.5 Hz).

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Band edge compliance

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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. Re "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct 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 TIA-603-D-2004

Description of Methods of Measurements

RF Power Output

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a
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 substitution procedure is used so that the readings from the spectrum analyser are corrected and represent
equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is establish
channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the E
measured.
5) The test procedure according to TIA-603-D-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, pow
be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedu
values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of
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 lim
the minimum necessary for successful communications.
(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation ca
terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limita
detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sens
as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

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Emission and Occupied Bandwidth

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 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 frequenc 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 frequenc mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall b under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its ampl rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be ap any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occu shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at 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. Re "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t 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 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 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 ha 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 sha the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated u conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated mo

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 frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belc
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4 whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 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 th 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 ban or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution ba least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emis is defined as the width of the signal between two points, one below the carrier center frequency and one above th 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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.

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Field strength of spurious radiation

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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 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 represe equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antenn frequency range of 30 MHz to 20 GHz (up to the 10th harmonic of the transmit frequency). The frequency range 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 w 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 ca on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, have been measured.
7) After this initial test, a final test according to TIA-603-D 2.2.12 Unwanted Emissions is performed on signals w

identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal subs
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
leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalen
supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, ind
sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) o
as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, v
measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical o
make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accept
equipment as installed. Such measurements must be accompanied by a description of the site where the measure
made showing the location of any possible source of reflections which might distort the field strength measureme
submitted shall include the relative radiated power of each spurious emission with reference to the rated power o
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those
removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages
checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 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 th
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 dBµV/m (field strength) in
m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution ban
or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution ba
least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A
resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is
the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emis
is defined as the width of the signal between two points, one below the carrier center frequency and one above th
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 e
specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se
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.

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Frequency stability

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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 temperatu
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel l
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 Commu
immediately after the call was established, five minutes after the call was established and ten minutes after the c
established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of
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
10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator cir
temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequ
transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring
temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency de
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
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end po
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 th
terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast tra
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 fre

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the
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
transmitters in the Public Mobile Service in the frequency range 821 to 896 MHz.

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Band edge compliance

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t

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

§ 24.238 Effective radiated power limits

Refer to chapter "Field strength of spurious radiation".

appendix1_FCC24

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 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 TIA-603-D-2004

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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a
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 substitution procedure is used so that the readings from the spectrum analyser are corrected and represent
equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is establish
channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the E
measured.
5) The test procedure according to TIA-603-C-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, pow
be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedu
values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of
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.

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Emission and Occupied Bandwidth

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 frequenc
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 frequenc
mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall b
under the following conditions (as applicable):

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

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Spurious emissions at antenna terminals

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 ha
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 sha
the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data
magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated u
conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated mo
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those

removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages
checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below th
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 ban
kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwi
one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narro
bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated
required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission b
defined as the width of the signal between two points, one below the carrier center frequency and one above the
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 e
specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se
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
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 represe
equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antenn
frequency range of 30 MHz to 10 GHz (up to the 10th harmonic of the transmit frequency). The frequency range
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 w
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 ca
on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y
have been measured.
7) After this initial test, a final test according to TIA-603-C 2.2.12 Unwanted Emissions is performed on signals w
identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal subs
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 leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalen supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, ind sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) o as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, v measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical o make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accept equipment as installed. Such measurements must be accompanied by a description of the site where the measure made showing the location of any possible source of reflections which might distort the field strength measureme submitted shall include the relative radiated power of each spurious emission with reference to the rated power o 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 frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4 whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below th 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 dBµV/m (field strength) in m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution ban kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwi one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narro bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission b defined as the width of the signal between two points, one below the carrier center frequency and one above the 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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 temperatu
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel b 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 Commu immediately after the call was established, five minutes after the call was established and ten minutes after the c established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of 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 sec
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals o 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator cir temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequ transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency de 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
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end po 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 th terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast tra any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§22.355 Frequency tolerance

…the carrier frequency of each transmitter in the Public Mobile Service must be maintained within the tolerances 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/aFor the mid channel

frequency tolerance is 2.5 ppm (2091.5 Hz).

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Band edge compliance

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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. Re "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t 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 TIA-603-D-2004

Description of Methods of Measurements

RF Power Output

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a
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 substitution procedure is used so that the readings from the spectrum analyser are corrected and represent
equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is establish
channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the E
measured.
5) The test procedure according to TIA-603-D-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, pow
be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedu
values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of
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 lim
the minimum necessary for successful communications.
(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation ca
terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limita
detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sens
as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

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Emission and Occupied Bandwidth

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 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 frequenc 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 frequenc mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall b under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its ampl rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be ap any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occu shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at 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. Re "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t 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 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 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 ha 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 sha the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated u conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated mo

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 frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belc
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4 whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 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 th 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 ban or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution ba least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emis is defined as the width of the signal between two points, one below the carrier center frequency and one above th 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 e specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se 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.

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Field strength of spurious radiation

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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 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 represe equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antenn frequency range of 30 MHz to 20 GHz (up to the 10th harmonic of the transmit frequency). The frequency range 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 w 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 ca on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, have been measured.
7) After this initial test, a final test according to TIA-603-D 2.2.12 Unwanted Emissions is performed on signals w

identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal subs
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
leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalen
supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, ind
sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) o
as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, v
measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical o
make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accept
equipment as installed. Such measurements must be accompanied by a description of the site where the measure
made showing the location of any possible source of reflections which might distort the field strength measureme
submitted shall include the relative radiated power of each spurious emission with reference to the rated power o
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those
removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages
checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 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 th
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 dBµV/m (field strength) in
m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution ban
or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution ba
least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A
resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is
the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emis
is defined as the width of the signal between two points, one below the carrier center frequency and one above th
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 e
specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio se
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.

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Frequency stability

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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 temperatu
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel l
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 Commu
immediately after the call was established, five minutes after the call was established and ten minutes after the c
established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of
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
10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator cir
temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequ
transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring
temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency de
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
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end po
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 th
terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast tra
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 fre

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the
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
transmitters in the Public Mobile Service in the frequency range 821 to 896 MHz.

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Band edge compliance

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t

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

§ 24.238 Effective radiated power limits

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 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 27, Subpart C—Technical Standards

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

additional documents

ANSI TIA-603-D-2004

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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a
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 substitution procedure is used so that the readings from the spectrum analyser are corrected and represent
equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is establish
channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the E
measured.
5) The test procedure according to TIA-603-D-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, pow
be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedu
values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of
terminals when this test is made shall be stated.
§27.50 Power and antenna height limits.
(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz a
MHz bands:
(2) Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to a peak
Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground, and n
portable stations must employ a means for limiting power to the minimum necessary for successful communicatic

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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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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
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 frequenc
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 frequenc
mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall b
under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its ampl
rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be ap
any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occu
shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at
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. Re
"Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct t
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 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
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 ha
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 sha
the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data
magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated u
conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated mo
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those
removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages
checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 27.53 Emission limits

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licens
block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(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 ba
megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's fre
resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transm
employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrie
frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 d
transmitter power.
(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's
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 express
parameters as the transmitter power.

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

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Field strength of spurious radiation

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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
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 represe
equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antenn
frequency range of 30 MHz to 18 GHz (up to the 10th harmonic of the transmit frequency). The frequency range
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 w
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 ca

on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y
have been measured.
7) After this initial test, a final test according to TIA-603-D 2.2.12 Unwanted Emissions is performed on signals w
identified as being close to the limit. For any emissions found to be within 10 dB of the limit, a specific signal subs
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
leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalen
supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, ind
sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) o
as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, v
measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical o
make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accept
equipment as installed. Such measurements must be accompanied by a description of the site where the measure
made showing the location of any possible source of reflections which might distort the field strength measureme
submitted shall include the relative radiated power of each spurious emission with reference to the rated power o
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
frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown belo
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 4
whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those
removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages
checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution ban

§ 27.53 Emission limits

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licens
block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.
Remark of the test laboratory: This is calculated to be -13 dBm (effective radiated power) which corresponds to 8
(field strength) in a distance of 3 m.
(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution ba
megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's fre
resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transm
employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrie
frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 d
transmitter power.
(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's
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 express
parameters as the transmitter power.

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

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Frequency stability

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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 temperatu
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel l
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 Commu
immediately after the call was established, five minutes after the call was established and ten minutes after the c
established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of
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 sec
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals
10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator cir
temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequ
transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring
temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency de
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
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end po
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 th
terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast tra
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 ban

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the
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

in accordance wi

appendix1_FCC27

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Subtests HSDPA

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Sub-test	βc	βd	βd (SF)	βc/βd	βHS (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: $?_{ACK}$, $?_{NACK}$ and $?_{CQI}$ = 30/15 with β_{hs} = 30/15 * β_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, $?_{ACK}$ and $?_{NACK}$ = 30/15 with β_{hs} = 30/15 * β_c , and $?_{CQI}$ = 24/15 with β_{hs} = 24/15 * β_c .

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 11/15 and β_d = 15/15.

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Subtests HSUPA

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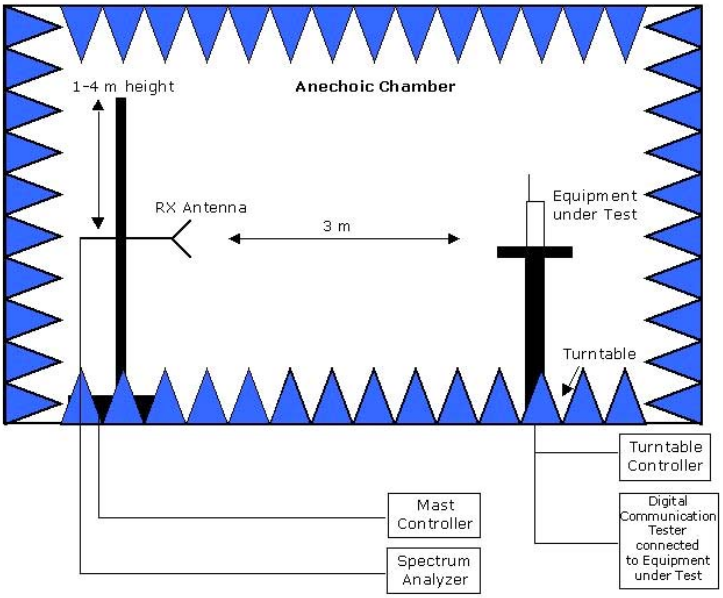
Subtest	Mode	Loopback Mode	Rel99 RMC	HSDPA FRC	HSUPA Test	Number of E-DPDCH Channels
1	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	1
2	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	1
3	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set1	HSUPA Loopback	2
4	Rel6 HSUPA	Test Mode 1	12.2kbps 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)	βc/βd	βhs	βed	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

appendix1b_HSPA

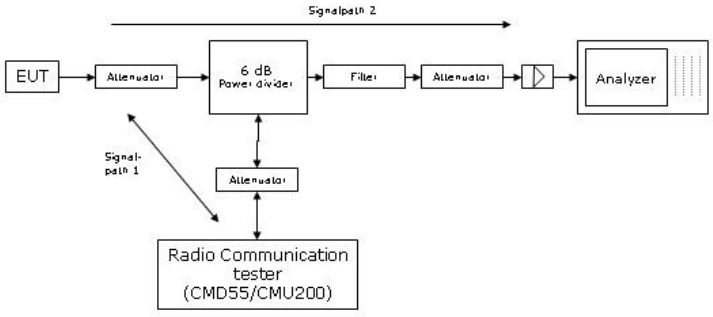
Setup Drawings



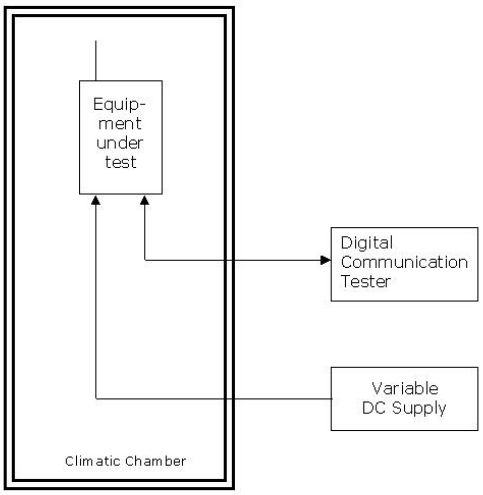
Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Principle set-up for radiated measurements

appendix2



Principle set-up for conducted measurements under nominal conditions



Principle set-up for tests under extreme test conditions

appendix3

Correlation of measurement requirements for Cellular Equipment from FCC and IC

FCC Rule / IC Standard	Part 22	RSS-132 Issue 3, 2016	Part 24	RSS-133 Issue 6, 2013	Part 27	RSS-139 Issue 3, 2015	RSS-130 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.

FCC ISED correlation table

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