TEST REPORT

Report Number: C21T00061-RF03-V02

Applicant	Shanghai Sunmi Technology Co., Ltd.
Product Name	Handheld Wireless Terminal
Model Name	T8911
Brand Name	SUNMI
FCC ID	2AH25T8911
IC	22621-T8911

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part 2/22/24, ANSI/TIA-603-E, ANSI C63.26, KDB 971168 D01,RSS-Gen Issue 5, RSS-132 Issue 3, RSS-133 Issue 6.

Prepared by	范宇航	Reviewed by	王长青
Approved by	[illegible]	Issue Date	2021-12-08

Industrial Internet Innovation Center (Shanghai) Co., Ltd.

NOTE

1. This report is invalid without the signature of the writer, reviewer and authorizer.
2. This report is invalid if altered.
3. For the benefit of clients, if you have any objection to the report, please inform the testing laboratory within 15 days from the date of receiving this report.
4. Samples in the test report are provided by the client. The test results are only applicable to the samples received by the laboratory. The source information of samples (such as sample sender, manufacturer, etc.) in the test report is provided by the client, and the laboratory is not responsible for its authenticity and the measurement accuracy.
5. The test report does not represent the identification of a product by a certification body or an authorized body.
6. This report is only valid as a whole, and no part of the report can be reproduced without the written approval of Industrial Internet Innovation Center (Shanghai) Co., Ltd.
7. Without the written permission of testing institutions and accreditation bodies, this report cannot be used in part or in whole for publicity or product introduction.
8. "N/A" is used in this report to indicate that it is not applicable or available.
9. Industrial Internet Innovation Center (Shanghai) Co., Ltd. assumes the legal responsibility for the report.
10. The measurement uncertainty is not taken into account when deciding conformity, and the results of measurement (or the average of measurement results) are directly used as the criterion for the stating conformity.

Test Laboratory:
Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Add: Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
Tel: +86 21 68866880

Revision Version

Report Number	Revision	Date	Memo
C21T00061-RF03-V00	00	2021-11-03	Initial creation of test report
C21T00061-RF03-V01	01	2021-11-25	Add test standard on report cover
C21T00061-RF03-V02	02	2021-12-08	Update output power in e.r.p.and e.i.r.p in report

CONTENTS

1. TEST LABORATORY 6
   1.1. TESTING LOCATION 6
   1.2. TESTING ENVIRONMENT 6
   1.3. PROJECT INFORMATION 6
2. CLIENT INFORMATION 7
   2.1. APPLICANT INFORMATION 7
   2.2. MANUFACTURER INFORMATION 7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 8
   3.1. ABOUT EUT 8
   3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 8
   3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST 9
4. REFERENCE DOCUMENTS 10
   4.1. REFERENCE DOCUMENTS FOR TESTING 10
   4.2. REFERENCE INFORMATION FROM CLIENT 10
5. TEST SUMMARY 11
   5.1. SUMMARY OF TEST RESULTS 11
   5.2. STATEMENTS 12
6. MEASUREMENT RESULTS 13
   6.1. OUTPUT POWER 14
   6.2. PEAK-TO-AVERAGE POWER RATIO 16
   6.3. 99% OCCUPIED BANDWIDTH 18
   6.4. -26DB EMISSION BANDWIDTH 25
   6.5 BAND EDGE AT ANTENNA TERMINALS 32
   6.6. FREQUENCY STABILITY 35

6.7. CONDUCTED SPURIOUS EMISSION 42

6.8. RADIATED SPURIOUS EMISSION 57

7. TEST EQUIPMENT LIST 70

CONDUCTED TEST SYSTEM 70

RADIATED EMISSION TEST SYSTEM 70

ANNEX A: MEASUREMENT UNCERTAINTY 71

ANNEX B: ACCREDITATION CERTIFICATE 72

1. Test Laboratory

1.1. Testing Location

Company Name	Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Address	Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
FCC Registration No.	958356
FCC Degistration No.	CN1177
IC Degistration No.	CN0067

1.2. Testing Environment

Normal Temperature	15℃~35℃
Relative Humidity	30%RH~60%RH
Supply Voltage	120V/60Hz

1.3. Project Information

Project Leader	Wang Wenwen
Testing Start Date	2021-06-04
Testing End Date	2021-10-28

2. Client Information

2.1. Applicant Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	+86 18721763396

2.2. Manufacturer Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	+86 18721763396

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Product Name	Handheld Wireless Terminal
Model name	T8911
Supported Radio Technology and Bands	GSM850/GSM900/GSM1800/GSM1900 WCDMA Band Ⅰ/Band Ⅱ/Band Ⅳ/Band Ⅴ/Band Ⅷ CDMA Band BC0/BC1/BC10 LTE 1/2/3/4/5/7/12/13/14/17/18/19/25/26/28/38/41/66/71 LTE CA Up Link 2CA: 7C,41C BT5.0 WLAN 802.11b,g,n WLAN 802.11a,n,ac NFC GPS GLONASS Galileo BDS
Hardware Version	V1.02
Software Version	V01_T46
FCC ID	2AH25T8911
IC	22621-T8911
Extreme Temperature	-20℃~55℃
Nominal Voltage	3.8V
Extreme High Voltage	4.2V
Extreme Low Voltage	3.5V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	864679050005368 864679050014659	V1.02	V01_T46	2021-06-04
N03	864679050005749 864679050015037	V1.02	V01_T46	2021-06-04
N05	864679050005574 864679050014865	V1.02	V01_T46	2021-06-04

*EUT ID: is internally used to identify the test sample in the lab.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
AE1	RF cable	N/A	N/A

*AE ID: is internally used to identify the test sample in the lab.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	2018-10-01
FCC Part 22	PUBLIC MOBILE SERVICES	2018-10-01
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	2018-10-01
ANSI-TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio	2015
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v03r01
RSS-Gen Issue 5	RSS-Gen —General Requirements for Compliance of Radio Apparatus	2019-03
RSS-132 Issue 3	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz	2013-01
RSS-133 Issue 6	2 GHz Personal Communications Services	2018-01

4.2. Reference Information from client

Antenna gain Information of the test sample provided by Shanghai Sunmi Technology Co., Ltd.
Antenna Gain:
CDMA2000 BC0：-1.74dBi
CDMA2000 BC1：0.24dBi
CDMA2000 BC10：-1.77dBi

5. Test Summary

5.1. Summary of Test Results

Measurement Items	Sub-clause	Sub-clause of IC	Verdict
Output Power	2.1046/22.913(a)/24.232(c)	RSS-132 5.4 RSS-133 6.4	Pass
Peak-to-Average Ratio	24.232(d)	RSS-132 5.4 RSS-133 6.4	Pass
99%Occupied Bandwidth	2.1049(h)(i)/ 22.917(b)	RSS-Gen 4.6	Pass
-26dB Emission Bandwidth	22.917(b)/§24.238(b)	RSS-Gen 4.6	Pass
Band Edge at antenna terminals	22.917(a)/24.238(a)	RSS-132 5.5 RSS-133 6.5	Pass
Frequency stability	2.1055/24.235	RSS-132 5.3 RSS-133 6.3	Pass
Conducted Spurious mission	2.1053/22.917(a)/24.238(a)	RSS-132 5.5 RSS-133 6.5	Pass
Emission Limit	2.1051/22.917/24.238/22.913 /24.232	RSS-132 5.5 RSS-133 6.5	Pass

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25℃
Voltage	Vnom	3.8V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa

5.2. Statements

The T8911, manufactured by Shanghai Sunmi Technology Co., Ltd. is a new product for testing.

The test data in the report conform to current IC valid standards.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

6. Measurement Results

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω
Temperature	Min. = 15 ℃, Max. = 35 ℃

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

6.1. Output Power

6.1.1. Summary

During the process of testing, the EUT was controlled Rhode & Schwarz Digital Radio. Communication tester (CMU-200) to ensure max power transmission and proper modulation.

This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

6.1.2. Conducted

6.1.2.1. Method of Measurements

Method of measurements please refer to KDB971168 D01 v03 clause 5.

The EUT was set up for the max output power with pseudo random data modulation.

The power was measured with Rhode & Schwarz Spectrum Analyzer FSQ (peak).

6.1.2.2 Test procedures:

1. The transmitter output port was connected to base station.
2. Set the EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for CDMA and maximum average power for other modulation signal.

6.1.2.3 Limit:

Rule RSS-132 5.4 specifies that "The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts." Limit ≤ 11.5 W (40.6 dBm)

Rule RSS-133 6.4 specifies that " Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.Limit ≤ 2 W (33 dBm)

6.1.2.4 Test Procedure:

The transmitter output power was connected to calibrated attenuator, the other end of which was connected to signal analyzer. Transmitter output power was read off the power in dBm. The power outputs at the transmitter antenna port was determined by adding the value of attenuator to the signal analyzer reading.

6.1.2.5 CDMA2000 Cellular Test Condition:

RBW	VBW	Sweep time	Span
1MHz	3MHz	300ms	10MHz

6.1.2.6 Measurement results:

CDMA2000 BC0	
Channel/fc(MHz)	Peak power (dBm)
Low 1013/824.7	23.86
Mid 384/836.52	24.08
High 777/848.31	24.21

CDMA2000 BC1	
Channel/fc(MHz)	Peak power (dBm)
Low 25/1851.25	22.76
Mid 600/1880.0	22.60
High 1175/1908.75	22.92
CDMA2000 BC10	
Channel/fc(MHz)	Peak power (dBm)
Low 450/817.25	24.82
Mid 550/819.75	24.58
High 650/822.25	24.78
1xEV-DO BC0 Release	
Channel/fc(MHz)	Peak power (dBm)
Low 1013/824.7	24.29
Mid 384/836.52	24.31
High 777/848.31	24.56
1xEV-DO BC1 Release	
Channel/fc(MHz)	Peak power (dBm)
Low 25/1851.25	23.42
Mid 600/1880.0	23.25
High 1175/1908.75	23.46
1xEV-DO BC10 Release	
Channel/fc(MHz)	Peak power (dBm)
Low 450/817.25	24.74
Mid 550/819.75	24.51
High 650/822.25	24.71

Conclusion: PASS

6.2. Peak-to-Average Power Ratio

Method of test measurements please refer to KDB971168 D01 v03 clause 5.7.

6.2.1 PAPR Limit

Rule RSS-132: 5.4: the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission. Limit≤13dB

Rule RSS-133 6.4 specifies that " the transmitters peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.” Limit≤13dB

6.2.2 Test procedures

1. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
2.
   1) Select the spectrum analyzer CCDF function.
   2) Set RBW≥signal’s occupied bandwidth.
   3) Set the number of counts to a value that stabilizes the measured CCDF cure;
   4) Sweep time ≥ 1s.
3. Record the maximum PAPR level associated with a probability of 0.1%.

6.2.3 Test results:

CDMA2000 BC0			
Channel	384	777	1013
Frequency (MHz)	836.52	848.31	824.7
PAPR(dB)	8.37	8.46	10.93
CDMA2000 BC1			
Channel	25	600	1175
Frequency (MHz)	1851.25	1880.0	1908.75
PAPR(dB)	8.43	10.58	9.81
CDMA2000 BC10			
Channel	450	550	650
Frequency (MHz)	822.25	819.75	822.25
PAPR(dB)	5.22	5.32	5.26

1xEV-DO BC0			
Channel	384	777	1013
Frequency (MHz)	836.52	848.31	824.7
PAPR(dB)	4.62	3.97	4.52
1xEV-DO BC1			
Channel	25	600	1175
Frequency (MHz)	1851.25	1880.0	1908.75
PAPR(dB)	3.91	3.85	4.20
1xEV-DO BC10			
Channel	450	550	650
Frequency (MHz)	822.25	819.75	822.25
PAPR(dB)	5.29	5.22	5.26

Conclusion: PASS

6.3. 99% Occupied Bandwidth

Method of test please refer to KDB971168 D01 v03 clause 4.0. No specific occupied bandwidth requirements in RSS-Gen: 6.6.

6.3.1. Occupied Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data.

6.3.2 Test Procedure:

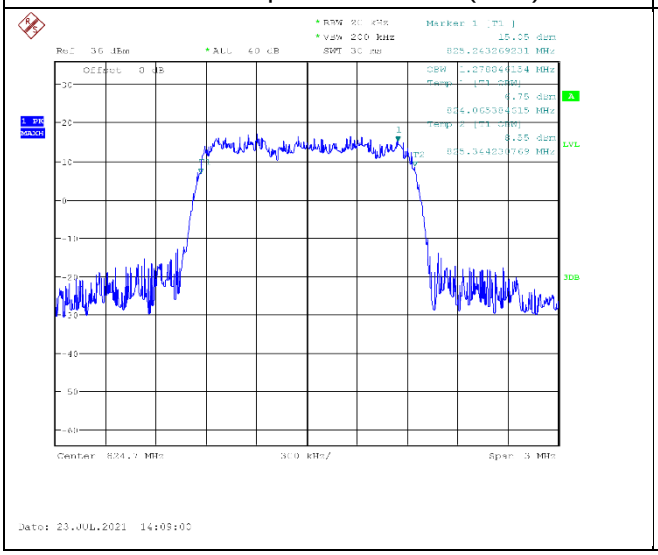
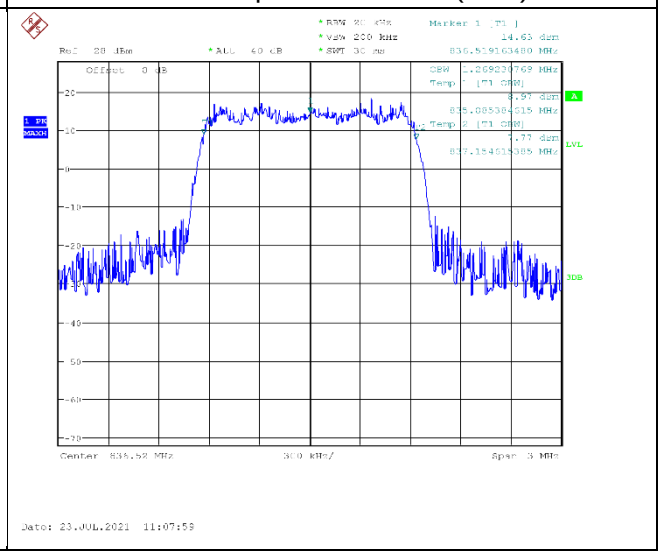
1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW.
3. 99% bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

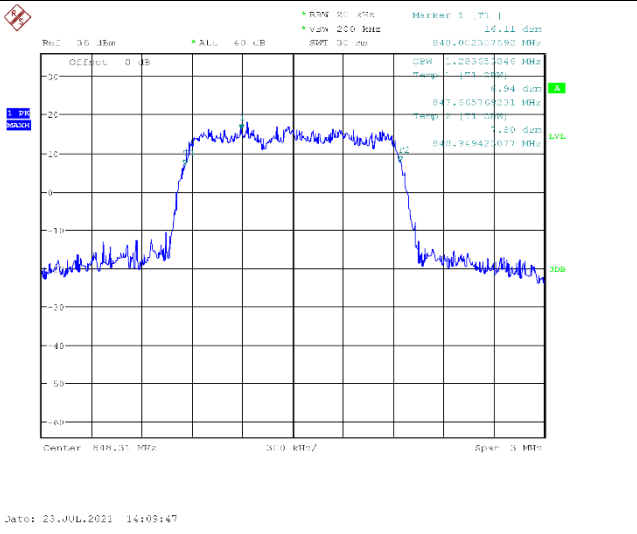
6.3.3 Test result:

CDMA2000 BC0		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 1013	824.7	1.279
Mid 384	836.52	1.269
High 777	848.31	1.284

Conclusion: PASS

CDMA2000 BC0

Channel 1013-Occupied Bandwidth (99%)	Channel 384-Occupied Bandwidth (99%)
	

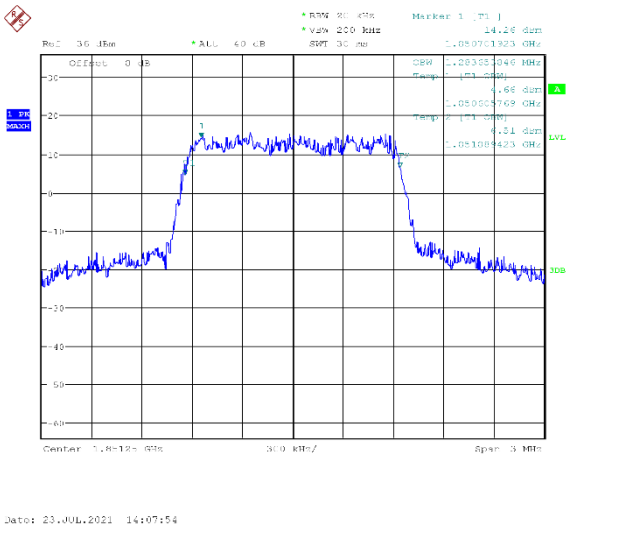
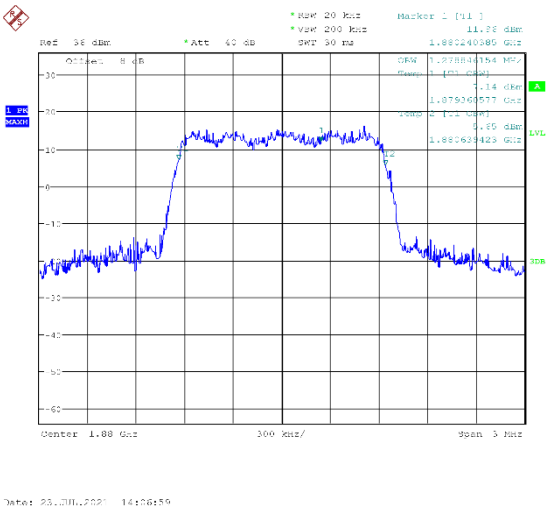
Channel 777-Occupied Bandwidth (99%)	/
	/

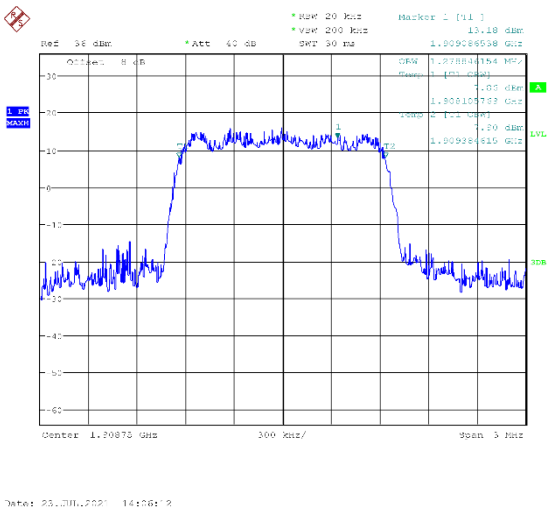
Conclusion: PASS

CDMA2000 BC1		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 25	1851.25	1.284
Mid 600	1880.0	1.279
High 1175	1908.75	1.279

Conclusion: PASS

CDMA2000 BC1

Channel 25-Occupied Bandwidth	Channel 600-Occupied Bandwidth
	

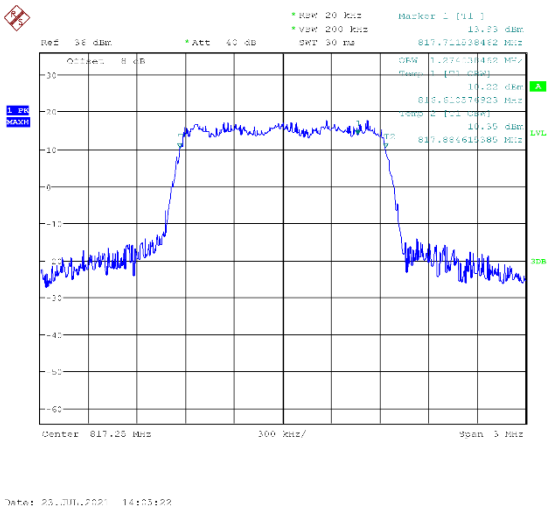
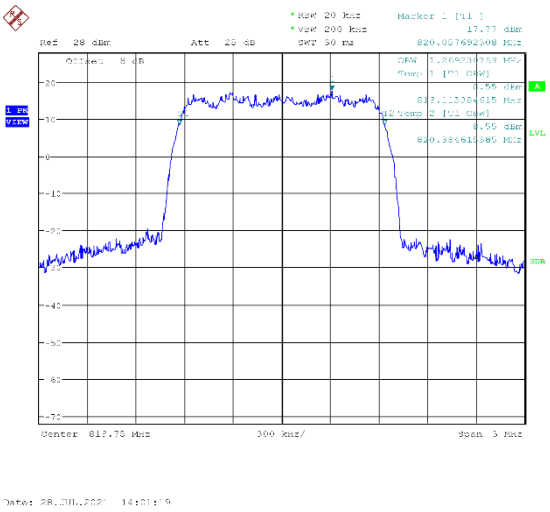
Channel 1175-Occupied Bandwidth	/
	/

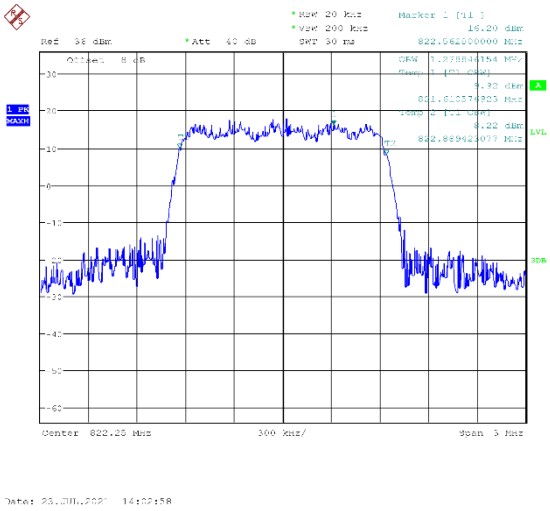
Conclusion: PASS

CDMA2000 BC10		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 450	817.25	1.274
Mid 550	819.75	1.269
High 650	822.25	1.279

Conclusion: PASS

CDMA2000 BC10

Channel 450-Occupied Bandwidth	Channel 550-Occupied Bandwidth
	

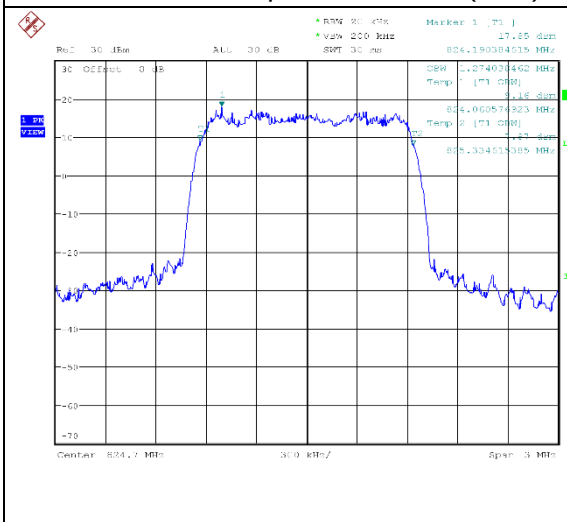
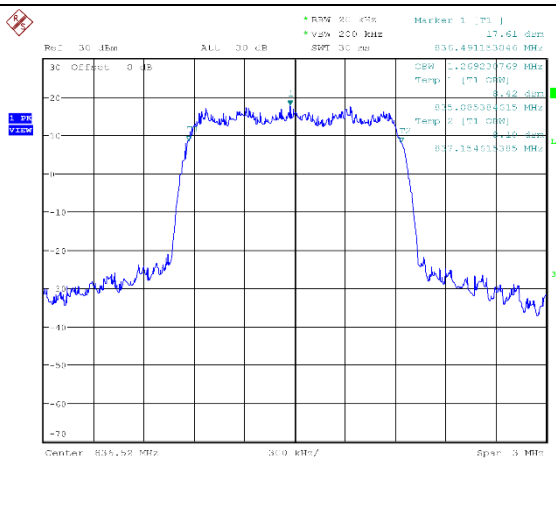
Channel 650-Occupied Bandwidth	/
	/

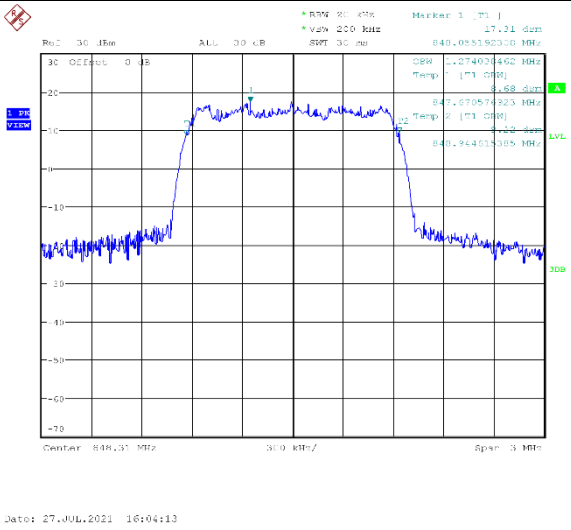
Conclusion: PASS

1xEV-DO BC0		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 1013	824.7	1.274
Mid 384	836.52	1.269
High 777	848.31	1.274

Conclusion: PASS

1xEV-DO BC0

Channel 1013-Occupied Bandwidth (99%)	Channel 384-Occupied Bandwidth (99%)
	

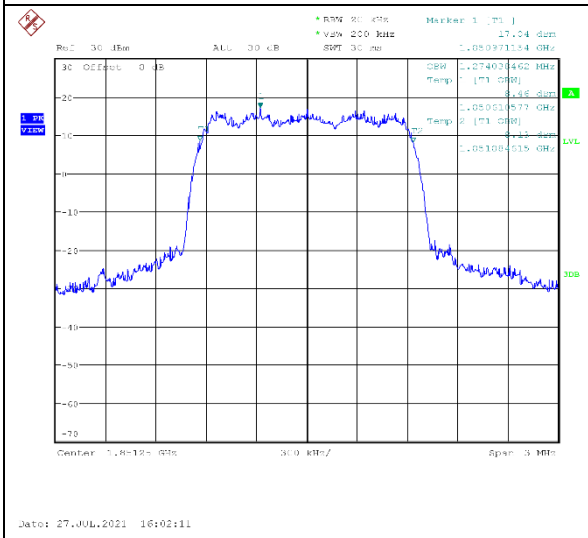
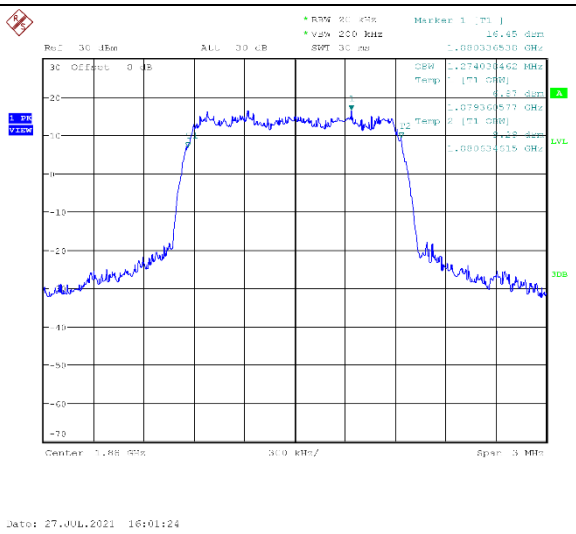
Channel 777-Occupied Bandwidth (99%)	/
	/

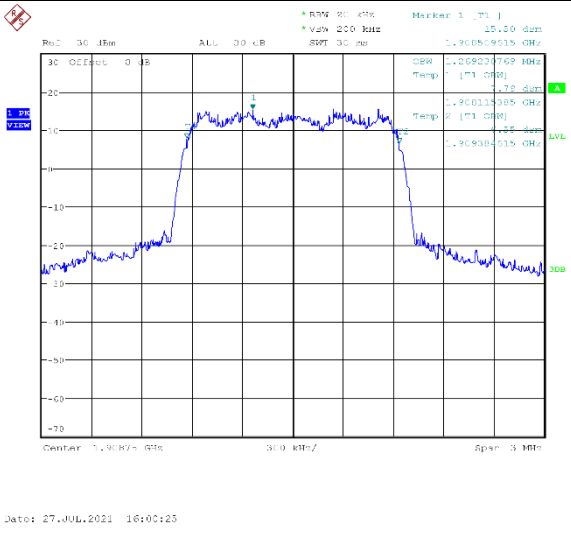
Conclusion: PASS

1xEV-DO BC1		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 25	1851.25	1.274
Mid 600	1880.0	1.274
High 1175	1908.75	1.269

Conclusion: PASS

1xEV-DO BC1

Channel 25-Occupied Bandwidth	Channel 600-Occupied Bandwidth
	

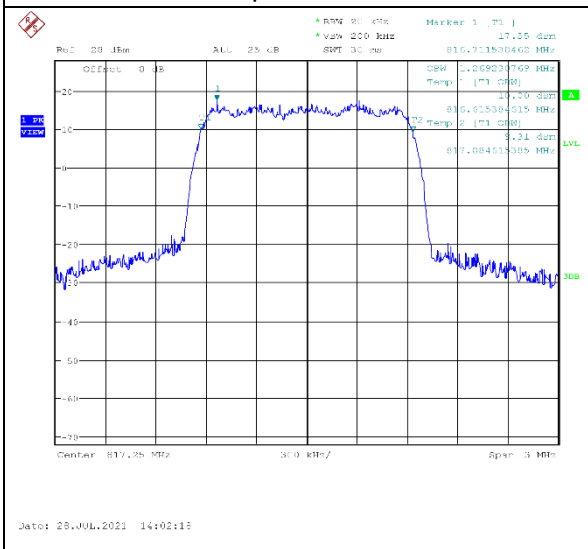
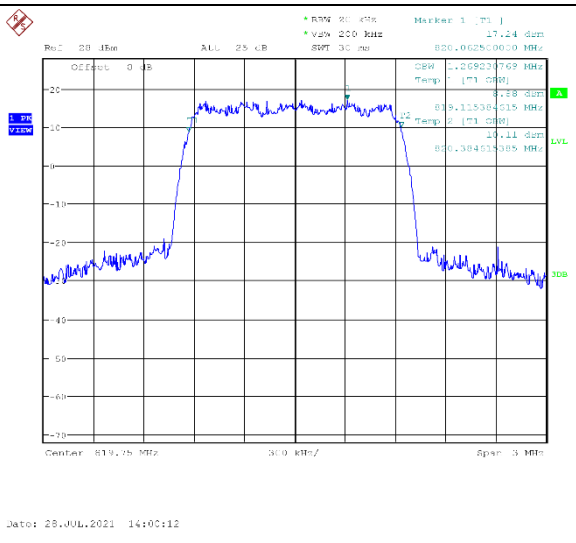
Channel 1175-Occupied Bandwidth	/
	/

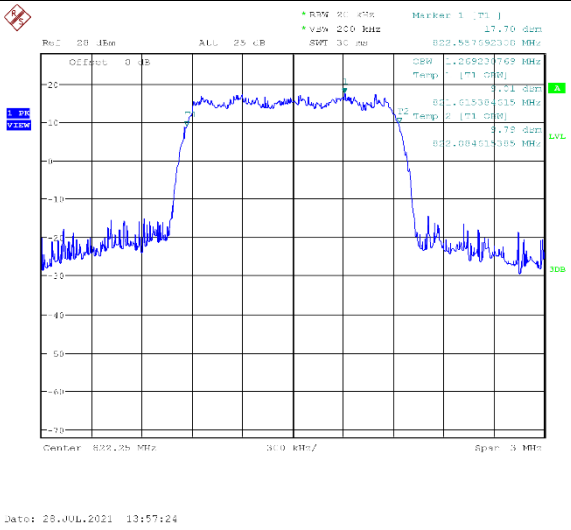
Conclusion: PASS

1xEV-DO BC10		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 450	817.25	1.269
Mid 550	819.75	1.269
High 650	822.25	1.269

Conclusion: PASS

1xEV-DO BC10

Channel 450-Occupied Bandwidth	Channel 550-Occupied Bandwidth
	

Channel 650-Occupied Bandwidth	/
	/

Conclusion: PASS

6.4. -26dB Emission Bandwidth

Method of test please refer to KDB971168 D01 v03 clause 4.0. No specific occupied bandwidth requirements in RSS-Gen: 6.6.

6.4.1. -26dB Emission Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data.

6.4.2 Test Procedure:

1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW.
3. 26dB bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

6.4.3 Measurement methods:

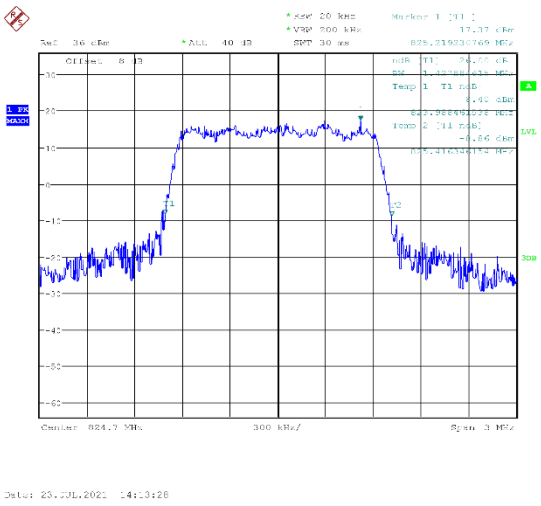
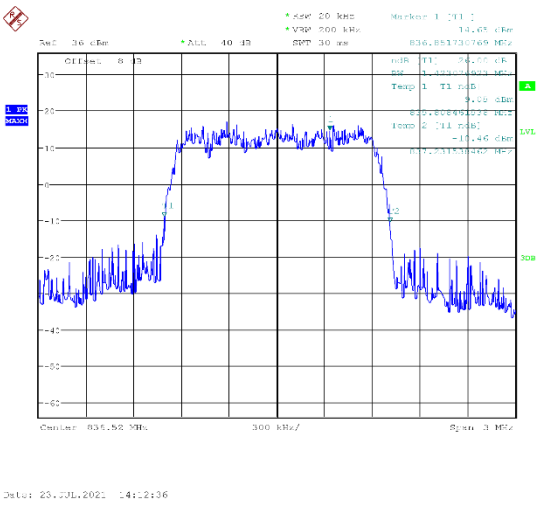
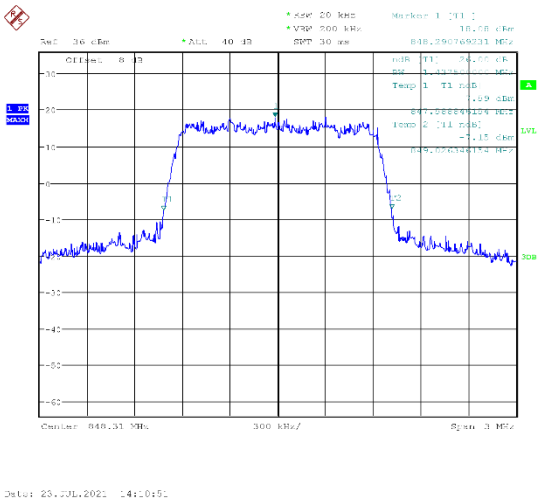
For CDMA: signal analyzer setting as: RBW=3KHz; VBW=10KHz; Span=1MHz.
For WCDMA: signal analyzer setting as: RBW=50KHz; VBW=200KHz; Span=10MHz.

6.4.4 Test results:

CDMA2000 BC0		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 1013	824.7	1.428
Mid 384	836.52	1.423
High 777	848.31	1.438

Conclusion: PASS

CDMA2000 BC0

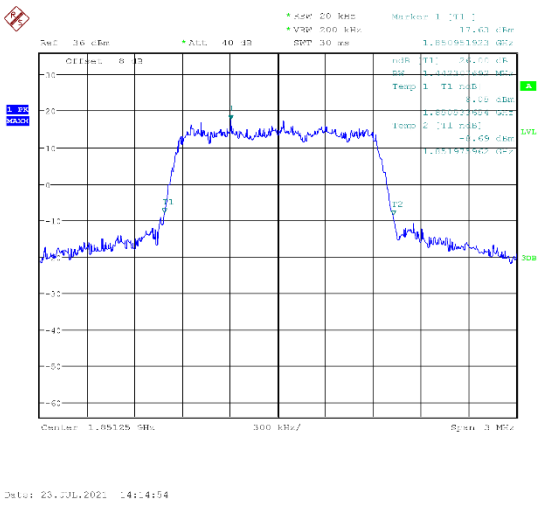
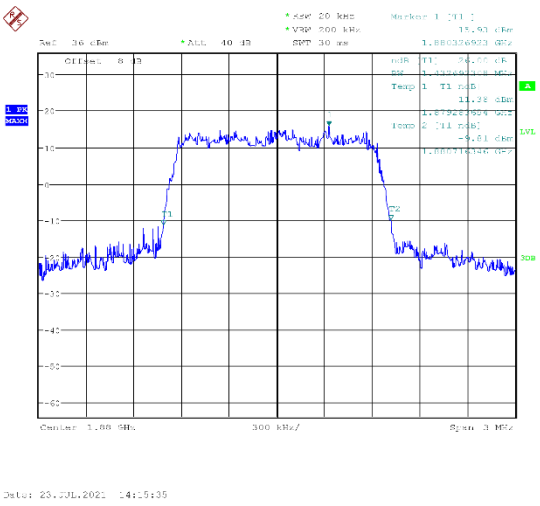
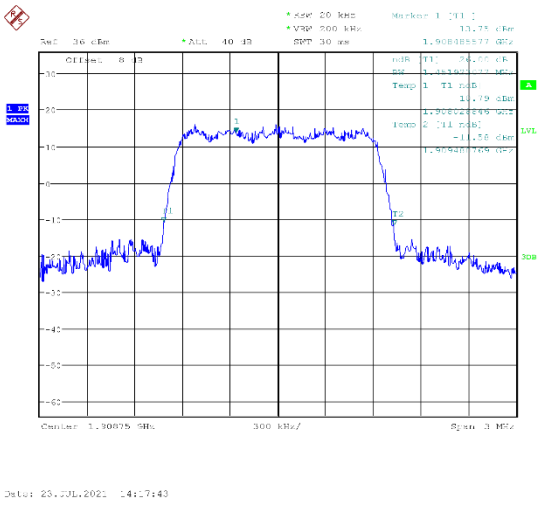
Channel 1013- Emission Bandwidth (-26dBc BW)	Channel 384- Emission Bandwidth (-26dBc BW)
	
Channel 777- Emission Bandwidth (-26dBc BW)	/
	/

Conclusion: PASS

CDMA2000 BC1		
Test channel	Test channel	–26dBc Emission Bandwidth(MHz)
Low 25	1851.25	1.442
Mid 600	1880.0	1.433
High 1175	1908.75	1.452

Conclusion: PASS

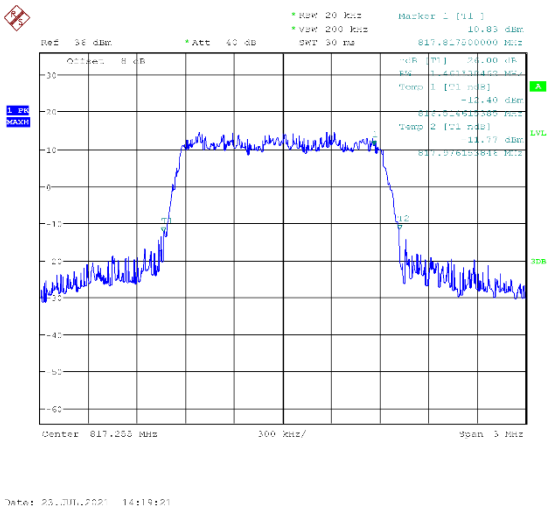
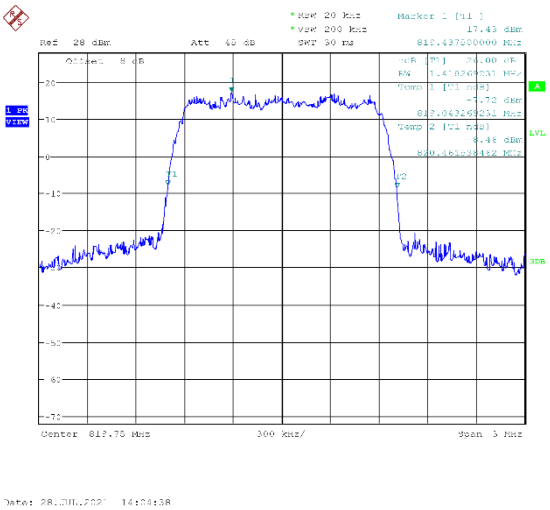
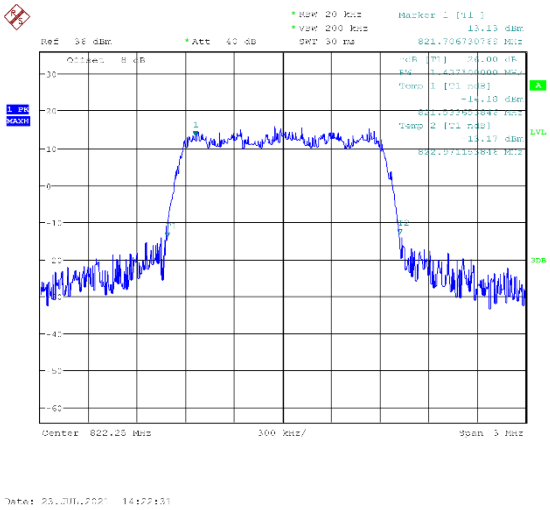
CDMA2000 BC1

Channel 25- Emission Bandwidth (-26dBc BW)	Channel 600- Emission Bandwidth (-26dBc BW)
	
Channel 1175- Emission Bandwidth (-26dBc BW)	/
	/

Conclusion: PASS

CDMA2000 BC10		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 450	817.25	1.462
Mid 550	819.75	1.418
High 650	822.25	1.438

Conclusion: PASS

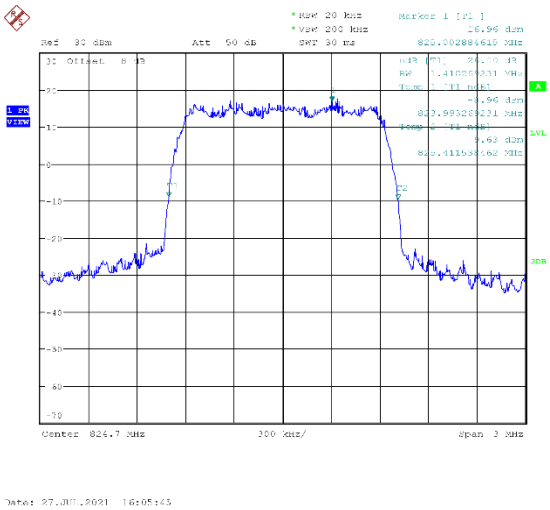
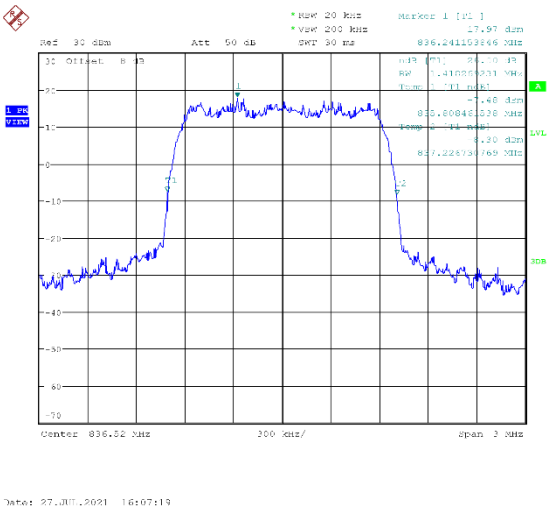
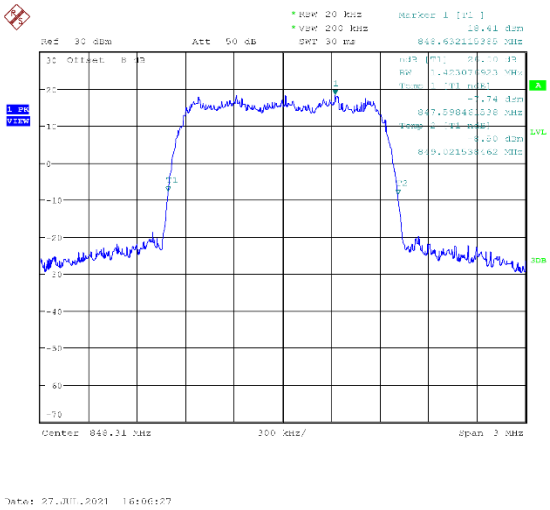
Channel 450- Emission Bandwidth (-26dBc BW)	Channel 550- Emission Bandwidth (-26dBc BW)
	
Channel 650- Emission Bandwidth (-26dBc BW)	/
	/

Conclusion: PASS

1xEV-DO BC0		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 1013	824.7	1.418
Mid 384	836.52	1.418
High 777	848.31	1.423

Conclusion: PASS

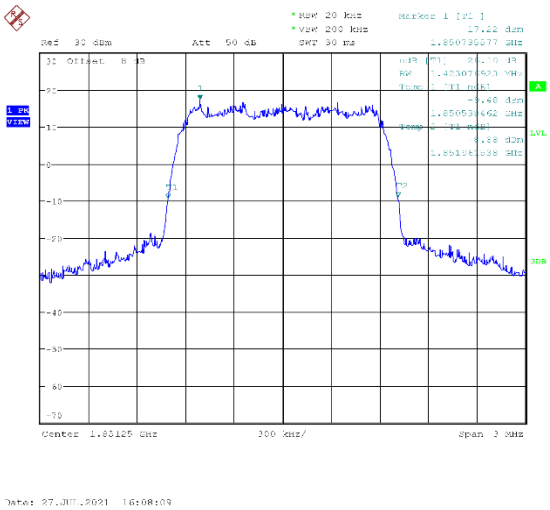
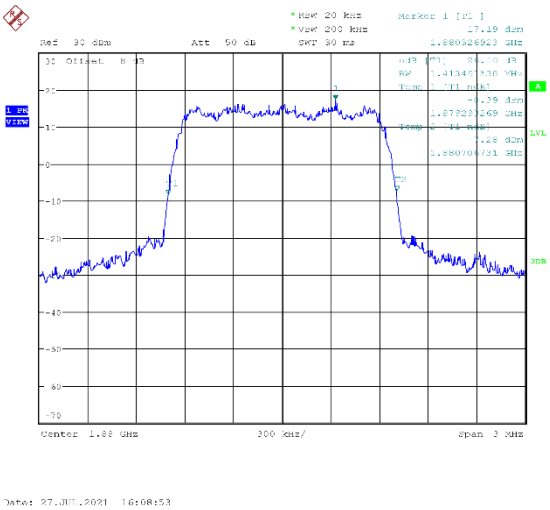
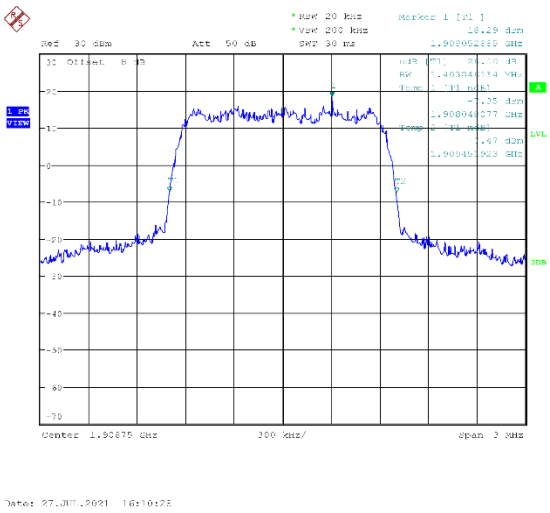
1xEV-DO BC0

Channel 1013- Emission Bandwidth (-26dBc BW)	Channel 384- Emission Bandwidth (-26dBc BW)
	
Channel 777- Emission Bandwidth (-26dBc BW)	/
	/

Conclusion: PASS

1xEV-DO BC1		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 25	1851.25	1.423
Mid 600	1880.0	1.413
High 1175	1908.75	1.404

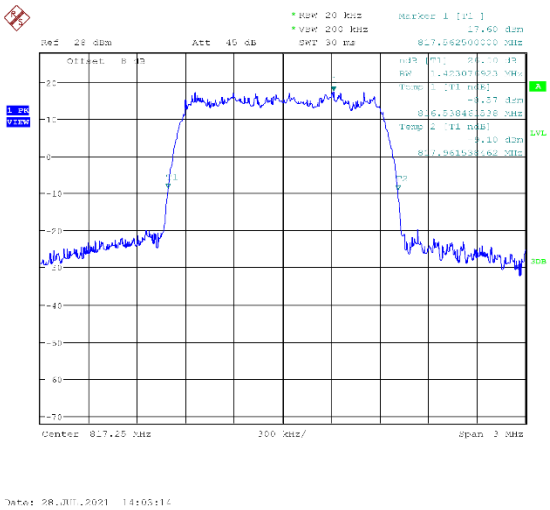
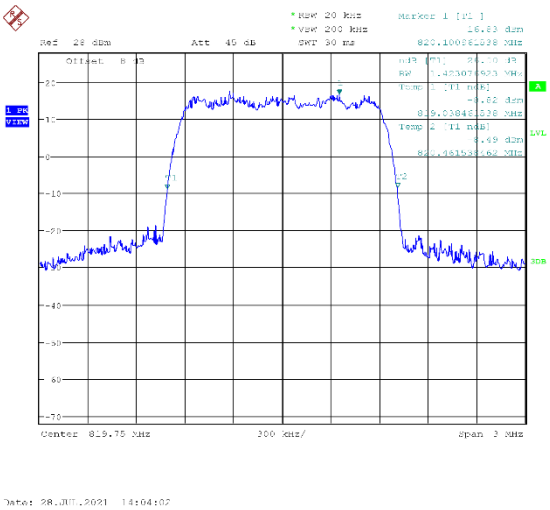
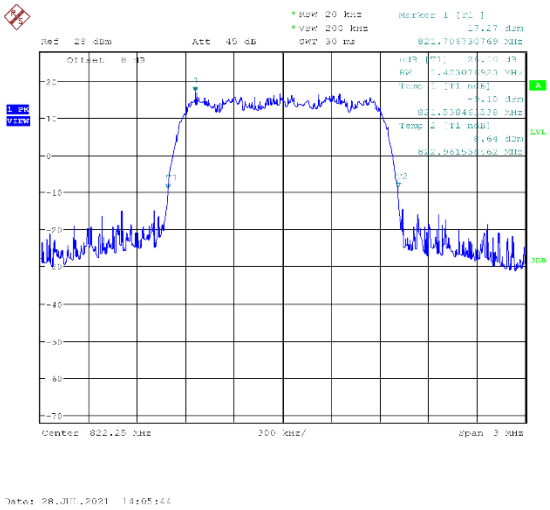
Conclusion: PASS

Channel 25- Emission Bandwidth (-26dBc BW)	Channel 600- Emission Bandwidth (-26dBc BW)
	
Channel 1175- Emission Bandwidth (-26dBc BW)	/
	/

Conclusion: PASS

1xEV-DO BC10		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 450	817.25	1.423
Mid 550	819.75	1.423
High 650	822.25	1.423

Conclusion: PASS

Channel 450- Emission Bandwidth (-26dBc BW)	Channel 550- Emission Bandwidth (-26dBc BW)
	
Channel 650- Emission Bandwidth (-26dBc BW)	**/**
	**/**

Conclusion: PASS

6.5 Band Edge at antenna terminals

Method of test measurements please refer to KDB971168 D01 v03 clause 6

6.5.1 Limit:

Rule RSS-132: 5.5:

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).

(ii)After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required. Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

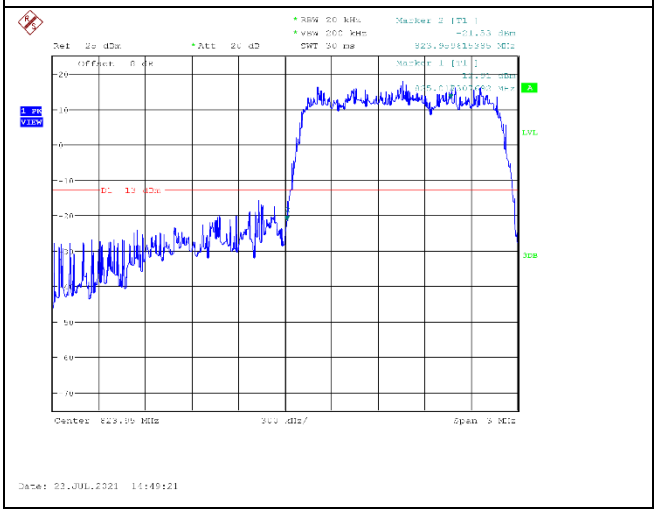
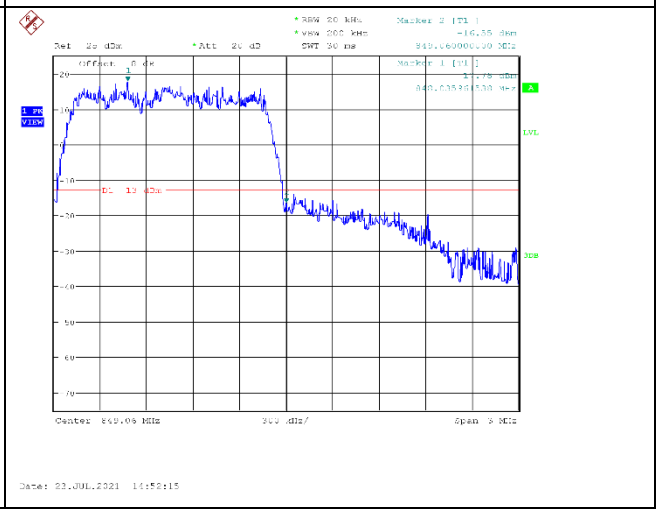
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

6.5.2 Test procedure:

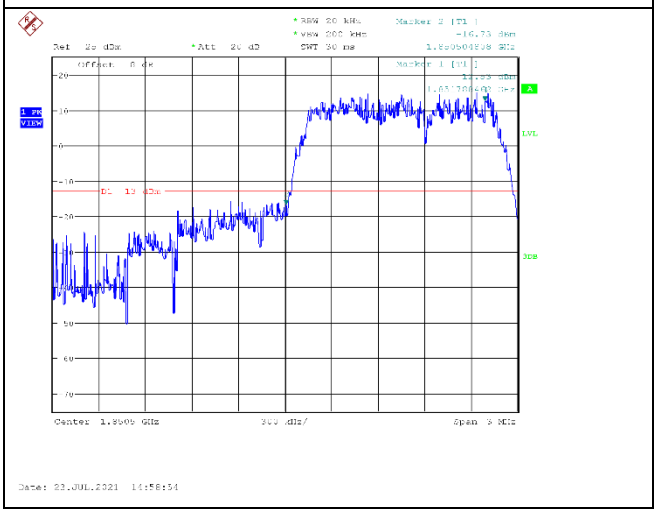
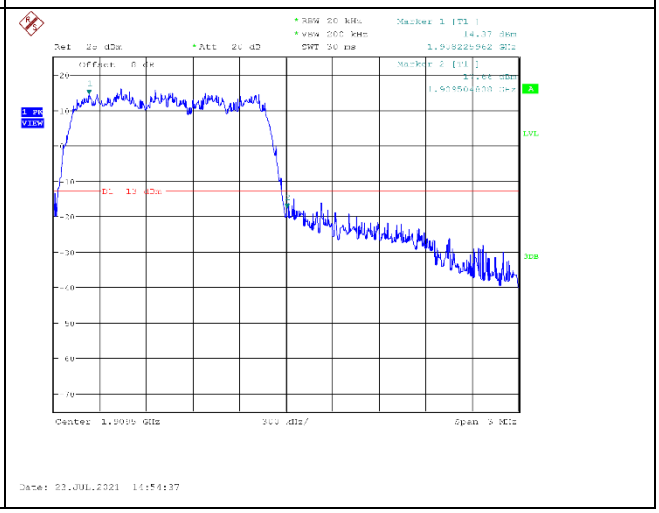
1. The RF output of the transceiver was connected to a signal analyzer through appropriate attenuation.
2. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.
3. The RF fundamental frequency should be excluded against the limit line in the operating frequency band
4. The limit line is derived from 43+10log(P) dB below the transmitter power P(Watts)
   = P (W)-[43+10 log (P)] (dB)
   = [30+10 log (P)] (dBm) - [43+10 log (P)] (dB)
   =-13dBm

6.5.3 Test Result:

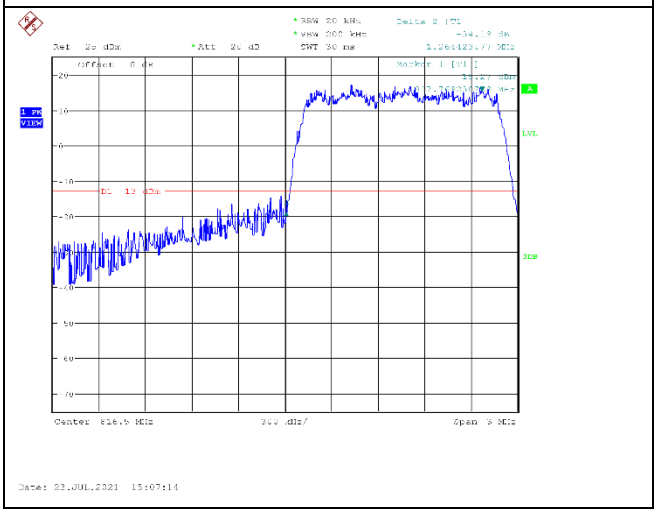
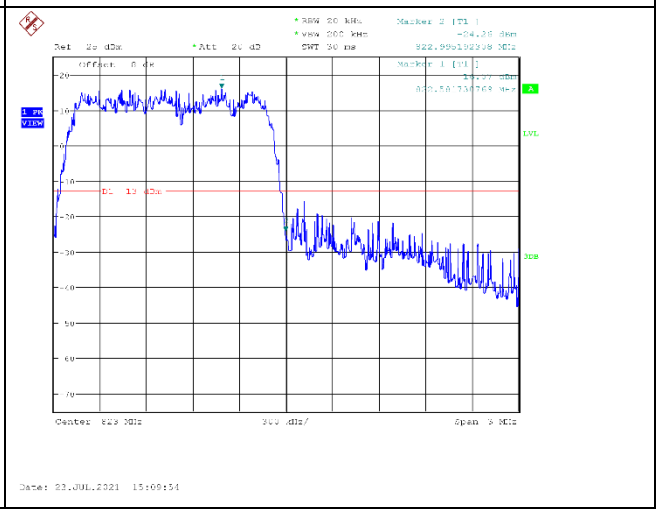
CDMA2000 BC0

Channel 1013- LOW BAND EDGE BLOCK	Channel 777- HIGH BAND EDGE BLOCK
	

CDMA2000 BC1

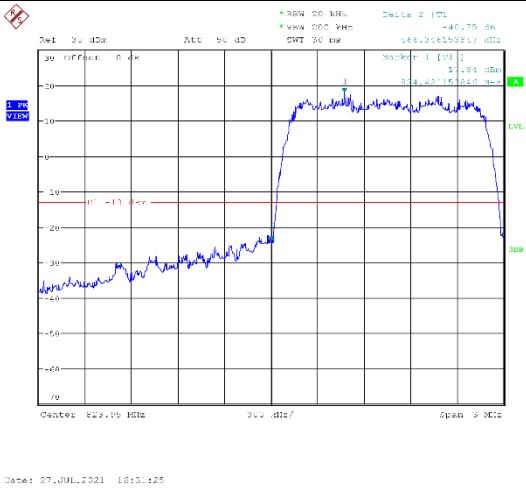
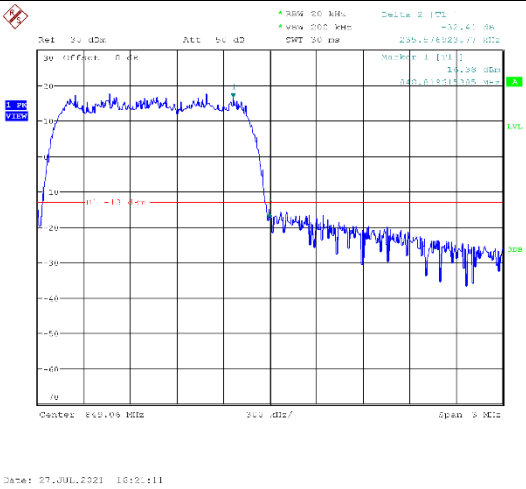
Channel 25- LOW BAND EDGE BLOCK	Channel 1175- HIGH BAND EDGE BLOCK
	

CDMA2000 BC10

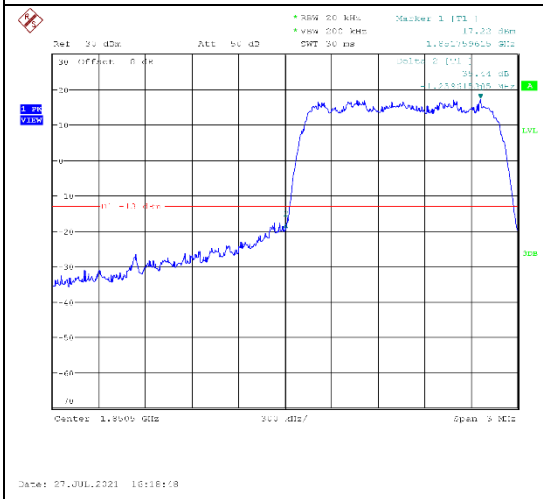
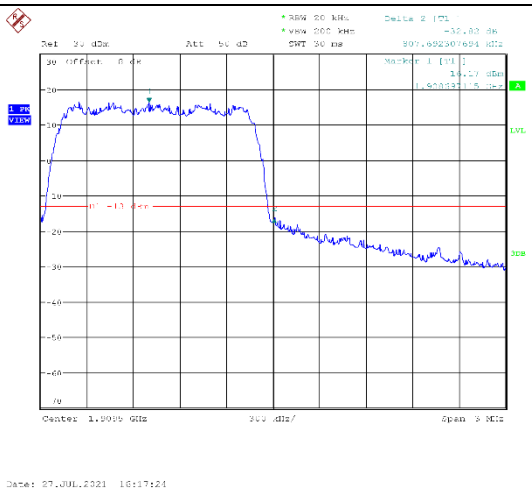
Channel 450- LOW BAND EDGE BLOCK	Channel 650- HIGH BAND EDGE BLOCK
	

Conclusion: PASS

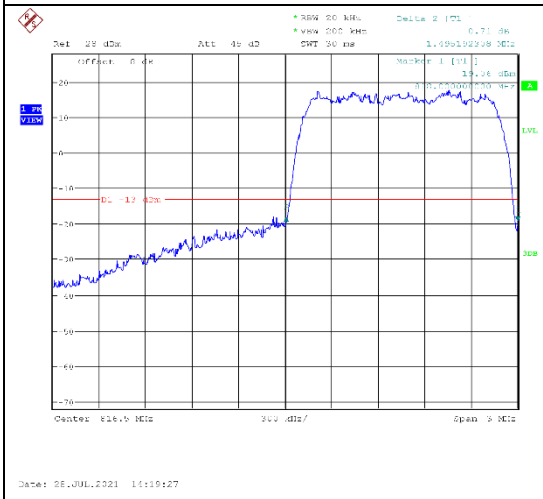
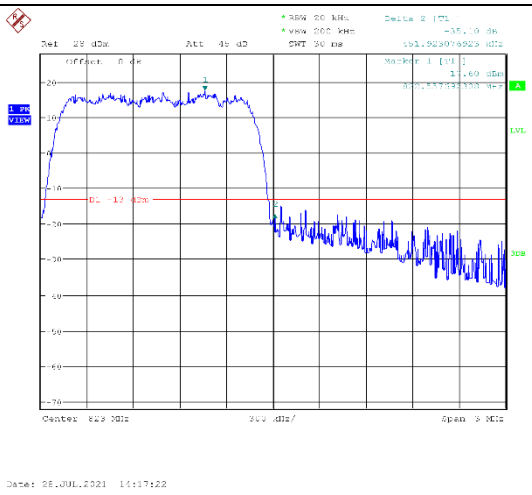
1xEV-DO BC0

Channel 1013- LOW BAND EDGE BLOCK	Channel 777- LOW BAND EDGE BLOCK
	

1xEV-DO BC1

Channel 25- LOW BAND EDGE BLOCK	Channel 1175- LOW BAND EDGE BLOCK
	

1xEV-DO BC10

Channel 450- LOW BAND EDGE BLOCK	Channel 650- LOW BAND EDGE BLOCK
	

Conclusion: PASS

6.6. Frequency Stability

Method of test measurements please refer to KDB971168 D01 v03 clause 9

6.6.1.Method of Measurement and test procedures

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.

2. Subject the EUT to overnight soak at -10℃.

3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

4. Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

6. Subject the EUT to overnight soak at +50℃.

7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made with in 2 minutes of Powering up the EUT, to prevent significant self-warming.

8. Repeat the above measurements at 10 C increments from +50℃ to -10℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.

9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

6.6.2. Measurement Limit

Rule RSS-132 5.3 specifies that "The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.” Limits ≤ 2.5 ppm

Rule RSS-133 6.3 specifies that "The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations.” Limit ≤ ±2.5 ppm

6.6.3 Test results

CDMA2000 BC0 Mid Channel/fc(MHz) 384/836.52

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-3.08	84
3.8	-20	-1.76	84
3.8	-10	1.46	84
3.8	0	-2.27	84
3.8	10	-2.12	84
3.8	20	-1.46	84
3.8	30	0.44	84
3.8	40	-2.78	84
3.8	50	-2.05	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	-1.25	84
3.8	25	-2.34	84
4.2	25	-0.59	84

CDMA2000 BC1 Mid Channel/fc(MHz) 600/1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	2.42	196
3.8	-20	-2.93	196
3.8	-10	0.22	196
3.8	0	-0.66	196
3.8	10	-2.86	196
3.8	20	-2.56	196
3.8	30	-0.15	196
3.8	40	1.83	196
3.8	50	2.42	196

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	-1.9	196
3.8	25	-1.17	196
4.2	25	-2.27	196

Conclusion: PASS

CDMA2000 BC10 Mid Channel/fc(MHz) 550/848.31

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	0.37	196
3.8	-20	-1.1	196
3.8	-10	1.76	196
3.8	0	-0.22	196
3.8	10	-2.86	196
3.8	20	-0.37	196
3.8	30	0.51	196
3.8	40	-0.88	196
3.8	50	1.17	196

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	0.44	196
3.8	25	0.81	196
4.2	25	-0.95	196

Conclusion: PASS

1xEV-DO BC0 Mid Channel/fc(MHz) 384/836.52

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	1.23	84
3.8	-20	1.21	84
3.8	-10	1.43	84
3.8	0	1.45	84
3.8	10	2.13	84
3.8	20	-1.91	84
3.8	30	2.14	84
3.8	40	2.16	84
3.8	50	2.17	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	0.76	84
3.8	25	1.01	84
4.2	25	0.71	84

Conclusion: PASS

1xEV-DO BC1 Mid Channel/fc(MHz) 600/1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	0.85	196
3.8	-20	1.21	196
3.8	-10	-0.97	196
3.8	0	1.28	196
3.8	10	2.19	196
3.8	20	2.10	196
3.8	30	1.93	196
3.8	40	2.10	196
3.8	50	2.01	196

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	-1.80	196
3.8	25	1.91	196
4.2	25	1.92	196

Conclusion: PASS

1xEV-DO BC01 Mid Channel/fc(MHz) 550/848.31

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	1.02	196
3.8	-20	1.91	196
3.8	-10	2.01	196
3.8	0	2.19	196
3.8	10	1.92	196
3.8	20	3.85	196
3.8	30	6.51	196
3.8	40	6.52	196
3.8	50	6.78	196

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	2.19	196
3.8	25	2.87	196
4.2	25	3.01	196

Conclusion: PASS

6.7. Conducted Spurious Emission

6.7.1. CDMA Measurement Method and test procedures

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
The trace mode is set to MaxHold to get the highest signal at each frequency;
Wait 25 seconds;Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

CDMA2000 BC0 Transmitter

Channel	Frequency(MHz)
1013	824.7
384	836.52
777	848.31

CDMA2000 BC1 Transmitter

Channel	Frequency(MHz)
25	1851.25
600	1880.0
1175	1908.75

CDMA2000 BC10 Transmitter

Channel	Frequency(MHz)
450	817.25
550	819.75
650	822.25

1xEV-DO BC0 Transmitter Release 0

Channel	Frequency(MHz)
1013	824.7
384	836.52
777	848.31

1xEV-DO BC1 Transmitter Release 0

Channel	Frequency(MHz)
25	1851.25
600	1880.0
1175	1908.75

1xEV-DO BC10 Transmitter Release 0

Channel	Frequency(MHz)
450	817.25
550	819.75
650	822.25

1xEV-DO BC0 Transmitter Release A

Channel	Frequency(MHz)
1013	824.7
384	836.52
777	848.31

1xEV-DO BC1 Transmitter Release A

Channel	Frequency(MHz)
25	1851.25
600	1880.0
1175	1908.75

Channel	Frequency(MHz)
450	817.25
550	819.75
650	822.25

6.7.1.1. Measurement Limit

Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required." Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

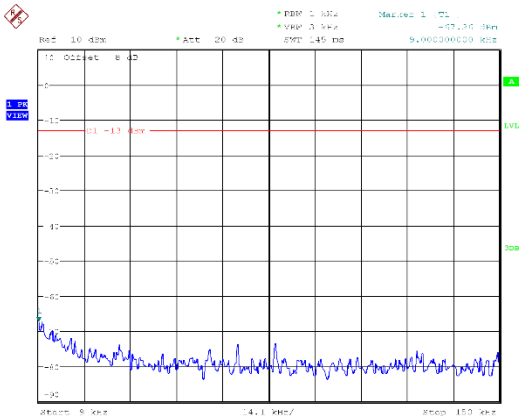
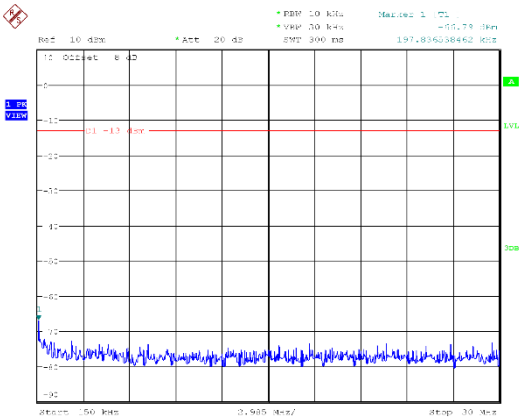
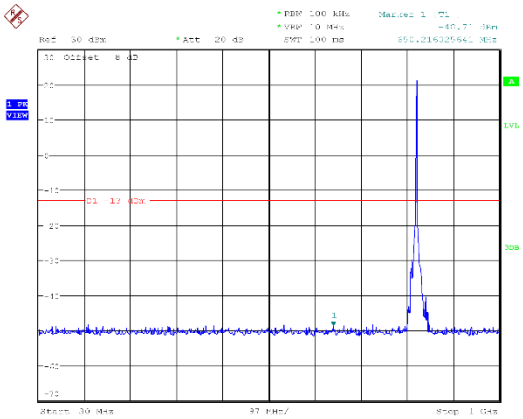
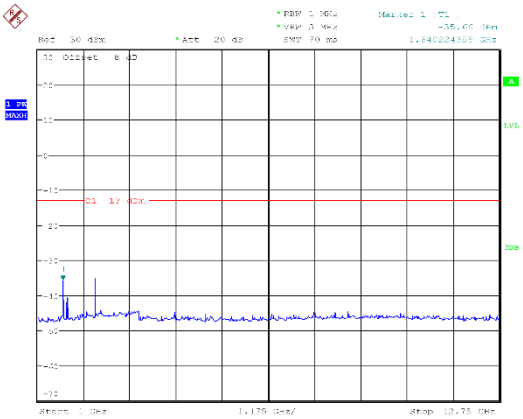
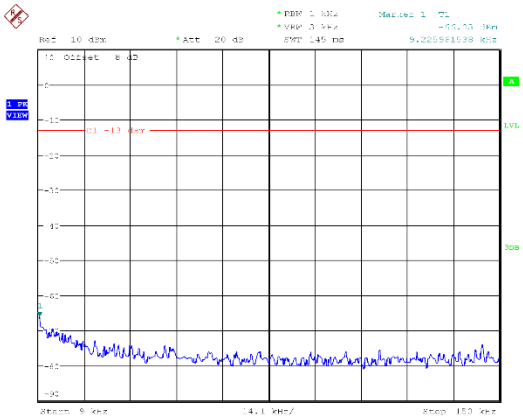
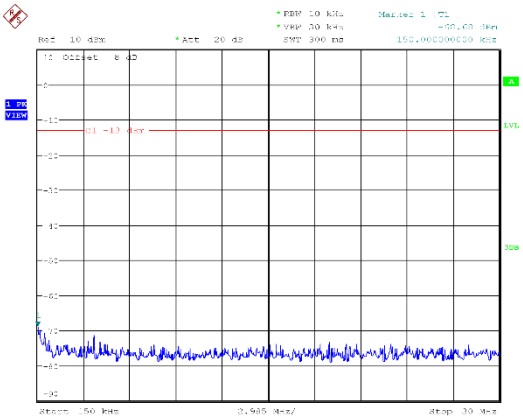
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

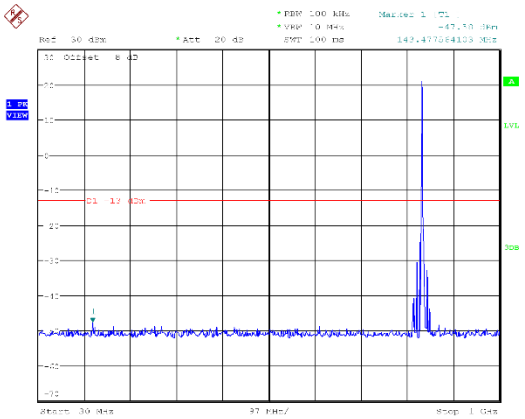
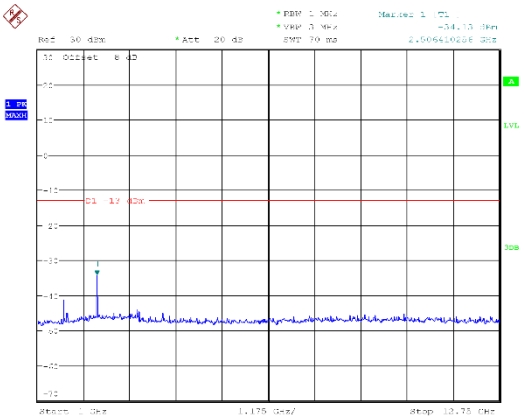
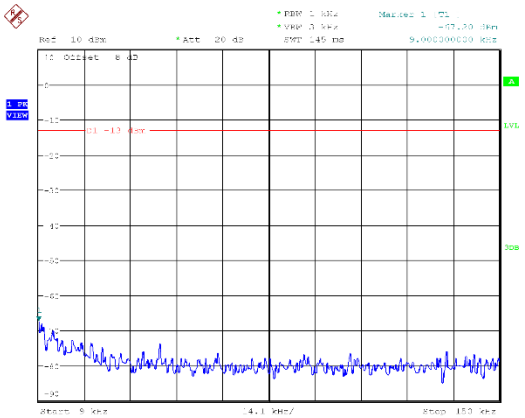
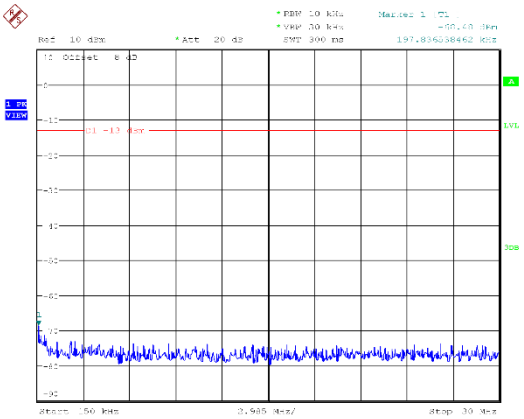
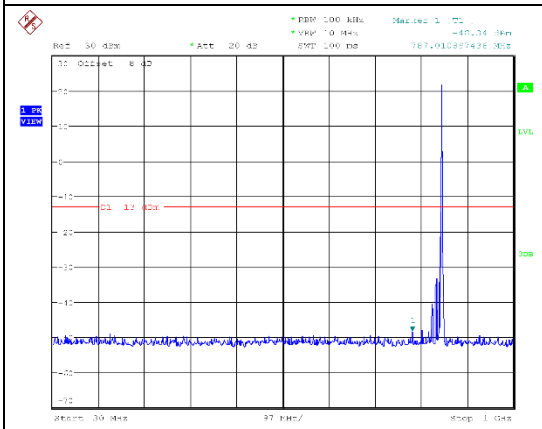
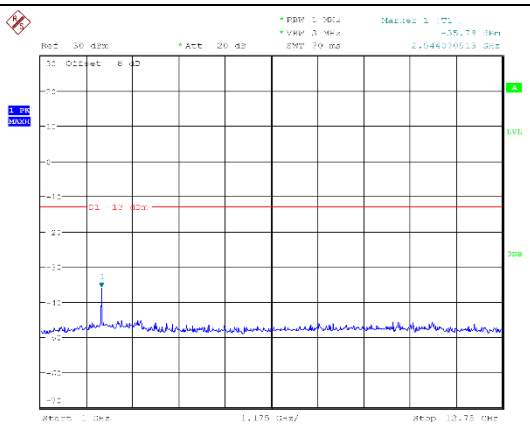
6.7.1.2. Measurement result

Spurious emission limit -13dBm.

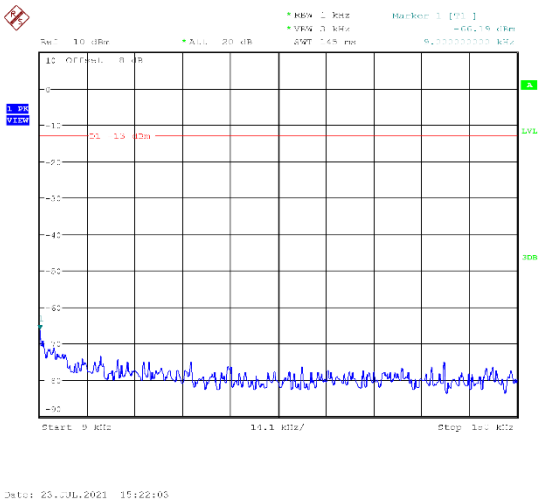
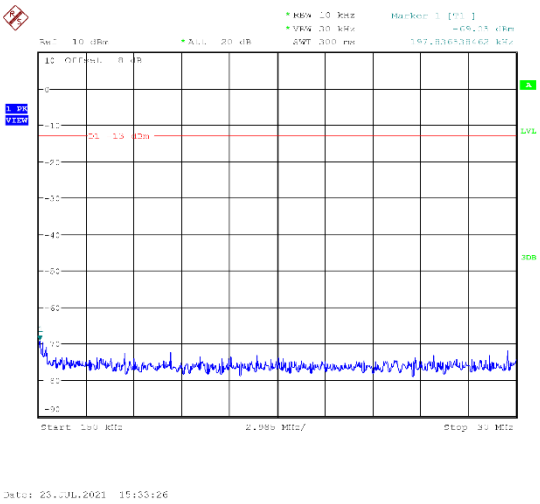
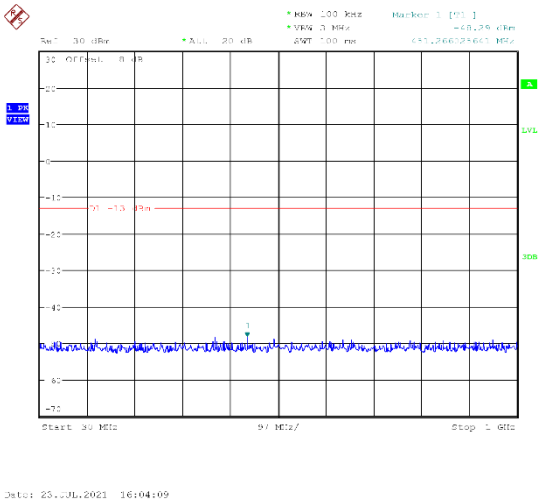
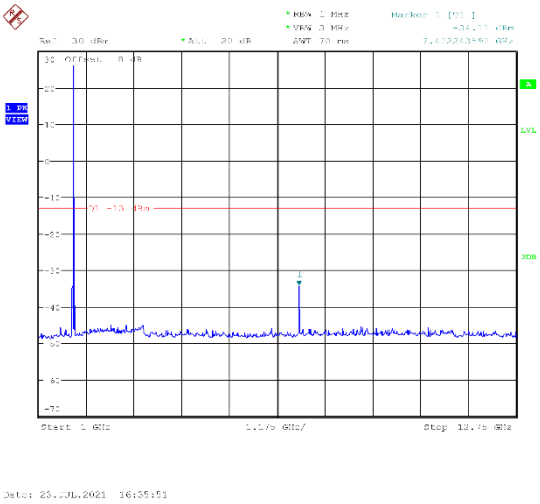
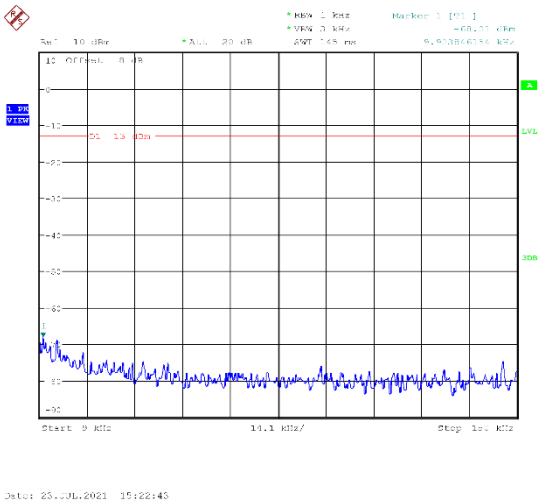
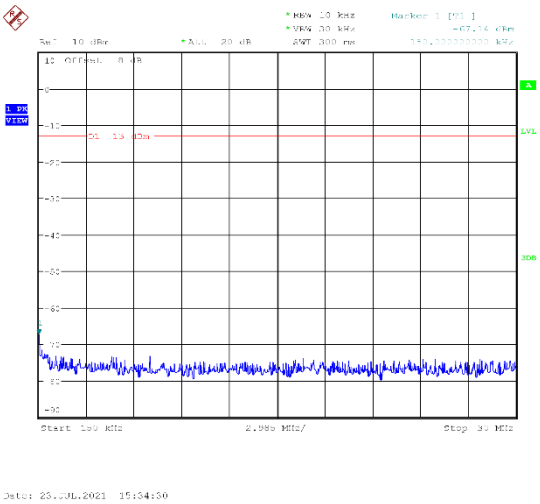
Note: peak above the limit line is the carrier frequency.

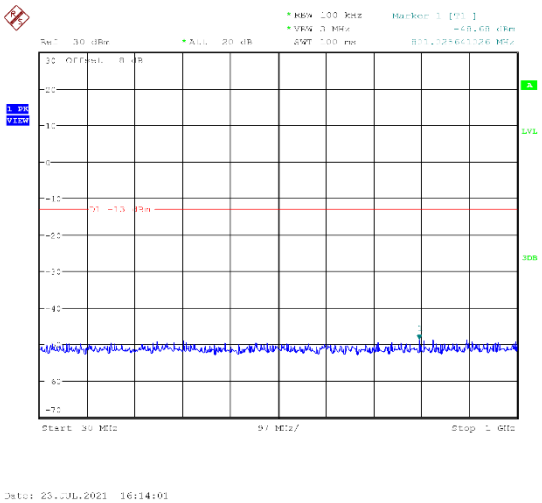
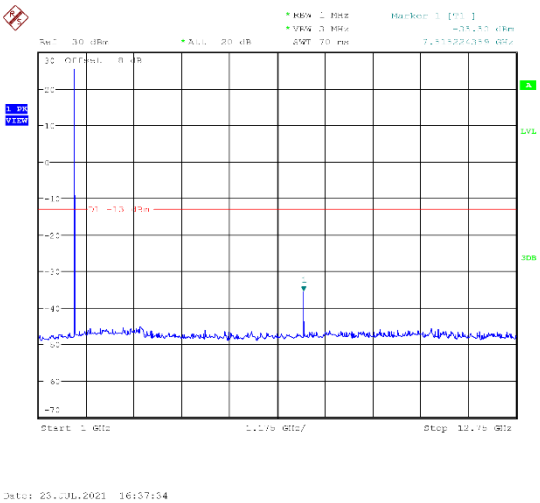
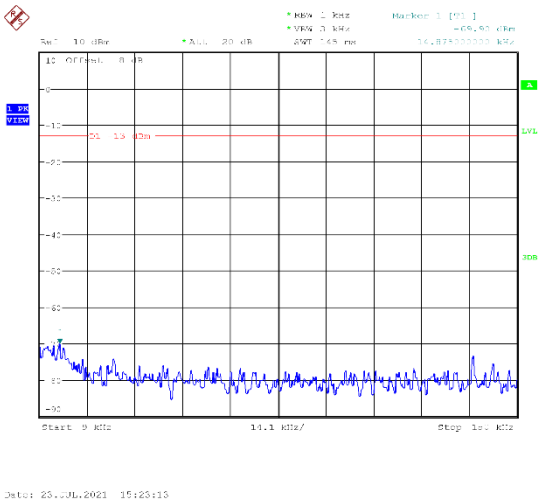
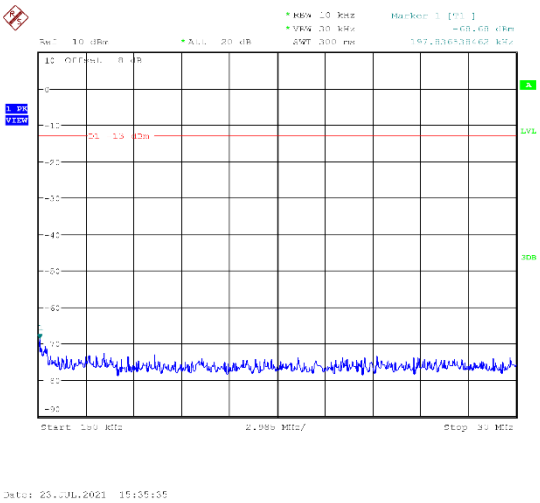
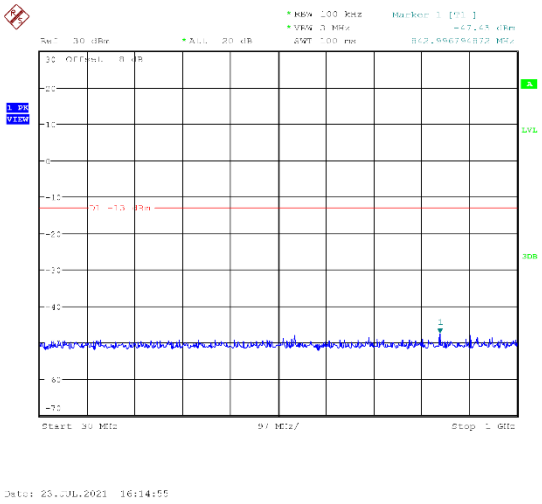
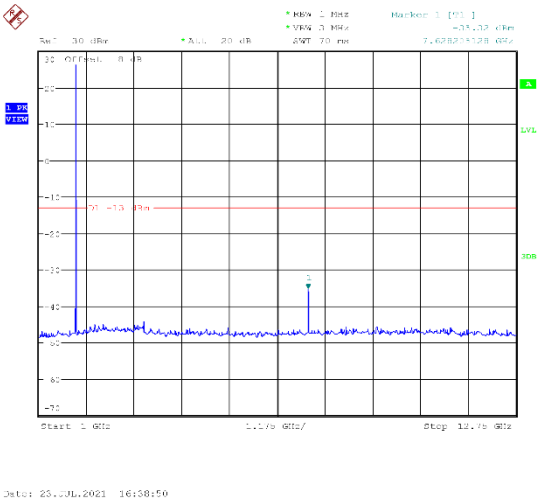
CDMA2000 BC0

Channel 1013: 9KHz~150KHz	Channel 1013: 150KHz~30MHz
	
Channel 1013: 30M Hz~1GHz	Channel 1013: 1GHz ~12.75GHz
	
Channel 384: 9KHz~150KHz	Channel 384: 150KHz~30MHz
	

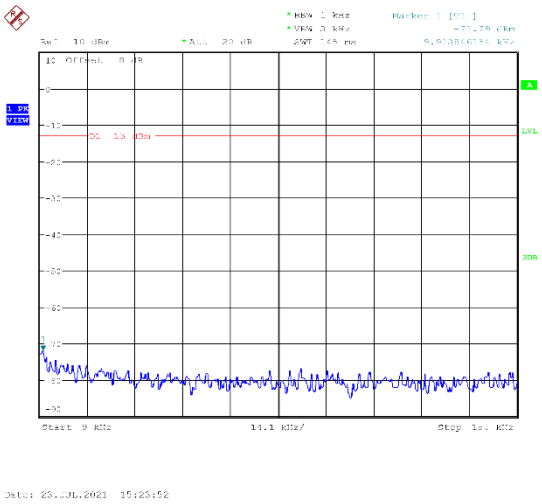
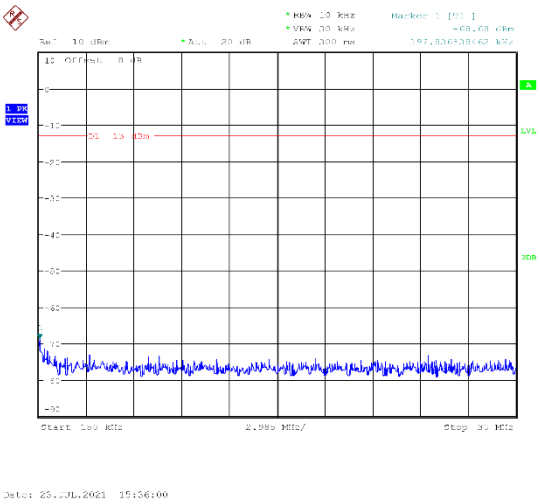
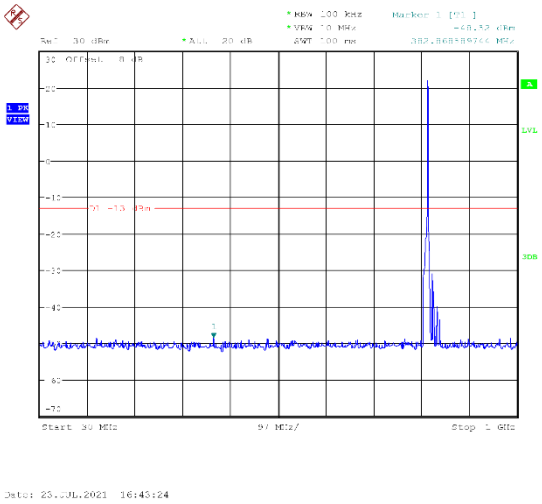
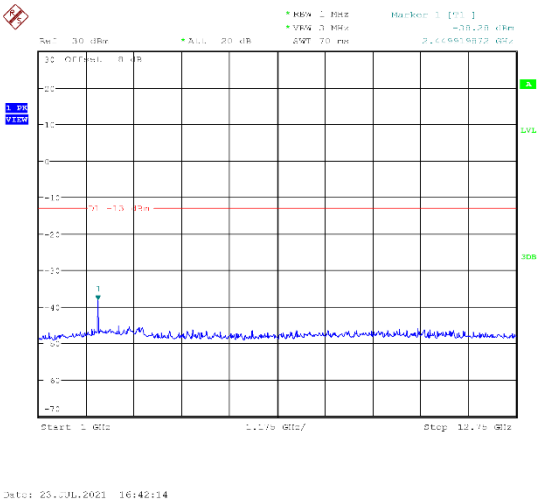
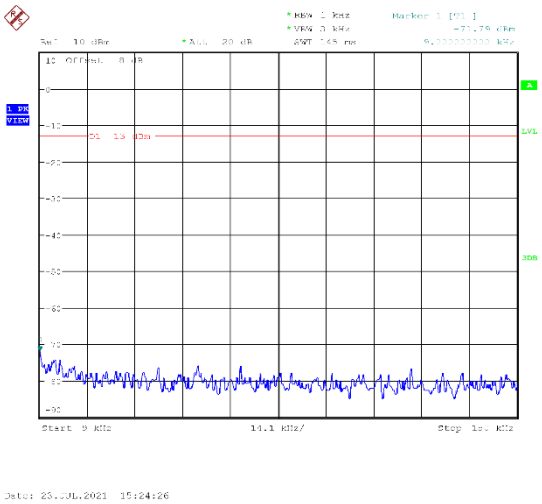
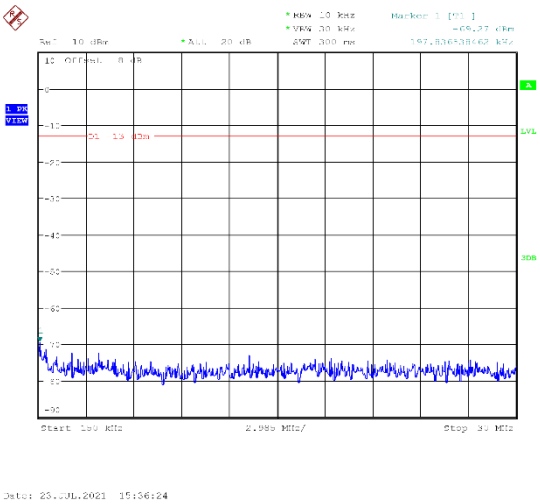
Channel 384: 30M Hz~1GHz	Channel 384: 1GHz ~12.75GHz
	
Channel 777: 9KHz~150KHz	**Channel 777: 150KHz~30MHz**
	
Channel 777: 30MHz~1GHz	**Channel 777: 1GHz~12.75GHz**
	

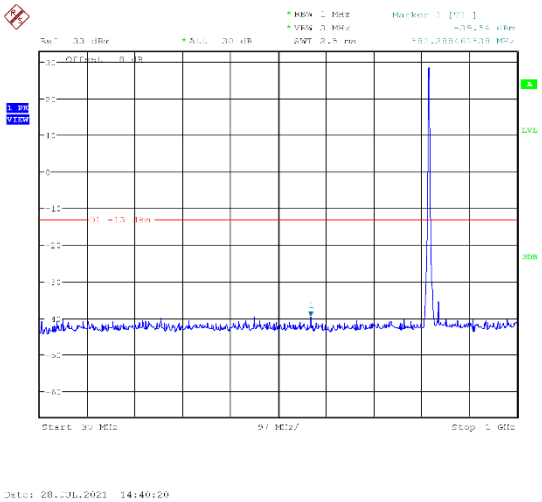
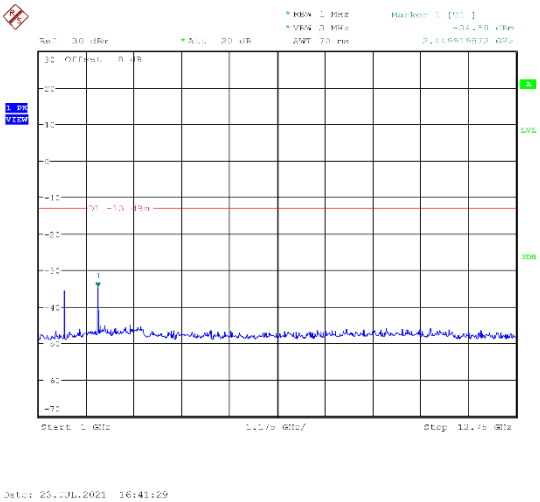
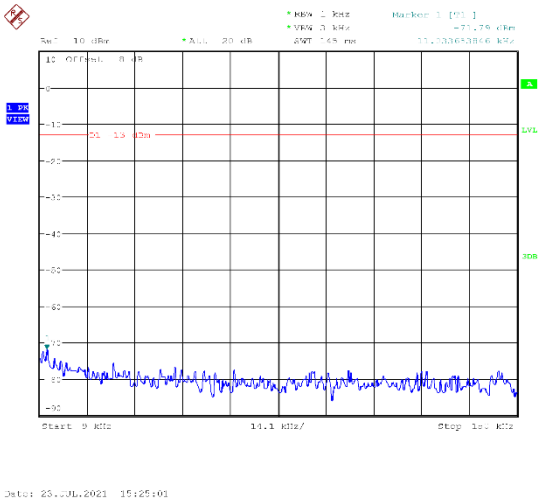
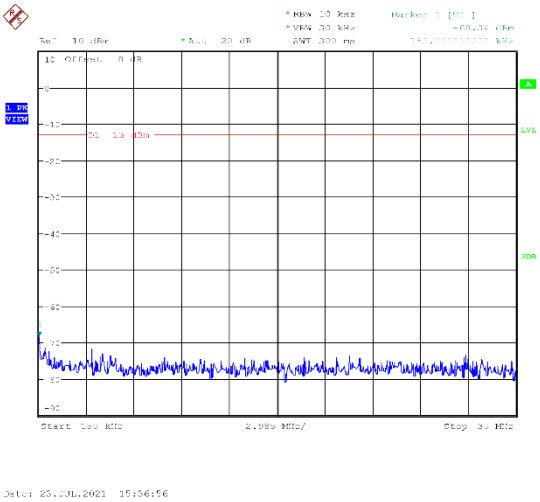
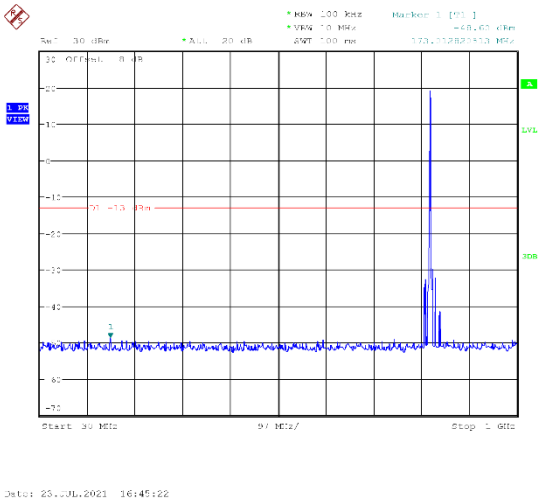
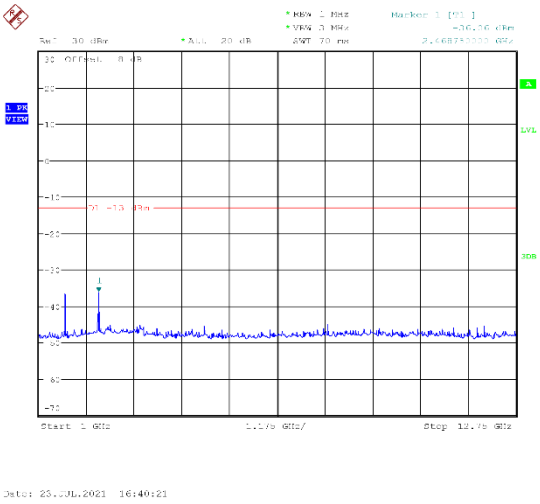
Conclusion: PASS

Channel 25: 9KHz~150KHz	Channel 25: 150KHz~30MHz
	
Channel 25: 30MHz~1GHz	Channel 25: 1GHz~12.75GHz
	
Channel 600: 9KHz~150KHz	Channel 600: 150KHz~30MHz
	

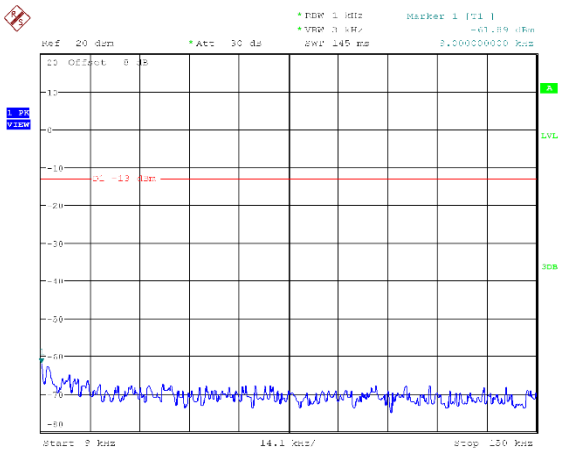
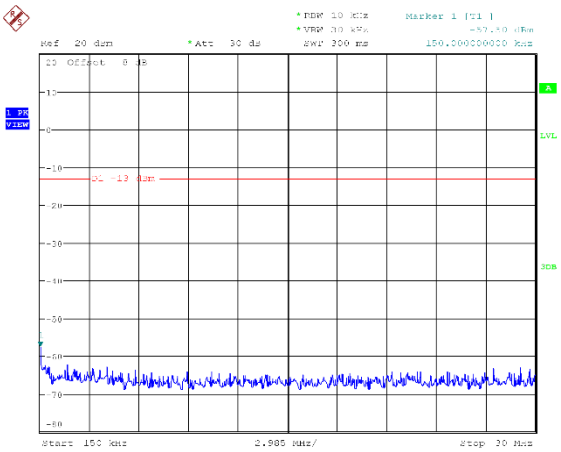
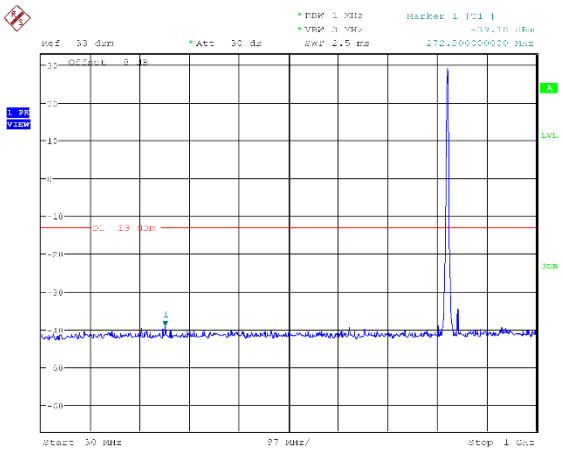
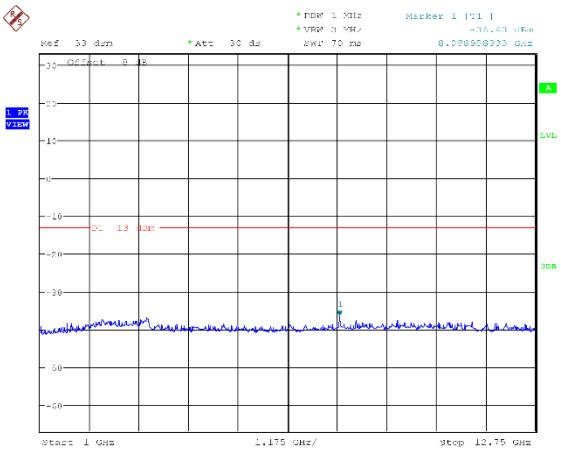
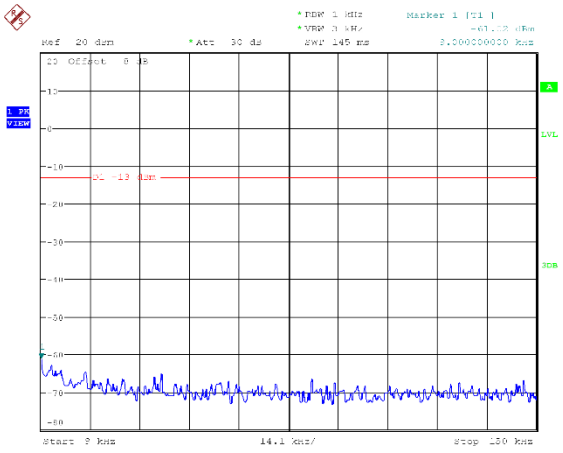
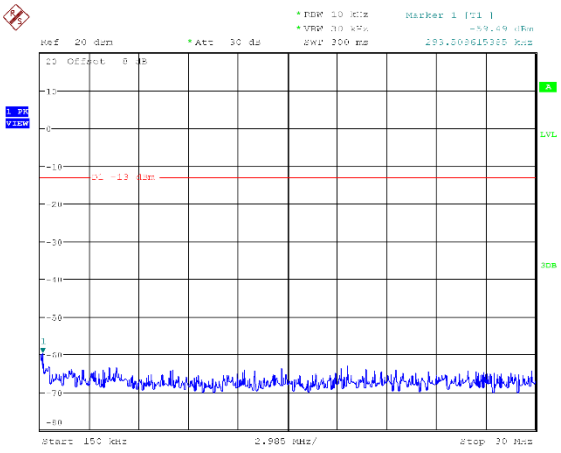
Channel 600: 30MHz~1GHz	Channel 600: 1GHz~12.75GHz
	
Channel 1175: 9KHz~150KHz	Channel 1175: 150KHz~30MHz
	
Channel 1175: 30MHz~1GHz	Channel 1175: 1GHz~12.75GHz
	

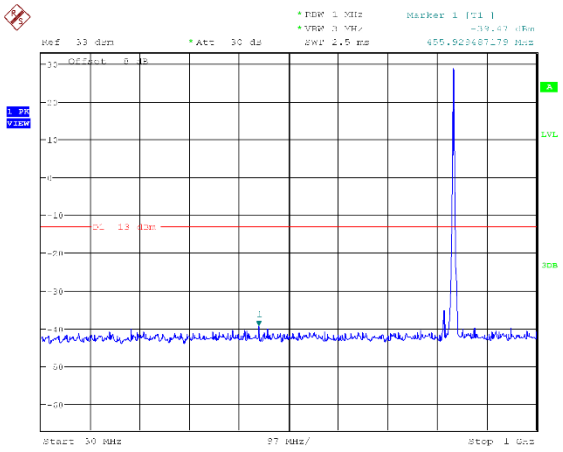
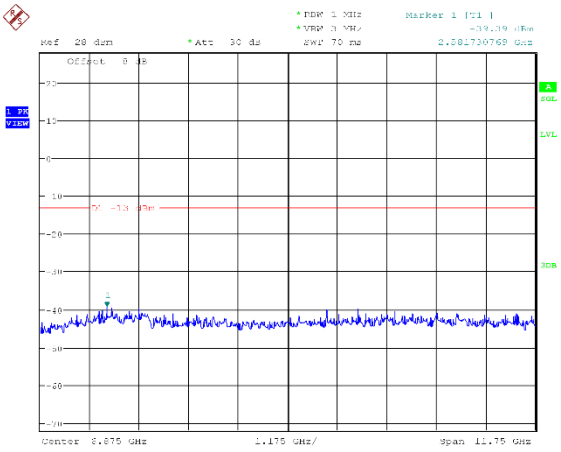
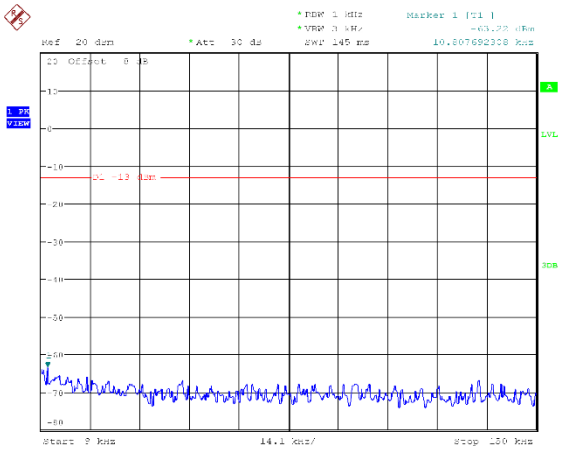
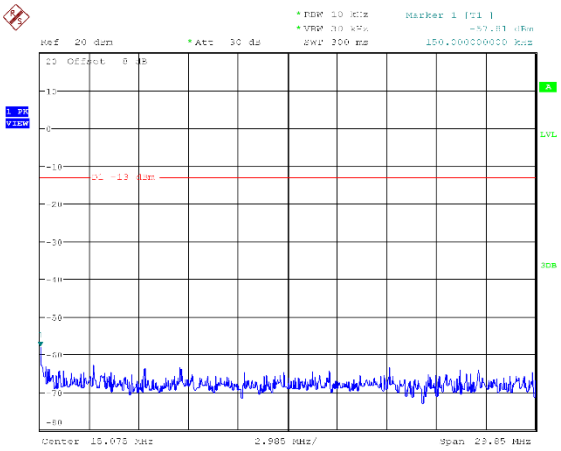
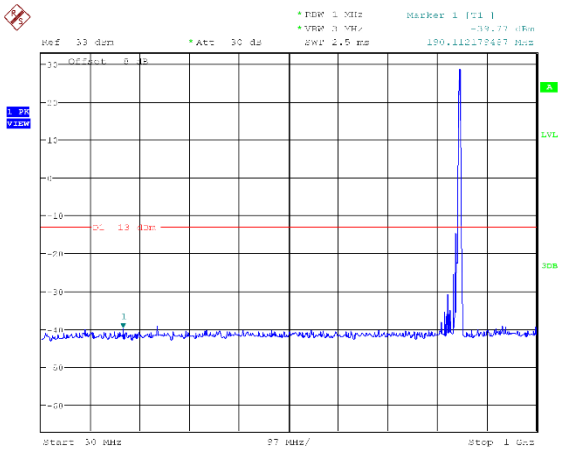
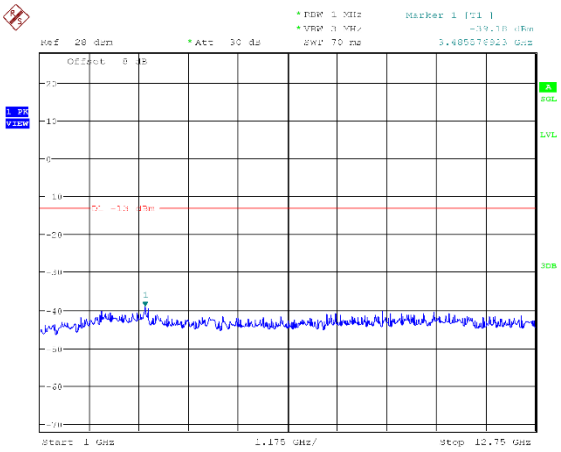
Conclusion: PASS

Channel 450: 9KHz~150KHz	Channel 450: 150KHz~30MHz
	
Channel 450: 30M Hz~1GHz	Channel 450: 1GHz ~12.75GHz
	
Channel 550: 9KHz~150KHz	Channel 550: 150KHz~30MHz
	

Channel 550: 30M Hz~1GHz	Channel 550: 1GHz ~12.75GHz
	
Channel 650: 9KHz~150KHz	Channel 650: 150KHz~30MHz
	
Channel 650: 30MHz~1GHz	Channel 650: 1GHz~12.75GHz
	

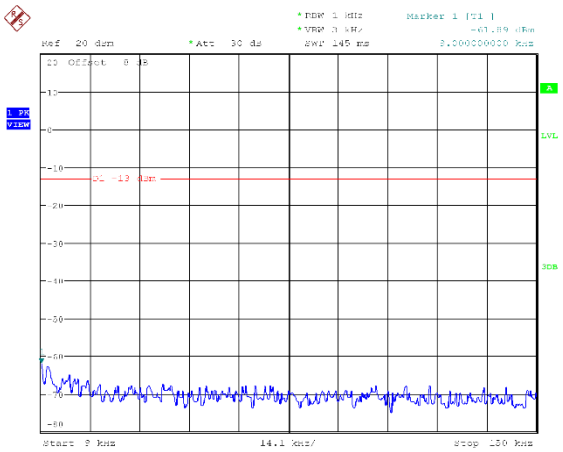
Conclusion: PASS

Channel 1013: 9KHz~150KHz	Channel 1013: 150KHz~30MHz
	
Channel 1013: 30M Hz~1GHz	Channel 1013: 1GHz ~12.75GHz
	
Channel 384: 9KHz~150KHz	Channel 384: 150KHz~30MHz
	

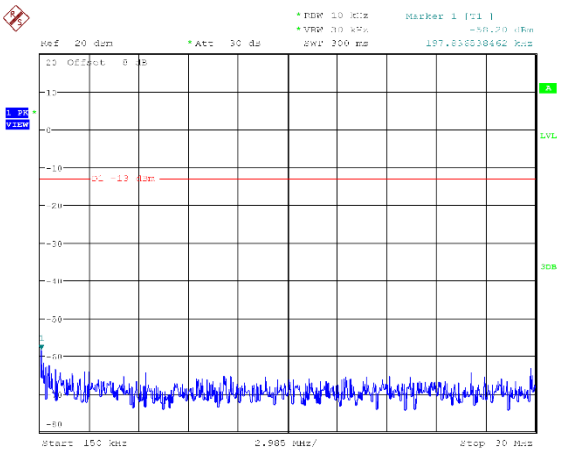
Channel 384: 30M Hz~1GHz	Channel 384: 1GHz ~12.75GHz
	
Channel 777: 9KHz~150KHz	Channel 777: 150KHz~30MHz
	
Channel 777: 30MHz~1GHz	Channel 777: 1GHz~12.75GHz
	

Conclusion: PASS

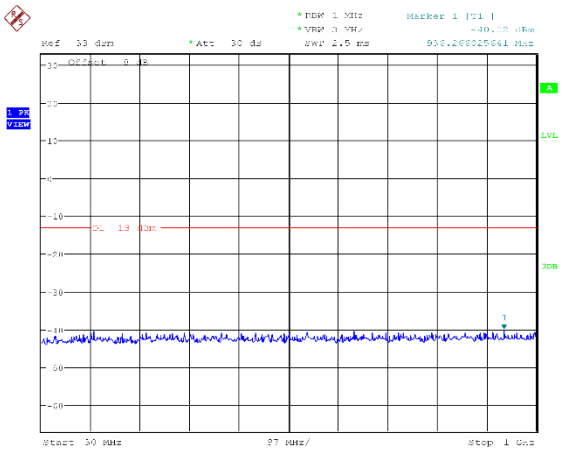
Channel 25: 9KHz~150KHz



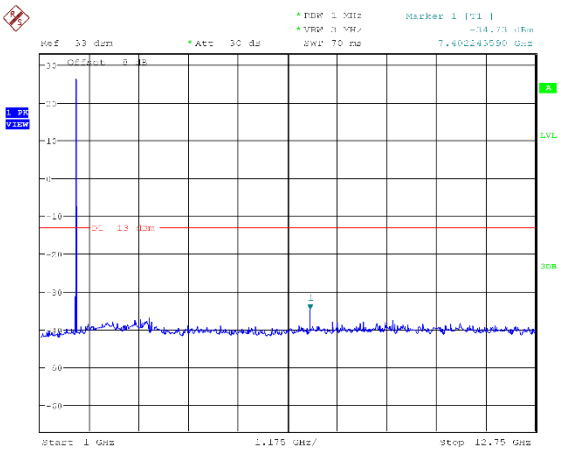
Channel 25: 150KHz~30MHz



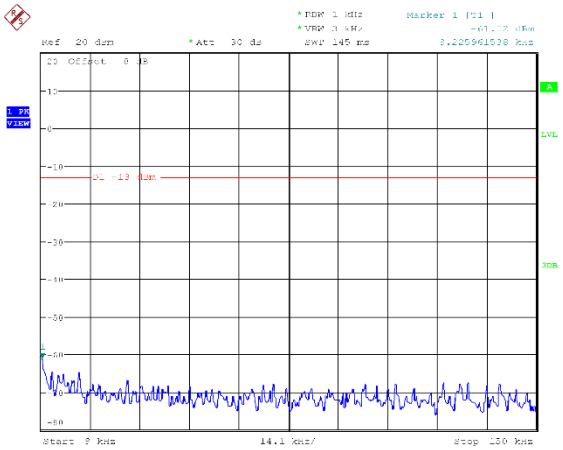
Channel 25: 30MHz~1GHz



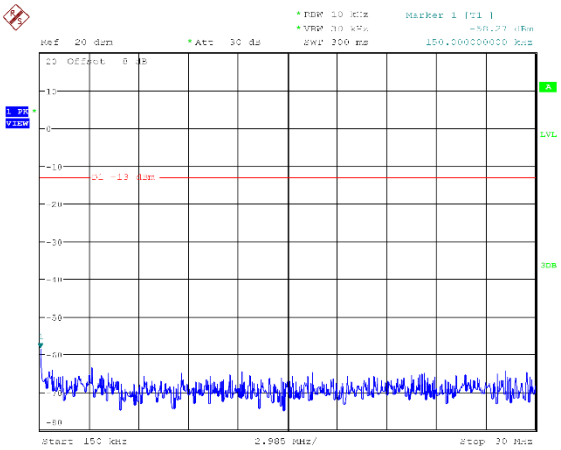
Channel 25: 1GHz~12.75GHz

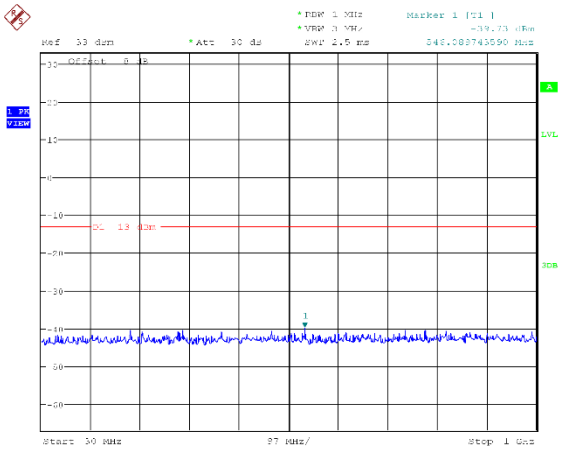
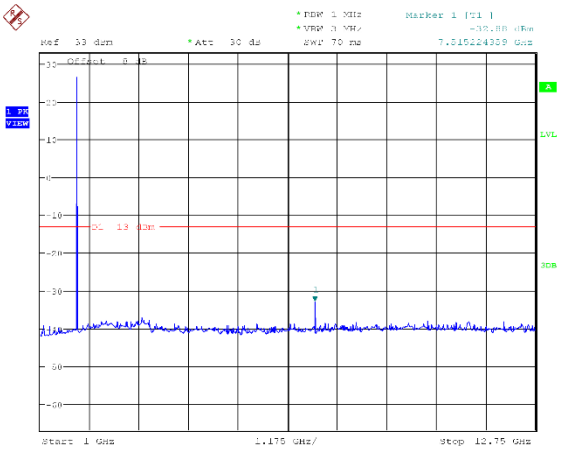
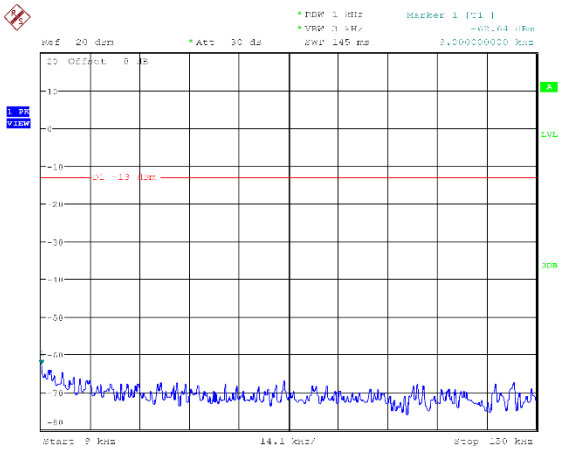
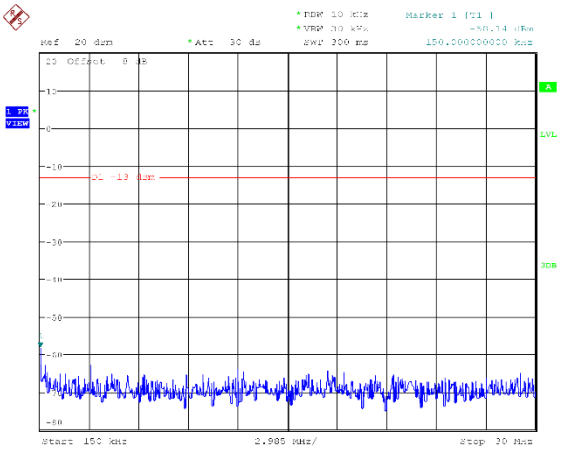
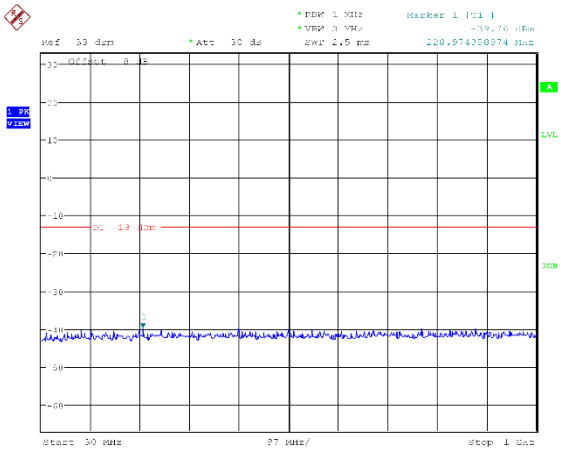
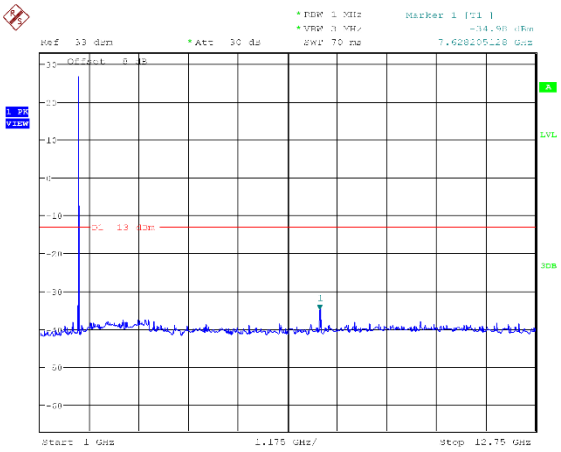


Channel 600: 9KHz~150KHz

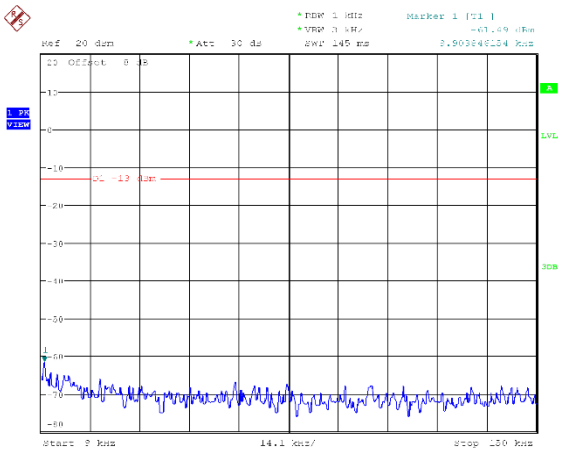
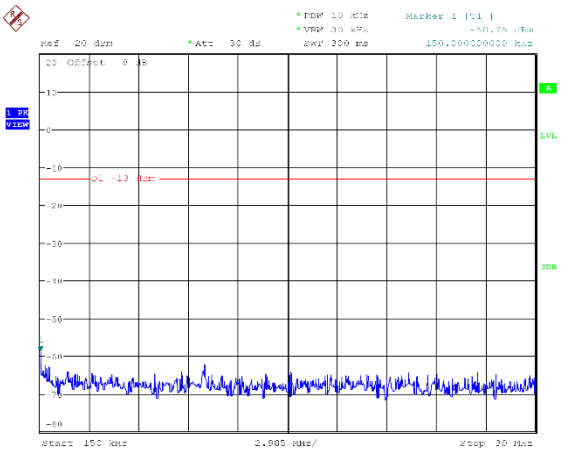
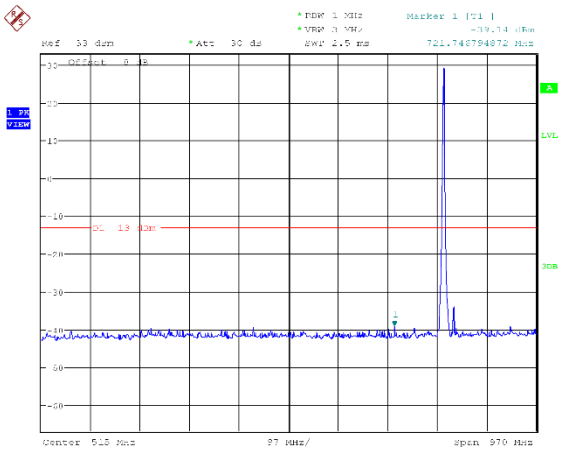
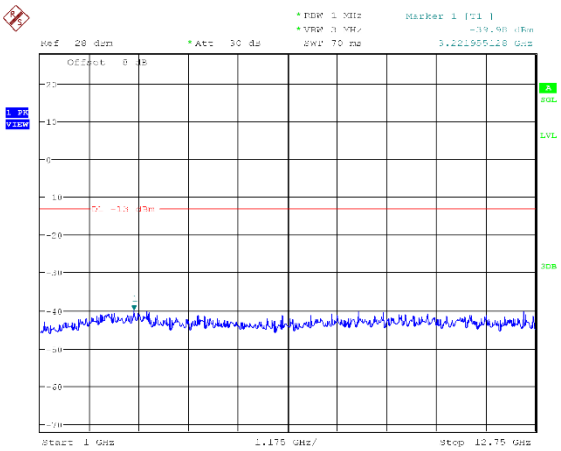
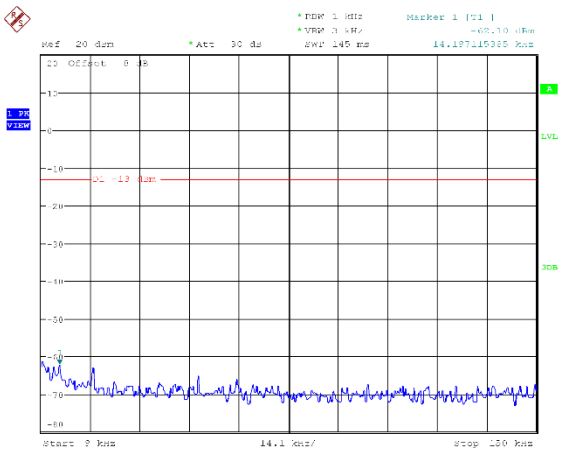
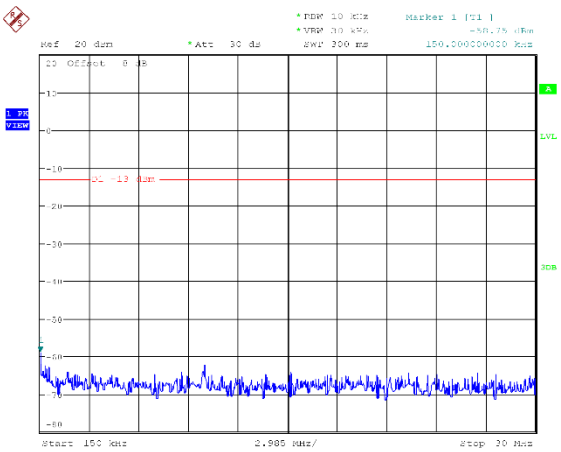


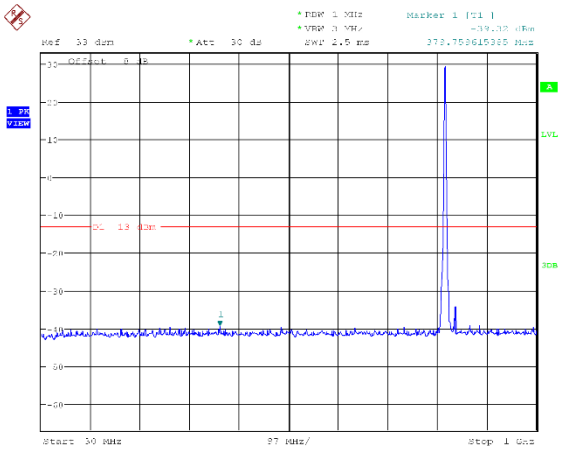
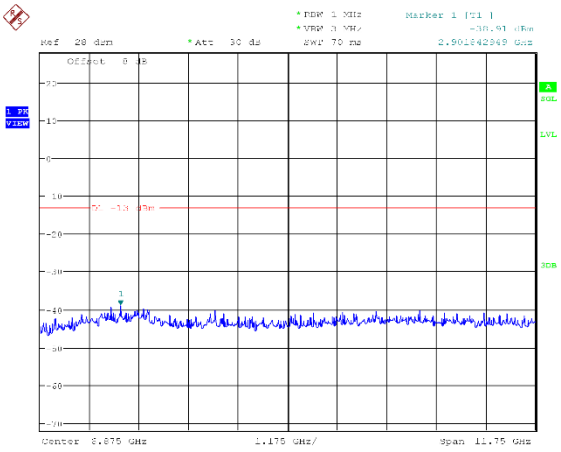
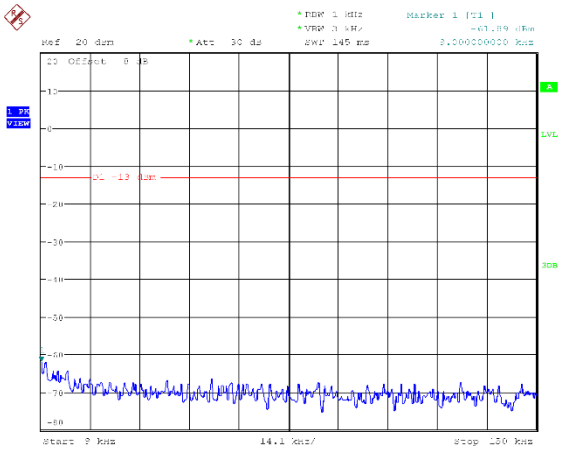
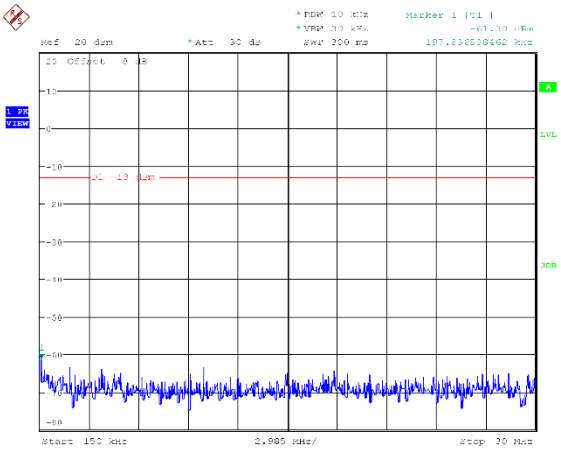
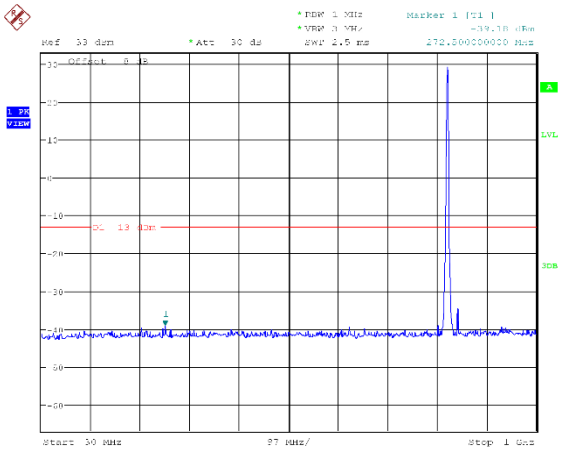
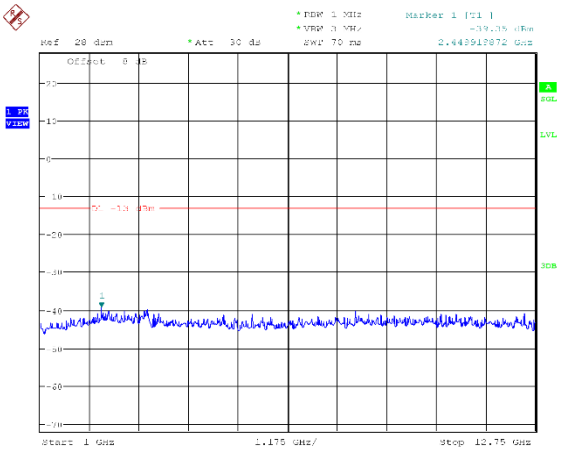
Channel 600: 150KHz~30MHz



Channel 600: 30MHz~1GHz	Channel 600: 1GHz~12.75GHz
	
Channel 1175: 9KHz~150KHz	Channel 1175: 150KHz~30MHz
	
Channel 1175: 30MHz~1GHz	Channel 1175: 1GHz~12.75GHz
	

Conclusion: PASS

Channel 450: 9KHz~150KHz	Channel 450: 150KHz~30MHz
	
Channel 450: 30M Hz~1GHz	**Channel 450: 1GHz ~12.75GHz**
	
Channel 550: 9KHz~150KHz	**Channel 550: 150KHz~30MHz**
	

Channel 550: 30M Hz~1GHz	Channel 550: 1GHz ~12.75GHz
	
Channel 650: 9KHz~150KHz	Channel 650: 150KHz~30MHz
	
Channel 650: 30MHz~1GHz	Channel 650: 1GHz~12.75GHz
	

Conclusion: PASS

6.8. Radiated Spurious Emission

6.8.1. EIRP

6.8.1.1. CDMA EIRP

6.8.1.1.1. Description

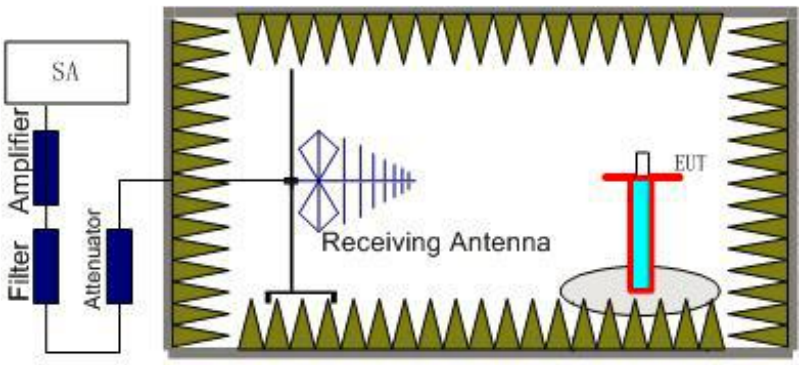
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

6.8.1.1.2. Method of Measurement

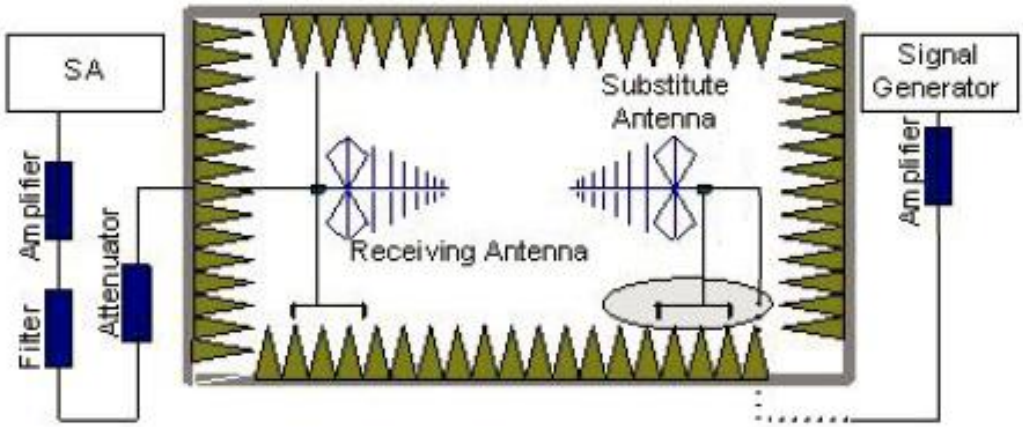
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connected between the Amplifier and the Substitution Antenna.

The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

Power(EIRP)=P_{Mea}+ P_{Ag}- P_{cl}+ G_a

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

6.8.1.1.3 CDMA2000 BC0-EIRP/ERP 22.913(a)

Measurement resultR

CDMA2000 BC0

Frequency(MHz)	Peak EIRP(dBm)	Peak ERP(dBm)	Polarization
824.7	22.43	20.28	H
836.52	22.34	20.19	H
848.31	22.47	20.32	H

Note: ANALYZER SETTINGS: RBW = VBW = 3MHz

6.8.1.1.4 CDMA2000 BC1-EIRP 24.232(c)

Measurement result

CDMA2000 BC1

Frequency(MHz)	Peak EIRP(dBm)	Polarization
1851.25	23.00	V
1880.0	22.84	V
1908.75	23.16	H

ANALYZER SETTINGS: RBW = VBW = 3MHz

6.8.1.1.5 CDMA2000 BCS10-ERP 24.232(c)

Measurement result

CDMA2000 BC10

Frequency(MHz)	Peak ERP(dBm)	Polarization
Low 450/817.25	20.93	V
Mid 550/819.75	20.66	V
High 650/822.25	20.86	H

ANALYZER SETTINGS: RBW = VBW = 3MHz

6.8.1.1.6 1xEV-DO BC0 -EIRP/ERP 24.232(c)

Measurement result

1xEV-DO BC0

Frequency(MHz)	Peak EIRP(dBm)	Peak ERP(dBm)	Polarization
Low 1013/824.7	22.55	20.40	H
Mid 384/836.52	22.57	20.42	H
High 777/848.31	22.51	20.36	H

Note: ANALYZER SETTINGS: RBW = VBW = 3MHz

6.8.1.1.7 1xEV-DO BC1 -EIRP 24.232(c)

Measurement result

1xEV-DO BC1

Frequency(MHz)	Peak EIRP(dBm)	Polarization
Low 25/1851.25	23.66	H
Mid 600/1880.0	23.49	H
High 1175/1908.75	23.70	H

ANALYZER SETTINGS: RBW = VBW = 3MHz

6.8.1.1.8 1xEV-DO BC10-ERP 24.232(c)

Measurement result

1xEV-DO BC10

Frequency(MHz)	Peak ERP(dBm)	Polarization
Low 450/817.25	20.82	H
Mid 550/819.75	20.59	H
High 650/822.25	20.79	H

ANALYZER SETTINGS: RBW = VBW = 3MHz

6.8.2 EMISSION LIMIT

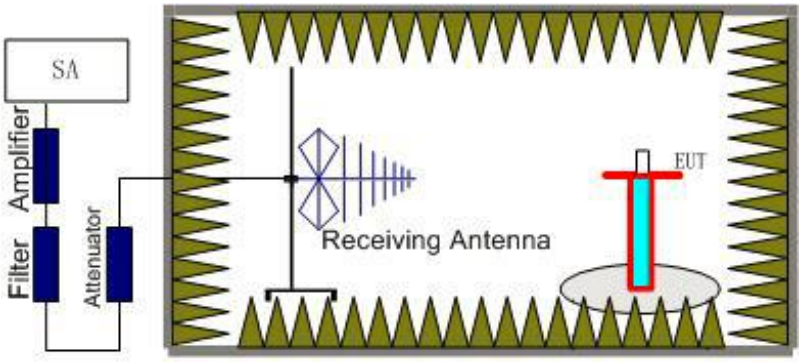
6.8.2.1 CDMA/1xEV-DO Measurement Method

The measurement procedures in TIA-603E-2016are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels.

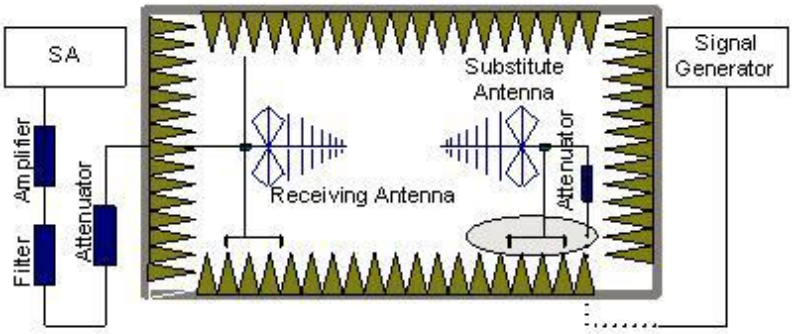
6.8.2.2 The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10thharmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (Ppl) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (Ga) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss (Ppl) is the summation of the cable loss .

The measurement results are obtained as described below:

Power(EIRP)=PMea- Ppl+ Ga

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi

6.8.2.3 Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

6.8.2.4 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is

capable of operating and it is the manufacturer's responsibility to verify this.

6.8.2.5 Measurement Results

Measurements results:

Frequency	Channel	Frequency Range	Result
CDMA2000 BC0	Low	30MHz~10GHz	Pass
	Middle	30MHz~10GHz	Pass
	High	30MHz~10GHz	Pass
CDMA2000 BC1	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
CDMA2000 BC10	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
1xEV-DO BC0	Low	30MHz~10GHz	Pass
	Middle	30MHz~10GHz	Pass
	High	30MHz~10GHz	Pass
1xEV-DO BC1	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
1xEV-DO BC10	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass

Frequency	Channel		Result
CDMA2000 BC0	L	1013	Pass
	M	384	Pass
	H	777	Pass
CDMA2000 BC1	L	25	Pass
	M	600	Pass
	H	1175	Pass
CDMA2000 BC10	L	450	Pass
	M	550	Pass
	H	650	Pass
1xEV-DO BC0	L	20775	Pass
	M	21100	Pass
	H	21425	Pass
1xEV-DO BC1	L	1013	Pass
	M	384	Pass
	H	777	Pass
1xEV-DO BC10	L	450	Pass
	M	550	Pass
	H	650	Pass

RSE-CDMA-BC0-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1882.5	-46.59	4.6	4.5	-46.69	-13	V
2711.8	-40.86	5.6	6.1	-40.36	-13	H
3466.2	-50.34	6.4	7.8	-48.94	-13	H
4384.6	-50.21	7.3	8.7	-48.81	-13	H
5109.2	-48.66	7.9	9.6	-46.96	-13	H
6010.8	-48.89	8.6	10.2	-47.29	-13	V

RSE-CDMA-BC0-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1762.5	-46.96	4.5	4.7	-46.76	-13	V
2552.1	-41.66	5.4	5.6	-41.46	-13	H
3361.2	-49.58	6.2	6.9	-48.88	-13	H
4255.4	-50.47	7.1	8.9	-48.67	-13	V
5185.4	-46.85	8.0	9.4	-45.45	-13	H
6153.8	-48.11	8.7	10.3	-46.51	-13	H

RSE-CDMA-BC0-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1921.1	-46.27	4.7	4.5	-46.47	-13	H
2783.6	-40.24	5.7	6.1	-39.84	-13	H
3377.3	-50.6	6.3	7.8	-49.1	-13	V
3896.5	-51.26	6.8	8.6	-49.46	-13	V
4662.7	-50.67	7.5	9.0	-49.17	-13	H
5194.6	-47.55	8.0	9.4	-46.15	-13	H

RSE-CDMA-BC1-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3879.6	-53.94	6.8	8.6	-52.14	-13	V
5877.0	-52.67	8.5	10.2	-50.97	-13	H
7886.4	-52.61	9.9	12.2	-50.31	-13	V
9942.0	-48.76	11.0	12.5	-47.26	-13	H
11611.2	-45.58	12.2	12.3	-45.48	-13	V
13306.8	-43.78	13.6	12.3	-45.08	-13	V

RSE-CDMA-BC1-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3903.6	-53.93	6.8	8.6	-52.13	-13	V
5856.0	-53.55	8.4	10.2	-51.75	-13	V
7842.0	-52.56	9.9	11.8	-50.66	-13	V
9754.8	-48.82	11.0	12.5	-47.32	-13	V
11709.6	-45.84	12.4	12.3	-45.94	-13	V
13633.2	-44.82	13.8	12.3	-46.32	-13	V

RSE-CDMA-BC1-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3944.4	-53.6	6.8	8.6	-51.8	-13	V
5849.4	-53.03	8.4	10.2	-51.23	-13	H
7897.2	-52.79	9.9	12.2	-50.49	-13	V
9902.4	-49.92	11.0	12.5	-48.42	-13	H
11601.6	-45.64	12.2	12.3	-45.54	-13	V
13354.8	-44	13.7	12.3	-45.4	-13	H

RSE-CDMA-BC10-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1815.0	-46.88	4.5	4.7	-46.68	-13	V
2536.1	-42.38	5.4	5.6	-42.18	-13	H
3165.0	-48.81	6.0	6.9	-47.91	-13	V
4065.0	-51.2	6.9	8.6	-49.5	-13	H
4926.9	-51.24	7.7	9.6	-49.34	-13	H
5688.5	-51	8.5	10.2	-49.3	-13	H

RSE-CDMA-BC10-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1783.9	-47.62	4.5	4.7	-47.42	-13	H
2715.0	-40.22	5.6	6.1	-39.72	-13	V
3141.9	-49.24	6.0	6.9	-48.34	-13	H
4073.1	-49.94	6.9	8.6	-48.24	-13	H
4834.6	-50.27	7.6	9.0	-48.87	-13	H
5655.0	-50.91	8.3	10.2	-49.01	-13	V

RSE-CDMA-BC10-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1868.6	-46.69	4.6	4.7	-46.59	-13	H
2622.9	-40.38	5.5	5.6	-40.28	-13	H
3184.6	-48.72	6.1	6.9	-47.92	-13	H
4048.8	-51.52	6.9	8.6	-49.82	-13	H
4996.2	-51.66	7.8	9.6	-49.86	-13	H
5906.5	-50.36	8.5	10.2	-48.66	-13	V

Conclusion: PASS

Note: the EUT was displayed in several different direction, the worst cases were shown.

RSE-EVDO-BC0-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1532.1	-48.55	4.2	5.3	-47.45	-13	V
2618.6	-41.36	5.5	5.6	-41.26	-13	H
3215.8	-48.83	6.1	6.9	-48.03	-13	H
4204.6	-50.43	7.0	8.9	-48.53	-13	H
5194.6	-47.76	8.0	9.4	-46.36	-13	H
5955.0	-49.14	8.5	10.2	-47.44	-13	V

RSE-EVDO-BC0-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1721.8	-48.33	4.5	4.7	-48.13	-13	V
2683.9	-40.81	5.6	6.1	-40.31	-13	H
3495.0	-51.23	6.4	7.8	-49.83	-13	V
4232.3	-50.19	7.1	8.9	-48.39	-13	H
5187.7	-47.49	8.0	9.4	-46.09	-13	H
6927.7	-49.92	9.3	11.1	-48.12	-13	H

RSE-EVDO-BC0-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1896.4	-46.13	4.7	4.5	-46.33	-13	H
2692.5	-40.94	5.6	6.1	-40.44	-13	V
3315.0	-49.19	6.2	6.9	-48.49	-13	H
4272.7	-50.48	7.1	8.9	-48.68	-13	V
5239.6	-46.9	8.0	9.4	-45.5	-13	H
6209.2	-48.37	8.7	10.3	-46.77	-13	V

RSE-EVDO-BC1-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3887.4	-53.83	6.8	8.6	-52.03	-13	H
5873.4	-52.43	8.4	10.2	-50.63	-13	V
7756.8	-52.26	9.8	11.8	-50.26	-13	H
9746.4	-47.86	10.9	12.7	-46.06	-13	V
11638.8	-45.13	12.2	12.3	-45.03	-13	V
14224.8	-43.74	13.7	12.3	-45.14	-13	V

RSE-EVDO-BC1-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3897.0	-53.27	6.8	8.6	-51.47	-13	H
5901.6	-52.37	8.5	10.2	-50.67	-13	H
7730.4	-52.57	9.8	11.8	-50.57	-13	V
9808.8	-48.7	11.0	12.5	-47.2	-13	H
11676.0	-45.35	12.4	12.3	-45.45	-13	V
14184.0	-43.41	13.7	12.3	-44.81	-13	V

RSE-EVDO-BC1-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3976.8	-52.92	6.9	8.6	-51.22	-13	V
5912.4	-52.38	8.5	10.2	-50.68	-13	H
7879.2	-52.53	9.9	12.2	-50.23	-13	H
9888.0	-49.3	11.0	12.5	-47.8	-13	V
11662.8	-45.5	12.4	12.3	-45.6	-13	V
13368.0	-43.23	13.7	12.3	-44.63	-13	V

RSE-EVDO-BC10-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1884.6	-46.32	4.7	4.5	-46.52	-13	H
2436.4	-42.47	5.3	5.6	-42.17	-13	H
3161.5	-49.42	6.0	6.9	-48.52	-13	H
4100.8	-51.08	7.0	8.6	-49.48	-13	H
4915.4	-50.31	7.7	9.6	-48.41	-13	H
5818.8	-49.91	8.4	10.2	-48.11	-13	H

RSE-EVDO-BC10-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1824.6	-47.31	4.6	4.7	-47.21	-13	H
2674.3	-41.01	5.5	6.1	-40.41	-13	H
3140.8	-49.01	6.0	6.9	-48.11	-13	H
4114.6	-51.33	7.0	8.6	-49.73	-13	H
4915.4	-51.08	7.7	9.6	-49.18	-13	H
5741.5	-50.25	8.5	10.2	-48.55	-13	V

RSE-EVDO-BC10-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1810.7	-47.19	4.5	4.7	-46.99	-13	V
2554.3	-42.29	5.4	5.6	-42.09	-13	H
3226.2	-48.96	6.1	6.9	-48.16	-13	H
4217.3	-50.27	7.0	8.9	-48.37	-13	H
5106.9	-48.69	7.9	9.6	-46.99	-13	V
6046.2	-48.88	8.6	10.2	-47.28	-13	V

Conclusion: PASS

Note: the EUT was displayed in several different direction, the worst cases were shown.

7. Test Equipment List

Conducted Test System

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Vector Signal Analyzer	FSQ26	101091	R&S	2021-05-09	1 year
2	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2021-05-09	1 year
3	Eagle Test Software	Eagle V3.1 FCC BT/WIFI	N/A	ECIT	N/A	N/A

Radiated Emission Test System

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2021-05-09	1 year
2	EMI Test Receiver	ESU40	100307	R&S	2021-05-09	1 year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2020-02-28	3 years
4	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	2020-02-28	3 years
5	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-09	1 year
6	EMI Test Software	EMC32 V 9.15.00	N/A	R&S	N/A	N/A

Anechoic chamber

Fully anechoic chamber by ETS.

Annex A: Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in 3IN documents. The detailed measurement uncertainty is defined in 3IN documents.

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Maximum Peak Output Power	30MHz-3600MHz	95%	±0.544dB
EBW and VBW	30MHz-3600MHz	95%	±62.04Hz
Transmitter Spurious Emission-Conducted	30MHz-2GHz	95%	±0.90dB
Transmitter Spurious Emission-Conducted	2GHz-3.6GHz	95%	±0.88dB
Transmitter Spurious Emission-Conducted	3.6GHz-8GHz	95%	±0.96dB
Transmitter Spurious Emission-Conducted	8GHz-20GHz	95%	±0.94dB
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	±5.66dB
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	±4.98dB
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	±5.06dB
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	±5.20dB
Frequency stability	1MHz-16GHz	95%	±62.04Hz

Annex B: Accreditation Certificate

ilac-MRA a2LA

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

**********END OF REPORT**********