TEST REPORT

Report Number: C21T00061-RF01-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-RF01-V00	00	2021-11-03	Initial creation of test report
C21T00061-RF01-V01	01	2021-11-25	Add test standard on report cover
C21T00061-RF01-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
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 17
   6.3. 99% OCCUPIED BANDWIDTH 17
   6.4. -26DB EMISSION BANDWIDTH 30
   6.5 BAND EDGE AT ANTENNA TERMINALS 41
   6.6. FREQUENCY STABILITY 47
   6.7. CONDUCTED SPURIOUS EMISSION 57

6.8. RADIATED 65

7. TEST EQUIPMENT LIST 83

7.1. CONDUCTED TEST SYSTEM 83

7.2. RADIATED EMISSION TEST SYSTEM 83

ANNEX A: MEASUREMENT UNCERTAINTY 84

ANNEX B: ACCREDITATION CERTIFICATE 85

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:
GSM 850: -1.74dBi
PCS 1900: 0.14dBi
WCDMA Band II: 0.13dBi
WCDMA Band IV: 0.21dBi
WCDMA Band V: -1.74dBi

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).
These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band; 824.2MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).
These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II; 1732.6 MHz, 1712.4MHz and 1752.6MHz for WCDMA Band IV; 826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V. (bottom, middle and top of operational frequency range).

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 GSM 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 GSM Test Condition:

RBW	VBW	Sweep time	Span
3MHz	10MHz	Auto	50MHz

6.1.2.6 WCDMA Test Condition:

RBW	VBW	Sweep time	Span
10MHz	30MHz	Auto	50MHz

6.1.2.7 Measurement results:

GSM 850 (GMSK)	
Channel/fc(MHz)	Peak power (dBm)
Low 128/824.2	32.10
Mid 189/836.4	32.26
High 251/848.8	32.38
GPRS 850 (GMSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Low 128/824.2	31.74
Mid 189/836.4	31.85
High 251/848.8	31.95
EDGE 850 (8PSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Low 128/824.2	23.54
Mid 189/836.4	23.86
High 251/848.8	23.62
GSM 1900(GMSK)	
Channel/fc(MHz)	Peak power (dBm)
Low 512/1850.2	29.63
Mid 661/1880	29.88
High 810/1909.8	30.00
GPRS 1900 (GMSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Low 512/1850.2	29.50
Mid 661/1880	29.88
High 810/1909.8	30.00

EDGE 1900 (8PSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Low 512/1850.2	22.54
Mid 661/1880	22.67
High 810/1909.8	22.92
WCDMA II	
Channel/fc(MHz)	Peak power (dBm)
Low 9262/1852.6	22.97
Mid 9400 /1880	23.08
High 9538/1907.4	23.20
WCDMA BAND IV	
Channel/fc(MHz)	Peak power (dBm)
Low 1312/1712.4	23.00
Mid 1413 /1732.6	23.03
High 1513/1752.6	22.78
WCDMA BAND V	
Channel/fc(MHz)	Peak power (dBm)
Low 4132/826.4	23.52
Mid 4183/836.6	24.05
High 4233/846.6	22.61

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 transmitter's 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:

GSM850			
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
PAPR(dB)	10．64	10.74	10.67
GPRS850			
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
PAPR(dB)	10.67	10.67	10.67
EDGE 850			
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
PAPR(dB)	10.67	10.67	10.67

GSM1900			
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
PAPR(dB)	7.63	7.63	7.63
GPRS1900			
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
PAPR(dB)	10.67	10.64	7.63
EDGE 1900			
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
PAPR(dB)	10.64	10.64	10.64
WCDMA Band II			
Channel	9263	9400	9537
Frequency (MHz)	1852.6	1880	1907.4
PAPR(dB)	2.72	8.46	2.92
WCDMA Band IV			
Channel	1313	1450	1512
Frequency (MHz)	1712.6	1740.4	1752.4
PAPR(dB)	3.17	3.17	2.85
WCDMA Band V			
Channel	4133	4175	4232
Frequency (MHz)	826.6	835.0	846.4
PAPR(dB)	2.98	2.98	2.79

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. Data were taken at the extreme and mid frequencies of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV.

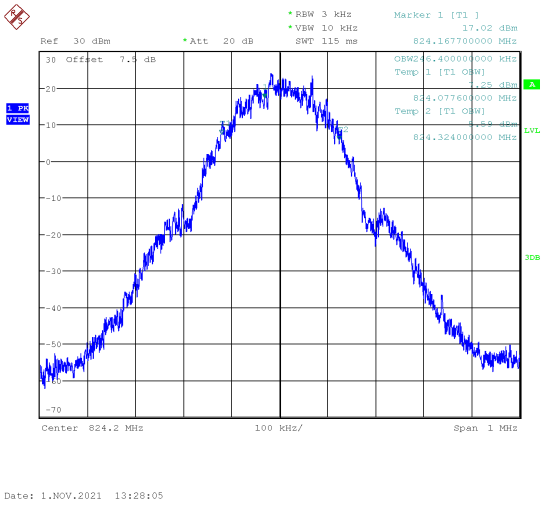
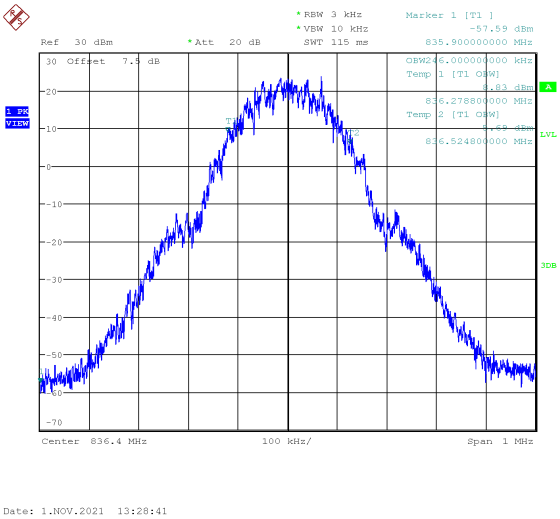
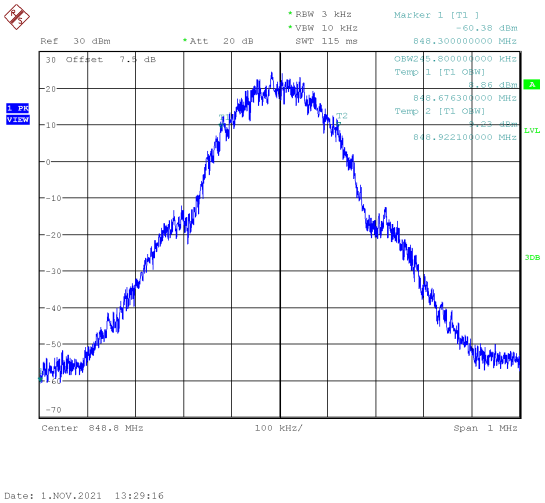
6.3.2 Test Procedure:

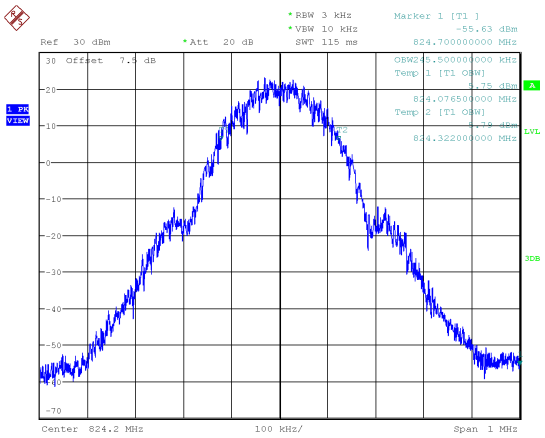
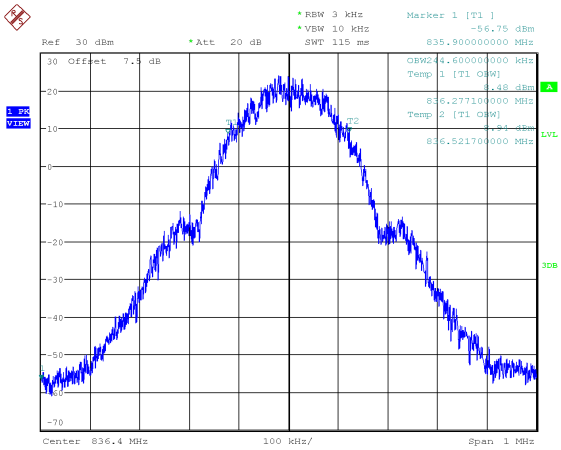
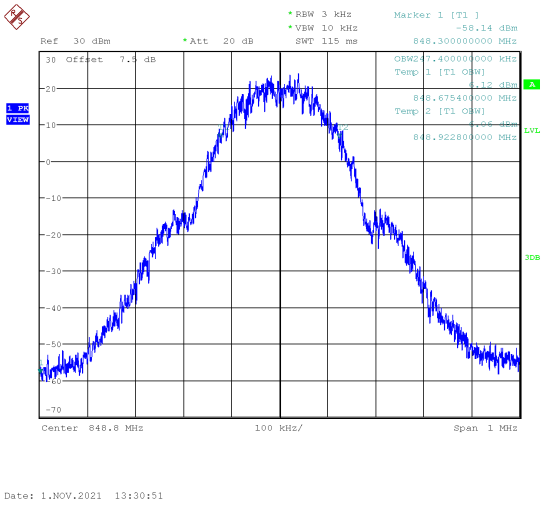
1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 99% bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

6.3.3 Test result:

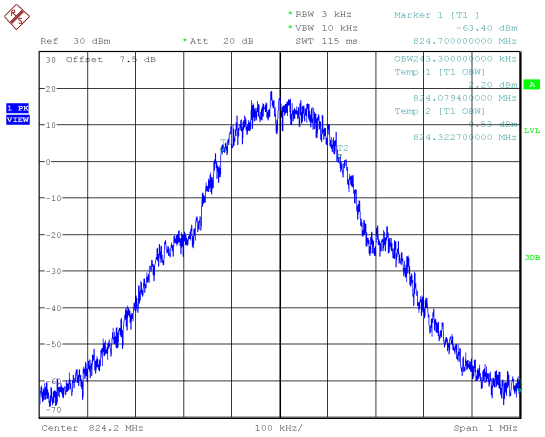
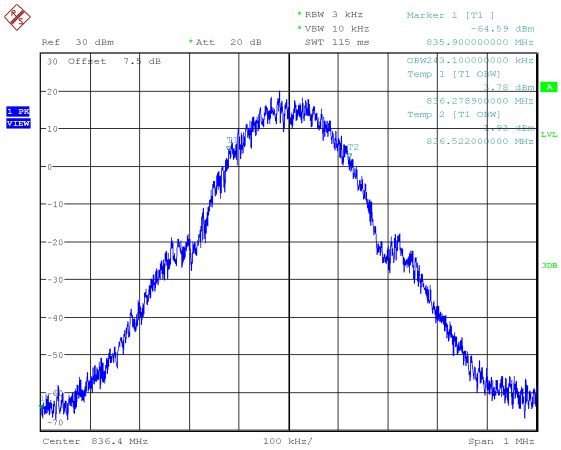
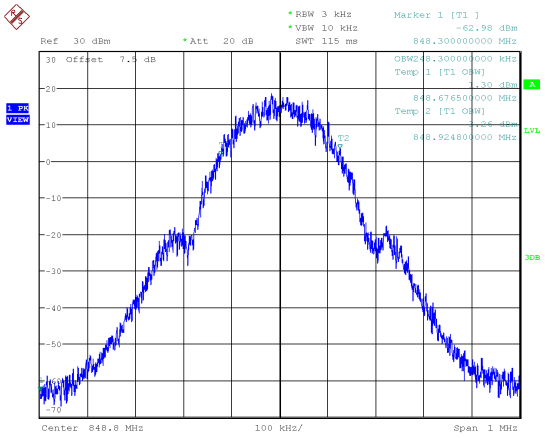
GSM850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)
Low 128	836.4	246.40
Mid 189	824.2	246.00
High 251	848.8	245.80
GPRS850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)
Low 128	836.4	245.50
Mid 189	824.2	244.60
High 251	848.8	247.40
EDGE850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)
Low 128	836.4	243.30
Mid 189	824.2	243.10
High 251	848.8	248.30

Conclusion: PASS

GSM 850	
Channel 128-Occupied Bandwidth (99%)	Channel 189-Occupied Bandwidth (99%)
	
Channel 251-Occupied Bandwidth (99%)	/
	/

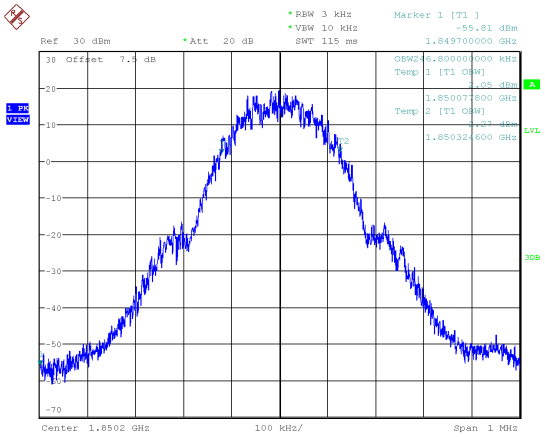
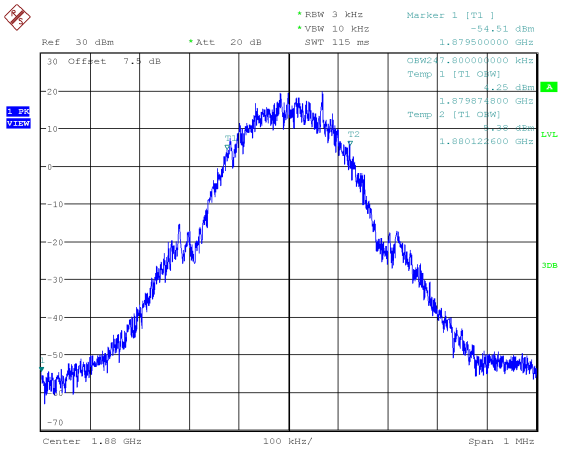
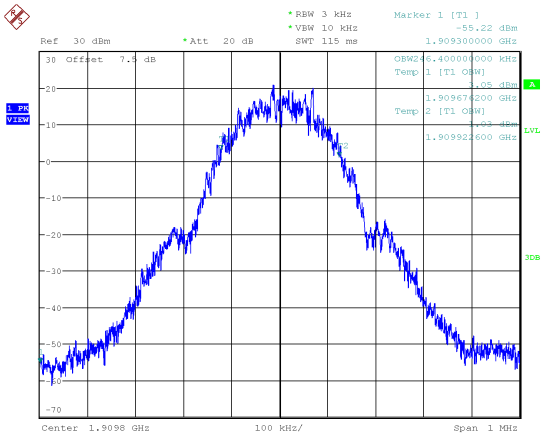
GPRS 850	
Channel 128-Occupied Bandwidth (99%)	Channel 189-Occupied Bandwidth (99%)
	
Channel 251-Occupied Bandwidth (99%)	/
	/

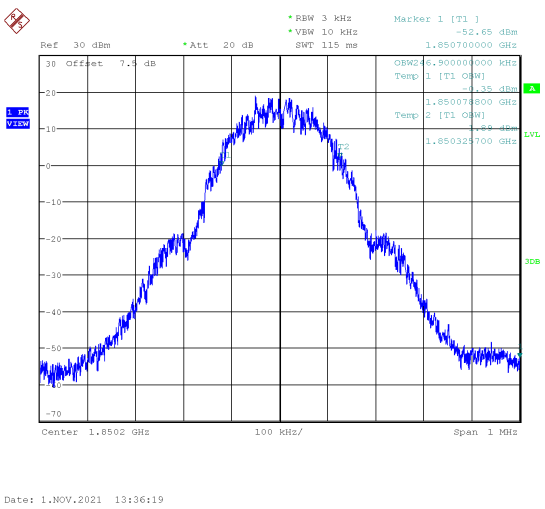
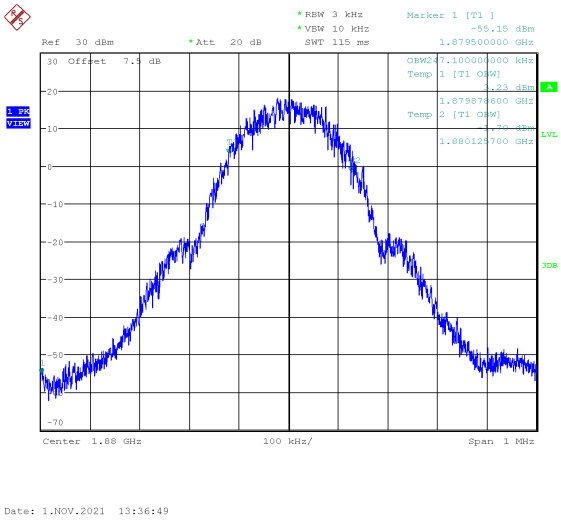
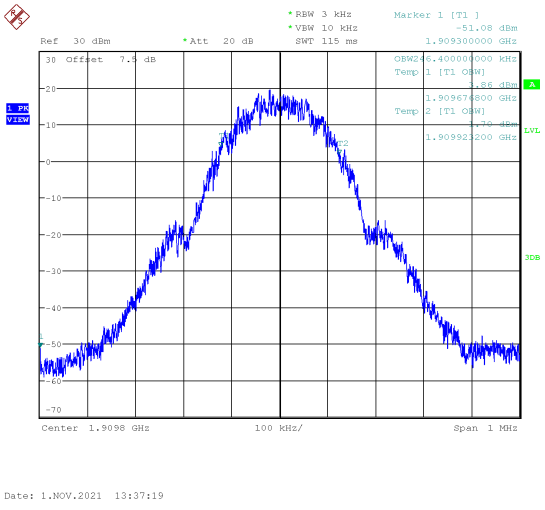
EDGE 850

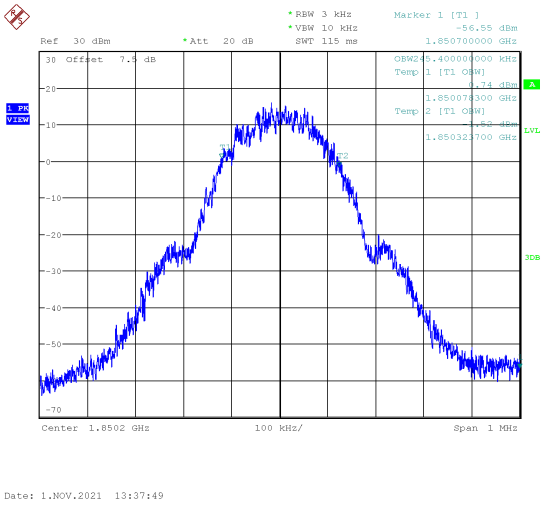
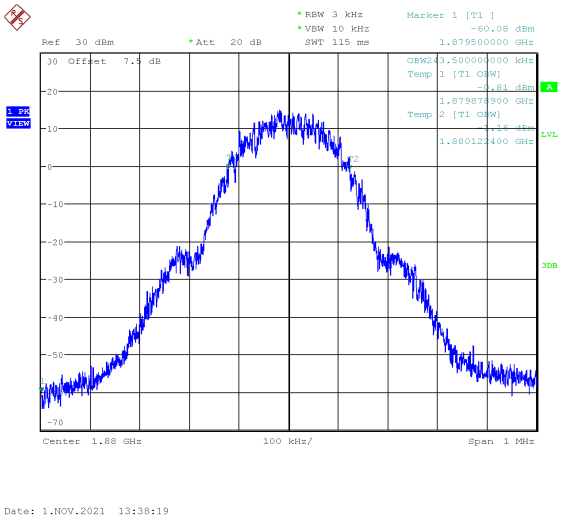
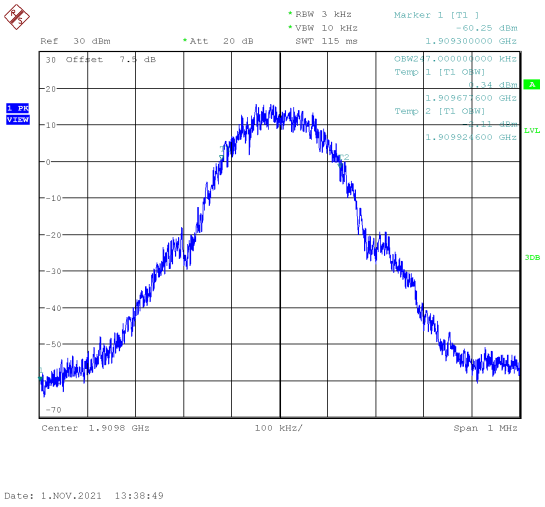
Channel 128-Occupied Bandwidth (99%)	Channel 189-Occupied Bandwidth (99%)
	
Channel 251-Occupied Bandwidth (99%)	**/**
	**/**

GSM1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)
Low 512	1880	246.80
Mid 661	1850.2	247.80
High 810	1909.8	246.40
GPRS1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)
Low 512	1880	246.90
Mid 661	1850.2	247.10
High 810	1909.8	246.40
EDGE1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)
Low 512	1880	245.40
Mid 661	1850.2	243.50
High 810	1909.8	247.00

Conclusion: PASS

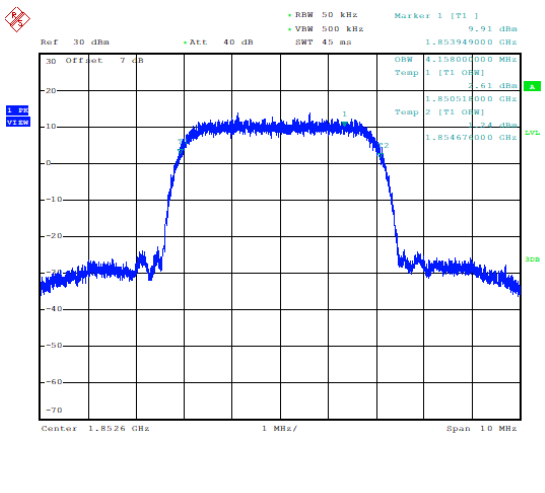
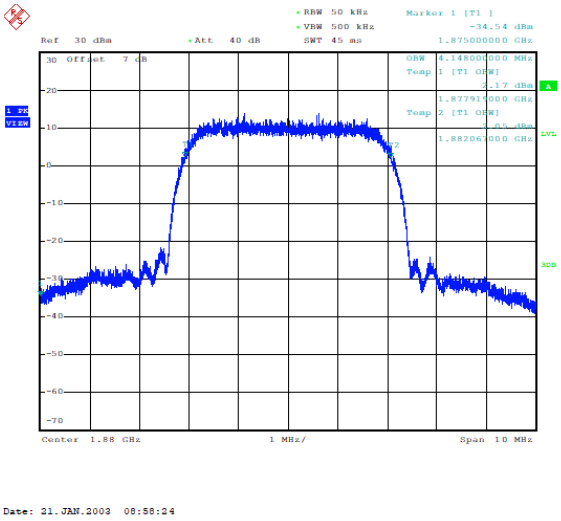
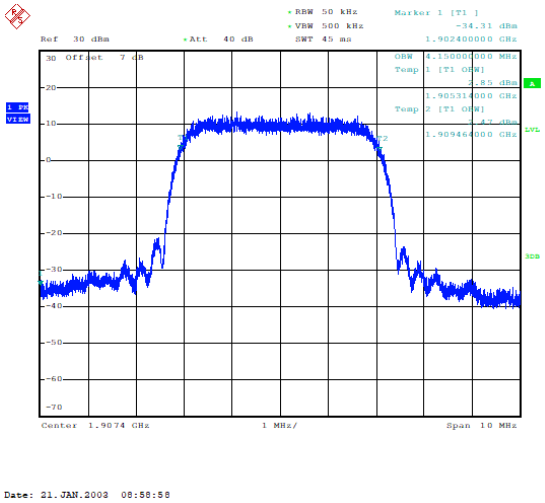
GSM 1900	
Channel 512-Occupied Bandwidth (99%)	Channel 661-Occupied Bandwidth (99%)
	
Channel 810-Occupied Bandwidth (99%)	/
	/

GPRS 1900	
Channel 512-Occupied Bandwidth (99%)	Channel 661-Occupied Bandwidth (99%)
	
Channel 810-Occupied Bandwidth (99%)	/
	/

EDGE 1900	
Channel 512-Occupied Bandwidth (99%)	Channel 661-Occupied Bandwidth (99%)
	
Channel 810-Occupied Bandwidth (99%)	/
	/

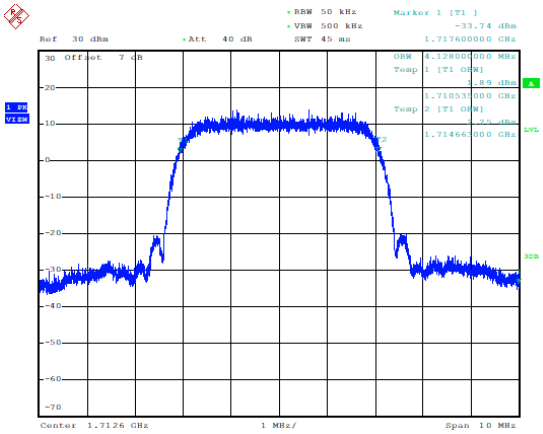
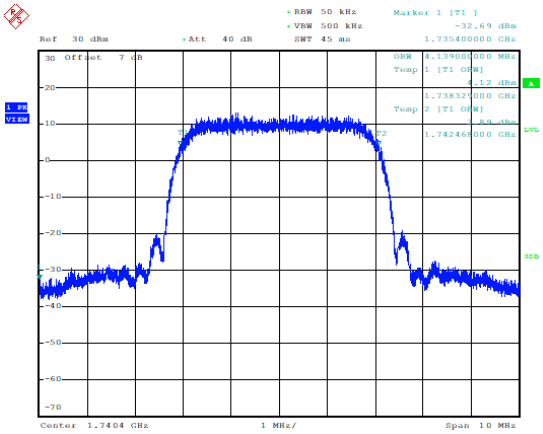
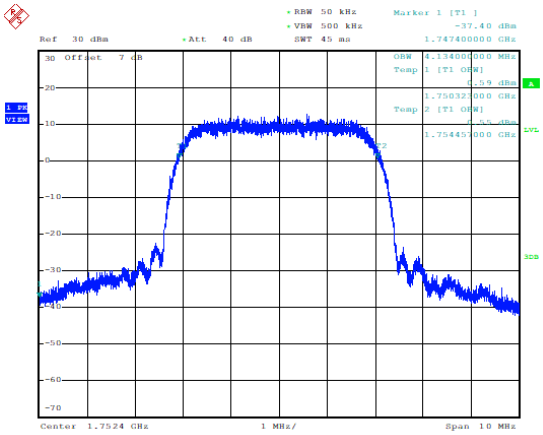
WCDMA BAND II		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 9263	1880	4.158
Mid 9400	1852.6	4.148
High 9537	1907.4	4.150

Conclusion: PASS

WCDMA BAND II	
Channel 9263-Occupied Bandwidth (99%)	Channel 9400-Occupied Bandwidth (99%)
	
Channel 9537-Occupied Bandwidth (99%)	/
	/

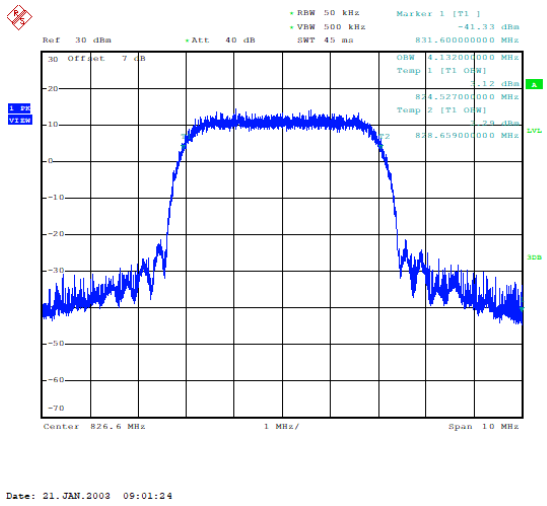
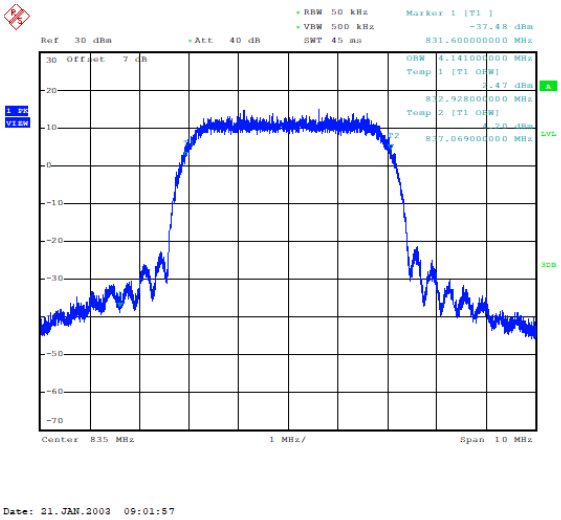
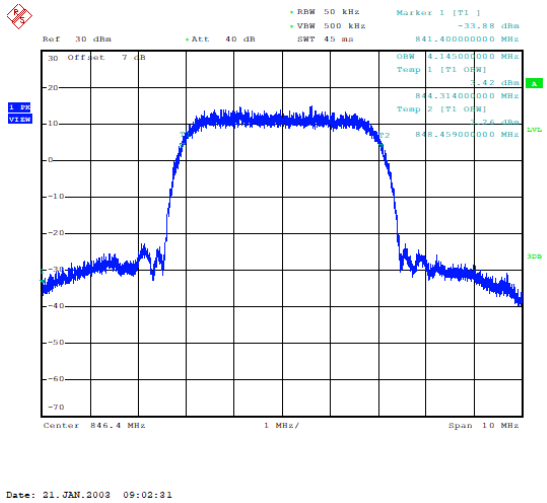
WCDMA BAND IV		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 1313	1740.4	4.128
Mid 1450	1712.6	4.139
High 1512	1752.5	4.134

Conclusion: PASS

WCDMA BAND IV	
Channel 1313-Occupied Bandwidth (99%)	Channel 1450-Occupied Bandwidth (99%)
	
Channel 1512-Occupied Bandwidth (99%)	/
	/

WCDMA BAND V		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Low 4133	835.0	4.132
Mid 4175	826.6	4.141
High 4233	846.4	4.145

Conclusion: PASS

WCDMA BAND V	
Channel 4133-Occupied Bandwidth (99%)	Channel 4175-Occupied Bandwidth (99%)
	
Channel 4233-Occupied Bandwidth (99%)	/
	/

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. Data were taken at the extreme and mid frequencies of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV.

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 GSM: signal analyzer setting as: RBW= 3KHz; VBW=10KHz; Span=1MHz.

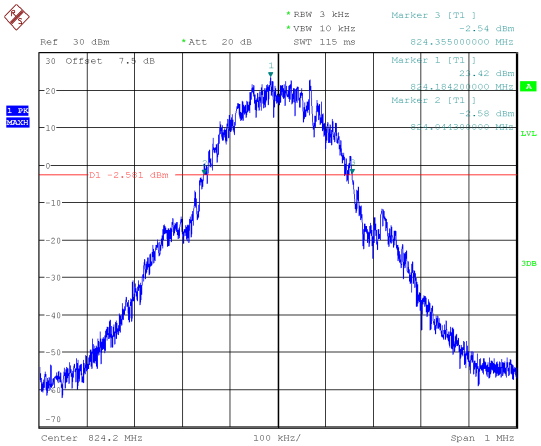
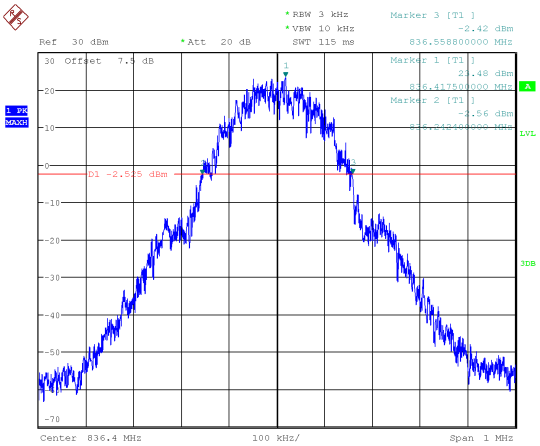
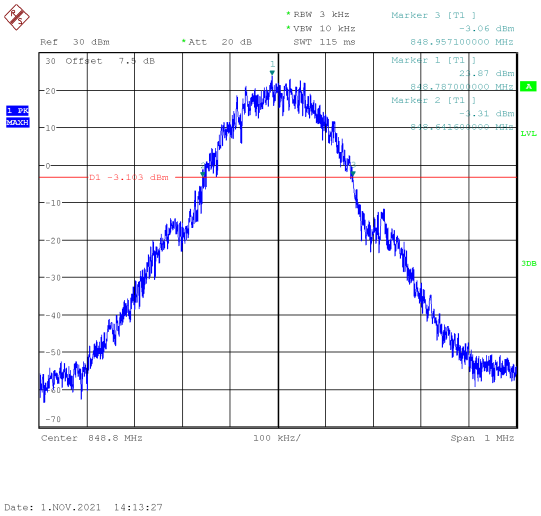
For WCDMA: signal analyzer setting as: RBW=50KHz; VBW=200KHz; Span=10MHz.

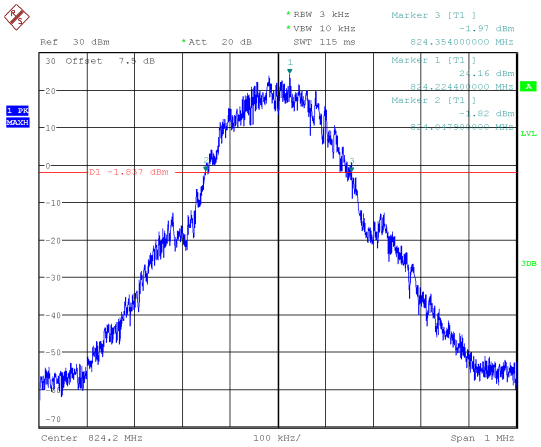
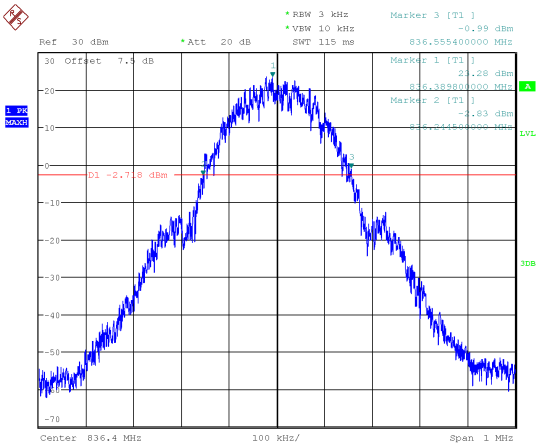
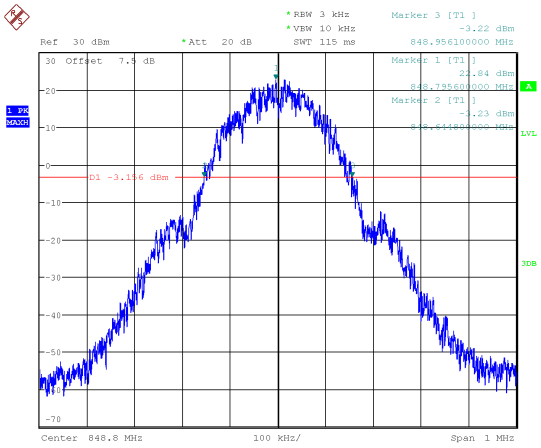
6.4.4 Test results:

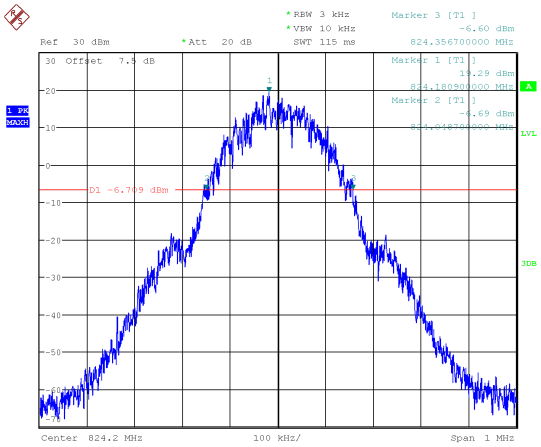
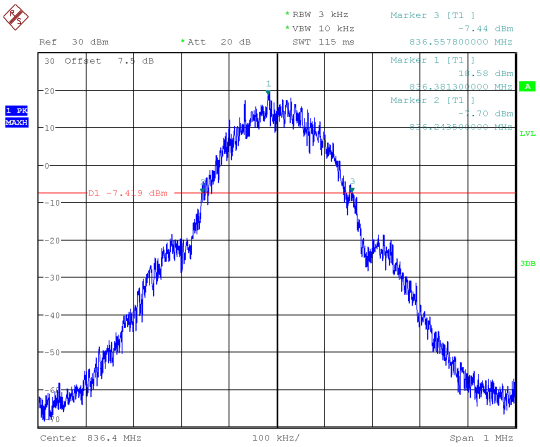
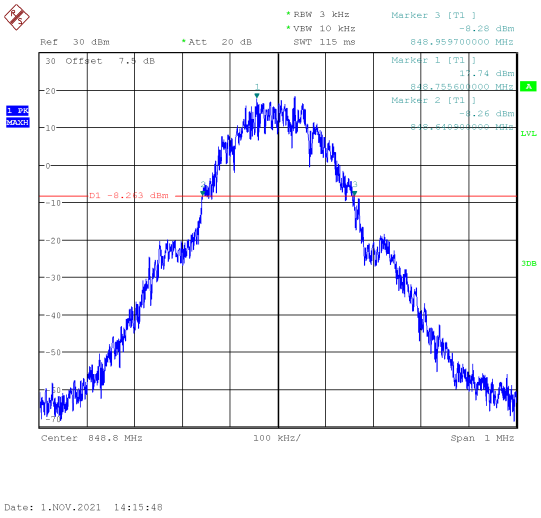
GSM 850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(kHz)
Low 128	836.4	311.00
Mid 189	824.2	316.00
High 251	848.8	316.00
GPRS 850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(kHz)
Low 128	836.4	306.00
Mid 189	824.2	311.00
High 251	848.8	311.00

EDGE 850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(kHz)
Low 128	836.4	308.00
Mid 189	824.2	314.00
High 251	848.8	319.00

Conclusion: PASS

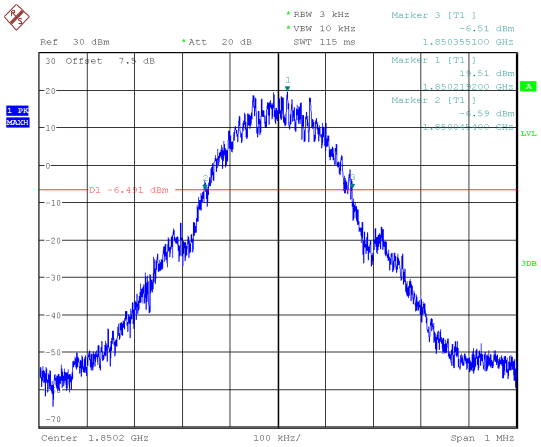
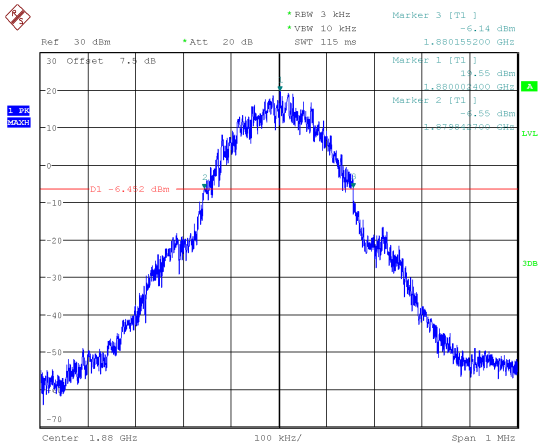
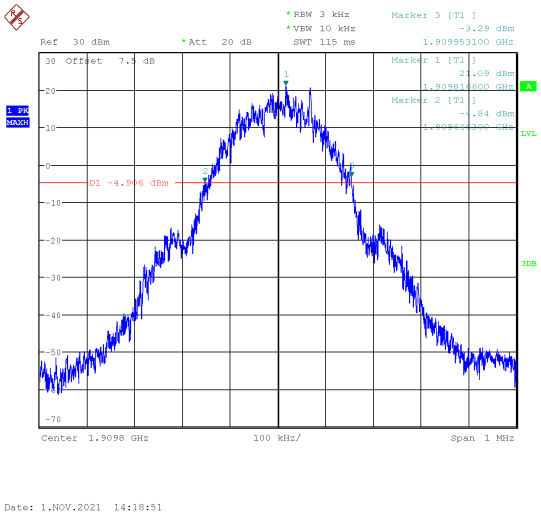
GSM 850	
Channel 128- Emission Bandwidth (-26dBc BW)	Channel 189- Emission Bandwidth (-26dBc BW)
	
Channel 251- Emission Bandwidth (-26dBc BW)	/
	/

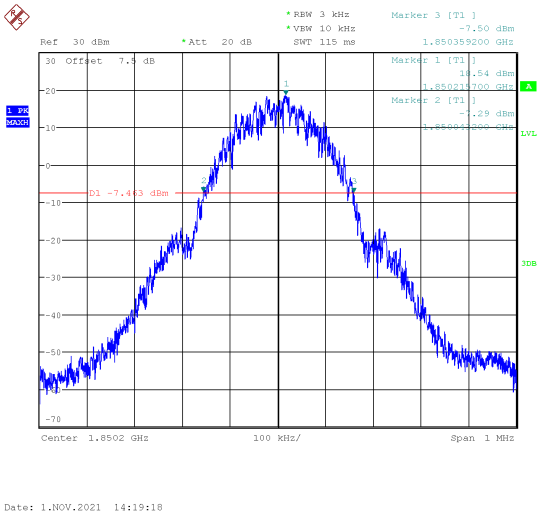
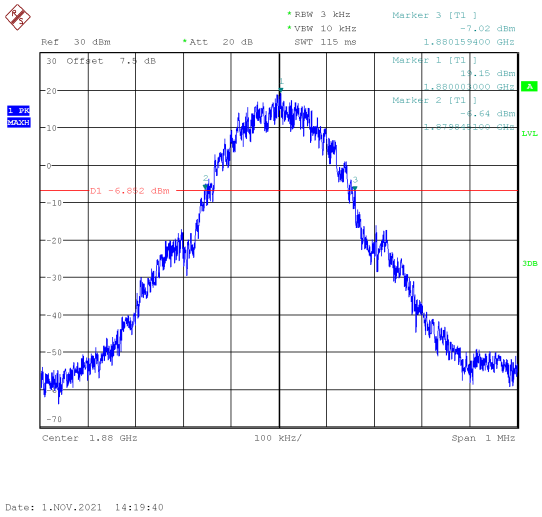
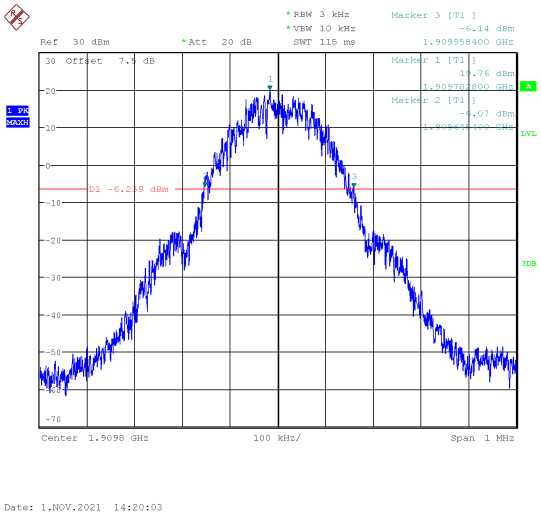
GPRS 850	
Channel 128- Emission Bandwidth (-26dBc BW)	Channel 189- Emission Bandwidth (-26dBc BW)
	
Channel 251- Emission Bandwidth (-26dBc BW)	/
	/

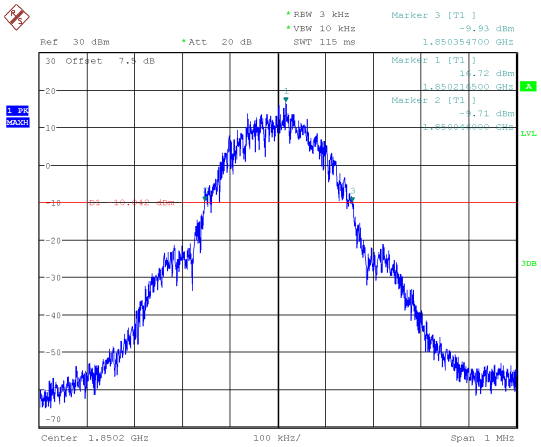
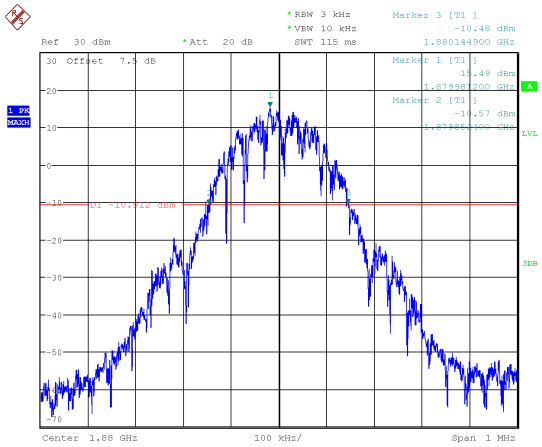
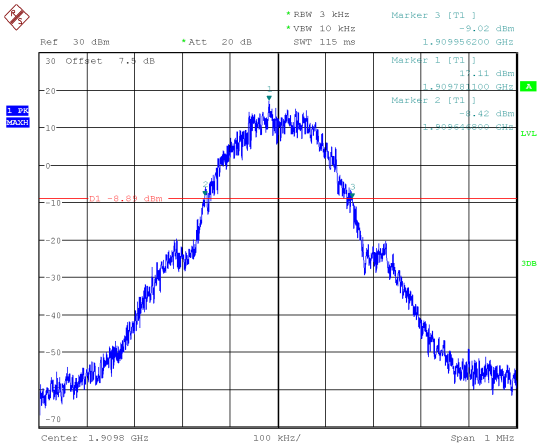
EDGE 850	
Channel 128- Emission Bandwidth (-26dBc BW)	Channel 189- Emission Bandwidth (-26dBc BW)
	
Channel 251- Emission Bandwidth (-26dBc BW)	/
	/

GSM1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(kHz)
Low 512	1880	310.00
Mid 661	1850.2	312.00
High 810	1909.8	307.60
GPRS1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(kHz)
Low 512	1880	316.00
Mid 661	1850.2	314.00
High 810	1909.8	313.00
EDGE1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(kHz)
Low 512	1880	309.00
Mid 661	1850.2	301.00
High 810	1909.8	309.00

Conclusion: PASS

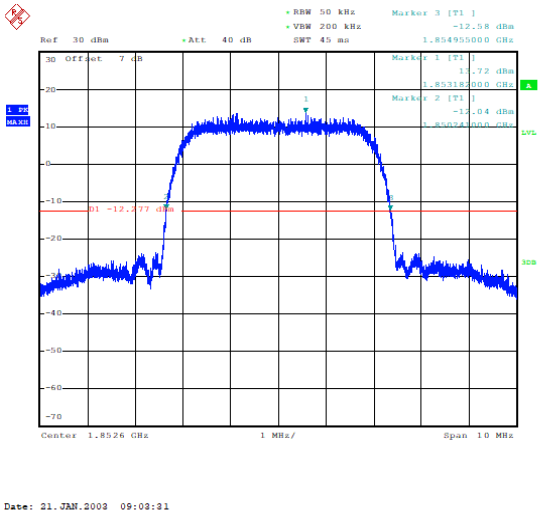
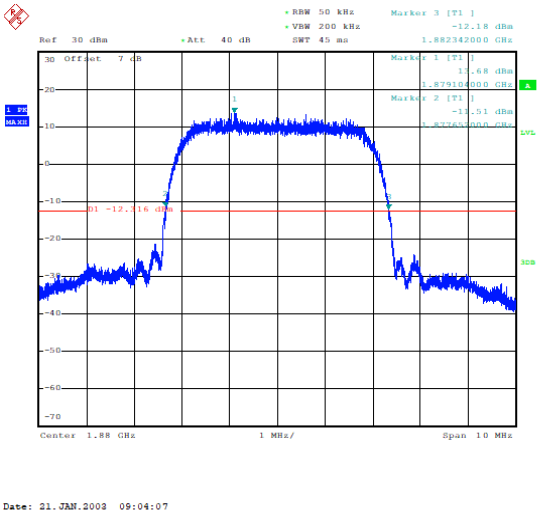
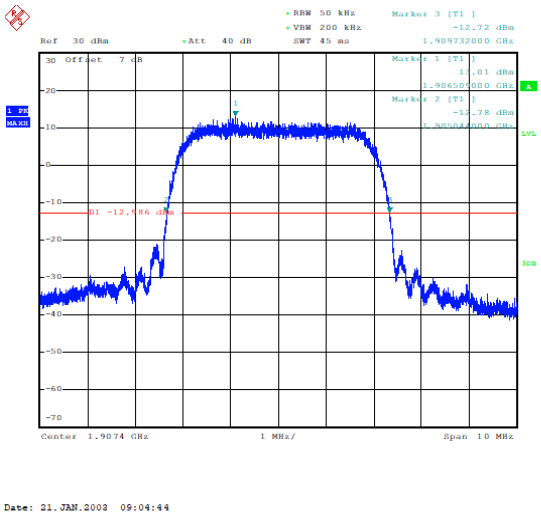
GSM 1900	
Channel 512- Emission Bandwidth (-26dBc BW)	Channel 661- Emission Bandwidth (-26dBc BW)
	
Channel 810- Emission Bandwidth (-26dBc BW)	/
	/

GPRS 1900	
Channel 512- Emission Bandwidth (-26dBc BW)	Channel 661- Emission Bandwidth (-26dBc BW)
	
Channel 810- Emission Bandwidth (-26dBc BW)	/
	/

EDGE 1900	
Channel 512- Emission Bandwidth (-26dBc BW)	Channel 881- Emission Bandwidth (-26dBc BW)
	
Channel 810- Emission Bandwidth (-26dBc BW)	/
	/

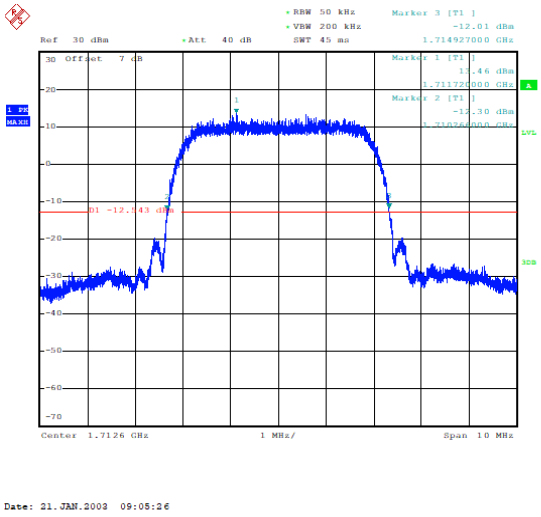
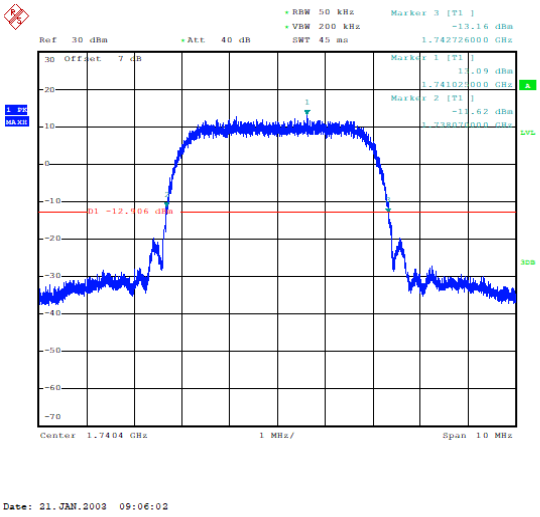
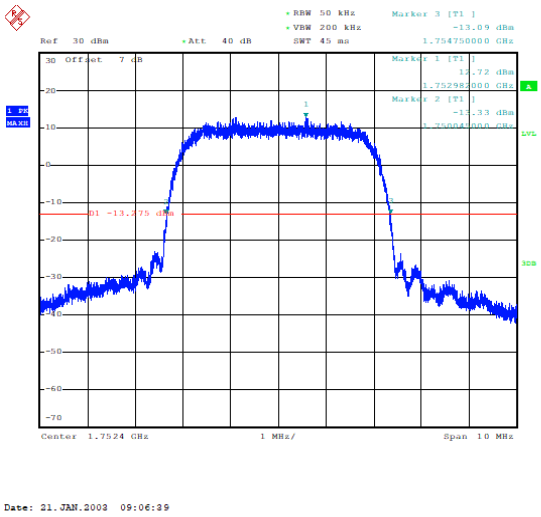
WCDMA BAND II		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 9263	1880	4.714
Mid 9400	1852.6	4.690
High 9537	1907.4	4.688

Conclusion: PASS

WCDMA BAND II	
Channel 9263- Emission Bandwidth (-26dBc BW)	Channel 9400- Emission Bandwidth (-26dBc BW)
	
Channel 9538- Emission Bandwidth (-26dBc BW)	/
	/

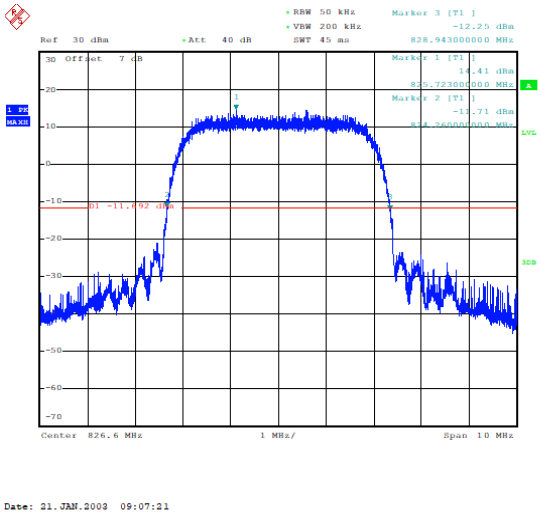
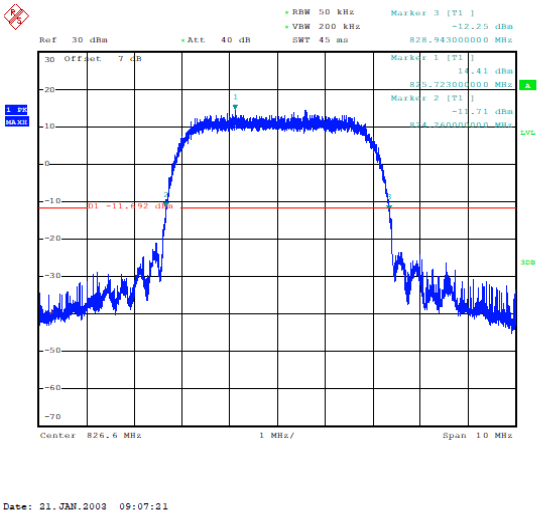
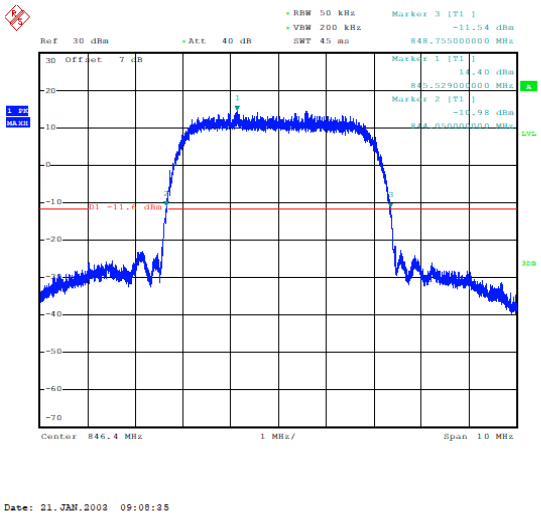
WCDMA BAND IV		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 1313	1740.4	4.661
Mid 1450	1712.6	4.656
High 1512	1752.4	4.705

Conclusion: PASS

WCDMA BAND IV	
Channel 1313- Emission Bandwidth (-26dBc BW)	Channel 1450- Emission Bandwidth (-26dBc BW)
	
Channel 1512- Emission Bandwidth (-26dBc BW)	/
	/

WCDMA BAND V		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Low 4133	835.0	4.683
Mid 4175	826.6	4.685
High 4232	846.4	4.705

Conclusion: PASS

WCDMA BAND V	
Channel 4133- Emission Bandwidth (-26dBc BW)	Channel 4175- Emission Bandwidth (-26dBc BW)
	
Channel 4232- Emission Bandwidth (-26dBc BW)	/
	/

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

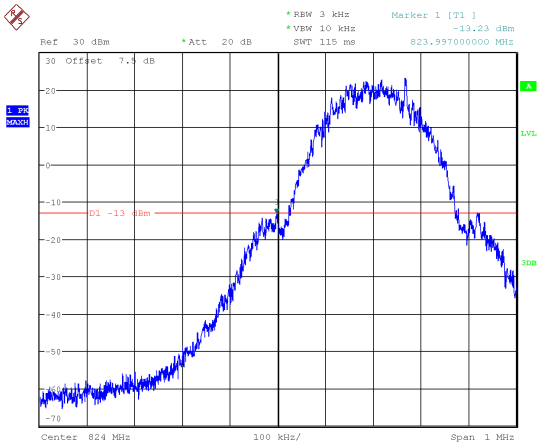
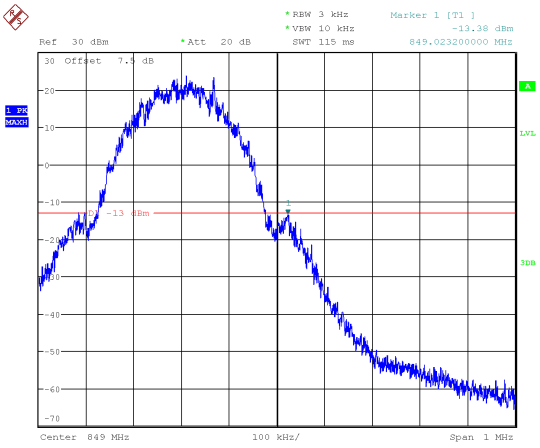
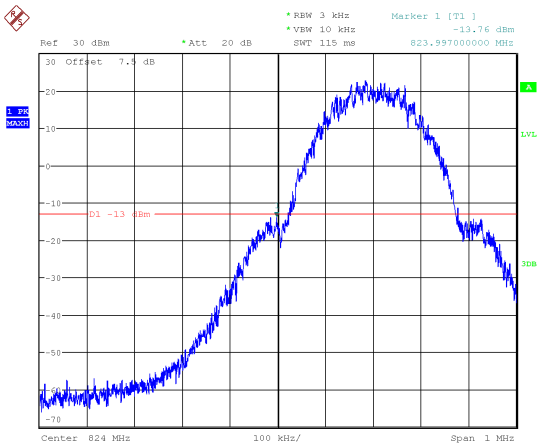
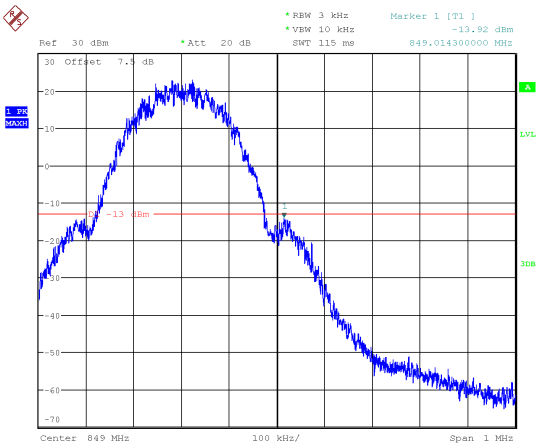
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

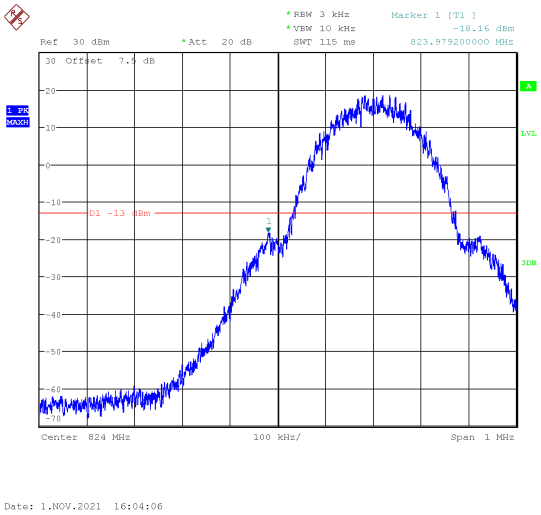
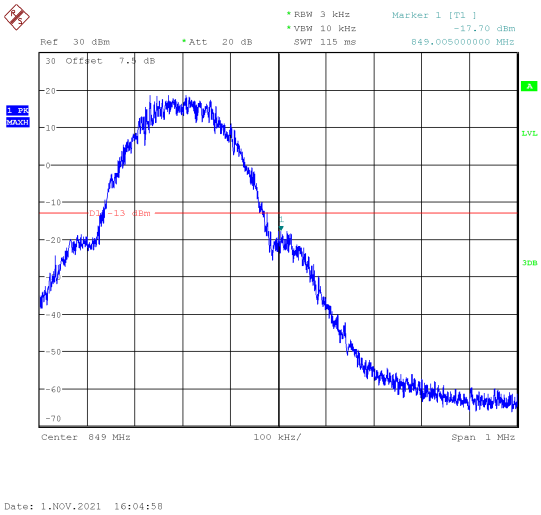
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required."Limit -13 dBm

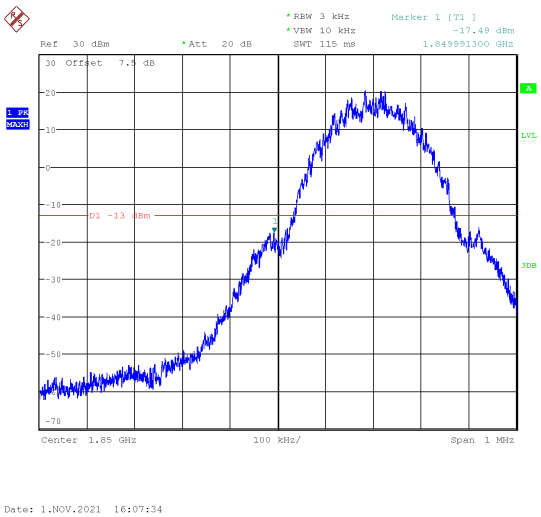
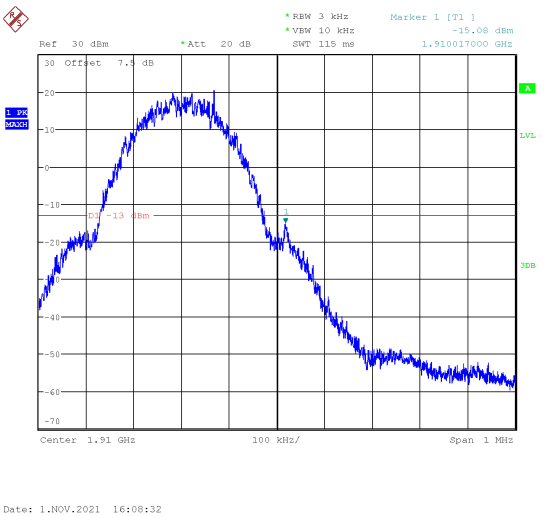
6.5.2 Test procedure:

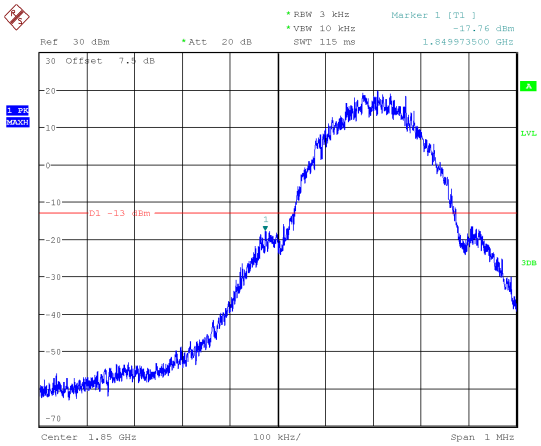
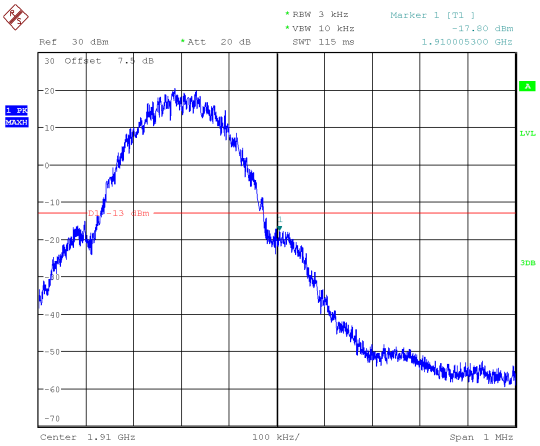
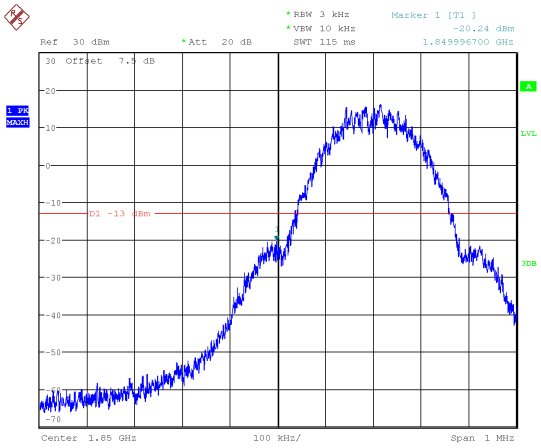
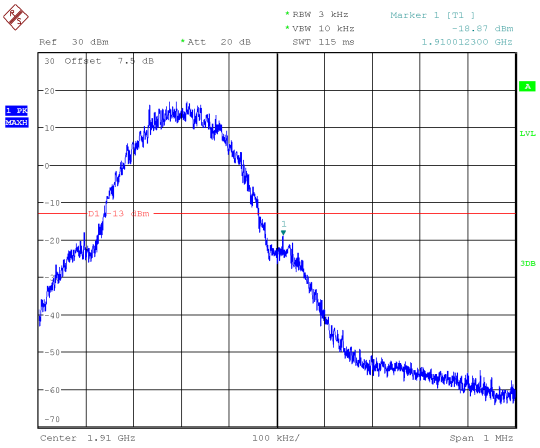
1. The RF output of the transceiver was connected to a signal analyzer through appropriate attenuation.
2. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter 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+10log(P)](Db)
   =[30+10log(P)](dBm)-[43+10log(P)](Db)
   =-13dBm

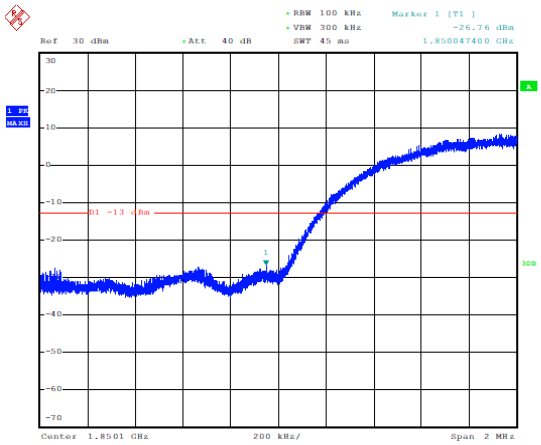
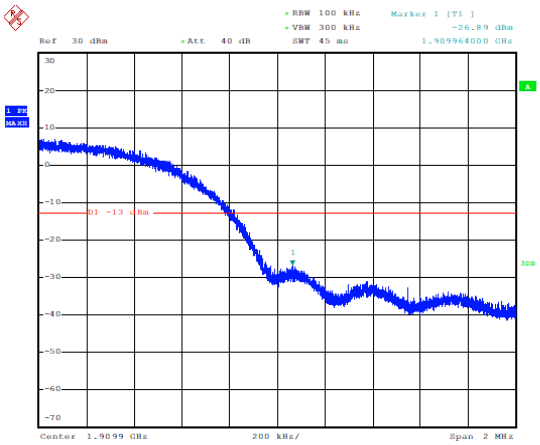
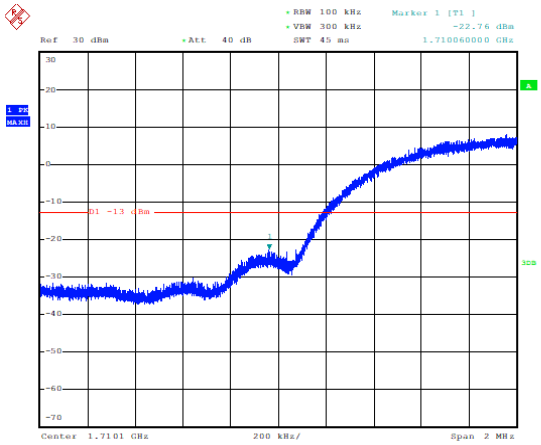
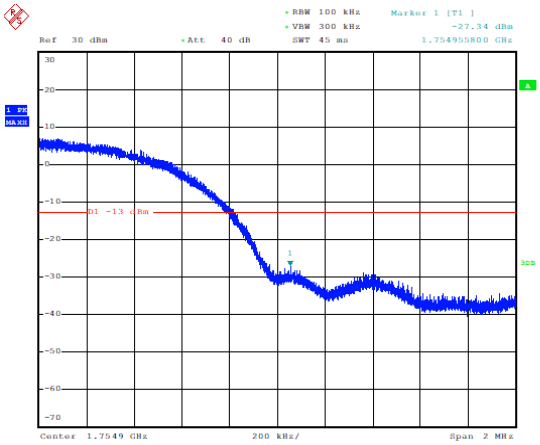
6.5.3 Test Result:

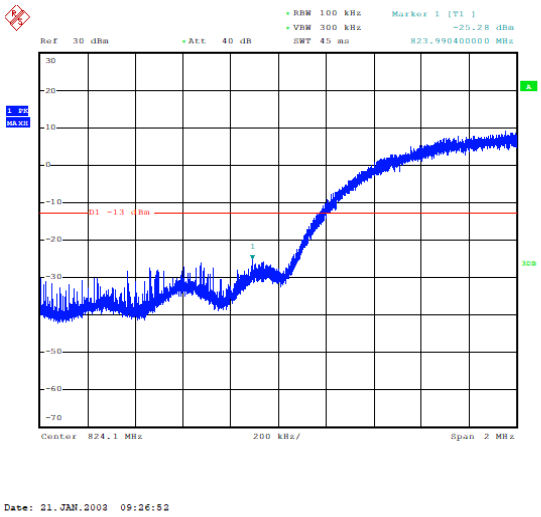
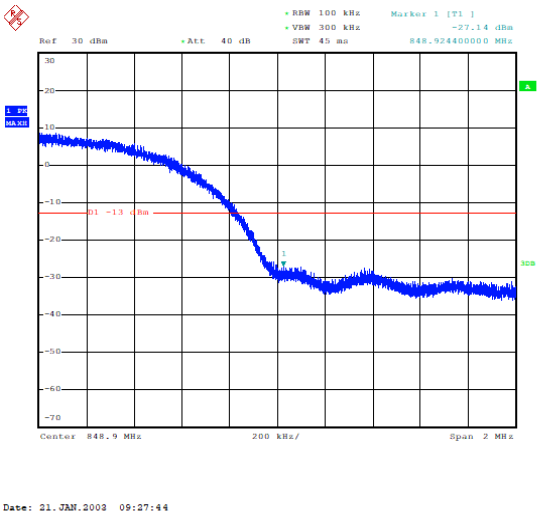
GSM 850	
Channel 128- LOW BAND EDGE BLOCK	Channel 251- LOW BAND EDGE BLOCK
	
GPRS 850	
Channel 128- LOW BAND EDGE BLOCK	Channel 251- LOW BAND EDGE BLOCK
	

EDGE 850	
Channel 128- LOW BAND EDGE BLOCK	Channel 251- LOW BAND EDGE BLOCK
	

GSM 1900	
Channel 512- LOW BAND EDGE BLOCK	Channel 810- LOW BAND EDGE BLOCK
	

GPRS 1900	
Channel 512- LOW BAND EDGE BLOCK	Channel 810- LOW BAND EDGE BLOCK
	
EDGE 1900	
Channel 512- LOW BAND EDGE BLOCK	Channel 810- LOW BAND EDGE BLOCK
	

WCDMA BAND II	
Channel 9263- LOW BAND EDGE BLOCK	Channel 9537- HIGH BAND EDGE BLOCK
	
WCDMA BAND IV	
Channel 1313- LOW BAND EDGE BLOCK	Channel 1512- HIGH BAND EDGE BLOCK
	

WCDMA BAND V	
Channel 4133- LOW BAND EDGE BLOCK	Channel 4232- HIGH 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 CMW 500 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 CMW 500 and in a simulated call on mid channel of GSM850, PCS1900, WCDMA BANDII, WCDMA BANDIV and WCDMA BANDV, 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 CMW 500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 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

GSM850 Mid Channel/Fc (MHz) 189/836.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-0.81	84
3.8	-20	2.03	84
3.8	-10	0.58	84
3.8	0	0.87	84
3.8	10	6.30	84
3.8	20	1.16	84
3.8	30	-5.26	84
3.8	40	-0.10	84
3.8	50	-0.90	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	3.45	84
3.8	25	5.17	84
4.2	25	2.84	84

GPRS850 Mid Channel/Fc (MHz) 189/836.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-2.62	84
3.8	-20	-1.42	84
3.8	-10	-1.32	84
3.8	0	2.62	84
3.8	10	-0.58	84
3.8	20	-0.61	84
3.8	30	0.61	84
3.8	40	0.77	84
3.8	50	-1.55	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	0.23	84
3.8	25	-2.07	84
4.2	25	-0.23	84

EDGE850 Mid Channel/Fc (MHz) 189/836.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	0.32	84
3.8	-20	2.36	84
3.8	-10	3.29	84
3.8	0	6.68	84
3.8	10	-0.68	84
3.8	20	0.52	84
3.8	30	1.78	84
3.8	40	2.32	84
3.8	50	2.65	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	-1.19	84
3.8	25	1.90	84
4.2	25	2.13	84

PCS1900 Mid Channel/fc(MHz) 661/1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	13.27	196
3.8	-20	1.61	196
3.8	-10	13.08	196
3.8	0	20.08	196
3.8	10	6.75	196
3.8	20	14.82	196
3.8	30	10.78	196
3.8	40	8.56	196
3.8	50	7.75	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	11.75	196
3.8	25	18.82	196
4.2	25	14.30	196

GPRS1900 Mid Channel/fc(MHz) 661/1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	13.14	196
3.8	-20	10.94	196
3.8	-10	15.30	196
3.8	0	13.72	196
3.8	10	7.39	196
3.8	20	10.69	196
3.8	30	15.53	196
3.8	40	10.78	196
3.8	50	16.47	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	11.20	196
3.8	25	8.94	196
4.2	25	8.07	196

EDGE1900 Mid Channel/fc(MHz) 661/1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	12.98	196
3.8	-20	12.07	196
3.8	-10	19.86	196
3.8	0	11.04	196
3.8	10	12.98	196
3.8	20	9.46	196
3.8	30	17.56	196
3.8	40	9.69	196
3.8	50	13.11	84

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	16.30	196
3.8	25	18.34	196
4.2	25	10.27	196

WCDMA BAND II Mid Channel/fc(MHz) 9400 /1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-4.263	4700
3.8	-20	-3.355	4700
3.8	-10	-2.797	4700
3.8	0	0.122	4700
3.8	10	-0.279	4700
3.8	20	-2.825	4700
3.8	30	-2.575	4700
3.8	40	-3.548	4700
3.8	50	-3.541	4700

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	-2.918	4700
3.8	25	-3.347	4700
4.2	25	-0.687	4700

WCDMA BAND IV Mid Channel/fc(MHz) 1450/1740.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-2.139	4331.5
3.8	-20	-0.093	4331.5
3.8	-10	-3.326	4331.5
3.8	0	-2.732	4331.5
3.8	10	-0.243	4331.5
3.8	20	-4.07	4331.5
3.8	30	-0.658	4331.5
3.8	40	-1.545	4331.5
3.8	50	-3.798	4331.5

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	-5.164	4331.5
3.8	25	-7.789	4331.5
4.2	25	-2.453	4331.5

WCDMA BAND V Mid Channel/fc(MHz) 4175/836.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-1.559	2091.5
3.8	-20	-0.672	2091.5
3.8	-10	-0.308	2091.5
3.8	0	-1.652	2091.5
3.8	10	-1.495	2091.5
3.8	20	1.38	2091.5
3.8	30	0.129	2091.5
3.8	40	-0.987	2091.5
3.8	50	-0.973	2091.5

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.5	25	0.343	2091.5
3.8	25	-0.451	2091.5
4.2	25	-0.265	2091.5

Conclusion: PASS

6.7. Conducted Spurious Emission

6.7.1. GSM 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. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 10 GHz.
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.

GSM 850 Transmitter

Channel	Frequency(MHz)
128	824.2
189	836.4
251	848.8

PCS 1900 Transmitter

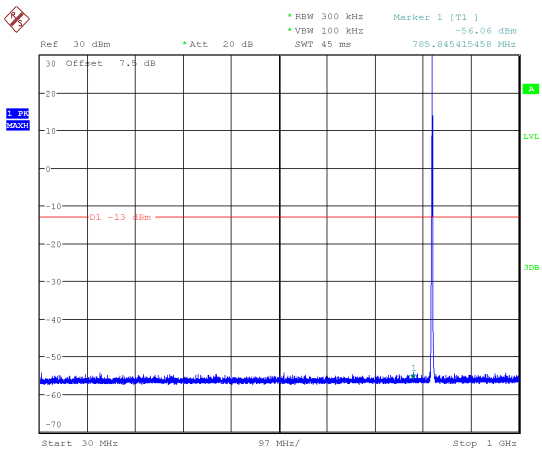
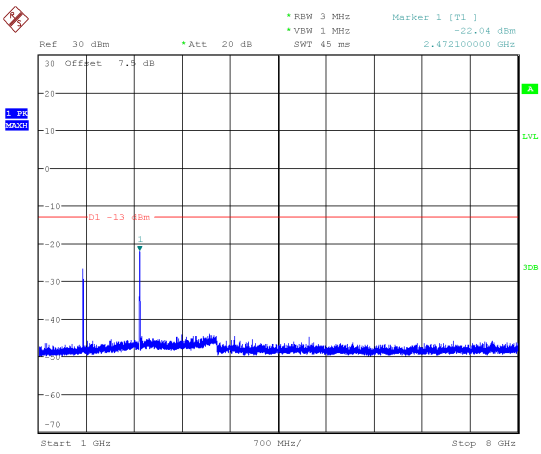
Channel	Frequency(MHz)
512	1850.2
661	1880.0
810	1909.8

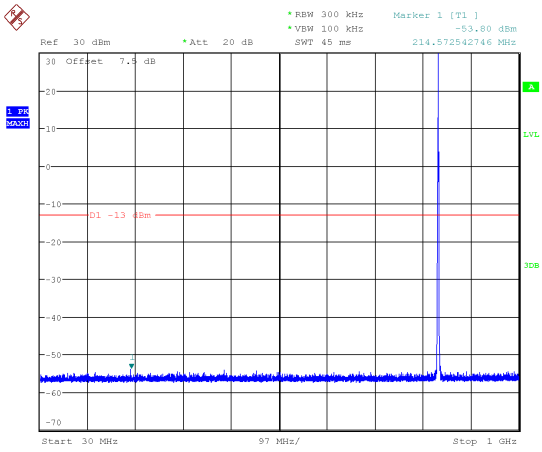
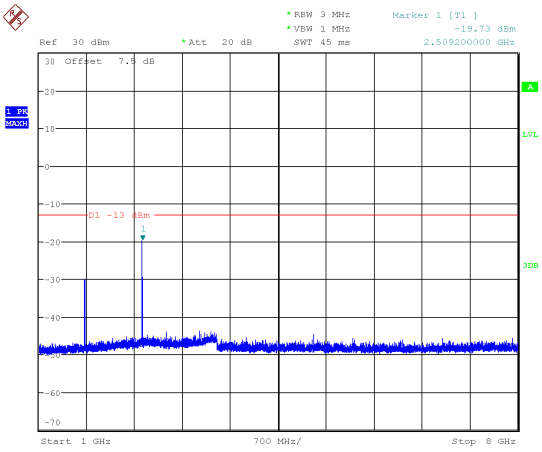
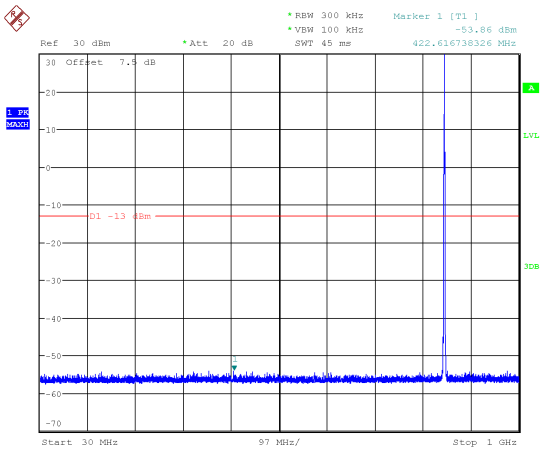
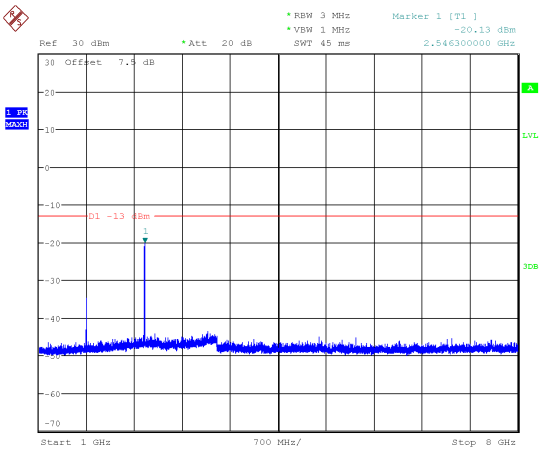
6.7.1.1. Measurement Limit

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

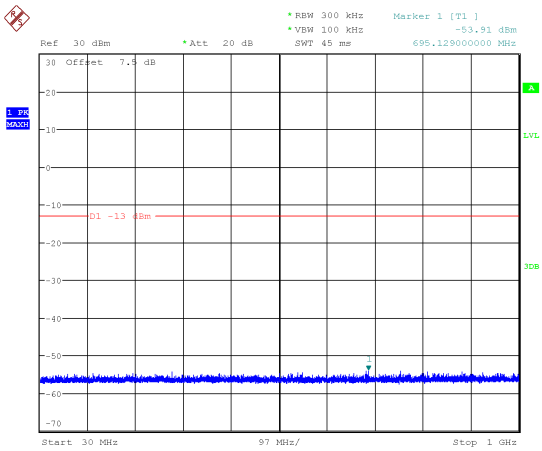
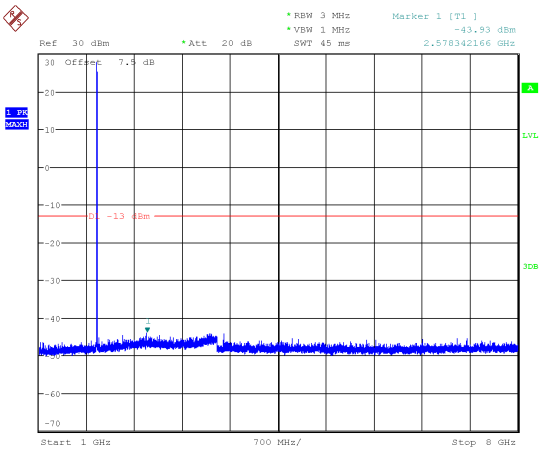
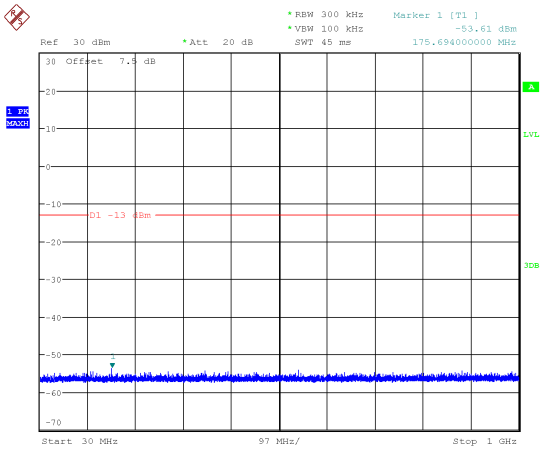
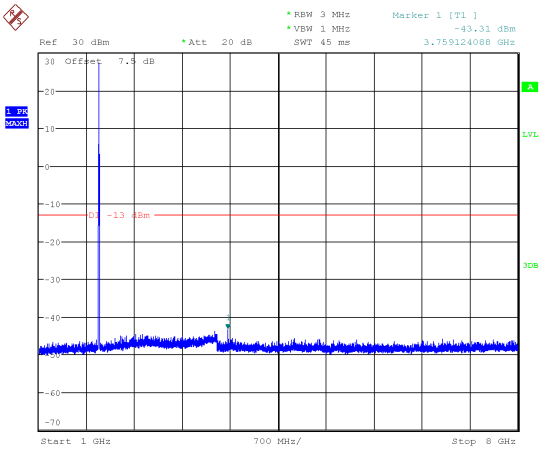
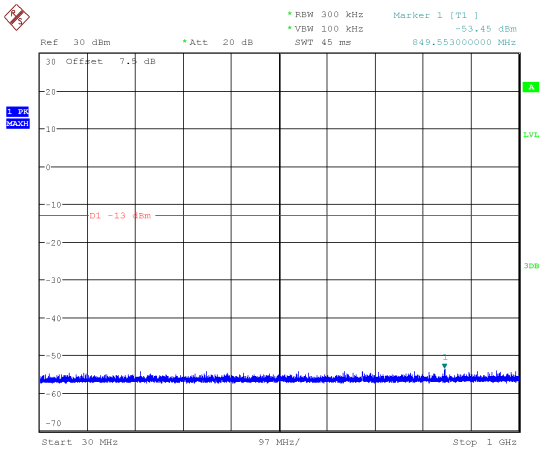
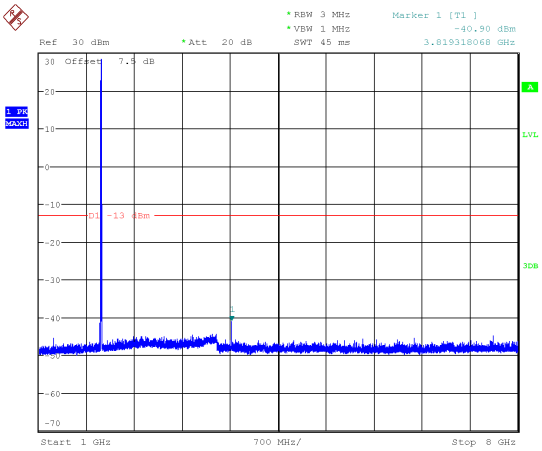
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). After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

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

GSM850	
Channel 128: 30MHz~1GHz	Channel 128: 1GHz~8GHz
	

Channel 189: 30MHz~1GHz	Channel 189: 1GHz~8GHz
	
Channel 251: 30MHz~1GHz	Channel 251: 1GHz~8GHz
	

GSM1900

Channel 512: 30MHz~1GHz	Channel 512: 1GHz~8GHz
	
Channel 661: 30MHz~1GHz	Channel 661: 1GHz~8GHz
	
Channel 810: 30MHz~1GHz	Channel 810: 1GHz~8GHz
	

6.7.2. WCDMA 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. For the equipment of WCDMA Band II and WCDMA BANDIV, these equate to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For WCDMA Band V, data taken from 30 MHz to 10GHz.
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.

WCDMA Band II Transmitter

Channel	Frequency (MHz)
9262	1852.40
9400	1880.00
9538	1907.60

WCDMA Band IV Transmitter

Channel	Frequency (MHz)
1312	1712.40
1413	1732.60
1513	1752.60

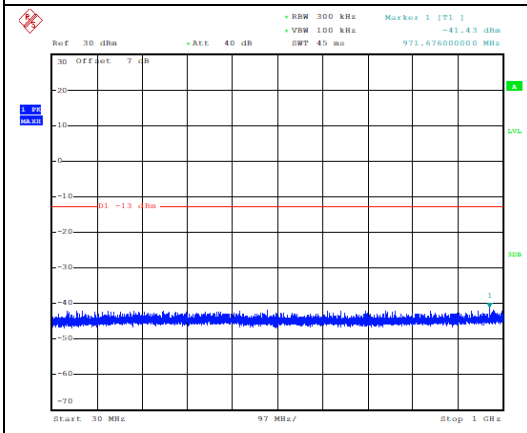
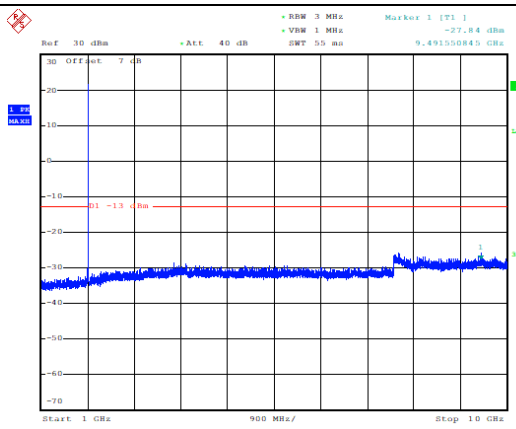
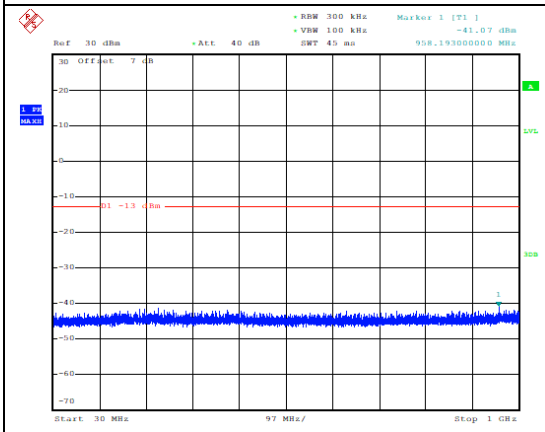
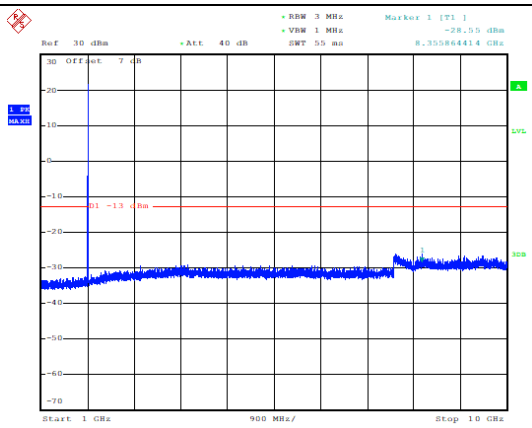
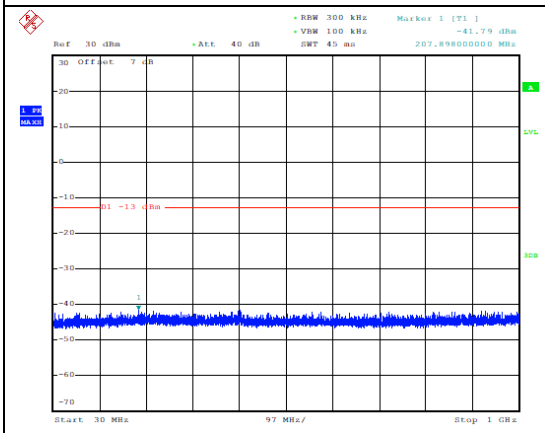
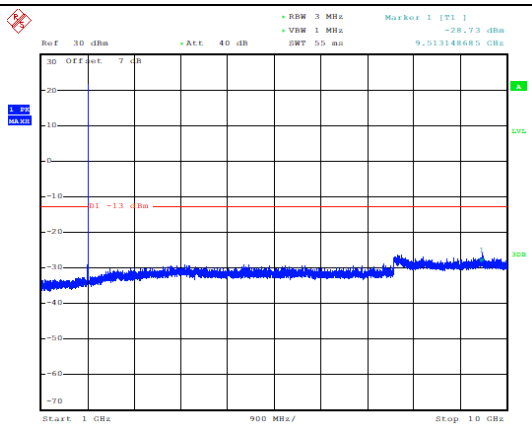
WCDMA Band V Transmitter

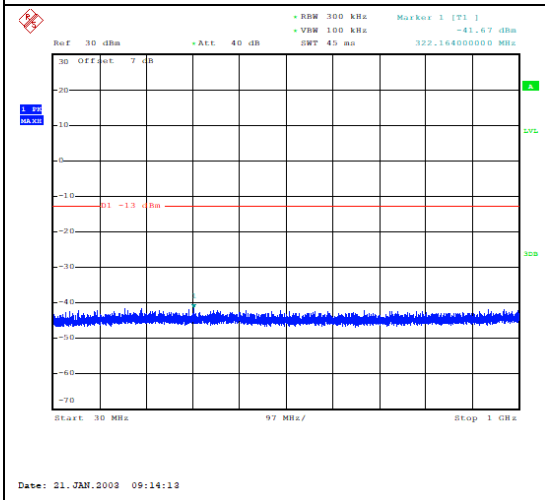
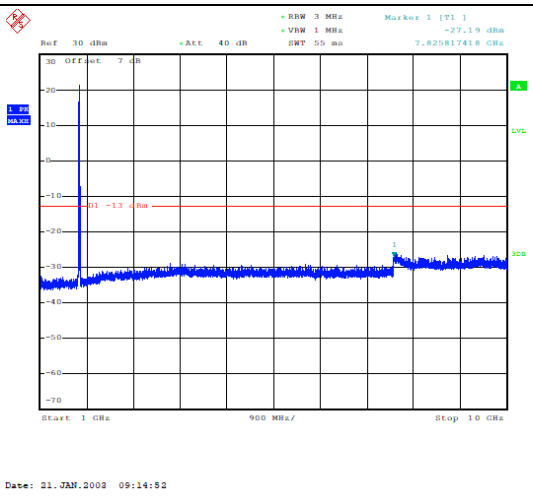
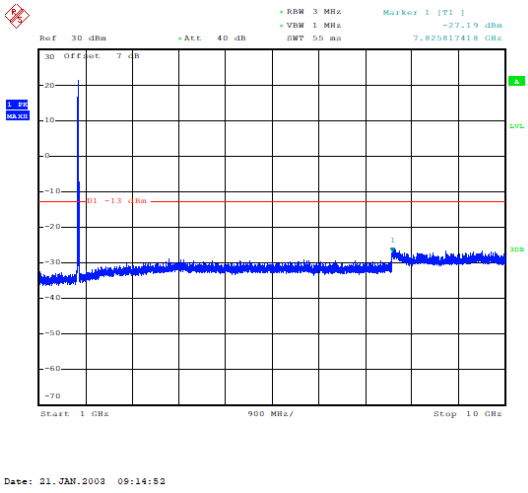
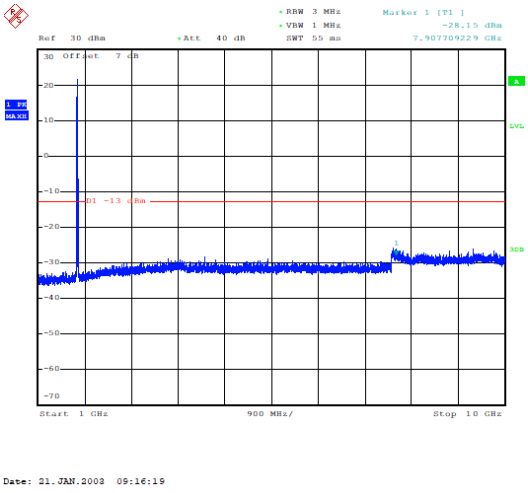
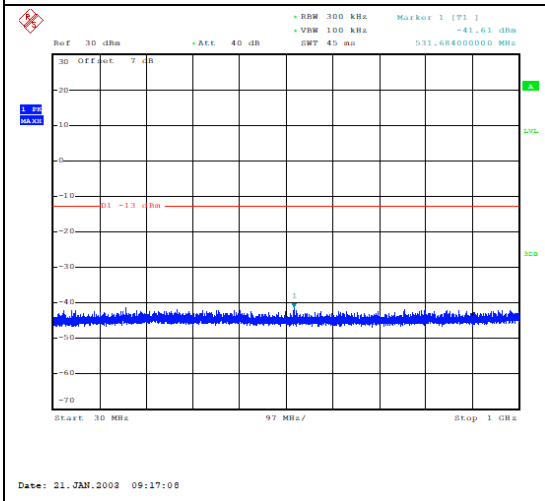
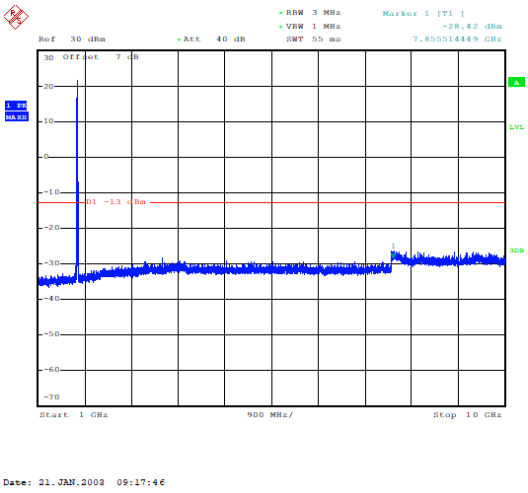
Channel	Frequency (MHz)
4132	826.40
4183	836.60
4233	846.60

6.7.2.1. Measurement result

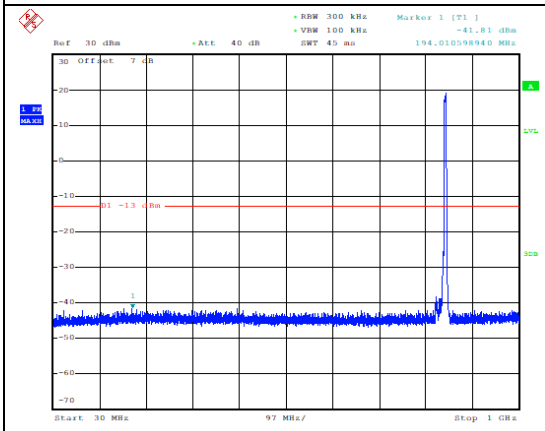
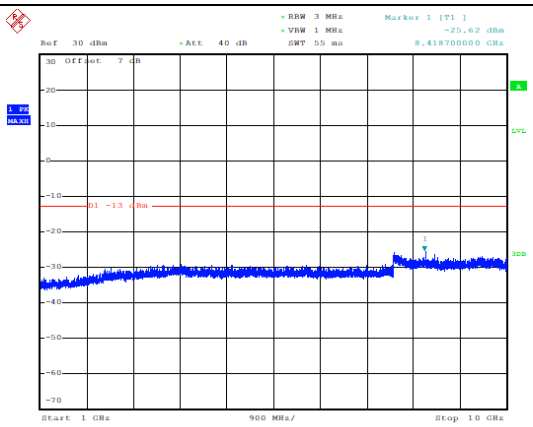
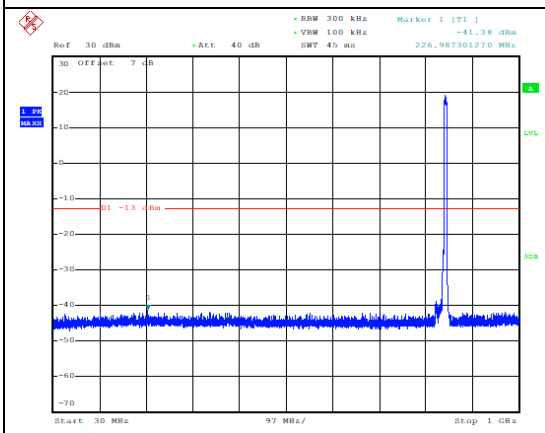
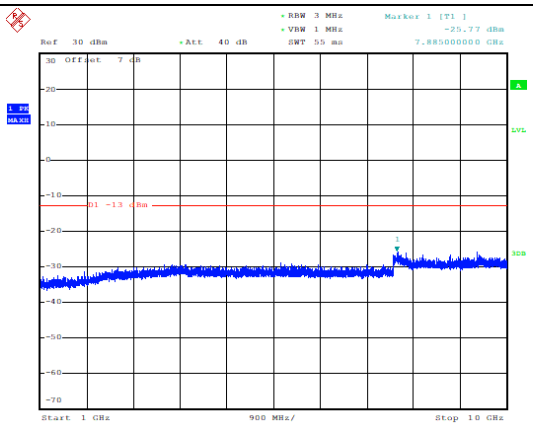
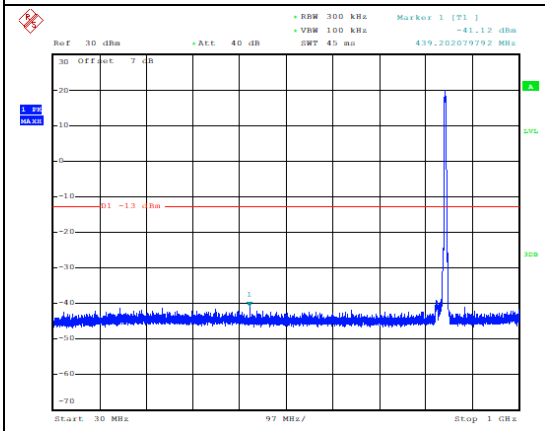
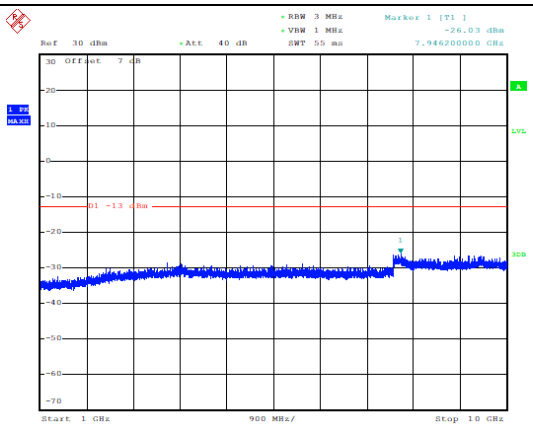
Spurious emission limit -13dBm.

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

WCDMA Band II	
Channel 9262: 30MHz~1GHz	Channel 9262: 1GHz~10GHz
	
Channel 9400: 30MHz~1GHz	Channel 9400: 1GHz~10GHz
	
Channel 9537: 30MHz~1GHz	Channel 9537: 1GHz~10GHz
	

WCDMA Band IV	
Channel 1313: 30MHz~1GHz	Channel 1313: 1GHz~10GHz
	
Channel 1450: 30MHz~1GHz	Channel 1450: 1GHz~10GHz
	
Channel 1512: 30MHz~1GHz	Channel 1512: 1GHz~10GHz
	

WCDMA Band V

Channel 4133: 30MHz~1GHz	Channel 4133: 1GHz~10GHz
	
Date: 21.JAN.2003 09:18:40	Date: 21.JAN.2003 09:19:19
Channel 4175: 30MHz~1GHz	**Channel 4175: 1GHz~10GHz**
	
Date: 21.JAN.2003 09:20:08	Date: 21.JAN.2003 09:20:46
Channel 4232: 30MHz~1GHz	**Channel 4232: 1GHz~10GHz**
	
Date: 21.JAN.2003 09:21:35	Date: 21.JAN.2003 09:22:14

6.8. Radiated

6.8.1. EIRP

6.8.1.1. GSM EIRP

6.8.1.1.1. Description

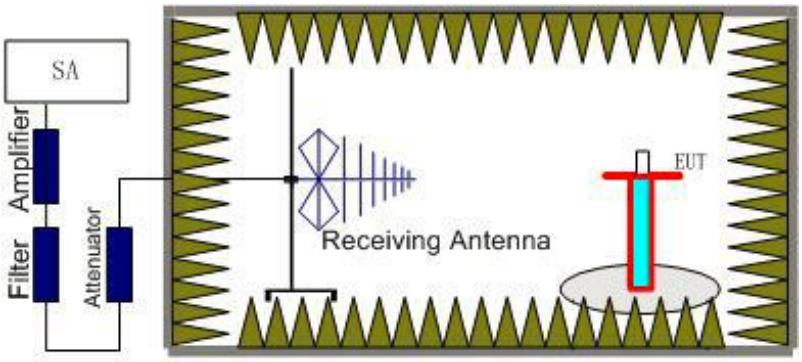
This is the test for the maximum radiated power from the EUT.

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

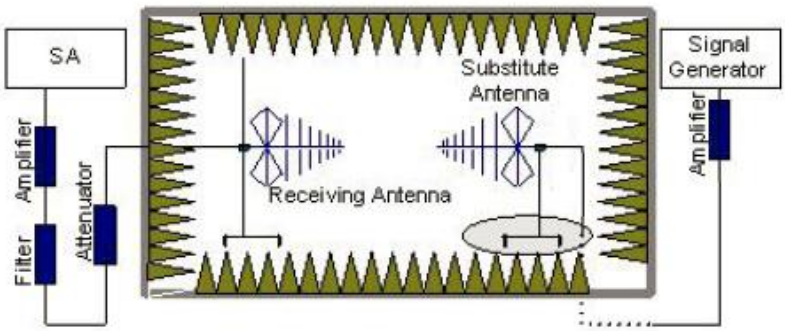
The measurements procedures in TIA-603E-2016 are used.

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. Measurement Limits

Rule RSS-132 6.6 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

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

6.8.1.1.4 GSM 850-ERP 22.913(a)

6.8.1.1.4.1 Measurement result

GSM(GMSK)

Frequency(MHz)	Peak EIRP (dBm)	Peak ERP (dBm)	Polarization
824.2	30.36	28.21	H
836.6	30.52	28.37	H
848.8	30.64	28.49	H

GPRS(GMSK)

Frequency(MHz)	Peak EIRP (dBm)	Peak ERP (dBm)	Polarization
824.2	30.00	27.85	H
836.6	30.11	27.96	H
848.8	30.21	28.06	H

EDGE(8PSK)

Frequency(MHz)	Peak EIRP (dBm)	Peak ERP (dBm)	Polarization
824.2	21.80	19.65	H
836.6	22.12	19.97	H
848.8	21.88	19.73	H

6.8.1.1.5 PCS 1900-EIRP 24.232(c)

6.8.1.1.5.1 Measurement result

GSM (GMSK)

Frequency(MHz)	Peak EIRP (dBm)	Polarization
1850.2	29.39	V
1880.0	29.64	H
1909.8	29.76	V

GPRS (GMSK)

Frequency(MHz)	Peak EIRP (dBm)	Polarization
1850.2	29.26	V
1880.0	29.64	H
1909.8	29.76	V

Frequency(MHz)	Peak EIRP (dBm)	Polarization
1850.2	22.30	V
1880.0	22.43	H
1909.8	22.68	V

6.8.1.2. WCDMA EIRP

6.8.1.2.1. Description

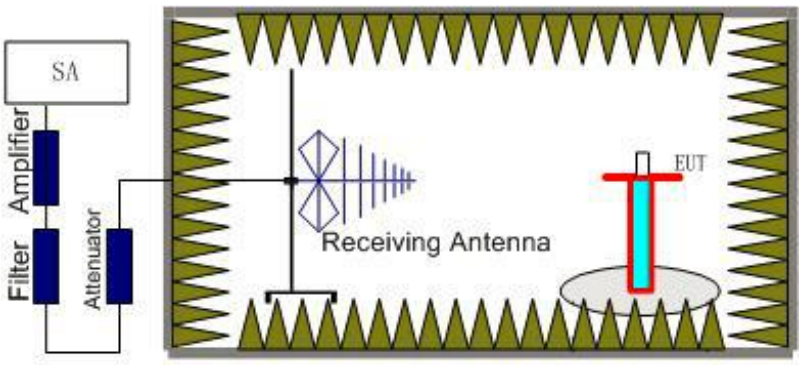
This is the test for the maximum radiated power from the EUT.

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."

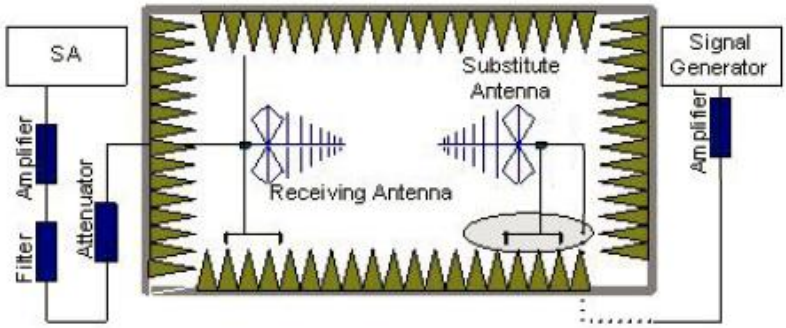
6.8.1.2.2. Method of Measurement

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 connect 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 (2.15 dBi) and known input power.

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

6.8.1.2.3. Method of Measurement

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

6.8.1.2.4.Measurement result

WCDMA Band II

Frequency (MHz)	Peak EIRP (dBm)	Polarization
1852.6	22.84	V
1880.0	22.95	H
1907.4	23.07	V

WCDMA Band IV

Frequency(MHz)	Peak EIRP(dBm)	Polarization
1712.4	22.79	H
1732.6	22.82	H
1752.6	22.57	H

WCDMA Band V

Frequency(MHz)	Peak ERP (dBm)	Polarization
826.4	19.63	H
836.6	20.16	H
846.6	19.72	H

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

6.8.2 EMISSION LIMIT

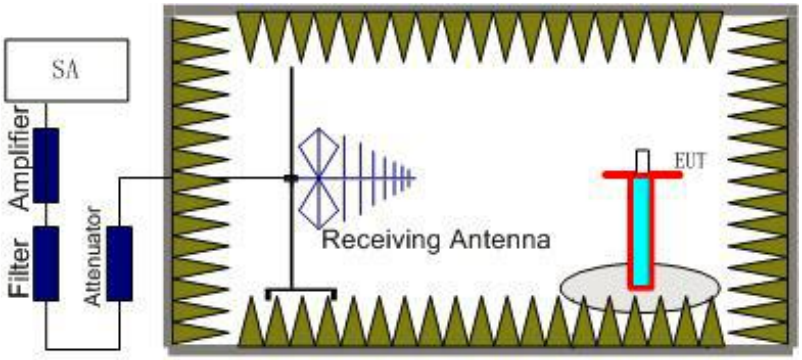
6.8.2.1 GSM Measurement Method

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

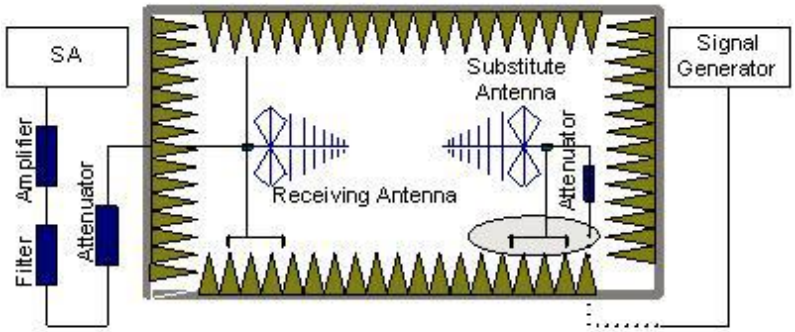
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

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 (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. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss .

The measurement results are obtained as described below:

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

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

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

6.8.2.4 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . 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 of the PCS1900 ,GSM850 into any of the other blocks. 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
GSM850	Low	30MHz~10GHz	Pass
	Middle	30MHz~10GHz	Pass
	High	30MHz~10GHz	Pass
GSM1900	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass

Note:

Power(ERP)= Pmea-Pcl+Ga

This method Applicable to the following table.

RSE-G850-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1647.9	-47.07	4.2	4.7	-46.57	-13	H
2464.3	-42.38	5.4	5.6	-42.18	-13	H
3296.5	-50.07	6.2	6.9	-49.37	-13	V
4120.4	-46.92	7.0	8.6	-45.32	-13	H
4787.3	-49.19	7.6	9.0	-47.79	-13	H
5880.0	-49.81	8.5	10.2	-48.11	-13	H

RSE-G850-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1711.1	-46.23	4.5	4.7	-46.03	-13	V
2520.0	-42.61	5.4	5.6	-42.41	-13	H
3316.2	-49.77	6.2	6.9	-49.07	-13	V
4116.9	-51.22	7.0	8.6	-49.62	-13	H
5025.0	-51.88	7.8	9.6	-50.08	-13	H
5793.5	-51.05	8.4	10.2	-49.25	-13	V

RSE-G850-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1774.3	-46.92	4.5	4.7	-46.72	-13	H
2547.9	-40.98	5.4	5.6	-40.78	-13	V
3283.8	-49.07	6.2	6.9	-48.37	-13	H
4258.8	-50.81	7.1	8.9	-49.01	-13	V
5109.2	-49.37	7.9	9.6	-47.67	-13	V
5955.0	-49.52	8.5	10.2	-47.82	-13	V

RSE-GPRS850-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1728.2	-48.31	4.5	4.7	-48.11	-13	V
2507.1	-43.23	5.4	5.6	-43.03	-13	V
3298.8	-50.31	6.2	6.9	-49.61	-13	H
4208.1	-50.94	7.0	8.9	-49.04	-13	V
5146.2	-49.19	7.9	9.4	-47.69	-13	H
5985.0	-49.03	8.6	10.2	-47.43	-13	H

RSE-GPRS850-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1712.1	-47.05	4.5	4.7	-46.85	-13	V
2482.5	-42.11	5.4	5.6	-41.91	-13	H
3273.5	-49.69	6.1	6.9	-48.89	-13	V
4126.2	-50.6	7.0	8.9	-48.7	-13	V
5064.2	-50.53	7.8	9.6	-48.73	-13	H
6000.0	-49.7	8.6	10.2	-48.1	-13	H

RSE-GPRS850-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1727.1	-47.81	4.5	4.7	-47.61	-13	H

2503.9	-42.44	5.4	5.6	-42.24	-13	H
3110.8	-49.39	6.0	6.7	-48.69	-13	H
4272.7	-50.14	7.1	8.9	-48.34	-13	H
5038.8	-51.24	7.8	9.6	-49.44	-13	H
6098.5	-48.94	8.7	10.2	-47.44	-13	V

RSE-EGPRS850-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1596.4	-49.7	4.2	5.3	-48.6	-13	V
2500.7	-43.34	5.4	5.6	-43.14	-13	H
3145.4	-49.15	6.0	6.9	-48.25	-13	H
4298.1	-50.56	7.1	8.9	-48.76	-13	H
5128.8	-49.6	7.9	9.4	-48.1	-13	H
5991.9	-48.92	8.6	10.2	-47.32	-13	H

RSE-EGPRS850-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1608.2	-50.01	4.2	5.3	-48.91	-13	H
2622.9	-39.45	5.5	5.6	-39.35	-13	H
3072.7	-49.13	6.0	6.7	-48.43	-13	V
4195.4	-50.99	7.0	8.9	-49.09	-13	H
5184.2	-48.56	8.0	9.4	-47.16	-13	V
6029.2	-49.21	8.6	10.2	-47.61	-13	V

RSE-EGPRS850-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1580.4	-49.63	4.2	5.3	-48.53	-13	H
2508.2	-42.1	5.4	5.6	-41.9	-13	H
3358.8	-49.5	6.2	6.9	-48.8	-13	H
4187.3	-51.7	7.0	8.9	-49.8	-13	H

4997.3	-51.18	7.8	9.6	-49.38	-13	H
5907.7	-50.42	8.5	10.2	-48.72	-13	H

RSE-G1900-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3700.2	-42.85	6.6	7.9	-41.55	-13	V
5550.6	-50.43	8.2	9.8	-48.83	-13	H
7399.2	-46.15	9.7	11.6	-44.25	-13	H
9200.4	-51.1	10.5	12.6	-49	-13	V
11092.8	-46.8	12.1	12.3	-46.6	-13	V
13022.4	-44.84	13.2	12.3	-45.74	-13	V

RSE-G1900-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3760.2	-49.33	6.6	7.9	-48.03	-13	V
5640.6	-49.45	8.3	10.2	-47.55	-13	H
7520.4	-46.2	9.7	11.6	-44.3	-13	H
9290.4	-49.48	10.7	12.7	-47.48	-13	V
11290.8	-47.18	12.1	12.3	-46.98	-13	V
13347.6	-43.99	13.6	12.3	-45.29	-13	V

RSE-G1900-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3819.6	-48.64	6.7	7.9	-47.44	-13	V
5730.0	-51.06	8.5	10.2	-49.36	-13	H
7638.0	-51.89	9.7	11.8	-49.79	-13	H
9548.4	-50.04	10.7	12.7	-48.04	-13	V
11288.4	-46.69	12.1	12.3	-46.49	-13	V
13354.8	-43.85	13.7	12.3	-45.25	-13	V

RSE-GPRS1900-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3819.0	-50.22	6.7	7.9	-49.02	-13	H
4305.0	-52.76	7.1	8.9	-50.96	-13	H
5730.0	-51.81	8.5	10.2	-50.11	-13	H
7639.2	-52.22	9.7	11.8	-50.12	-13	H
9548.4	-49.29	10.7	12.7	-47.29	-13	H
12848.4	-43.57	12.5	12.3	-43.77	-13	H

RSE-GPRS1900-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3948.6	-52.7	6.8	8.6	-50.9	-13	H
5038.8	-52.4	7.8	9.6	-50.6	-13	H
7488.0	-51.37	9.7	11.6	-49.47	-13	V
9763.2	-49.06	11.0	12.5	-47.56	-13	H
12234.0	-44.98	12.6	12.3	-45.28	-13	V
15722.4	-37.97	14.5	12.3	-40.17	-13	H

RSE-GPRS1900-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3819.6	-46.91	6.7	7.9	-45.71	-13	V
5730.0	-50.97	8.5	10.2	-49.27	-13	H
7346.4	-51.08	9.6	11.4	-49.28	-13	H
7638.0	-50.12	9.7	11.8	-48.02	-13	H
9548.4	-48.21	10.7	12.7	-46.21	-13	H
12808.8	-45.08	12.5	12.3	-45.28	-13	H

RSE-EGPRS1900-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3700.2	-40.63	6.6	7.9	-39.33	-13	V

5550.6	-49.09	8.2	9.8	-47.49	-13	H
7400.4	-46.8	9.7	11.6	-44.9	-13	H
9690.0	-49.63	10.9	12.7	-47.83	-13	V
12225.6	-44.9	12.6	12.3	-45.2	-13	V
15900.0	-38.55	15.0	12.3	-41.25	-13	H

RSE-EGPRS1900-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3760.2	-46.18	6.6	7.9	-44.88	-13	V
4655.4	-53.09	7.5	9.0	-51.59	-13	H
5640.6	-50.65	8.3	10.2	-48.75	-13	H
7520.4	-42	9.7	11.6	-40.1	-13	H
10518.0	-47.67	11.6	12.3	-46.97	-13	V
12876.0	-43.51	13.0	12.3	-44.21	-13	H

RSE-EGPRS1900-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3818.4	-51.63	6.7	7.9	-50.43	-13	V
4765.8	-51.81	7.5	9.0	-50.31	-13	H
5729.4	-50.19	8.5	10.2	-48.49	-13	H
8674.8	-51.4	10.3	12.7	-49	-13	V
12883.2	-44.9	13.0	12.3	-45.6	-13	V
15732.0	-38.47	14.5	12.3	-40.67	-13	H

Conclusion: PASS

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

6.8.3 WCDMA Measurement Method

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

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917.

The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band V.

The procedure of radiated spurious emissions is the same like GSM.

6.8.3.1 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

6.8.3.2 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA Band V (826.4MHz, 836.6MHz and 846.6MHz) . 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 of the WCDMA Band V into any of the other blocks. 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.

6.8.3.3 Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band II	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
WCDMA Band IV	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
WCDMA Band V	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass

RSE-WCDMA BAND II-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3701.6	-61.47	6.6	7.9	-60.17	-13	H
5609.6	-61.84	8.3	9.8	-60.34	-13	H
7188.4	-61.18	9.5	11.4	-59.28	-13	H
8678.8	-59.68	10.4	12.7	-57.38	-13	H
10666.0	-55.77	11.7	12.3	-55.17	-13	H
12281.7	-52.52	12.7	12.3	-52.92	-13	V

RSE-WCDMA BAND II-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3673.2	-60.71	6.6	7.9	-59.41	-13	H
5613.6	-57.17	8.3	9.8	-55.67	-13	H
7476.8	-52.55	9.7	11.6	-50.65	-13	H
9345.6	-53.25	10.7	12.7	-51.25	-13	H
11177.1	-54.43	12.1	12.3	-54.23	-13	V
13117.5	-54.29	13.0	12.3	-54.99	-13	H

RSE-WCDMA BAND II-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3824.8	-60.81	6.7	7.9	-59.61	-13	H
5698.8	-61.48	8.5	10.2	-59.78	-13	V
7628.4	-60.95	9.7	11.8	-58.85	-13	H
9489.2	-58	10.7	12.7	-56	-13	H
11513.8	-53.84	12.3	12.3	-53.84	-13	V
13342.2	-53.05	13.6	12.3	-54.35	-13	V

RSE-WCDMA BAND IV-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
4534.4	-59.1	7.4	8.7	-57.8	-13	H

5198.8	-59.02	8.0	9.4	-57.62	-13	H
6827.6	-61	9.2	10.9	-59.3	-13	H
8500.0	-59.25	10.3	12.6	-56.95	-13	V
10120.0	-57.08	11.3	12.5	-55.88	-13	V
11610.4	-54.21	12.2	12.3	-54.11	-13	V

RSE-WCDMA BAND IV-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3393.2	-64.74	6.3	7.8	-63.24	-13	H
5190.0	-58.67	8.0	9.4	-57.27	-13	H
6840.8	-59.49	9.2	10.9	-57.79	-13	H
8658.8	-60.44	10.3	12.7	-58.04	-13	V
10360.4	-56.69	11.6	12.3	-55.99	-13	V
12100.8	-54.66	12.6	12.3	-54.96	-13	V

RSE-WCDMA BAND IV-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3499.6	-65.15	6.4	7.8	-63.75	-13	H
5246.4	-58.88	8.0	9.4	-57.48	-13	H
7052.8	-59.92	9.4	11.1	-58.22	-13	H
8759.6	-60.29	10.4	12.7	-57.99	-13	H
10108.4	-56.43	11.3	12.5	-55.23	-13	H
12192.4	-54.24	12.6	12.3	-54.54	-13	H

RSE-WCDMA BAND V-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1716.1	-59.87	4.5	4.7	-59.67	-13	H
2419.6	-50.26	5.3	5.6	-49.96	-13	V
3477.2	-64.93	6.4	7.8	-63.53	-13	V
4145.6	-62.02	7.0	8.9	-60.12	-13	H

4893.6	-61.93	7.7	9.6	-60.03	-13	H
5732.8	-61.34	8.5	10.2	-59.64	-13	H

RSE-WCDMA BAND V-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1711.1	-59.61	4.5	4.7	-59.41	-13	V
2503.1	-56.73	5.4	5.6	-56.53	-13	H
3301.2	-64.53	6.2	6.9	-63.83	-13	V
4231.6	-61.83	7.1	8.9	-60.03	-13	V
5024.8	-62.14	7.8	9.6	-60.34	-13	H
5915.6	-60.75	8.5	10.2	-59.05	-13	V

RSE-WCDMA BAND V-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1718.2	-57.29	4.5	4.7	-57.09	-13	H
2460.8	-51.47	5.4	5.6	-51.27	-13	H
3369.2	-63.88	6.2	6.9	-63.18	-13	H
4243.6	-61.4	7.1	8.9	-59.6	-13	V
5003.6	-62.12	7.8	9.6	-60.32	-13	H
5910.4	-61.26	8.5	10.2	-59.56	-13	V

Conclusion: PASS

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

7. Test Equipment List

7.1. Conducted Test System

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Universal Radio Communication Tester	CMW500	148874	R&S	2021-05-10	1 year
2	Vector Signal Analyzer	FSQ26	101091	R&S	2021-05-10	1 year
3	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2021-05-09	1 year
4	Eagle Test Software	Eagle V3.1 FCC BT/WIFI	N/A	ECIT	N/A	N/A

7.2. Radiated Emission Test System

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-10	1 year
2	Test Receiver	ESU40	100307	R&S	2021-05-10	1 year
3	TRILOG Antenna	VULB9163	VULB9163-515	Schwarzbeck	2020-02-28	2 years
4	Double Ridged Guide Antenna	ETS-3117	135890	ETS	2020-02-28	2 years
5	2-Line V-Network	ENV216	101380	R&S	2021-05-10	1 year
6	RF Signal Generator	SMF100A	102314	R&S	2021-05-10	1 year
7	Amplifier	SCU08	10146	R&S	2021-05-10	1 year
8	EMI Test Software	EMC32 V9.15.00	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**********