FCC PART 22H /24E TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in FCC CFR47 Rules.

Applicant / Manufacturer	:	Shanghai MobileTek Communication Ltd.
Address	:	Free Trade Zone No. 33, No. 17 building 6H Xiya Road, China (Shanghai)
Factory	:	Shanghai MobileTek Communication Ltd.
Address	:	Free Trade Zone No. 33, No. 17 building 6H Xiya Road, China (Shanghai)
E.U.T.	:	GSM/GPRS+GNSS Module
Brand Name	:	LYNQ
Model No.	:	L218
FCC ID	:	2AK9DL218
Measurement Standard	:	FCC PART 22H, FCC PART 24E
Date of Receiver	:	January 10, 2017
Date of Test	:	January 10, 2017 to February 20, 2017
Date of Report	:	February 20, 2017

This Test Report is Issued Under the Authority of :

Prepared by	Approved & Authorized Signer
Rose Hu / Engineer	Iori Luo / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

Table of Contents

1. GENERAL INFORMATION 5

1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST 5
1.2 RELATED SUBMITTAL(S) / GRANT (S) 7
1.3 TEST METHODOLOGY 7
1.4 EQUIPMENT MODIFICATIONS 7
1.5 SUPPORT DEVICE 7
1.6 TEST FACILITY AND LOCATION 7
1.7 SUMMARY OF TEST RESULTS 8

2. RF OUTPUT POWER 9

2.1 APPLICABLE STANDARD 9
2.2 TEST PROCEDURE 9

3. TEST OCCUPIED BANDWIDTH 14

3.1 APPLICABLE STANDARD 14
3.2 TEST PROCEDURE 14

4. FREQUENCY STABILITY 28

4.1 APPLICABLE STANDARD 28
4.2 TEST PROCEDURE 28

5. BAND EDGES 33

5.1 APPLICABLE STANDARD 33
5.2 TEST PROCEDURE 33

6. MODULATION CHARACTERISTIC 38

7. SPURIOUS EMISSIONS AT ANTENNA TERMINALS 39

7.1 APPLICABLE STANDARDS 39
7.2 TEST PROCEDURE 39

8. FIELD STRENGTH OF SPURIOUS RADIATED EMISSIONS 44

8.1 APPLICABLE STANDARDS 44
8.2 TEST OF BLOCK DIAGRAM OF CONFIGURATION 44
8.3 TEST PROCEDURE 45

9. PEAK-AVERAGE RATIO 48

9.1 APPLICABLE STANDARDS 48
9.2 TEST PROCEDURE 48
9.3 TEST RESULT 48

10. RF EXPOSURE 52

10.1 APPLICABLE STANDARDS 52

10.2 TEST RESULT 52

11. TEST EQUIPMENT LIST 53

Revision History of This Test Report

Report Number	Description	Issued Date
NTC1701088FV00	Initial Issue	2017-02-20

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

This device is a GSM/GPRS+GNSS Module, it's powered by DC 3.8V come from external power source. For more details features, please refer to User's Manual.

Power Supply	:	DC 3.8V
Adapter	:	None
Test voltage	:	AC 120V 60Hz Adapter input
Model name	:	L218
Model difference	:	None
Hardware version	:	V1.0
Software version	:	V1.0
Serial number	:	N/A
Note	:	This report only applies to modulation technology PCE(GSM).

Technical parameters

Frequency Range	:	Cellular Band: 824.2-848.8MHz (TX) 869.2-893.8MHz(RX) PCS Band: 1850.2-1909.8MHz (TX) 1930.2-1989.8MHz(RX)
Modulation	:	GMSK for GSM/PCS
GPRS Multi-slot class	:	8/10/12
Antenna Type	:	External antenna
Antenna Gain	:	3.0dBi for GSM850 3.0dBi for PCS1900
Number of Channels	:	299 for GSM850 124 for PCS1900
Maximum Output Power to Antenna	:	GSM850: 32.80dBm PCS1900: 29.40dBm

Channel list

GSM850		PCS1900	
Channel	Frequency MHz	Channel	Frequency MHz
128	824.2	512	1850.2
189	836.4	661	1880.0
251	848.8	810	1909.8

1.2 Related Submittal(s) / Grant (s)

This submittal(s) test report is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR47 Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document to TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

Adapter: Model RCL050200
Input: AC100-240V 50/60Hz 0.5A
Output: DC 5.0V 2000mA

Test fixture: Evaluation V2 Card
provided by manufacturer.

1.6 Test Facility and Location

Listed by FCC, July 03, 2014
The Certificate Registration Number is 665078.
Listed by Industry Canada, June 18, 2014
The Certificate Registration Number is 9743A.

Dongguan NTC Co., Ltd.
(Full Name: Dongguan Nore Testing Center Co., Ltd.)

Building D, Gaosheng Science and Technology Park, Hongtu Road,
Nancheng District, Dongguan City, Guangdong, China
(Full Name: Building D, Gaosheng Science & Technology Park,
Zhouxi Longxi Road, Nancheng District, Dongguan, Guangdong, China.

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§2.1046 §22.913(a) §24.232(c)	RF Output Power	Compliant
§ 2.1049 § 22.905 § 22.917 § 24.238	Occupied Bandwidth	Compliant
§ 2.1055 § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917 (a) § 24.238 (a)	Out of band emission, Band Edge	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1051 § 22.917 (a) § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053 § 22.917 (a) § 24.238 (a)	Field Strength of Spurious Radiation	Compliant
§1.1307, §2.1093	RF Exposure (SAR)	Compliant(refer to SAR report please)
§24.232(d)	Peak-to-average ratio	Compliant

2. RF OUTPUT POWER

2.1 Applicable Standard

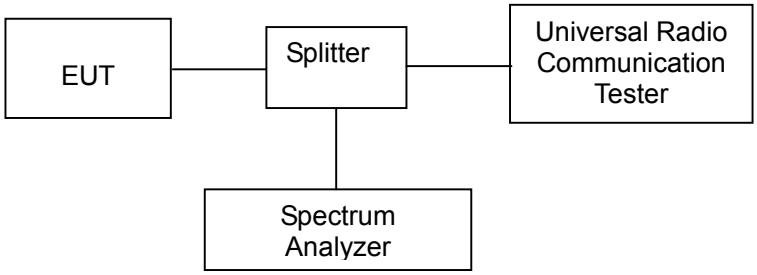
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), in no case may the peak output power of a base station transmitter exceed 2 watt EIRP.

2.2 Test Procedure

Conducted Method:

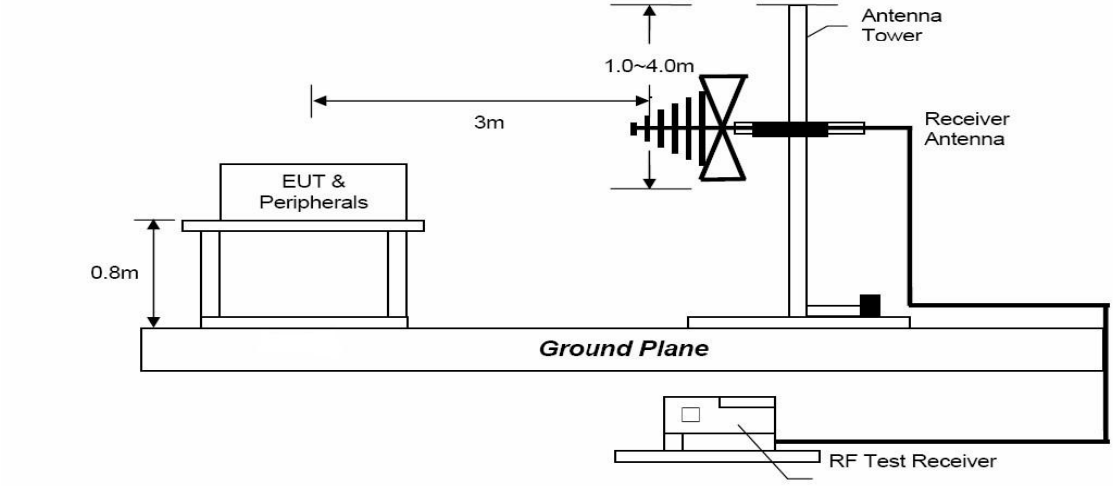
The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a spectrum analysis. Transmitter output was read off the spectrum analysis in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to spectrum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



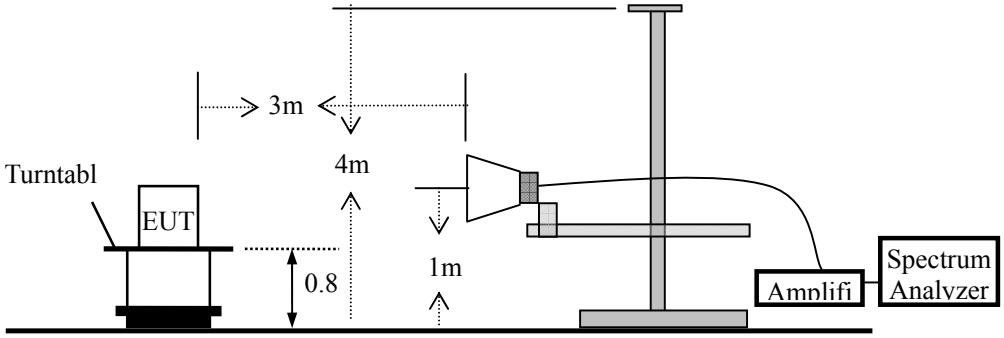
Radiated method:

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 1m to 4m. The reading was recorded and the field strength (E in dBuV/m) was calculated. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB) EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)

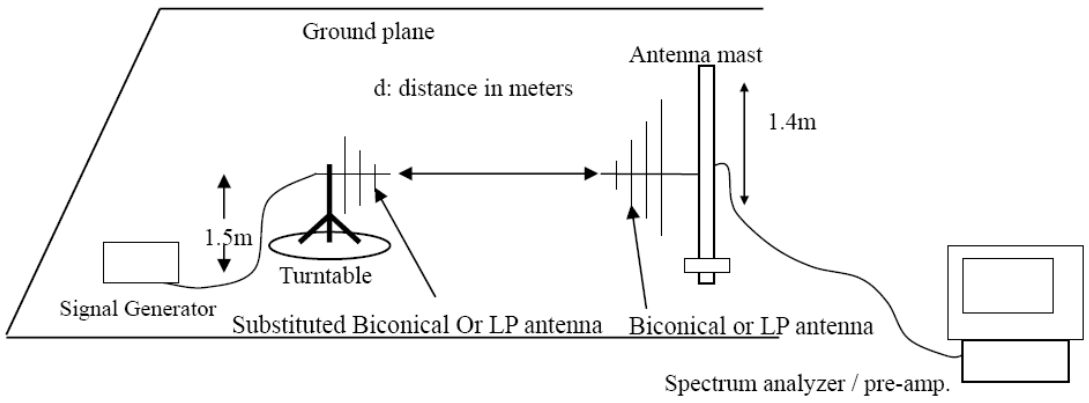
Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-Up, Frequency above 1GHz



Substituted Method Test Set-UP



Conducted Power:

Cellular Band (Part 22H) GSM 850				
Humidity :		50 %	Temperature :	22 ℃
Test Result:		PASS	Test By:	Sance
Mode	Channel	**Frequency (MHz)**	**Output Power (dBm)**	Tune up power tolerant
GSM (1 Uplink)	128	824.2	32.80	32.5±1
	189	836.4	32.60	32.5±1
	251	848.8	32.60	32.5±1
GPRS 8 (1 Uplink)	128	824.2	32.73	32.5±1
	189	836.4	32.55	32.5±1
	251	848.8	32.55	32.5±1
GPRS 10 (2 Uplink)	128	824.2	32.01	32.0±1
	189	836.4	31.78	32.0±1
	251	848.8	31.75	32.0±1
GPRS 12 (4 Uplink)	128	824.2	29.66	29.5±1
	189	836.4	29.37	29.5±1
	251	848.8	29.28	29.5±1

PCS Band (Part 24E) PCS 1900				
Humidity :		50 %	Temperature :	22 ℃
Test Result:		PASS	Test By:	Sance
Mode	Channel	**Frequency (MHz)**	**Output Power (dBm)**	Tune up power tolerant
GSM (1 Uplink)	512	1850.2	29.40	29.5±1
	661	1880.0	29.40	29.5±1
	810	1909.8	29.20	29.5±1
GPRS 8 (1 Uplink)	512	1850.2	29.39	29.0±1
	661	1880.0	29.38	29.0±1
	810	1909.8	29.16	29.0±1
GPRS 10 (2 Uplink)	512	1850.2	28.81	28.5±1
	661	1880.0	28.90	28.5±1
	810	1909.8	28.76	28.5±1
GPRS 12 (4 Uplink)	512	1850.2	25.78	26.0±1
	661	1880.0	26.00	26.0±1
	810	1909.8	26.09	26.0±1

Note: Measurement uncertainty ±0.56dB

Radiated Power (ERP and EIRP)

Cellular Band (Part 22H)/ ERP							
Humidity :		50 %	Temperature :			22 ℃	
Mode:		GSM850	Test By:			Sance	
Test Result:		PASS					
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
GSM 850							
128	824.2	23.37	H	7.86	0.9	30.33	38.45
		23.61	V	7.86	0.9	30.57	38.45
189	836.4	22.84	H	7.81	0.9	29.75	38.45
		21.49	V	7.81	0.9	28.40	38.45
251	848.8	21.47	H	7.81	0.9	28.38	38.45
		21.18	V	7.81	0.9	28.09	38.45
GPRS 850							
128	824.2	24.21	H	7.86	0.9	31.17	38.45
		23.05	V	7.86	0.9	30.01	38.45
189	836.4	22.51	H	7.81	0.9	29.42	38.45
		22.09	V	7.81	0.9	29.00	38.45
251	848.8	19.49	H	7.81	0.9	26.40	38.45
		19.54	V	7.81	0.9	26.45	38.45

PCS Band (Part 24E)/ EIRP							
Humidity :		50 %	Temperature :			22 ℃	
Mode:		PCS1900	Test By:			Sance	
Test Result:		PASS					
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
PCS 1900							
512	1850.2	19.40	H	8.04	2.3	25.14	33.0
		17.42	V	8.04	2.3	23.16	33.0
661	1880.0	18.79	H	8.06	2.3	24.55	33.0
		16.44	V	8.06	2.3	22.20	33.0
810	1909.8	14.62	H	8.09	2.3	20.41	33.0
		15.49	V	8.09	2.3	21.28	33.0
GPRS 1900							
512	1850.2	17.58	H	8.04	2.3	23.32	38.45
		18.62	V	8.04	2.3	24.36	38.45
661	1880.0	16.28	H	8.06	2.3	22.14	38.45
		18.96	V	8.06	2.3	24.72	38.45
810	1909.8	14.74	H	8.09	2.3	20.53	38.45
		16.89	V	8.09	2.3	22.68	38.45

Note: Measurement uncertainty ±3.7dB.

3. TEST OCCUPIED BANDWIDTH

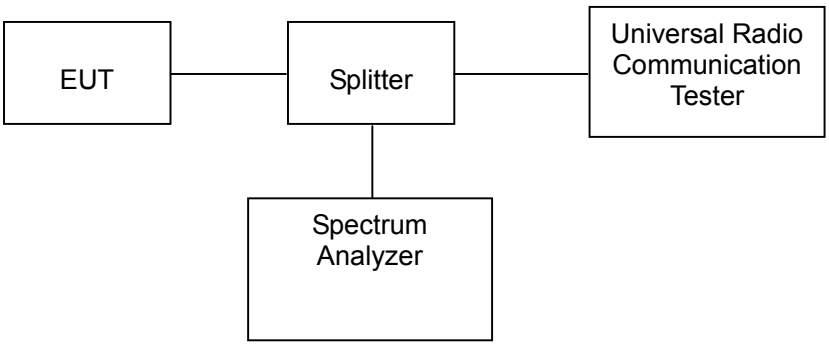
3.1 Applicable Standard

CFR 47 §2.1049, §22.917, §22.905 and §24.238.

3.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

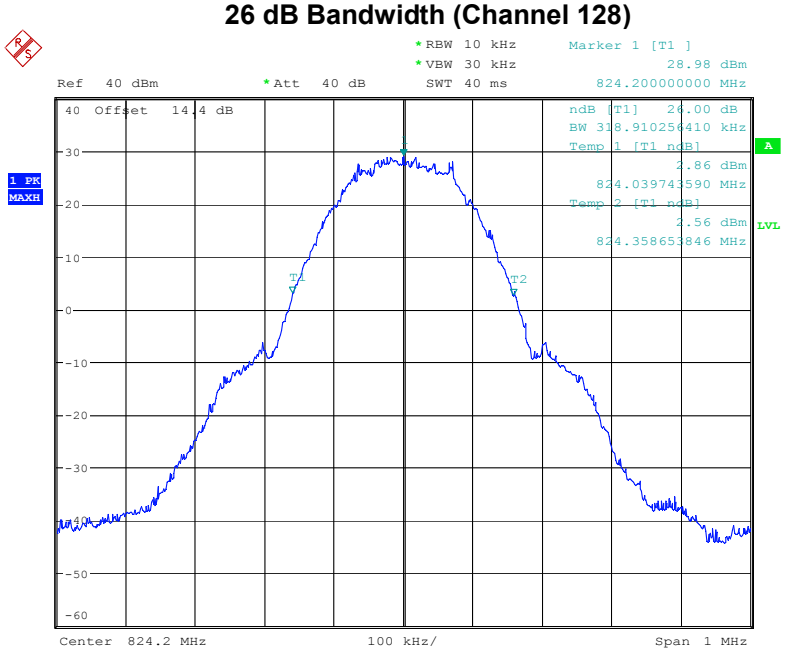
The resolution bandwidth of the spectrum analyzer was set at 30 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



Cellular Band (Part 22H)				
Humidity :		50 %	Temperature :	22 ℃
Test Result:		PASS	Test By:	Sance
Mode	Channel	**Frequency (MHz)**	**99% Power Bandwidth (kHz)**	**26 dB Bandwidth (kHz)**
Cellular Band Part 22H				
GSM850	128	824.2	244	319
	189	836.4	245	316
	251	848.8	245	321
GPRS 850	128	824.2	244	319
	189	836.4	242	316
	251	848.8	247	321
PCS Band Part 24E				
PCS1900	512	1850.2	247	314
	661	1880.0	244	317
	810	1909.8	247	314
GPRS 1900	512	1850.2	244	317
	661	1880.0	245	319
	810	1909.8	245	321

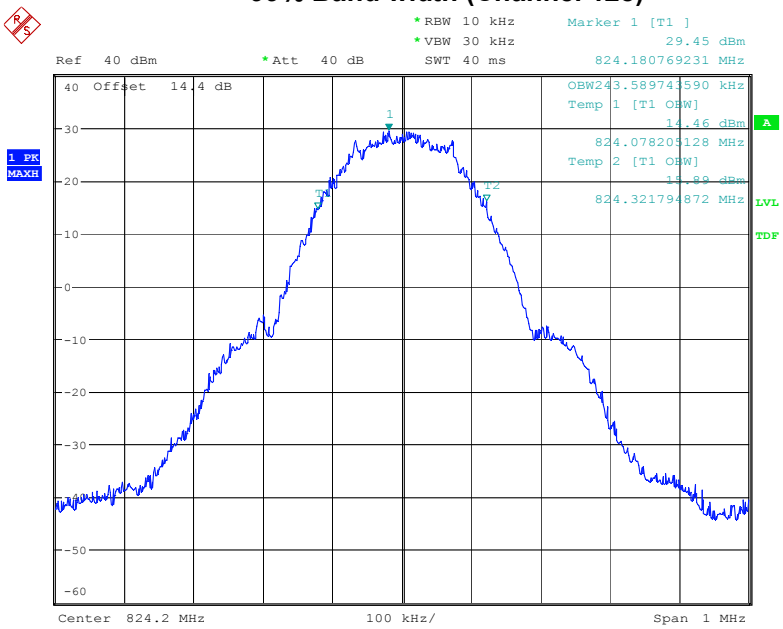
Cellular Band (Part 22H) GSM850

26 dB Bandwidth (Channel 128)



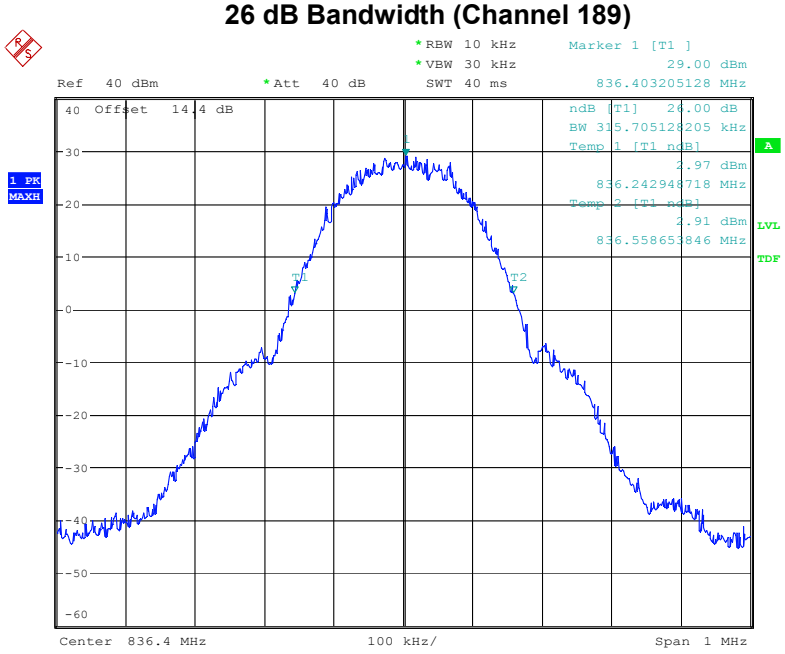
Date: 20.JAN.2017 14:12:21

99% Band width (Channel 128)



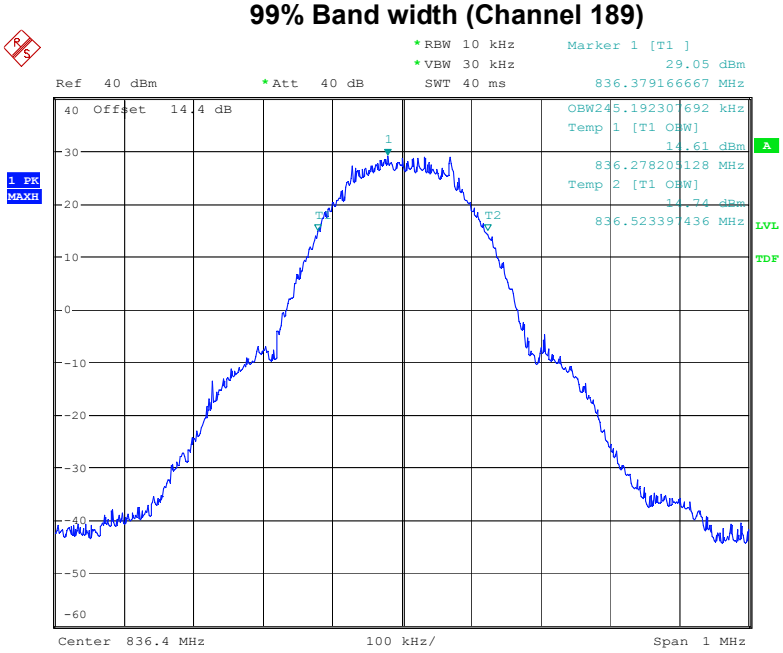
Date: 20.JAN.2017 14:21:49

26 dB Bandwidth (Channel 189)



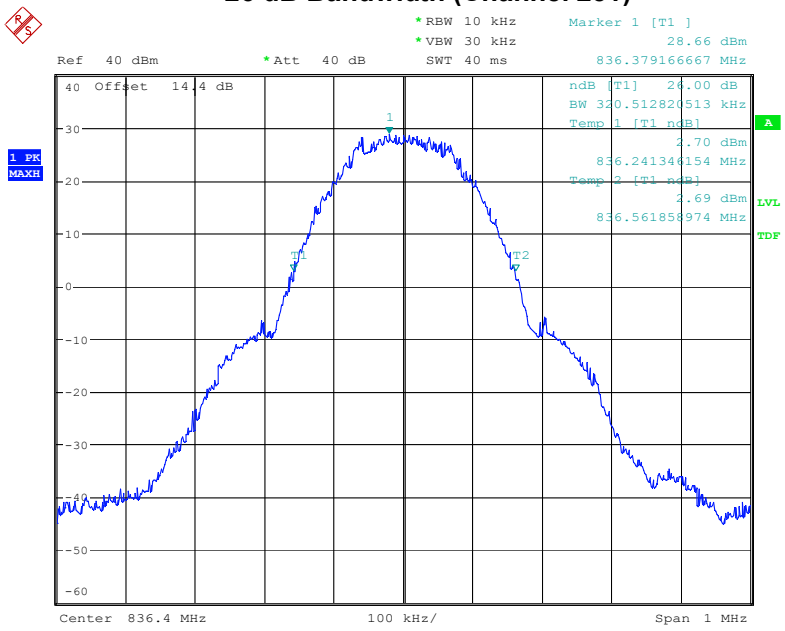
Date: 20.JAN.2017 14:14:35

99% Band width (Channel 189)



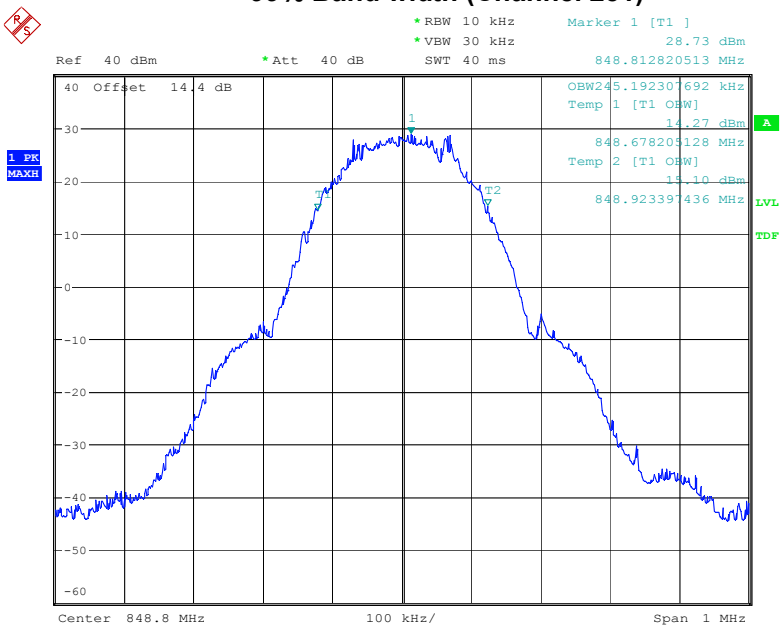
Date: 20.JAN.2017 14:22:50

26 dB Bandwidth (Channel 251)



Date: 20.JAN.2017 14:16:12

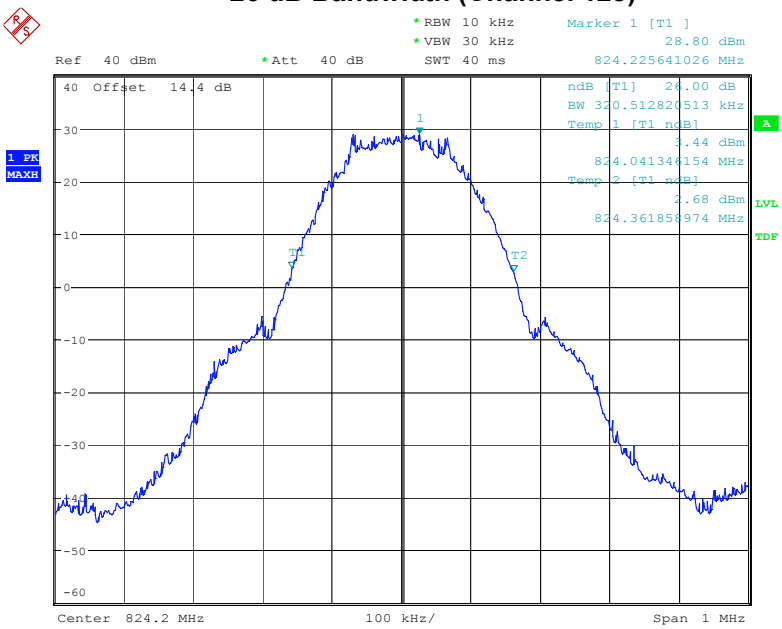
99% Band width (Channel 251)



Date: 20.JAN.2017 14:19:33

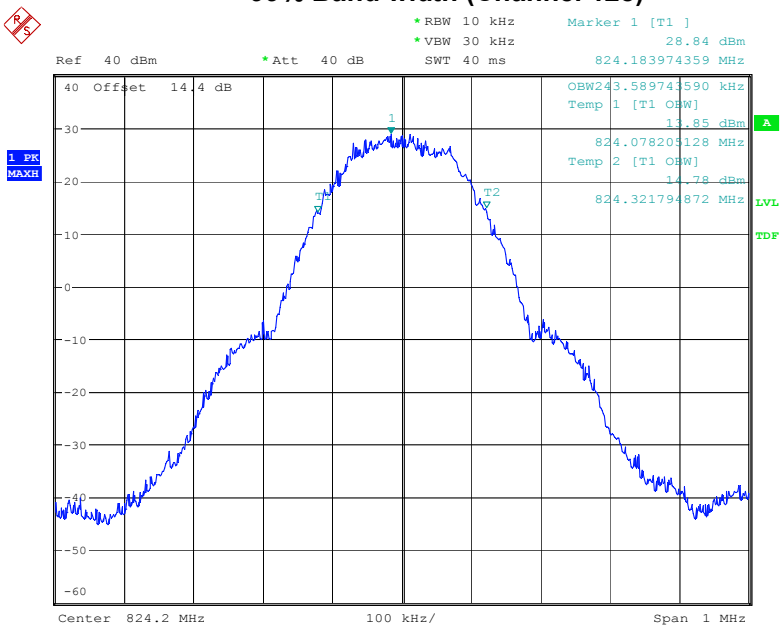
Cellular Band (Part 22H) GPRS 850

26 dB Bandwidth (Channel 128)



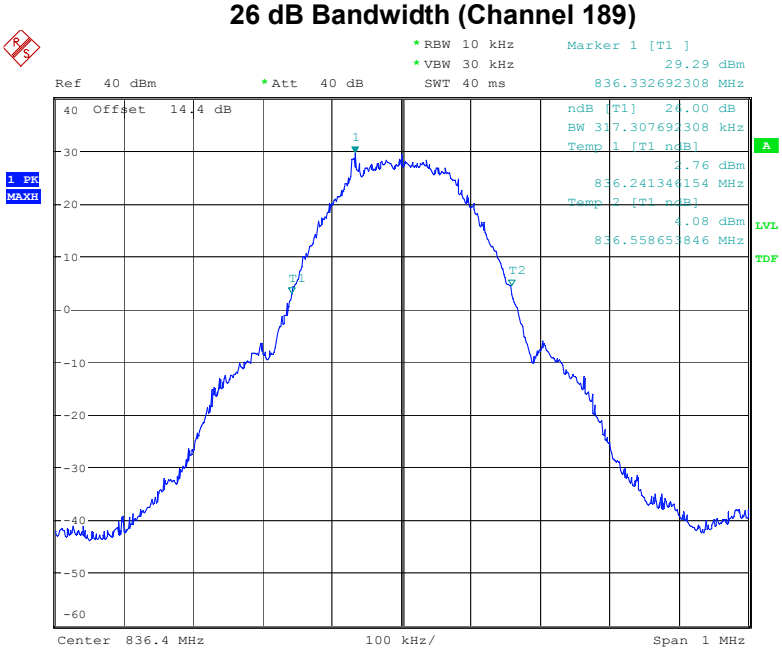
Date: 7.FEB.2017 13:28:30

99% Band width (Channel 128)



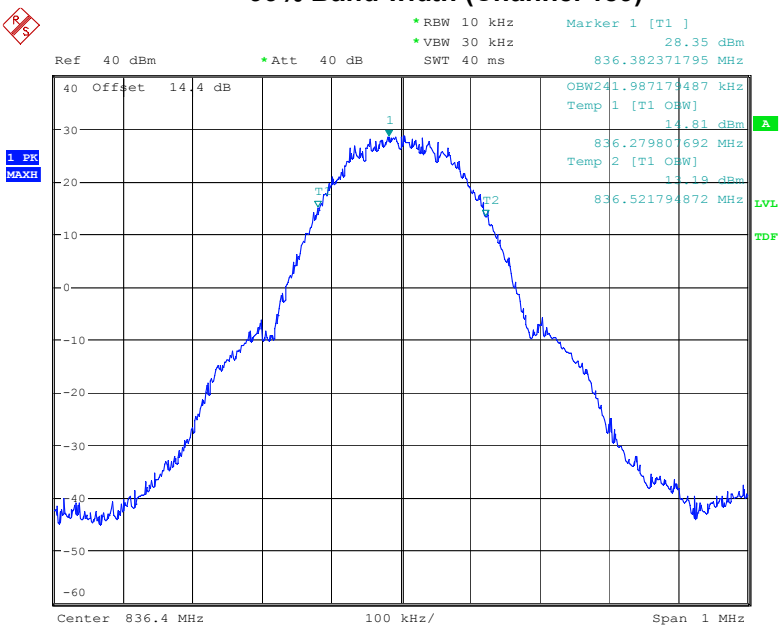
Date: 7.FEB.2017 13:34:48

26 dB Bandwidth (Channel 189)



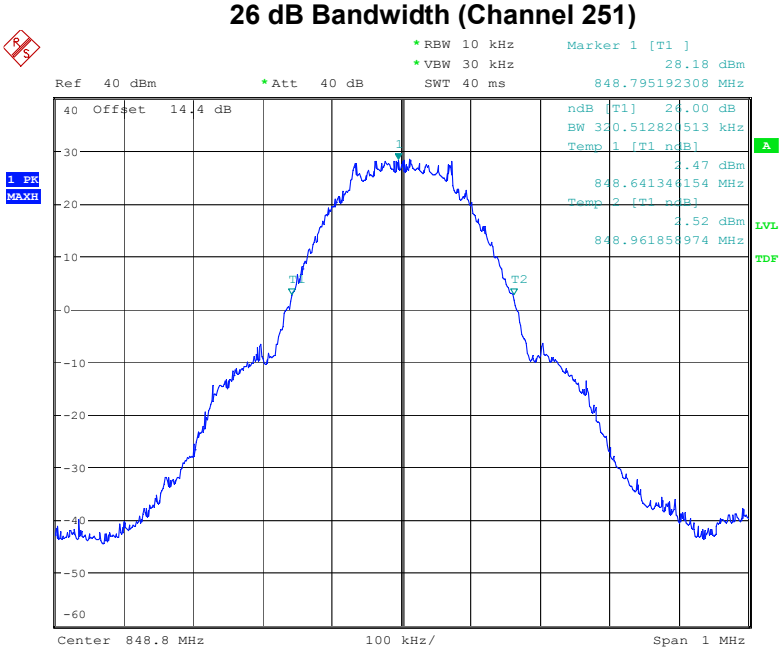
Date: 7.FEB.2017 13:30:45

99% Band width (Channel 189)



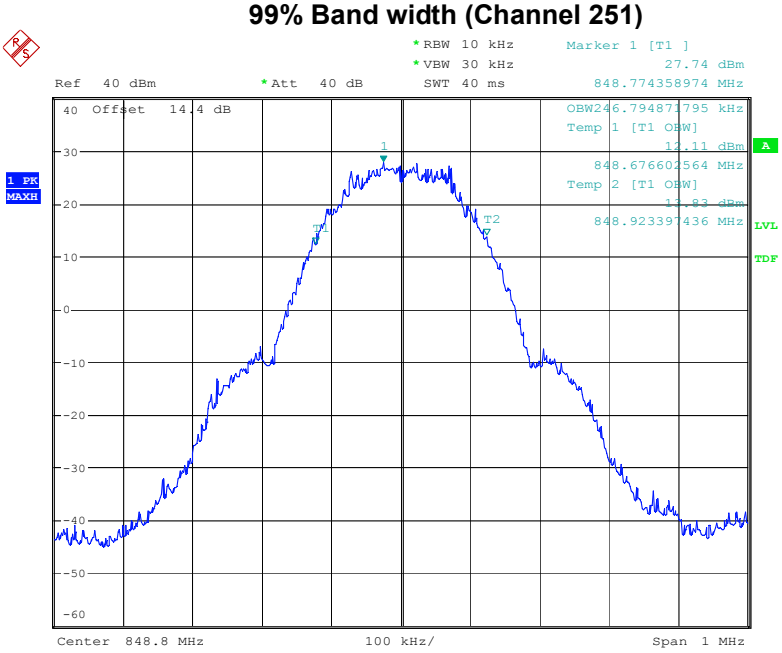
Date: 7.FEB.2017 13:33:52

26 dB Bandwidth (Channel 251)



Date: 7.FEB.2017 13:32:13

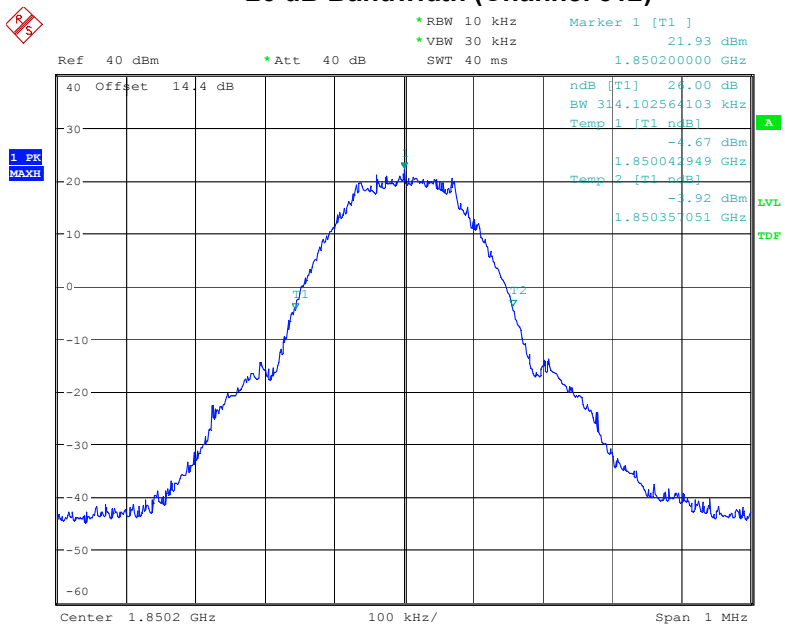
99% Band width (Channel 251)



Date: 7.FEB.2017 13:32:43

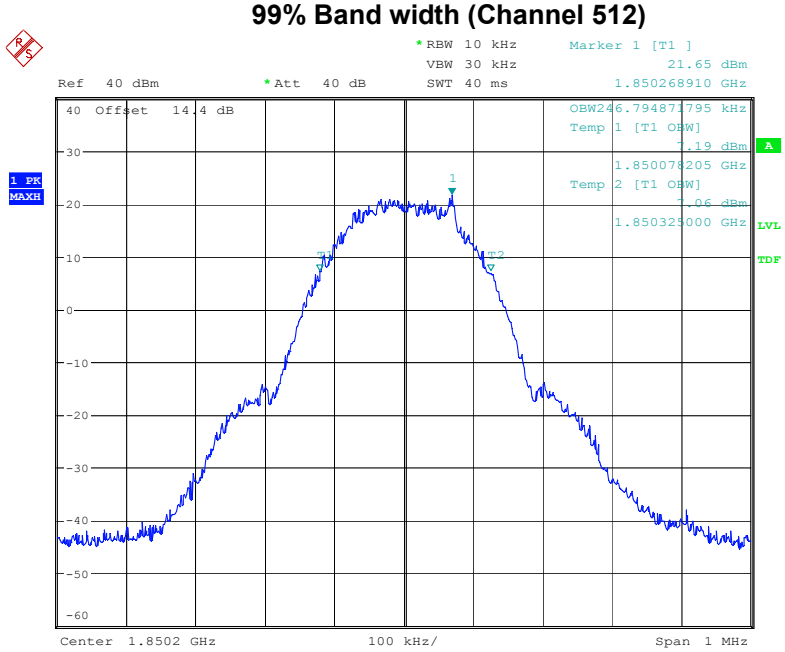
PCS Band (Part 24H) PCS 1900

26 dB Bandwidth (Channel 512)



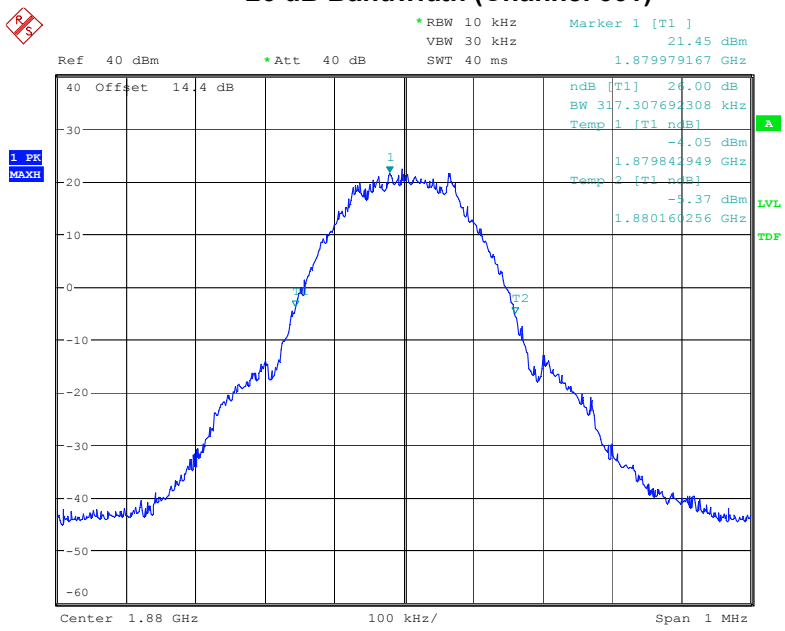
Date: 7.FEB.2017 10:05:21

99% Band width (Channel 512)



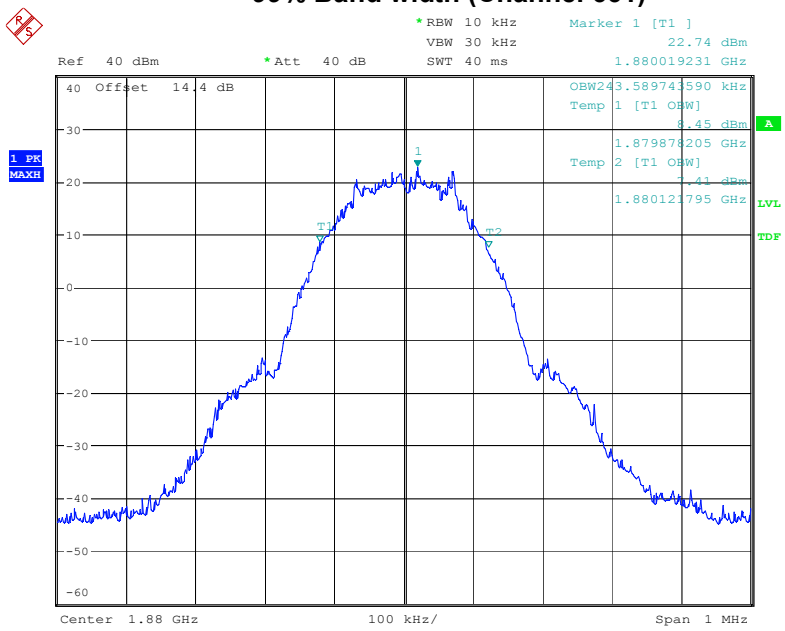
Date: 7.FEB.2017 10:33:47

26 dB Bandwidth (Channel 661)



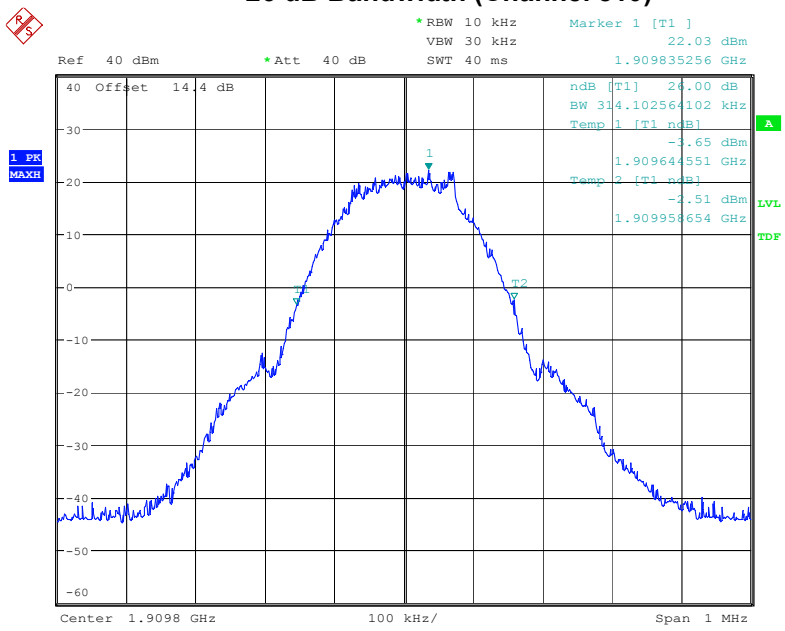
Date: 7.FEB.2017 10:29:31

99% Band width (Channel 661)



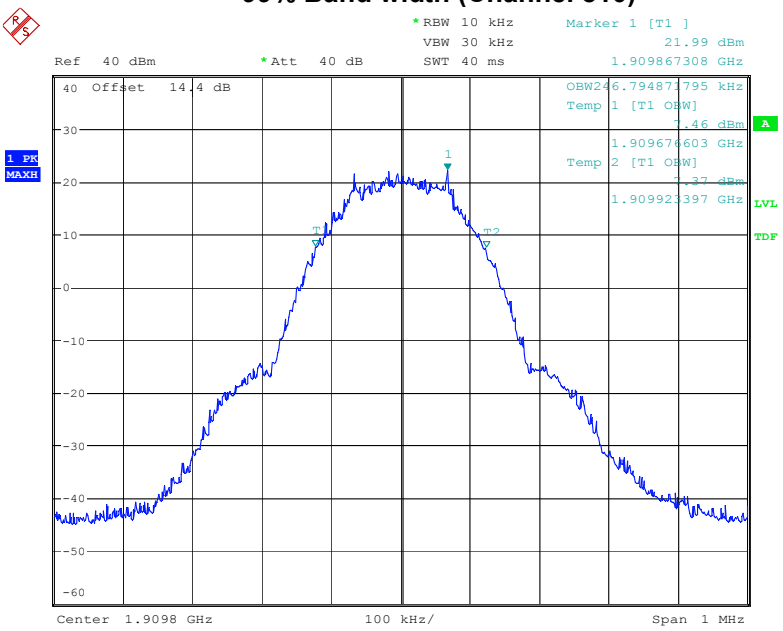
Date: 7.FEB.2017 10:32:53

26 dB Bandwidth (Channel 810)



Date: 7.FEB.2017 10:30:37

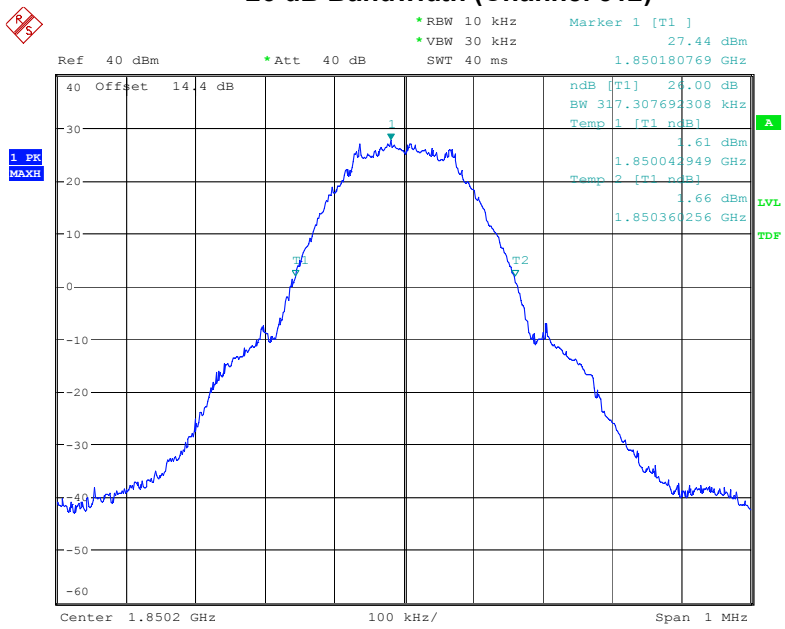
99% Band width (Channel 810)



Date: 7.FEB.2017 10:31:40

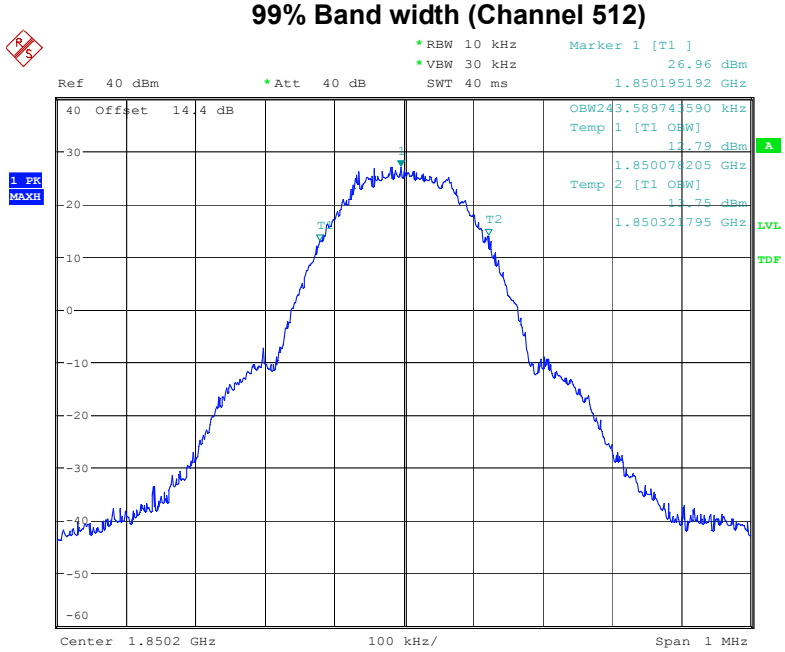
PCS Band (Part 24H) GPRS 1900

26 dB Bandwidth (Channel 512)



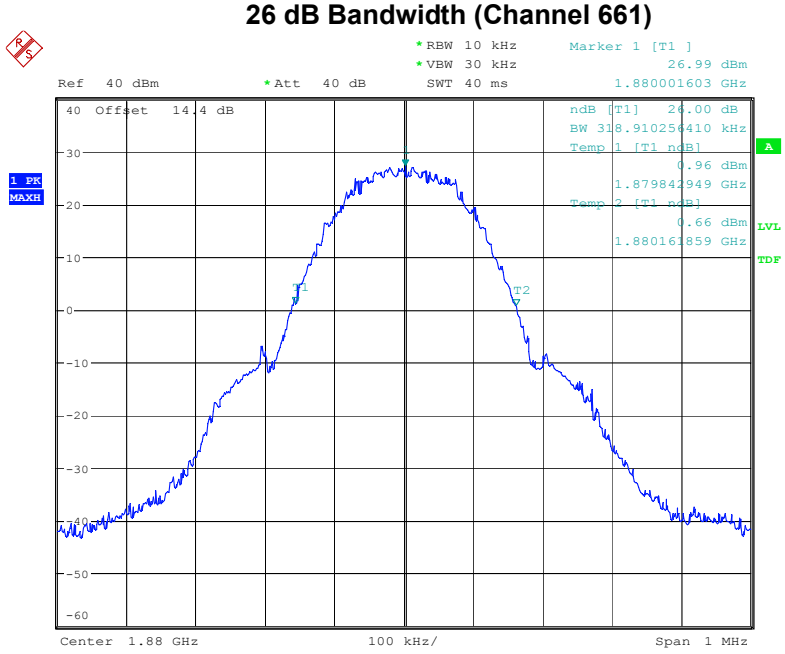
Date: 7.FEB.2017 13:06:23

99% Band width (Channel 512)



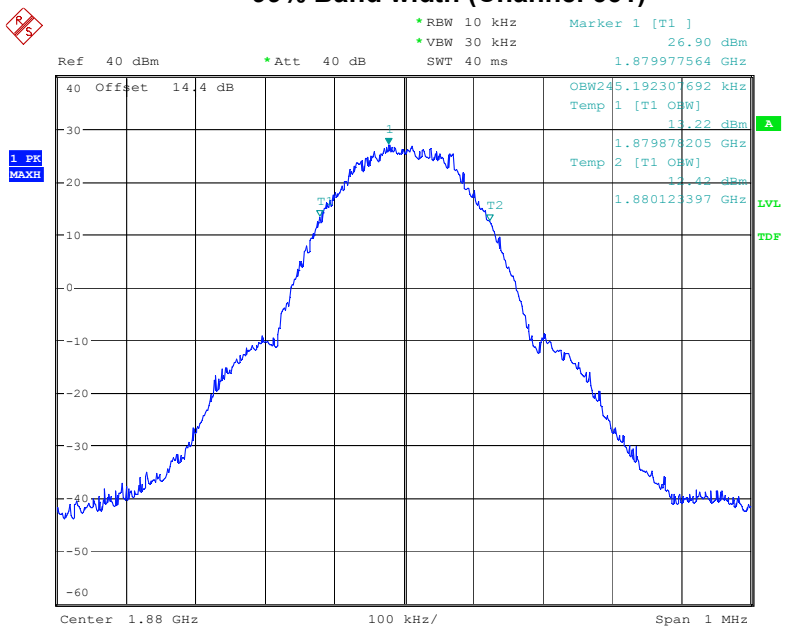
Date: 7.FEB.2017 13:13:02

26 dB Bandwidth (Channel 661)



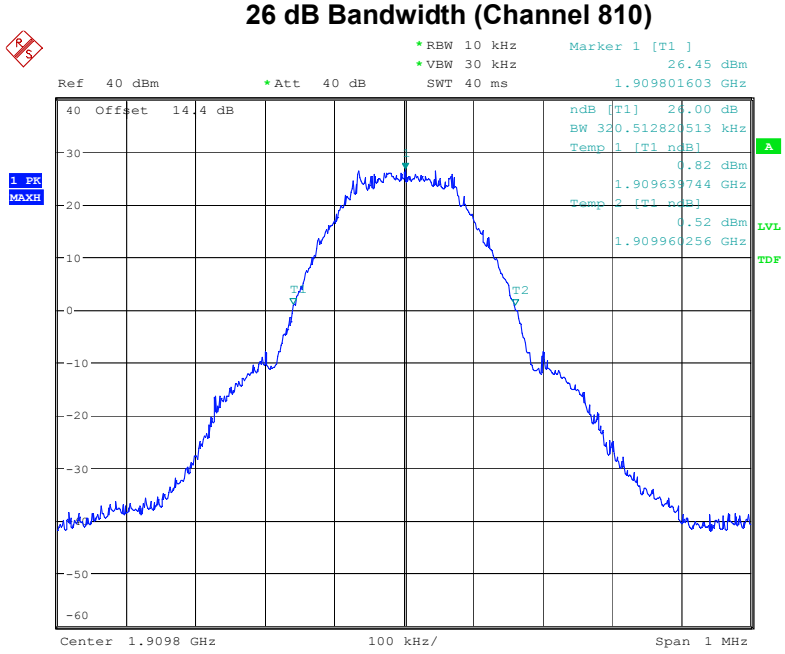
Date: 7.FEB.2017 13:08:07

99% Band width (Channel 661)



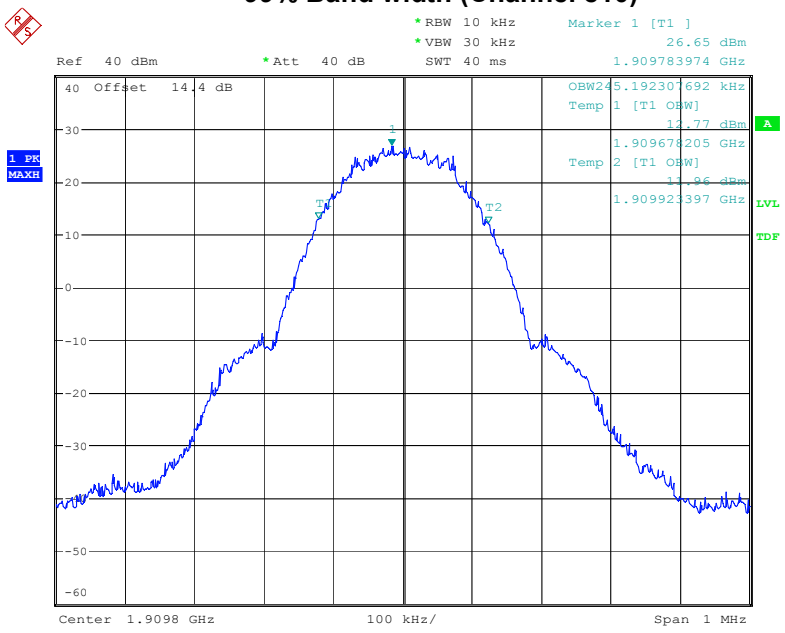
Date: 7.FEB.2017 13:11:39

26 dB Bandwidth (Channel 810)



Date: 7.FEB.2017 13:09:47

99% Band width (Channel 810)



Date: 7.FEB.2017 13:10:45

4. FREQUENCY STABILITY

4.1 Applicable Standard

CFR47 § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

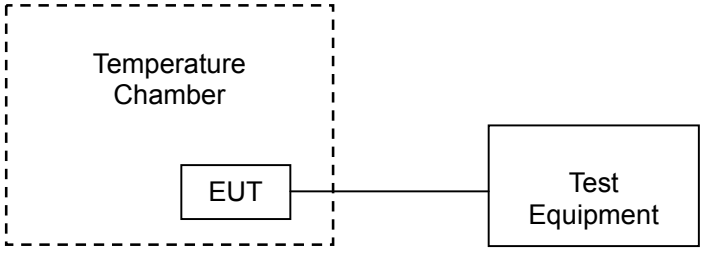
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

4.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 30 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Cellular Band Part 22H GSM 850			
Humidity :	50 %	Temperature :	22 ℃
Mode:	GSM850	Test By:	Sance
Test Result:	PASS		

Middle channel, f_o =836.4MHz;

Temperature (℃)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-40	3.8	-15	-0.0179	2.5
0		18	0.0215	2.5
10		-17	-0.0203	2.5
20		-14	-0.0167	2.5
30		15	0.0179	2.5
50		17	0.0203	2.5
85		10	0.0120	2.5
25	3.8	-15	-0.0179	2.5
	4.2	-8	-0.0096	2.5
	3.4	-12	-0.0143	2.5

Note: The manufacturer declared that the EUT could work within temperature range -40℃ to 85℃ and voltage range DC 3.4V to DC 4.2V. The nominal voltage is DC 3.8V.

Cellular Band Part 22H GPRS 850			
Humidity :	50 %	Temperature :	22 ℃
Mode:	GSM850	Test By:	Sance
Test Result:	PASS		

Middle channel, f_o =836.4MHz;				
Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-40	3.8	10	0.0120	2.5
0		17	0.0203	2.5
10		-12	-0.0143	2.5
20		-10	-0.0120	2.5
30		-6	-0.0072	2.5
50		-11	-0.0132	2.5
85		-17	-0.0203	2.5
25	3.8	-11	-0.0132	2.5
	4.2	-12	-0.0143	2.5
	3.4	17	0.0203	2.5

Note: The manufacturer declared that the EUT could work within temperature range -40℃ to 85℃ and voltage range DC 3.4V to DC 4.2V. The nominal voltage is DC 3.8V.

PCS Band Part 24E PCS 1900			
Humidity :	50 %	Temperature :	22 ℃
Mode:	PCS1900	Test By:	Sance
Test Result:	PASS		

Middle channel, f_o =1880.0MHz;

Temperature (℃)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-40	3.8	-20	-0.0106	2.5
0		-12	-0.0064	2.5
10		8	0.0043	2.5
20		15	0.0080	2.5
30		22	0.0117	2.5
50		15	0.0080	2.5
85		-8	-0.0043	2.5
25	3.8	-8	-0.0043	2.5
	4.2	-13	-0.0069	2.5
	3.4	-13	-0.0069	2.5

Note: The manufacturer declared that the EUT could work within temperature range -40℃ to 85℃ and voltage range DC 3.4V to DC 4.2V. The nominal voltage is DC 3.8V.

PCS Band Part 24E GPRS 1900			
Humidity :	50 %	Temperature :	22 ℃
Mode:	PCS1900	Test By:	Sance
Test Result:	PASS		

Middle channel, f_o =1880.0MHz;

Temperature (℃)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-40	3.8	-12	-0.0064	2.5
0		-13	-0.0069	2.5
10		13	0.0069	2.5
20		22	0.0117	2.5
30		-11	-0.0059	2.5
50		15	0.0080	2.5
85		15	0.0080	2.5
25	3.8	-10	-0.0053	2.5
	4.2	-8	-0.0043	2.5
	3.4	-11	-0.0059	2.5

Note: The manufacturer declared that the EUT could work within temperature range -40℃ to 85℃ and voltage range DC 3.4V to DC 4.2V. The nominal voltage is DC 3.8V.

5. BAND EDGES

5.1 Applicable Standard

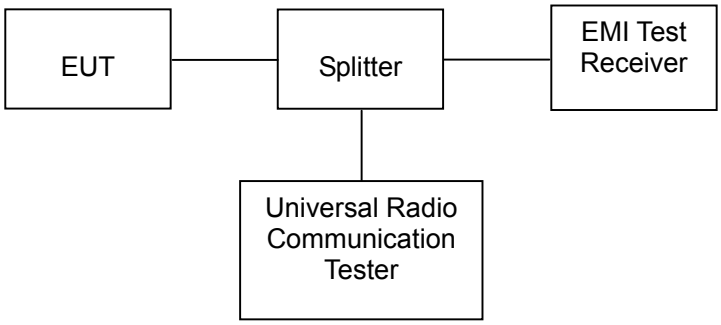
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

5.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 3 kHz.

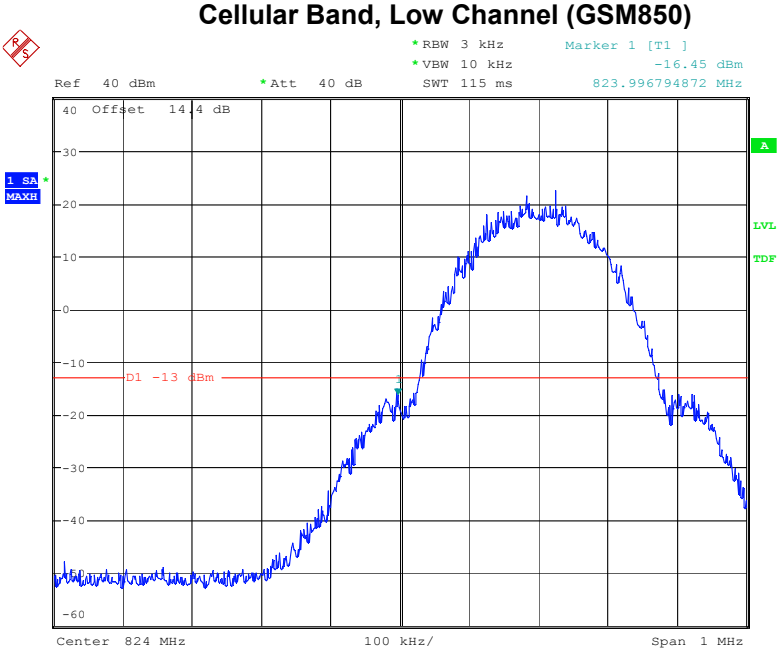


5.3 Test Result

Pass.

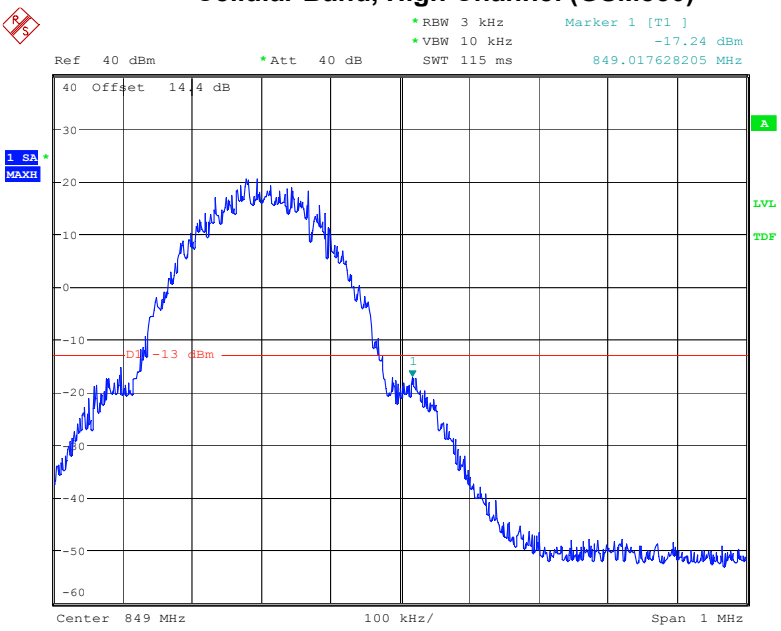
Please refer to following plots.

Cellular Band, Low Channel (GSM850)



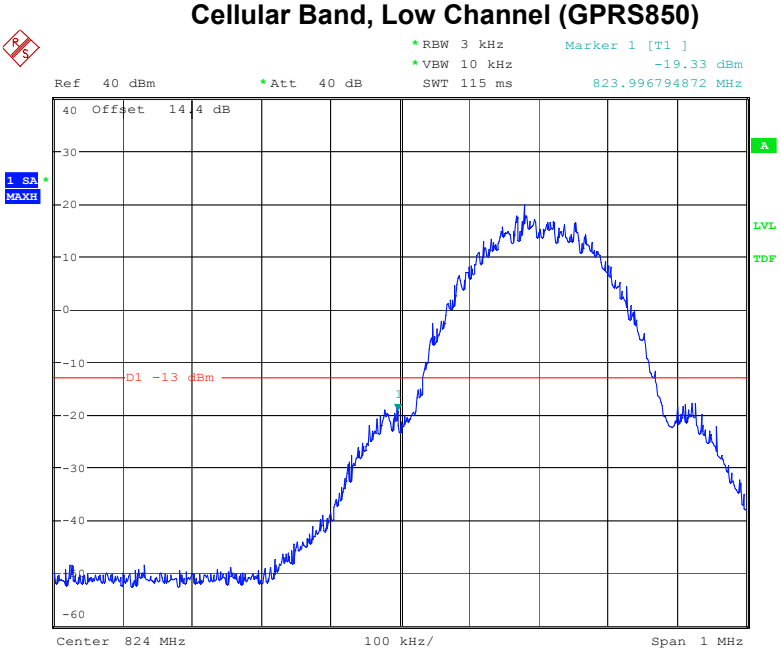
Date: 20.JAN.2017 14:28:34

Cellular Band, High Channel (GSM850)



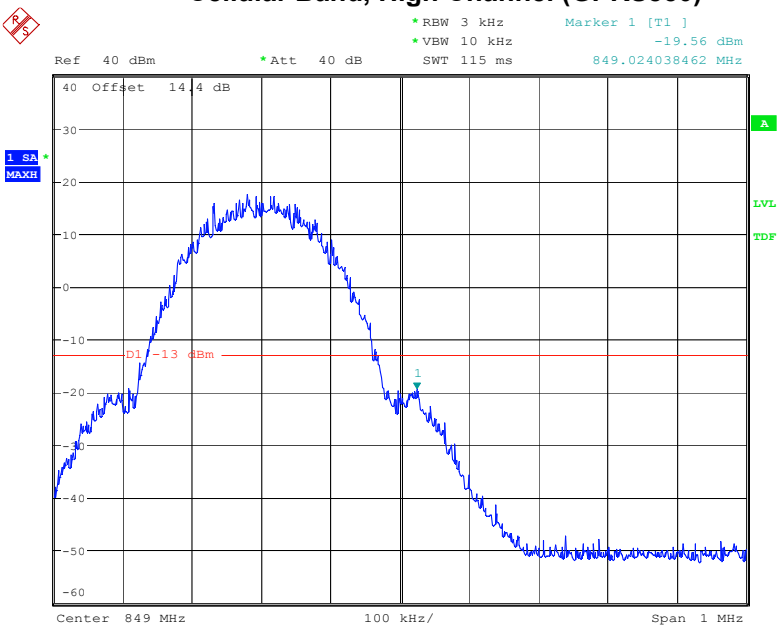
Date: 20.JAN.2017 14:26:26

Cellular Band, Low Channel (GPRS850)



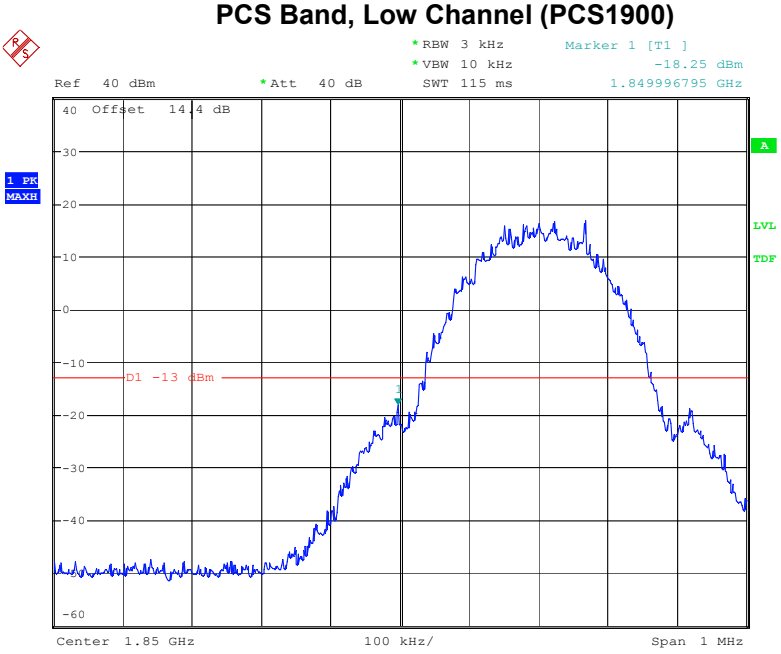
Date: 8.FEB.2017 10:16:15

Cellular Band, High Channel (GPRS850)



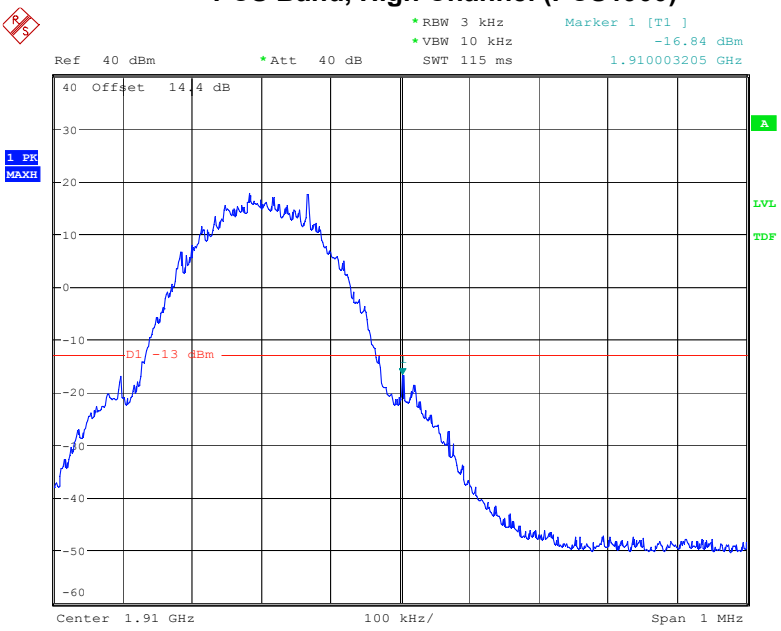
Date: 8.FEB.2017 10:17:53

PCS Band, Low Channel (PCS1900)



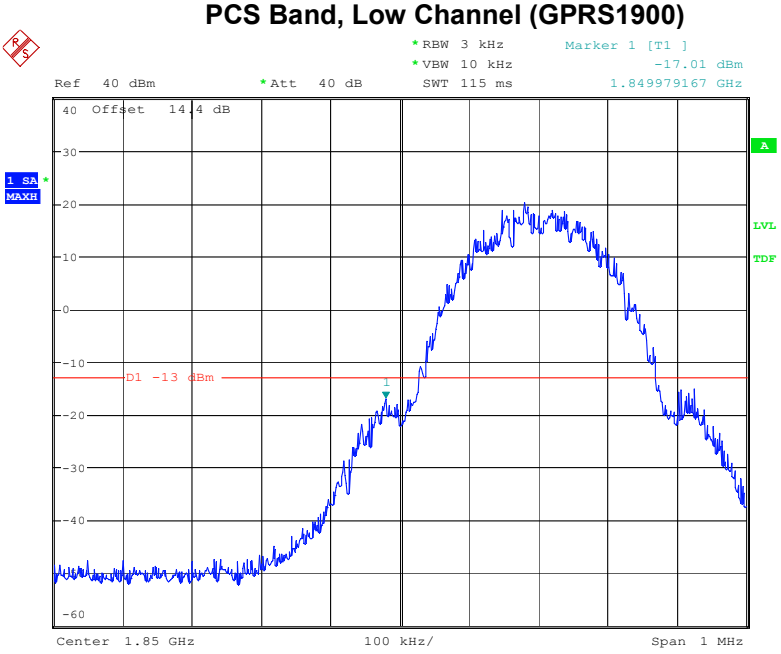
Date: 7.FEB.2017 10:36:45

PCS Band, High Channel (PCS1900)



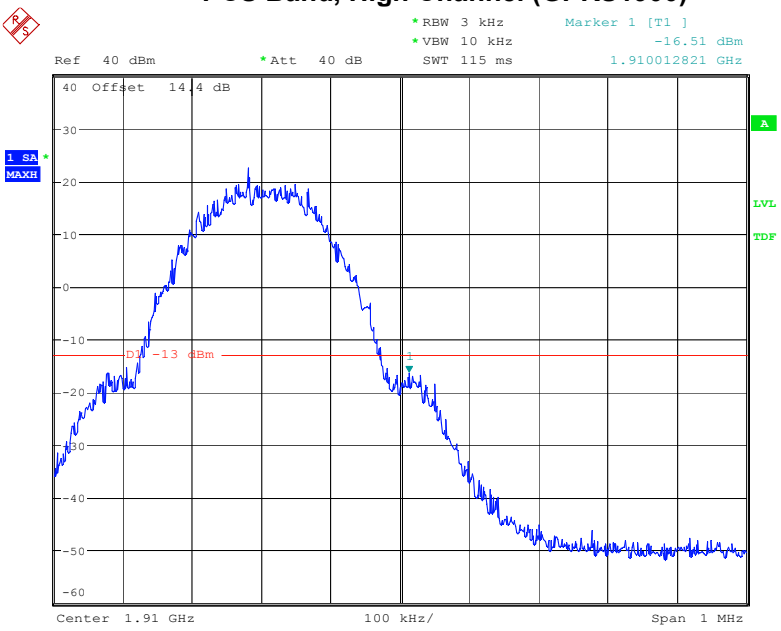
Date: 7.FEB.2017 11:16:42

PCS Band, Low Channel (GPRS1900)



Date: 7.FEB.2017 13:16:55

PCS Band, High Channel (GPRS1900)



Date: 7.FEB.2017 13:18:16

6. MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

7. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

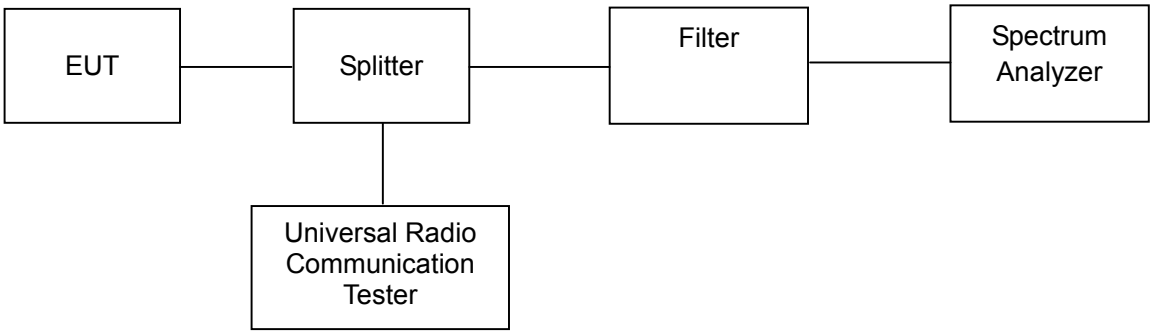
7.1 Applicable Standards

CFR 47 §2.1051, §22.917(a) and §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

7.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate
attenuation. The resolution bandwidth of the spectrum analyzer was set at 1000 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



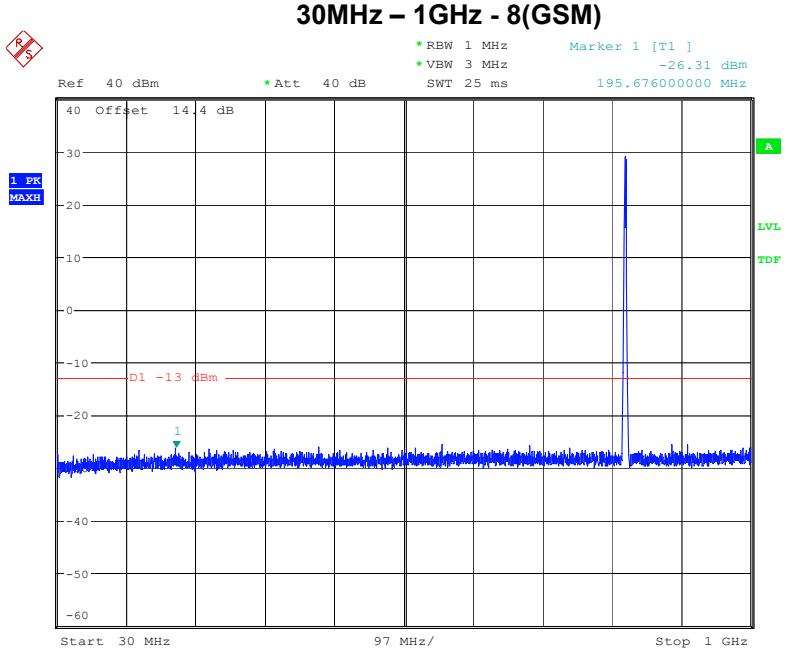
7.2 Test Result

Pass.

For GSM850, all channels (CH128, 824.2MHz, CH189 836.4MHz, CH251 848.8MHz) has been tested, only the worst case was recorded in the test report: CH128 824.2MHz;

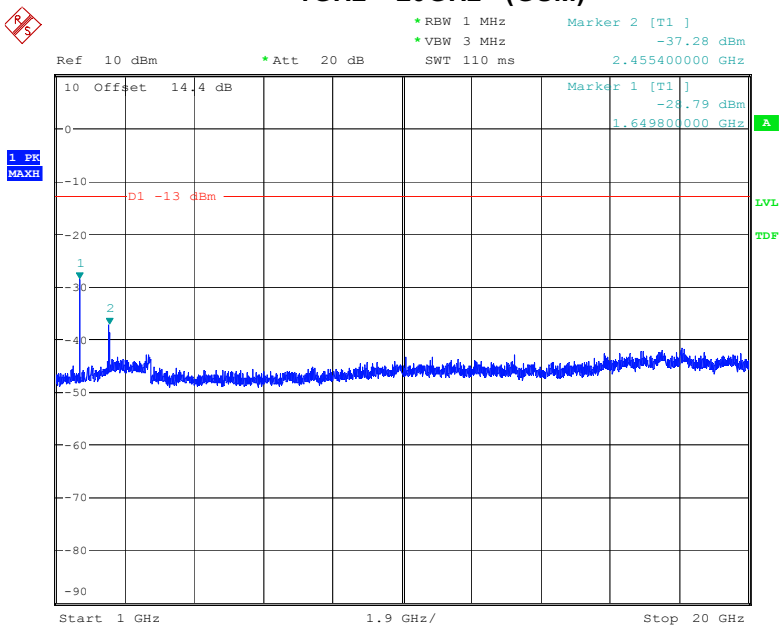
For PCS1900, all channels (CH512, 1850.2MHz, CH661 1880.0MHz, CH810 1909.8MHz) has been tested, only the worst case was recorded in the test report: CH512 1850.2MHz.

Cellular Band (Part 22H)
30MHz – 1GHz - 8(GSM)



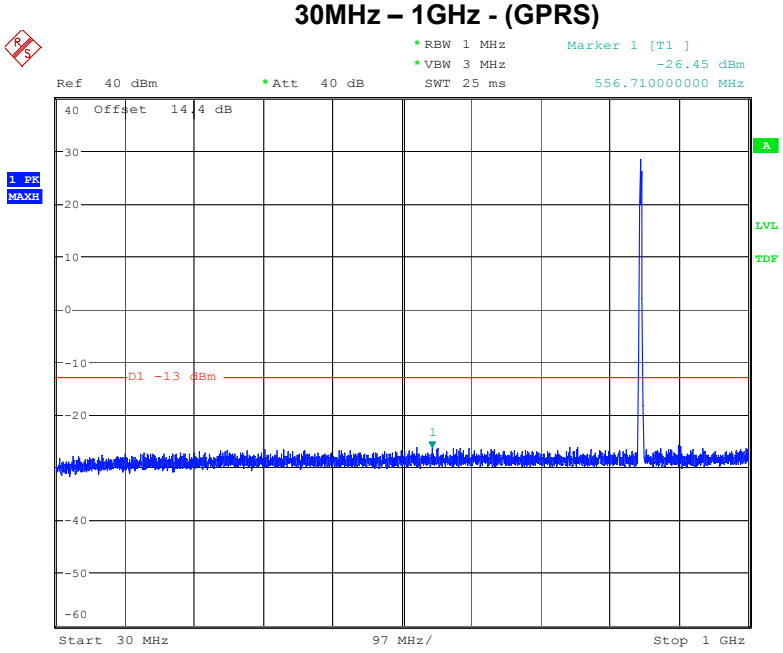
Date: 20.JAN.2017 14:32:10

1GHz – 20GHz - (GSM)



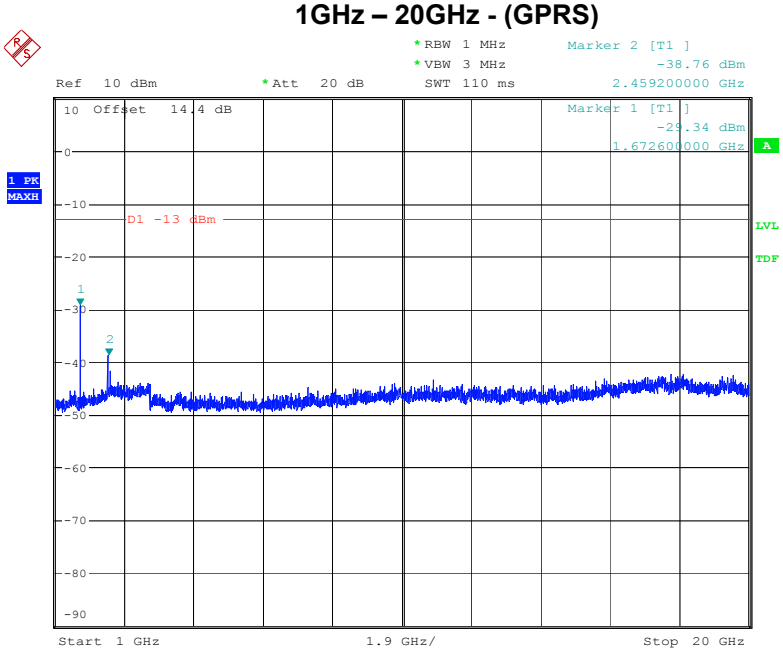
Date: 20.JAN.2017 14:34:28

30MHz – 1GHz - (GPRS)



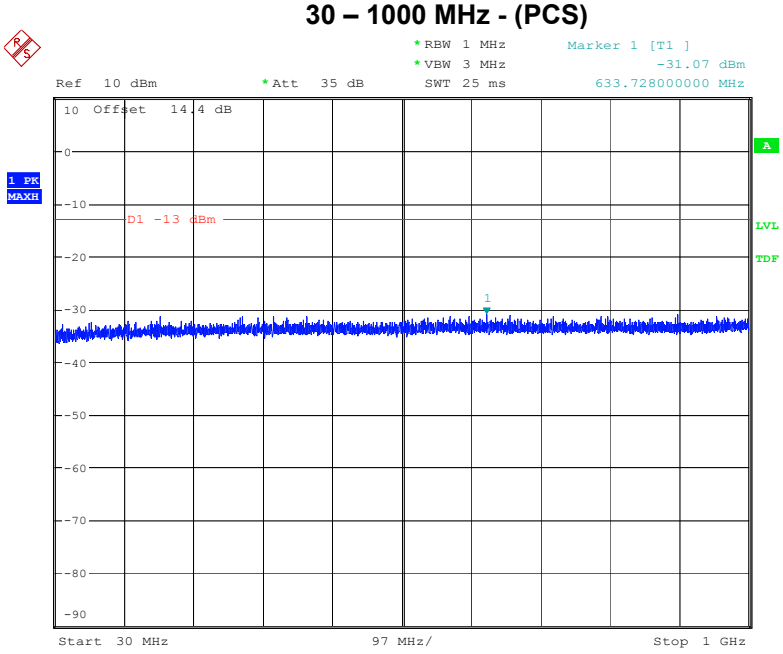
Date: 20.JAN.2017 14:42:30

1GHz – 20GHz - (GPRS)



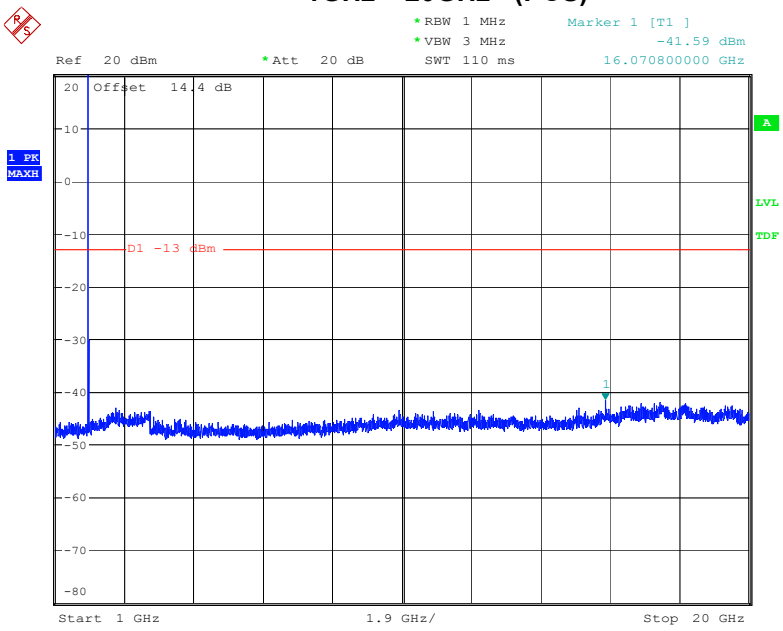
Date: 20.JAN.2017 14:38:06

PCS Band (Part24E)
30 – 1000 MHz - (PCS)



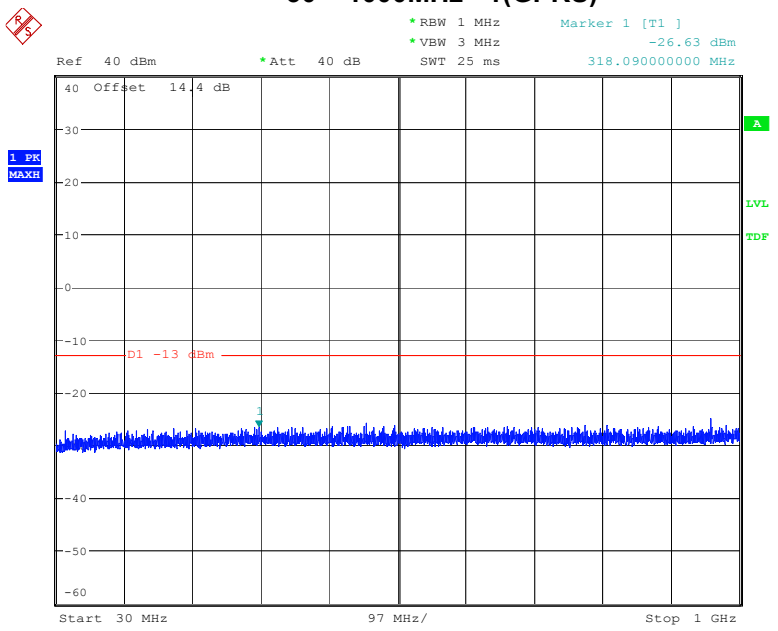
Date: 7.FEB.2017 11:25:10

1GHz – 20GHz - (PCS)



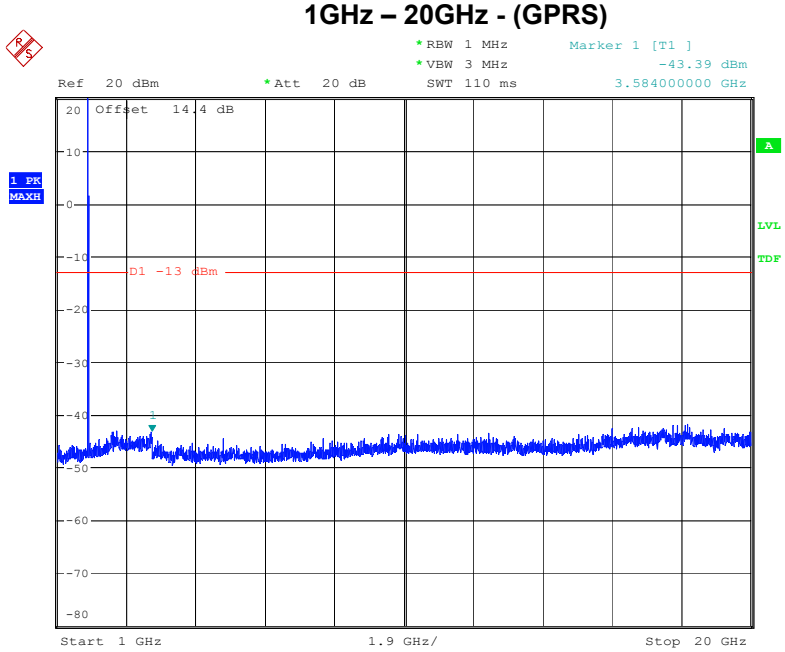
Date: 7.FEB.2017 11:26:44

30 – 1000MHz - 1(GPRS)



Date: 7.FEB.2017 11:35:41

1GHz – 20GHz - (GPRS)



Date: 7.FEB.2017 11:36:30

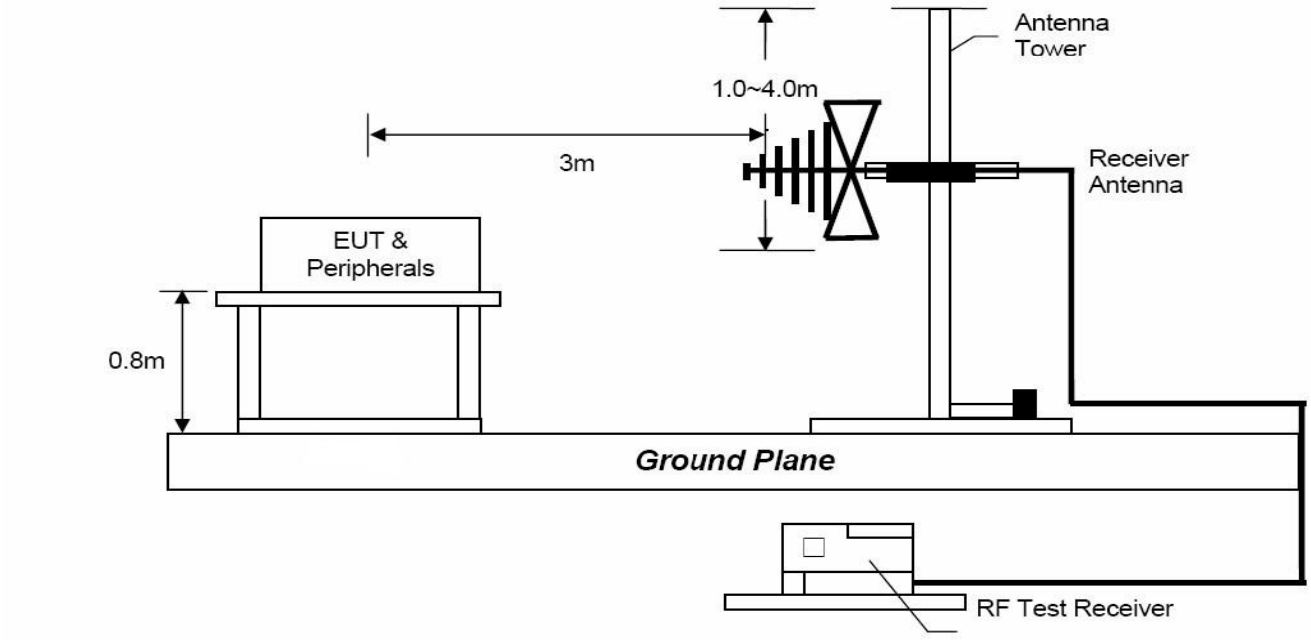
8. FIELD STRENGTH OF SPURIOUS RADIATED EMISSIONS

8.1 Applicable Standards

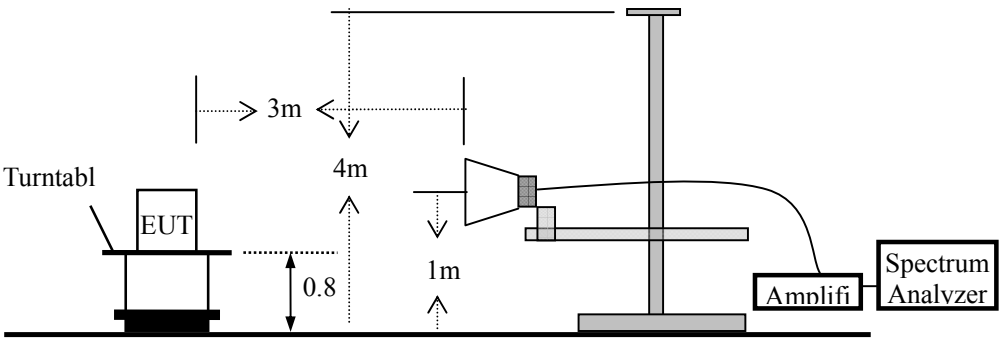
According to FCC §2.1053
FCC §22.917(a),§24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

8.2 Test of Block Diagram of configuration

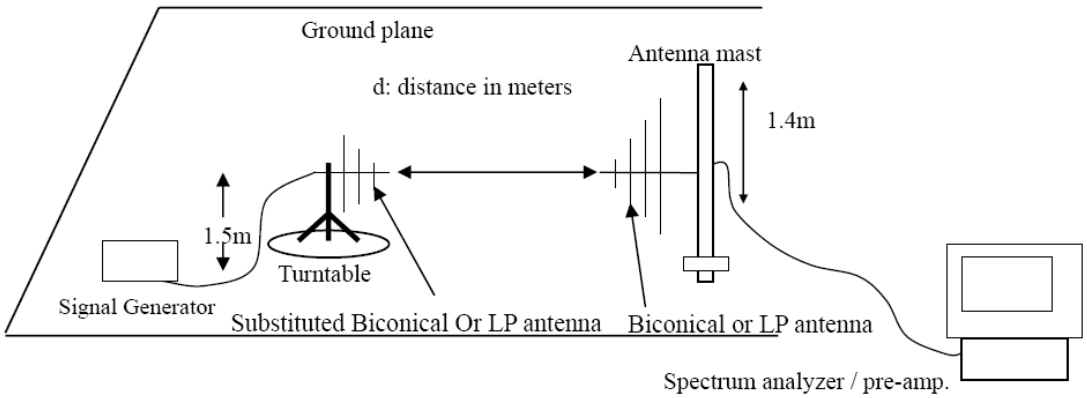
Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-Up, Frequency above 1GHz



Substituted Method Test Set-UP



8.3 Test Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. EIRP = S.G. output (dBm) + Antenna Gain(dBi) – Cable Loss (dB)

For GSM850, all channels (CH128, 824.2MHz, CH189 836.4MHz, CH251 848.8MHz) has been tested, only the worst case was recorded in the test report: CH128 824.2MHz;

For PCS1900, all channels (CH512, 1850.2MHz, CH661 1880.0MHz, CH810 1909.8MHz) has been tested, only the worst case was recorded in the test report: CH512 1850.2MHz.

Cellular Band (Part 22H)							
Humidity :		50 %	Temperature :			22 ℃	
Mode:		**GSM850**	Test By:			Sance	
Test Result:		PASS					
Channel	**Frequency (MHz)**	**Substituted level (dBm)**	**Polarization (H/V) Antenna**	**Gain Correction (dBi)**	**Cable Loss (dB)**	**Absolute Level (dBm)**	**Limit (dBm)**
GSM850							
Low	**1648.4**	**-36.44**	**H**	**8.26**	**2.1**	**-30.28**	**-13.00**
	1648.4	**-36.35**	**V**	**8.26**	**2.1**	**-30.19**	**-13.00**
	2472.6	**-47.47**	**H**	**9.2**	**2.6**	**-40.87**	**-13.00**
	2472.6	**-46.66**	**V**	**9.2**	**2.6**	**-40.06**	**-13.00**
GPRS850							
Low	**1648.4**	**-37.16**	**H**	**8.26**	**2.1**	**-31.00**	**-13.00**
	1648.4	**-37.79**	**V**	**8.26**	**2.1**	**-31.63**	**-13.00**
	2472.6	**-48.99**	**H**	**9.2**	**2.6**	**-42.39**	**-13.00**
	2472.6	**-49.73**	**V**	**9.2**	**2.6**	**-43.13**	**-13.00**

Note: 1. Spurious emissions below 1000MHz were found more than 20dB below limit line.
2. Measurement uncertainty : ±3.7dB.
3. All modes have been tested but only worst case is recorded in report.

PCS Band (Part 24E)							
Humidity :		50 %	Temperature :			22 ℃	
Mode:		PCS1900	Test By:			Sance	
Test Result:		PASS					
Channel	**Frequency (MHz)**	**Substituted level (dBm)**	**Polarization (H/V) Antenna**	**Gain Correction (dBi)**	**Cable Loss (dB)**	**Absolute Level (dBm)**	**Limit (dBm)**
PCS 1900							
Low	**3700.4**	**-51.98**	**H**	**10.5**	**3.8**	**-45.28**	**-13.00**
	3700.4	**-50.79**	**V**	**10.5**	**3.8**	**-44.09**	**-13.00**
GPRS 1900							
Low	**3700.4**	**-52.01**	**H**	**10.5**	**3.8**	**-45.31**	**-13.00**
	3700.4	**-51.86**	**V**	**10.5**	**3.8**	**-45.16**	**-13.00**

Note: 1. Spurious emissions below 1000MHz were found more than 20dB below limit line.
2. Measurement uncertainty : ±3.7dB.
3. All modes have been tested but only worst case is recorded in report.

9. PEAK-AVERAGE RATIO

9.1 Applicable Standards

According to FCC §24.232(d)
The peak-to-average radio (PAR) of the transmission may not exceed 13 dB.

9.2 Test Procedure

According with KDB 971168

The signal analyzer's CCDF measurement profile is enabled,

Frequency = carrier center frequency,

Measurement BW > Emission bandwidth of signal,

The signal analyzer was set to collect one million samples to generate the CCDF curve,
The measurement interval was set depending on the type of signal analyzed. For continuous signals > 98% duty cycle, the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

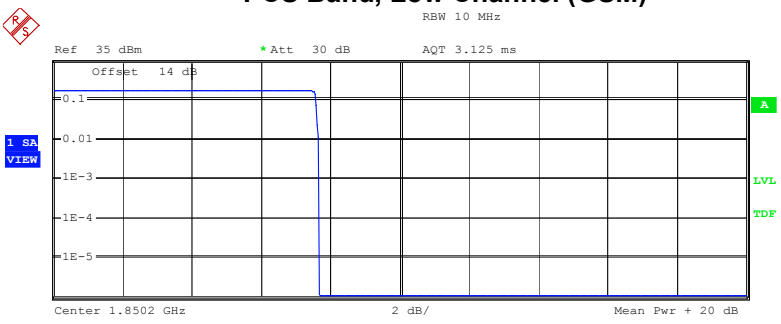
9.3 Test Result

PASS.

Please refer to following tables and plots.

PCS Band						
Temperature:	21℃		Humidity:	52%		
Test By:	Sance		Test result:	PASS		
Mode	PCS 1900			GPRS1900		
Channel	512	661	810	512	661	810
Frequency(MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
Peak-to-Average Ratio (dB)	7.68	7.68	7.62	7.68	7.66	7.68
Limit (dB)	<13dB					

PCS Band, Low Channel (GSM)

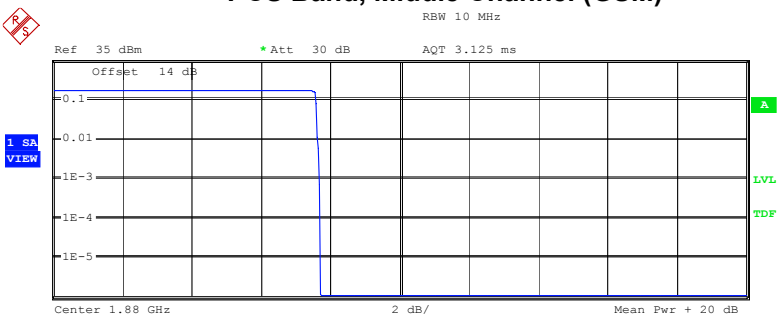


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	21.36 dBm
Peak	29.03 dBm
Crest	7.68 dB
10 %	7.60 dB
1 %	7.66 dB
.1 %	7.69 dB
.01 %	7.69 dB

Date: 7.FEB.2017 15:08:20

PCS Band, Middle Channel (GSM)

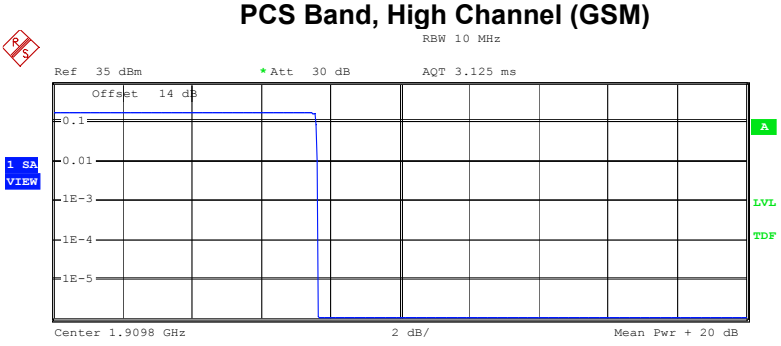


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	21.56 dBm
Peak	29.25 dBm
Crest	7.68 dB
10 %	7.60 dB
1 %	7.63 dB
.1 %	7.69 dB
.01 %	7.72 dB

Date: 7.FEB.2017 15:03:45

PCS Band, High Channel (GSM)

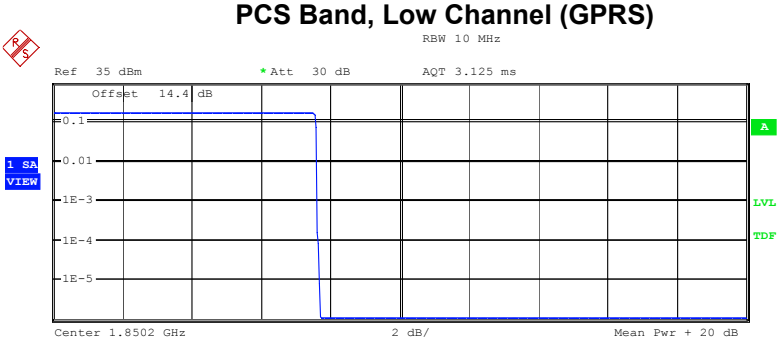


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	21.69 dBm
Peak	29.31 dBm
Crest	7.62 dB
10 %	7.60 dB
1 %	7.63 dB
.1 %	7.66 dB
.01 %	7.66 dB

Date: 7.FEB.2017 15:10:20

PCS Band, Low Channel (GPRS)

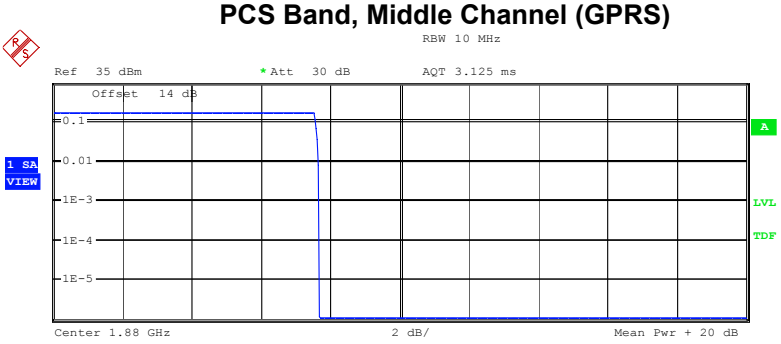


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	21.87 dBm
Peak	29.55 dBm
Crest	7.68 dB
10 %	7.60 dB
1 %	7.63 dB
.1 %	7.63 dB
.01 %	7.66 dB

Date: 8.FEB.2017 10:48:25

PCS Band, Middle Channel (GPRS)

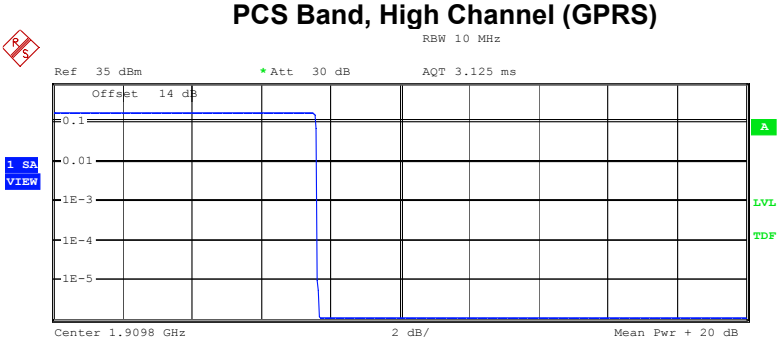


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	21.73 dBm
Peak	29.39 dBm
Crest	7.66 dB
10 %	7.56 dB
1 %	7.66 dB
.1 %	7.69 dB
.01 %	7.69 dB

Date: 7.FEB.2017 15:27:46

PCS Band, High Channel (GPRS)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	21.56 dBm
Peak	29.25 dBm
Crest	7.68 dB
10 %	7.60 dB
1 %	7.63 dB
.1 %	7.63 dB
.01 %	7.63 dB

Date: 7.FEB.2017 15:29:12

10. RF Exposure

10.1 Applicable Standards

§1.1307 and §2.1093.

10.2 Test Result

Compliance

Please refer to RF exposure evaluation report (NTC1702143FV00).

11. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	Nov. 22, 2016	Nov. 21, 2017
Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 25, 2016	Nov. 24, 2017
Cable	Huber+Suhner	CBL2-NN-1M	22390001	Nov. 06, 2016	Nov. 05, 2017
Antenna	Teseq	CBL 6111D	27086	Nov. 25, 2016	Nov. 24, 2017
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 06, 2016	Nov. 05, 2017
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	Oct.22, 2016	Oct.21, 2017
Horn Antenna	Com-Power	AH-118	071078	Nov. 04, 2016	Nov. 03, 2017
Analyzer Modulation	HP	8901A	2026A00847	Dec. 23, 2016	Dec. 22, 2017
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Aug. 31, 2016	Aug. 30, 2017
Pre-Amplifier	Agilent	8449B	3008A02964	Nov. 02, 2016	Nov. 01, 2017
SMA Cable	REBES	A46-NMNM	N/A	Nov. 06, 2016	Nov. 05, 2017
Temperature & Humidity Chamber	BELL	BE-TH-408	N/A	Dec. 23, 2016	Dec. 22, 2017
DC Source	HUAYI	HY5003-2	N/A	Dec. 23, 2016	Dec. 22, 2017
Signal Generator	Agilent	N5182A	MY48180739	Mar. 07, 2016	Mar. 06, 2017
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	117060	Mar. 07, 2016	Mar. 06, 2017
Anechoic chamber	SAEMC	9*7*7m	N/A	Aug. 22, 2016	Aug. 20, 2018
Shielded room 1	SAEMC	6.2*4*3.6m	N/A	Aug. 22, 2016	Aug. 20, 2018
Shielded room 2	SAEMC	8*4*3.6m	N/A	Aug. 22, 2016	Aug. 20, 2018

--End--