RF TEST REPORT

Report No.: SET2015-16981

Product: Mobile Phone

FCC ID: SG7201511L50

Model No.: L52, L50a

Applicant: Haier Telecom(Qingdao) CO., Ltd.

Address: No1.Haier Road,Hi-tech Zone Qingdao,China

Dates of Testing: 11/10/2015 — 11/24/2015

Issued by: CCIC-SET

Lab Location: Electronic Testing Building, Shahe Road，Xili, Nanshan District, Shenzh China

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Test Report

Product……...:	Mobile Phone
Brand Name……:	Haier
Trade Name……....:	Haier
Applicant……:	Haier Telecom(Qingdao) CO., Ltd.
Applicant Address……...:	No1.Haier Road,Hi-tech Zone Qingdao,China
Manufacturer……..:	Haier Telecom(Qingdao) CO., Ltd.
Manufacturer Address….:	No1.Haier Road,Hi-tech Zone Qingdao,China
Test Standards……..…:	47 CFR FCC Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations 47 CFR FCC Part 22(H): Cellular Radiotelephone Service 47 CFR FCC Part 24(E): Personal Communications Services 47 CFR FCC Part 27(L) Miscellaneous Wireless communications Services
Test Result……..…:	PASS
Tested by……....:	2015.11.25 Lu Lei，Test Engineer
Reviewed by……..…:	2015.11.25 Zhu Qi, Senior Egineer
Approved by……....:	2015.11.25 Wu Li'an，Manager

Table of Contents

1. GENERAL INFORMATION 4

1.1 EUT Description 4

1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator 5

1.3 Test Standards and Results 6

1.4 Test Configuration of Equipment under Test 7

1.5 Measurement Results Explanation Example 8

1.6 Facilities and Accreditations 8

2. 47 CFR PART 2, PART 22H & 24E REQUIREMENTS 9

2.1 Conducted RF Output Power 9

2.2 Peak to Average Radio 12

2.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement 20

2.4 Frequency Stability 43

2.5 Conducted Out of Band Emissions 47

2.6 Band Edge 70

2.7 Transmitter Radiated Power (EIRP/ERP) 79

2.8 Radiated Spurious Emissions 84

3. LIST OF MEASURING EQUIPMENT 93

Change History		
Issue	Date	Reason for change
1.0	2015.11.25	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	Mobile Phone
Hardware Version	H01
Software Version	V01
EUT supports Radios application	GSM/GPRS/EDGE/WCDMA/HSPA/LTE WLAN2.4GHz 802.11b/g/n (HT20/HT40) Bluetooth V3.0+EDR / Bluetooth V4.0LE
Multi Slot Class	GPRS: Multi slot Class12, EGPRS: Multi slot Class12
Frequency Range	GSM 850MHz: Tx: 824.2 - 848.8MHz (at intervals of 200kHz); Rx: 869.2 - 893.8MHz (at intervals of 200kHz) GSM 1900MHz: Tx: 1850.2 - 1909.8MHz (at intervals of 200kHz); Rx: 1930.2 - 1989.8MHz (at intervals of 200kHz) WCDMA 850MHz Tx: 826.4 - 846.6MHz (at intervals of 200kHz); Rx: 871.4 - 891.6MHz (at intervals of 200kHz) WCDMA 1700MHz Tx: 1712.4 - 1752.6MHz (at intervals of 200kHz); Rx: 2112.4 - 2152.6MHz (at intervals of 200kHz) WCDMA 1900MHz Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz); Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)
Maximum Output Power to Antenna	GSM 850: 32.57dBm GSM 1900: 29.18dBm EDGE 850: 32.50dBm EDGE 1900: 29.12dBm WCDMA 850: 22.95dBm WCDMA 1900: 22.73dBm WCDMA 1700: 22.50dBm
Type of Modulation	GSM / GPRS:GMSK EDGE:GMSK / 8PSK WCDMA: QPSK(Uplink) HSDPA:QPSK(Downlink) HSUPA:QPSK(Uplink)
Antenna Type	Monopole Antenna

Note: The EUT is a Mobile Phone，it contains two models，they are L52 and L52a. They have the same size, appearance and internal structure, and the only difference is the model number.

1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)
GSM 850	GMSK	246KGXW	0.03	0.998
GSM 1900	GMSK	246KGXW	0.03	0.454
EDGE 850	8PSK	246KG7W	0.03	0.931
EDGE 1900	8PSK	250KG7W	0.03	0.441
WCDMA 850 RMC 12.2Kbps	QPSK	4M24F9W	0.03	0.132
WCDMA 1900 RMC 12.2Kbps	QPSK	4M26F9W	0.03	0.123
WCDMA 1700 RMC 12.2Kbps	QPSK	4M26F9W	0.03	0.123

1.3 Test Standards and Results

1. 47 CFR Part 2, 22(H), 24(E), 27(L)
2. ANSI / TIA / EIA-603-D-2010
3. FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

Remark：
1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

Test detailed items/section required by FCC rules and results are as below:

No.	Section FCC	Description	Limit	Result
1	2.1046	Conducted Output Power	Reporting Only	PASS
2	24.232(d) 27.50(d)	Peak to Average Radio	＜13dBm	PASS
3	2.1049 22.917(b) 24.238(b) 27.53(g)	Occupied Bandwidth	Reporting Only	PASS
4	2.1055 22.355 24.235 27.54	Frequency Stability	≤±2.5ppm	PASS
5	2.1051 22.917 24.238 27.53	Conducted Out of Band Emissions	< 43+10log10 (P[Watts])	PASS
6	2.1051 22.917 24.238 27.53	Band Edge	< 43+10log10 (P[Watts])	PASS
7	22.913	Effective Radiated Power	＜7Watts	PASS
	24.232	Equivalent Isotropic Radiated Power	＜2Watts	PASS
	27.50(d)	Effective Radiated Power	＜1Watts	PASS

8	2.1053 22.917 24.238 27.53	Radiated Spurious Emissions	< 43+10log10 (P[Watts])	PASS

1.4 Test Configuration of Equipment under Test

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 20000 MHz for GSM1900 and WCDMA Band II.
3. 30 MHz to 18000 MHz for WCDMA Band IV

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	GSM Link EDGE Link	GSM Link EDGE Link
GSM 1900	GSM Link EDGE Link	GSM Link EDGE Link
WCDMA Band V	RMC 12.2Kbps Link	RMC 12.2Kbps Link
WCDMA Band II	RMC 12.2Kbps Link	RMC 12.2Kbps Link
WCDMA Band IV	RMC 12.2Kbps Link	RMC 12.2Kbps Link

Note: The maximum power levels are chosen to test as the worst case configuration as follows:

GSM mode for GMSK modulation,

EDGE multi-slot class 8 mode for 8PSK modulation,

RMC 12.2Kbps mode for WCDMA band V,

RMC 12.2Kbps mode for WCDMA band II

RMC 12.2Kbps mode for WCDMA band IV, only these modes were used for all tests.

1.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 7dB and 10dB attenuator.

Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB).
= 7 + 10 = 17 (dB)

1.6 Facilities and Accreditations

1.6.1 Test Facilities

CNAS-Lab Code: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 406086, Renewal date Nov. 19, 2011, valid time is until Nov. 18, 2014.

IC-Registration No.: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on July. 15, 2013, valid time is until July. 15, 2016.

1.6.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (℃):	15℃- 35℃
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR PART 2, PART 22H & 24E REQUIREMENTS

2.1 Conducted RF Output Power

2.1.1 Definition

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

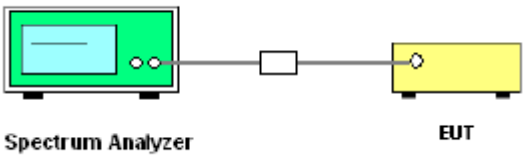
2.1.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

2.1.4 Test Setup



2.1.5 Test Results of Conducted Output Power

1. GSM Model Test Verdict:

Band	Channel	Frequency (MHz)	Measured Output Power dBm	Verdict
GSM 850MHz	128	824.2	32.56	PASS
	190	836.6	32.55	PASS
	251	848.8	**32.57**	PASS
GSM 1900MHz	512	1850.2	28.96	PASS
	661	1880.0	29.00	PASS
	810	1909.8	**29.18**	PASS
GPRS 850MHz	128	824.2	32.43	PASS
	190	836.6	32.43	PASS
	251	848.8	32.44	PASS
GPRS 1900MHz	512	1850.2	28.85	PASS
	661	1880.0	28.94	PASS
	810	1909.8	29.06	PASS
EDGE 850MHz	128	824.2	32.47	PASS
	190	836.6	32.49	PASS
	251	848.8	**32.50**	PASS
EDGE 1900MHz	512	1850.2	28.90	PASS
	661	1880.0	28.97	PASS
	810	1909.8	**29.12**	PASS

Note 1: For the GPRS and EDGE model, all the slots were tested and just the worst data was record in this report.

2. WCDMA Model Test Verdict:

Item	band	WCDMA 850			WCDMA 1900		
	Frequency	4132	4183	4233	9262	9400	9538
	Subtest	dBm			dBm		
WCDMA	RMC 12.2Kbps	**22.95**	22.76	22.89	22.66	22.50	**22.73**
HSDPA	1	22.46	22.52	22.54	22.31	22.24	22.39
	2	22.54	22.47	22.45	22.43	22.37	22.54
	3	22.41	22.56	22.59	22.35	22.26	22.47
	4	21.79	21.69	21.72	21.87	21.84	21.91
HSUPA	1	22.39	22.37	22.45	22.24	22.29	22.38
	2	21.96	21.81	21.82	21.88	21.76	21.79
	3	22.29	22.24	22.32	22.13	22.09	22.19
	4	21.71	21.69	21.59	21.69	21.51	21.55
	5	22.12	22.26	22.18	22.01	21.98	22.05

Item	band	WCDMA 1700		
	Frequency	4132	4175	4233
	Subtest	dBm		
WCDMA	RMC 12.2Kbps	**22.50**	22.45	22.41
HSDPA	1	22.01	21.93	21.95
	2	21.96	22.05	21.93
	3	22.09	21.94	22.06
	4	22.05	21.96	21.98
HSUPA	1	22.22	22.13	22.11
	2	21.91	21.96	21.85
	3	22.03	21.95	21.96
	4	21.87	21.88	21.79
	5	22.02	22.01	21.98

2.2 Peak to Average Radio

2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

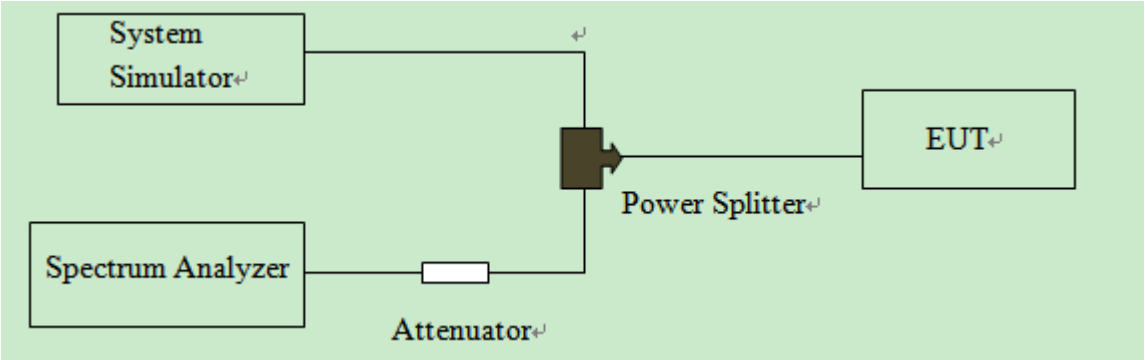
2.2.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. For GSM/EGPRS operating modes:
   a. Set EUT in maximum power output.
   b. Set the RBW = 10kHz, VBW = 30kHz, Peak detector on spectrum analyzer for first trace.
   c. Set the RBW = 10kHz, VBW = 30kHz, AV detector on spectrum analyzer for second trace.
   d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.
4. For UMTS operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

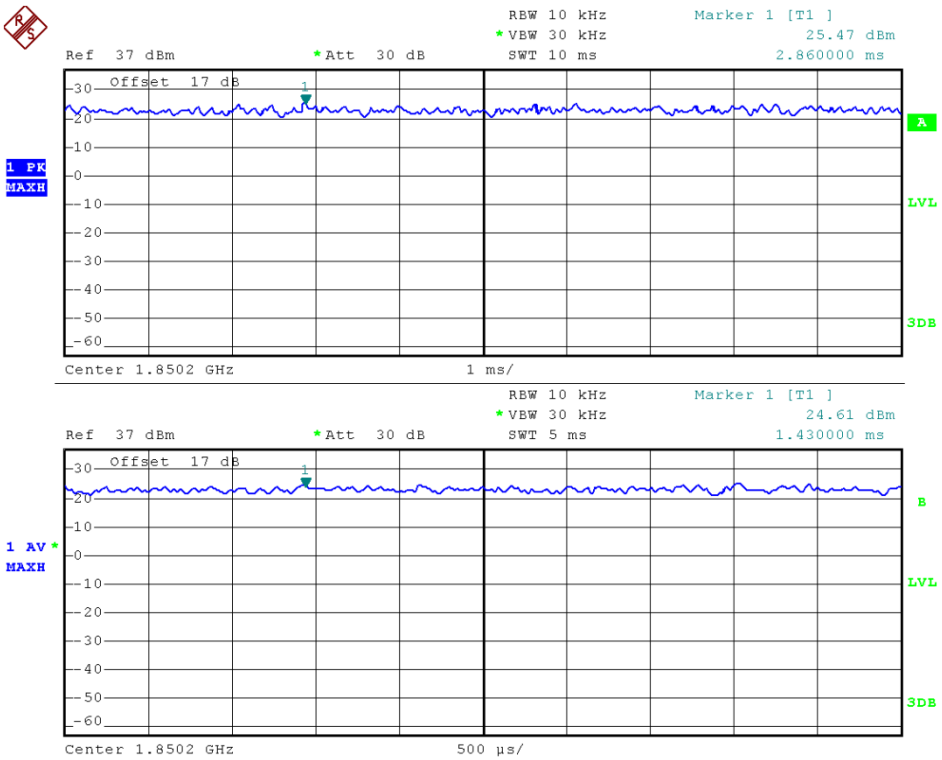
2.2.4 Test Setup



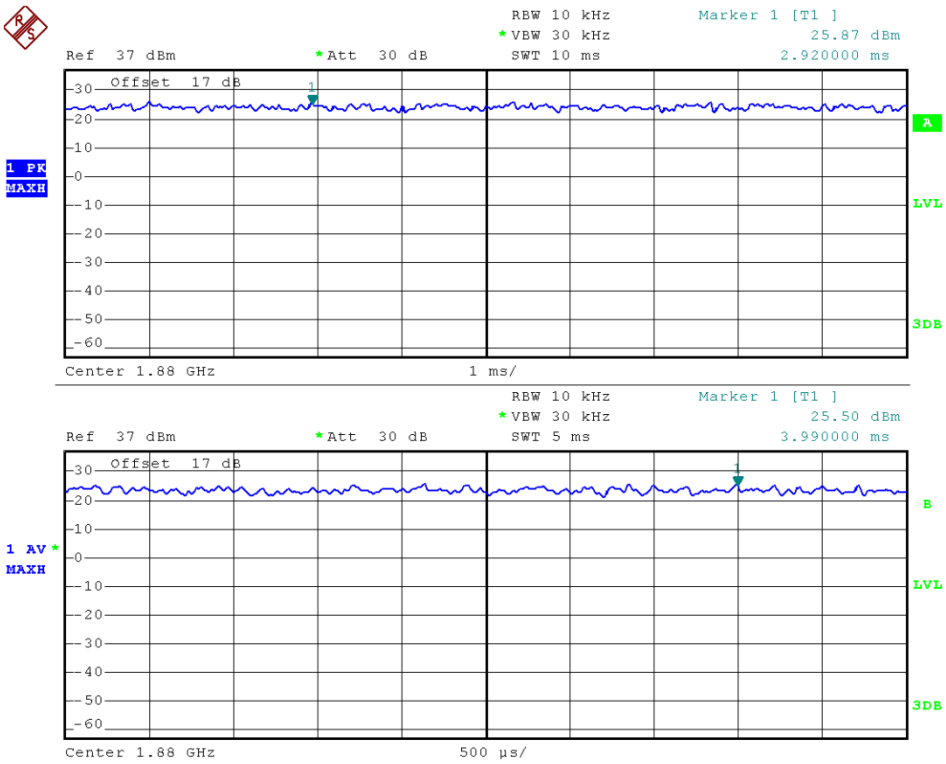
2.2.5 Test Results of Peak-to-Average Ratio

Band	Channel	Frequency (MHz)	Peak to Average radio		Limit	Verdict
			dB	Refer to Plot	dB	
GSM 1900MHz	512	1850.2	0.86	Plot A1 to A3	13	PASS
	661	1880.0	0.37			PASS
	810	1909.8	0.38			PASS
EDGE 1900MHz	512	1850.2	0.43	Plot B1 to B3	13	PASS
	661	1880.0	0.28			PASS
	810	1909.8	0.65			PASS
WCDMA 1700MHz	1312	1712.4	6.00	Plot C1 to C3	13	PASS
	1412	1732.4	6.00			PASS
	1513	1752.6	6.00			PASS
WCDMA 1900MHz	9262	1852.4	6.04	Plot D1 to D3	13	PASS
	9400	1880.0	5.96			PASS
	9538	1907.6	5.96			PASS

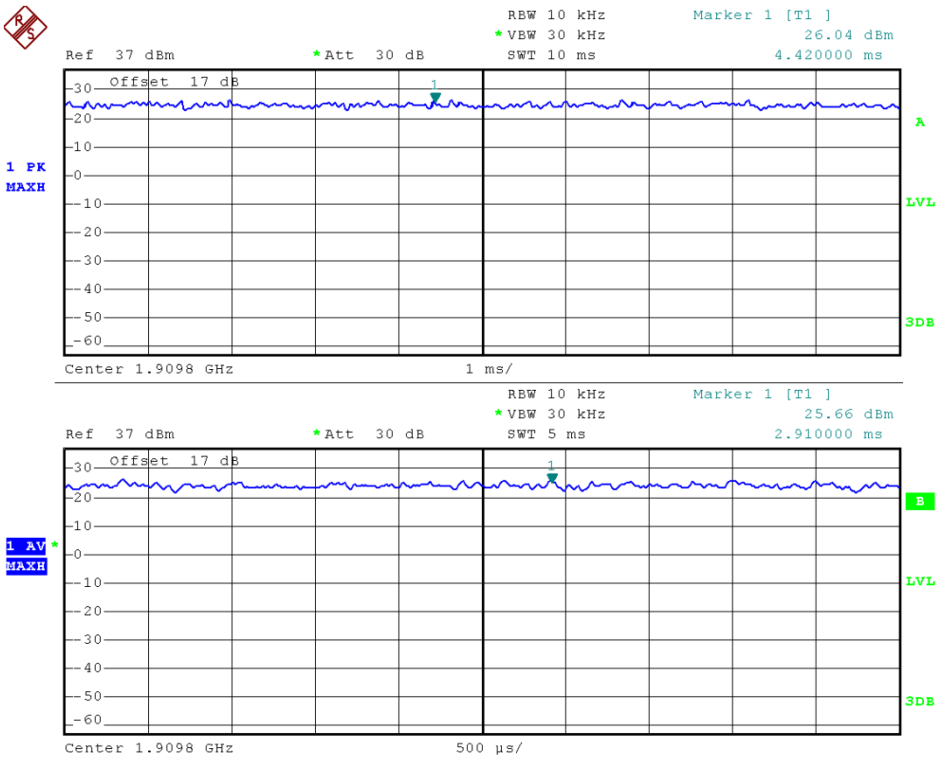
2.2.6 Test Results (Plots) of Peak-to-Average Ratio



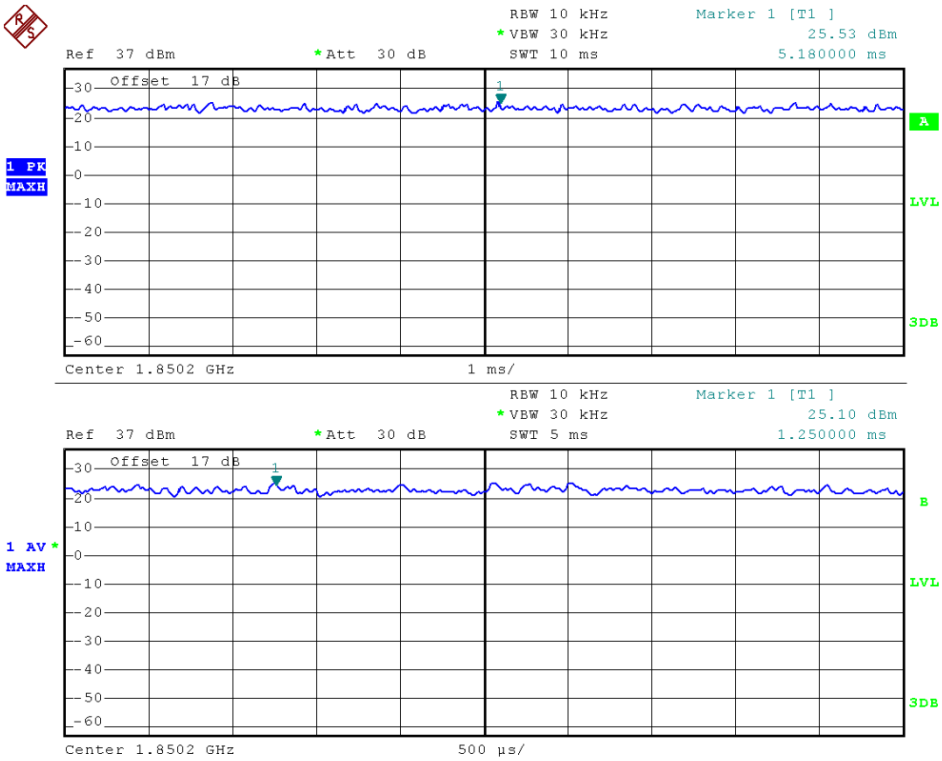
(Plot A1: GSM 1900 MHz Channel = 512)



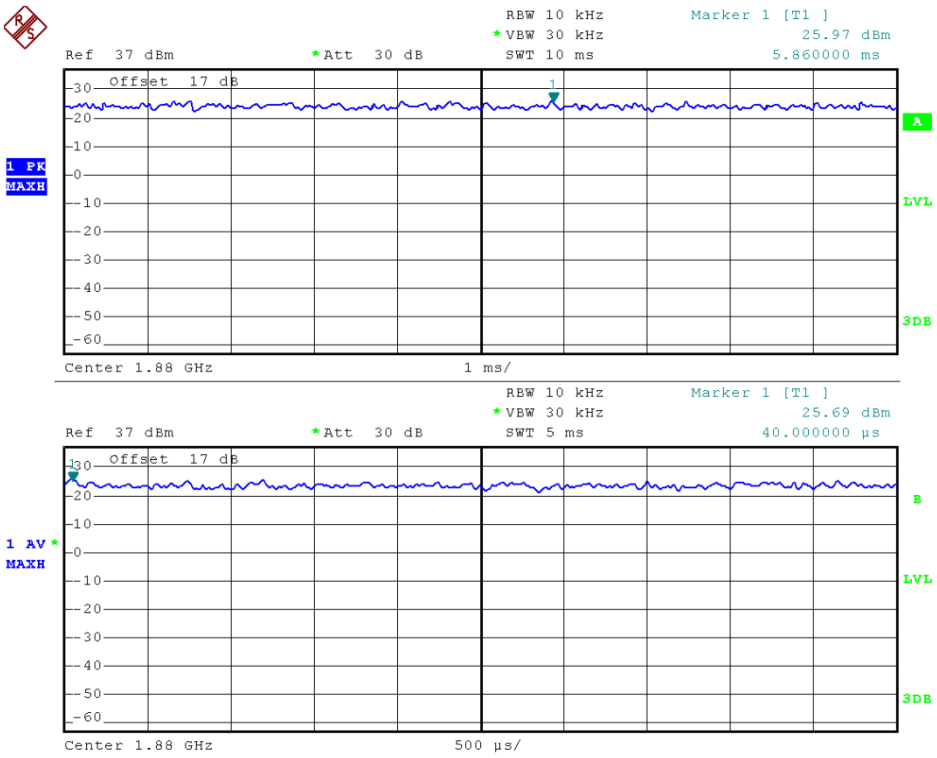
(Plot A2: GSM 1900 MHz Channel = 661)



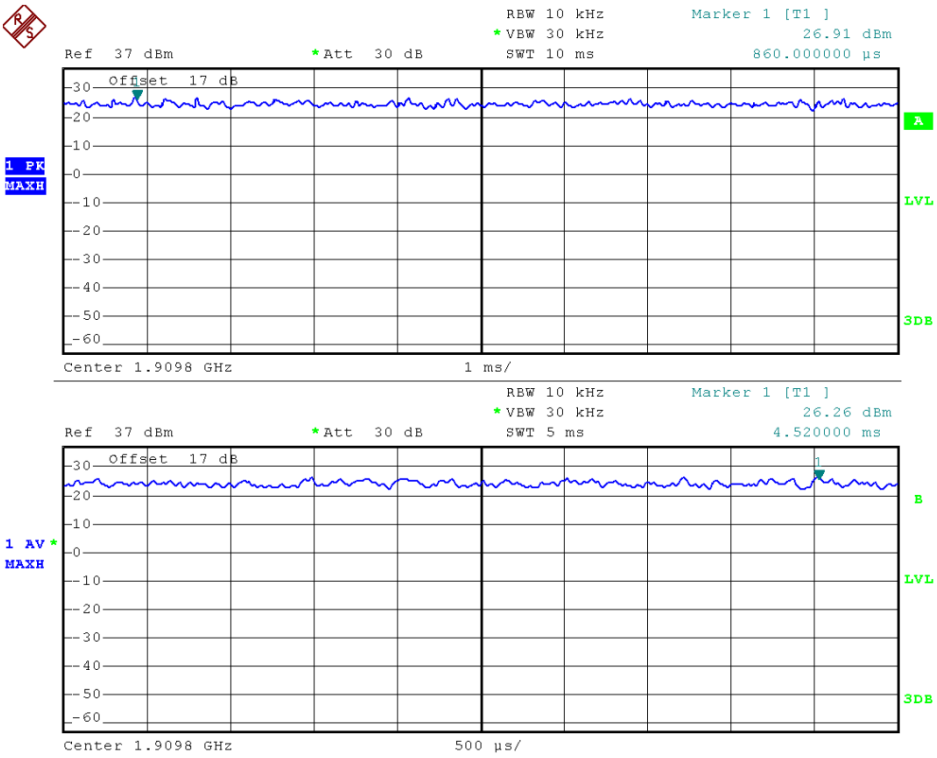
(Plot A3: GSM 1900MHz Channel = 810)



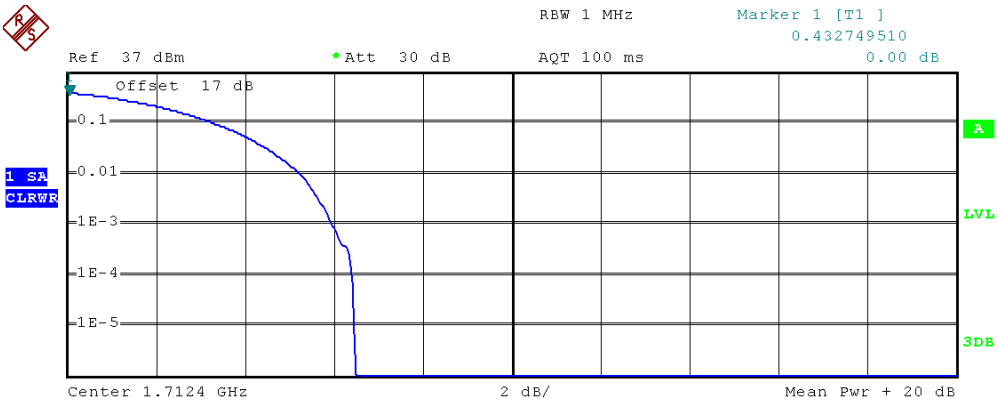
(Plot B1: EDGE 1900 MHz Channel = 512)



(Plot B2: EDGE 1900 MHz Channel = 661)



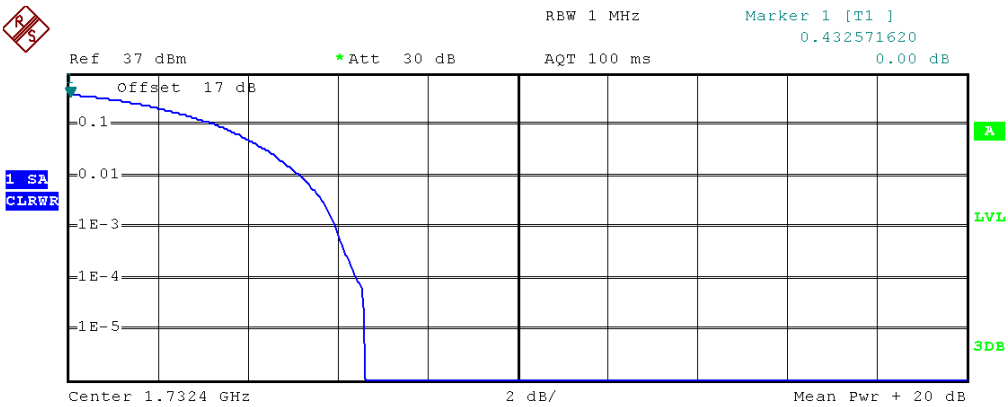
(Plot B3: EDGE 1900MHz Channel = 810)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	14.02 dBm
Peak	20.49 dBm
Crest	6.47 dB
10 %	3.36 dB
1 %	5.28 dB
.1 %	6.00 dB
.01 %	6.44 dB

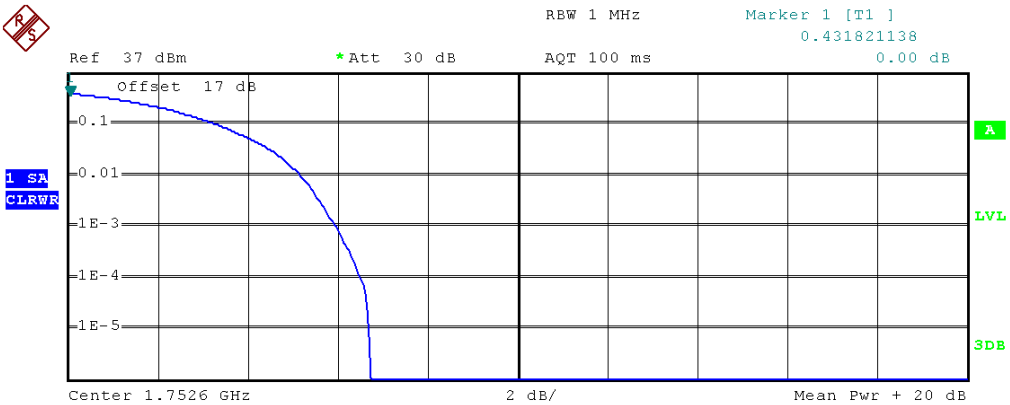
(Plot C1: WCDMA 1700MHz Channel = 1312)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	13.17 dBm
Peak	19.78 dBm
Crest	6.62 dB
10 %	3.40 dB
1 %	5.20 dB
.1 %	6.00 dB
.01 %	6.44 dB

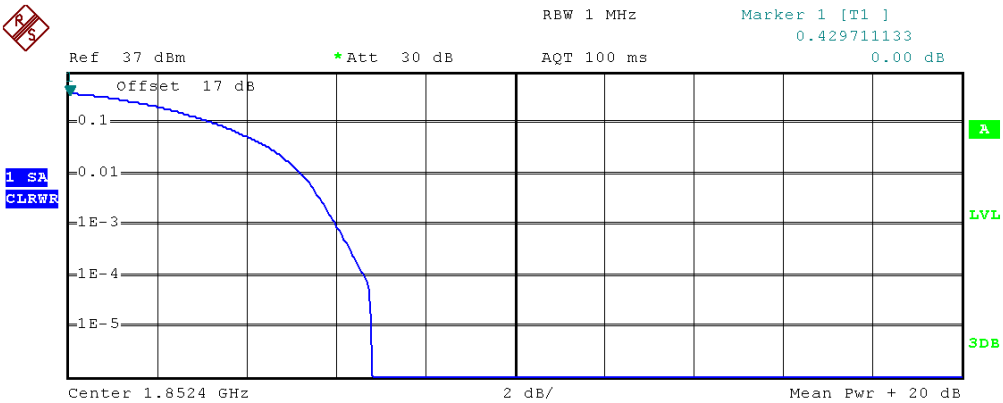
(Plot C2: WCDMA 1700MHz Channel = 1412)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	12.56 dBm
Peak	19.29 dBm
Crest	6.72 dB
10 %	3.40 dB
1 %	5.20 dB
.1 %	6.00 dB
.01 %	6.52 dB

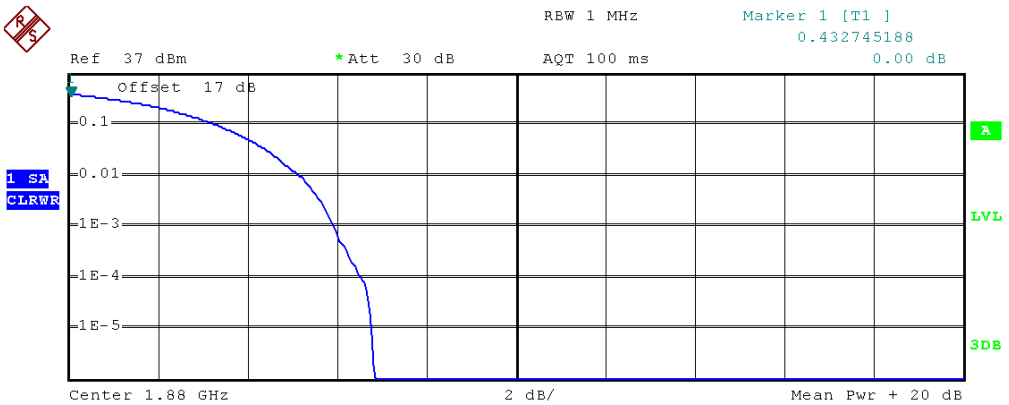
(Plot C3: WCDMA 1700MHz Channel =1513)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	13.82 dBm
Peak	20.63 dBm
Crest	6.81 dB
10 %	3.40 dB
1 %	5.24 dB
.1 %	6.04 dB
.01 %	6.68 dB

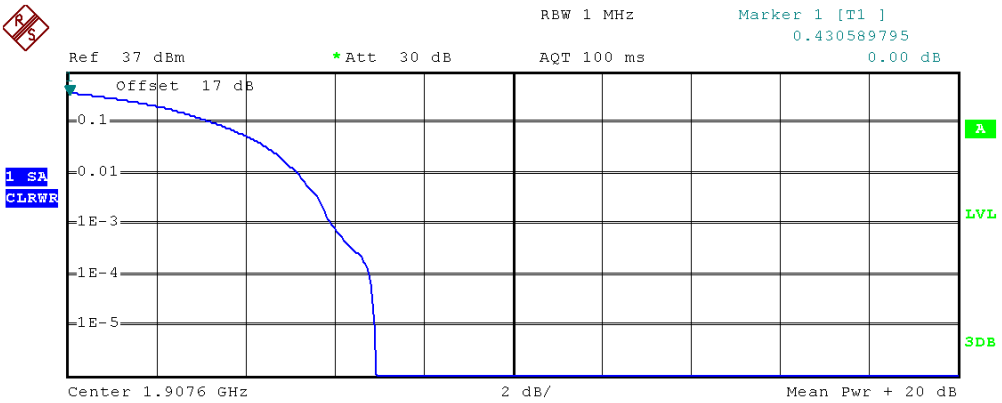
(Plot D1: WCDMA 1900MHz Channel = 9262)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	14.56 dBm
Peak	21.40 dBm
Crest	6.84 dB
10 %	3.36 dB
1 %	5.20 dB
.1 %	5.96 dB
.01 %	6.56 dB

(Plot D2: WCDMA 1900MHz Channel = 9400)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	15.31 dBm
Peak	22.25 dBm
Crest	6.94 dB
10 %	3.40 dB
1 %	5.20 dB
.1 %	5.96 dB
.01 %	6.80 dB

(Plot D3: WCDMA 1900MHz Channel = 9538)

2.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement

2.3.1 Definition

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

2.3.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

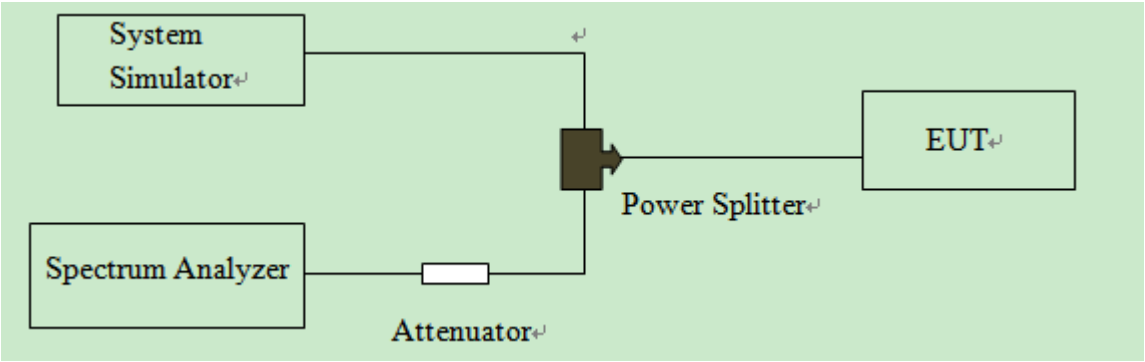
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.

5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

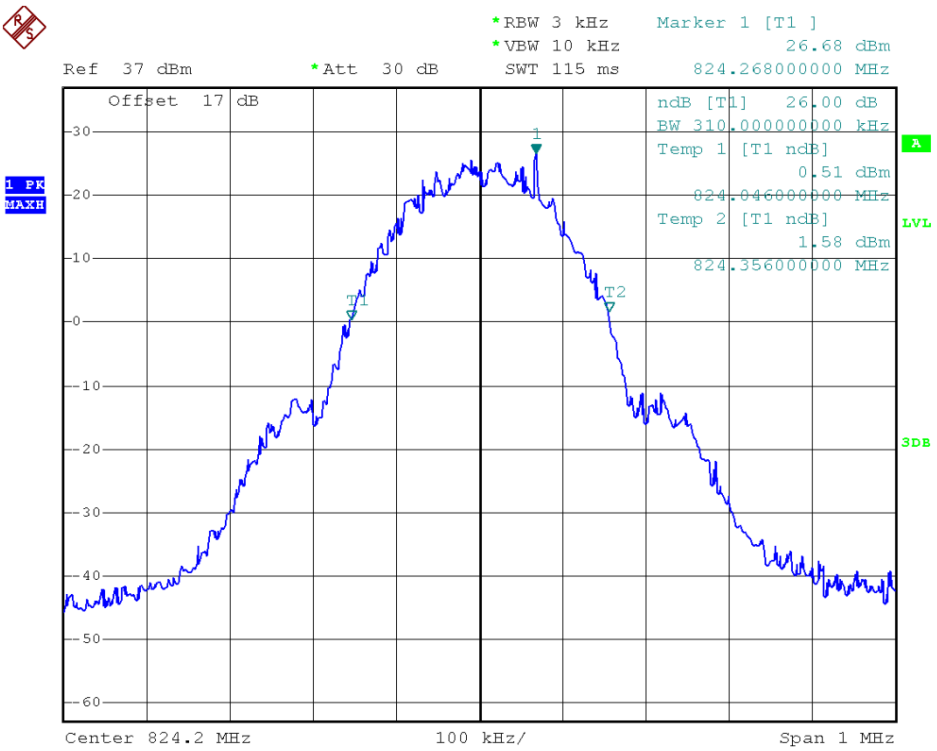
2.3.4 Test Setup



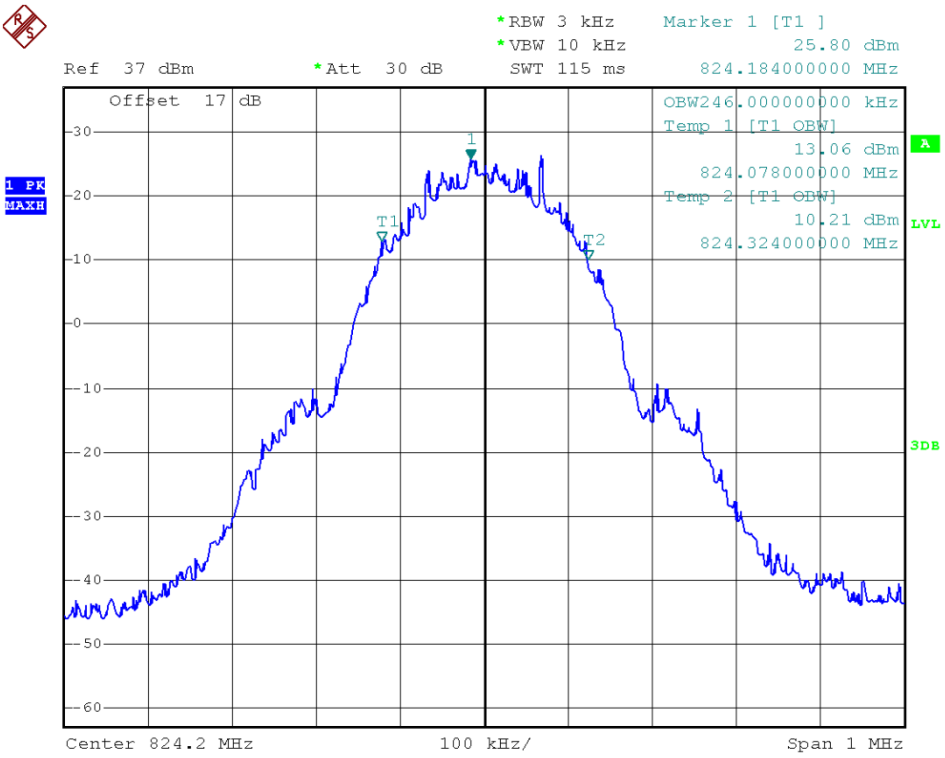
2.3.5 Test Results of 99% Occupied Bandwidth and 26dB Bandwidth

Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
GSM 850MHz	128	824.2	310kHz	246kHz	Plot A1-A2
	190	836.6	308kHz	246kHz	Plot A3-A4
	251	848.8	310kHz	242kHz	Plot A5-A6
GSM 1900MHz	512	1850.2	314kHz	242kHz	Plot B1-B2
	661	1880.0	312kHz	244kHz	Plot B3-B4
	810	1909.8	306kHz	246kHz	Plot B5-B6
EDGE 850MHz	128	824.2	304kHz	246kHz	Plot C1-C2
	190	836.6	312kHz	244kHz	Plot C3-C4
	251	848.8	310kHz	244kHz	Plot C5-C6
EDGE 1900MHz	512	1850.2	318kHz	248kHz	Plot D1-D2
	661	1880.0	312kHz	246kHz	Plot D3-D4
	810	1909.8	314kHz	250kHz	Plot D5-D6
WCDMA 850MHz	4132	826.4	4.88MHz	4.22MHz	Plot E1-E2
	4183	836.6	4.86MHz	4.22MHz	Plot E3-E4
	4233	846.6	4.92MHz	4.24MHz	Plot E5-E6
WCDMA 1900MHz	9262	1852.4	5.04MHz	4.26MHz	Plot F1-F2
	9400	1880	4.94MHz	4.24MHz	Plot F3-F4
	9538	1907.6	4.98MHz	4.26MHz	Plot F5-F6
WCDMA 1700MHz	1312	1712.4	4.94MHz	4.26MHz	Plot G1-G2
	1412	1732.4	4.92MHz	4.24MHz	Plot G3-G4
	1513	1752.6	4.88MHz	4.22MHz	Plot G5-G6

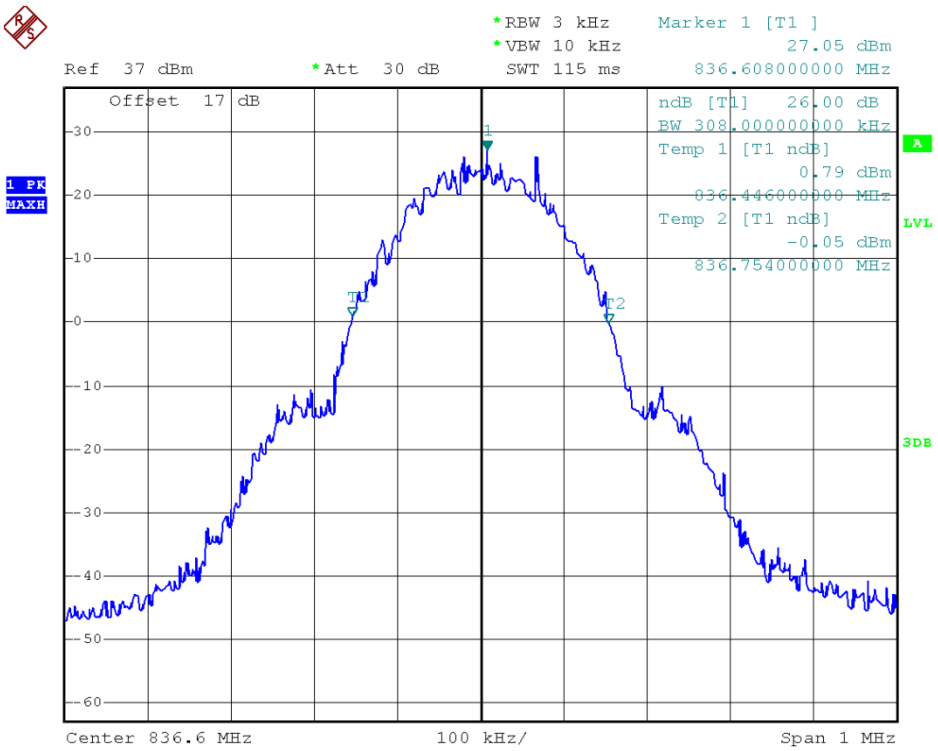
2.3.6 Test Results (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth



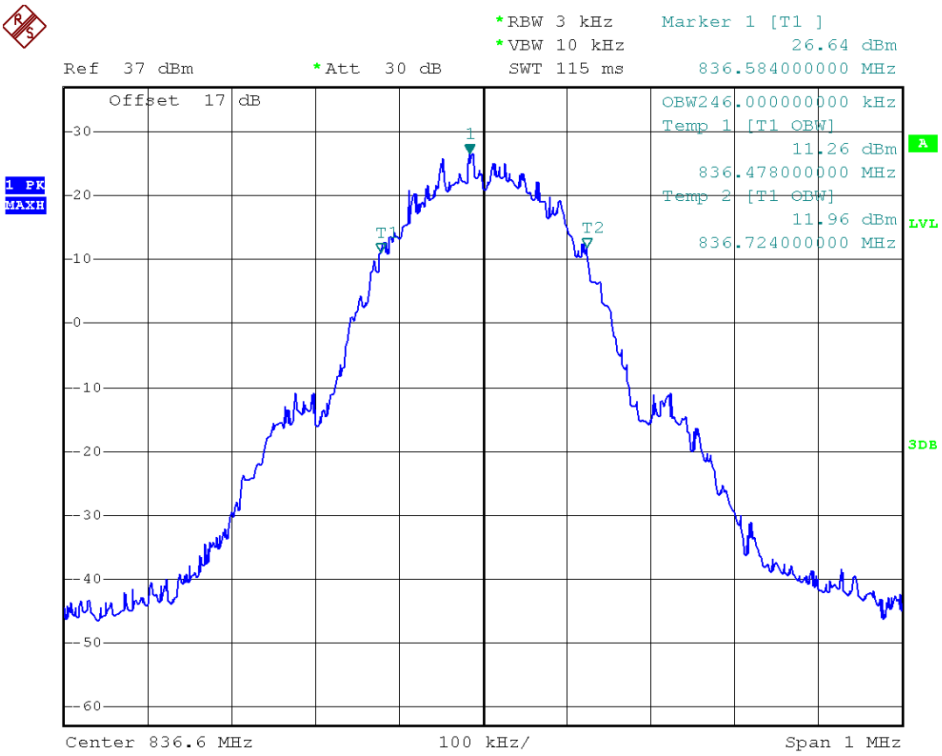
(Plot A1: GSM 850MHz Channel = 128 26dB bandwidth)



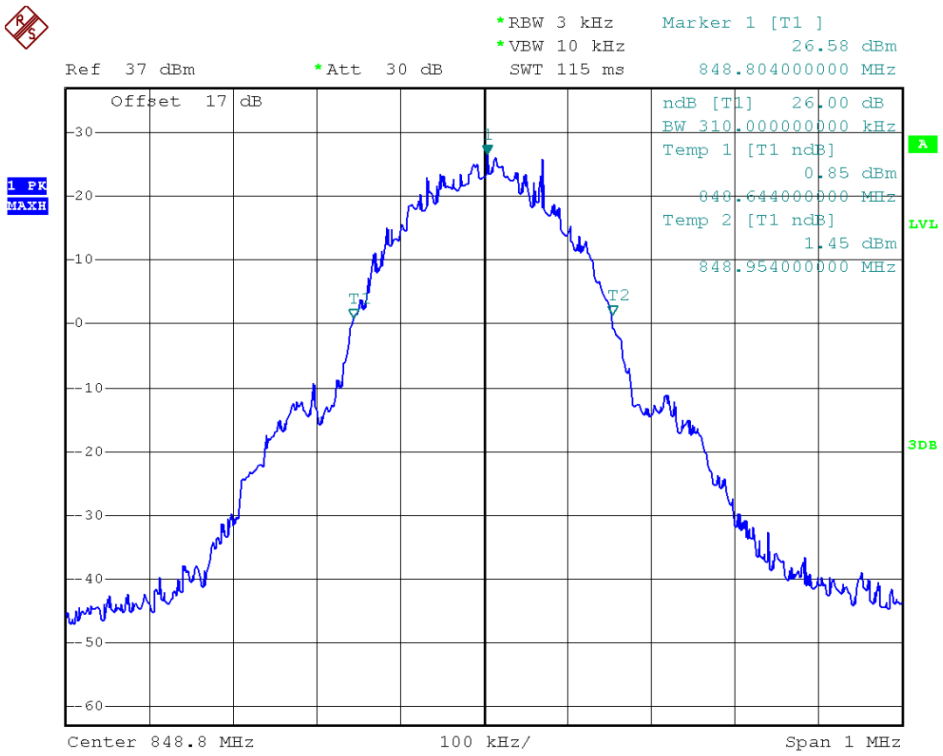
(Plot A2: GSM 850MHz Channel = 128 99% Occupied Bandwidth)



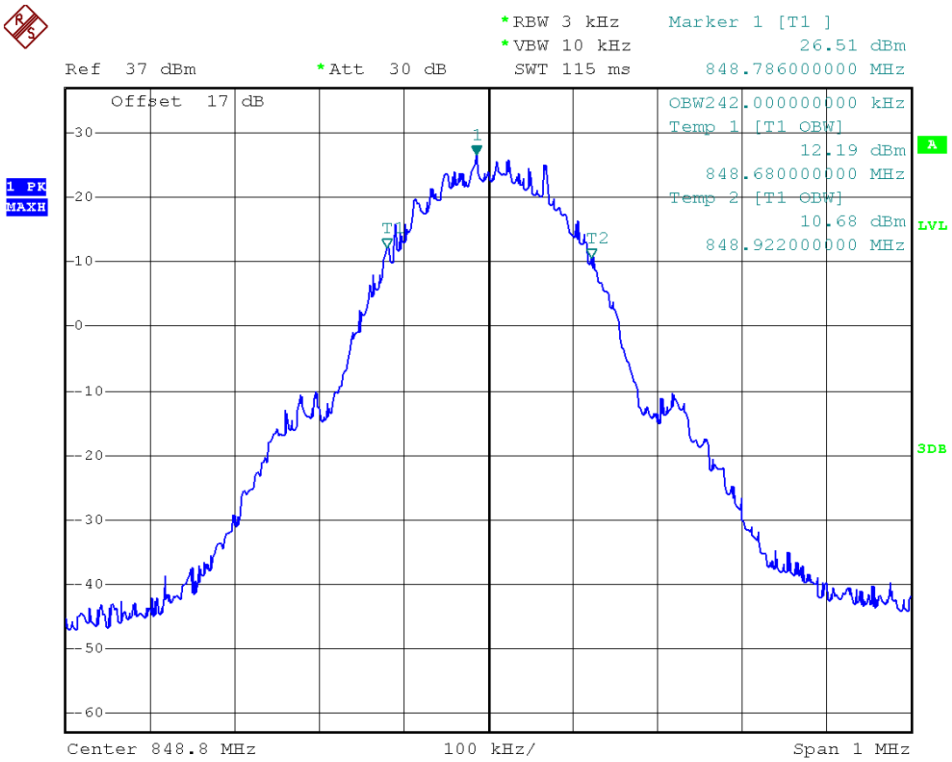
(Plot A3: GSM 850MHz Channel = 190 26dB bandwidth)



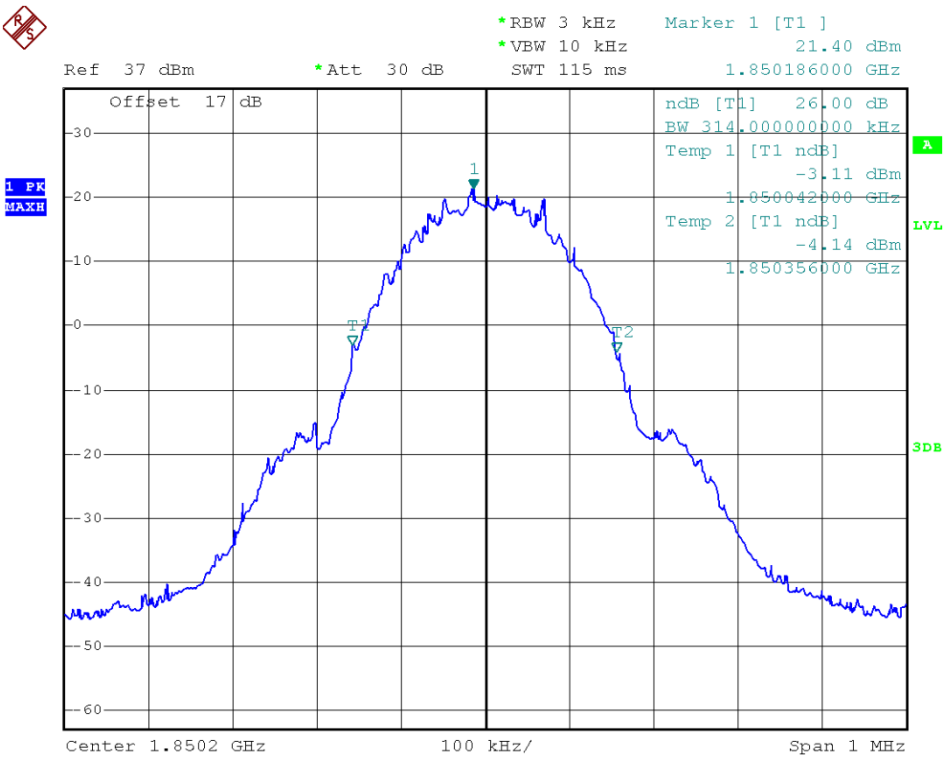
(Plot A4: GSM 850MHz Channel = 190 99% Occupied Bandwidth)



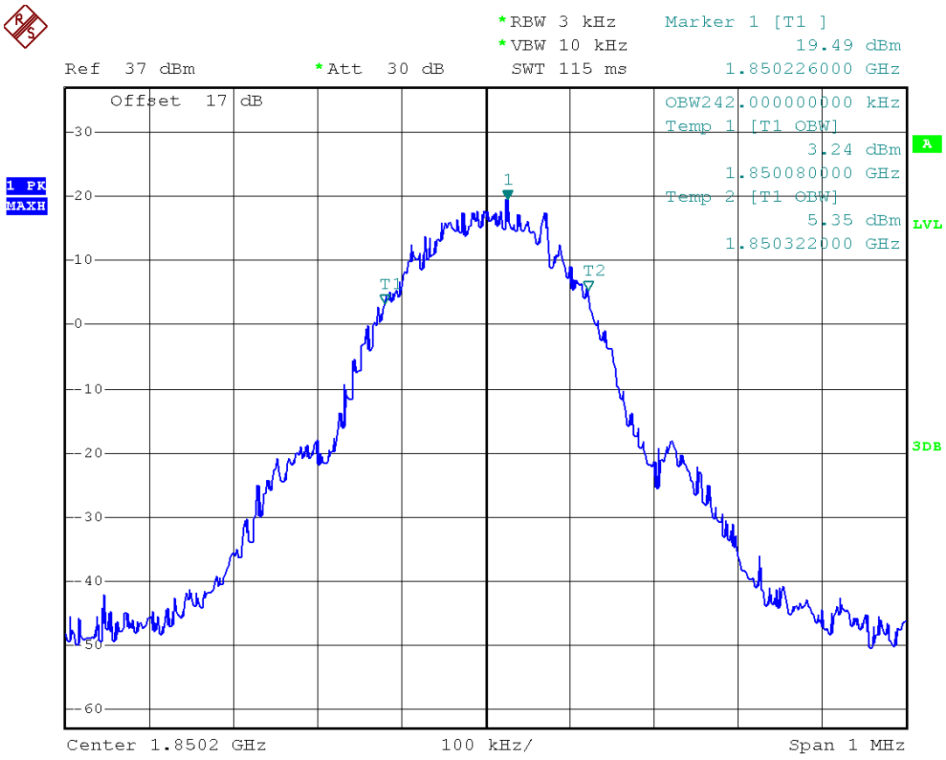
(Plot A5: GSM 850MHz Channel = 251 26dB bandwidth)



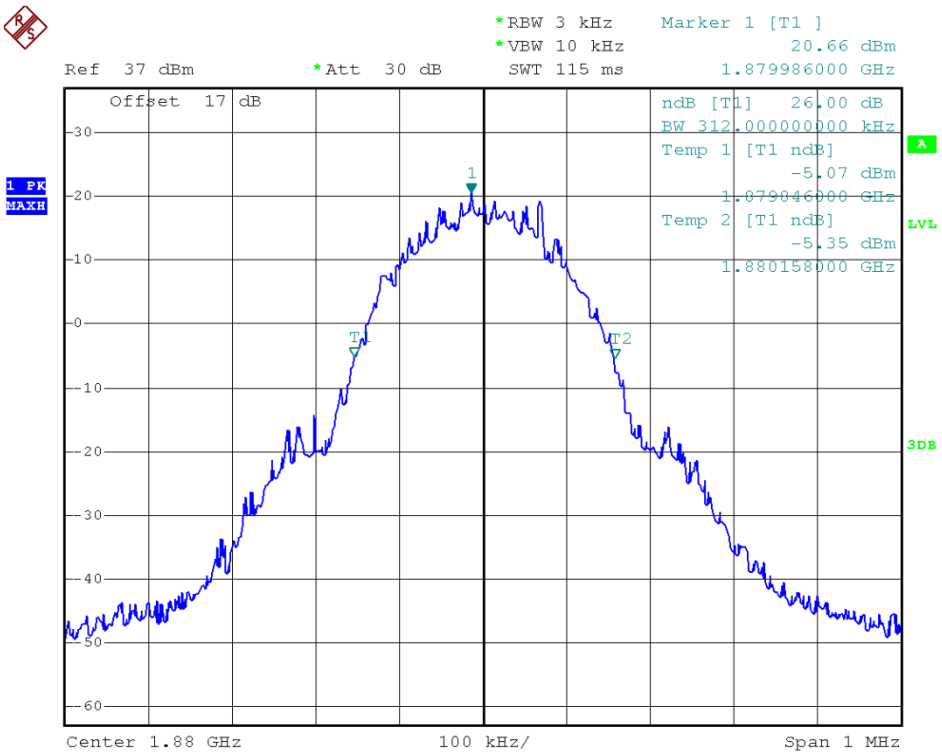
(Plot A6: GSM 850MHz Channel = 251 99% Occupied Bandwidth)



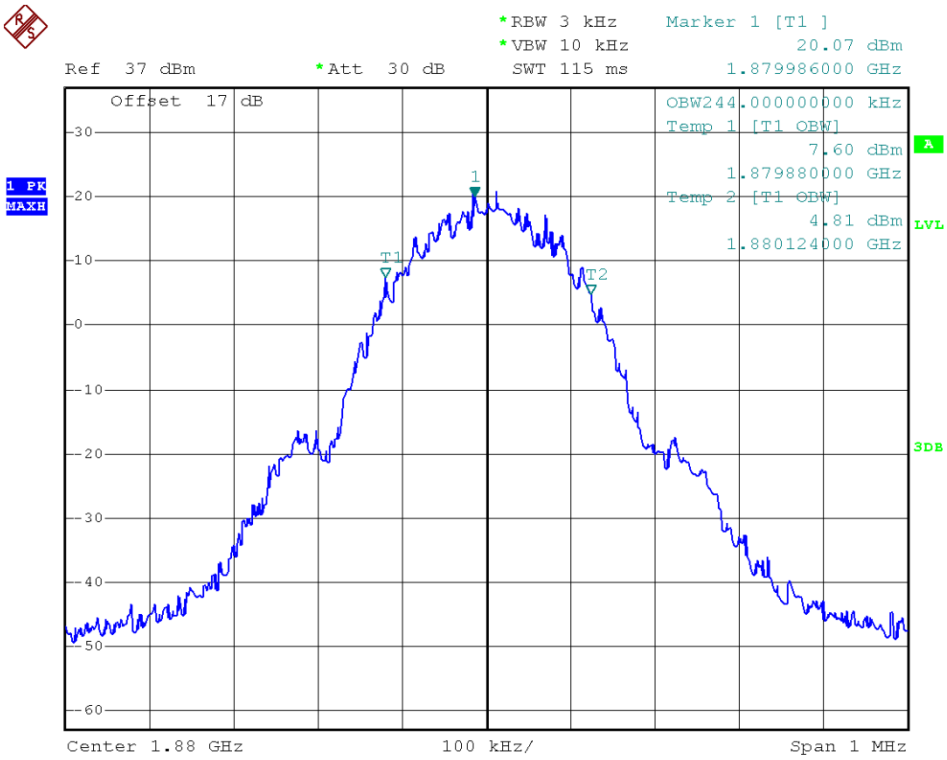
(Plot B1: GSM 1900MHz Channel = 512 26dB bandwidth)



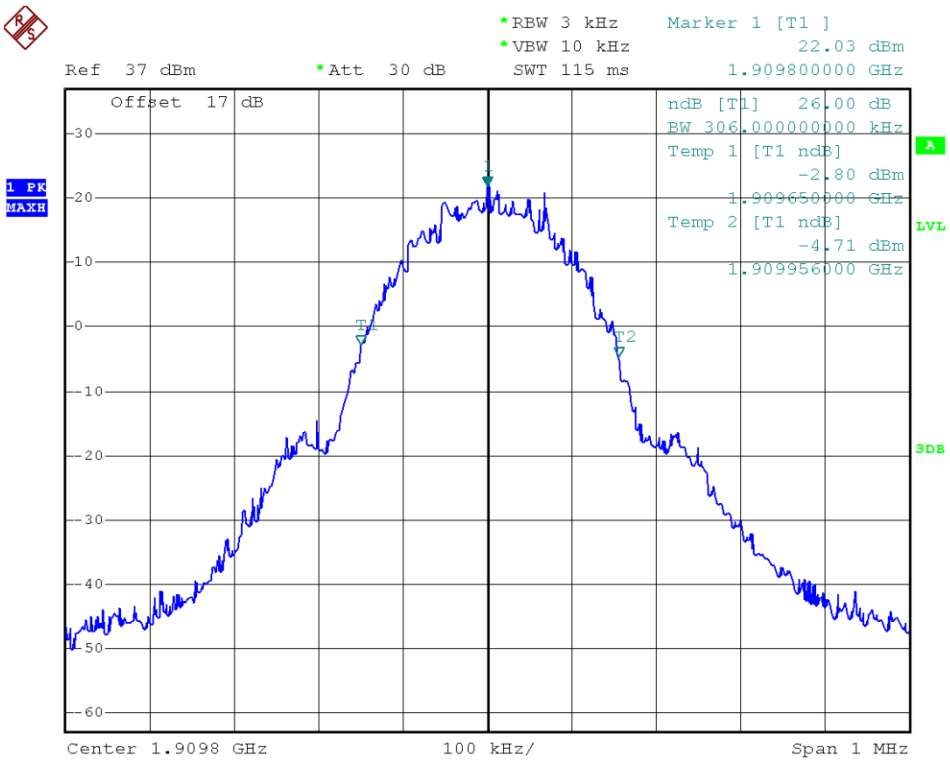
(Plot B2: GSM 1900MHz Channel = 512 99% Occupied Bandwidth)



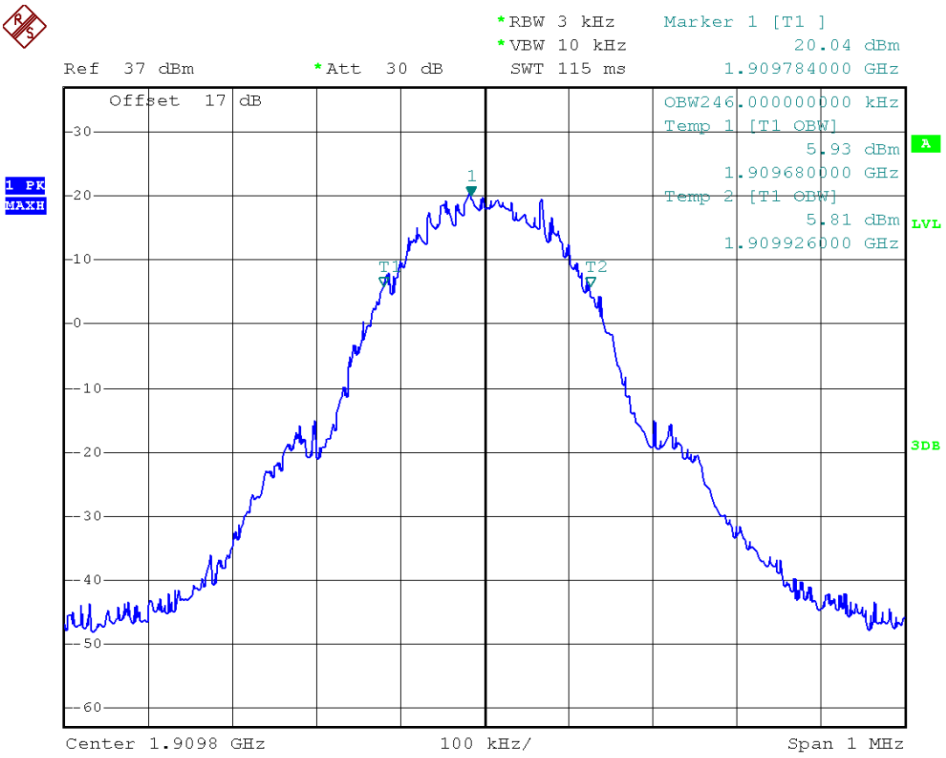
(Plot B3: GSM 1900MHz Channel = 661 26dB bandwidth)



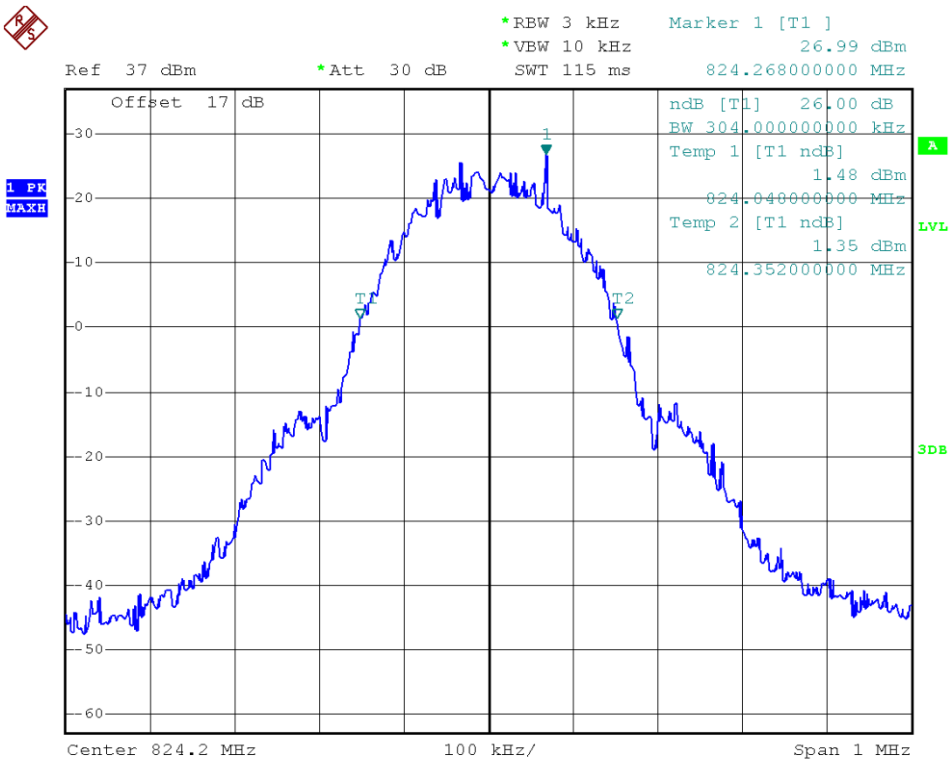
(Plot B4: GSM 1900MHz Channel = 661 99% Occupied Bandwidth)



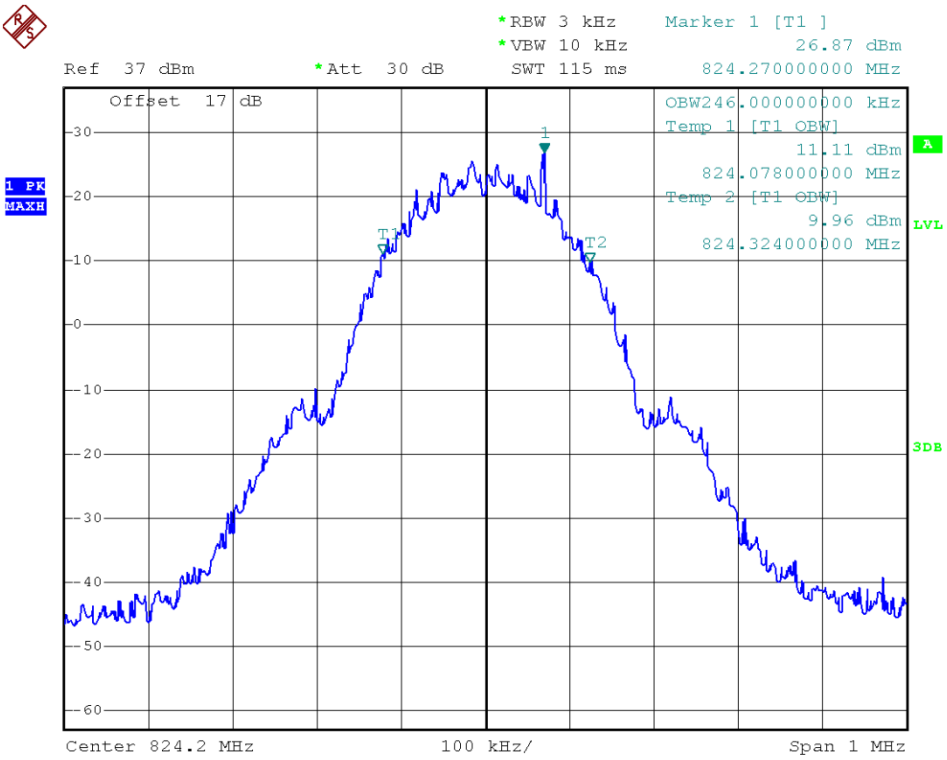
(Plot B5: GSM 1900MHz Channel = 810 26dB bandwidth)



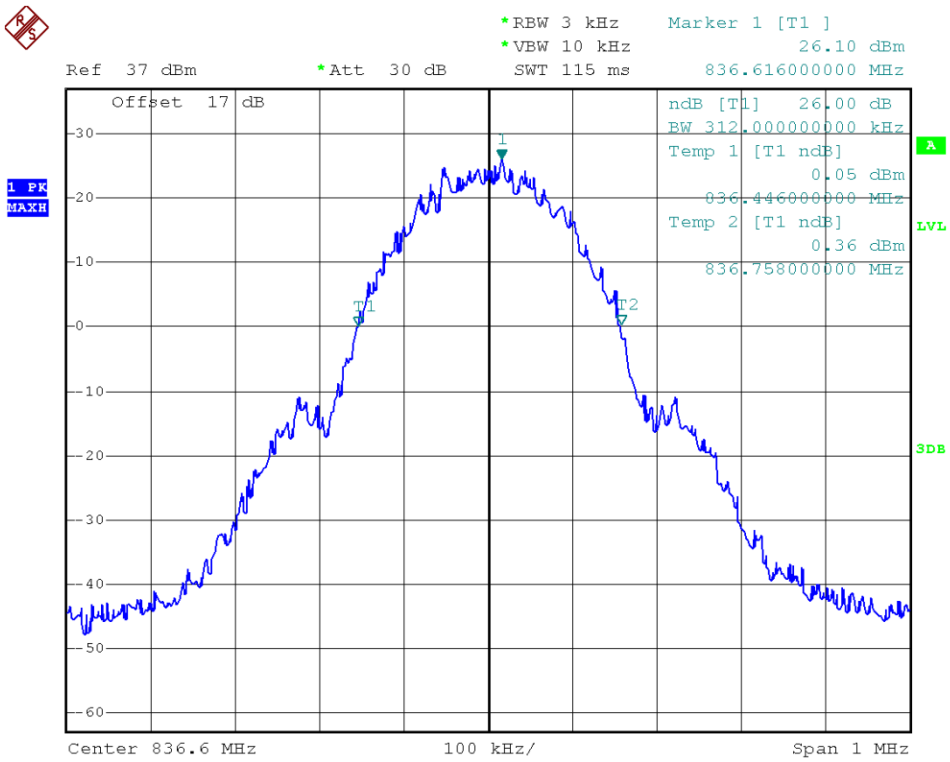
(Plot B6: GSM 1900MHz Channel = 810 99% Occupied Bandwidth)



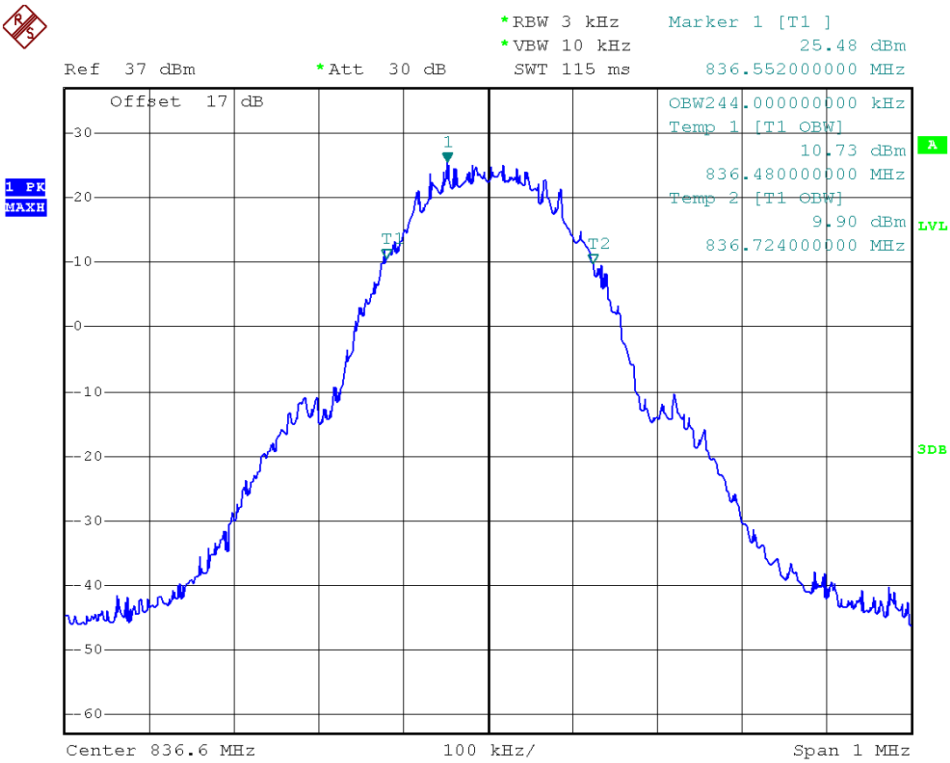
(Plot C1: EDGE 850MHz Channel = 128 26dB bandwidth)



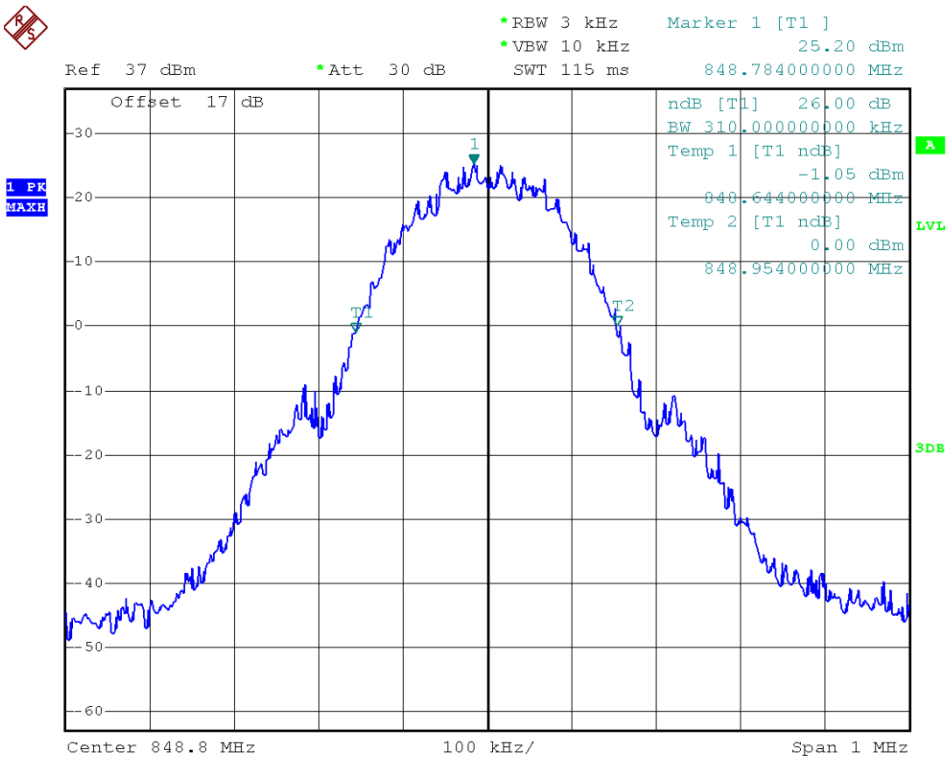
(Plot C2: EDGE 850MHz Channel = 128 99% Occupied Bandwidth)



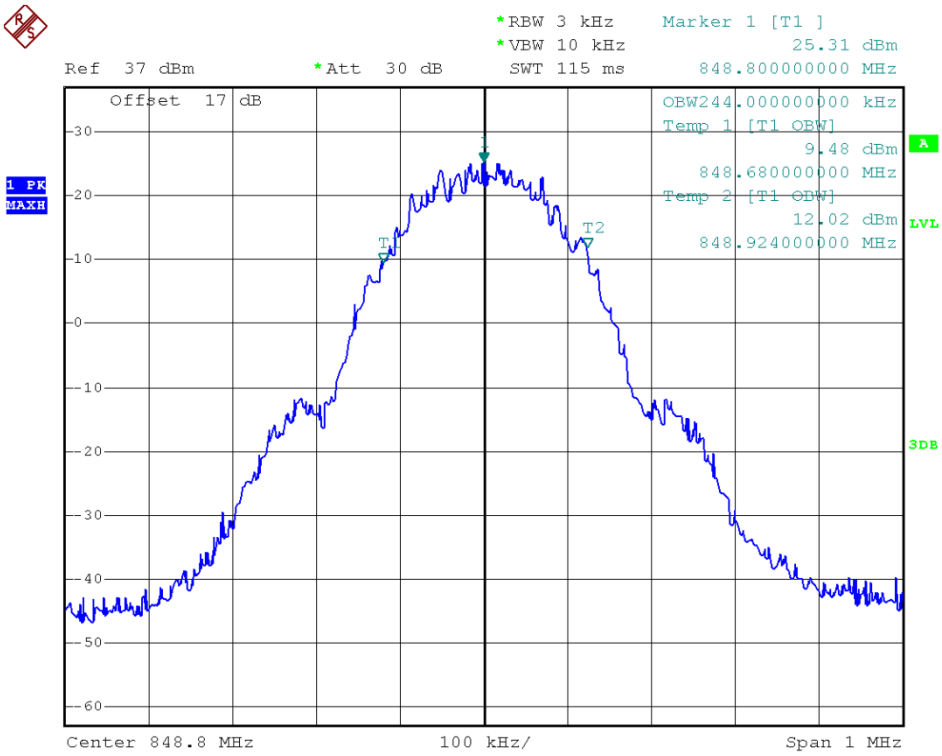
(Plot C3: EDGE 850MHz Channel = 190 26dB bandwidth)



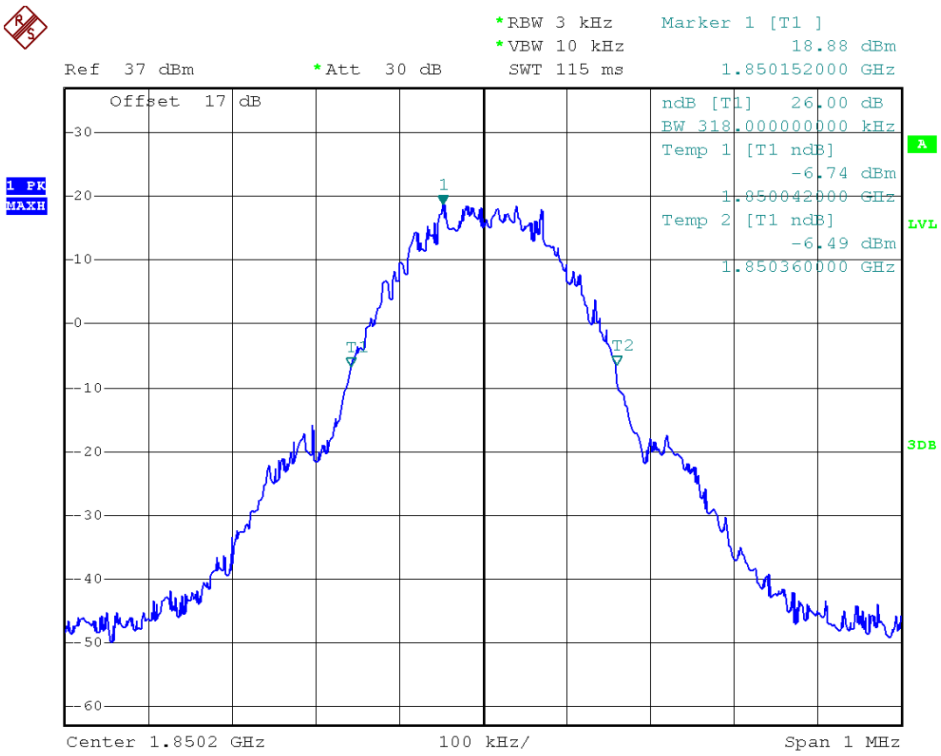
(Plot C4: EDGE 850MHz Channel = 190 99% Occupied Bandwidth)



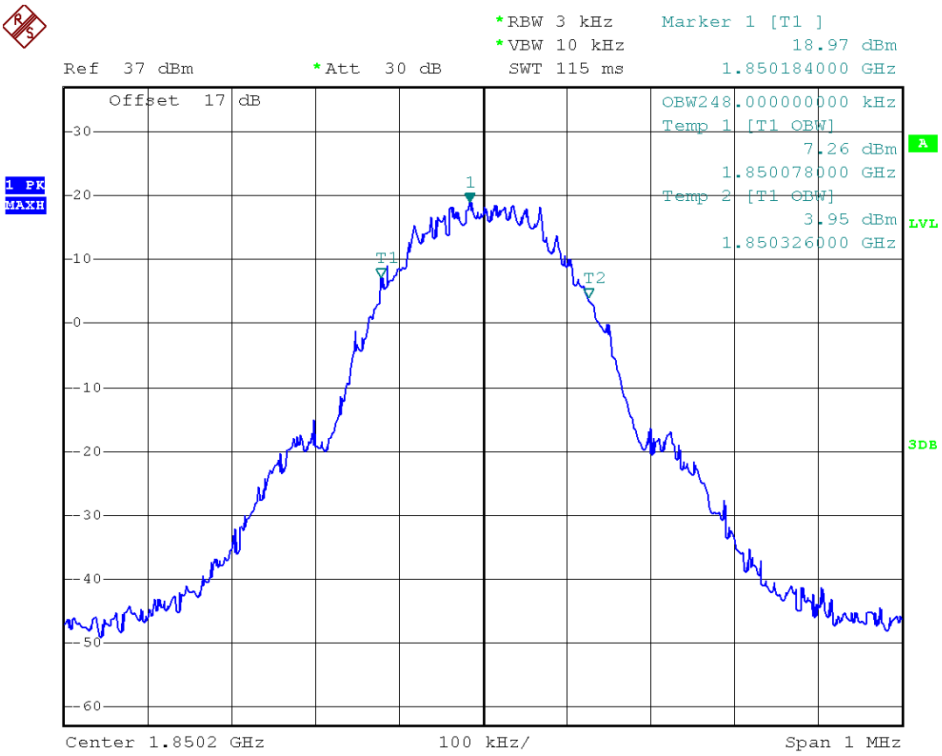
(Plot C5: EDGE 850MHz Channel = 251 26dB bandwidth)



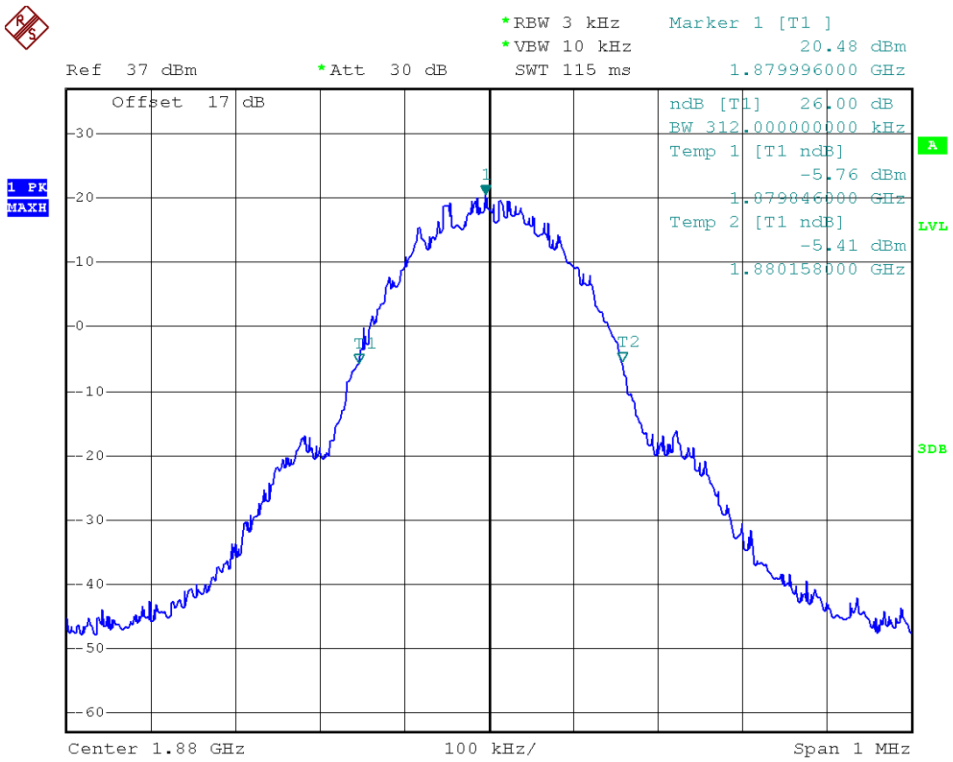
(Plot C6: EDGE 850MHz Channel = 251 99% Occupied Bandwidth)



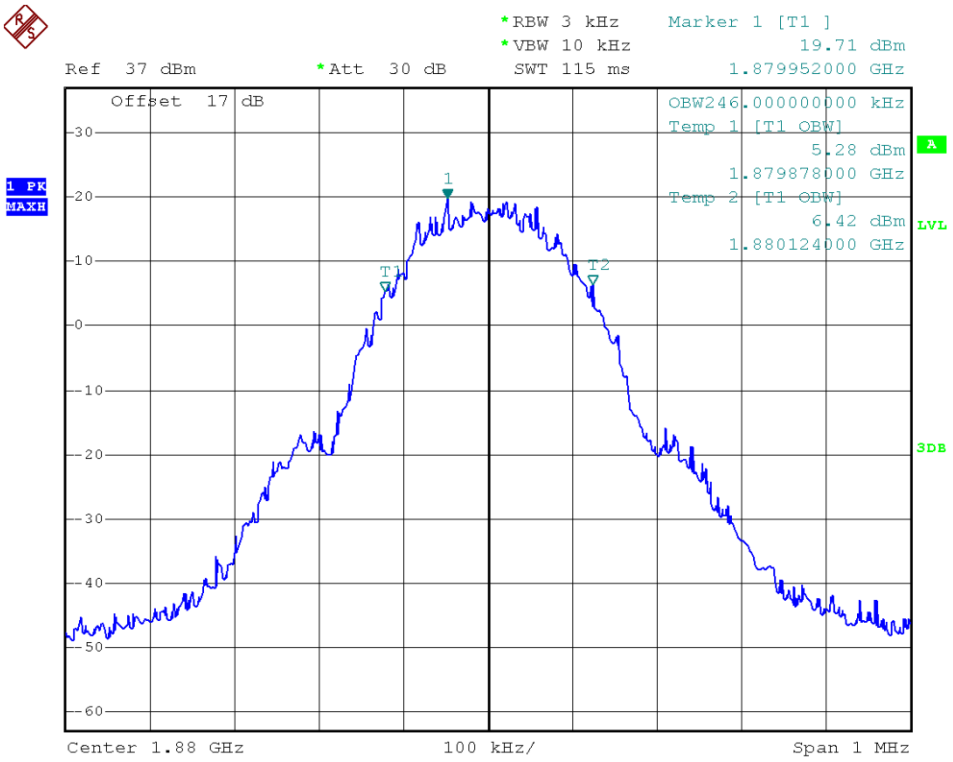
(Plot D1: EDGE 1900MHz Channel = 512 26dB bandwidth)



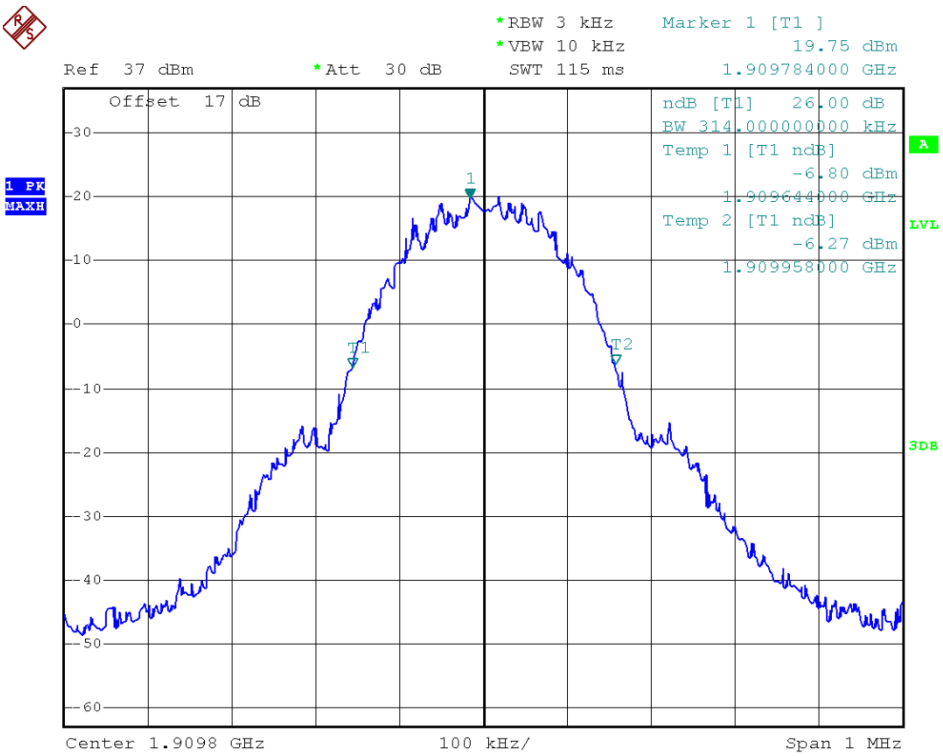
(Plot D2: EDGE 1900MHz Channel = 512 99% Occupied Bandwidth)



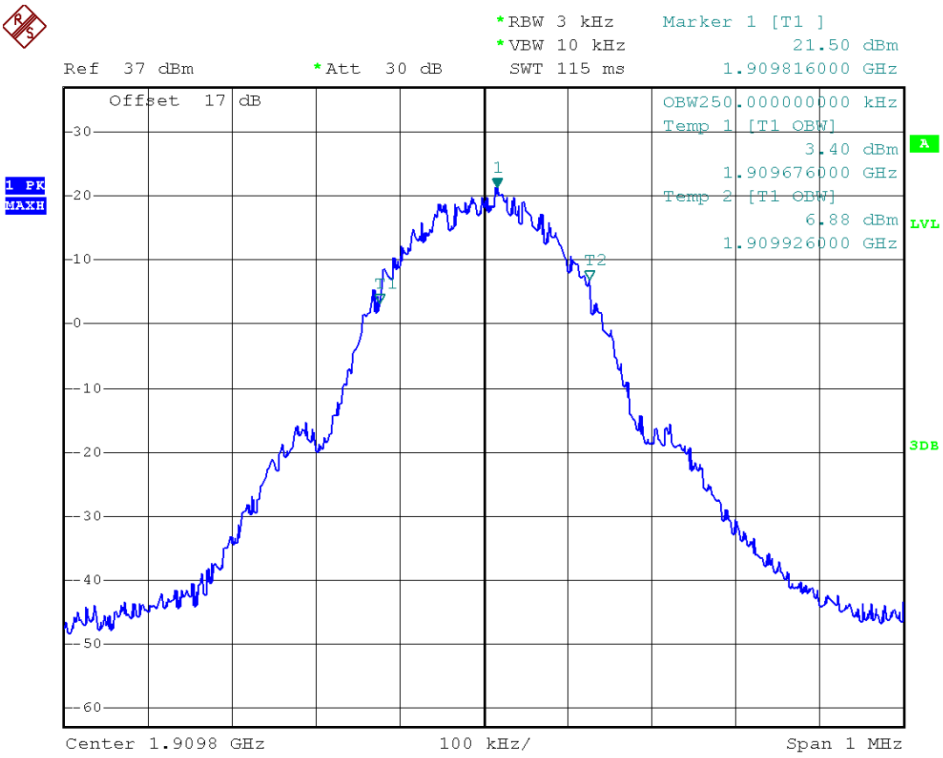
(Plot D3: EDGE 1900MHz Channel = 661 26dB bandwidth)



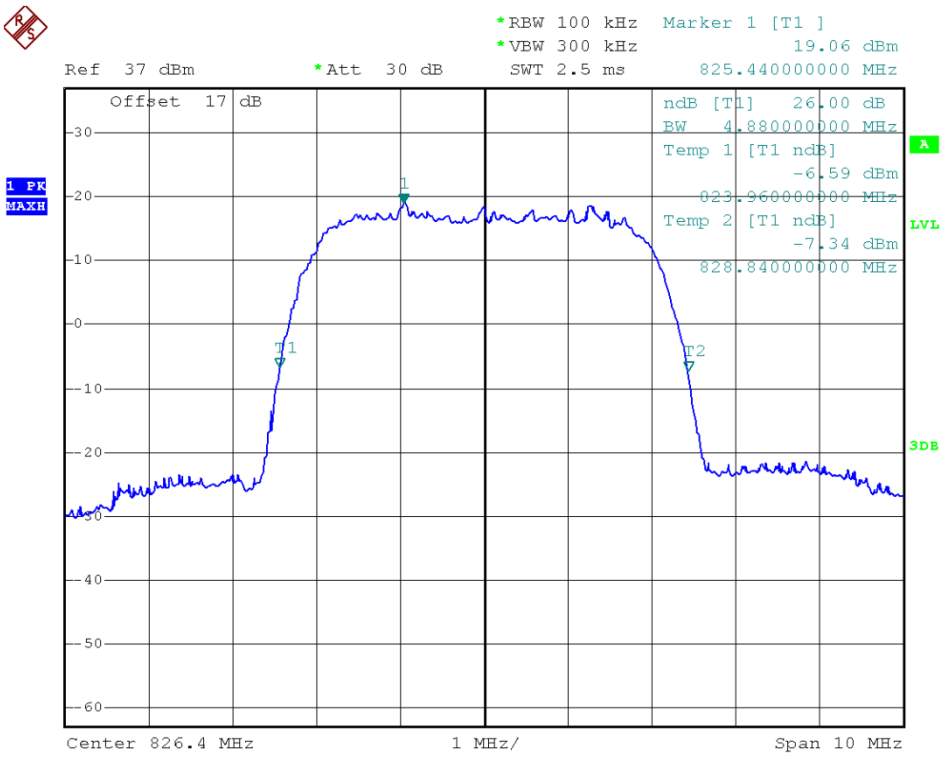
(Plot D4: EDGE 1900MHz Channel = 661 99% Occupied Bandwidth)



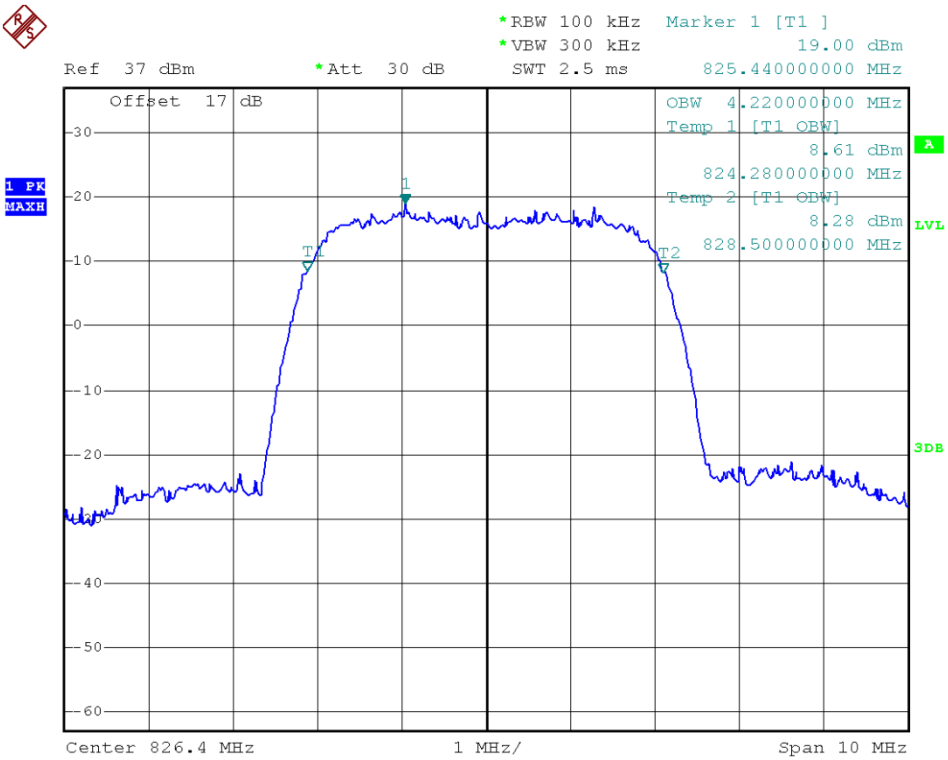
(Plot D5: EDGE 1900MHz Channel = 810 26dB bandwidth)



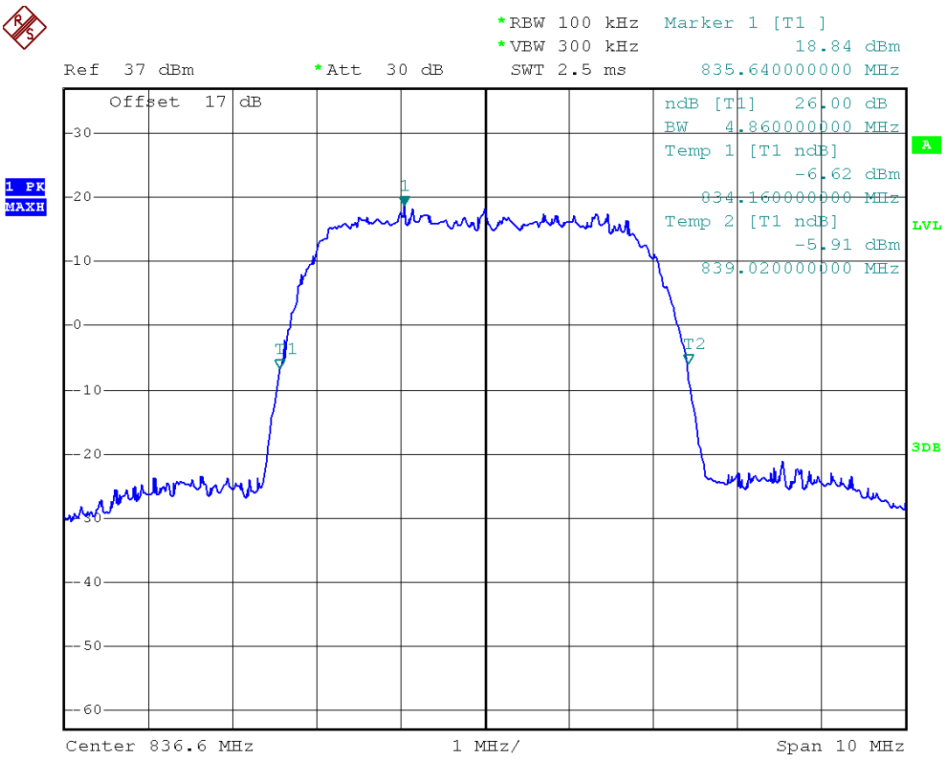
(Plot D6: EDGE 1900MHz Channel = 810 99% Occupied Bandwidth)



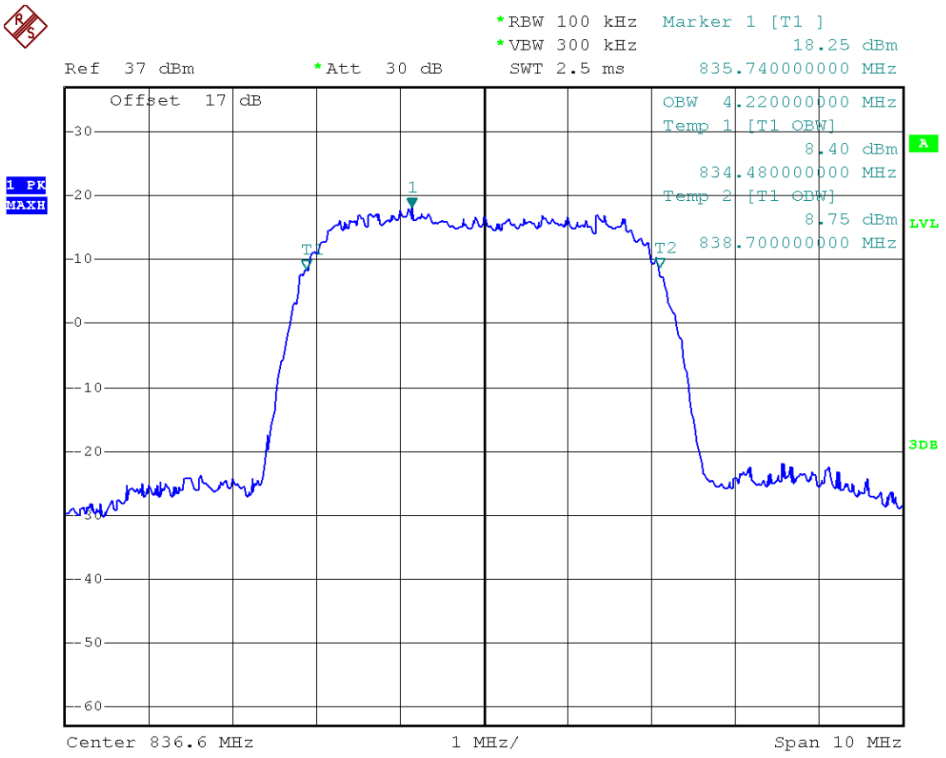
(Plot E1: WCDMA 850MHz Channel = 4132 26dB bandwidth)



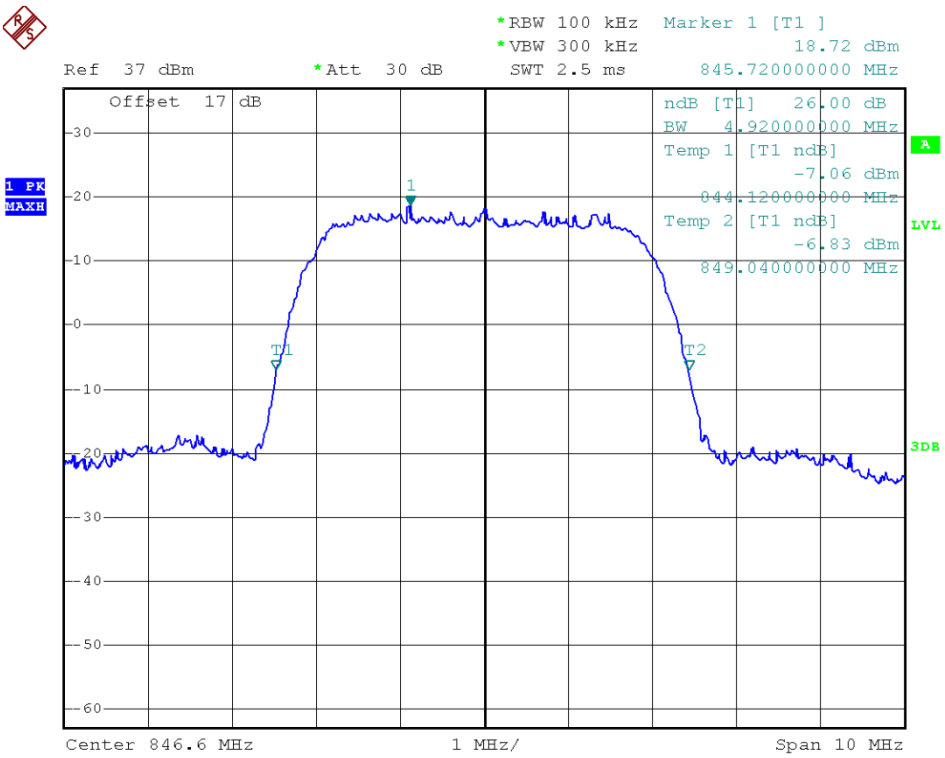
(Plot E2: WCDMA 850MHz Channel = 4132 99% Occupied Bandwidth)



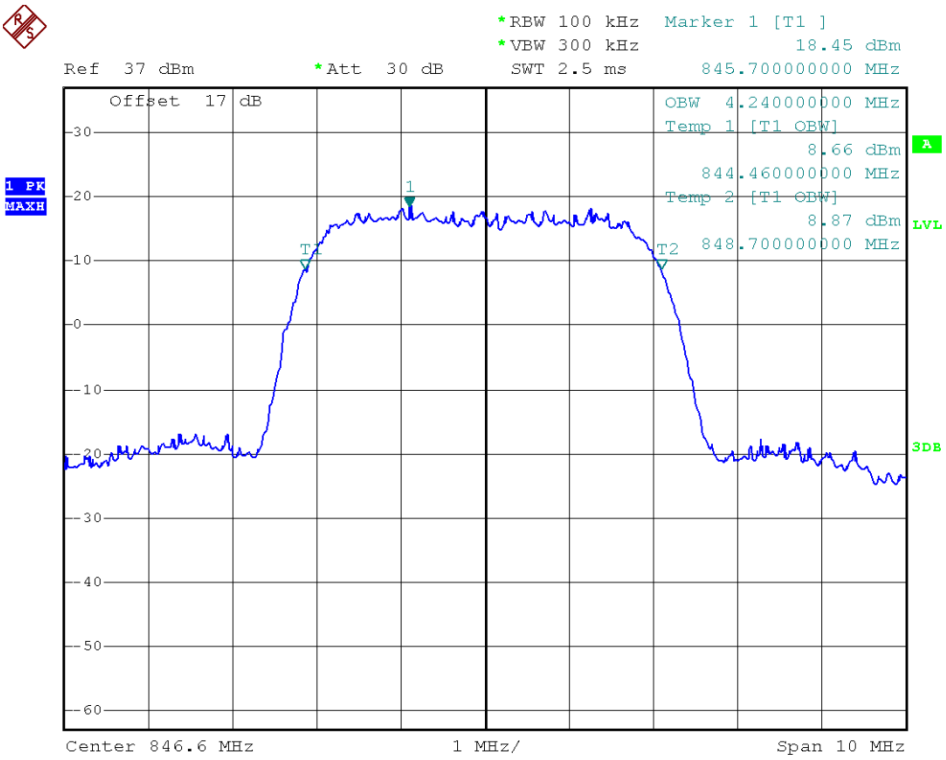
(Plot E3: WCDMA 850MHz Channel = 4183 26dB bandwidth)



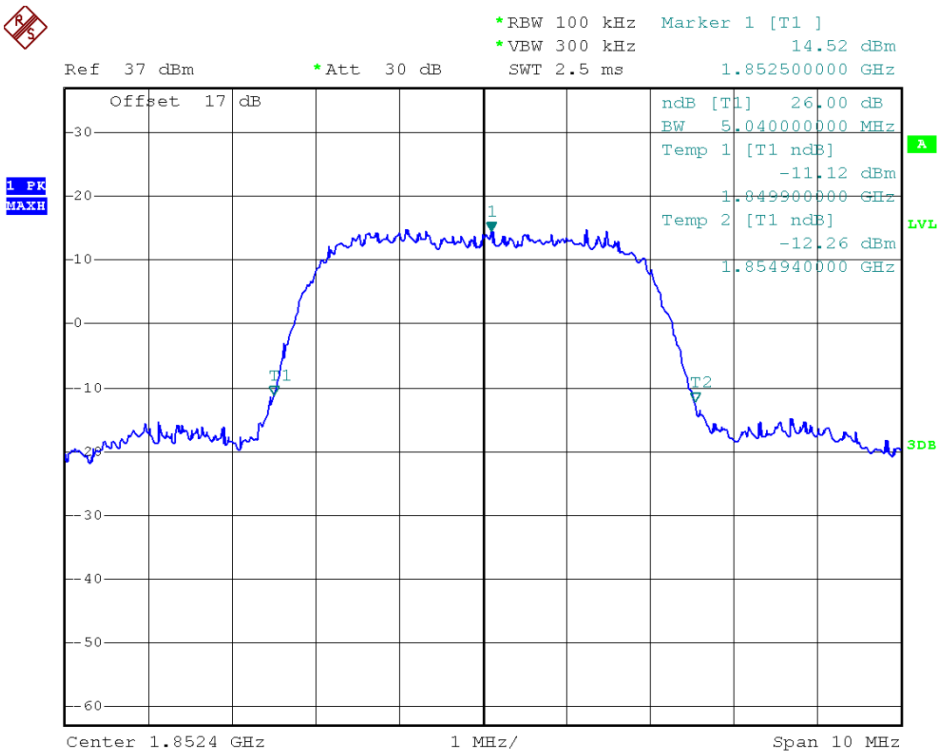
(Plot E4: WCDMA 850MHz Channel = 4183 99% Occupied Bandwidth)



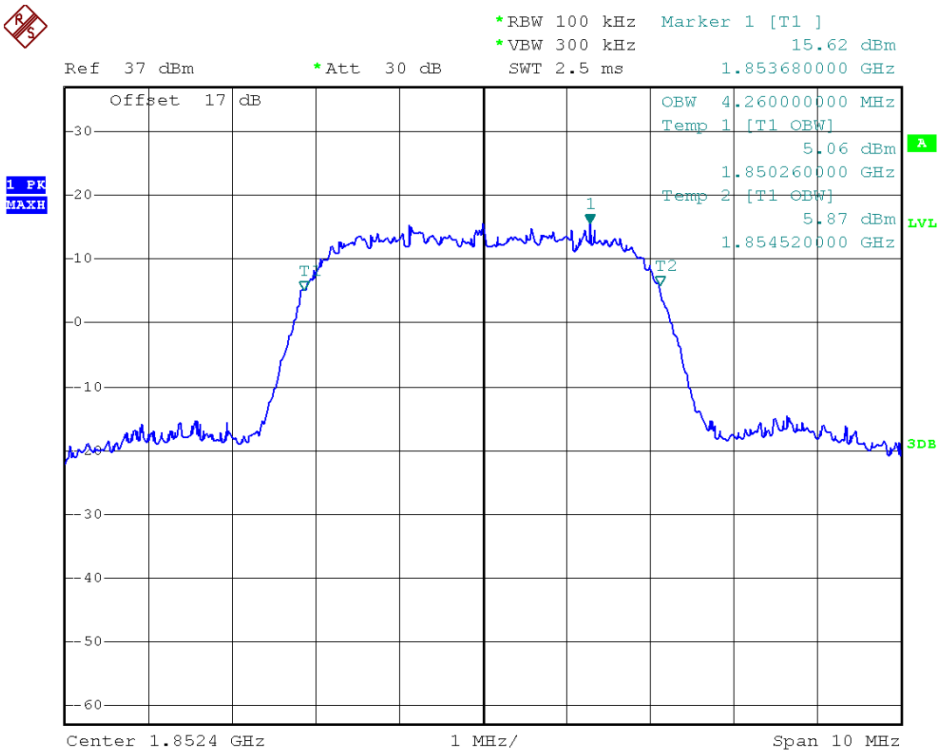
(Plot E5: WCDMA 850MHz Channel = 4233 26dB bandwidth)



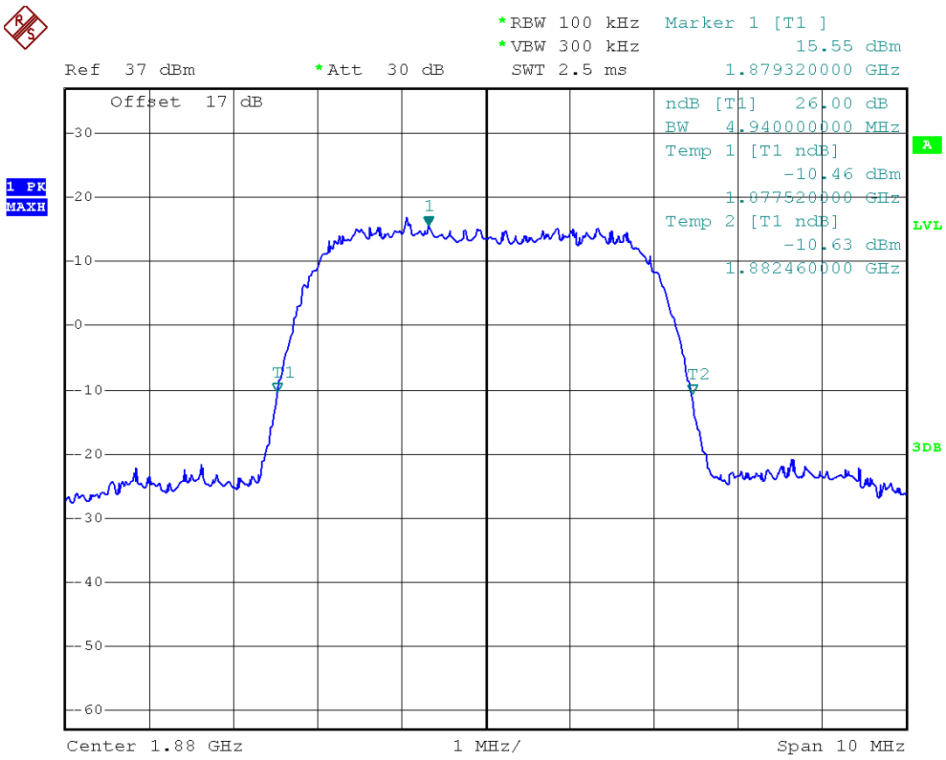
(Plot E6: WCDMA 850MHz Channel = 4233 99% Occupied Bandwidth)



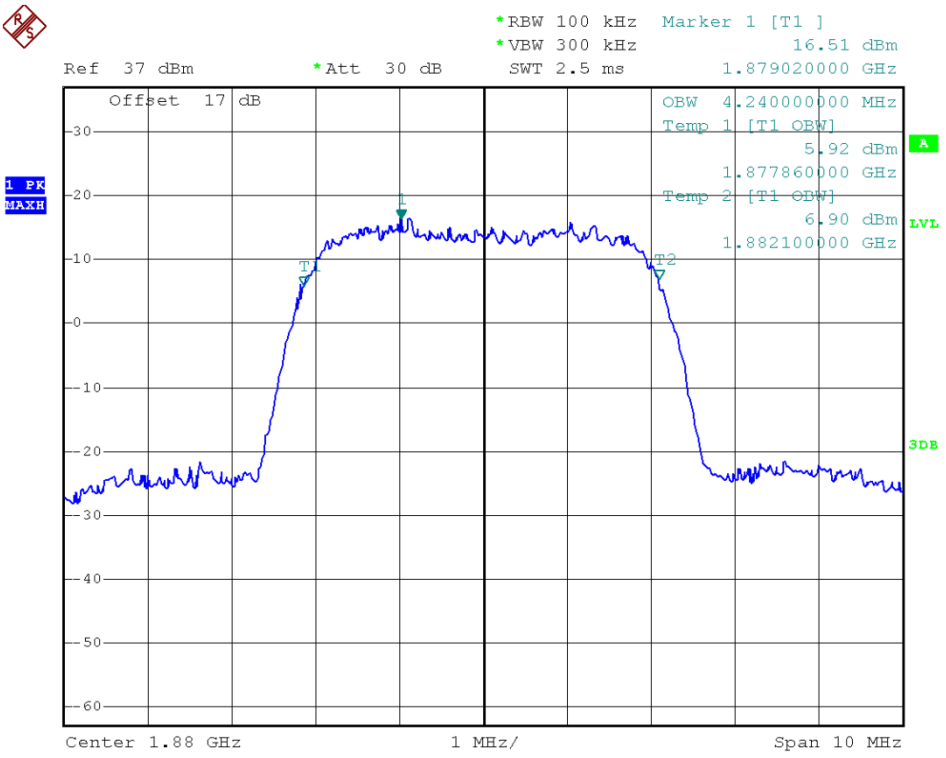
(Plot F1: WCDMA 1900MHz Channel = 9262 26dB bandwidth)



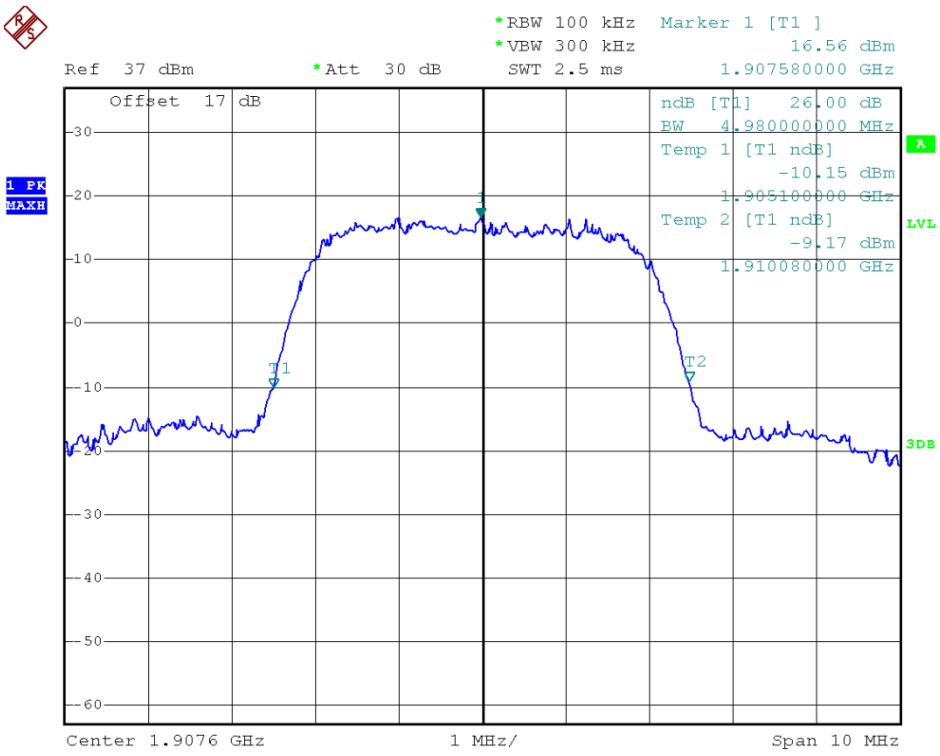
(Plot F2: WCDMA 1900MHz Channel = 9262 99% Occupied Bandwidth)



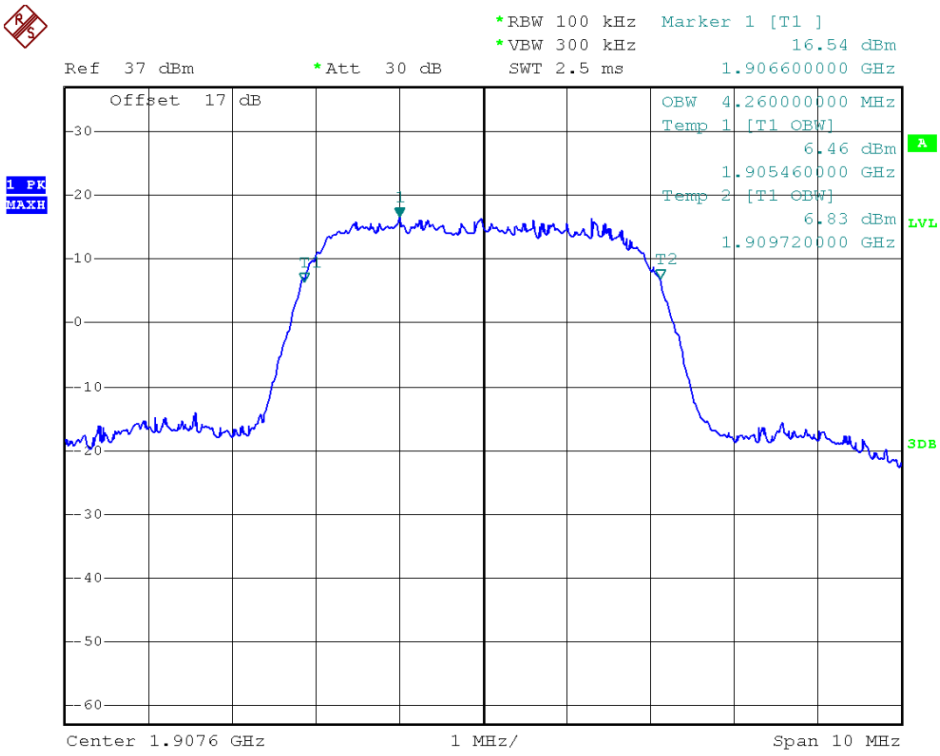
(Plot F3: WCDMA 1900MHz Channel = 9400 26dB bandwidth)



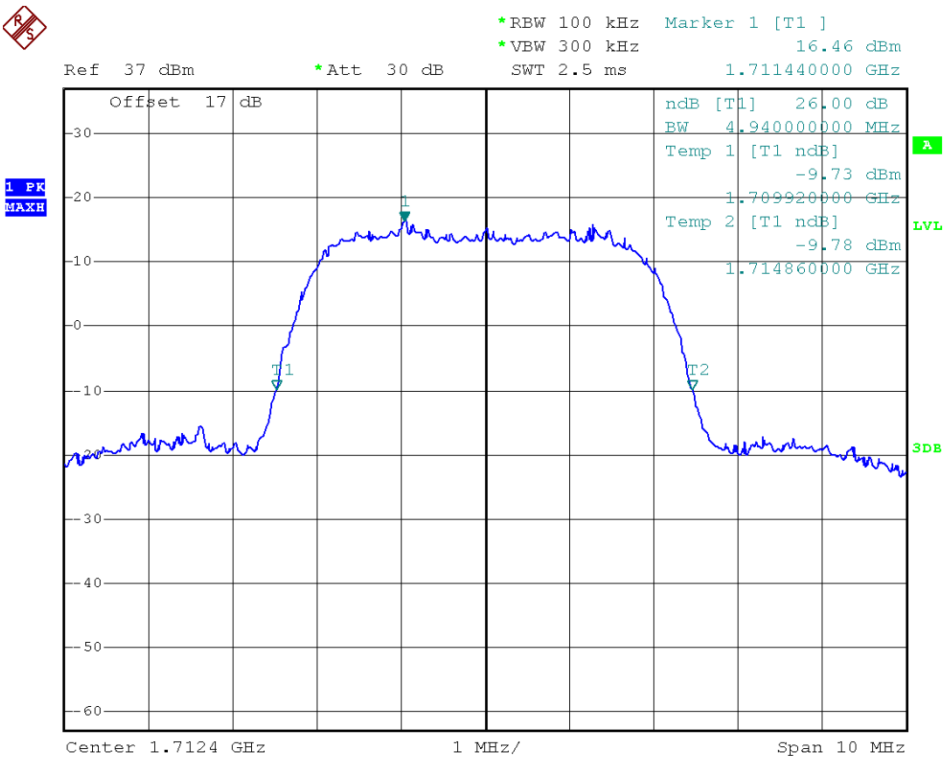
(Plot F4: WCDMA 1900MHz Channel = 9400 99% Occupied Bandwidth)



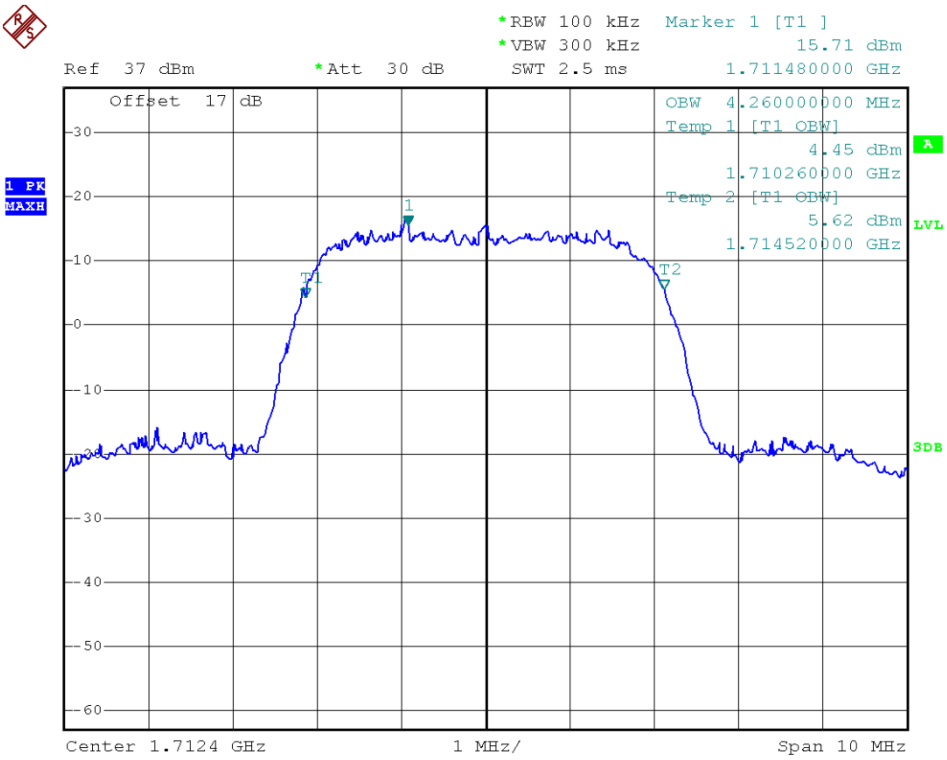
(Plot F5: WCDMA 1900MHz Channel = 9538 26dB bandwidth)



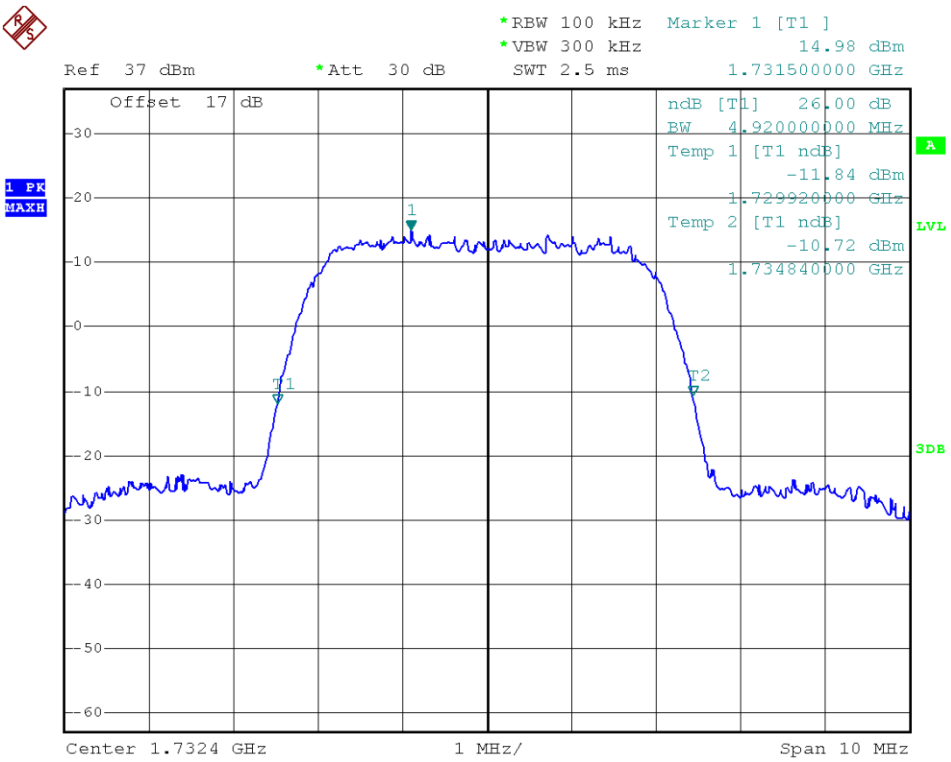
(Plot F6: WCDMA 1900MHz Channel = 9538 99% Occupied Bandwidth)



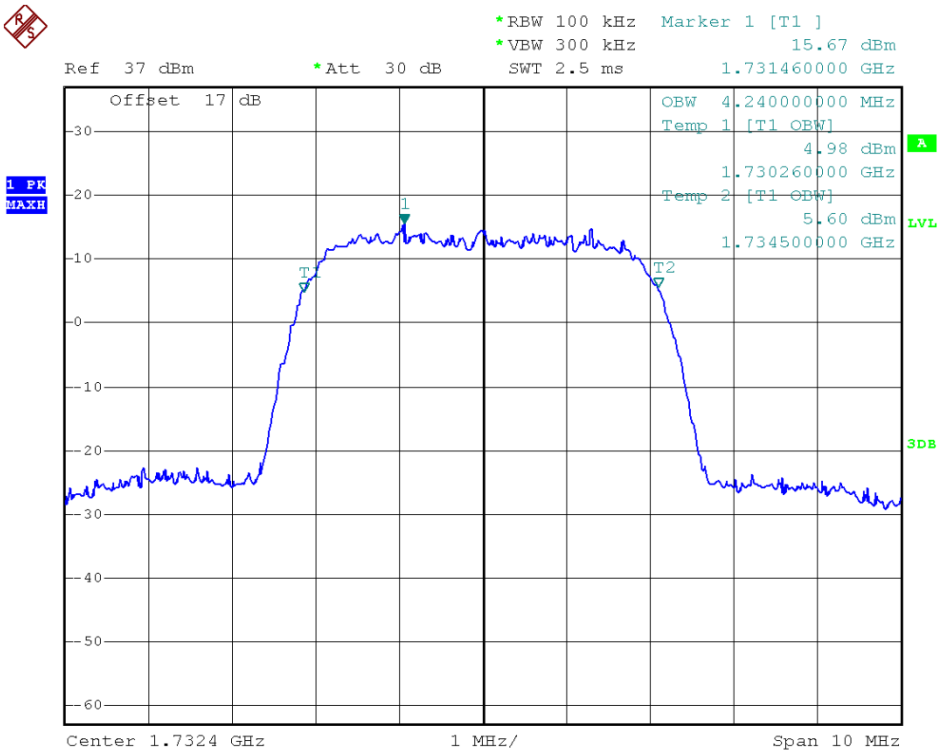
(Plot G1: WCDMA 1700MHz Channel = 1312 26dB bandwidth)



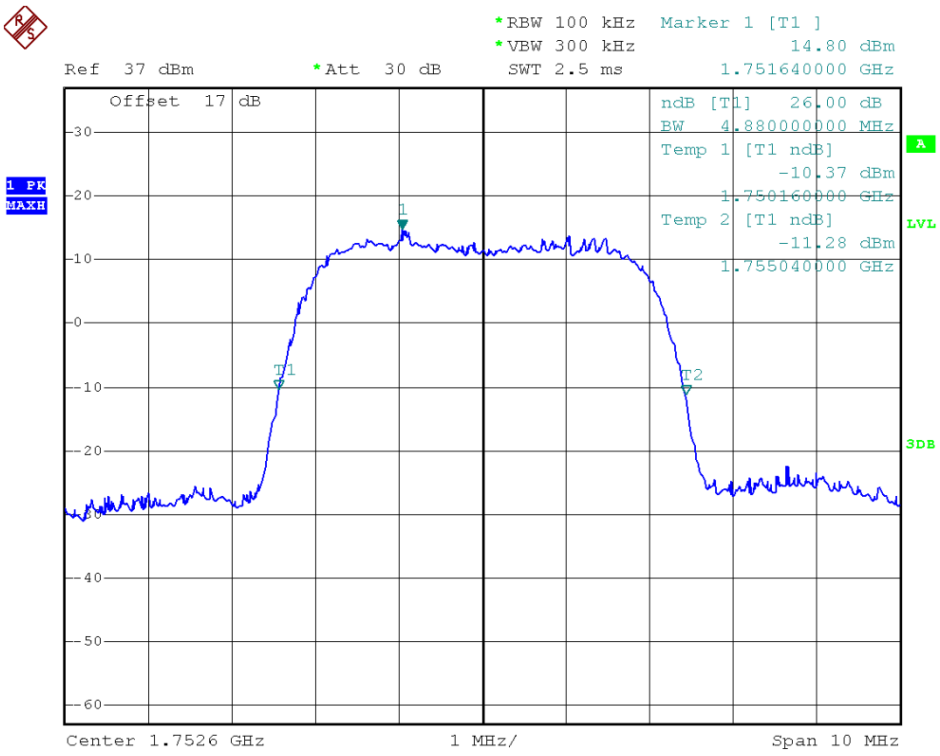
(Plot G2: WCDMA 1700MHz Channel = 1312 99% Occupied Bandwidth)



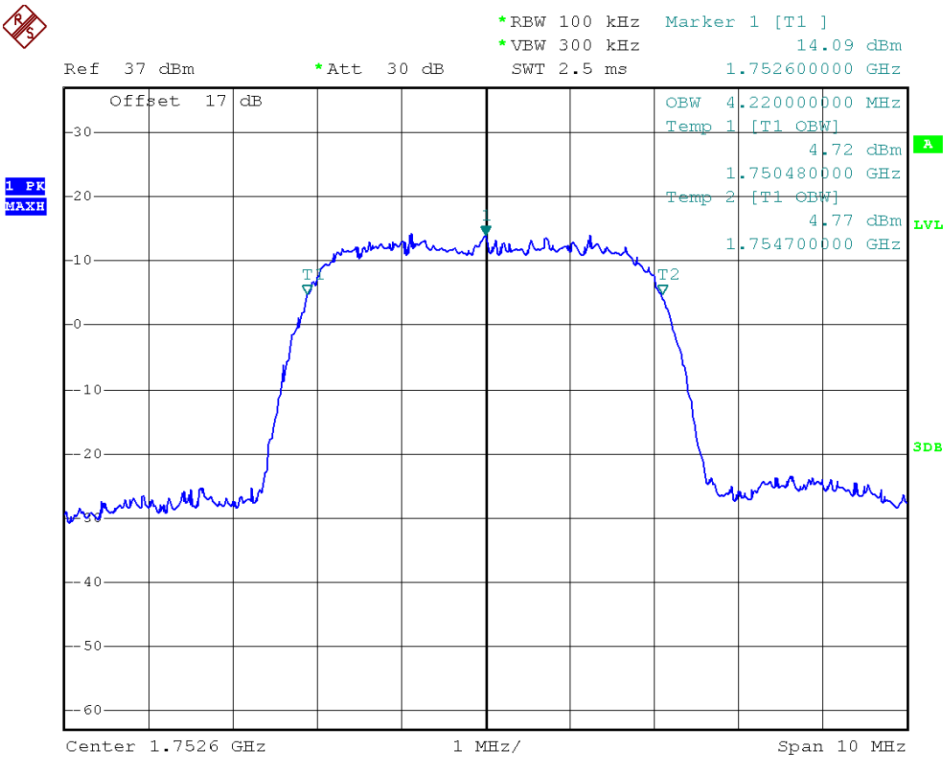
(Plot G3: WCDMA 1700MHz Channel = 1412 26dB bandwidth)



(Plot G4: WCDMA 1700MHz Channel = 1412 99% Occupied Bandwidth)



(Plot G5: WCDMA 1700MHz Channel = 1513 26dB bandwidth)



(Plot G6: WCDMA 1700MHz Channel = 1513 99% Occupied Bandwidth)

2.4 Frequency Stability

2.4.1 Requirement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

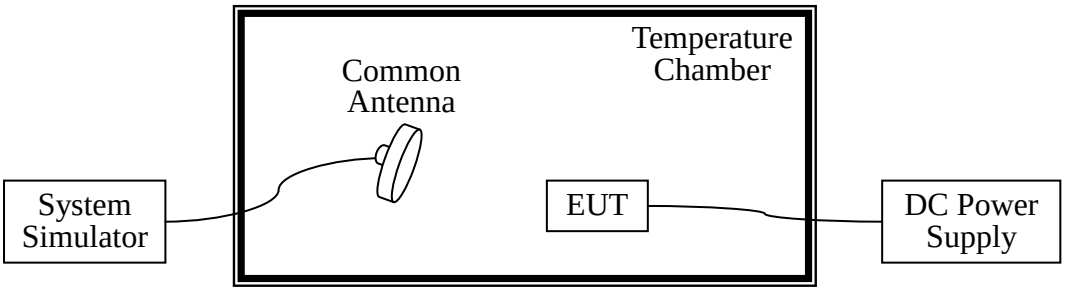
2.4.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30℃ and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10℃ steps up to 50℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

2.4.4 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

2.4.5 Test Setup



2.4.6 Test Results of Frequency Stability

1. GSM 850MHz Band

Band:	GSM 850	Channel:	190
Limit(ppm):	2.5	Frequency:	836.6MHz

Power (VDC)	Temperature (℃)	GSM		EDGE		Result
		Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
3.7	-30	18	0.02	12	0.01	PASS
	-20	10	0.01	18	0.02	
	-10	24	0.03	17	0.02	
	0	16	0.02	14	0.01	
	+10	13	0.01	25	0.03	
	+20	17	0.02	18	0.02	
	+30	18	0.02	11	0.01	
	+40	25	0.03	25	0.03	
	+50	8	0.01	9	0.01	
4.2	+25	12	0.01	26	0.03	
3.5	+25	25	0.03	18	0.02	

2. GSM 1900MHz Band

Band:	GSM 1900	Channel:	661
Limit(ppm):	2.5	Frequency:	1880.0MHz

Power (VDC)	Temperature (℃)	GSM		EDGE		Result
		Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
3.7	-30	37	0.02	57	0.03	PASS
	-20	48	0.02	22	0.01	
	-10	25	0.01	46	0.02	
	0	56	0.03	21	0.01	
	+10	45	0.02	46	0.02	
	+20	22	0.01	25	0.01	
	+30	40	0.02	44	0.02	
	+40	54	0.03	25	0.01	
	+50	25	0.01	57	0.03	
4.2	+25	56	0.03	22	0.01	
3.5	+25	21	0.01	58	0.03	

3. WCDMA 850MHz Band

Band:	WCDMA Band V	Channel:	4183
Limit(ppm):	2.5	Frequency:	836.6MHz

Power (VDC)	Temperature (℃)	RMC 12.2Kbps		Result
		Freq. Dev. (Hz)	Deviation (ppm)	
3.7	-30	16	0.02	PASS
	-20	15	0.02	
	-10	28	0.03	
	0	17	0.02	
	+10	19	0.02	
	+20	9	0.01	
	+30	16	0.02	
	+40	12	0.01	
	+50	26	0.03	
4.2	+25	20	0.02	
3.5	+25	27	0.03	

4. WCDMA 1900MHz Band

Band:	WCDMA Band II	Channel:	9400
Limit(ppm):	2.5	Frequency:	1880.0MHz

Power (VDC)	Temperature (℃)	RMC 12.2Kbps		Result
		Freq. Dev. (Hz)	Deviation (ppm)	
3.7	-30	54	0.03	PASS
	-20	38	0.02	
	-10	21	0.01	
	0	20	0.01	
	+10	46	0.02	
	+20	22	0.01	
	+30	57	0.03	
	+40	36	0.02	
	+50	14	0.01	
4.2	+25	56	0.03	
3.5	+25	21	0.01	

5. WCDMA 1700MHz Band

Band:	WCDMA Band IV	Channel:	1412
Limit(ppm):	2.5	Frequency:	1732.4MHz

Power (VDC)	Temperature (℃)	RMC 12.2Kbps		Result
		Freq. Dev. (Hz)	Deviation (ppm)	
3.7	-30	52	0.03	PASS
	-20	41	0.02	
	-10	24	0.01	
	0	21	0.01	
	+10	22	0.01	
	+20	44	0.02	
	+30	21	0.01	
	+40	57	0.03	
	+50	36	0.02	
4.2	+25	15	0.01	
3.5	+25	30	0.02	

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

2.5.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3 Test Procedures

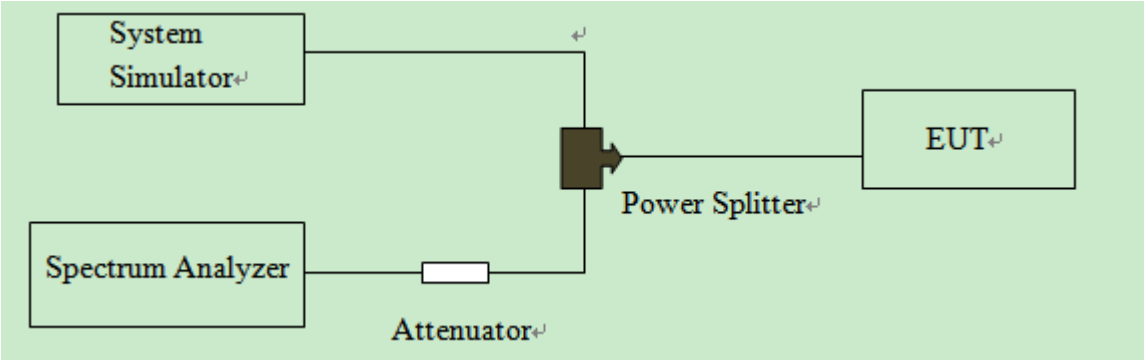
1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

   = P(W) - [43 + 10log(P)] (dB)

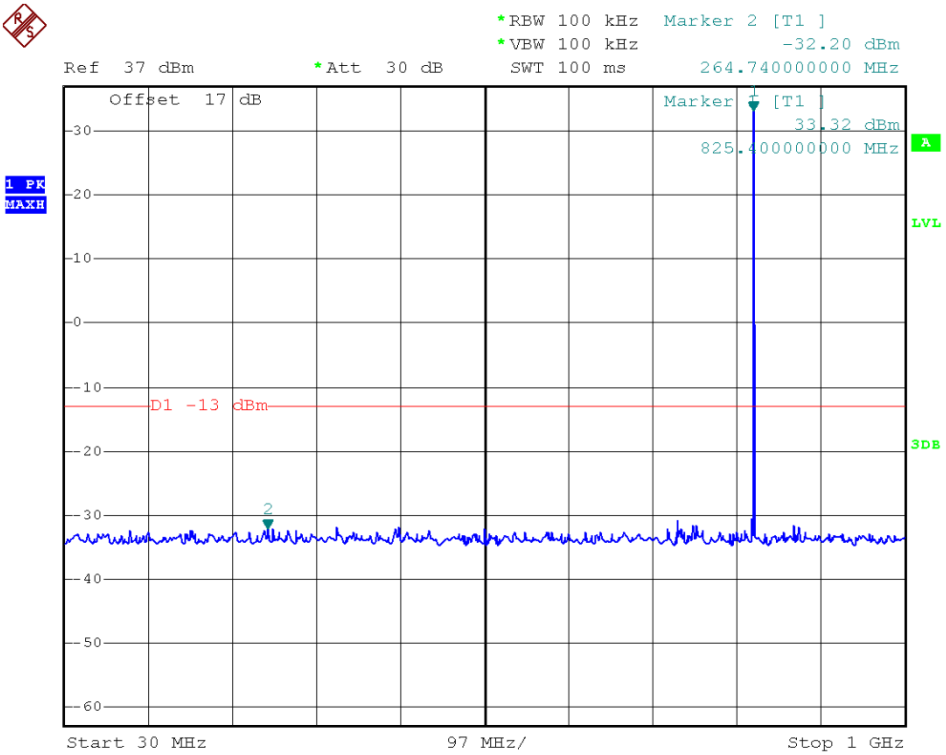
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

   = -13dBm.

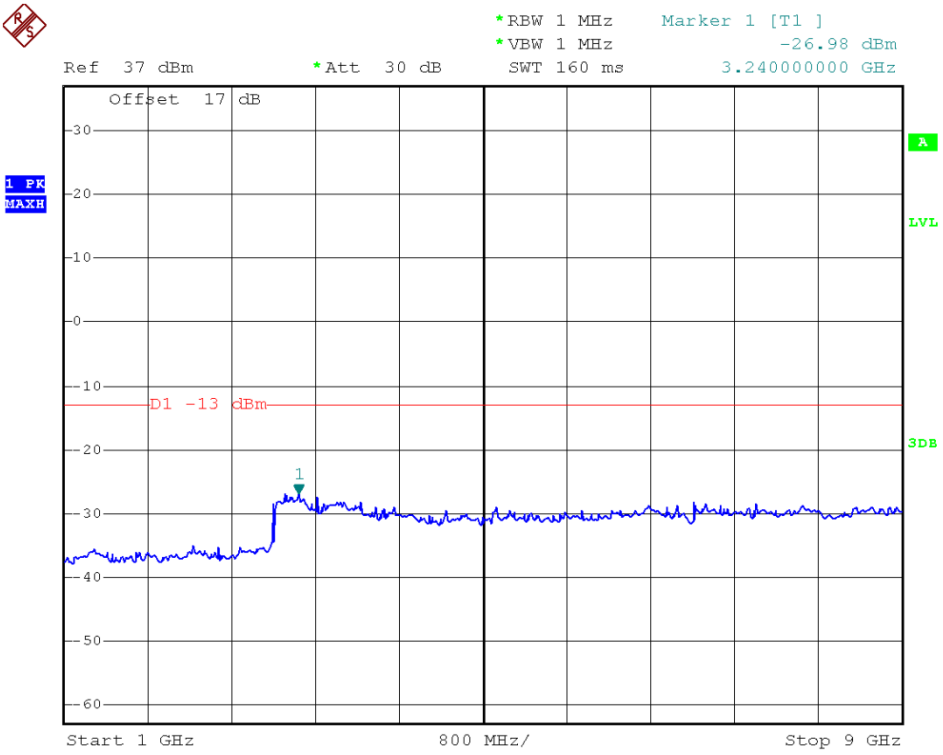
2.5.4 Test Setup



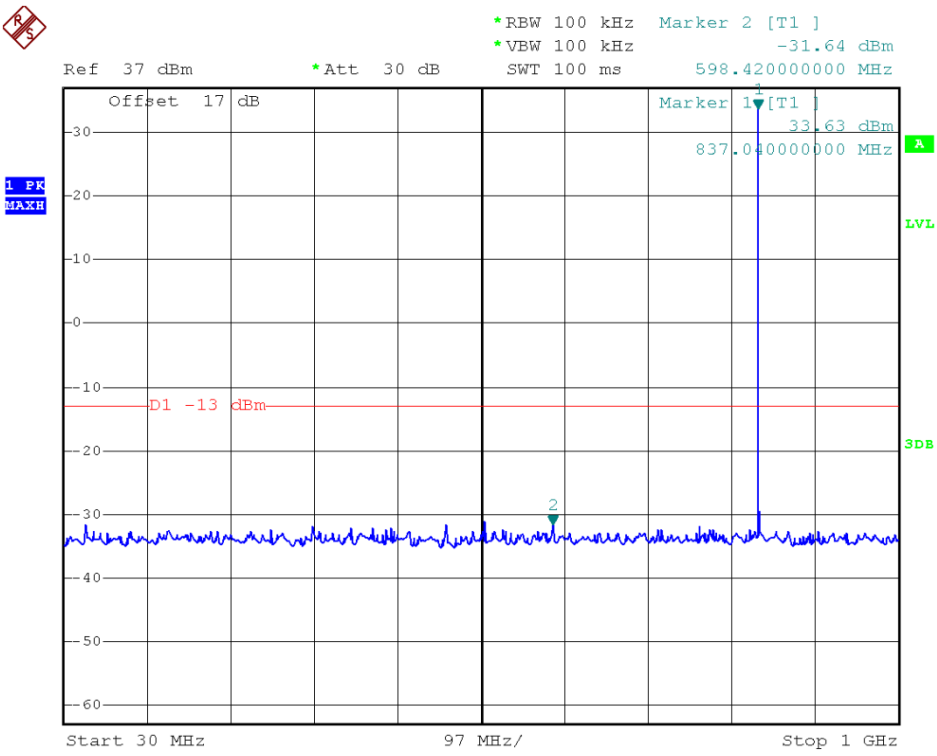
2.5.5 Test Result (Plots) of Conducted Spurious Emission



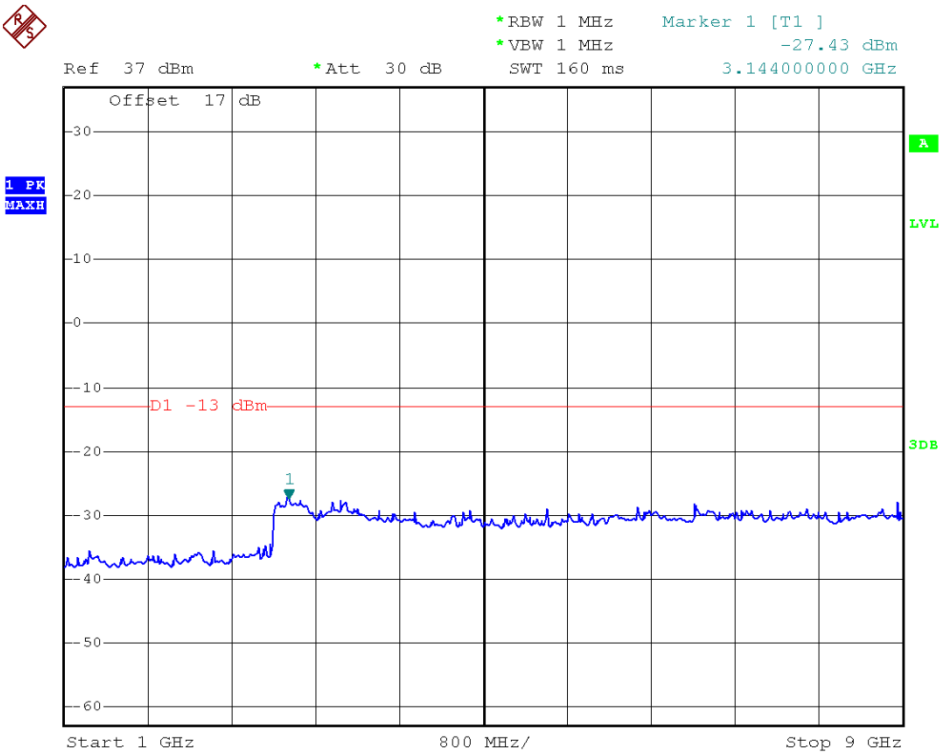
GSM 850MHz Channel = 128, 30MHz to 1GHz



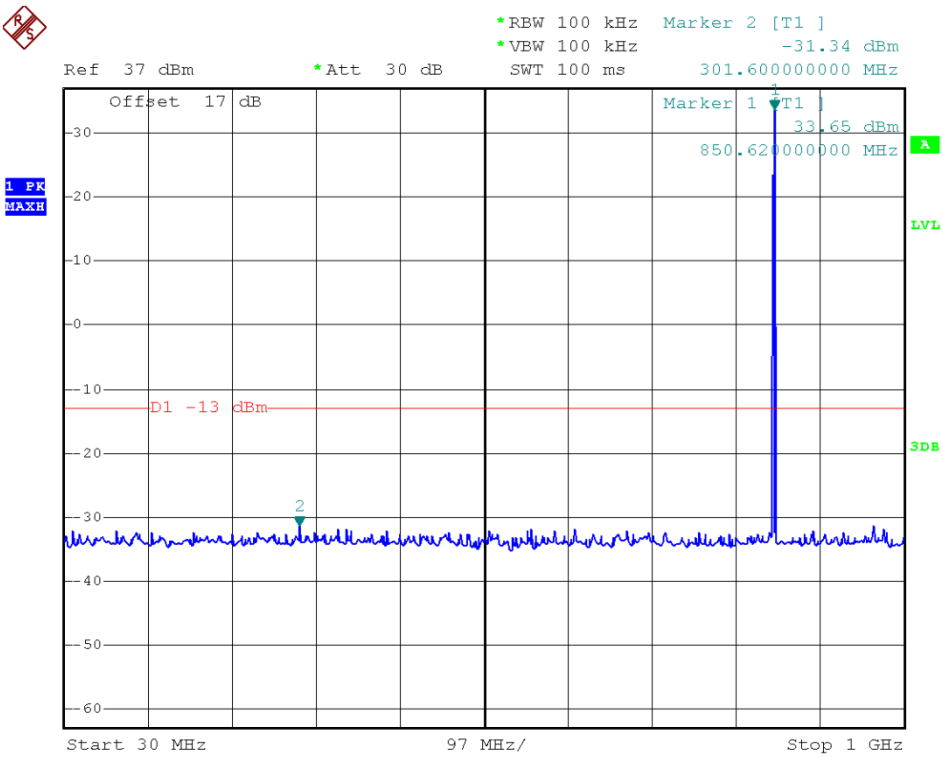
GSM 850MHz Channel = 128, 1GHz to 9GHz



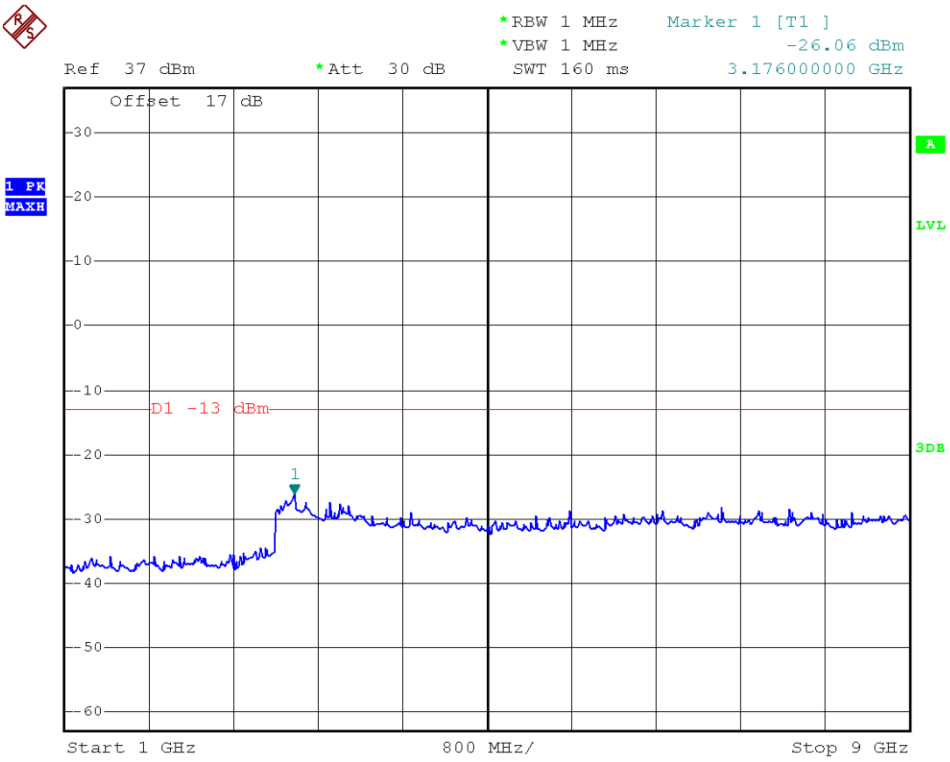
GSM 850MHz Channel = 190, 30MHz to 1GHz



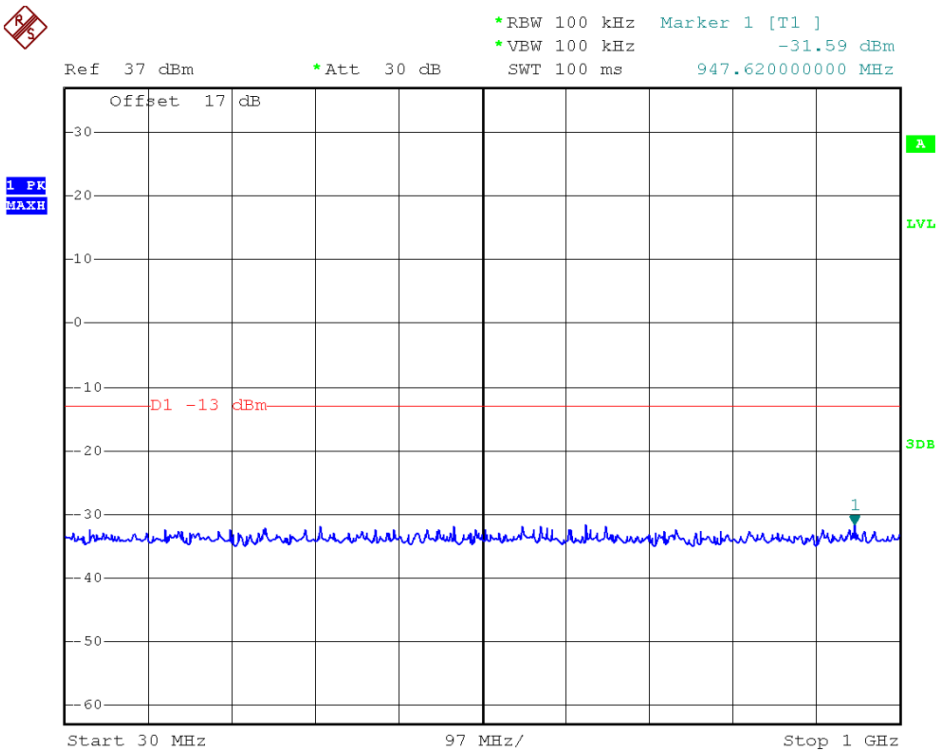
GSM 850MHz Channel = 190, 1GHz to 9GHz



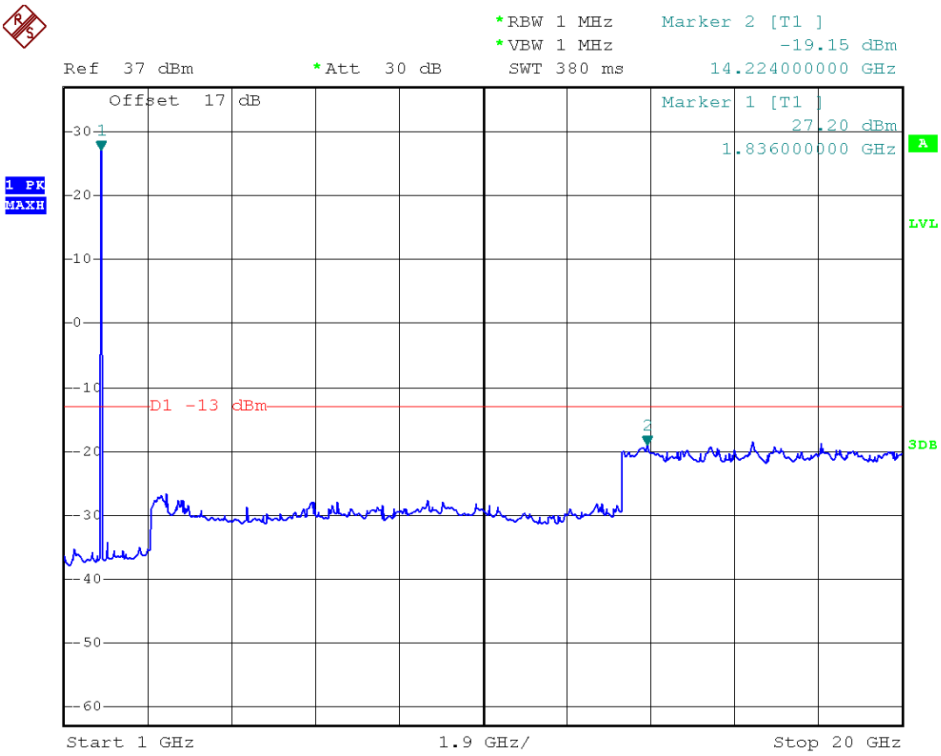
GSM 850MHz Channel = 251, 30MHz to 1GHz



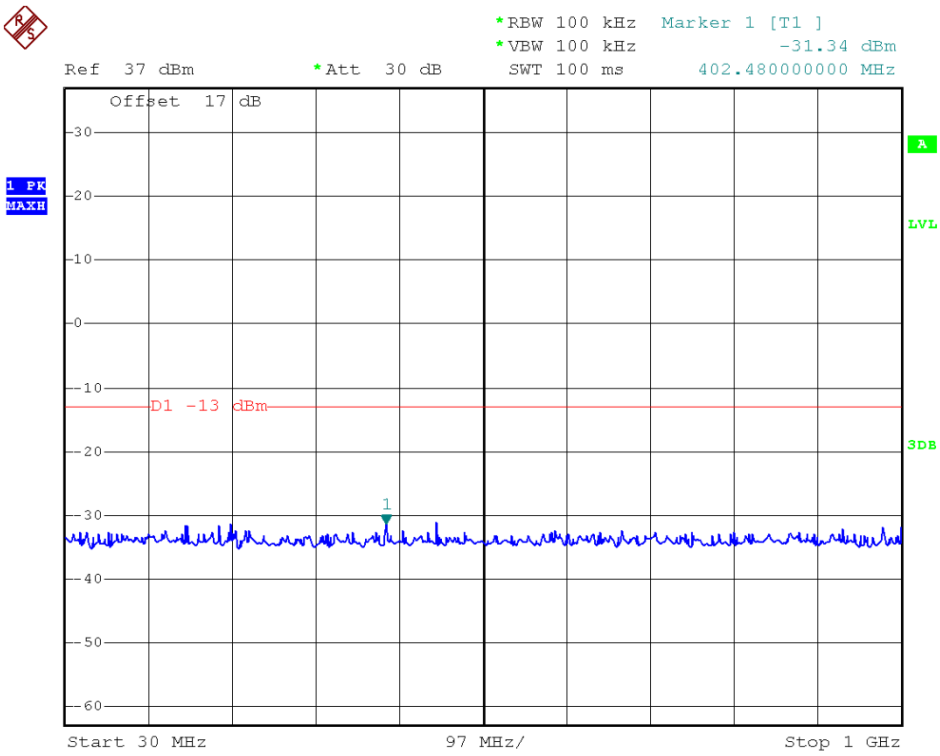
GSM 850MHz Channel = 251, 1GHz to 9GHz



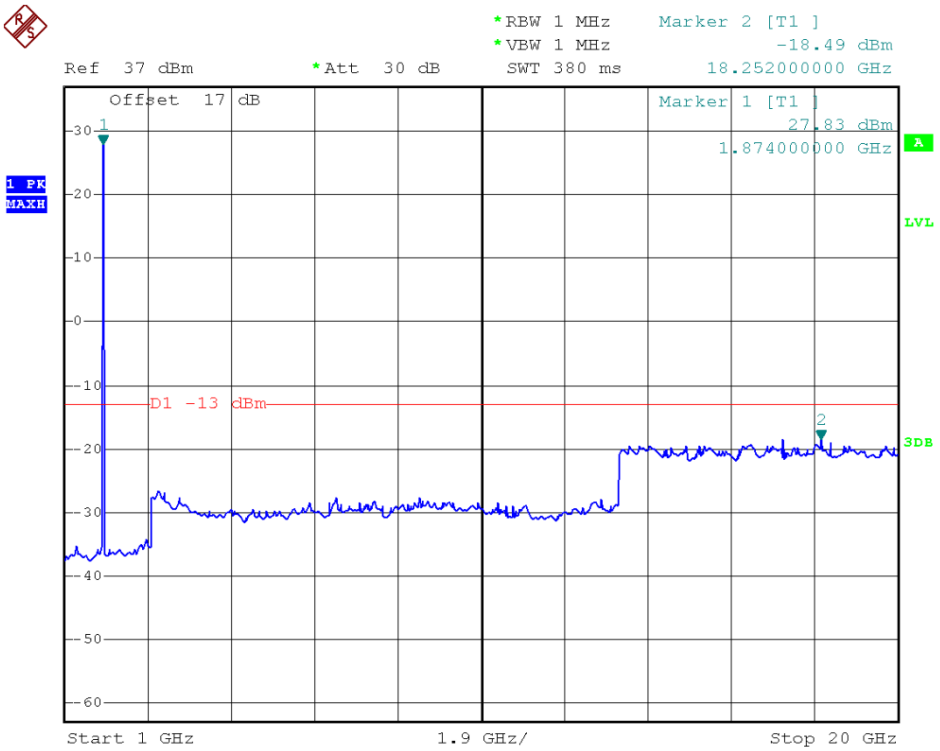
GSM 1900MHz Channel = 512, 30MHz to 1GHz



GSM 1900MHz Channel = 512, 1GHz to 20GHz



GSM 1900MHz Channel = 661, 30MHz to 1GHz



GSM 1900MHz Channel = 661, 1GHz to 20GHz