



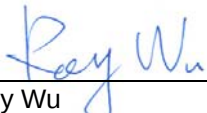
FCC Test Report

According to

47 CFR Part 22H, 24E

Equipment : GPS Phone
Trade Name : Mio
Model Name : N169
FCC ID : P4Q-N169
Tx Frequency Range : GSM850 : 824.2 ~ 848.8MHz
GSM1900 : 1850.2 ~1909.8 MHz
Max. ERP/EIRP Power : GSM850(GSM) : 1.17 W
GSM850(EDGE) : 0.22 W
GSM1900(GSM) : 1.09 W
GSM1900(EDGE) : 0.53 W
Emission Designator : GSM : 300KGXW
EDGE : 300KG7W
Applicant : MiTAC International Corp.
6th Fl., No. 187, Tiding Blvd., Sec. 2, Taipei,
Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
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- The data shown in this test report had been finished on Aug. 4, 2008 at **Sporton International Inc. LAB.**
- Report No.: FG821504-03, Report Version: Rev. 01.


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Manager

SPORTON International Inc.

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Report Version: Rev. 01



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History of This Test Report

Report Issue Date: Aug. 06, 2008

Report No.	Description



1. General Information

1.1 Applicant

MiTAC International Corp.

6th Fl., No. 187, Tiding Blvd., Sec. 2, Taipei, Taiwan, R.O.C.

1.2 Manufacturer

MiTAC Computer (KunShan) Co., Ltd.

No. 269, 2nd Road, Export Processing Zone, Changjiang South Road, KunShan, JiangSu Prov., China

1.3 Basic Description of Equipment under Test

AC Adapter 1	Trade Name	PHIHONG
	Model Name	PSAA05R-050
	Power Rating	I/P: 100-240V, 50-60Hz, 0.3A O/P: +5Vdc, 1A Max.
	AC Power Cord Type	1.85m non-shielded cable without ferrite core
AC Adapter 2	Trade Name	TPT
	Model Name	MII050100
	Power Rating	I/P: 100-240V, 50-60Hz, 0.5A; O/P: +5Vdc, 1A Max
	AC Power Cord Type	1.2m non-shielded cable without ferrite core
Battery 1	Trade Name	Welldone
	Model Name	E4MT261K1002
	Rating	3.7V, 1100mAh
	Type	Li-ion
Battery 2	Trade Name	Welldone
	Model Name	E4MT261K1002
	Rating	3.7V, 1150mAh
	Type	Li-ion
Earphone 1	Trade Name	PETER
	Model Name	A1-CS-127
	Signal line Type	1.2m shielded cable without ferrite core
Earphone 2	Trade Name	PETER
	Model Name	D-AS-107-070917A
	Signal line Type	1.3m non-shielded cable without ferrite core
Remote Control for Earphone 2	Trade Name	BIMOS
	Model Name	781001010002
	Signal line Type	1.1m shielded cable without ferrite core
USB Cable	Trade Name	MPT
	Model Name	A5B-1A-1.3M
LCD Panel	Trade Name	TPO
	Model Name	99000307
Camera	Trade Name	HANSUNG
	Model Name	MT01SS40B

Remark: Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

**1.4 Feature of Equipment under Test**

Product Feature & Specification	
DUT Type :	GPS Phone
Trade Name :	Mio
Model Name :	N169
FCC ID :	P4Q-N169
Tx Frequency :	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz
Rx Frequency :	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz
Channel Spacing :	GSM : 200 KHz Bluetooth : 1 MHz WLAN : 5 MHz
Maximum Output Power to Antenna :	GSM850: 32.62 dBm GSM1900: 29.19 dBm
Maximum ERP/EIRP :	GSM850(GSM) : 1.17 W (30.69 dBm) GSM850(EDGE) : 0.22 W (23.49 dBm) GSM1900(GSM) : 1.09 W (30.39 dBm) GSM1900(EDGE) : 0.53 W (27.21 dBm)
Antenna Type :	GSM: Monopole Antenna Bluetooth: Monopole Antenna WLAN: Monopole Antenna
Antenna Gain :	GSM: 2dBi Bluetooth : 2 dBi WLAN : 2 dBi
HW Version	R05
SW Version	R33
Power Rating (DC/AC , Voltage and Current of RF element or PA) :	Battery : DC 3.7V Adapter : AC 100-240V
GPRS / EGPRS Multislot class :	10
Type of Modulation :	GSM : GMSK EDGE : 8PSK Bluetooth : GFSK WLAN : DSSS / OFDM
Type of Emission :	GSM : 300KGXW EDGE : 300KG7W
DUT Stage :	Identical Prototype

2. Test Configuration of Equipment under Test

2.1 Test Manner

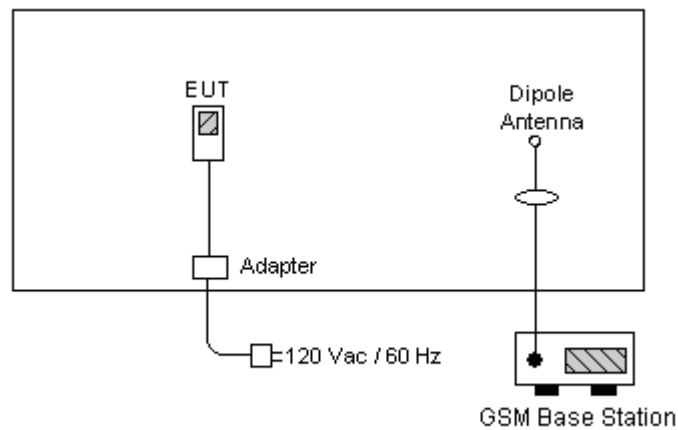
1. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.
2. During all testings, EUT is in link mode with base station emulator at maximum power level.
3. Frequency range investigated: radiated emission 30 MHz to 9000 MHz for GSM850; 30MHz to 19000 MHz for GSM1900.

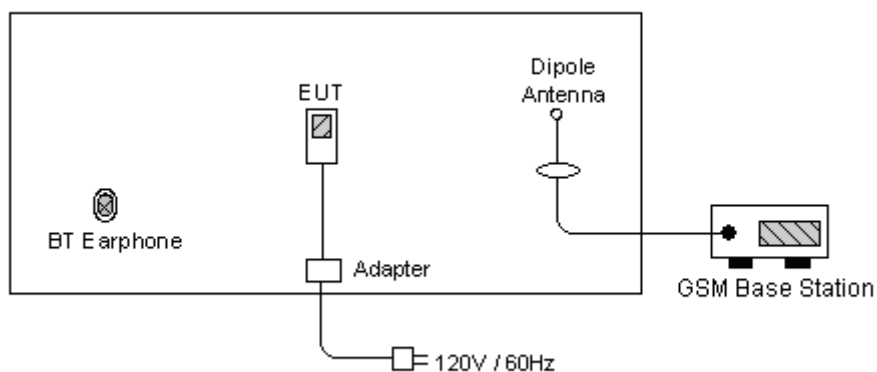
2.2 Test Mode

Application	GSM850	GSM1900
Radiated Emission	☒ Mode 1: GSM Link ☒ Mode 2: EDGE Link ☒ Mode 5: GSM Link + BT Link ☒ Mode 6: GSM Link + 11g Tx Ch11	☒ Mode 3: GSM Link ☒ Mode 4: EDGE Link
Conducted Measurement	☒ Mode 1: GSM Link ☒ Mode 2: EDGE Link	☒ Mode 3: GSM Link ☒ Mode 4: EDGE Link

2.3 Connection Diagram of Test System

GSM Link Mode



GSM Link + BT Link Mode

2.4 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Code
1.	GSM Base Station	R&S	CMU200	N/A	N/A	Unshielded, 1.8m
2.	BT Earphone	Samsung	SEC-WEP410	A3LWEP410	N/A	N/A



3. General Information of Test Site

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-328-4978
Test Site No : 03CH07-HY, TH02-HY
FCC Designation No : TW1022

The chamber meets the characteristics of ANSI C63.4-2003. This site is on file with the FCC.

3.1 Test Voltage

AC 120V / 60Hz

3.2 Test Compliance

47 CFR Part 22H, 24E, Part 2

3.3 Frequency Range

- a. Radiation: from 30MHz to 9000MHz for GSM850.
- b. Radiation: from 30 MHz to 19000 MHz for GSM1900.

3.4 Test Distance

The test distance of radiated emission from antenna to EUT is 3 m.

4. Test Data and Test Result

4.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result	Section
§2.1046	RF Output Power	Passed	4.2
§ 22.913 §24.232	ERP / EIRP	Passed	4.3
§2.1049, § 22.917, § 24.238(b)	Occupied Bandwidth & Band Edge Measurement	Passed	4.4
§2.1051	Conducted Emission	Passed	4.5
§2.1053	Field Strength of Spurious Radiation	Passed	4.6
§2.1055, § 22.355, §24.235	Frequency Stability vs. Temperature	Passed	4.7
§2.1055, §22.355, §24.235	Frequency Stability vs. Voltage	Passed	4.8

4.2 RF Output Power

4.2.1 Measurement Instruments

As described in chapter 5 of this test report.

4.2.2 Test Procedure

- The transmitter output was connected to power meter and base station.
- Set EUT at PCL=5 for GSM850 and/or PCL=0 for GSM1900 maximum power through base station.
- Select lowest, middle, and highest channels for each band.

4.2.3 Test Setup Layout



4.2.4 Test Result

Bands	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
GSM850 (GSM)	128	824.2 (Low)	32.28	1.690
	189	836.4 (Mid)	32.44	1.754
	251	848.8 (High)	32.62	1.828
GSM850 (EDGE)	128	824.2 (Low)	27.41	0.551
	189	836.4 (Mid)	27.13	0.516
	251	848.8 (High)	26.91	0.491
GSM1900 (GSM)	512	1850.2 (Low)	29.10	0.813
	661	1880.0 (Mid)	29.17	0.826
	810	1909.8 (High)	29.19	0.830
GSM1900 (EDGE)	512	1850.2 (Low)	26.69	0.467
	661	1880.0 (Mid)	26.37	0.434
	810	1909.8 (High)	26.58	0.455

4.3 ERP / EIRP Measurement

Equivalent isotropic radiated power measurements by substitution method according to ANSI/TIA/EIA-603-C.

4.3.1 Measurement Instruments

As described in chapter 5 of this test report.

4.3.2 Test Procedure

- a. The EUT was placed on a trolley with 1.0 meter height in an fully anechoic chamber.
- b. The EUT was set 1.2 meters from the receiving antenna which was mounted on the antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiated power.
- d. The height of the receiving antenna is also kept at 1.0M height.
- e. Taking the record of maximum ERP/EIRP.
- f. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
- g. The conducted power at the terminal of the dipole antenna is measured.
- h. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
- i. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

P_s (dBm) : Input power to substitution antenna.

G_s (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

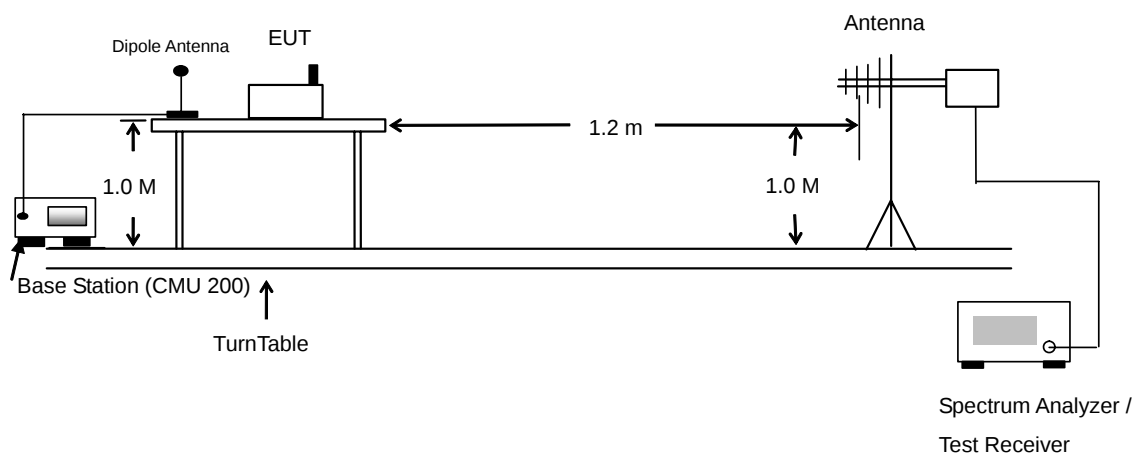
$E_s = R_s + AF$

AF (dB/m) : Receive antenna factor

R_t : The highest received signal in Spectrum Analyzer for EUT.

R_s : The highest received signal in spectrum analyzer for substitution antenna.

4.3.3 Test Setup Layout of ERP/EIRP



**4.3.4 Test Result**

GSM850 (GSM) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-29.09	-48.12	0.00	-1.08	17.95	0.06
836.40	-28.04	-48.28	0.00	-0.93	19.31	0.09
848.80	-28.14	-48.35	0.00	-0.76	19.45	0.09
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-17.92	-47.97	0.00	-1.08	28.97	0.79
836.40	-17.02	-48.01	0.00	-0.93	30.06	1.01
848.80	-16.60	-48.05	0.00	-0.76	30.69	1.17

GSM850 (EDGE) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-35.38	-48.12	0.00	-1.08	11.66	0.01
836.40	-35.52	-48.28	0.00	-0.93	11.83	0.02
848.80	-35.17	-48.35	0.00	-0.76	12.42	0.02
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-24.10	-47.97	0.00	-1.08	22.79	0.19
836.40	-23.97	-48.01	0.00	-0.93	23.11	0.20
848.80	-23.80	-48.05	0.00	-0.76	23.49	0.22

**GSM1900 (GSM) Radiated Power EIRP****Horizontal Polarization**

Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	EIRP (dBm)	EIRP (W)
1850.20	-25.97	-51.88	0.00	1.96	27.87	0.61
1880.00	-28.09	-52.99	0.00	2.00	26.90	0.49
1909.80	-30.15	-54.28	0.00	1.98	26.11	0.41

Vertical Polarization

Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	EIRP (dBm)	EIRP (W)
1850.20	-23.70	-52.13	0.00	1.96	30.39	1.09
1880.00	-24.92	-53.17	0.00	2.00	30.25	1.06
1909.80	-26.15	-54.13	0.00	1.98	29.96	0.99

GSM1900 (EDGE) Radiated Power EIRP**Horizontal Polarization**

Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	EIRP (dBm)	EIRP (W)
1850.20	-28.60	-51.88	0.00	1.96	25.24	0.33
1880.00	-31.18	-52.99	0.00	2.00	23.81	0.24
1909.80	-33.57	-54.28	0.00	1.98	22.69	0.19

Vertical Polarization

Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	EIRP (dBm)	EIRP (W)
1850.20	-26.88	-52.13	0.00	1.96	27.21	0.53
1880.00	-28.50	-53.17	0.00	2.00	26.67	0.46
1909.80	-29.88	-54.13	0.00	1.98	26.23	0.42

4.4 Occupied Bandwidth and Band Edge Measurement

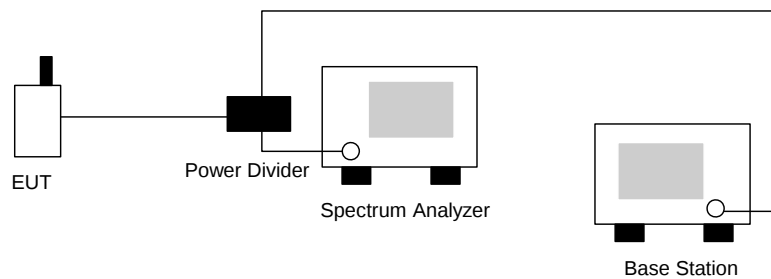
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

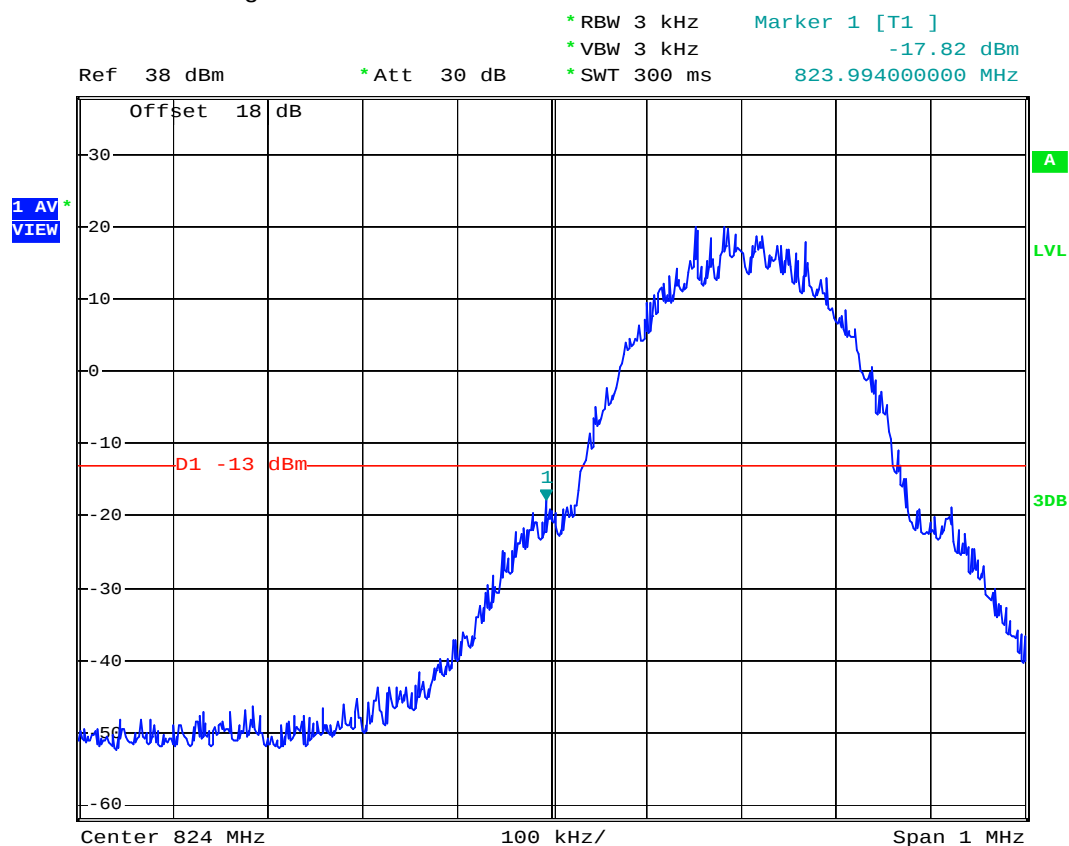
- a. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
- b. The 99% occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
- c. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly BW/100.

4.4.3 Test Setup Layout



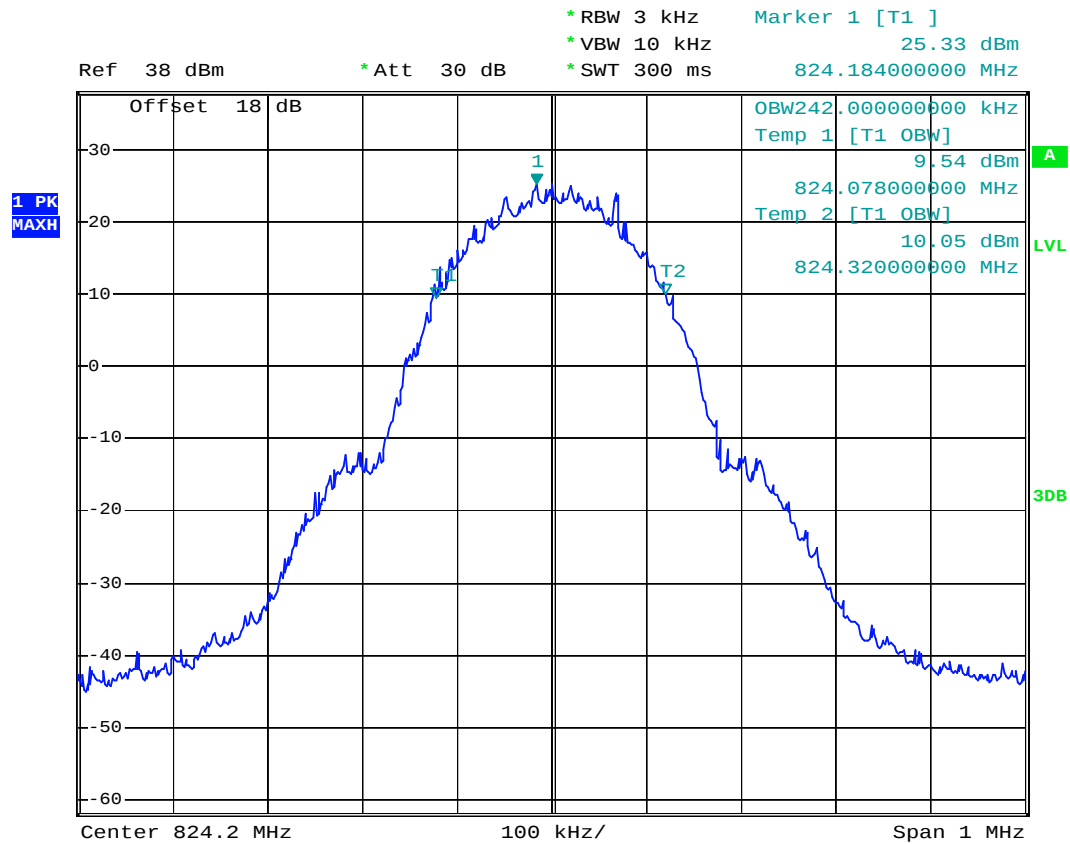
**4.4.4 Test Result**

- Mode 1
- Test Mode : GSM850 (GSM) CH128 the lowest channel for band edge.
- Power State : High



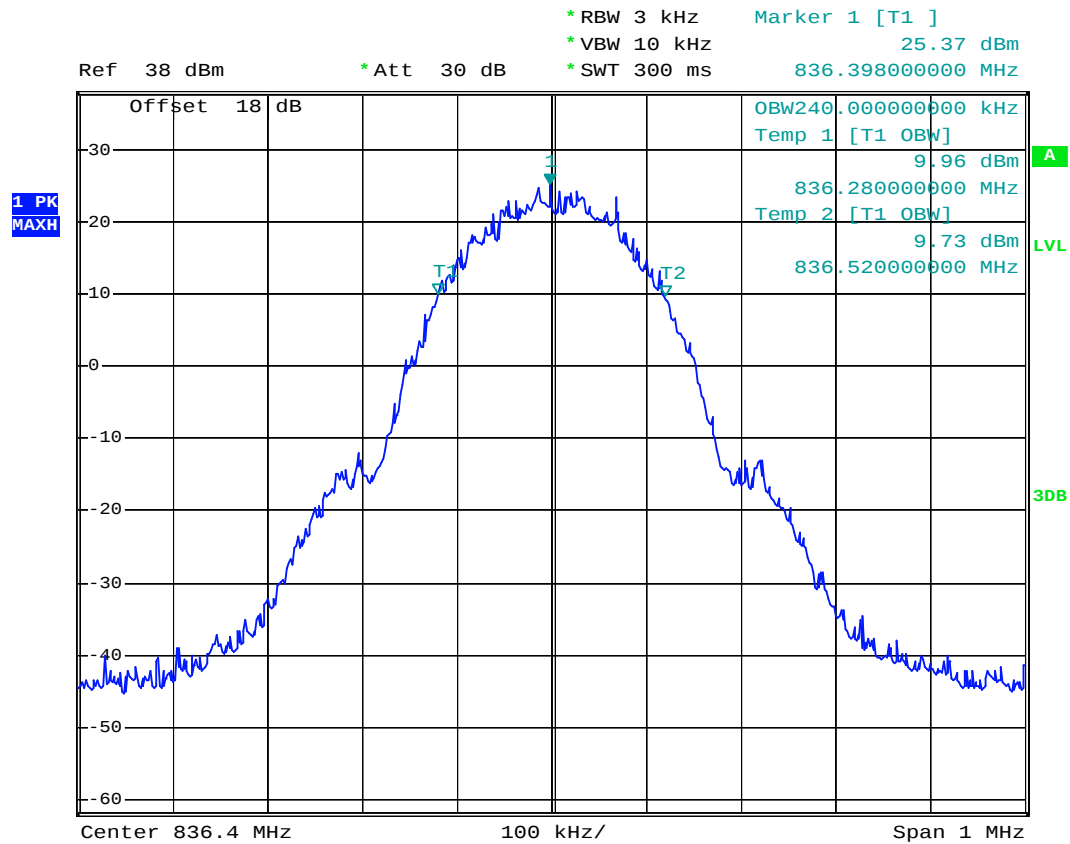


- Test Mode : GSM850 (GSM) CH128 99% Occupied Bandwidth
- Power State : High



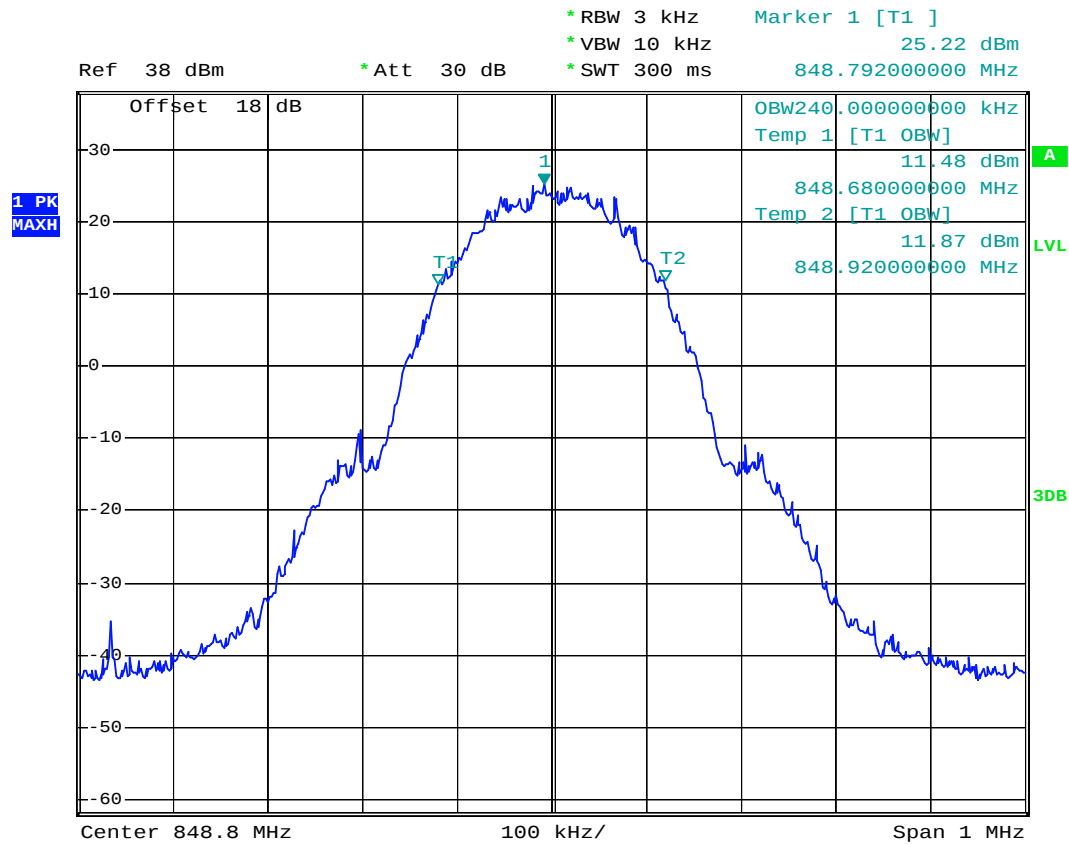


- Test Mode : GSM850 (GSM) CH189 99% Occupied Bandwidth
- Power State : High



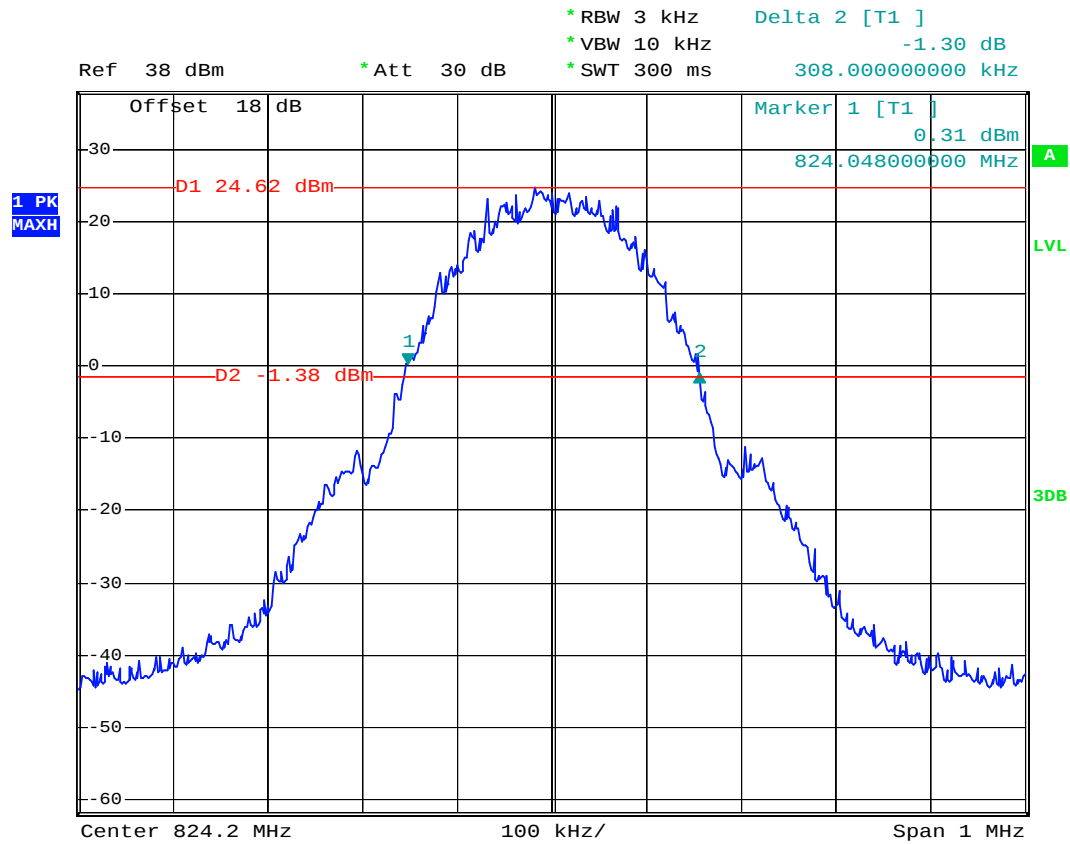


- Test Mode : GSM850 (GSM) CH 251 99% Occupied Bandwidth
- Power State : High



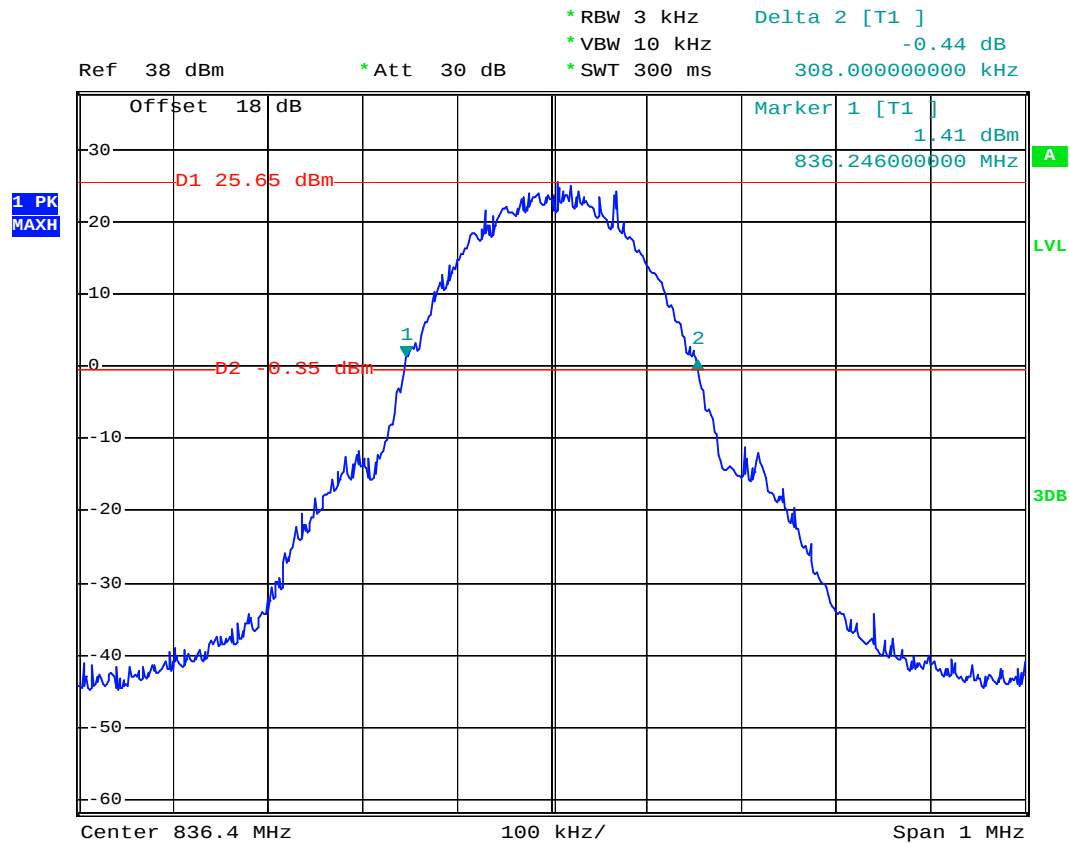


- Test Mode : GSM850 (GSM) CH128 26dB Bandwidth
- Power State : High



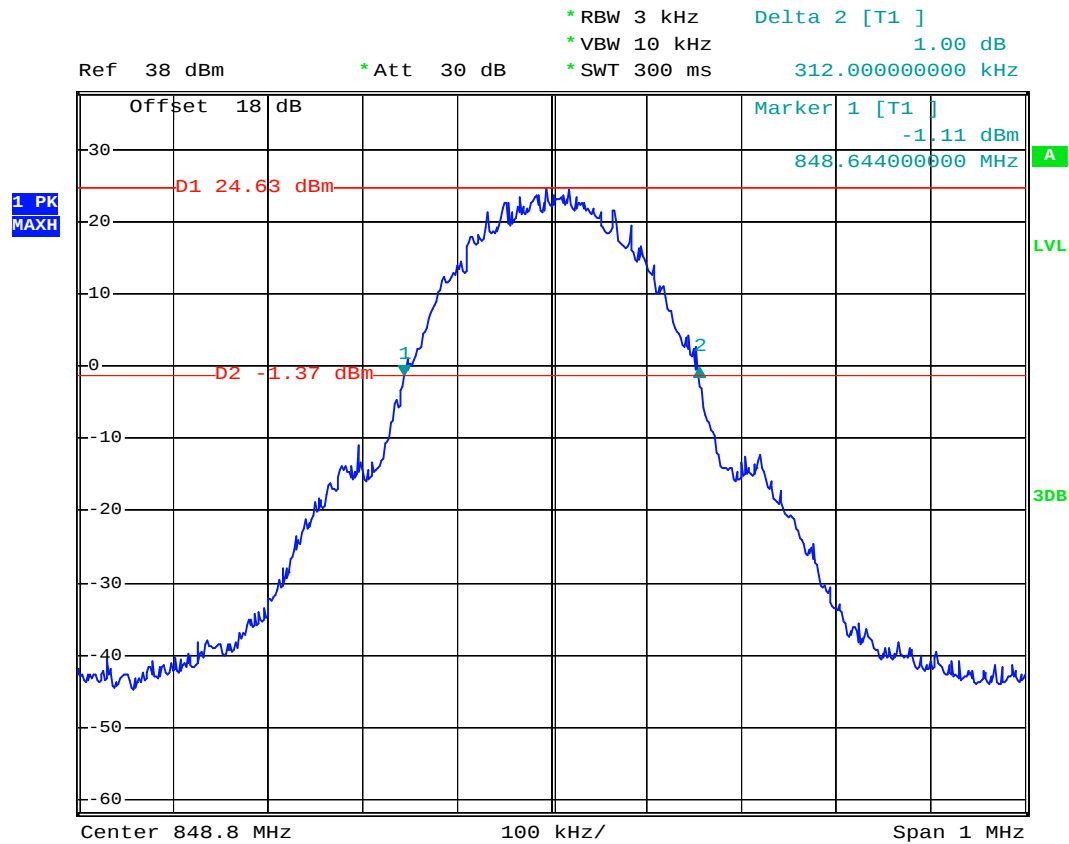


- Test Mode : GSM850 (GSM) CH189 26dB Bandwidth
- Power State : High



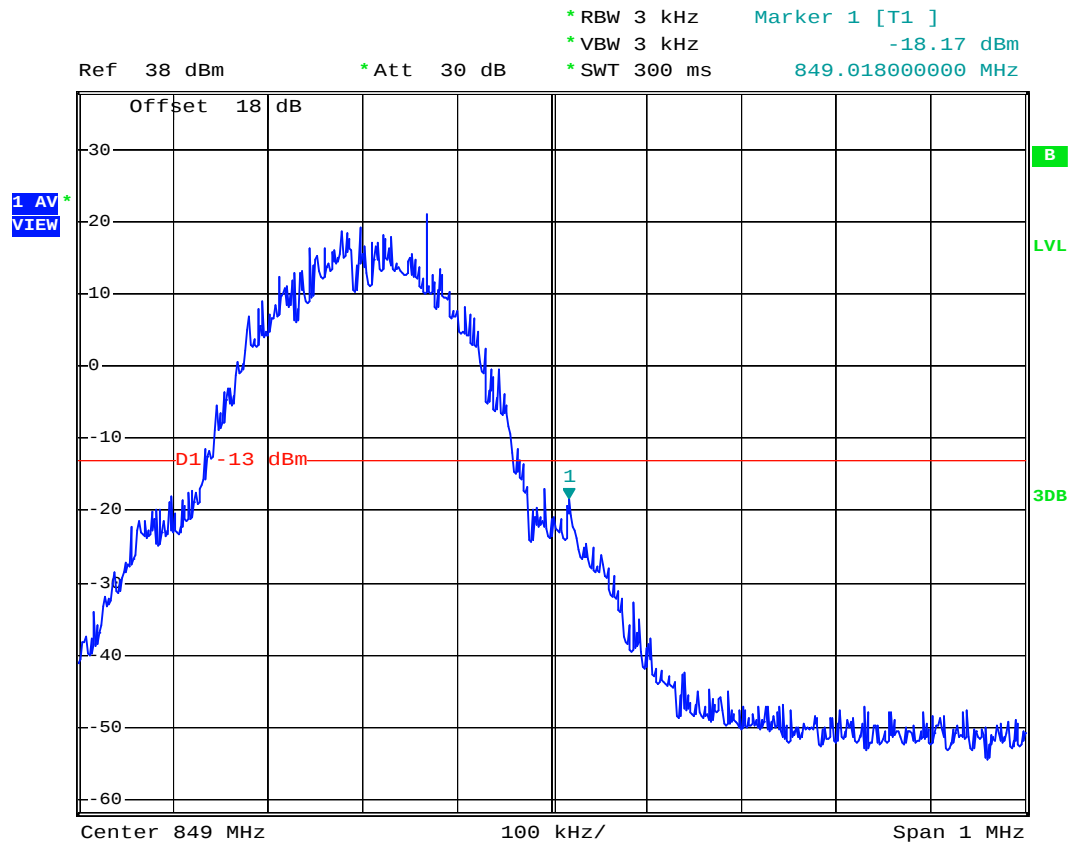


- Test Mode : GSM850 (GSM) CH 251 26dB Bandwidth
- Power State : High



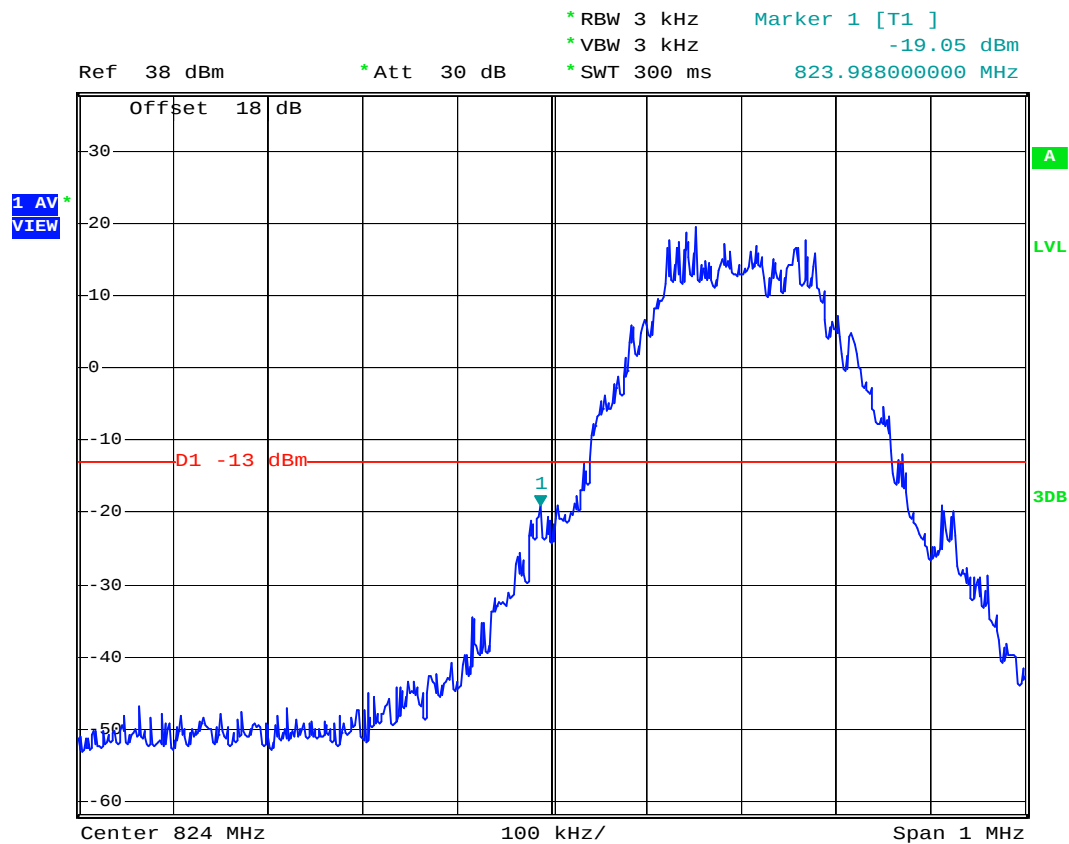


- Test Mode : GSM850 (GSM) CH251 the highest channel for band edge
- Power State : High



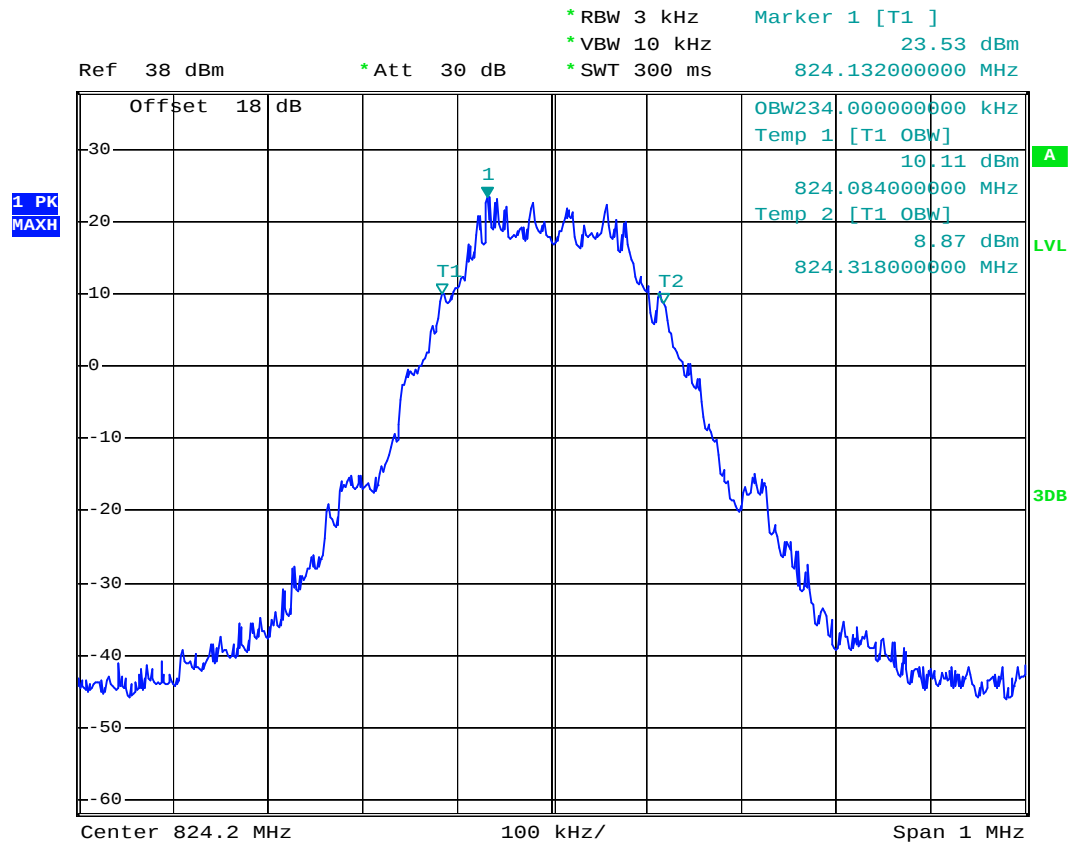


- Mode 2
- Test Mode : GSM850 (EDGE) CH128 the lowest channel for band edge
- Power State : High



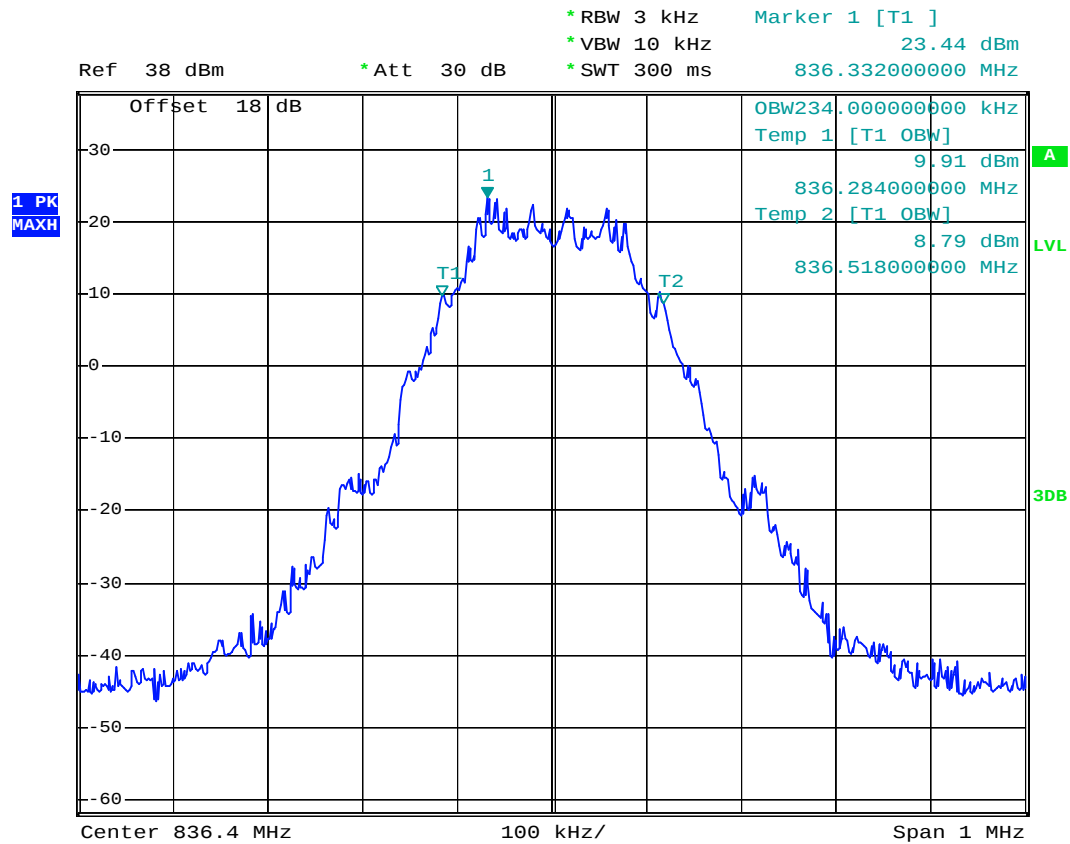


- Test Mode : GSM850 (EDGE) CH128 99% Occupied Bandwidth
- Power State : High



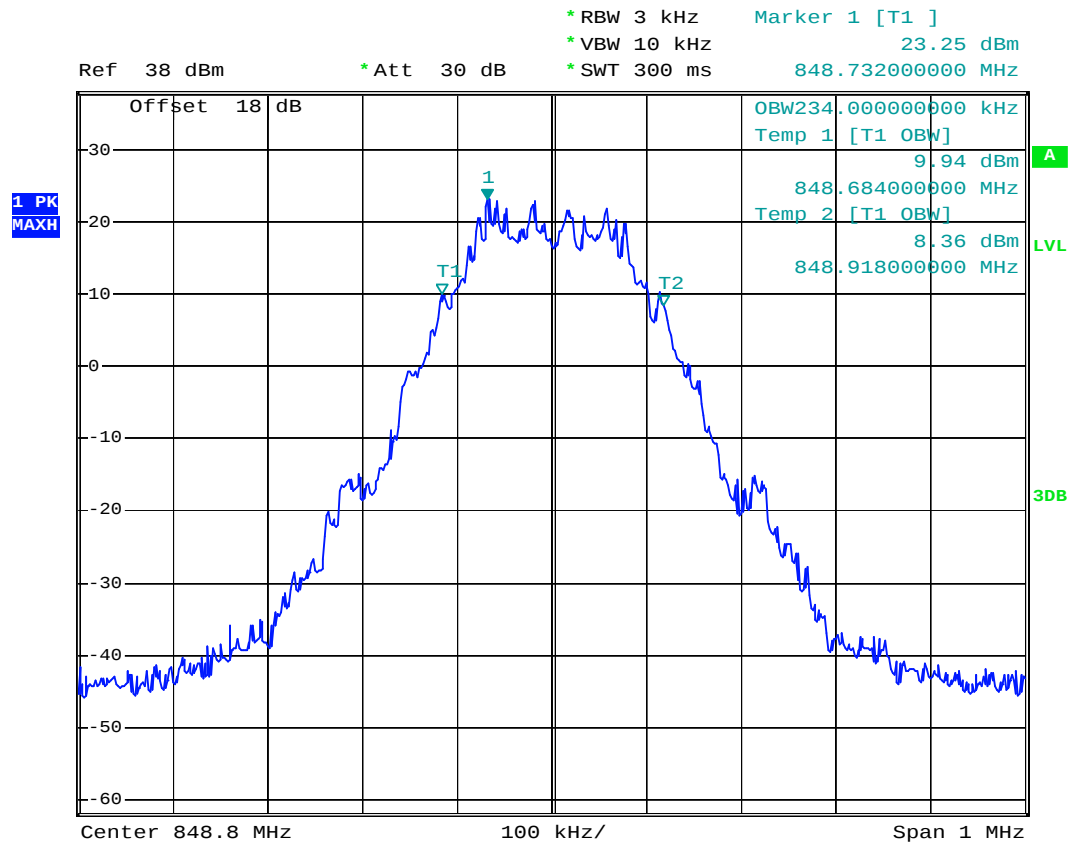


- Test Mode : GSM850 (EDGE) CH189 99% Occupied Bandwidth
- Power State : High



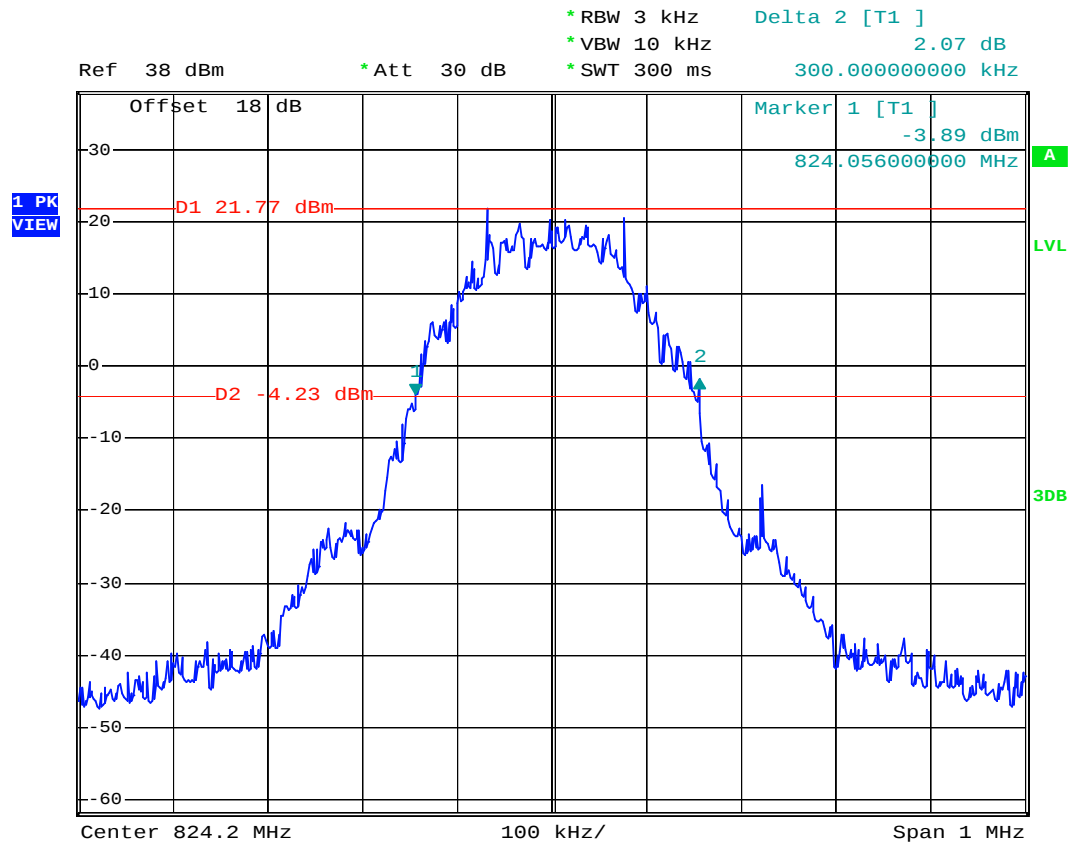


- Test Mode : GSM850 (EDGE) CH 251 99% Occupied Bandwidth
- Power State : High



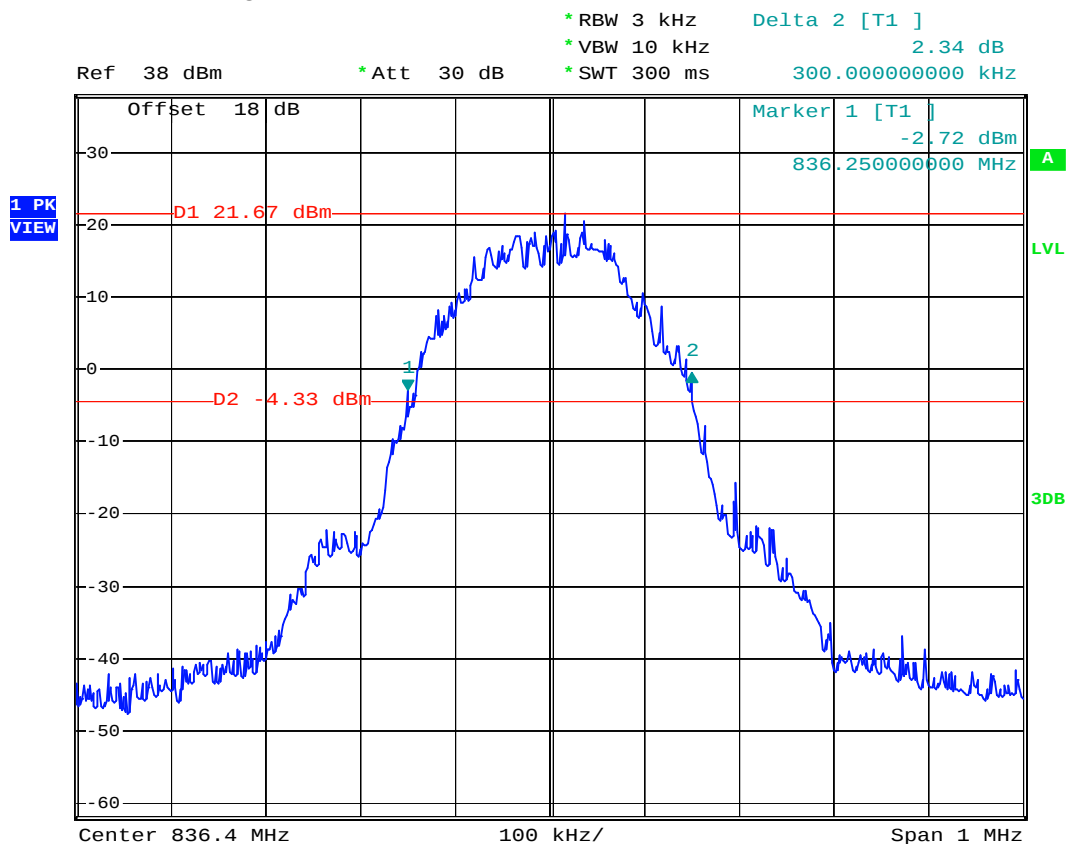


- Test Mode : GSM850 (EDGE) CH128 26dB Bandwidth
- Power State : High



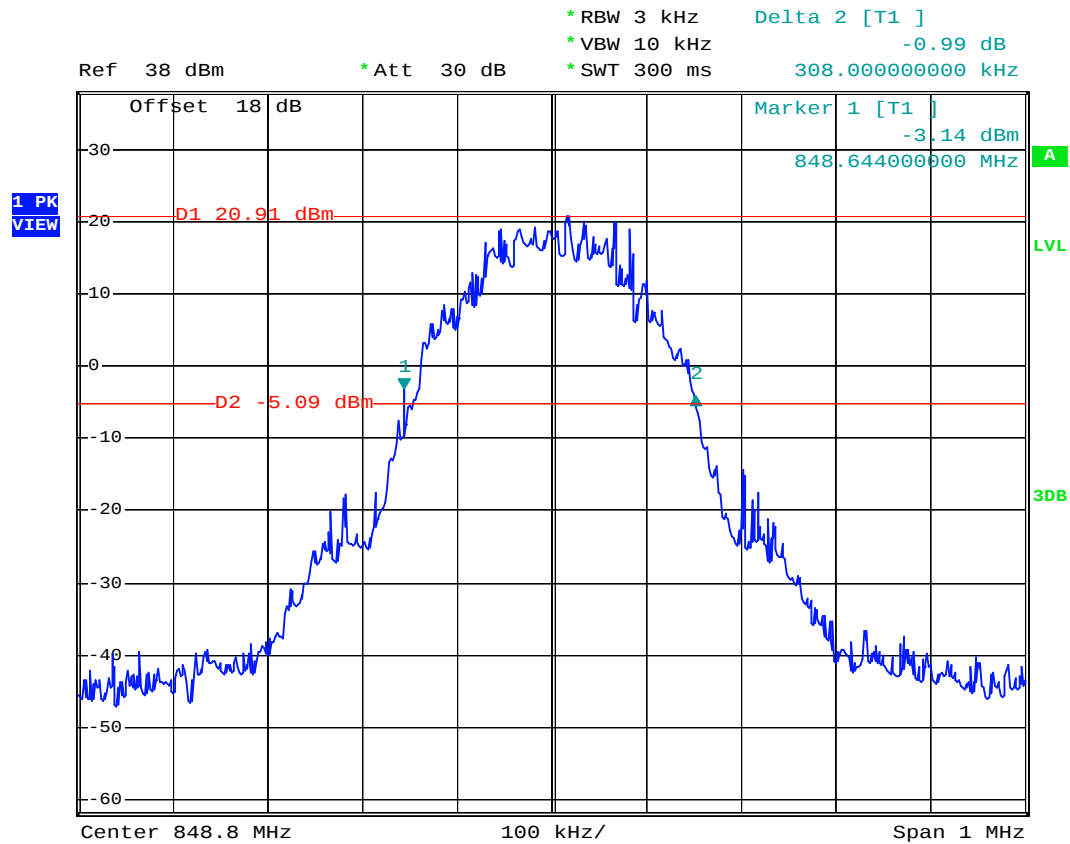


- Test Mode : GSM850 (EDGE) CH189 26dB Bandwidth
- Power State : High



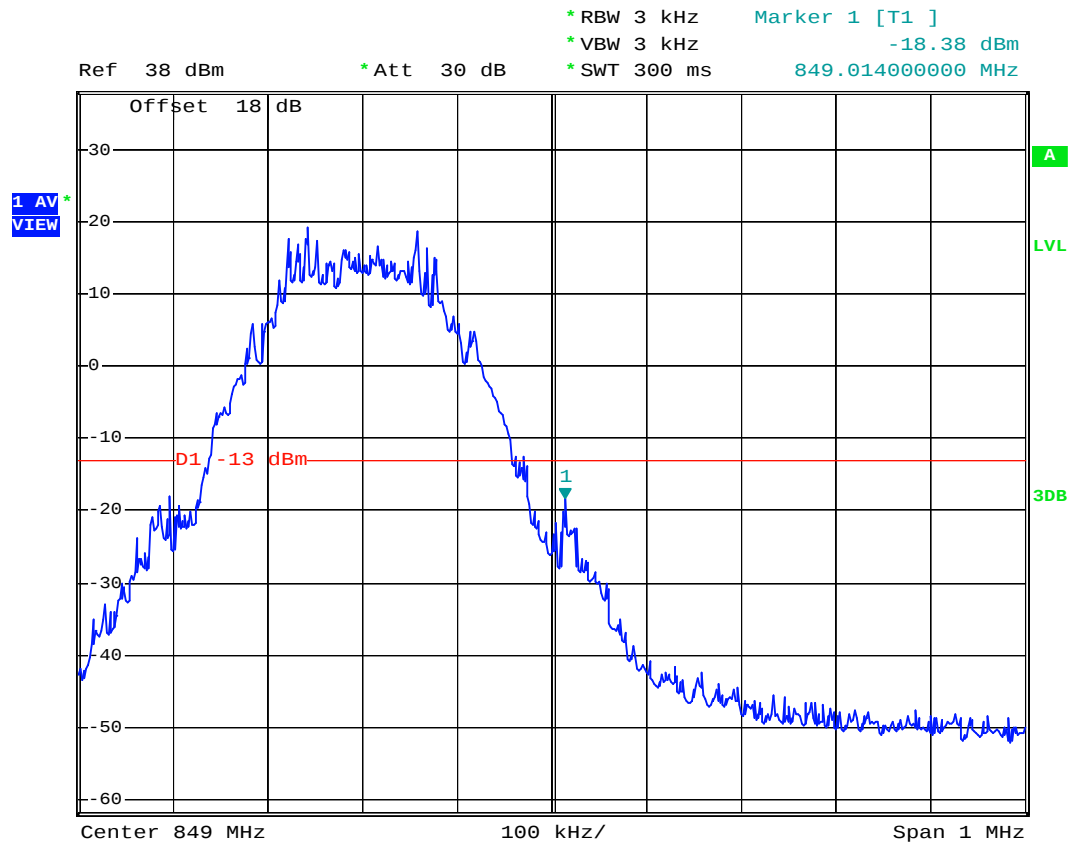


- Test Mode : GSM850 (EDGE) CH 251 26dB Bandwidth
- Power State : High



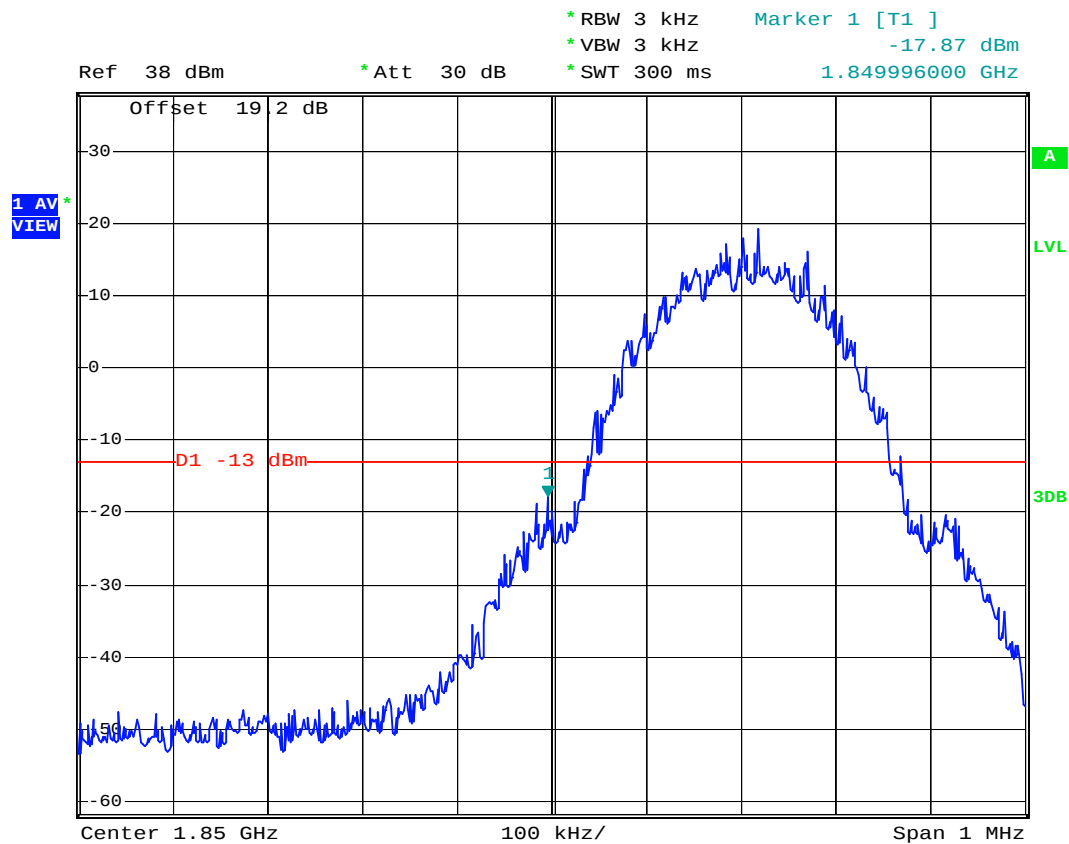


- Test Mode : GSM850 (EDGE) CH251 the highest channel for band edge
- Power State : High



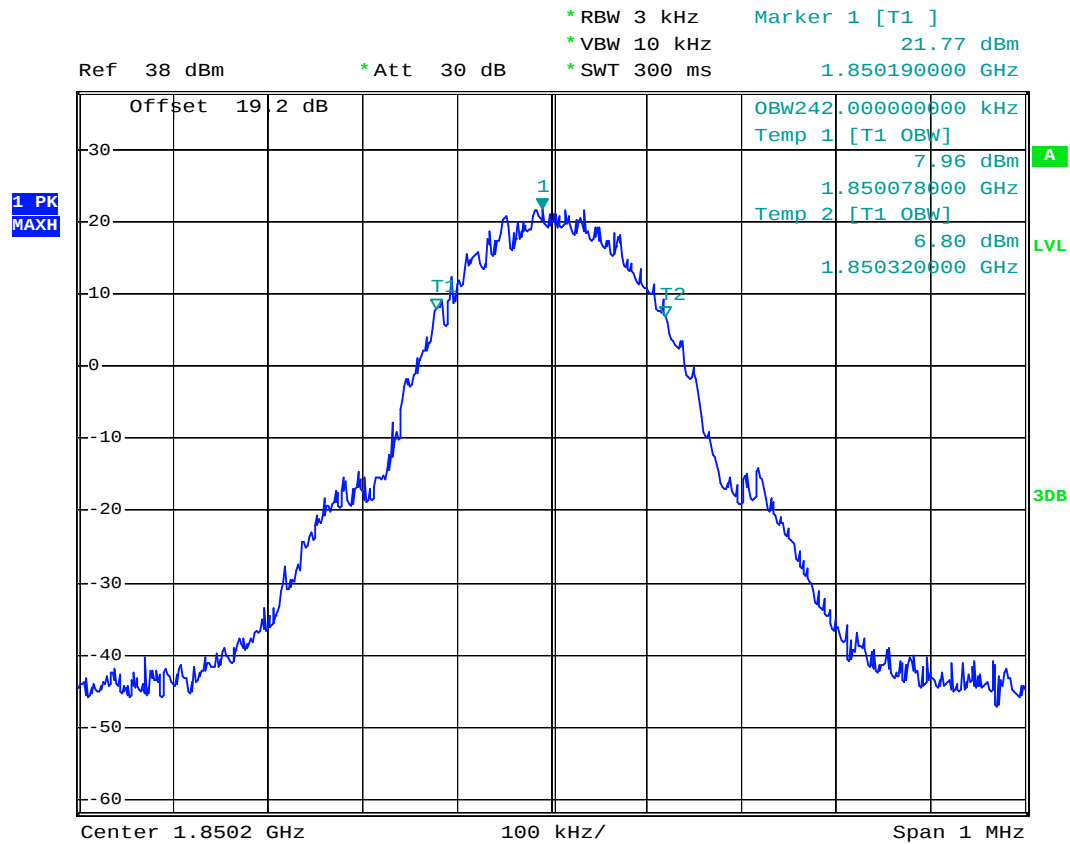


- Mode 3
- Test Mode : GSM1900 (GSM) CH512 the lowest channel for band edge
- Power State : High



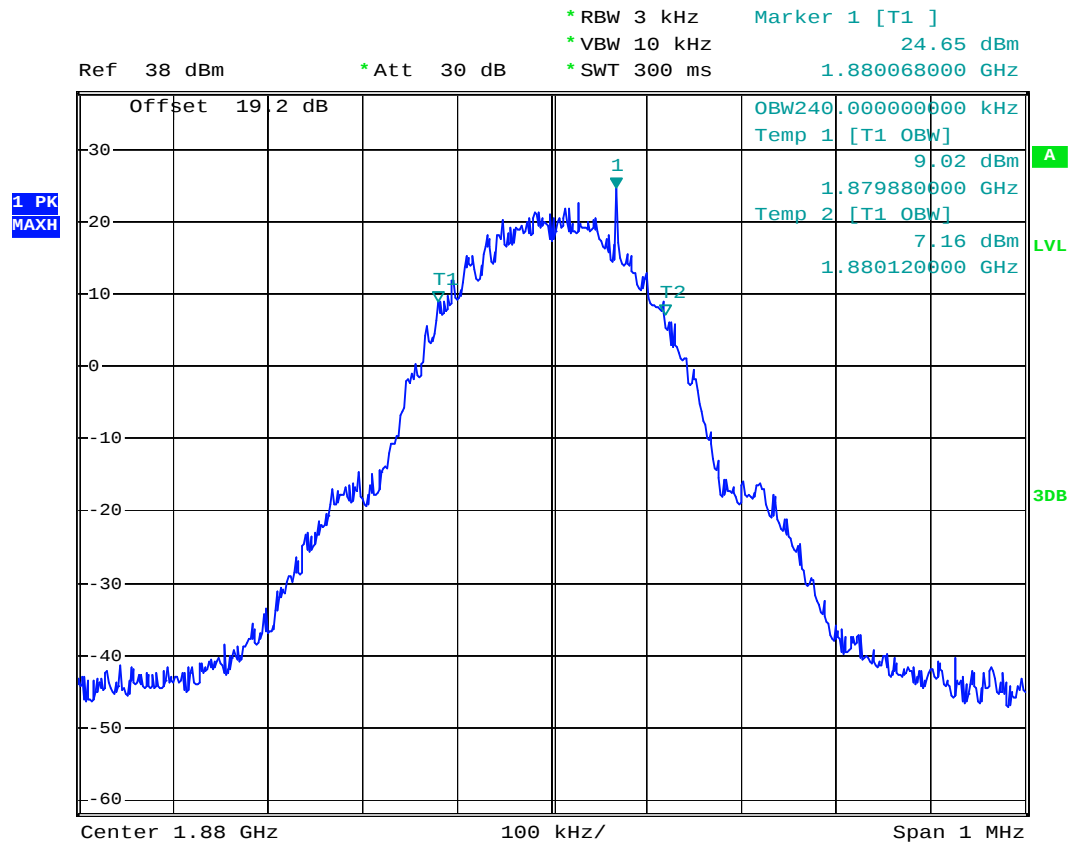


- Test Mode : GSM1900 (GSM) CH512 99% Occupied Bandwidth
- Power State : High



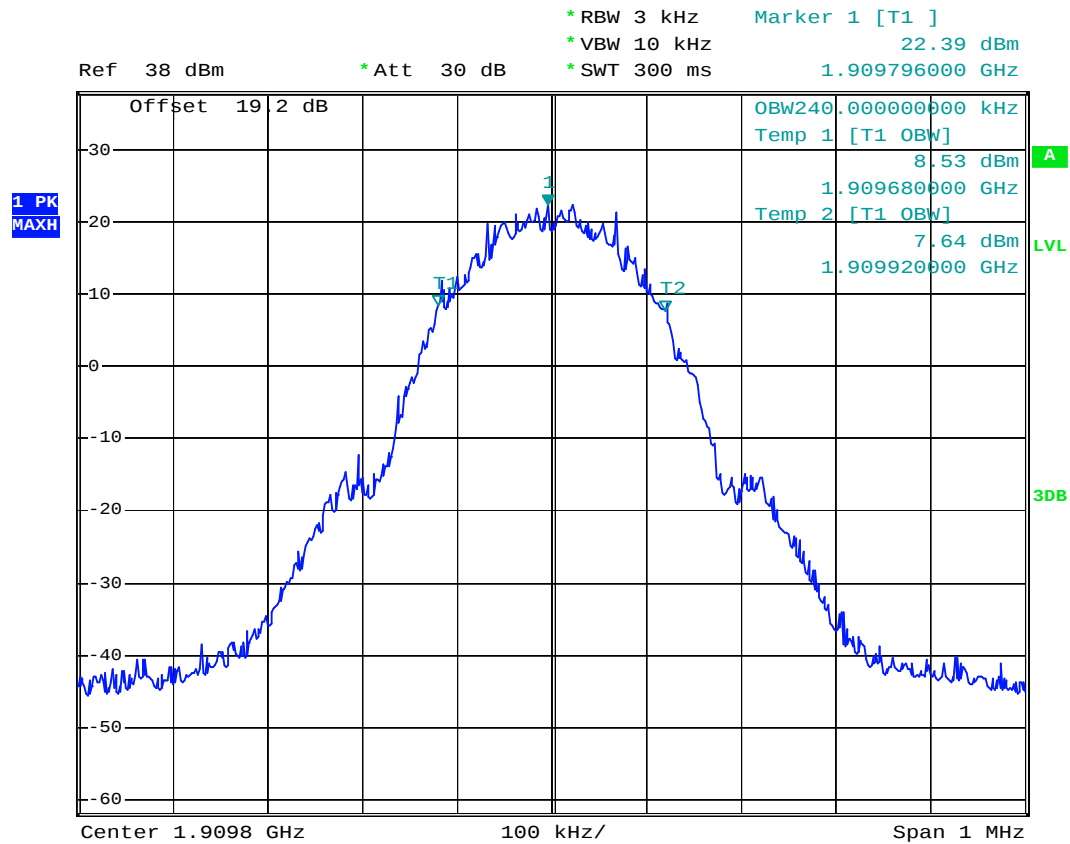


- Test Mode : GSM1900 (GSM) CH661 99% Occupied Bandwidth
- Power State : High



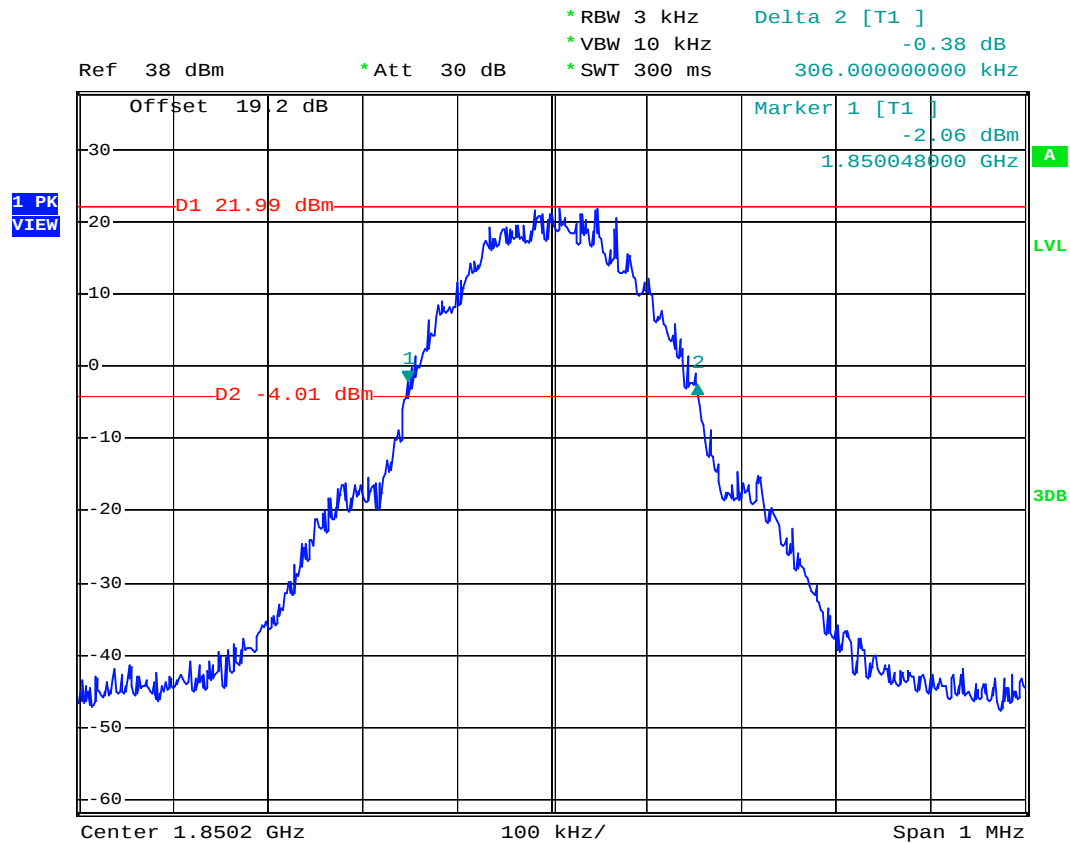


- Test Mode : GSM1900 (GSM) CH810 99% Occupied Bandwidth
- Power State : High



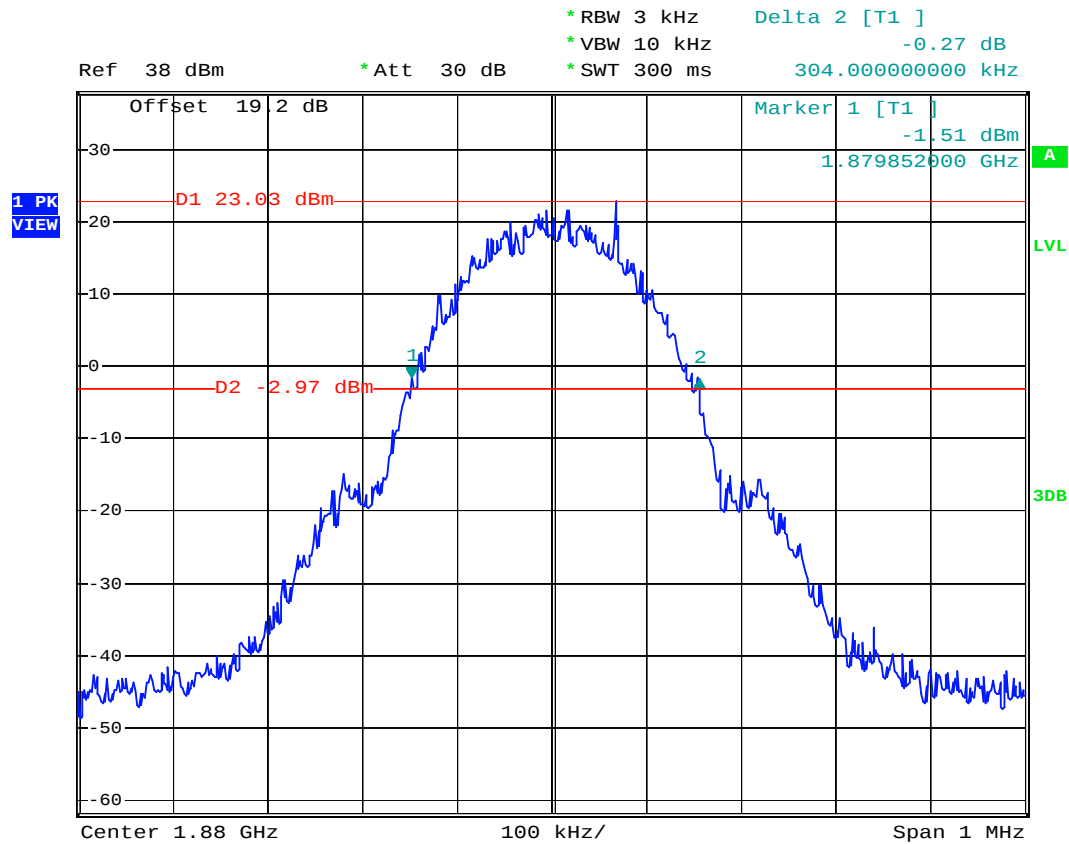


- Test Mode : GSM1900 (GSM) CH512 26dB Bandwidth
- Power State : High



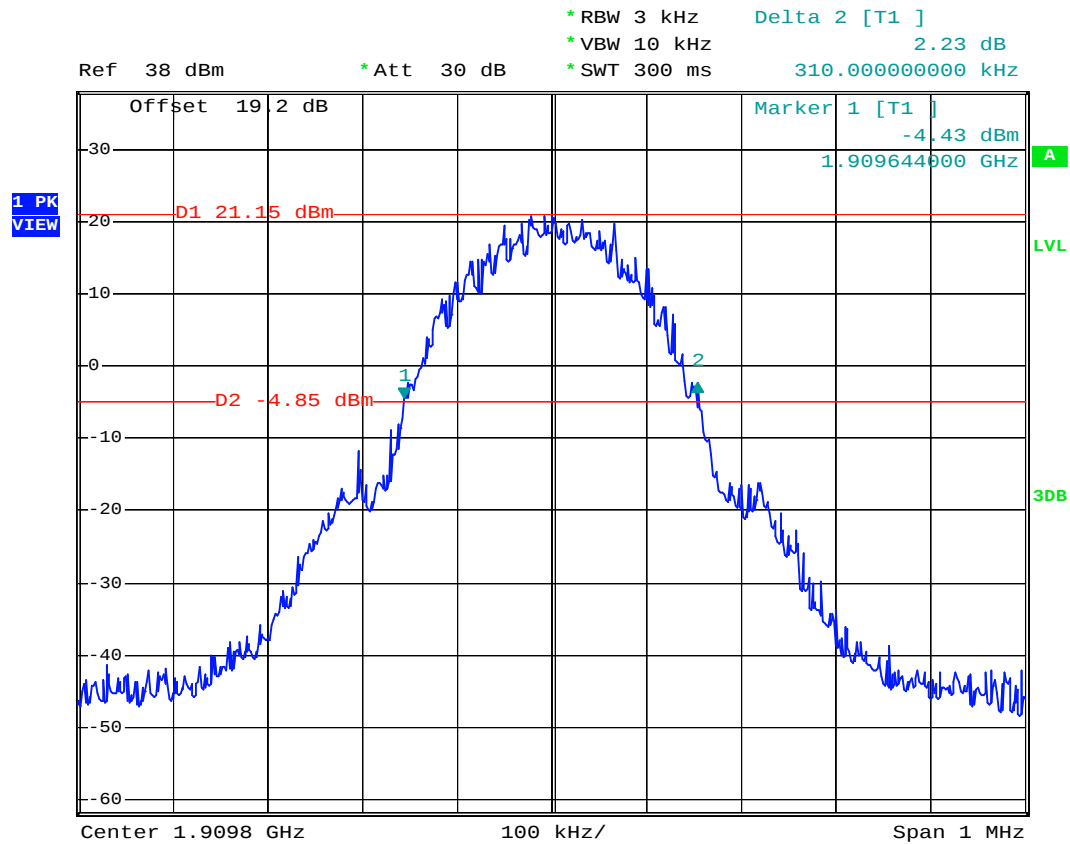


- Test Mode : GSM1900 (GSM) CH661 26dB Bandwidth
- Power State : High



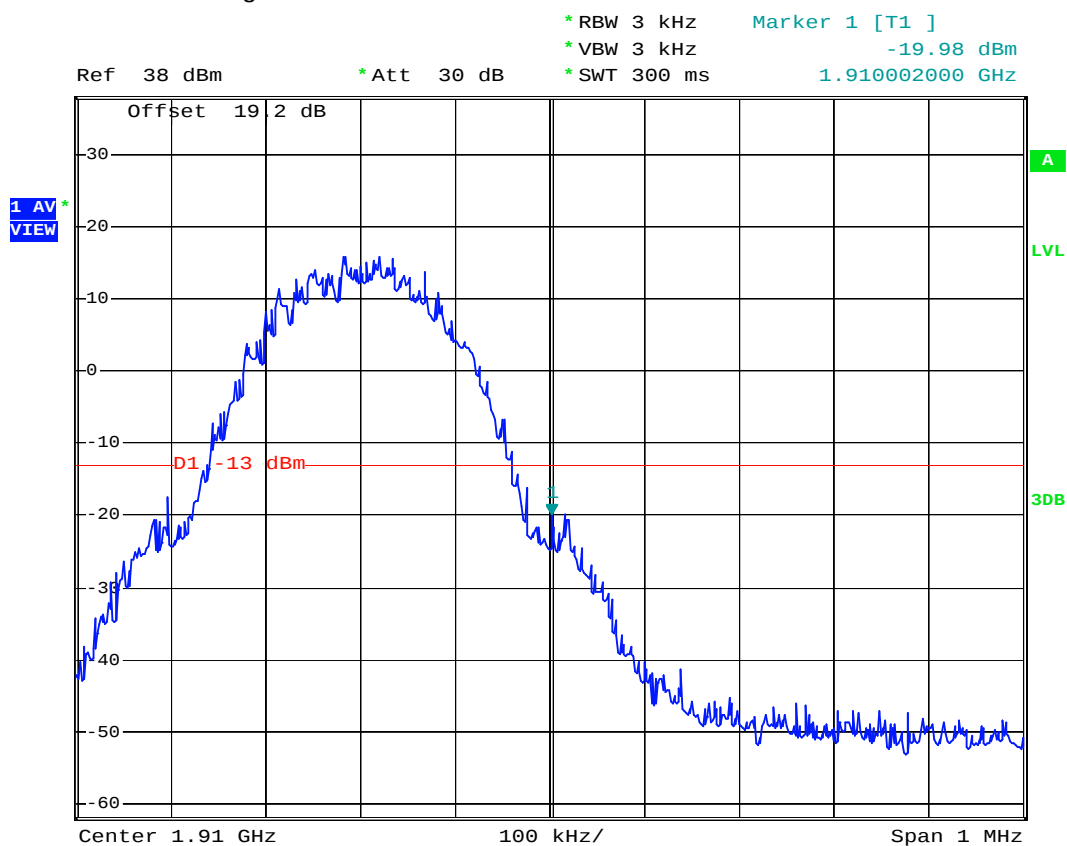


- Test Mode : GSM1900 (GSM) CH810 26dB Bandwidth
- Power State : High



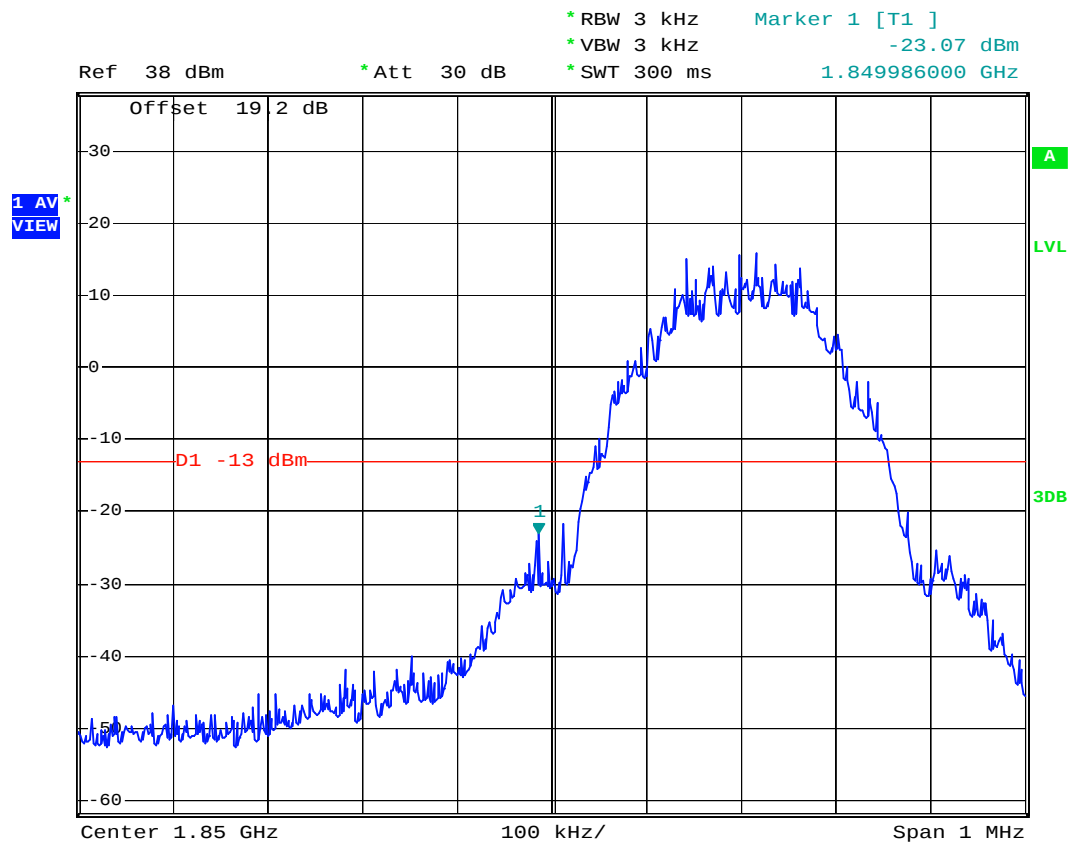


- Test Mode : GSM1900 (GSM) CH810 the highest channel for band edge
- Power State : High



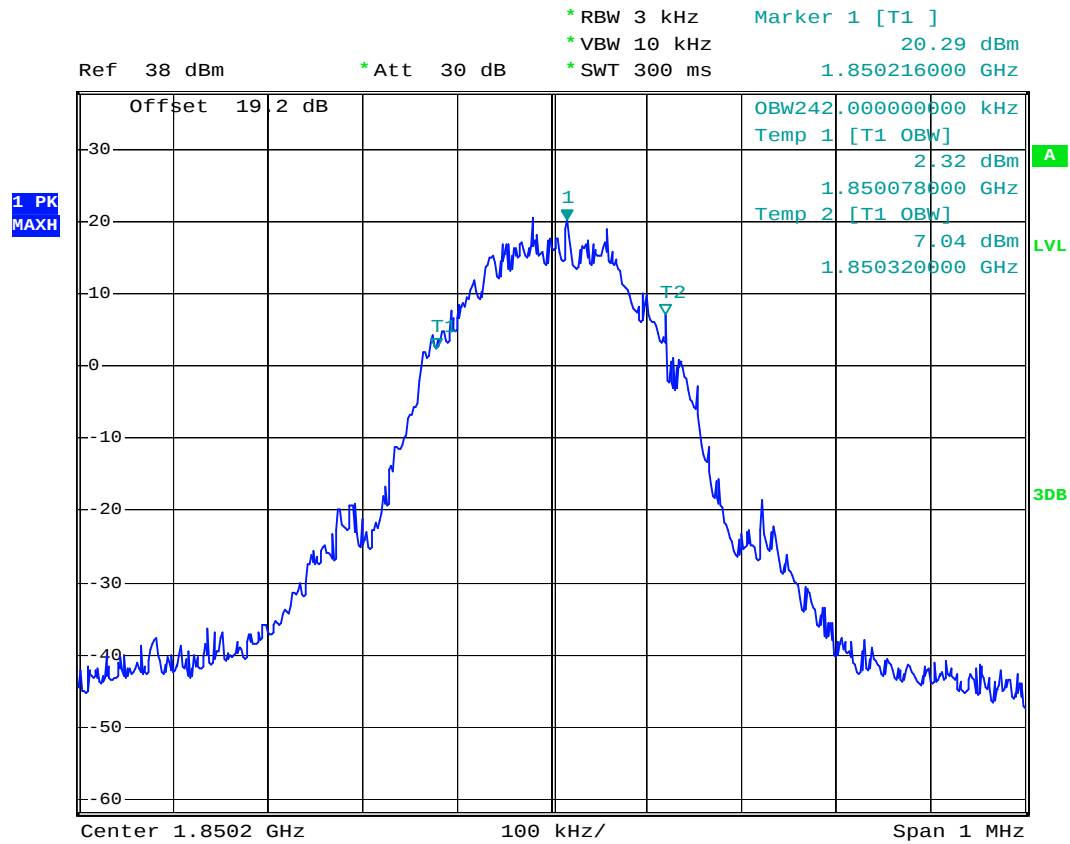


- Mode 4
- Test Mode : GSM1900 (EDGE) CH512 the lowest channel for band edge
- Power State : High



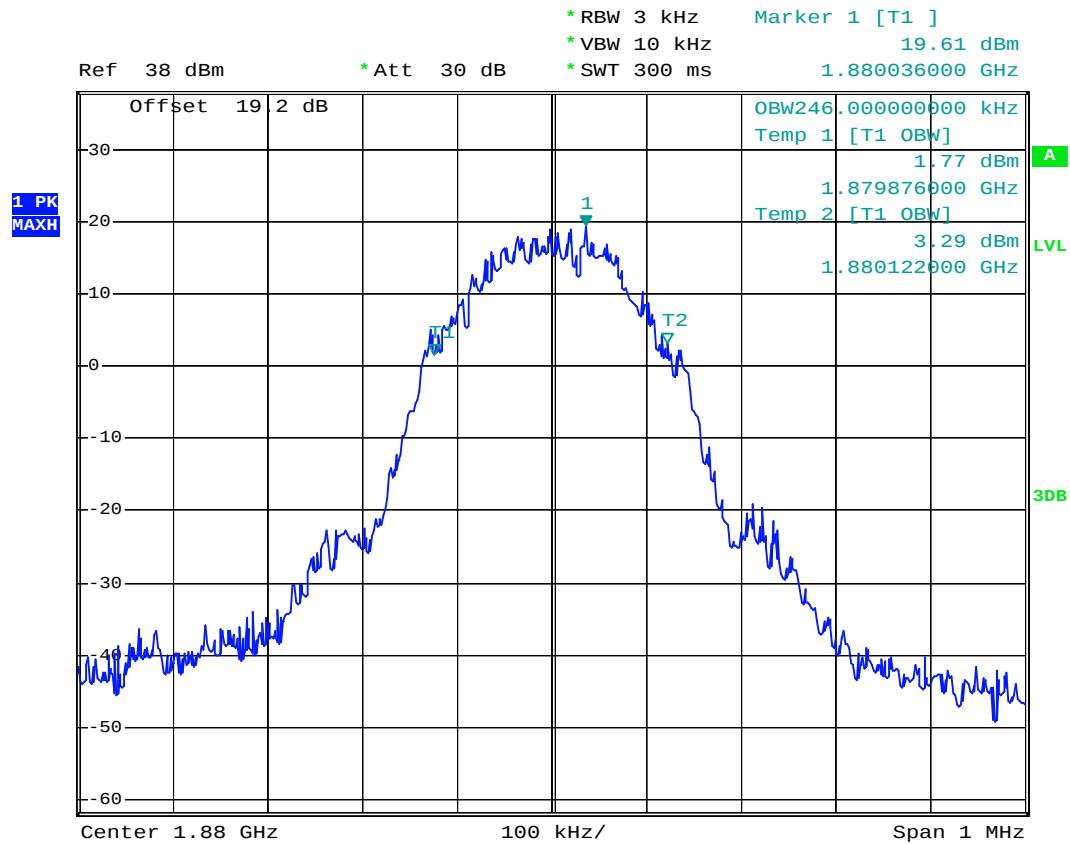


- Test Mode : GSM1900 (EDGE) CH512 99% Occupied Bandwidth
- Power State : High



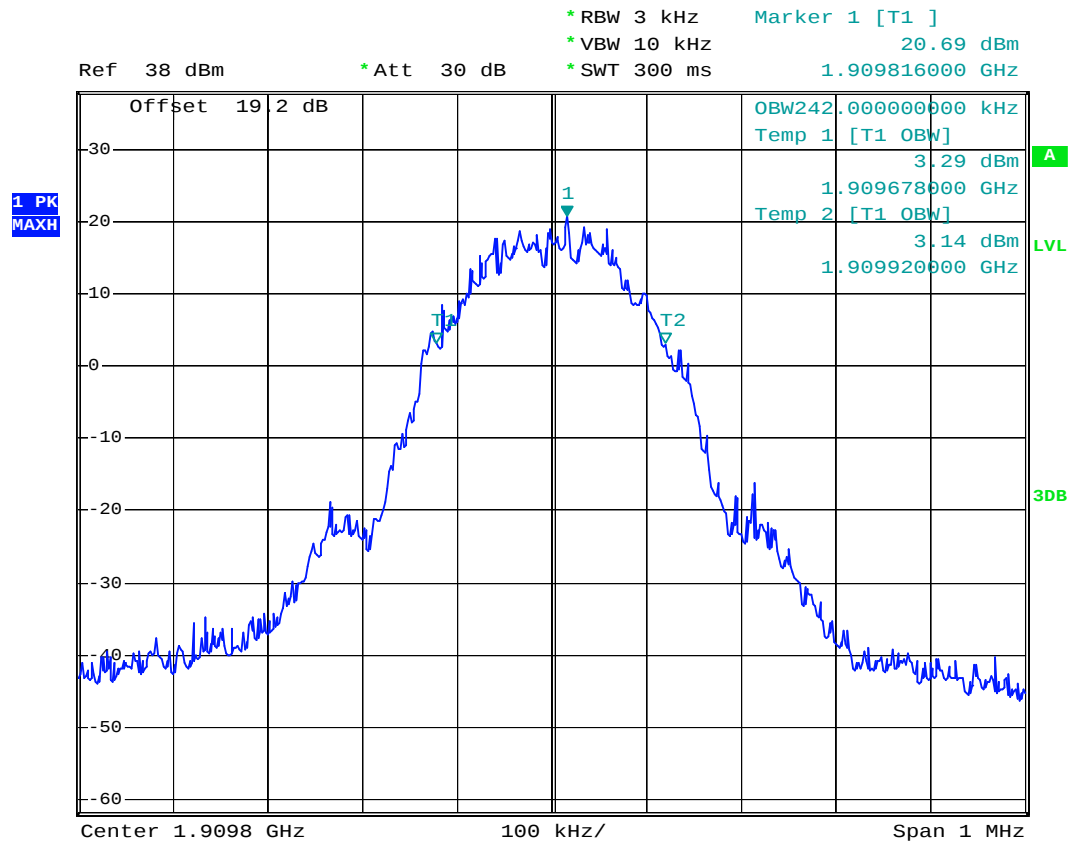


- Test Mode : GSM1900 (EDGE) CH661 99% Occupied Bandwidth
- Power State : High



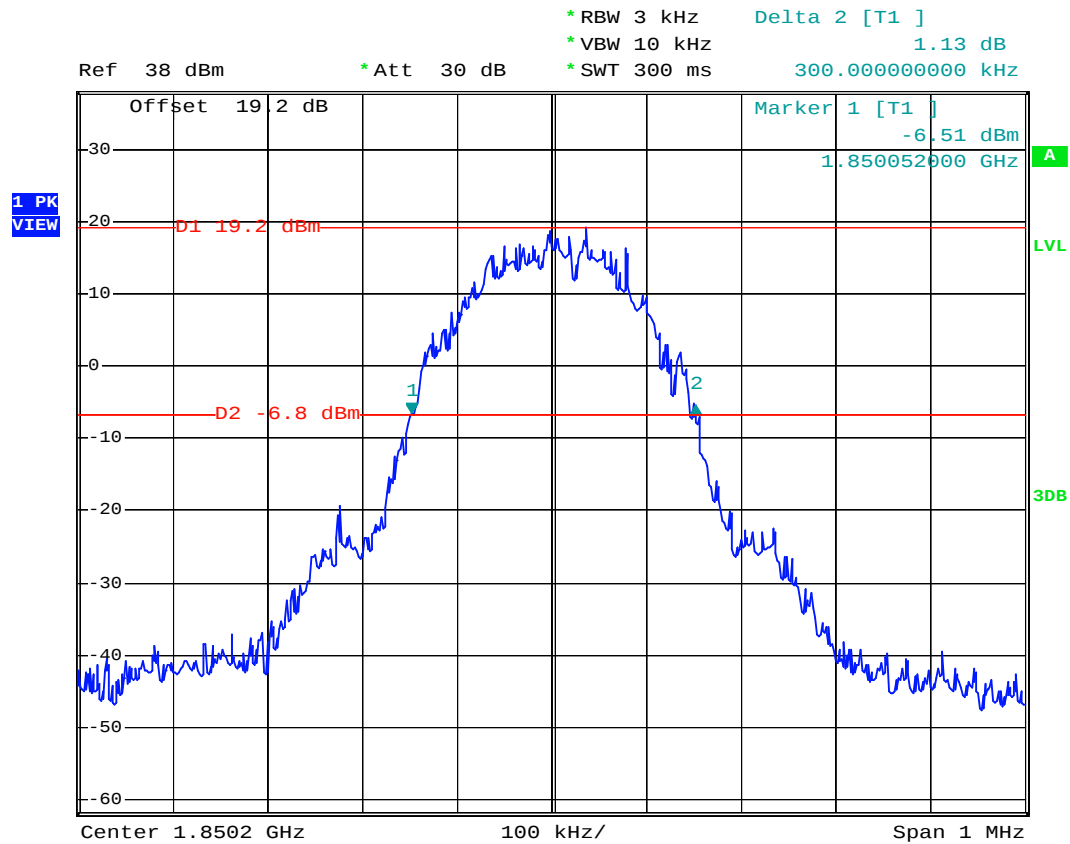


- Test Mode : GSM1900 (EDGE) CH810 99% Occupied Bandwidth
- Power State : High



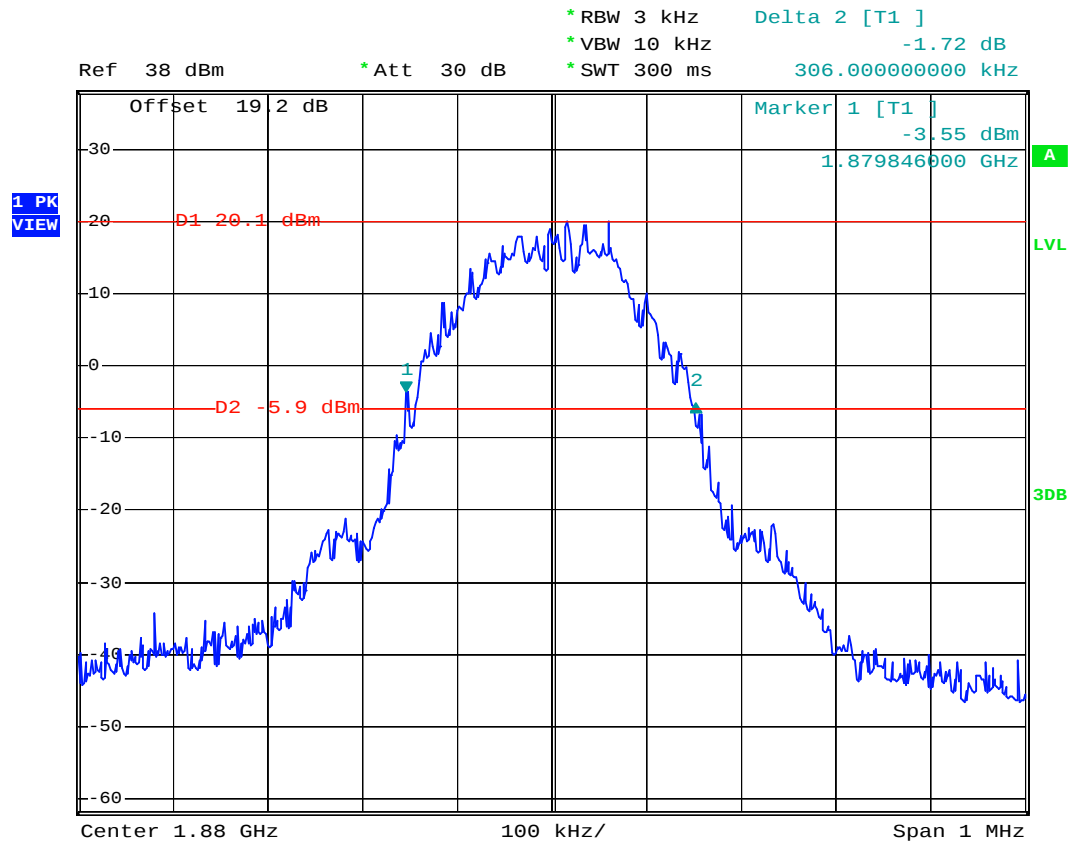


- Test Mode : GSM1900 (EDGE) CH512 26dB Bandwidth
- Power State : High



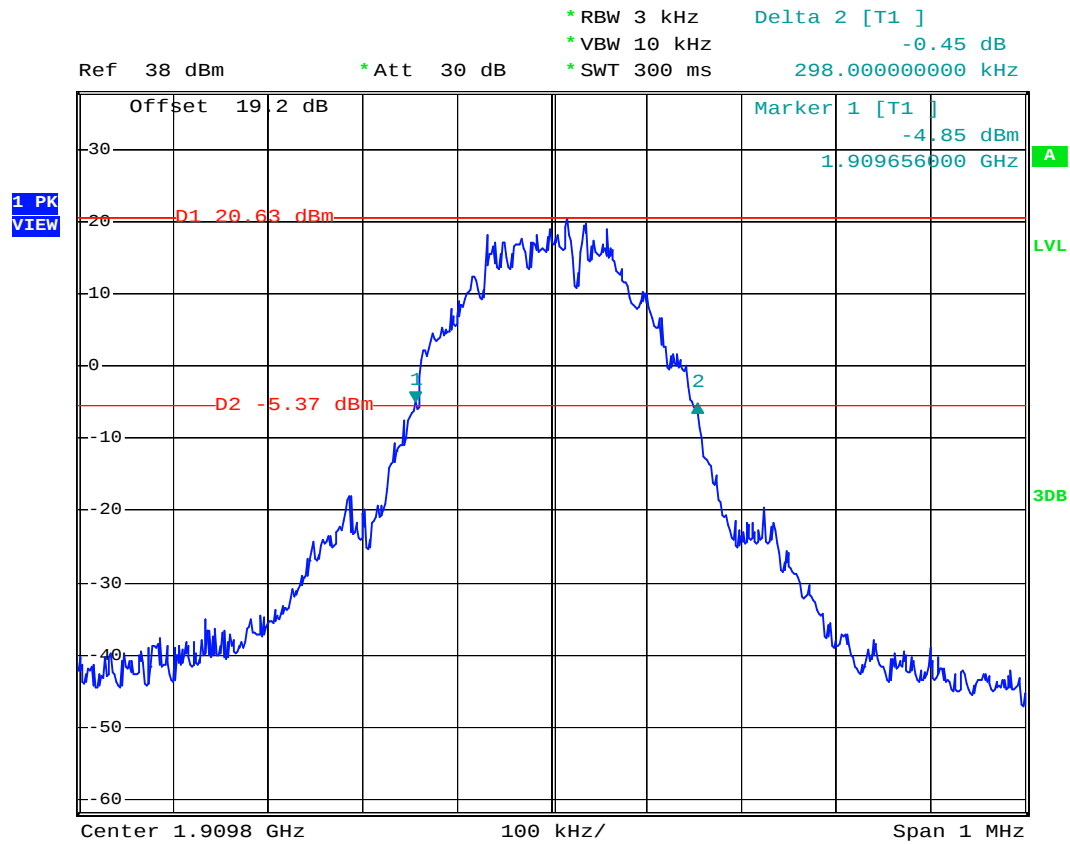


- Test Mode : GSM1900 (EDGE) CH661 26dB Bandwidth
- Power State : High



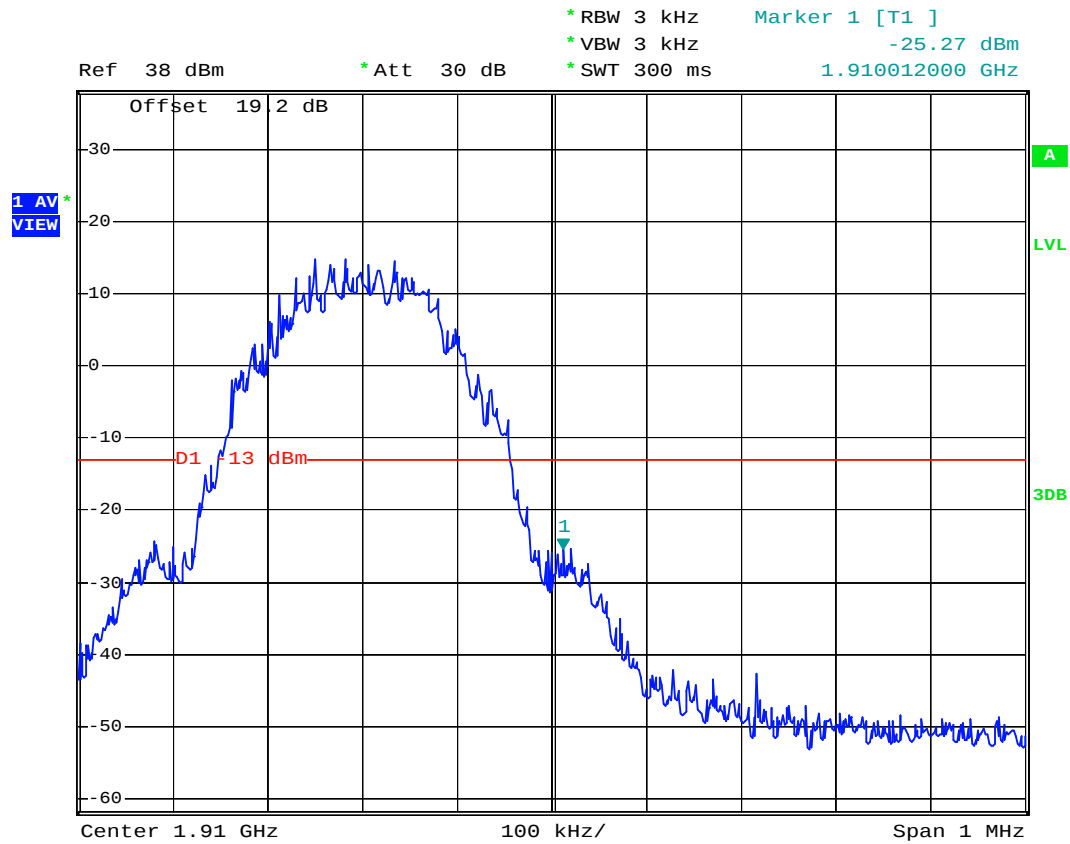


- Test Mode : GSM1900 (EDGE) CH810 26dB Bandwidth
- Power State : High





- Test Mode : GSM1900(EDGE) CH810 the highest channel for band edge
- Power State : High



4.5 Conducted Emission

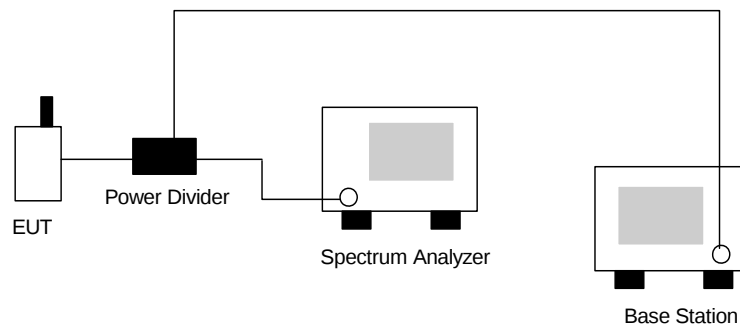
4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

4.5.2 Test Procedure

- The EUT was connected to Spectrum Analyzer and Base Station via power divider.
- The middle channel for the highest RF power within the transmitting frequency was measured.
- The conducted spurious emission for the whole frequency range was taken.

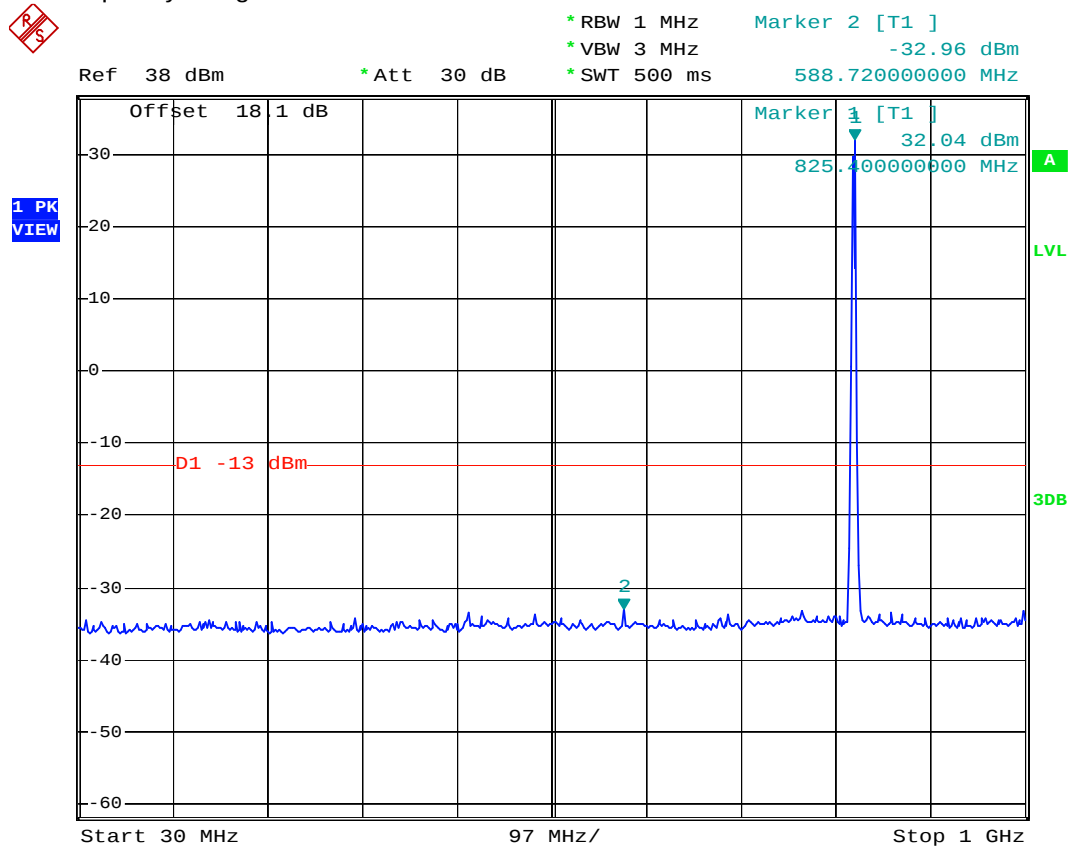
4.5.3 Test Setup Layout





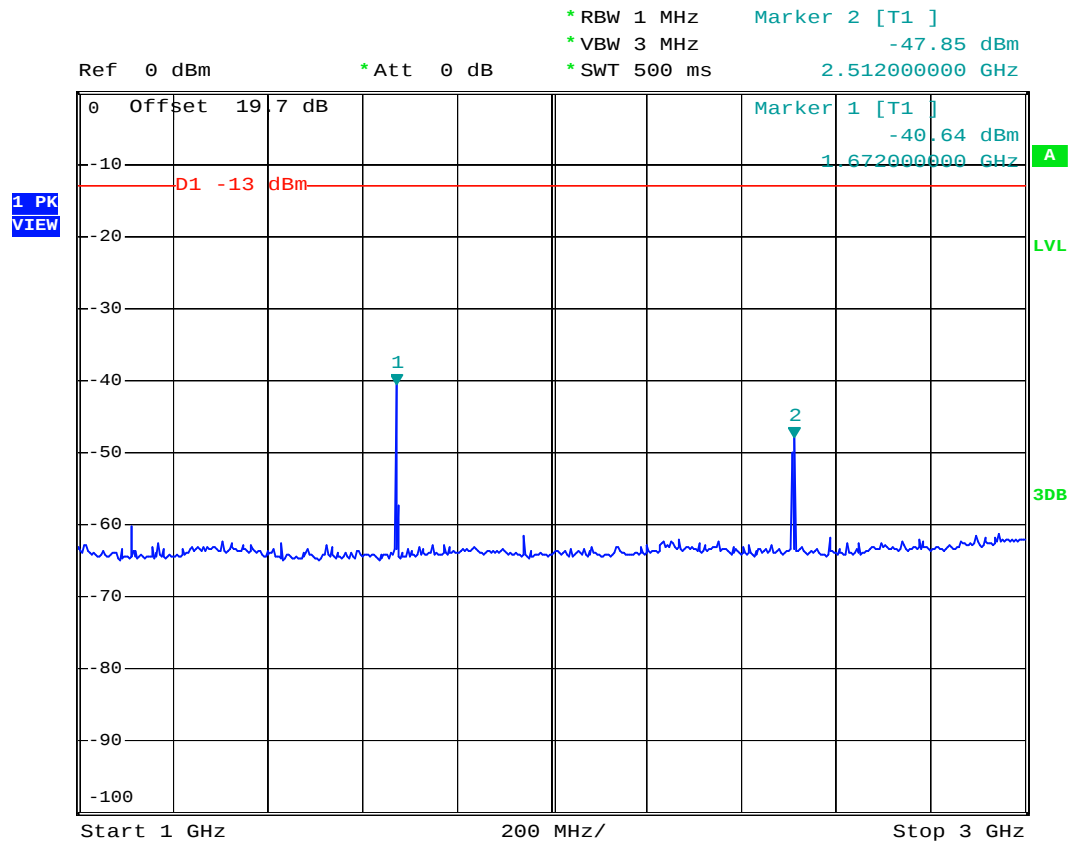
4.5.4 Test Result

- Mode 1
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 30M-1G



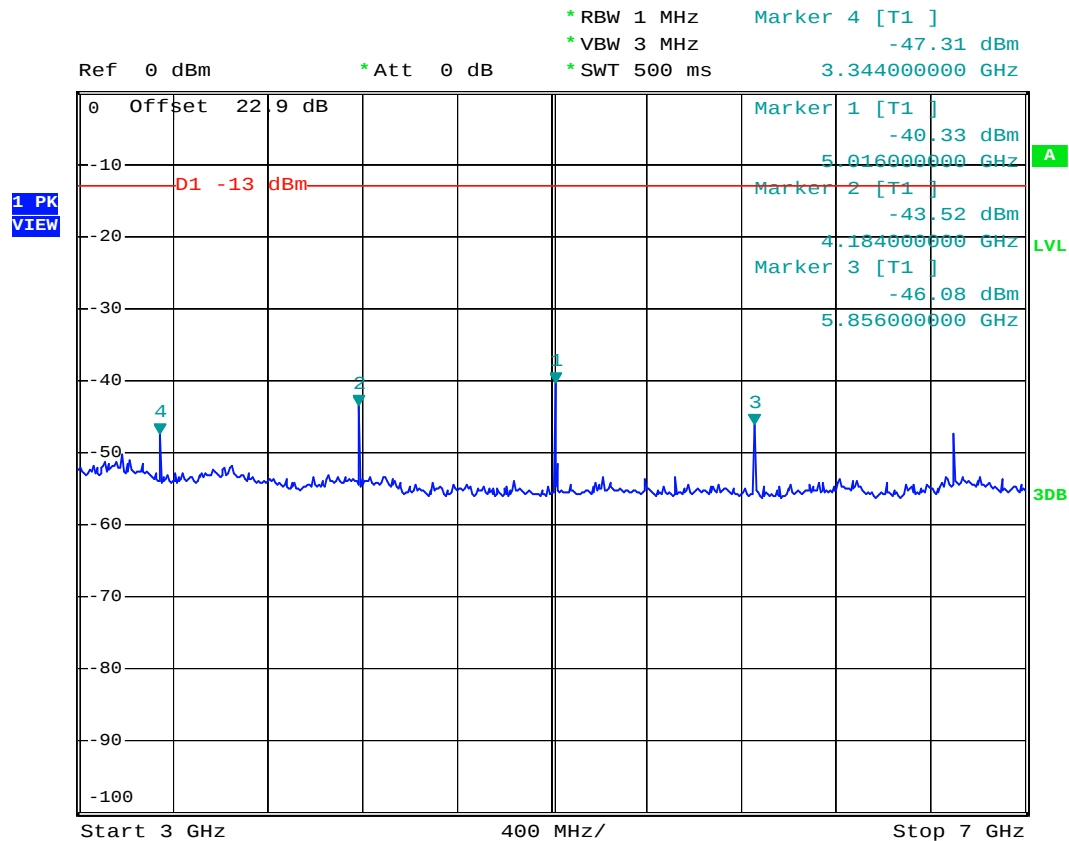


- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 1G-3G



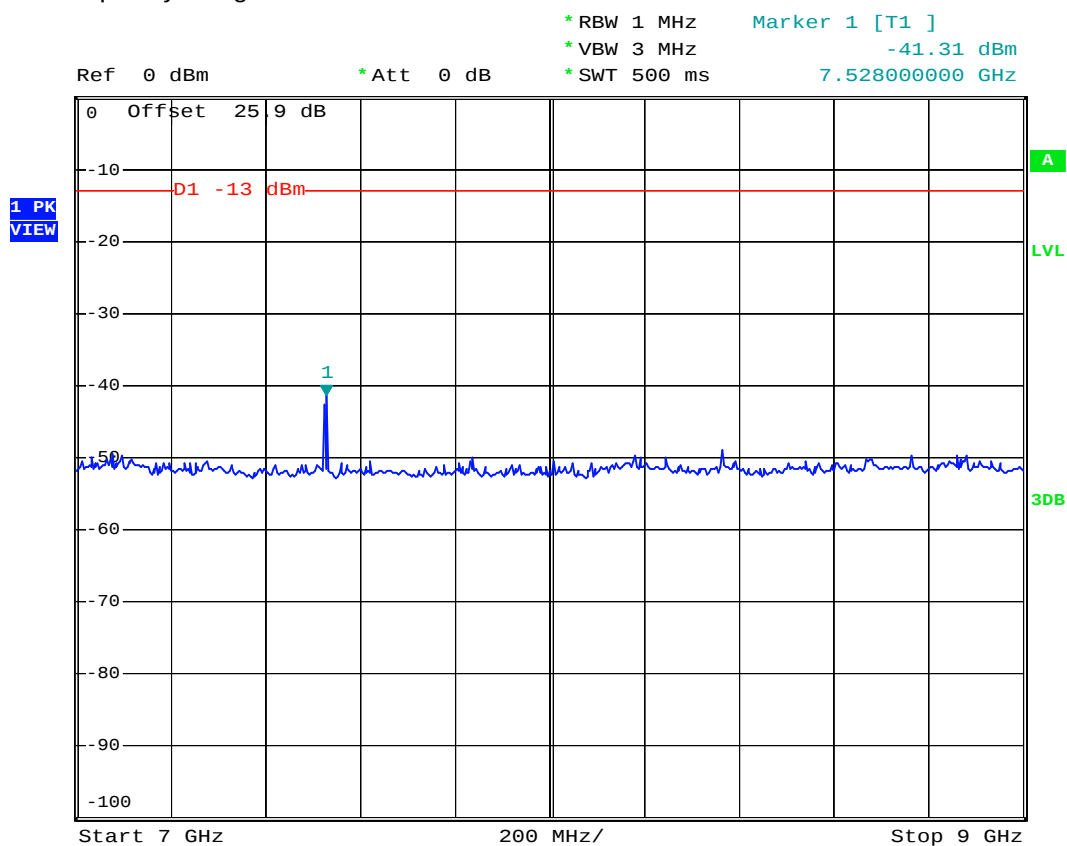


- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 3G-7G



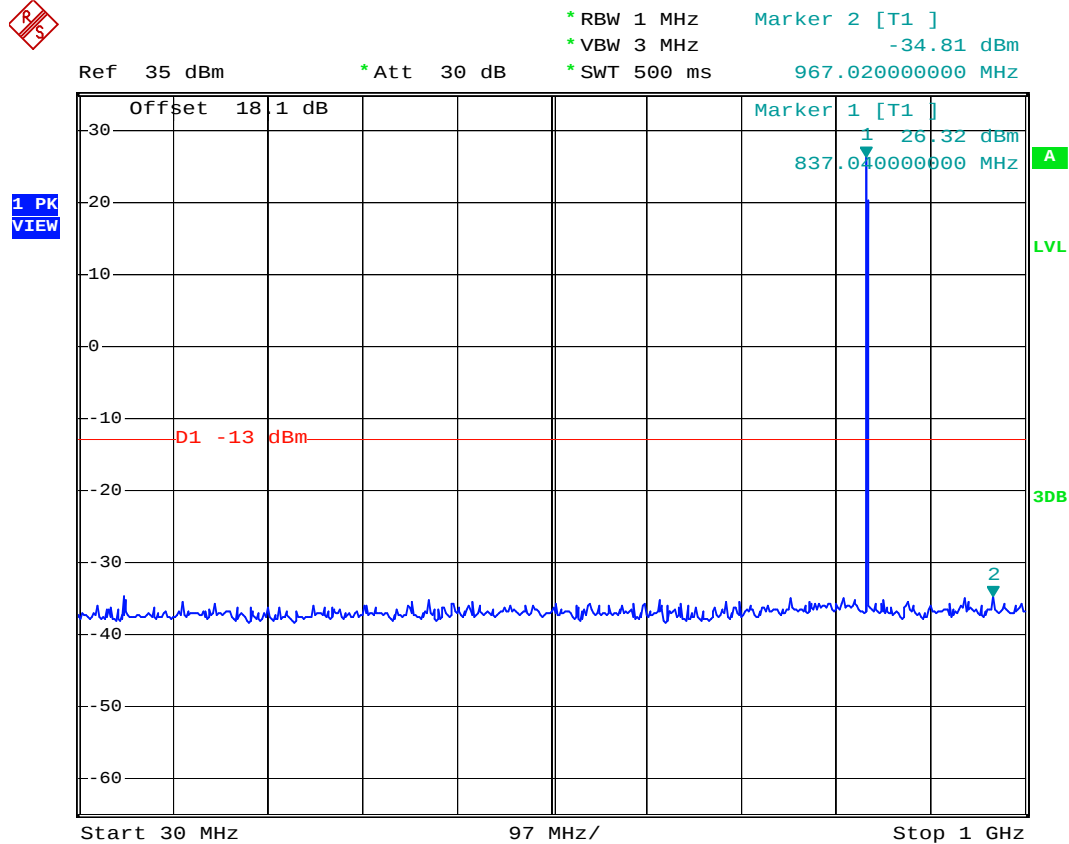


- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 7G-9G



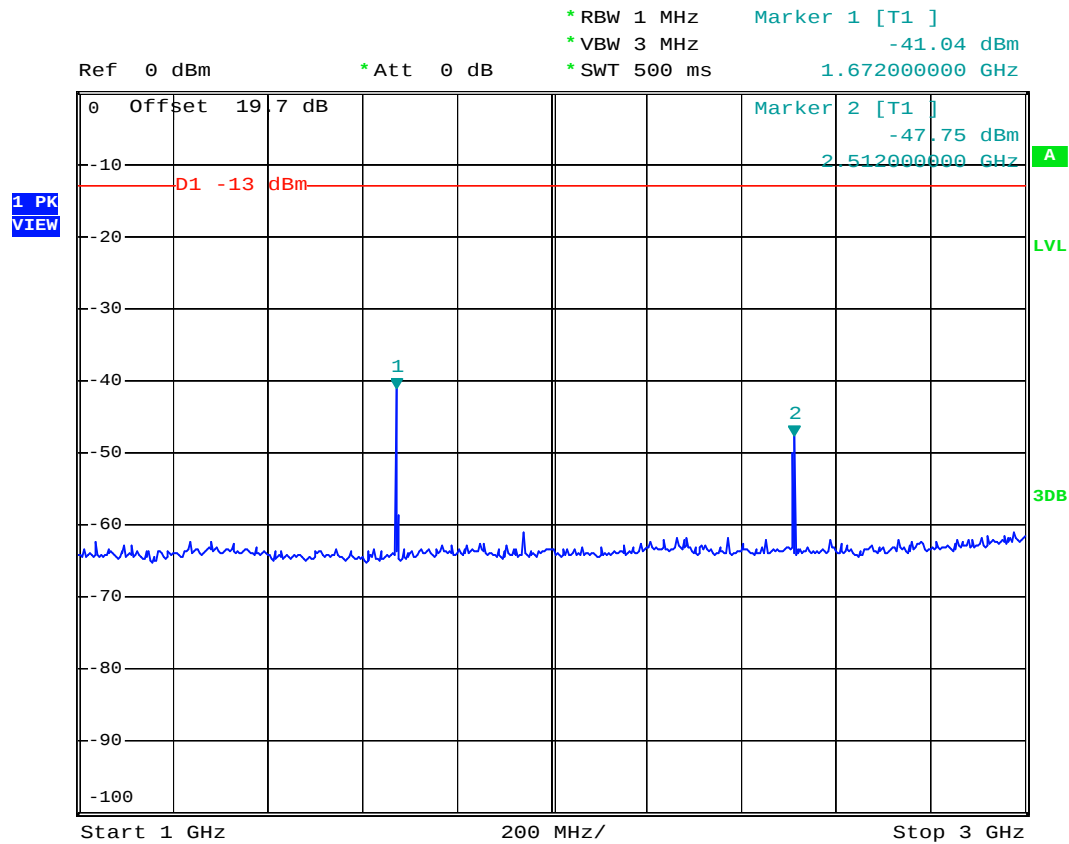


- Mode 2
- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 30M-1G



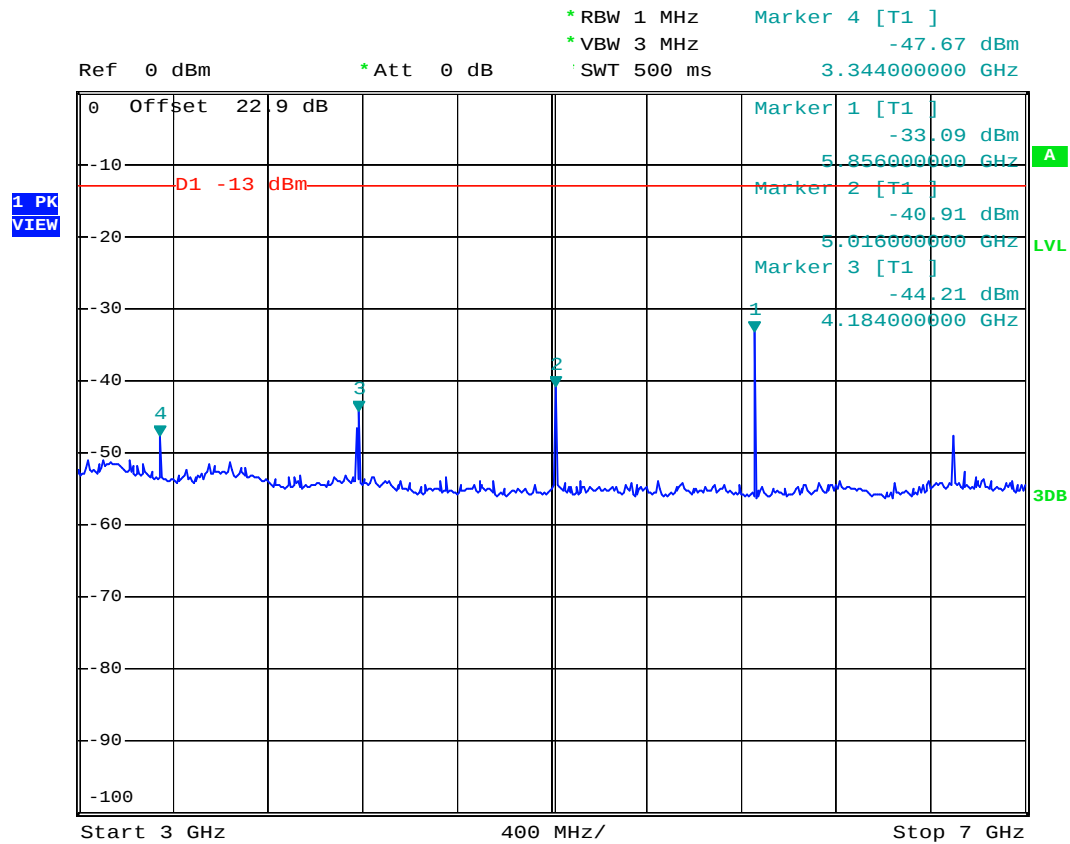


- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 1G-3G



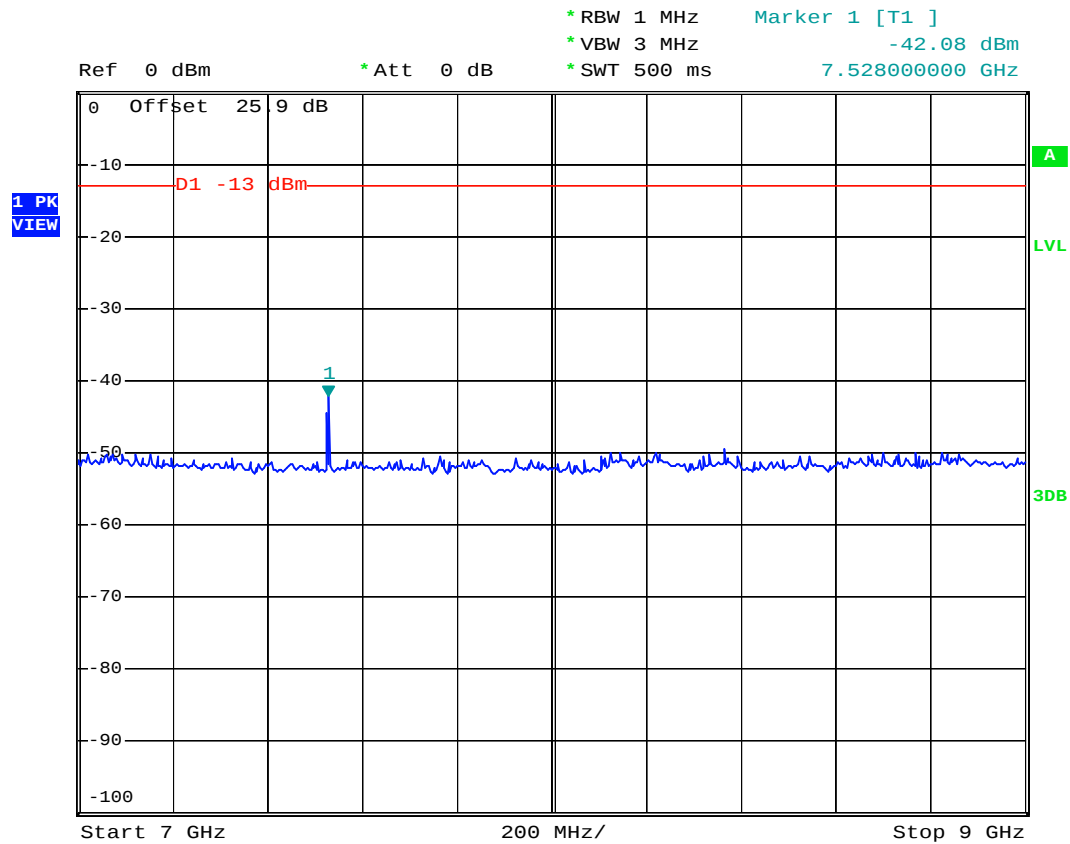


- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 3G-7G



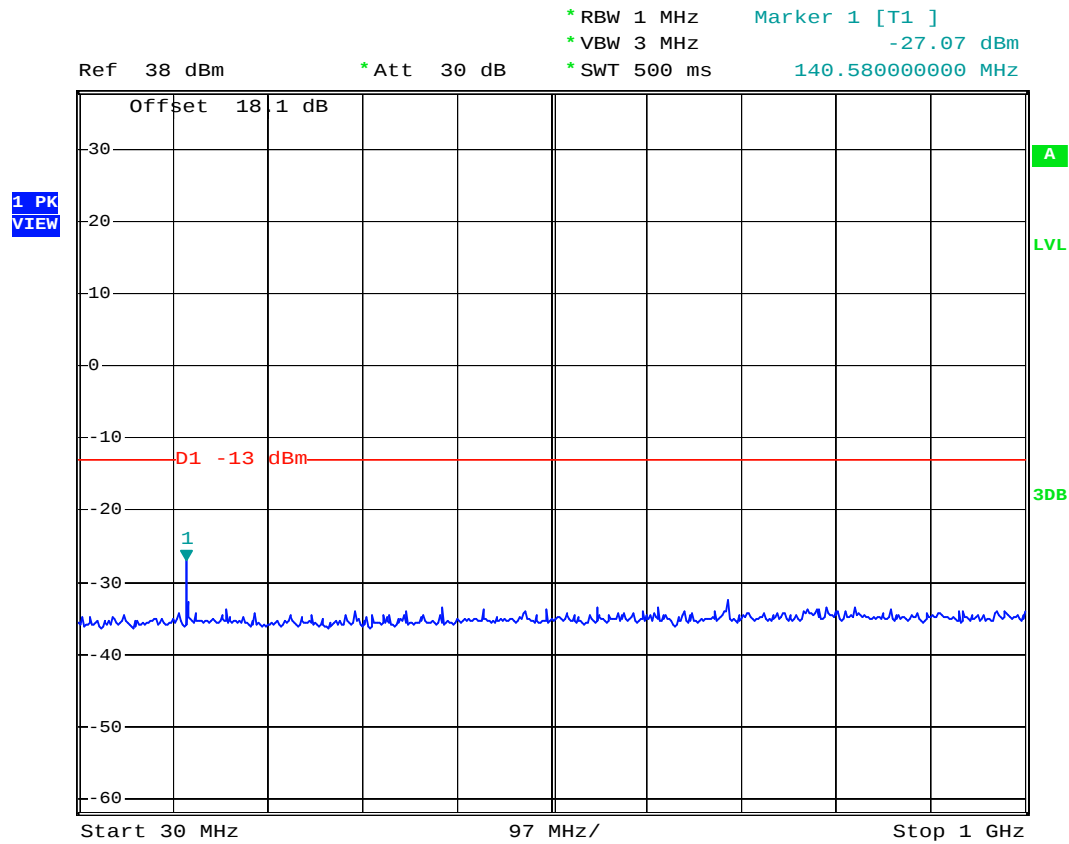


- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 7G-9G



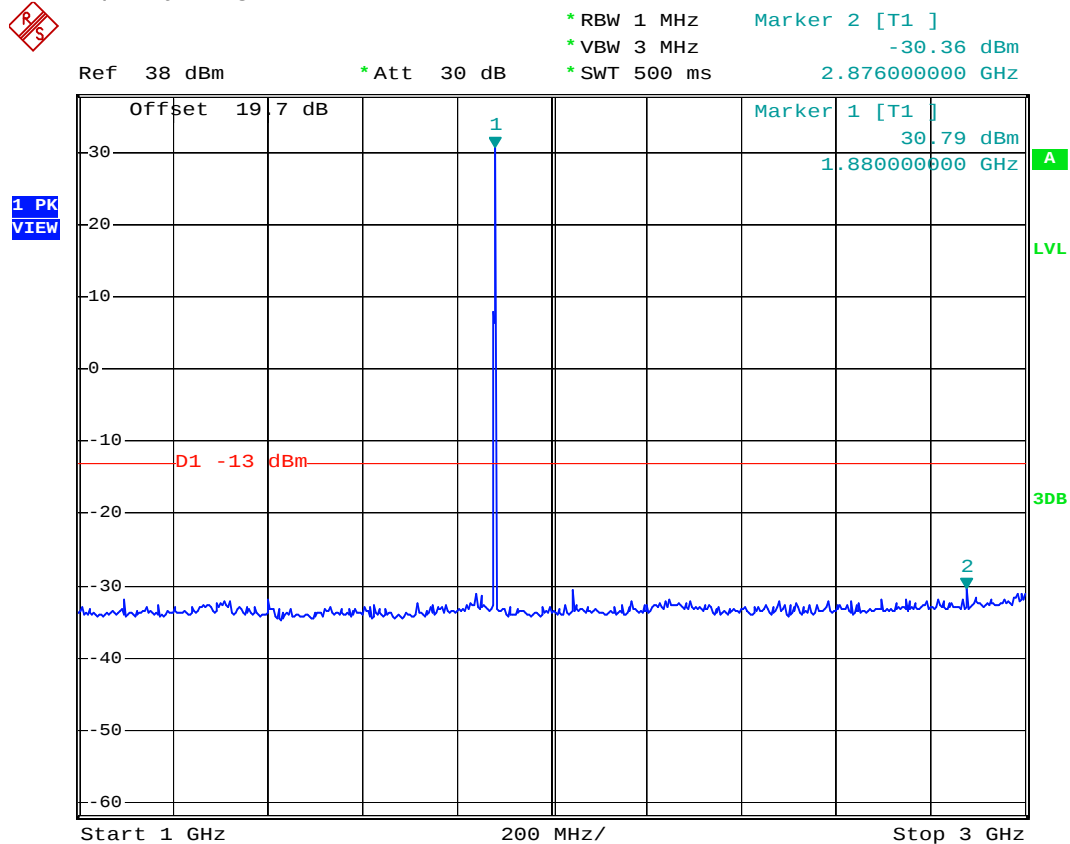


- Mode 3
- Test Mode : GSM1900 (GSM) CH661
- Frequency Range : 30M-1G



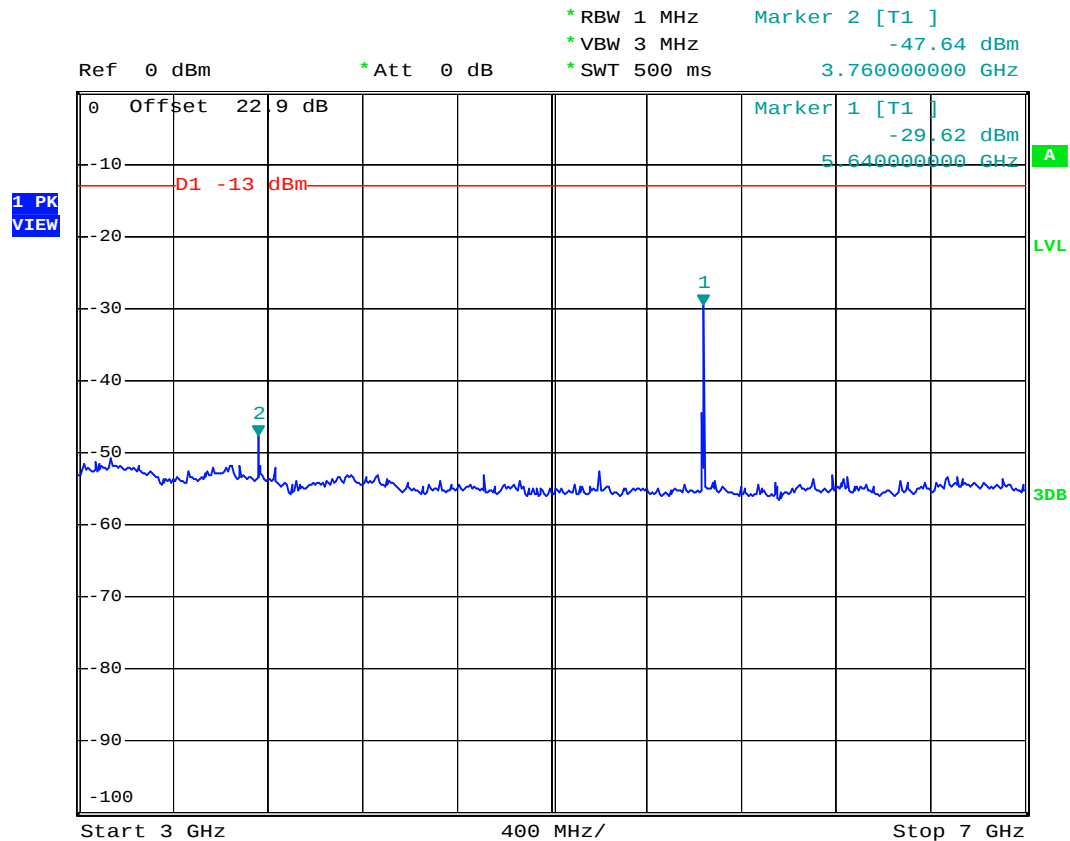


- Test Mode : GSM1900 (GSM) CH661
- Frequency Range : 1G-3G



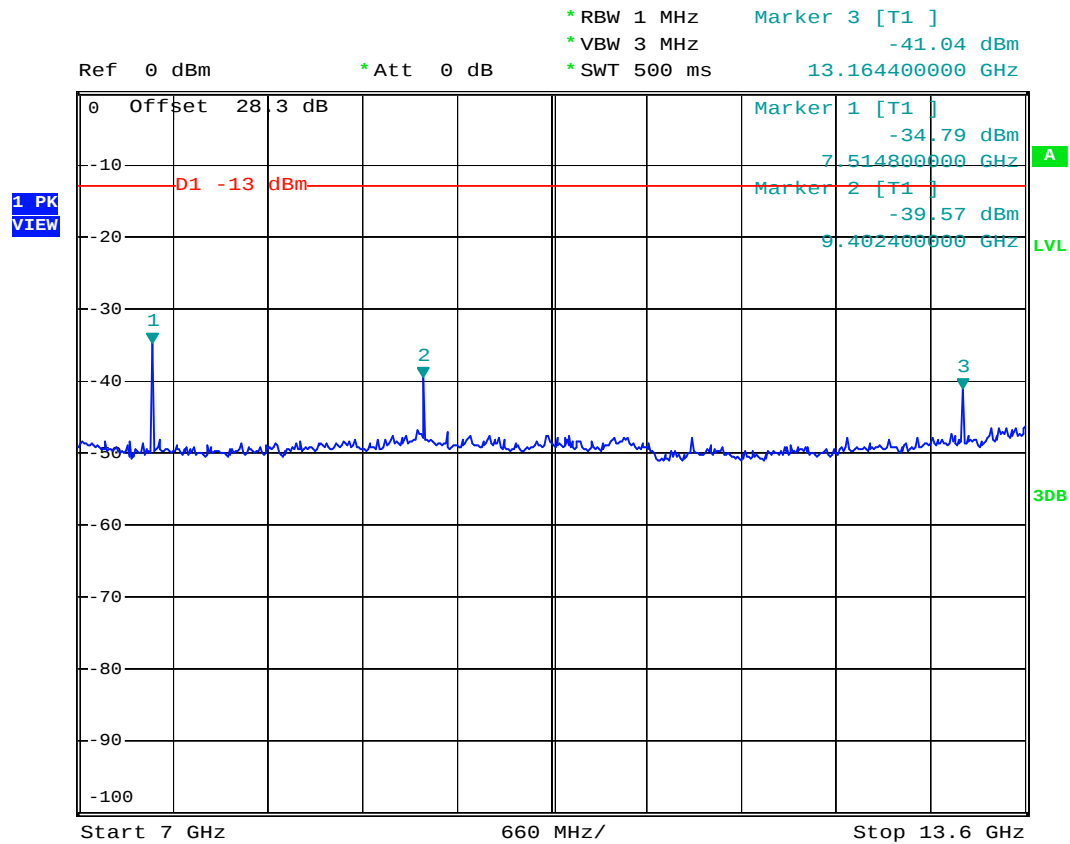


- Test Mode : GSM1900 (GSM) CH661
- Frequency Range : 3G-7G



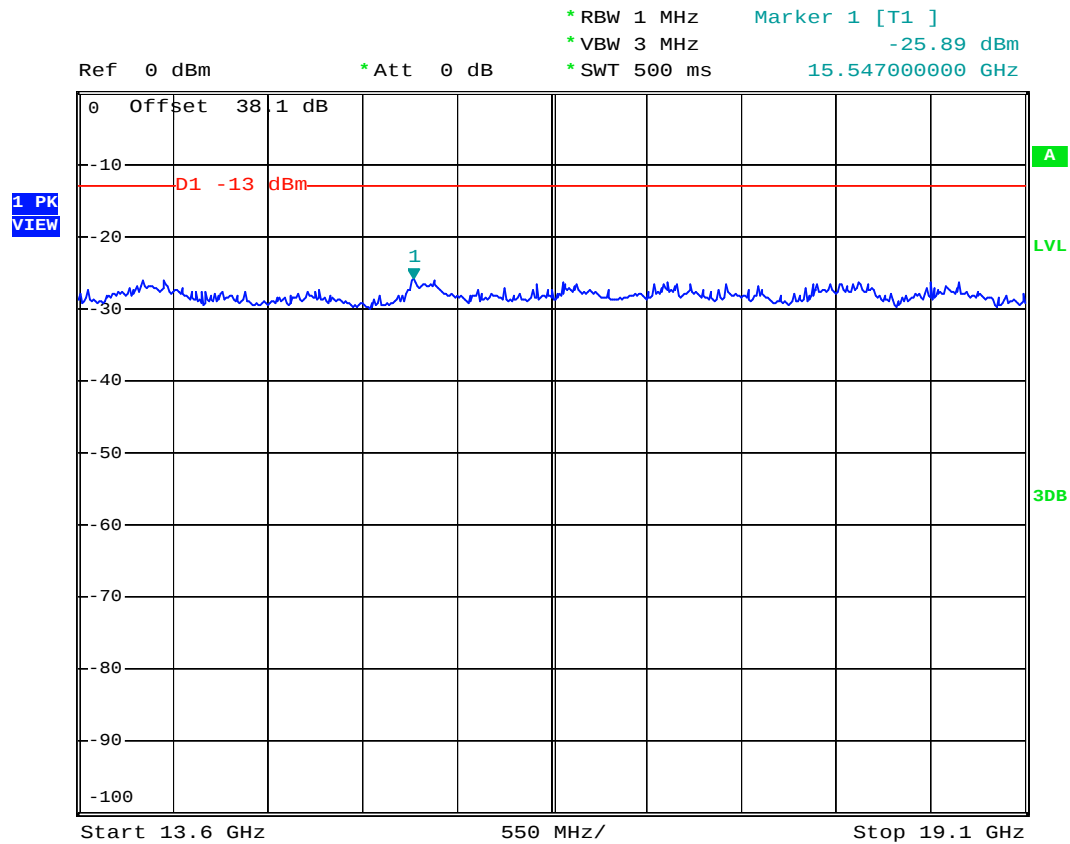


- Test Mode : GSM1900 (GSM) CH661
- Frequency Range : 7G-13.6G



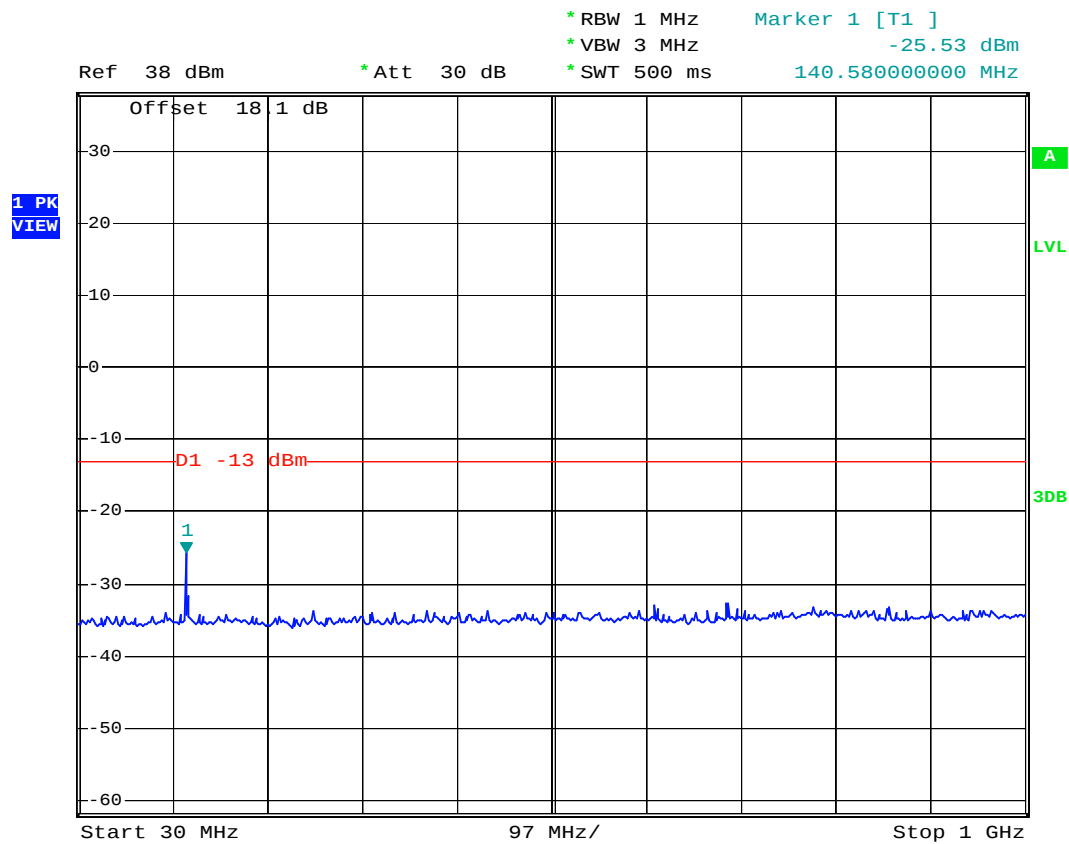


- Test Mode : GSM1900 (GSM) CH661
- Frequency Range : 13.6G-19.1G



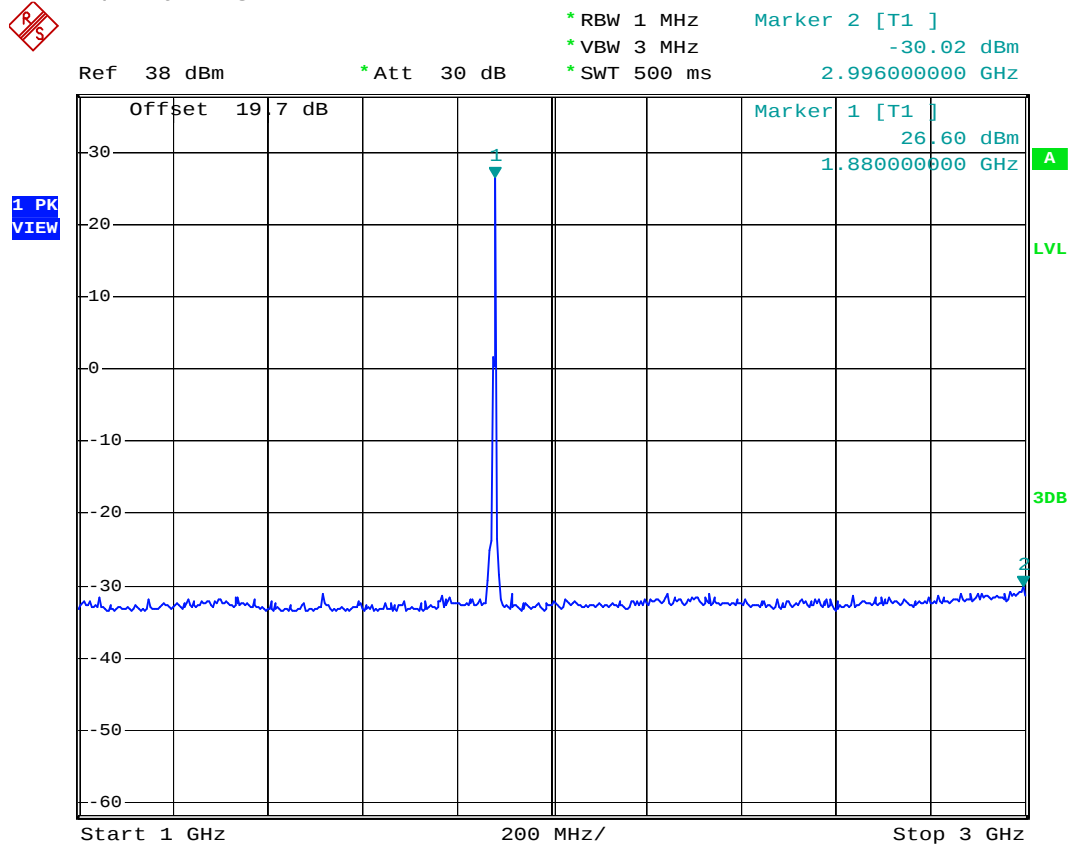


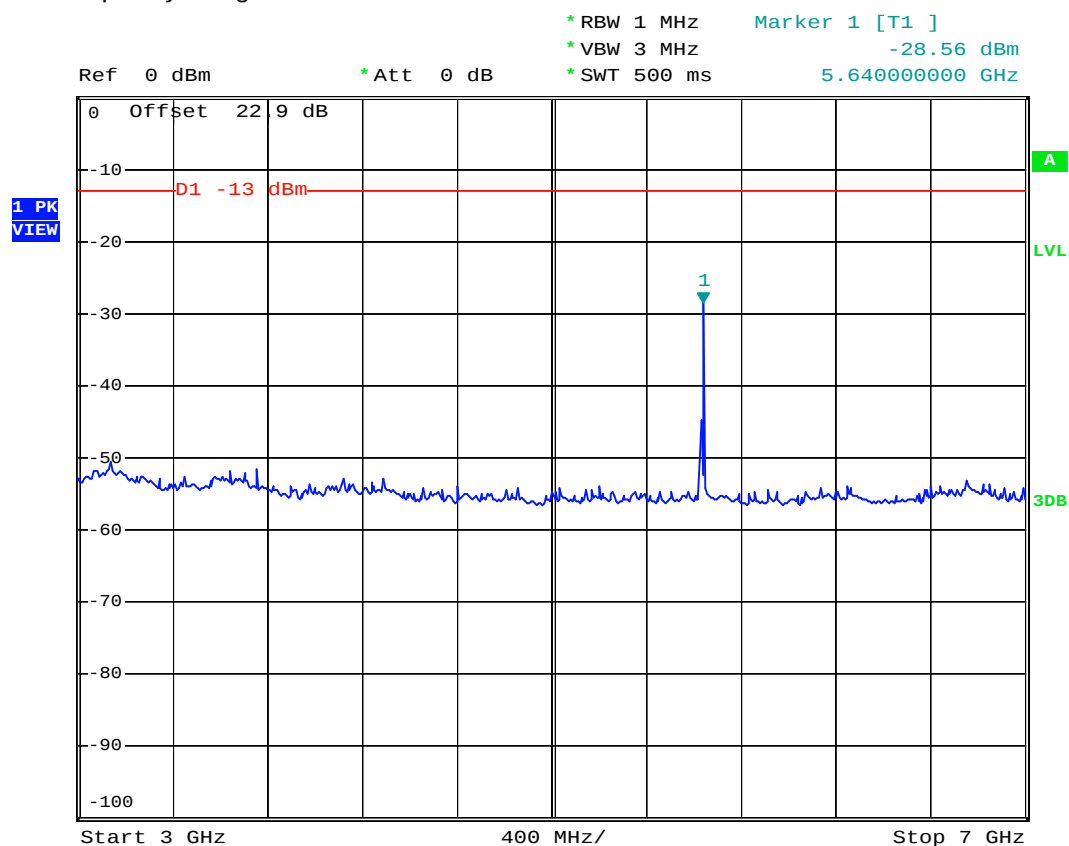
- Mode 4
- Test Mode : GSM1900 (EDGE) CH661
- Frequency Range : 30M-1G





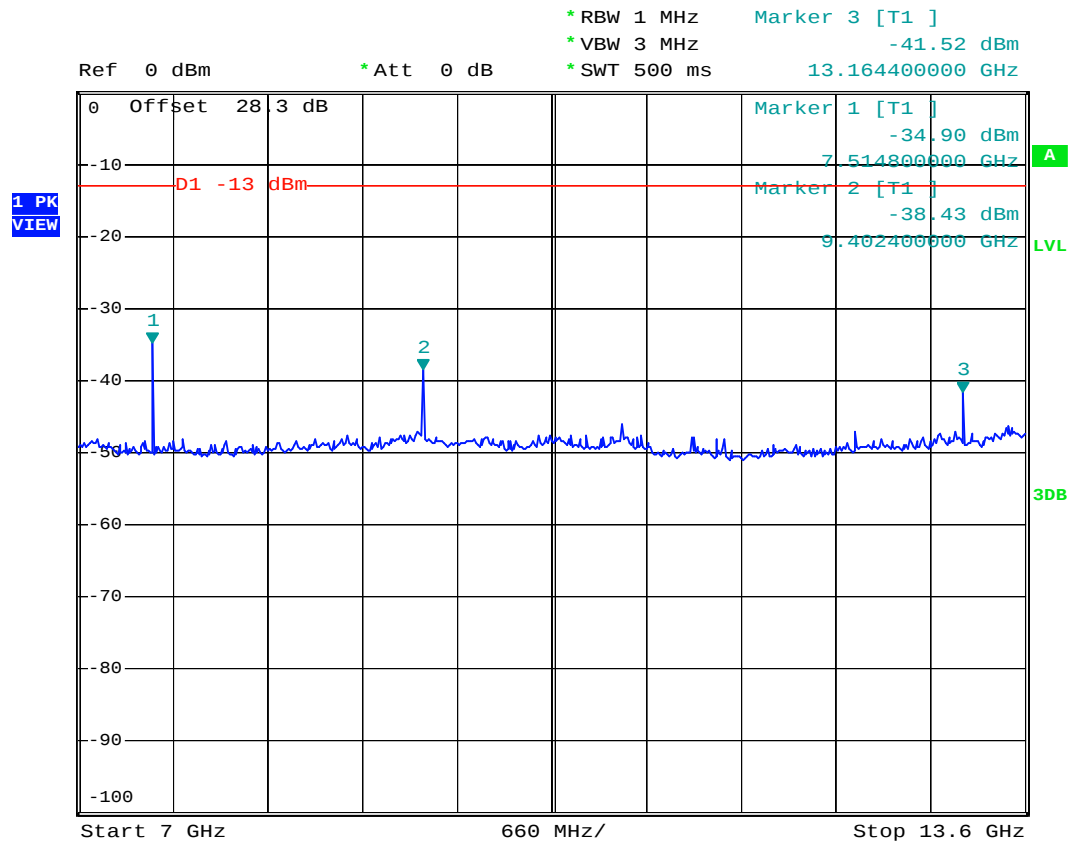
- Test Mode : GSM1900 (EDGE) CH661
- Frequency Range : 1G-3G





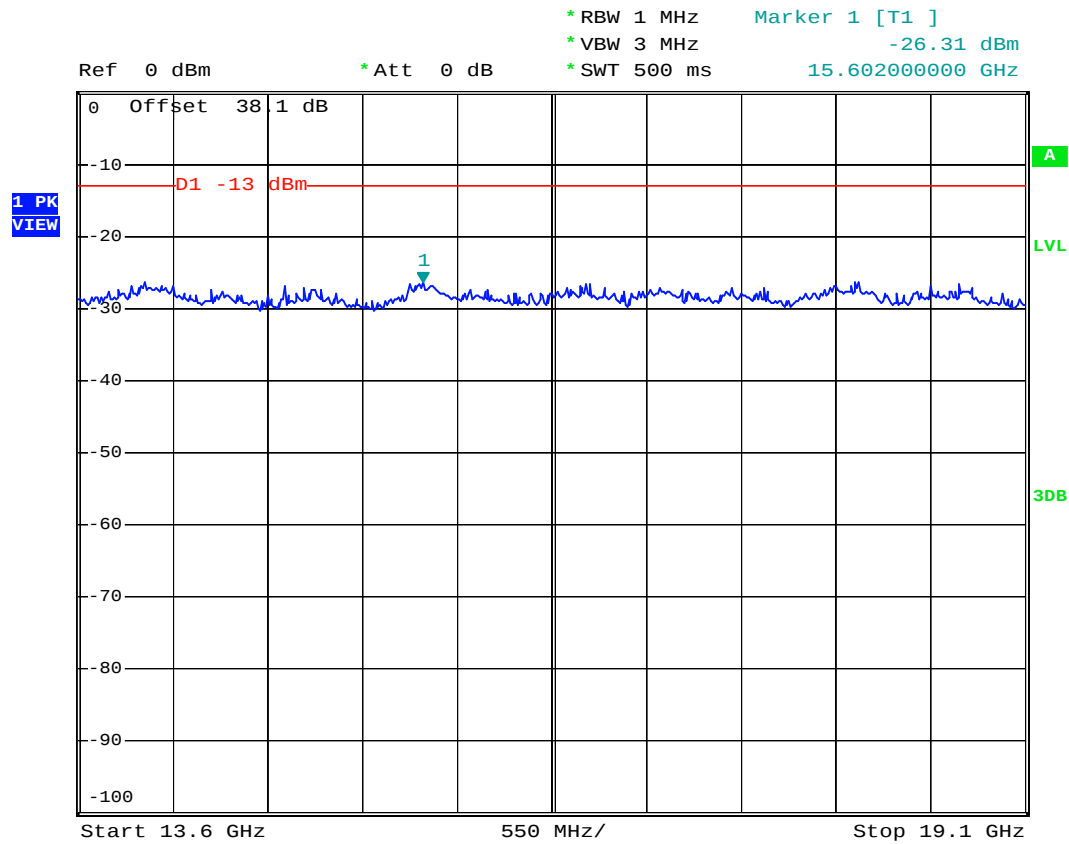


- Test Mode : GSM1900 (EDGE) CH661
- Frequency Range : 7G-13.6G





- Test Mode : GSM1900 (EDGE) CH661
- Frequency Range : 13.6G-19.1G



4.6 Field Strength of Spurious Radiation

Equivalent isotropic radiated Power Measurements by substitution method according to ANSI/TIA/EIA-603-C.

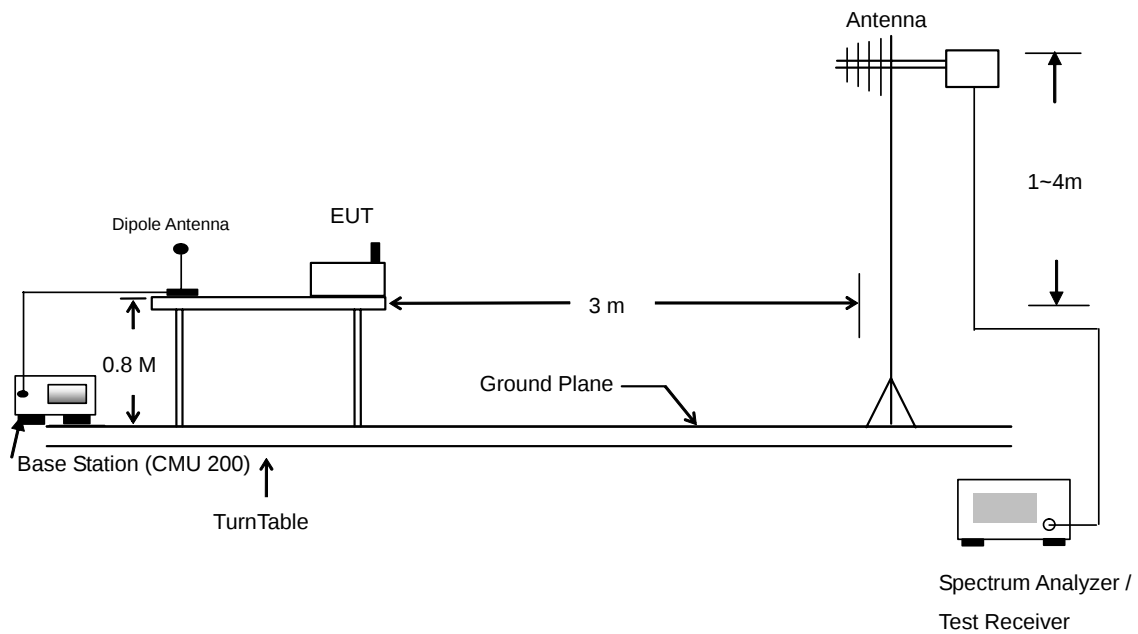
4.6.1 Measurement Instruments

As described in chapter 5 of this test report.

4.6.2 Test Procedure

- a. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
- b. The EUT was set 3 meters from the receiving antenna which was mounted on the antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- d. The height of the receiving antenna is varied between one meter and four meters to reach the maximum spurious emission for both horizontal and vertical polarizations.
- e. Taking the record of maximum spurious emission.
- f. A Horn antenna was substituted in place of the EUT and was driven by a signal generator.
- g. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- h. Taking the record of output power at antenna port.
- i. Repeat step 7 to step 8 for another polarization.
- j. Emission level (dBm) = output power + substitution Gain.

4.6.3 Test Setup Layout



**4.6.4 Test Data**

- Mode 1
- Horizontal Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-29.98	-13	-16.98	-38.6	-28.99	3.39	4.55	H	Pass
2509	-48.15	-13	-35.15	-58.29	-48.21	3.71	5.92	H	Pass
4175	-32.09	-13	-19.09	-44.55	-34.5	3.01	7.57	H	Pass
5015	-48.58	-13	-35.58	-63.34	-52.33	2.61	8.51	H	Pass
5850	-33.02	-13	-20.02	-50	-35.47	4.38	8.98	H	Pass
6690	-41.03	-13	-28.03	-62.84	-43.22	5.22	9.56	H	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Vertical Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-33.44	-13	-20.44	-39.54	-32.06	3.39	4.16	V	Pass
2509	-49.04	-13	-36.04	-58.31	-48.9	3.71	5.72	V	Pass
4175	-38.15	-13	-25.15	-52.41	-41.27	3.01	8.28	V	Pass
5850	-39.92	-13	-26.92	-55.3	-43.41	4.38	10.02	V	Pass
6690	-41.95	-13	-28.95	-63.17	-45.2	5.22	10.62	V	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Mode 2
- Horizontal Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-40.30	-13	-27.30	-48.38	-39.31	3.39	4.55	H	Pass
2509	-51.77	-13	-38.77	-61.91	-51.83	3.71	5.92	H	Pass
4175	-36.01	-13	-23.01	-48.19	-38.42	3.01	7.57	H	Pass
5015	-48.32	-13	-35.32	-63.08	-52.07	2.61	8.51	H	Pass
5850	-31.81	-13	-18.81	-48.88	-34.26	4.38	8.98	H	Pass
6690	-37.65	-13	-24.65	-59.46	-39.84	5.22	9.56	H	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Vertical Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-44.58	-13	-31.58	-49.96	-43.2	3.39	4.16	V	Pass
2509	-50.37	-13	-37.37	-60.96	-50.23	3.71	5.72	V	Pass
4175	-36.65	-13	-23.65	-51.19	-39.77	3.01	8.28	V	Pass
5850	-39.32	-13	-26.32	-54.74	-42.81	4.38	10.02	V	Pass
6690	-42.22	-13	-29.22	-63.44	-45.47	5.22	10.62	V	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



- Mode 3
- Horizontal Polarization

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1716	-43.07	-13	-30.07	-51.17	-45.64	1.9	4.47	H	Pass
2044	-44.99	-13	-31.99	-54.75	-46.76	2.31	4.08	H	Pass
3760	-33.66	-13	-20.66	-49.29	-37.03	4.03	7.40	H	Pass
5636	-29.73	-13	-16.73	-52.02	-34.67	3.87	8.81	H	Pass
9396	-41.97	-13	-28.97	-64.35	-46.67	6.02	10.72	H	Pass
11280	-34.13	-13	-21.13	-65.77	-36.41	8.48	10.76	H	Pass
13156	-33.94	-13	-20.94	-66.37	-36.84	8.13	11.03	H	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Vertical Polarization

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1716	-41.70	-13	-28.70	-52.05	-44.27	1.9	4.47	V	Pass
2044	-45.37	-13	-32.37	-57.35	-47.14	2.31	4.08	V	Pass
3760	-38.13	-13	-25.13	-55.71	-42.01	4.03	7.91	V	Pass
5636	-33.85	-13	-20.85	-56.54	-39.75	3.87	9.77	V	Pass
7520	-45.56	-13	-32.56	-66.01	-50.54	5.83	10.81	V	Pass
11280	-36.22	-13	-23.22	-67.76	-39.1	8.48	11.36	V	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Mode 4
- Horizontal Polarization

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1716	-44.78	-13	-31.78	-52.88	-47.35	1.9	4.47	H	Pass
2044	-45.66	-13	-32.66	-55.42	-47.43	2.31	4.08	H	Pass
3760	-34.72	-13	-21.72	-50.33	-38.09	4.03	7.40	H	Pass
5636	-28.87	-13	-15.87	-51.02	-33.81	3.87	8.81	H	Pass
11280	-31.16	-13	-18.16	-63.54	-33.44	8.48	10.76	H	Pass
13156	-34.42	-13	-21.42	-66.85	-37.32	8.13	11.03	H	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Vertical Polarization

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1716	-43.11	-13	-30.11	-53.46	-45.68	1.9	4.47	V	Pass
2044	-46.74	-13	-33.74	-58.72	-48.51	2.31	4.08	V	Pass
3760	-36.83	-13	-23.83	-54.71	-40.71	4.03	7.91	V	Pass
5636	-32.10	-13	-19.10	-55.1	-38	3.87	9.77	V	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



- Mode 5
- Horizontal Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1609	-41.67	-13	-28.67	-49.57	-40.83	3.37	4.68	H	Pass
1669	-32.23	-13	-19.23	-40.63	-31.24	3.39	4.55	H	Pass
2509	-50.19	-13	-37.19	-56.81	-50.25	3.71	5.92	H	Pass
4175	-32.69	-13	-19.69	-45.01	-35.10	3.01	7.57	H	Pass
5850	-30.98	-13	-17.98	-48.08	-33.43	4.38	8.98	H	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Vertical Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-33.87	-13	-20.87	-40.21	-32.49	3.39	4.16	V	Pass
2509	-47.13	-13	-34.13	-56.98	-46.99	3.71	5.72	V	Pass
4175	-33.04	-13	-20.04	-47.67	-36.16	3.01	8.28	V	Pass
5850	-36.97	-13	-23.97	-52.86	-40.46	4.38	10.02	V	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Mode 6
- Horizontal Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-27.72	-13	-14.72	-36.37	-26.73	3.39	4.55	H	Pass
4175	-31.20	-13	-18.20	-43.55	-33.61	3.01	7.57	H	Pass
5850	-33.09	-13	-20.09	-50.07	-35.54	4.38	8.98	H	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

- Vertical Polarization

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-32.93	-13	-19.93	-39.03	-31.55	3.39	4.16	V	Pass
4175	-34.09	-13	-21.09	-48.68	-37.21	3.01	8.28	V	Pass
5850	-37.98	-13	-24.98	-53.67	-41.47	4.38	10.02	V	Pass

Remark : Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

4.7 Frequency Stability (Temperature Variation)

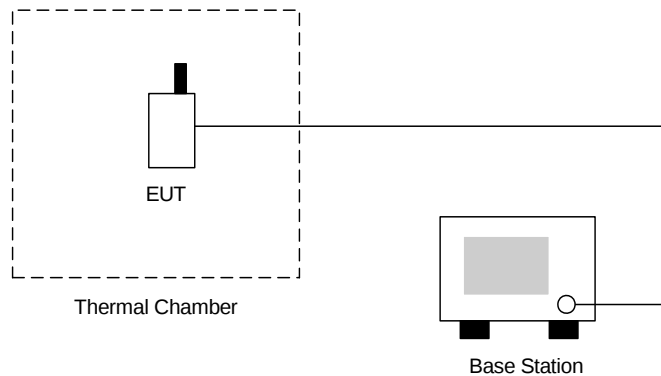
4.7.1 Measurement Instrument

As described in chapter 5 of this test report.

4.7.2 Test Procedure

- a. The EUT and test equipment were set up as shown on the following section.
- b. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
- c. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
- d. The temperature tests were performed for the worst case.
- e. Test data was recorded.

4.7.3 Test Setup Layout



4.7.4 Test Result

• Test Mode : GSM850 (GSM) CH189

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-20	-18	-0.02	2.5	Passed
-10	-19	-0.02		
0	-21	-0.02		
10	-24	-0.03		
20	-19	-0.02		
30	-30	-0.04		
40	-22	-0.03		
50	-18	-0.02		

• Test Mode : GSM850 (EDGE) CH189

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-20	-14	-0.02	2.5	Passed
-10	-17	-0.02		
0	-18	-0.02		
10	-40	-0.05		
20	-22	-0.03		
30	-32	-0.04		
40	-17	-0.02		
50	-15	-0.02		



▪ Test Mode : GSM1900 (GSM) CH661

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-20	-30	-0.02	2.5	Passed
-10	-38	-0.02		
0	33	0.02		
10	-38	-0.02		
20	-32	-0.02		
30	-34	-0.02		
40	-31	-0.02		
50	-35	-0.02		

▪ Test Mode : GSM1900 (EDGE) CH661

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-20	33	0.02	2.5	Passed
-10	-37	-0.02		
0	-35	-0.02		
10	-44	-0.02		
20	-34	-0.02		
30	-45	-0.02		
40	32	0.02		
50	-27	-0.01		

4.8 Frequency Stability (Voltage Variation)

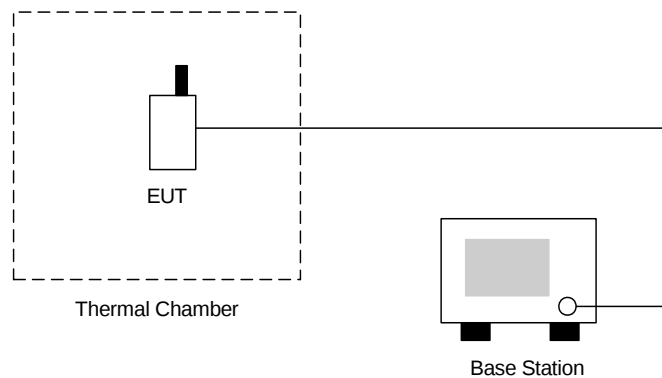
4.8.1 Measurement Instrument

As described in chapter 5 of this test report.

4.8.2 Test Procedure

- The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as the following section.
- The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
- The variation in frequency was measured for the worst case.

4.8.3 Test Setup Layout



4.8.4 Test Result

- Test Mode : GSM850 (GSM) CH189

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	-20.0	-0.02	2.5	Passed
BEP	58.0	0.07		
4.2	-22.0	-0.03		

- Test Mode : GSM850 (EDGE) CH189

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	-16.0	-0.02	2.5	Passed
BEP	-19.0	-0.02		
4.2	-17.0	-0.02		

- Test Mode : GSM1900 (GSM) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	-40.0	-0.02	2.5	Passed
BEP	57.0	0.03		
4.2	-38.0	-0.02		

- Test Mode : GSM1900 (EDGE) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	-39.0	-0.02	2.5	Passed
BEP	-39.0	-0.02		
4.2	-36.0	-0.02		

Remark:

- Normal Voltage= 3.7V.
- Battery End Point (BEP)= 3.2 V.



5. List of Measurement Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz-1GHz	Dec. 01, 2007	Nov. 30, 2008	Radiation (03CH07-HY)
Spectrum Analyzer	R & S	FSP	101067	9KHz~30GHz	Dec. 05, 2007	Dec. 04, 2008	Radiation (03CH07-HY)
PreAmplifier	COM-POWER	PA-103A	161241	10-1000MHz.32d B.GAIN	Mar. 31, 2008	Mar. 30, 2009	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	66584	1G~18GHz	Dec. 20, 2007	Dec. 19, 2008	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1G~18GHz	Dec. 20, 2007	Dec. 19, 2008	Radiation (03CH07-HY)
Base Station Simulator	R & S	CMU200	103937	N/A	Oct. 19, 2007	Oct. 18, 2008	Radiation (03CH07-HY)
Thermal Chamber	Tenyi technology	TTH-D35P	TBN-930701	N/A	Aug. 01, 2008	Jul. 31, 2009	Conducted (TH02-HY)
Spectrum	R&S	FSP40	100055	9KHz~40GHz	Jun.26,2008	Jun.25,2009	Conducted (TH02-HY)
Bluetooth Test	ANRITSU	MT8852A	6K00003939	N/A	N/A	N/A	Conducted (TH02-HY)
Power Divider	ARRA	5200-1	3871	N/A	Oct. 01, 2007	Sep. 30, 2008	Conducted (TH02-HY)
DC Power Supply	TOPWARD	3303D	740889	N/A	May 25, 2007	May 24, 2009	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 21, 2008	Feb. 20, 2009	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 21, 2008	Feb. 20, 2009	Conducted (TH02-HY)

6. Uncertainty Evaluation

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
Combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	2.36				
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	4.72				

END OF TEST REPORT



Appendix A. Photographs of EUT

Please refer to Sporton report number EP821504-03 as below.