FCC Part §22, §24, §2
IC RSS-132 / 133 / 139

Test Report

Equipment Under Test	**VW OCU module**
Model Name	**TUVM01IU-G**
Variant Model Name	**TUVM01IU-R, TUVP01IU-G, TUVP01IU-R**
Applicant	**LG Electronics Inc.**
FCC ID	**BEJTUVM01IU**
IC Number	**2703K-TUVM01IU**
Manufacturer	**LG Electronics Vietnam Haiphong Co.,Ltd**
Date of Test(s)	**2015. 02. 02 ~ 2015. 02. 24**
Date of Issue	**2015. 03. 24**

In the configuration tested, the EUT complied with the standards specified above.

Issue to	Issue by
LG Electronics Inc. 2621, Nambusunhwan-ro, Gangnam-gu, Seoul, Korea Tel.: +82-2-6971-0515	**MOVON CORPORATION** 498-2, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 449-812 Tel.: +82-31-338-8837 Fax: +82-31-338-8847

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Revision history

Revision	Date of issue	Description	Revised by
--	Mar. 24, 2015	Initial	--

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1. General information

1.1. Details of applicant

Applicant	:	LG Electronics Inc.
Address	:	2621, Nambusunhwan-ro,Gangnam-gu, Seoul, Korea
Contact Person	:	Steve Jeon
Telephone	:	+ 82-2-6971-0515
Fax	:	-

1.2. Manufacturer Information

Manufacturer	:	LG Electronics Vietnam Haiphong Co.,Ltd
Address	:	LG Electronics Vietnam Haiphong Co.,Ltd Lots CN2 and CN3, Trang Due Industrial Zone,An Duong District within Dinh Vu Cat Hai Economic Zone, Hai Phong City, Vietnam

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1.3. Summary of test results

The EUT has been tested according to the following specifications;

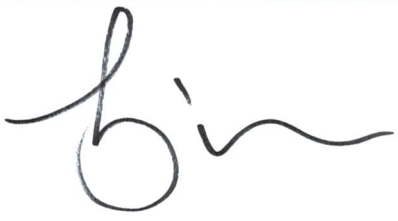
Section in FCC	Section in IC	Description	Result
§2.1049, §22.917(a), §24.238(a)	RSS-GEN(4.6.1) RSS-133(6.5) RSS-139(6.4)	Occupied Bandwidth	C
§2.1051, §22.917(a), §24.238(a)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.5)	Band Edge Spuriuos and harmonic Emissions at Antenna Terminal	C
§2.1046	RSS-132(5.4) RSS-133(6.4) RSS-139(6.4)	Conducted Output Power	C
§24.232(d)	RSS-132(5.4) RSS-133(6.4) RSS-139(6.4)	Peak-to-Average Ratio	C
§2.1055, §22.355, §24.235	RSS-132(5.3) RSS-133(6.3) RSS-139(6.3)	Frequency stability / variation of ambient temperature	C
§22.913(a)(2)	-	Effective Radiated Power	C
§24.232(c)	-	Equivalent Isotropic Radiated Power	C
§2.1053, §22.917(a), §24.238(a)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.5)	Radiated Spurious and Harmonic Emissions	C

The sample was tested according to the following specification:
FCC Parts 22, 24, 2; ANSI C-63.4-2009, FCC Public Notice KDB 971168 D01
RSS-132 / 133 / 139
TEST SITE REGISTRATION NUMBER: ***FCC(670686), IC(6432B-1)***

※ Abbreviation

C Complied
N/A Not applicable
F Fail

Approval Signatories

Test and Report Completed by :	Report Approval by :
	
Jungmoo Her Test Engineer MOVON CORPORATION	Issac Jin Technical Manager MOVON CORPORATION

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2. EUT Description

Kind of product	VW OCU module
FCC ID	BEJTUVM01IU
Model Name	TUVM01IU-G
Variant Model Name	TUVM01IU-R, TUVP01IU-G, TUVP01IU-R
Serial Number	N/A
Power supply	DC 12.0V
Tx Frequency	824.2 ~ 848.8 MHz (GSM850)
	1 850.2 ~ 1909.8 MHz (GSM1900)
	826.4~846.6 MHz (WCDMA V)
	1 852.4~1 907.6 MHz (WCDMA II)
Rx Frequency	869.2 ~ 893.8 MHz (GSM850)
	1 930.2 ~ 1989.8 MHz (GSM1900)
	871.4~891.6 MHz (WCDMA V)
	1 932.4~1 987.6 MHz (WCDMA II)
Antenna gain (External Antenna)	0 ㏈i (Max.) (GSM850/WCDMA II)
	5.5 ㏈i (Max.) (GSM1900/WCDMA V)
Antenna gain (Internal Antenna)	2.1 ㏈i (Max.) (GSM850/WCDMA II)
	4.609 ㏈i (Max.) (GSM1900/WCDMA V)
Test Site Registration Number	FCC(670686), IC(6432B-1)

2.1. Declarations by the manufacturer

None

2.2. Details of modification

None

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3. Measurement equipment

Equipment	Manufacturer	Model	Serial number	Calibration Interval	Calibration due.
EMI Test Receiver	R&S	ESIB26	100196/026	1 year	2015-12-11
Signal Generator	R&S	SMB100A	178128	1 year	2016-03-06
Siganl Analyzer	R&S	FSV-40	100832	1 year	2016-03-06
Power Meter	Agilent	E4416A	GB41290645	1 year	2015-09-29
Power Sensor	Agilent	9327A	US40441490	1 year	2016-03-05
Double Ridged Horn Antenna	R&S	HF906	100236	2 year	2015-07-31
Double Ridged Horn Antenna	R&S	HF906	100235	2 year	2015-04-23
Bi-Log Antenna	AH system	SAS-521-7	127	1 year	2015-07-24
Bi-Log Antenna	AH system	SAS-521-7	128	1 year	2015-10-21
Power Amplifier	MITEQ	AM-1431	1497315	1 year	2015-09-29
Power Amplifier	MITEQ	AFS43-01002600	1374382	1 year	2015-09-29
High Pass Filter	Wainwright	WHK3.0/18G-10SS	508	1 year	2015-09-29
DC Power Supply	HP	6674A	3637A01351	1 year	2015-09-29
Controller	INNCO	CO2000	co200/064/6961003/L	N/A	N/A
Antenna Master	INNCO	MA4000	MA4000/038/6961003/L	N/A	N/A
Loop Antenna	ETS LINDGREN	6502	00118166	2 year	2015-09-27
TUNABLE BANDREJECT FILTER	K&L Microwave	3TNF-800/1000-0.2-N/N	441	1 year	2015-09-11
TUNABLE BANDREJECT FILTER	K&L Microwave	5TNF-1700/2000-0.1-N/N	302	1 year	2015-09-11

※ Remark;
Support equipment

Description	Manufacturer	Model	Serial number
-	-	-	-

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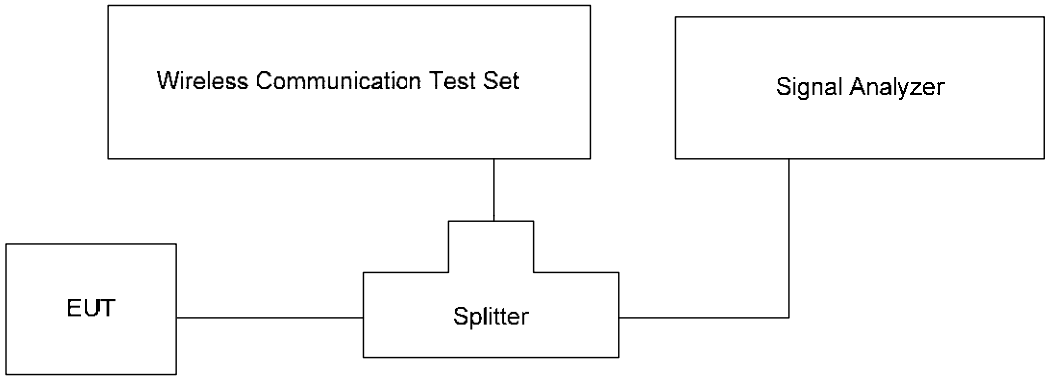
4. Occupied Bandwidth

4.1. Test setup



4.2. Test Procedure

Occupied Bandwidth is tested in accordance with KDB971168 D01

The EUT makes a call to the communication simulator. The power was measured with Signal Analyzer. All measurements were done at 3 channels (low, middle and hogh operational range).
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.
Use OBW measurement function of Signal analyzer to measure 99 % occupied bandwidth.

4.3. Limit

N/A

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4.4. Test result

Ambient temperature: 23 ℃
Relative humidity: 45 % R.H.

Band	Channel	Frequency (㎒)	Result (㎑)
GSM850	128	824.20	246.02
	190	836.60	243.13
	251	848.80	246.02
GSM850 EDGE	128	824.20	244.57
GSM1900	512	1850.20	246.02
	661	1880.00	248.91
	810	1909.80	244.57
GSM1900 EDGE	661	1880.00	246.02
Band	**Channel**	**Frequency (㎒)**	**Result (㎒)**
WCDMA V	4132	826.40	4.156
	4183	836.60	4.133
	4233	846.60	4.122
WCDMA II	9262	1852.40	4.156
	9400	1880.00	4.133
	9538	1907.60	4.156

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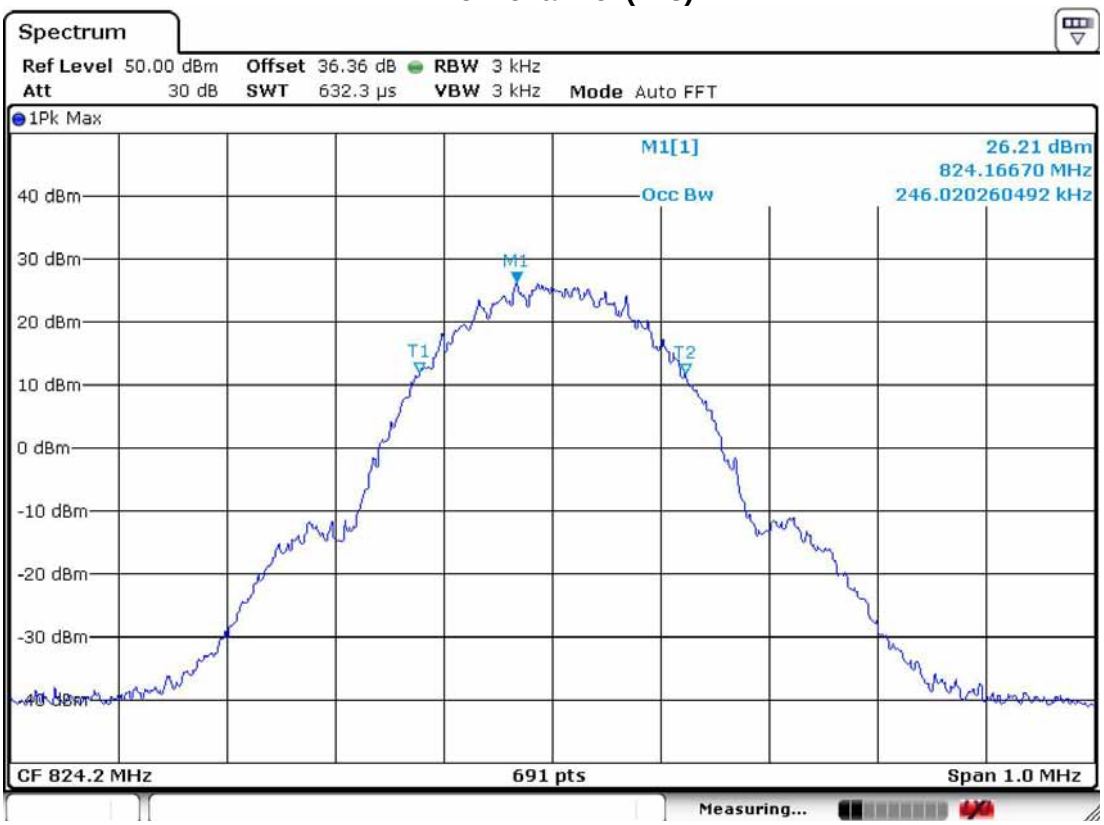
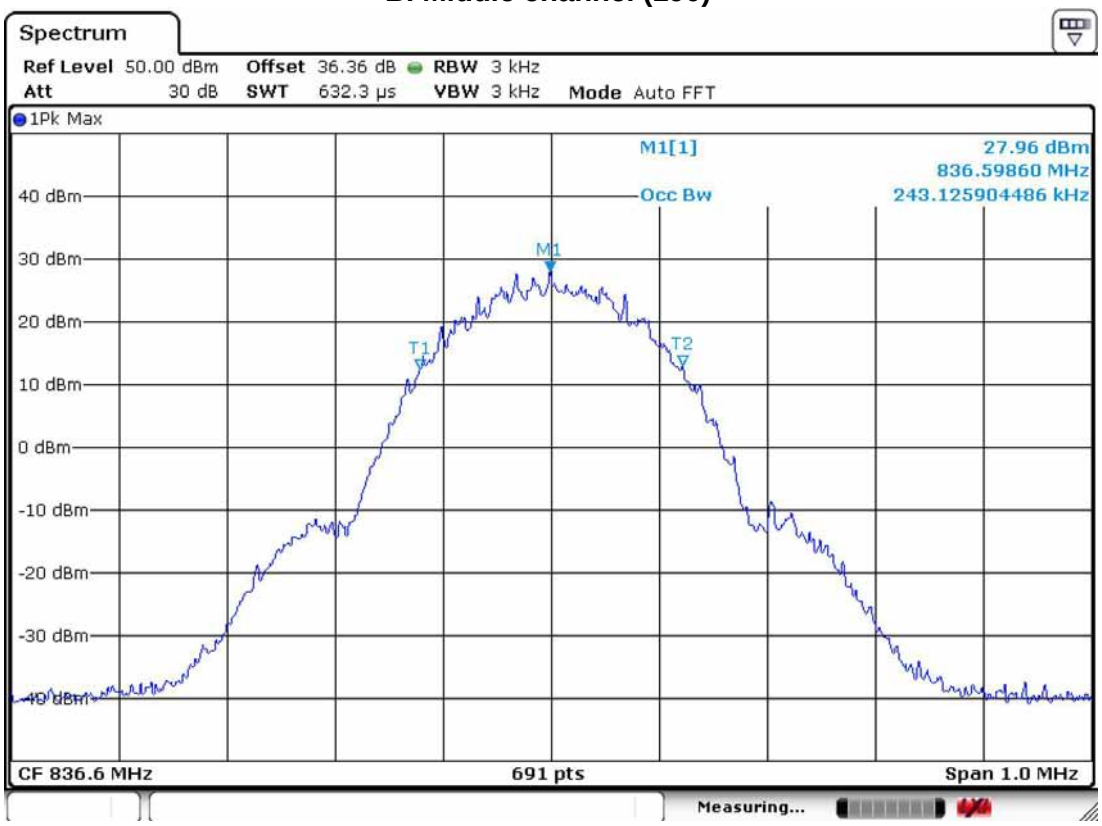
4.5. Test Plots

GSM850

A. Low channel (128)



B. Middle channel (190)



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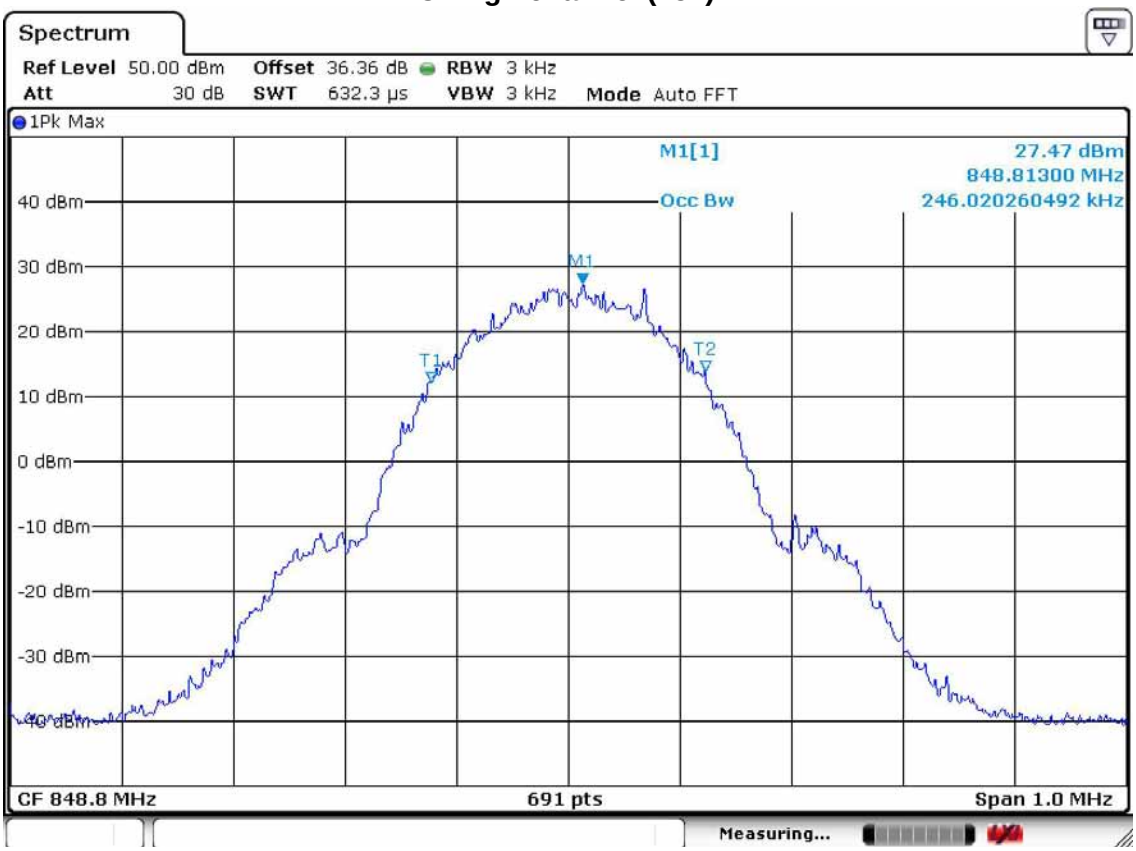
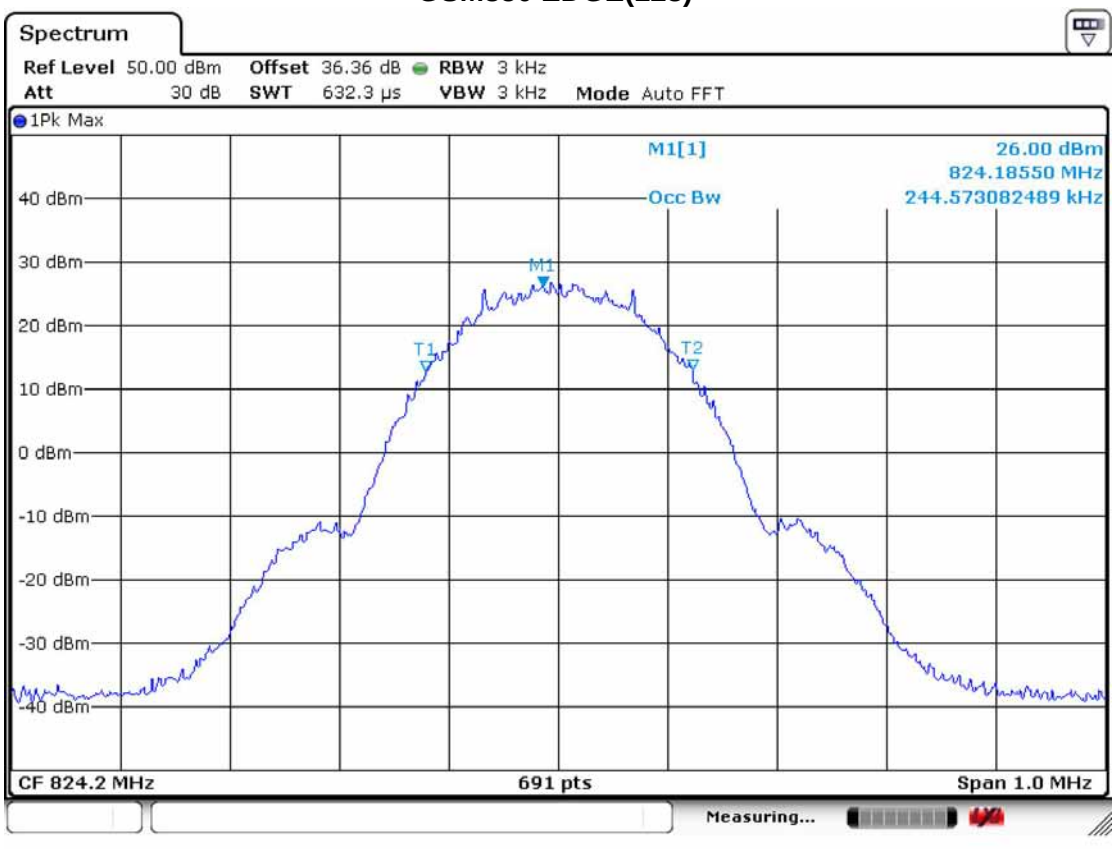
C. High channel (251)



GSM850 EDGE(128)



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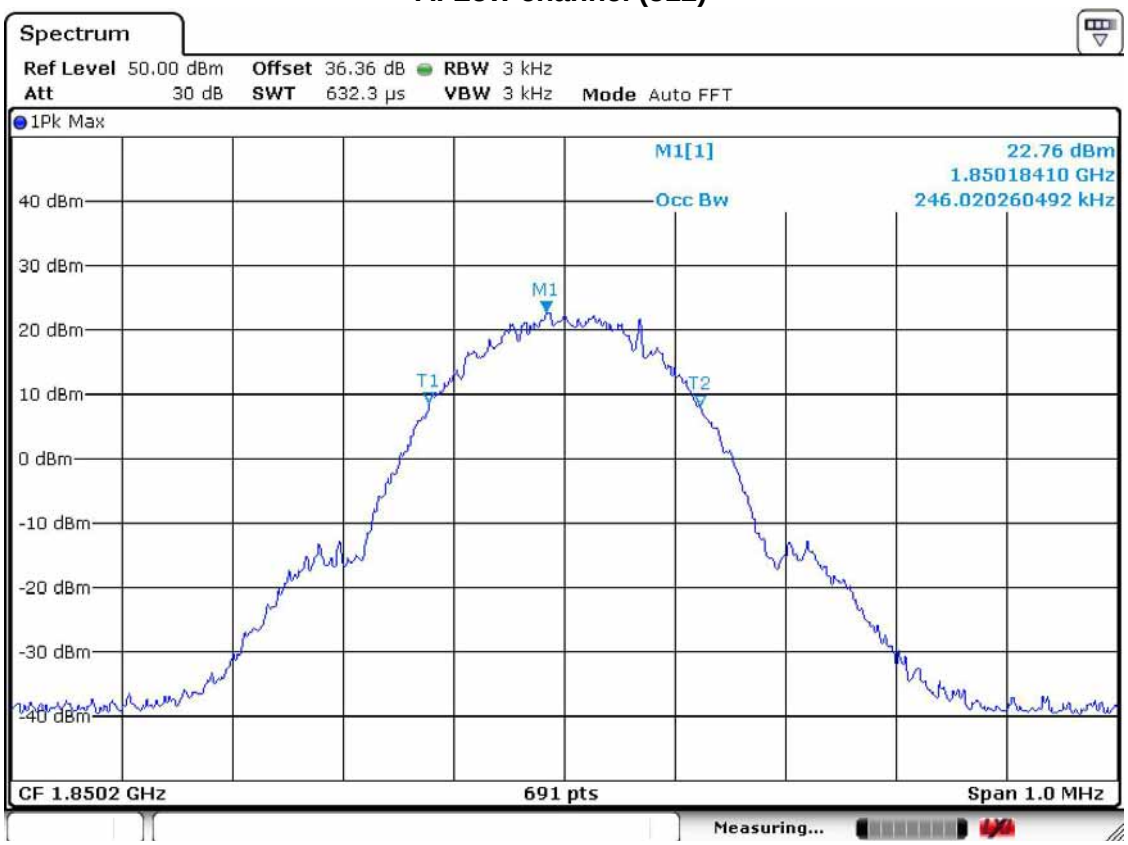
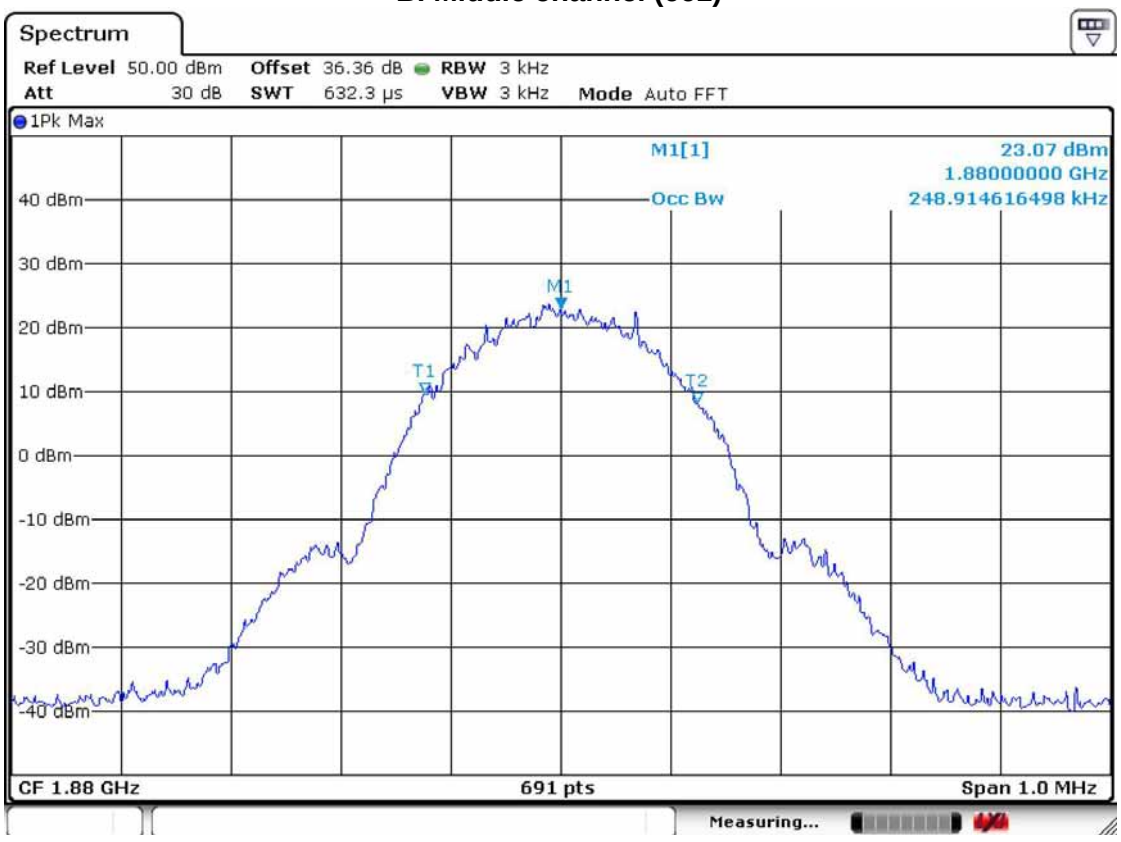
GSM1900
A. Low channel (512)



B. Middle channel (661)



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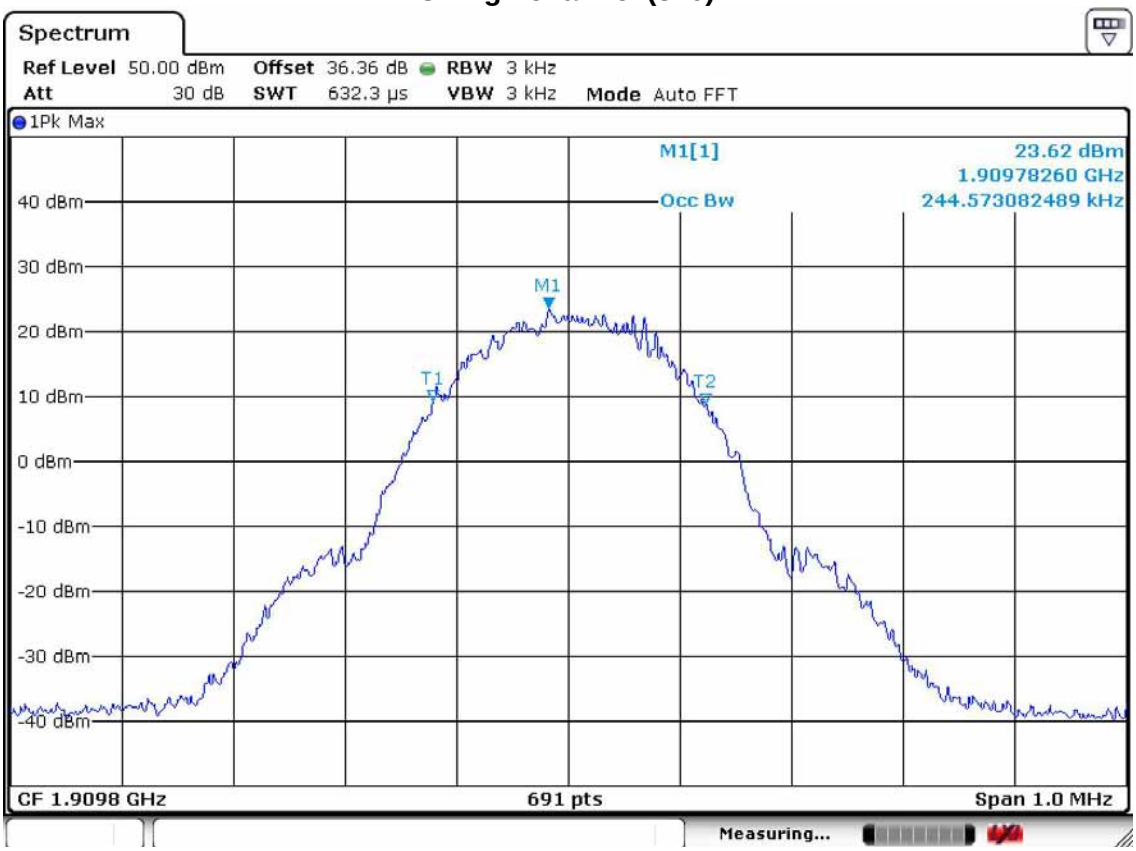
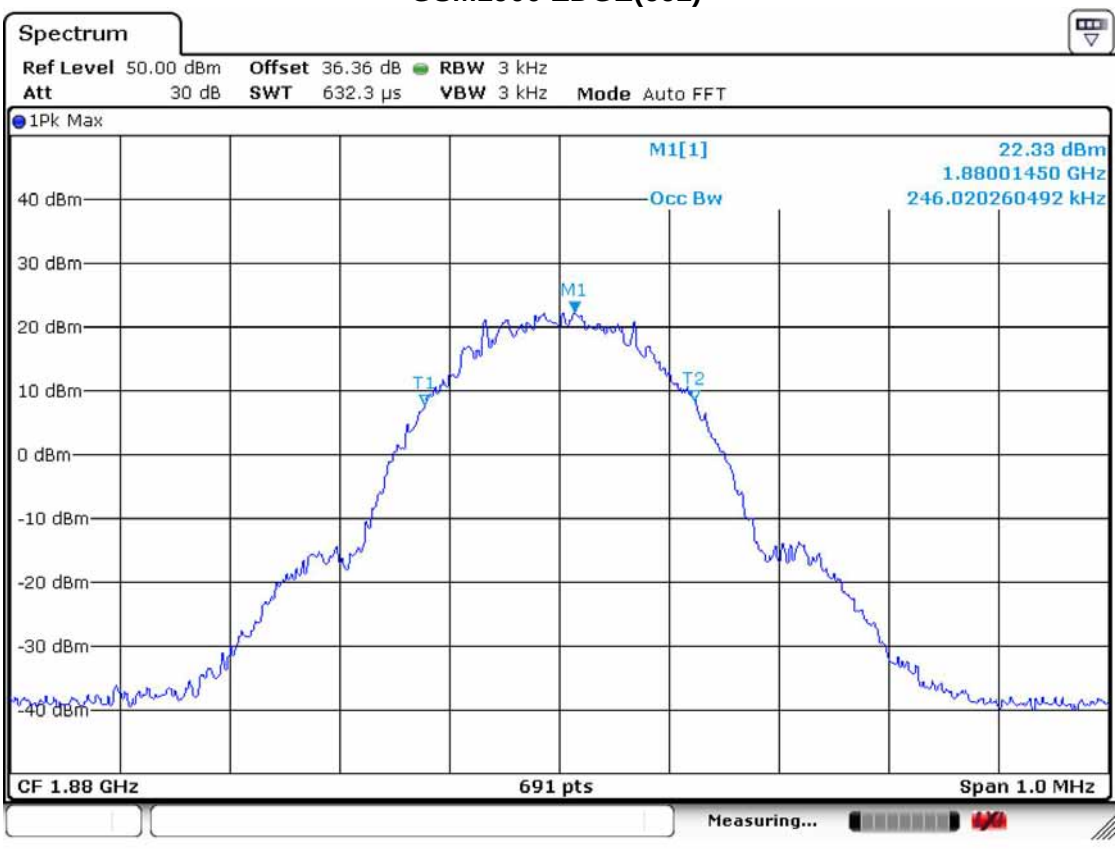
C. High channel (810)



GSM1900 EDGE(661)



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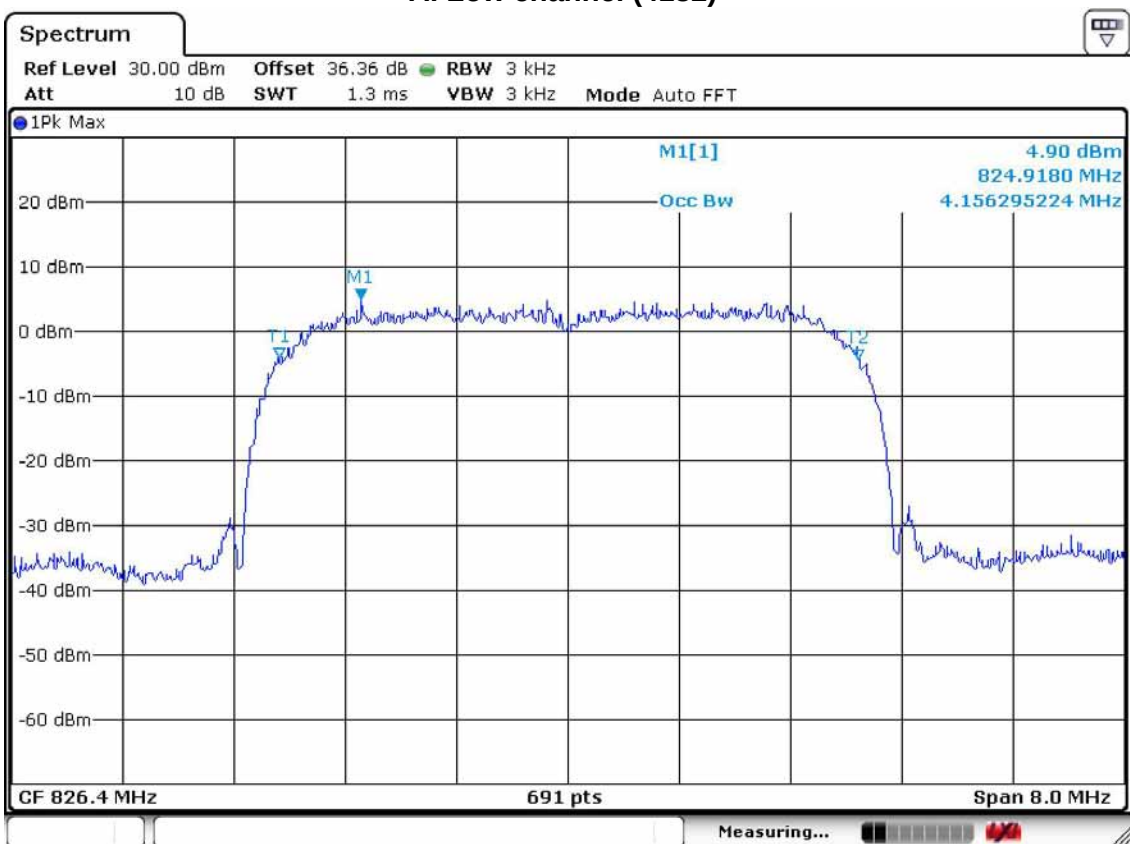
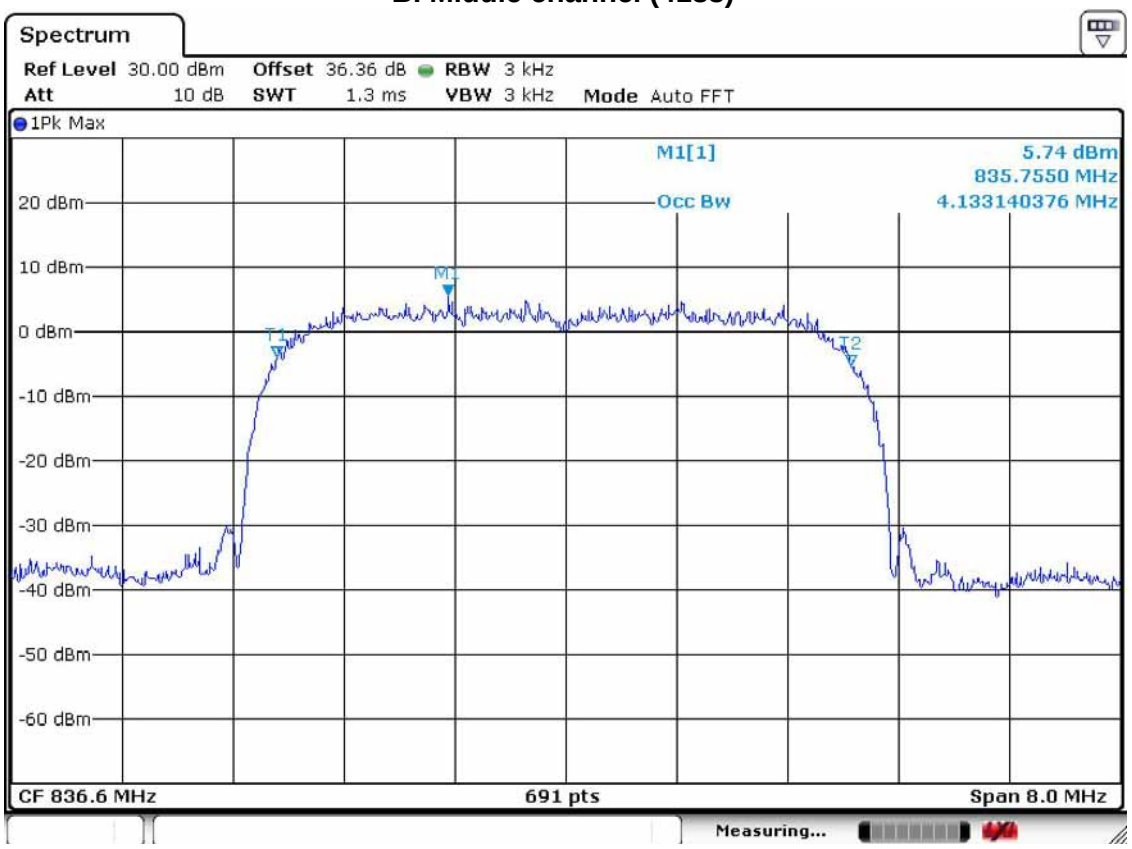
WCDMA V

A. Low channel (4132)



B. Middle channel (4183)



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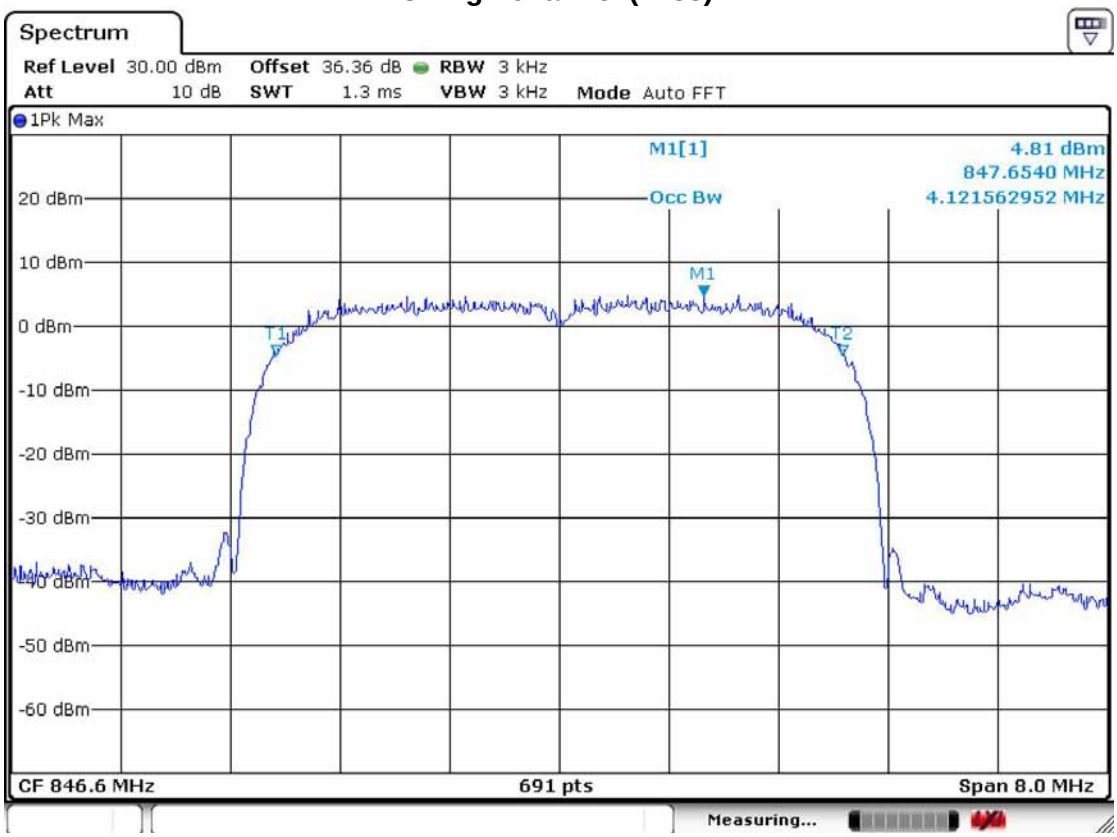
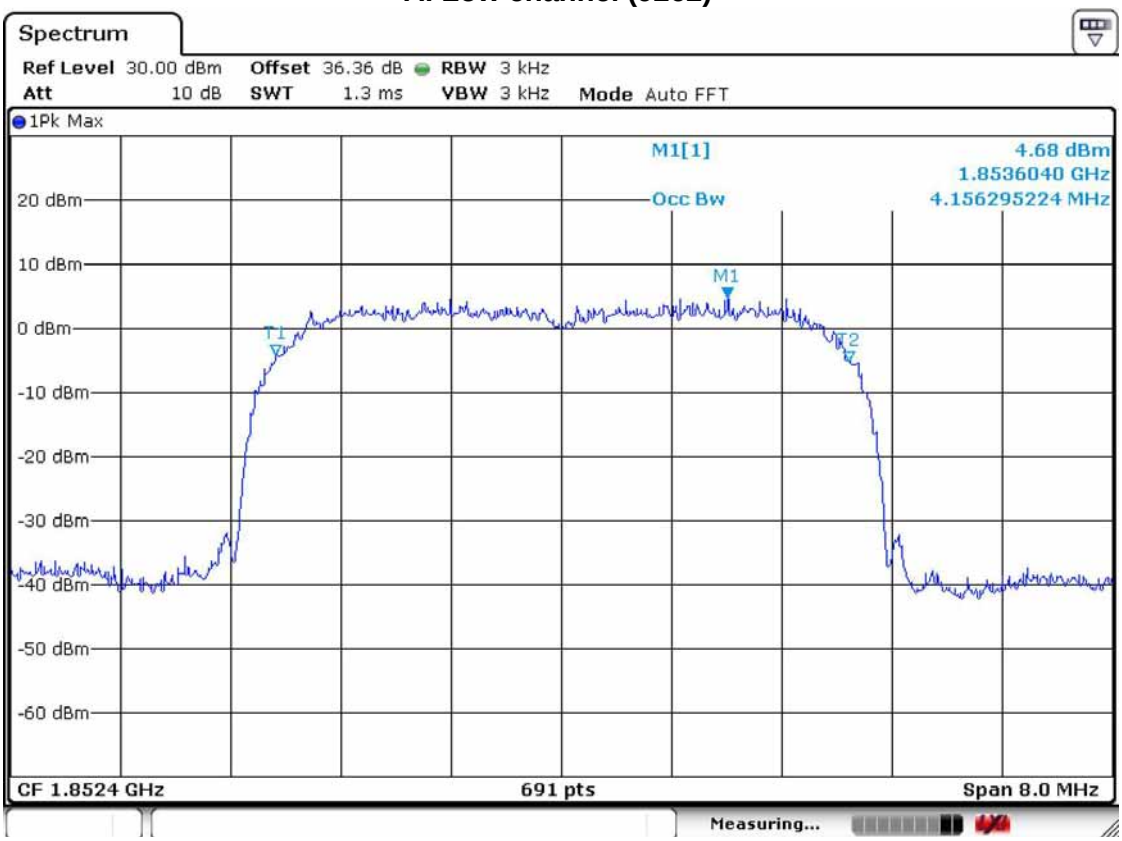
C. High channel (4233)



WCDMA II
A. Low channel (9262)



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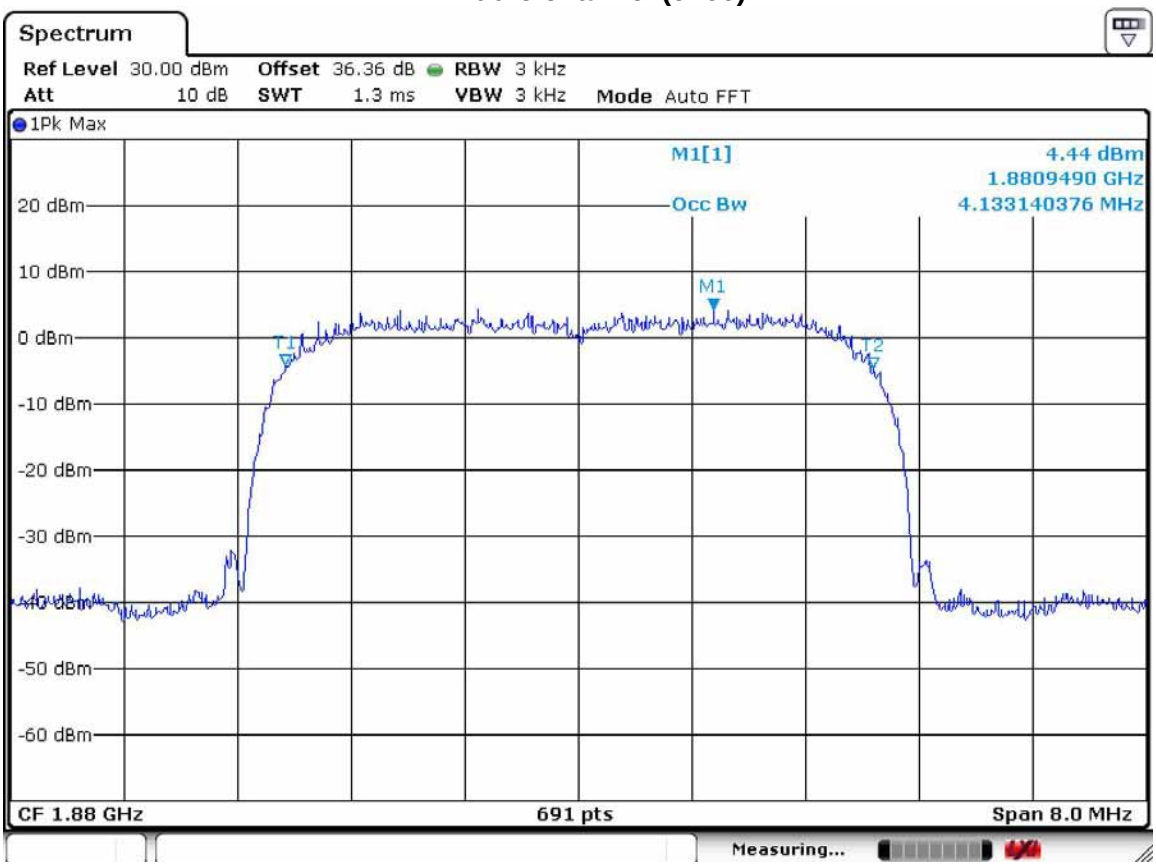
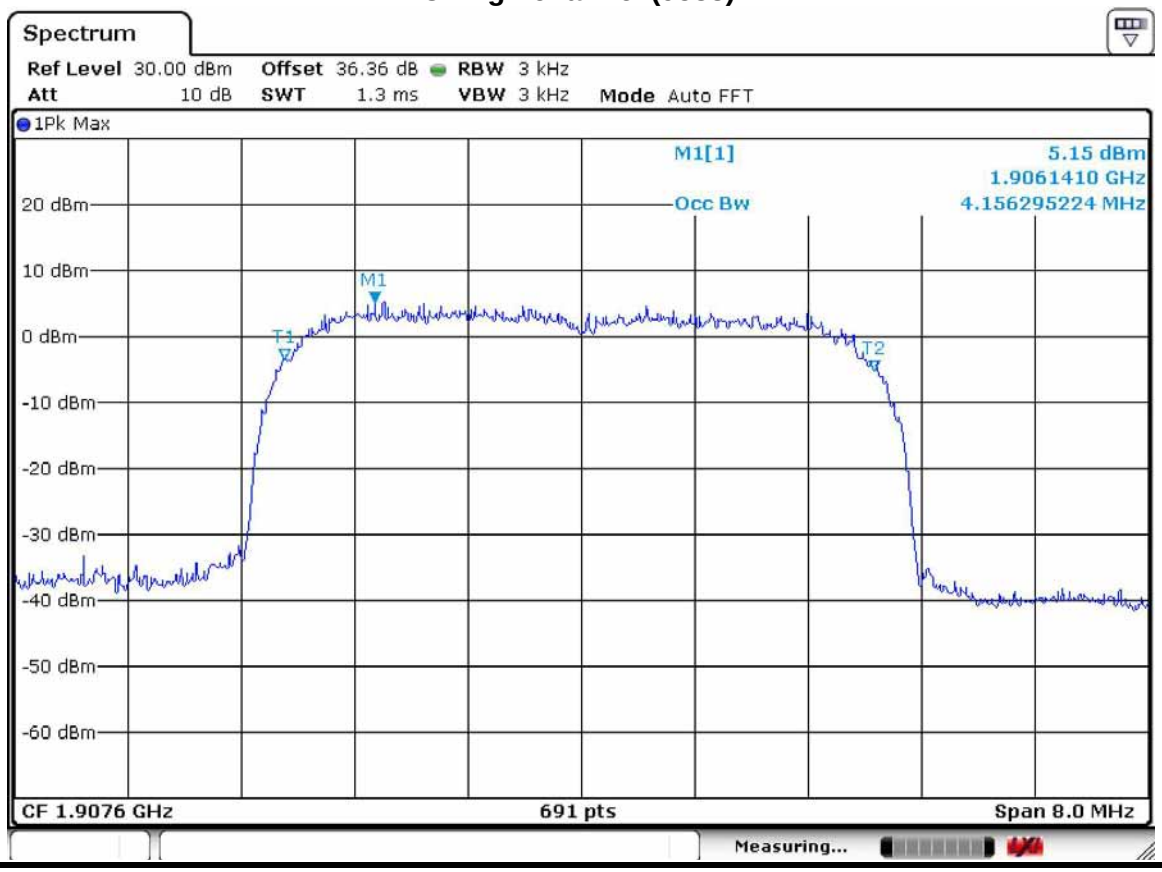
B. Middle channel (9400)



C. High channel (9538)



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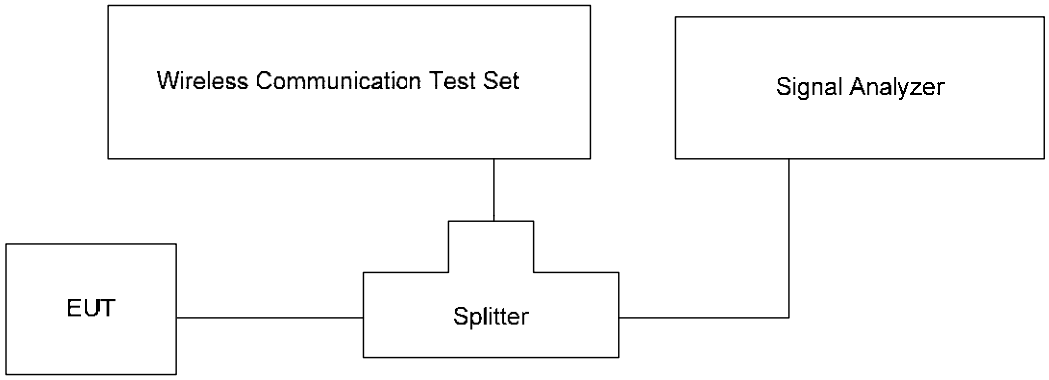
5. Band Edge / Spuriuos and Harmonic Emissions at Antenna Terminal

5.1. Test setup



5.2. Test Procedure

Band Edge / spurious and harmonic emissions at antenna terminal is tested in accordance with KDB971168 D01

The level of carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated signal analyzer.
On any frequency outside a license's frequency block, the power of any emission shall be attenuated below the transmitter power(P) by at least 43 + 10 log(P) dB. The RBW settings used in the testing are greater than 1 % of occupied bandwidth. The 1 MHz RBW was used to scan from 10 MHz to 10 GHz/ (GSM 1900 Mode: 10 MHz to 20 GHz). A display line was placed at -13 dBm to show compliance. The high , lowest and a middle channel were tested for out of band measurements.
Measurements of all out of band are made on RBW = 1 MHz and VBW ≥ 3 MHz in the worst case despite RBW = 1 kHz and VBW ≥ 300 kHz upon 1 GHz.

- RBW = 1 MHz / VBW ≥ 3 MHz
- Detector = Peak / Trace Mode = max hold
- Sweep time = auto
- Number of points in sweep ≥ 2*Span / RBW

Band Edge Requirement : According to FCC 22.917, 24.238 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundmental emission of the transmitter may be employed.
All measurements were done at 2 channels(low and high operational frequency range.)
The band edge measurement used the power splitter via EUT RF power connector between simulation base station and signal analyzer.
In GSM mode, the center frequency of signal analyzer set to the band edge frequency. The span is 1 MHz (RBW = at least 1 % of the EBW, VBW ≥ 3 MHz, Detector = Average).
In WCDMA mode, the center frequency of signal analyzer set to the band edge frequency. The span is 7 MHz (RBW = at least 1 % of the EBW, VBW ≥ 3 MHz, Detector = Average).

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5.3. Limit

Less than 43 + 10 log(P) dB

5.4. Test result

Ambient temperature: 23 ℃
Relative humidity: 45 % R.H.

Band	Channel	Frequency of Maximum Harmonic (GHz)	Result (dBm)
GSM850	128	6.999	-17.17
	190	6.912	-17.74
	251	6.576	-17.27
GSM1900	512	6.975	-16.90
	661	6.929	-17.55
	810	6.999	-16.67
WCDMA V	4132	6.966	-26.38
	4183	6.955	-26.38
	4233	6.999	-27.16
WCDMA II	9262	17.742	-25.03
	9400	17.789	-24.67
	9538	17.696	-24.18

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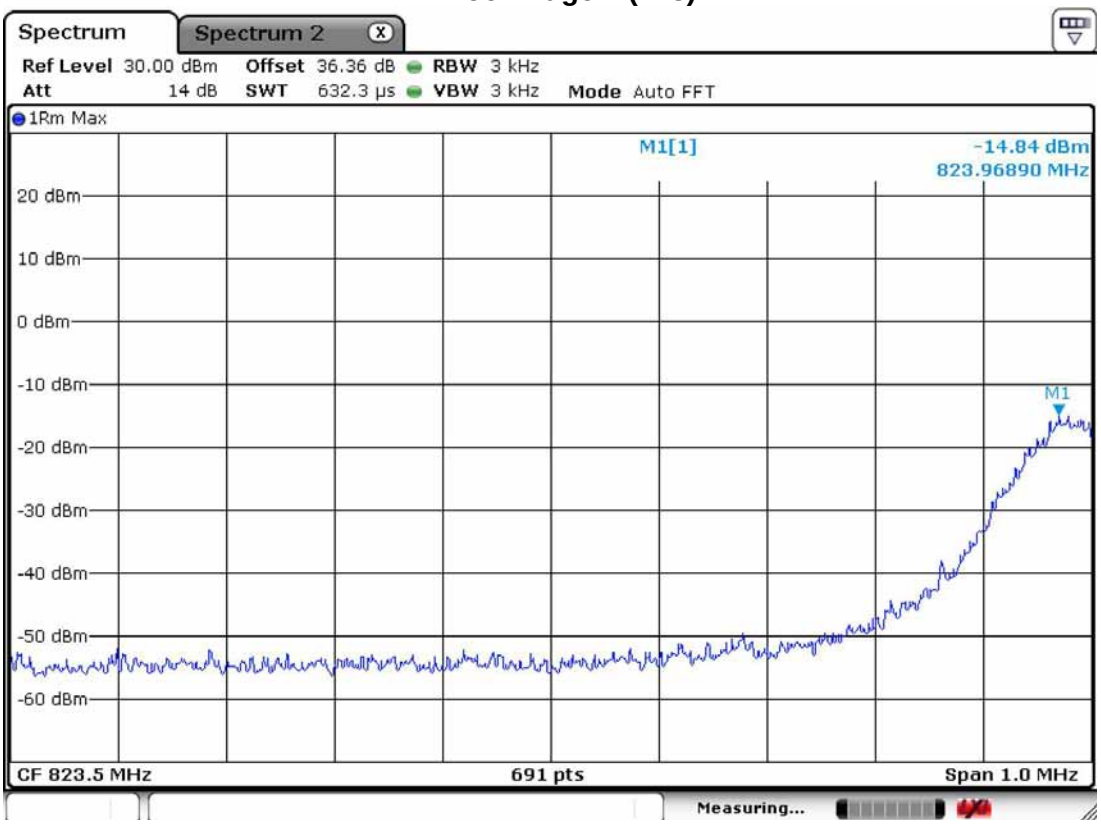
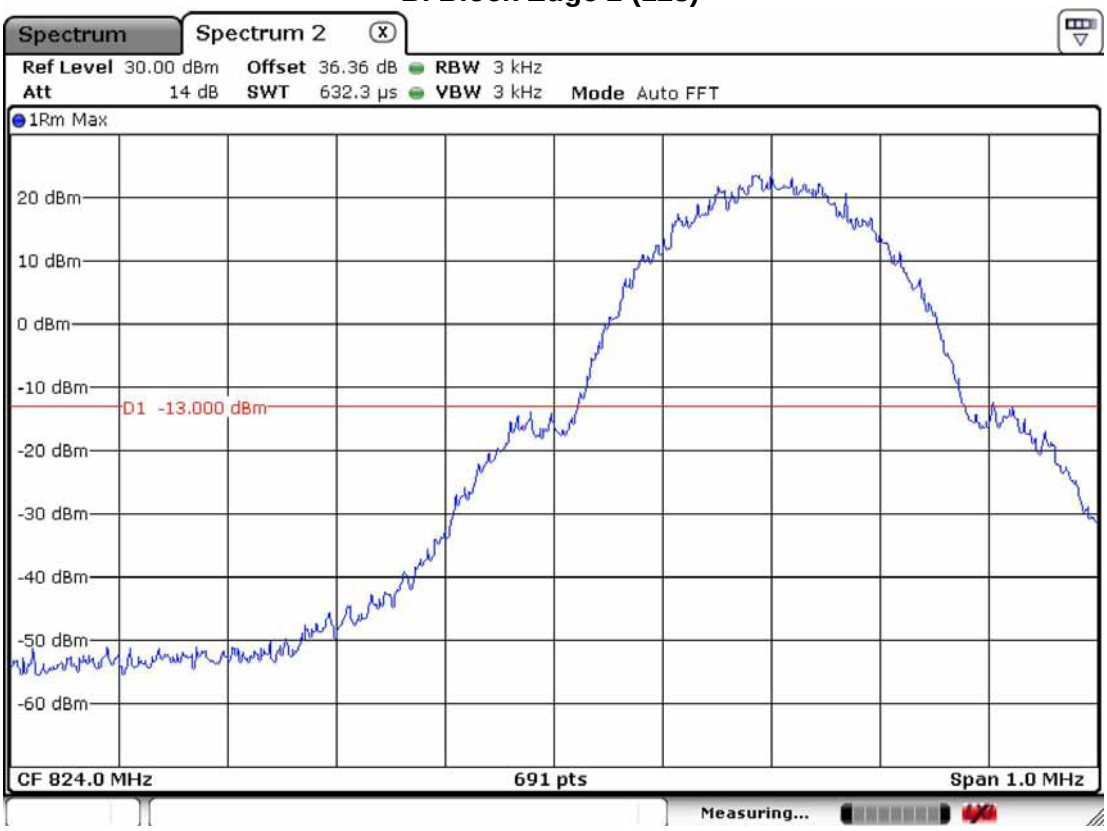
5.5. Test Plots

GSM850 Low Channel

A. Block Edge 1 (128)



B. Block Edge 2 (128)



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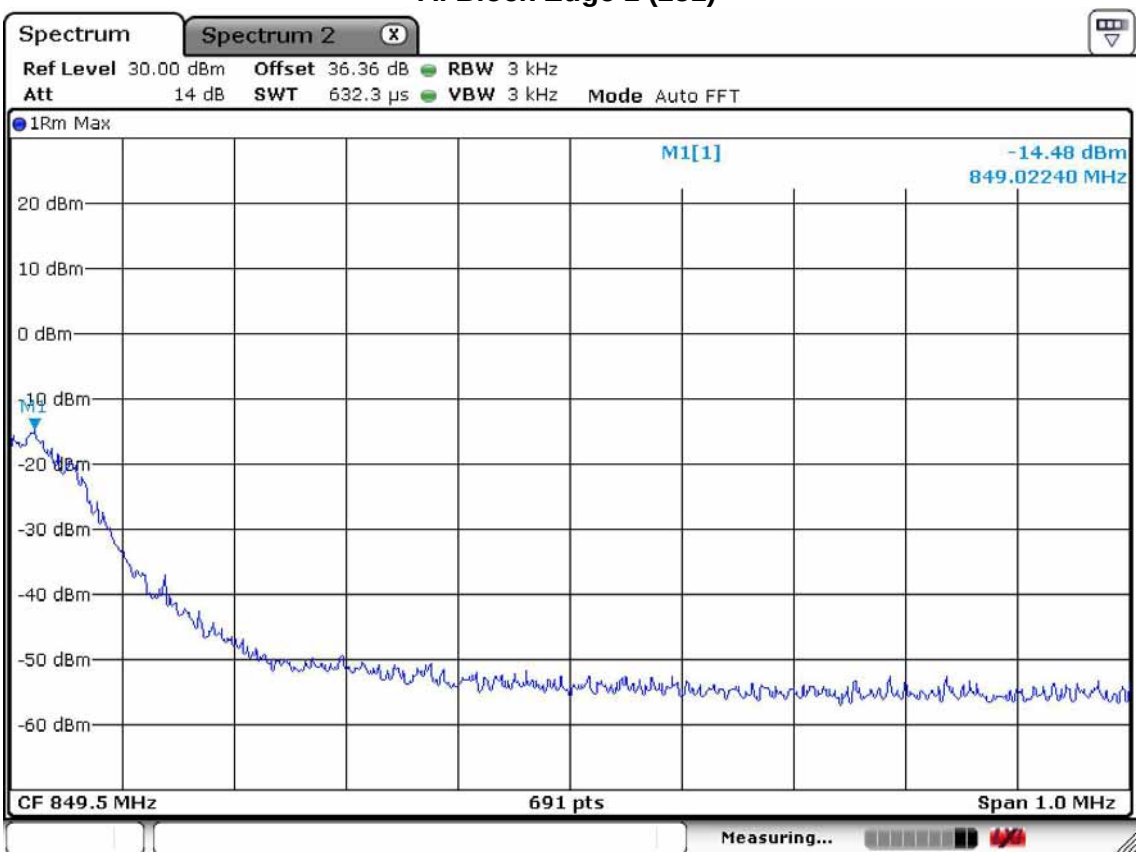
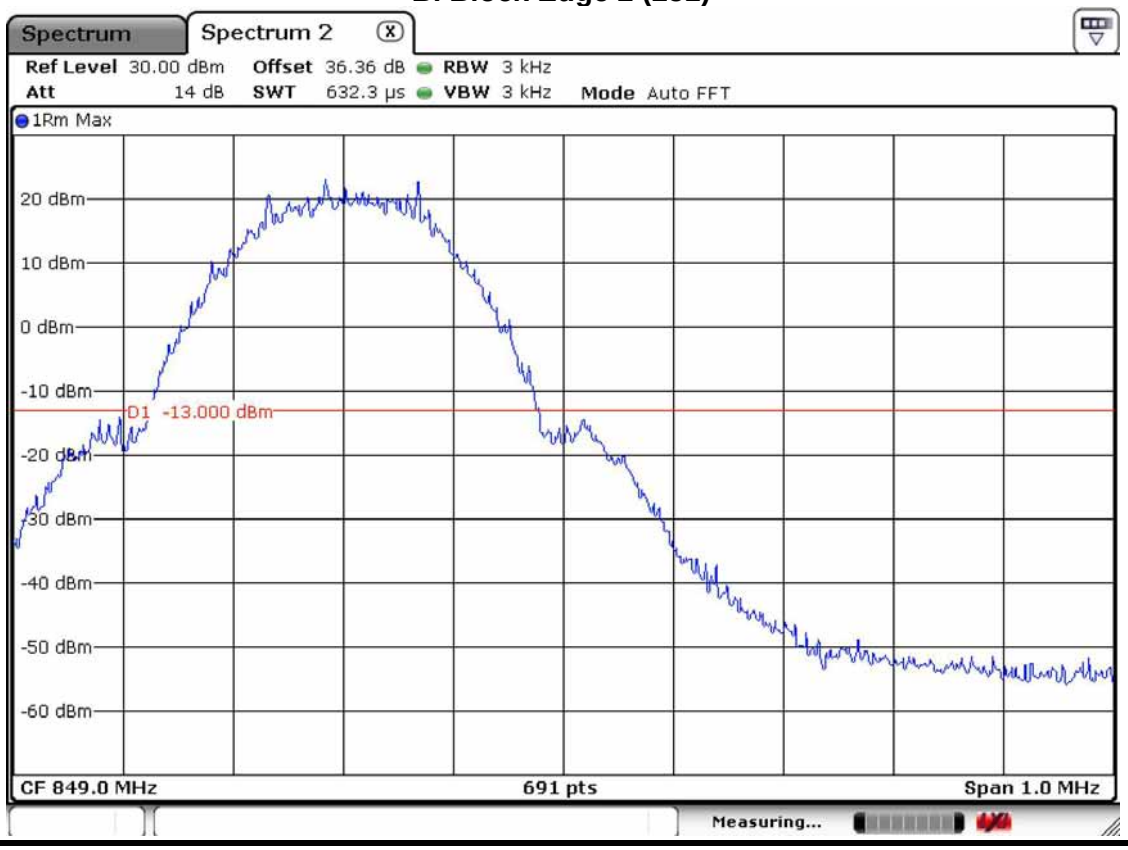
GSM850 High Channel
A. Block Edge 1 (251)



B. Block Edge 2 (251)



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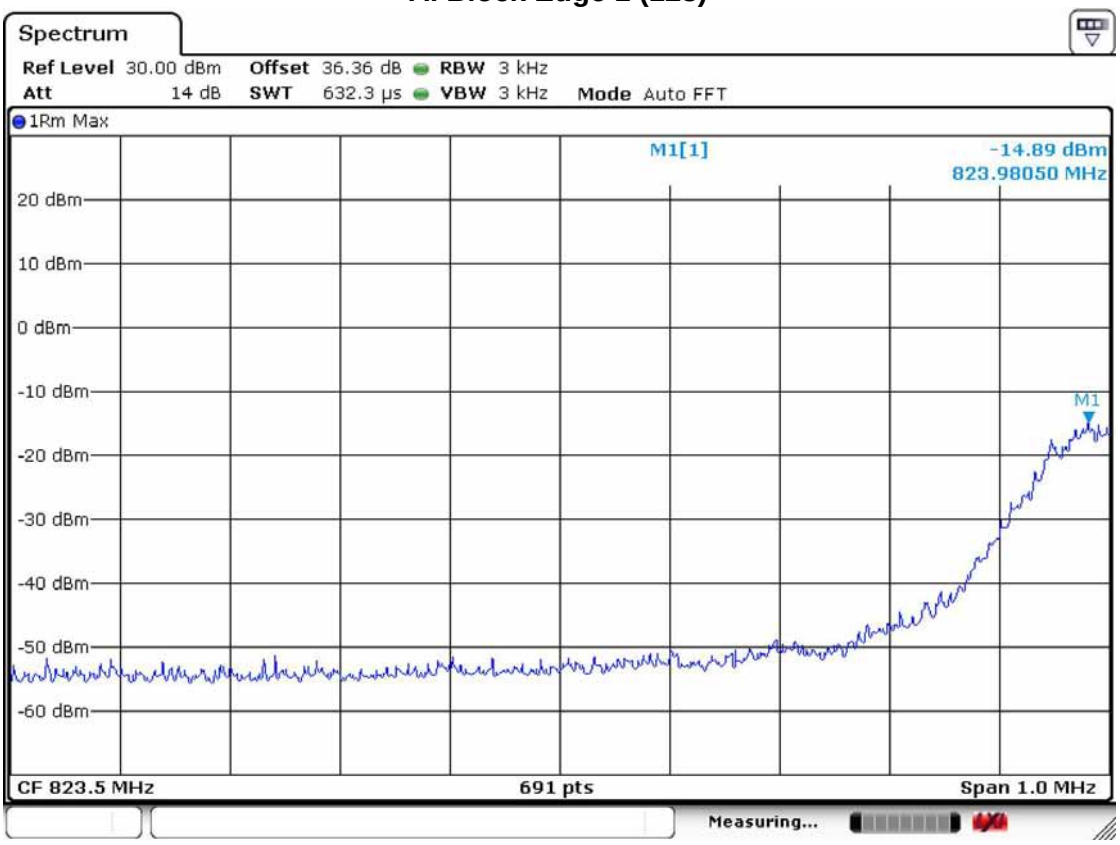
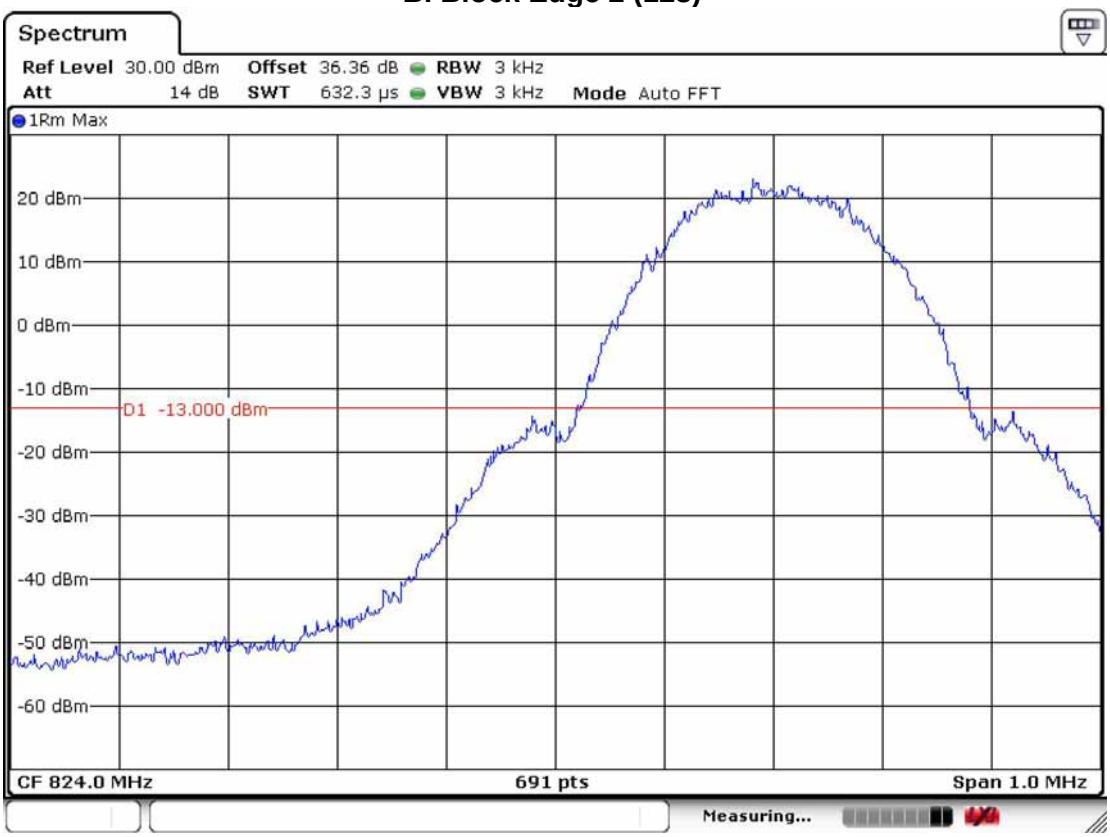
EDGE 850 Low Channel
A. Block Edge 1 (128)



B. Block Edge 2 (128)



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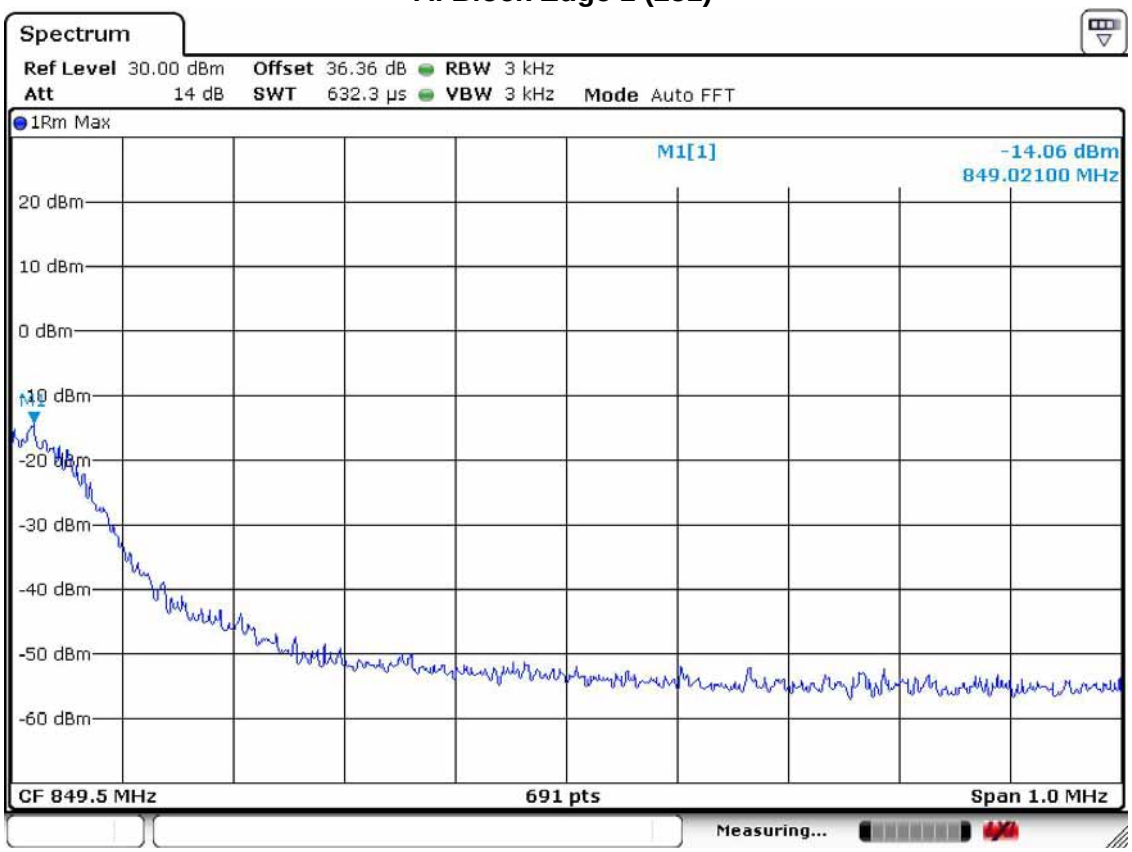
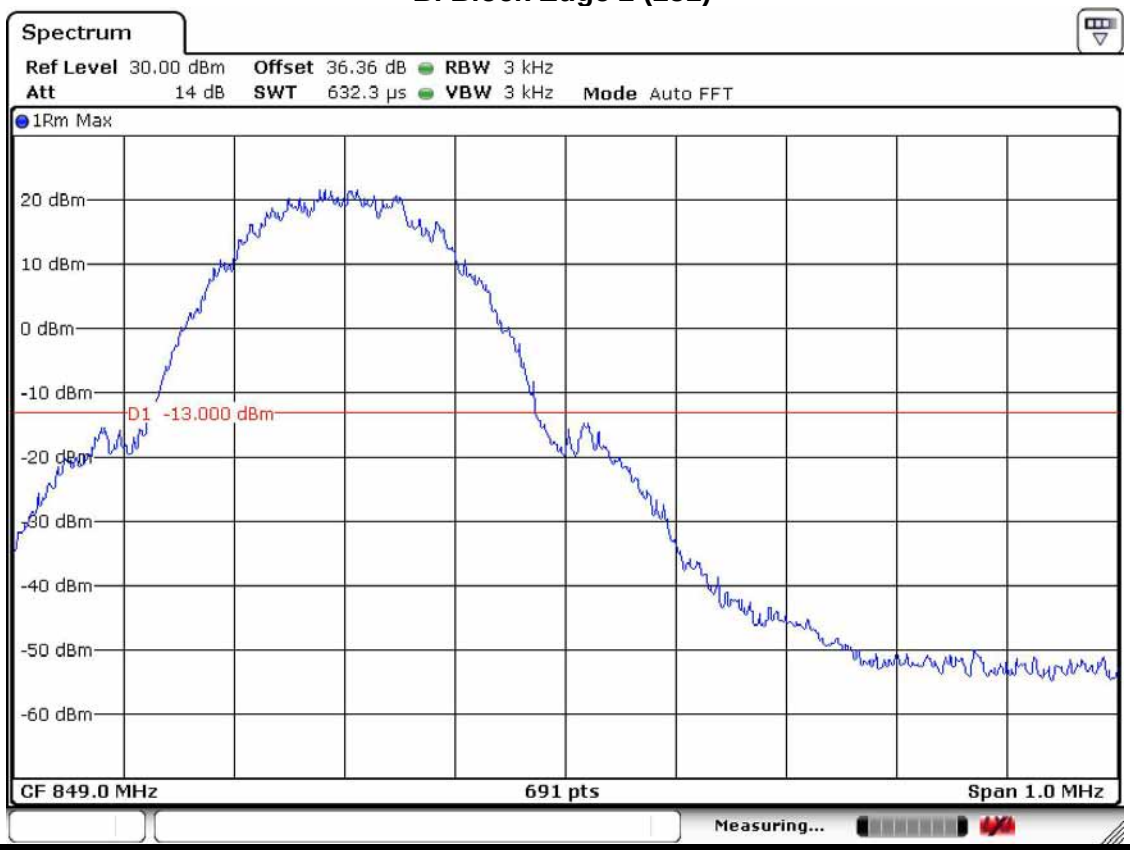
EDGE 850 High Channel
A. Block Edge 1 (251)



B. Block Edge 2 (251)



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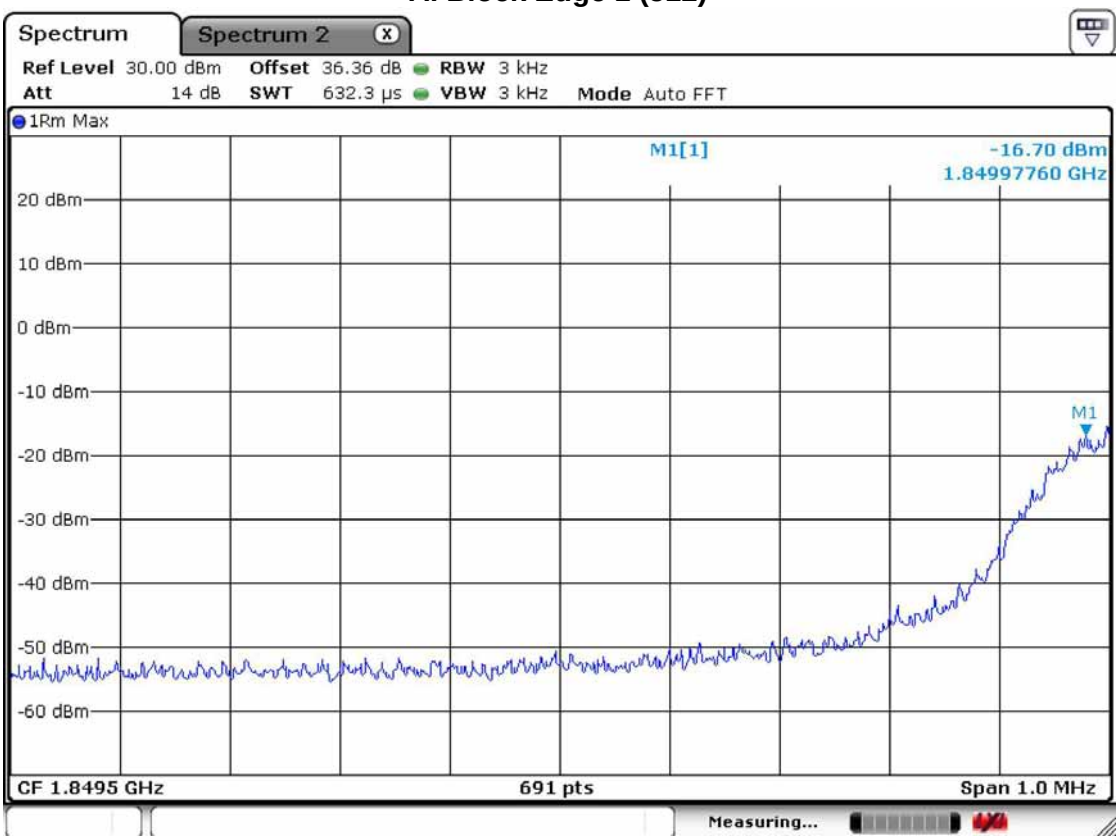
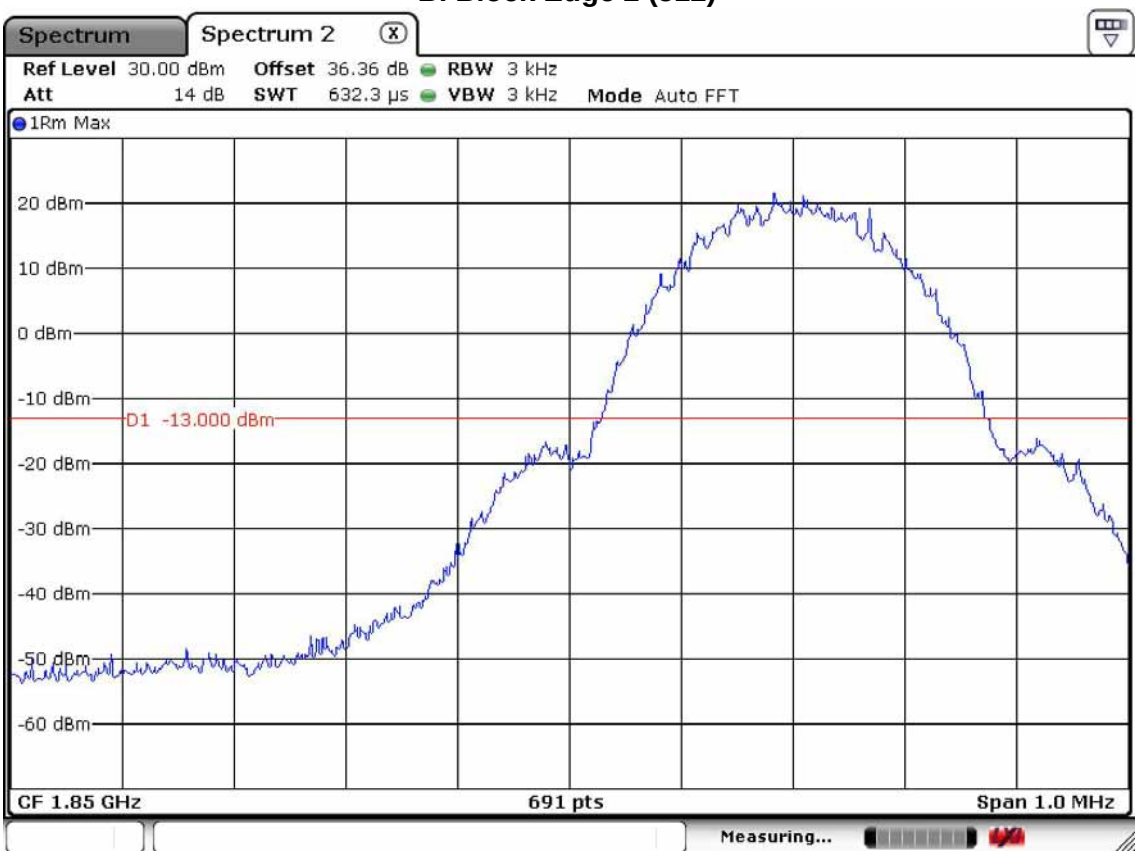
GSM1900 Low Channel
A. Block Edge 1 (512)



B. Block Edge 2 (512)



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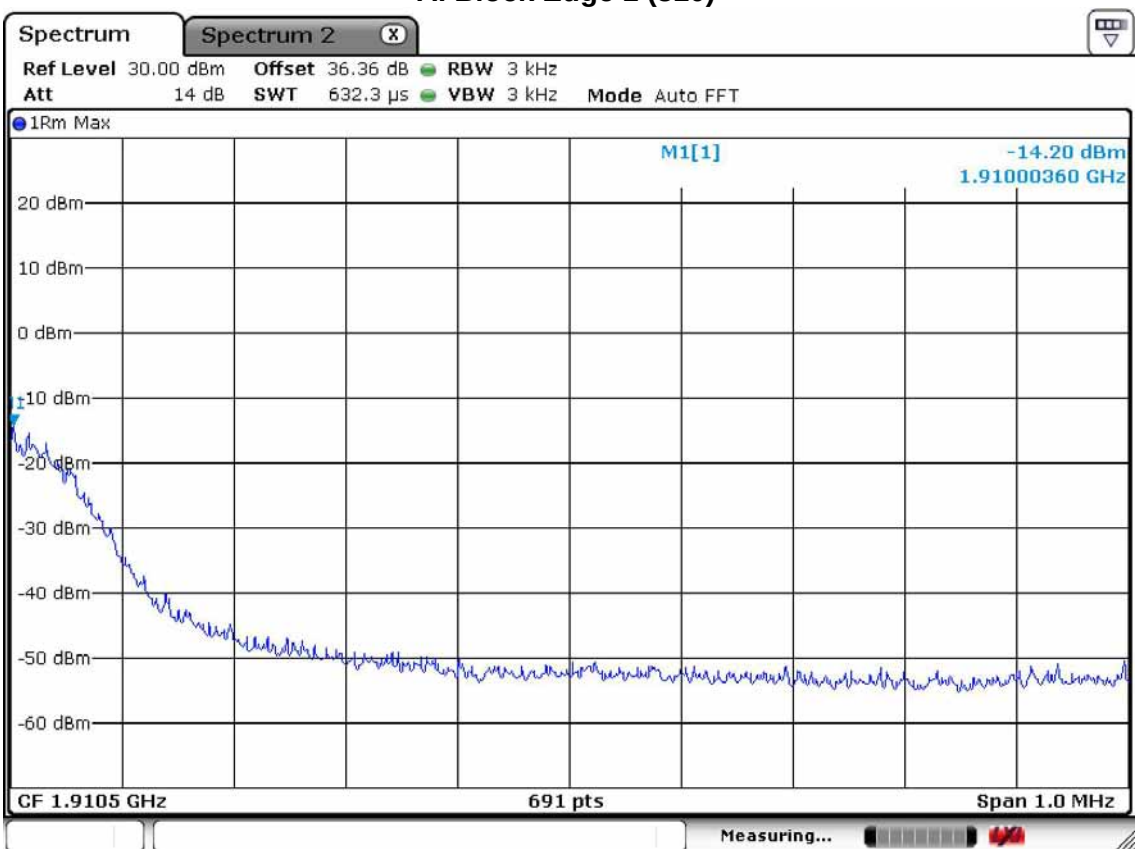
GSM1900 High Channel
A. Block Edge 1 (810)



B. Block Edge 2 (810)

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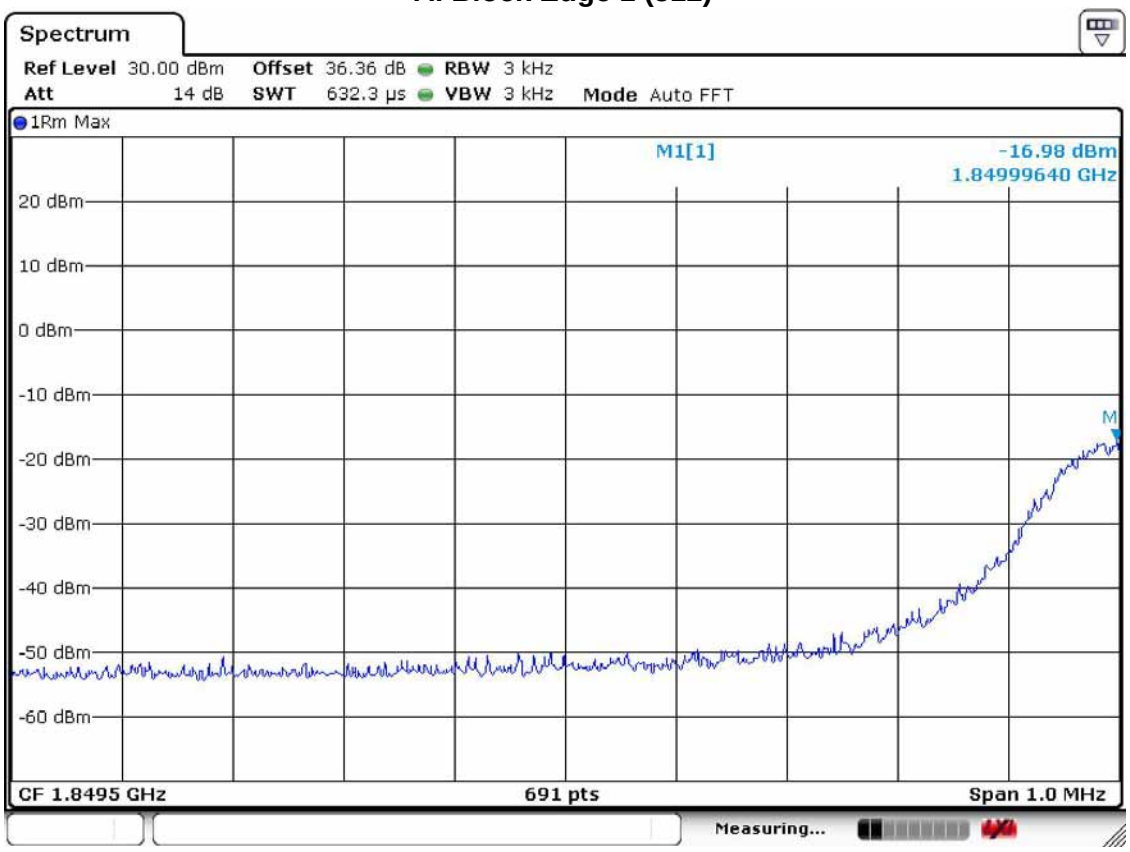
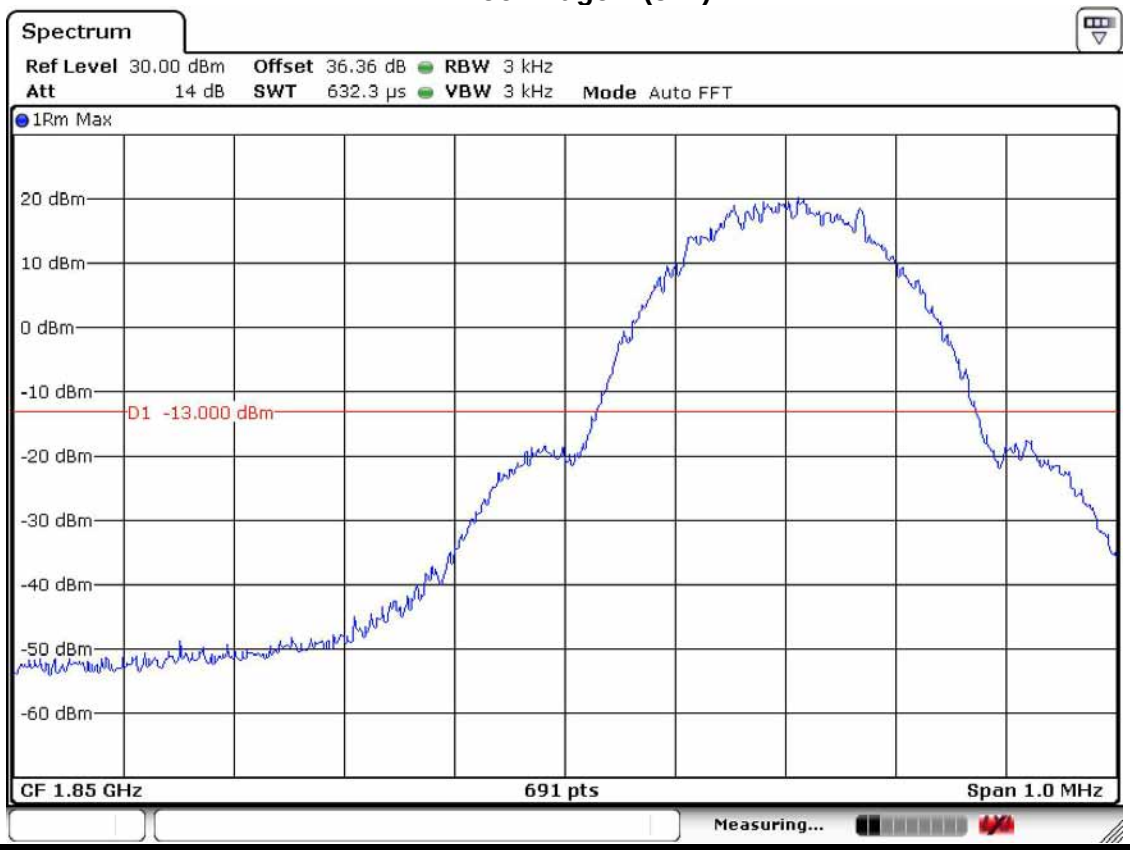
EDGE 1900 Low Channel
A. Block Edge 1 (512)



B. Block Edge 2 (512)



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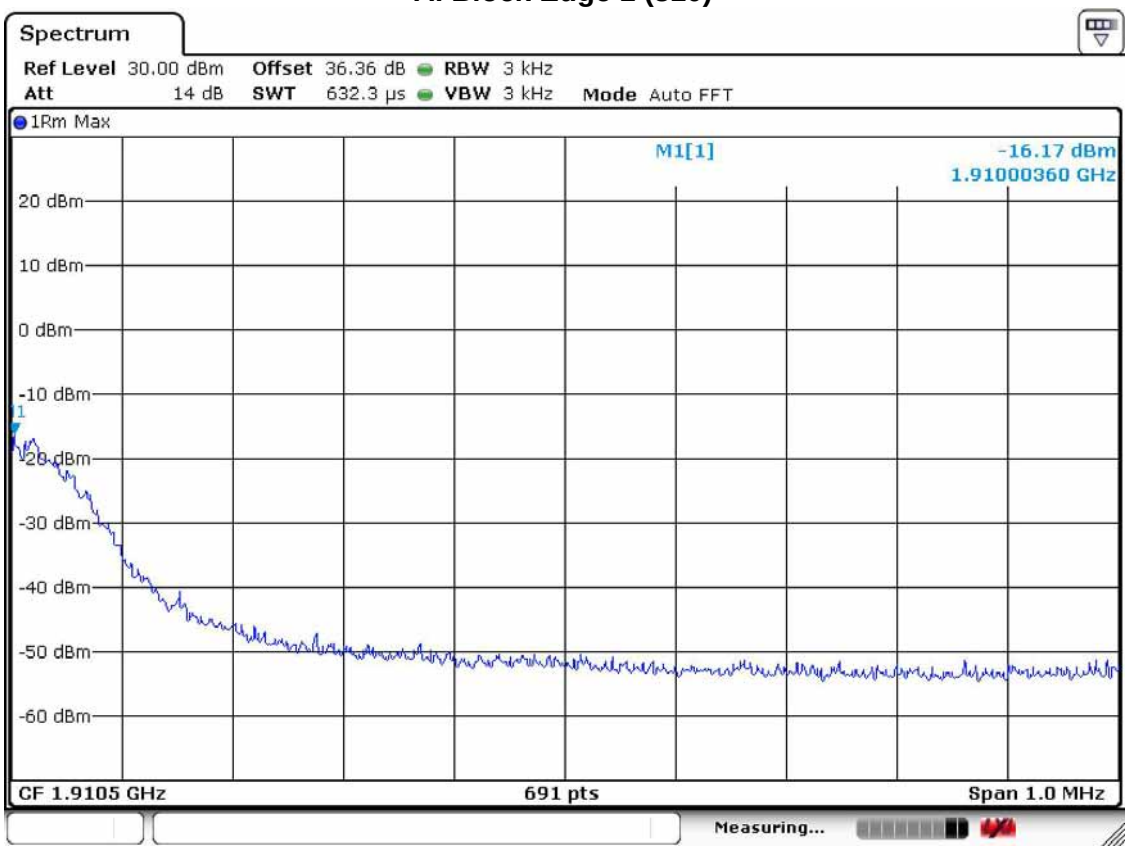
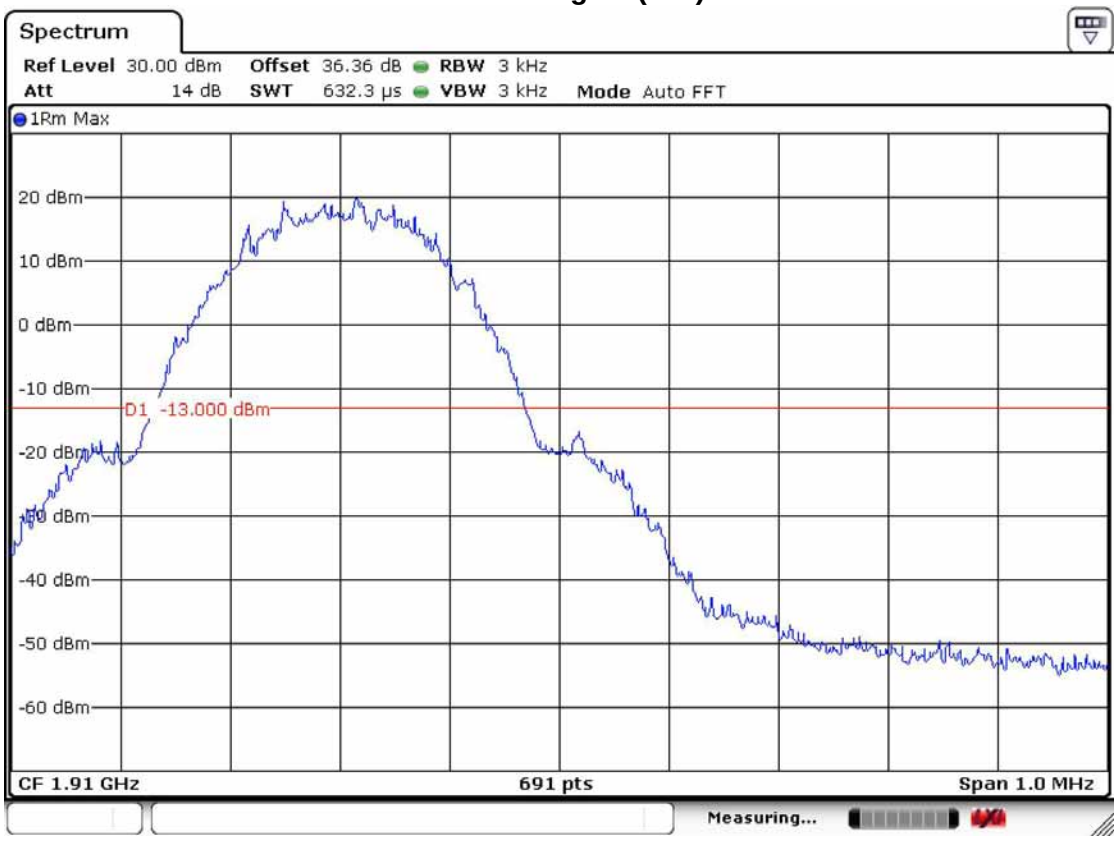
EDGE 1900 High Channel
A. Block Edge 1 (810)



B. Block Edge 2 (810)



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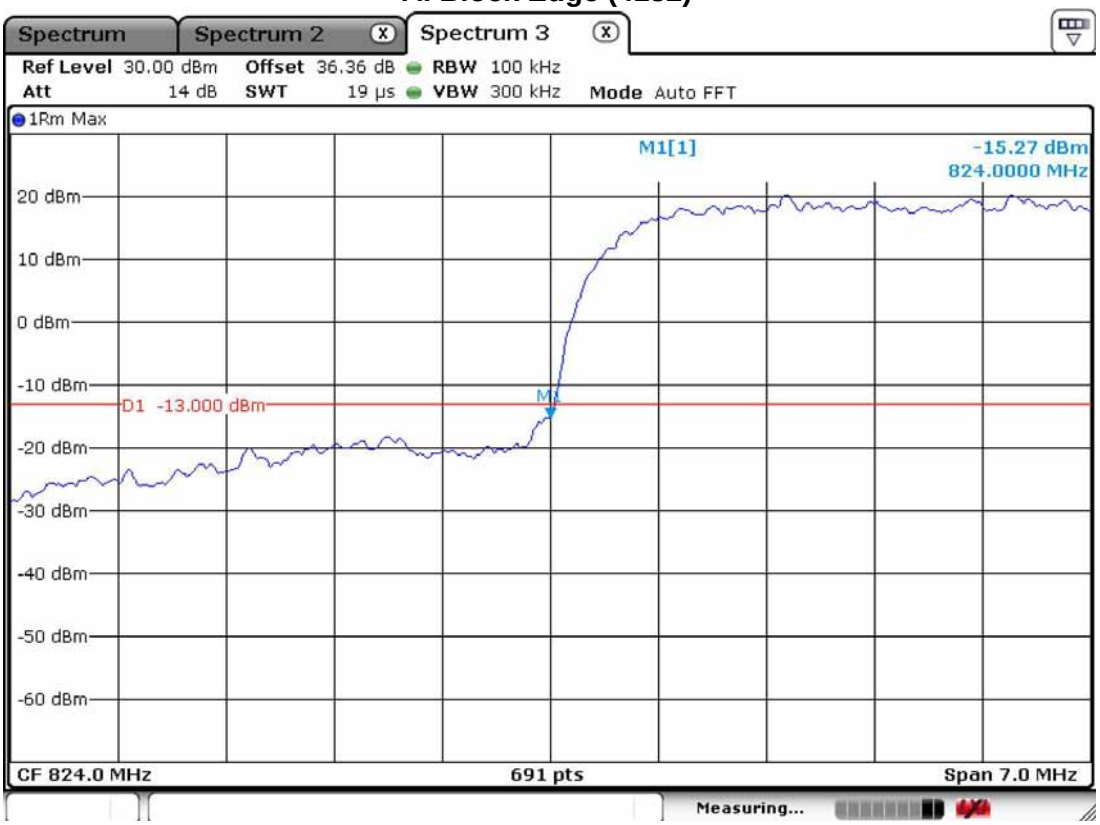
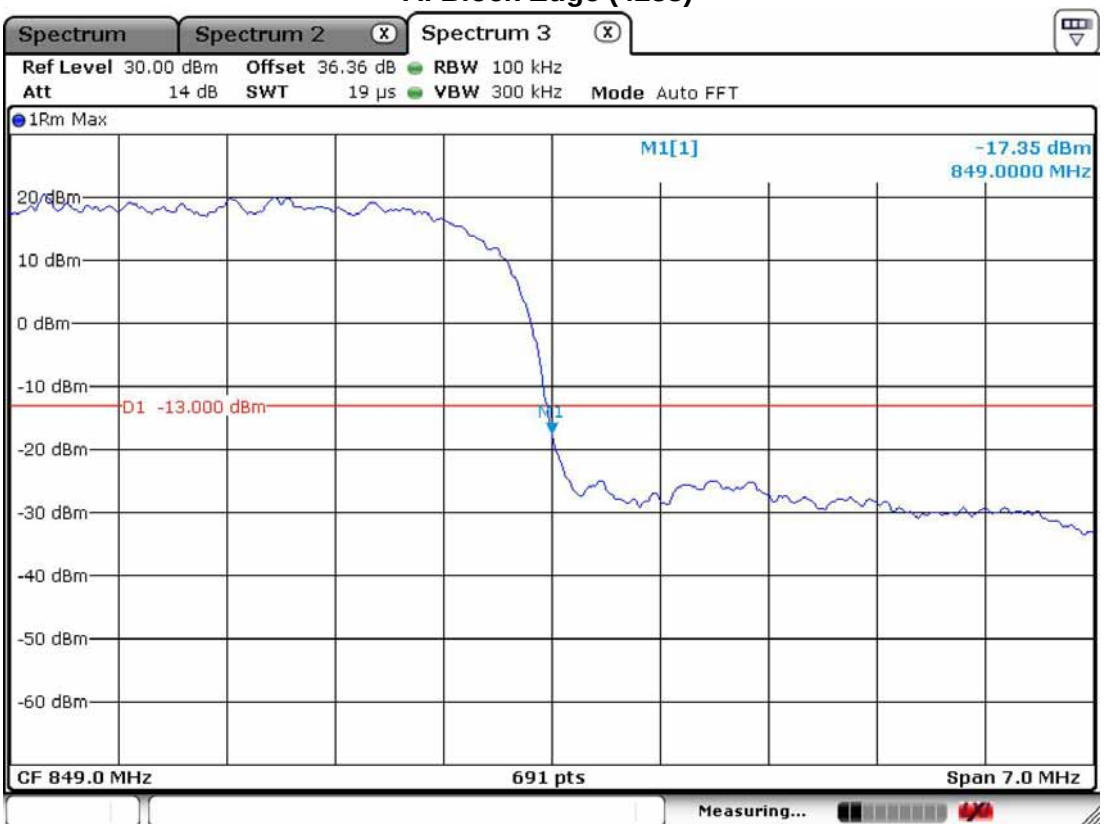
WCDMA V Low Channel
A. Block Edge (4132)



WCDMA V High Channel
A. Block Edge (4233)



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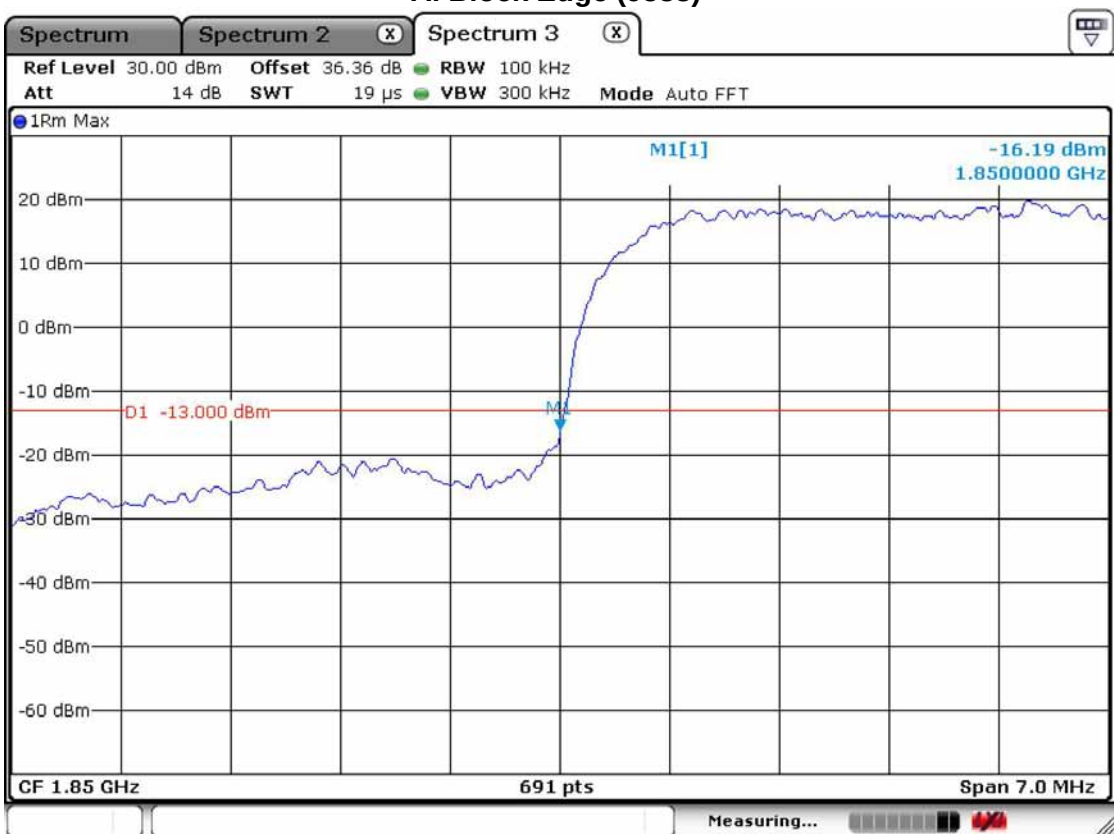
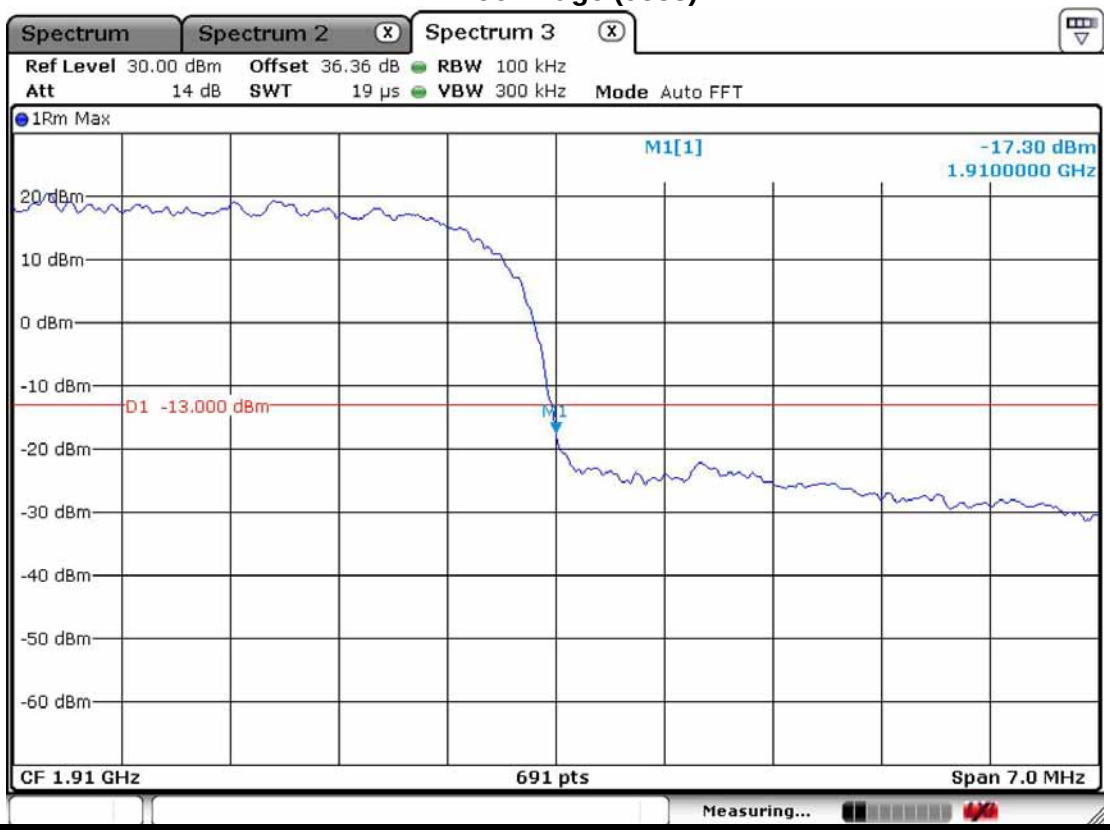
WCDMA II High Channel
A. Block Edge (9538)



WCDMA II High Channel
A. Block Edge (9538)



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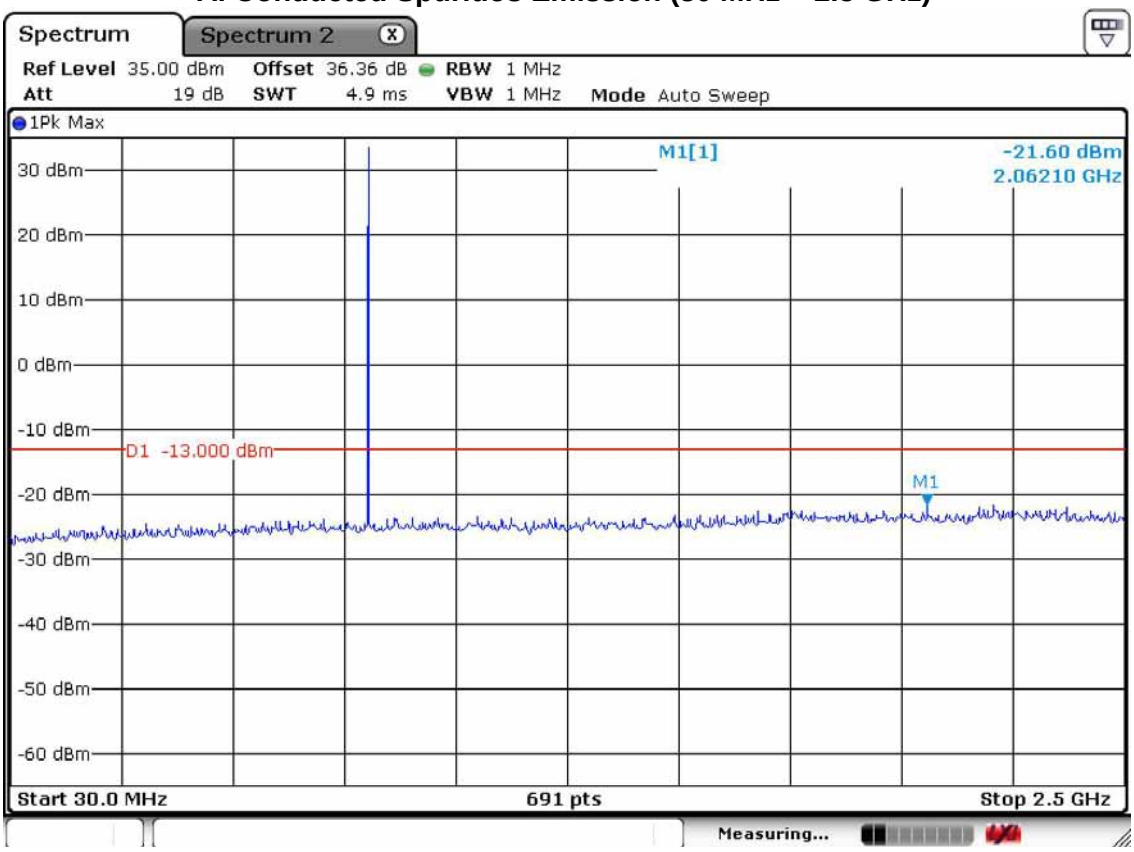
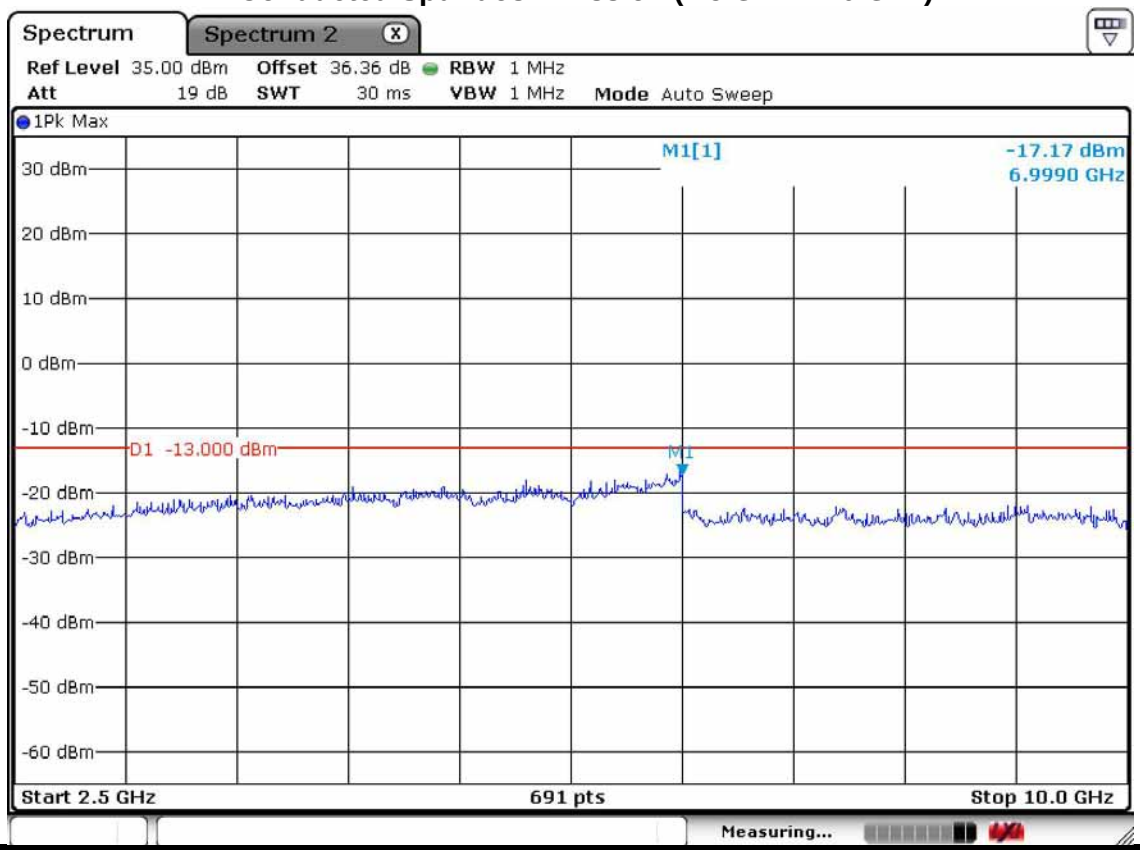
GSM 850 Low Channel (128)

A. Conducted Spuriuos Emission (30 MHz ~ 2.5 GHz)



B. Conducted Spuriuos Emission (2.5 GHz ~ 10 GHz)



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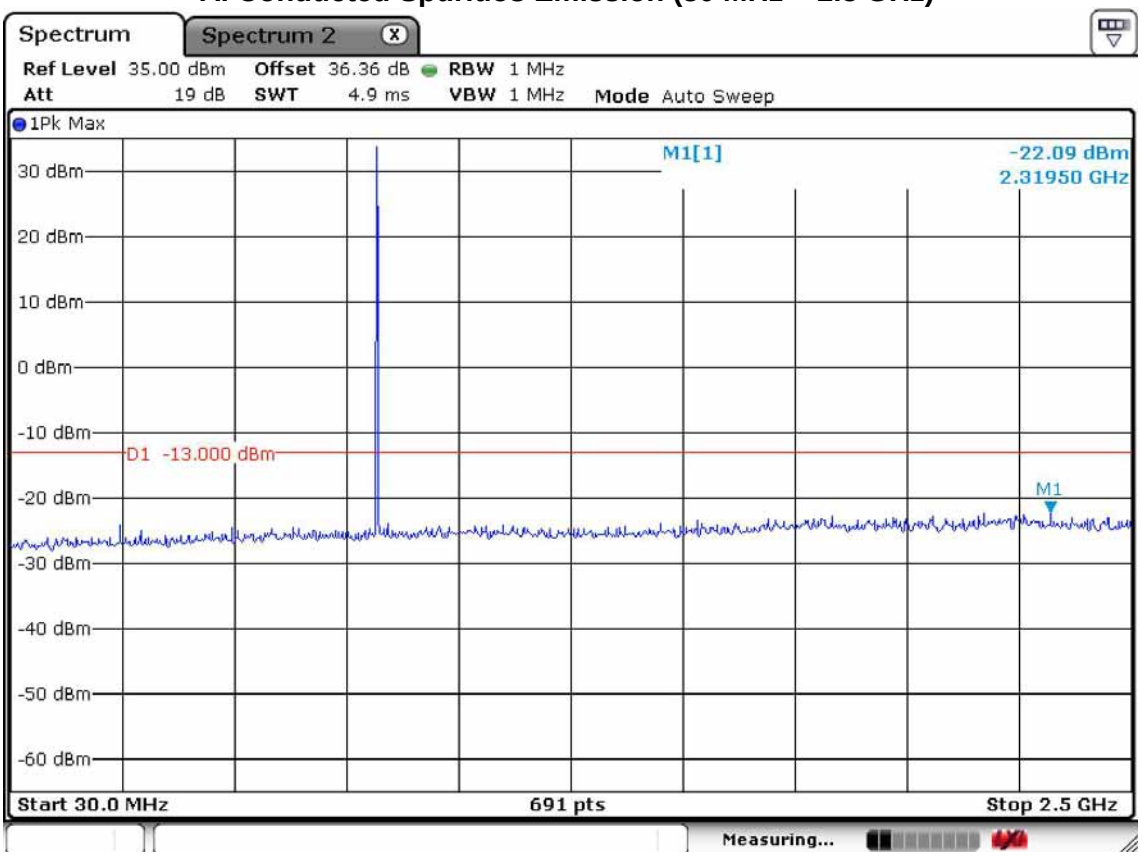
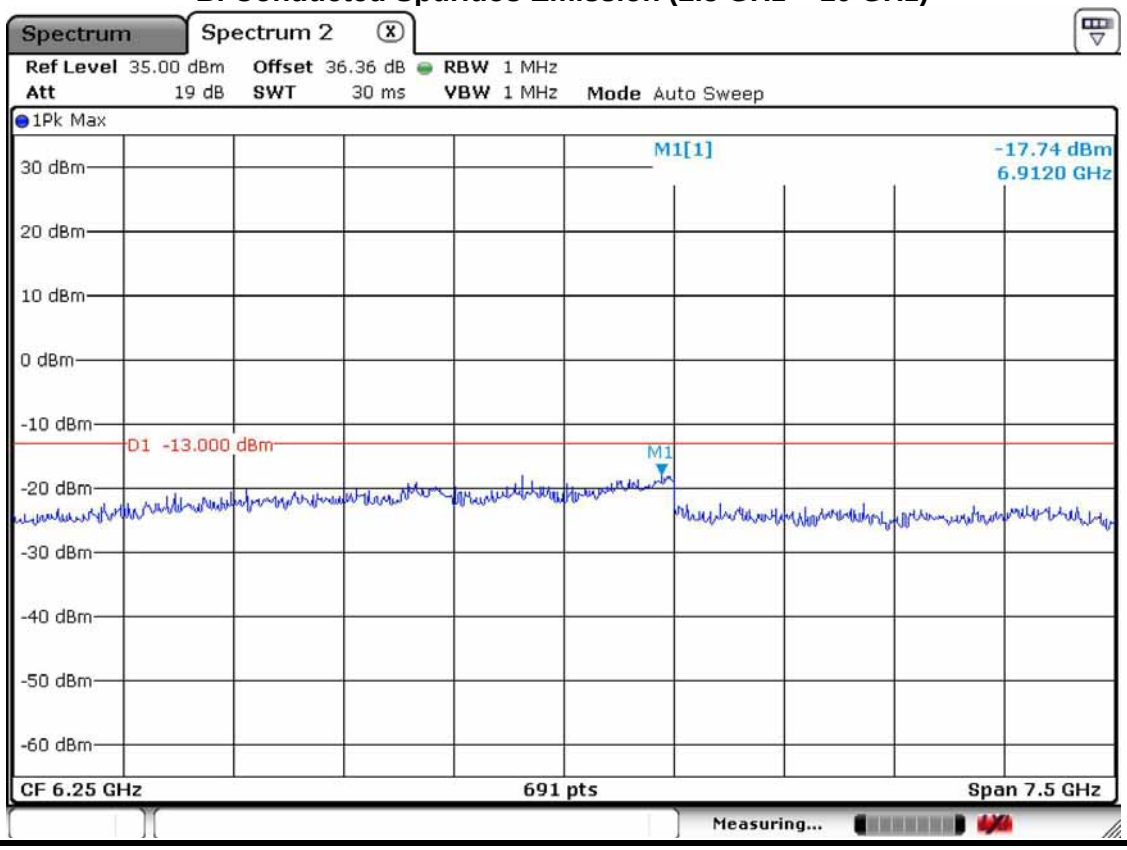
GSM 850 Middle Channel (190)

A. Conducted Spuriuos Emission (30 MHz ~ 2.5 GHz)



B. Conducted Spuriuos Emission (2.5 GHz ~ 10 GHz)



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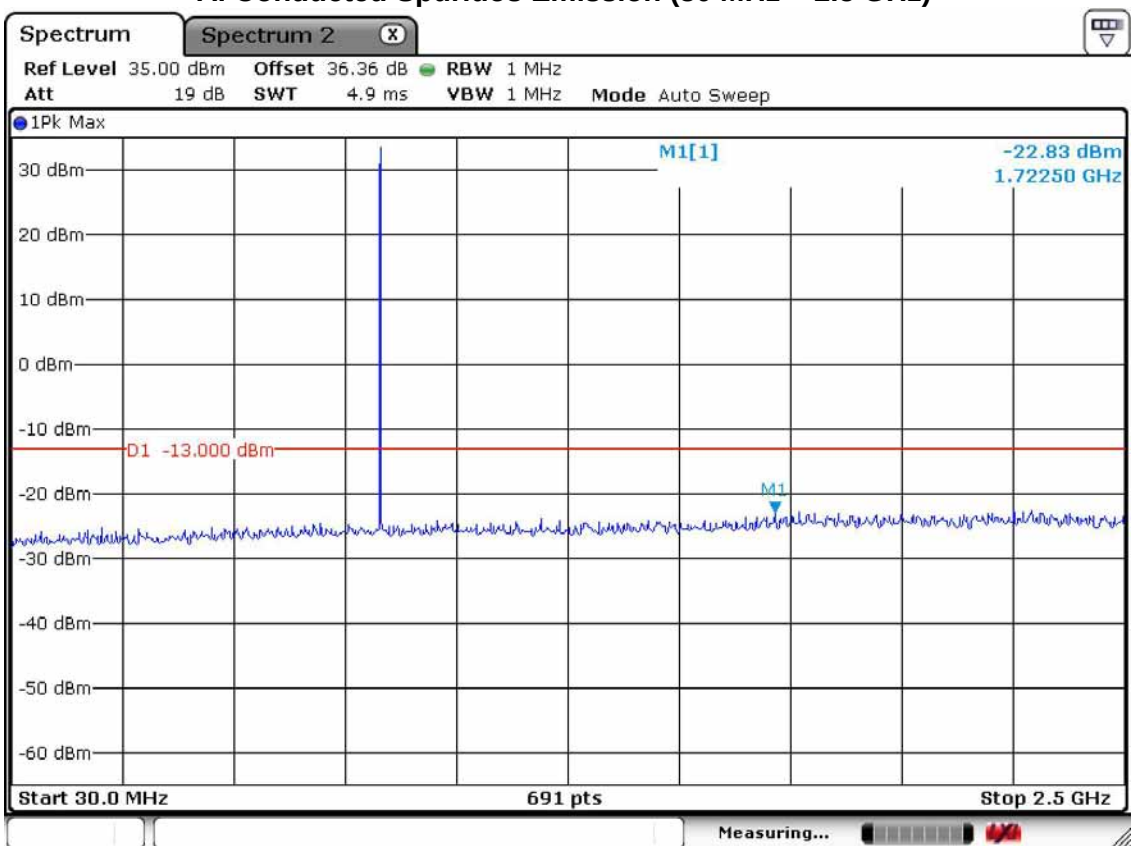
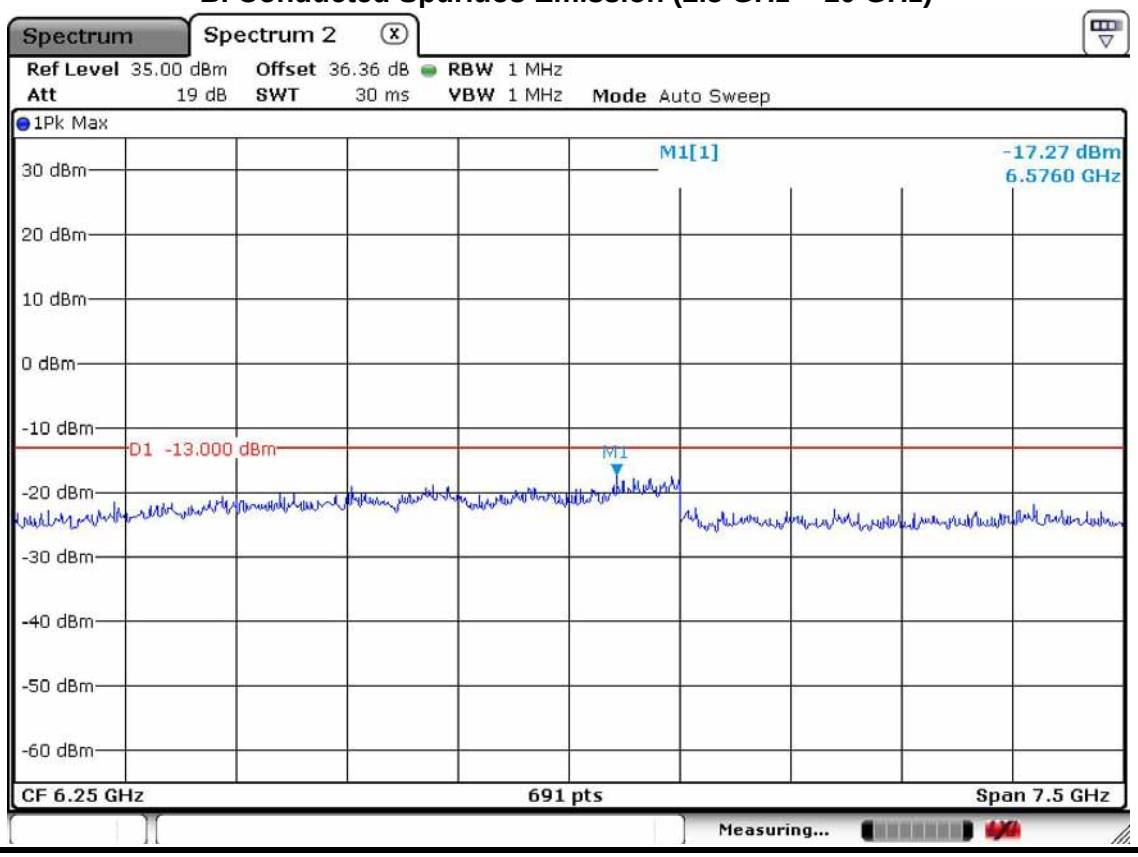
GSM 850 High Channel (251)

A. Conducted Spuriuos Emission (30 MHz ~ 2.5 GHz)



B. Conducted Spuriuos Emission (2.5 GHz ~ 10 GHz)



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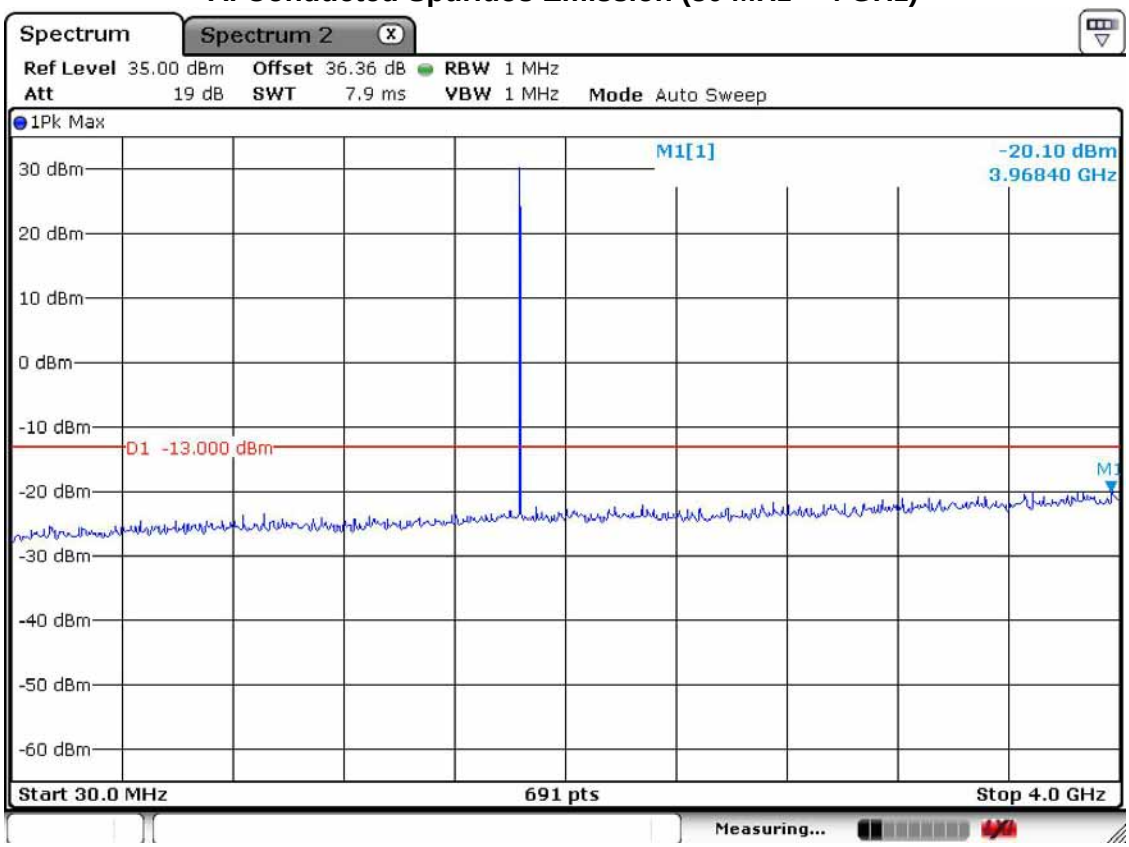
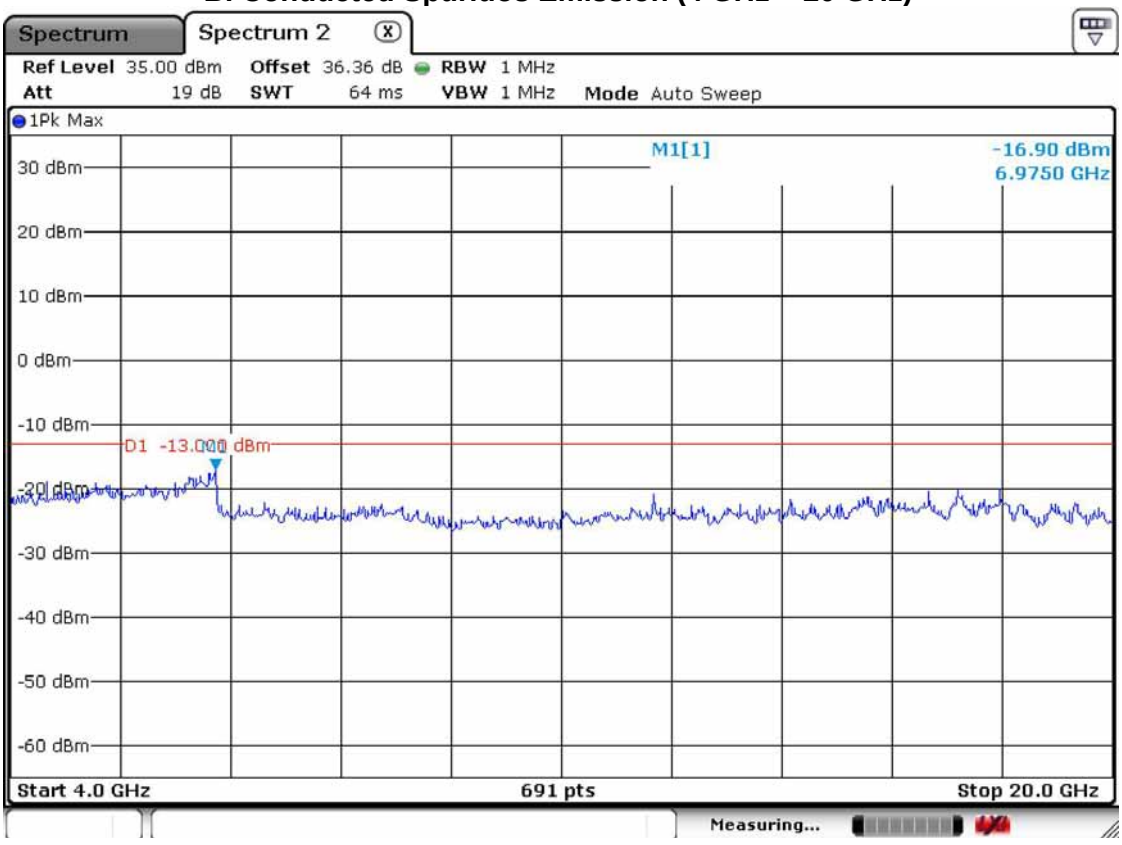
GSM 1900 Low Channel (512)

A. Conducted Spuriuos Emission (30 MHz ~ 4 GHz)



B. Conducted Spuriuos Emission (4 GHz ~ 20 GHz)



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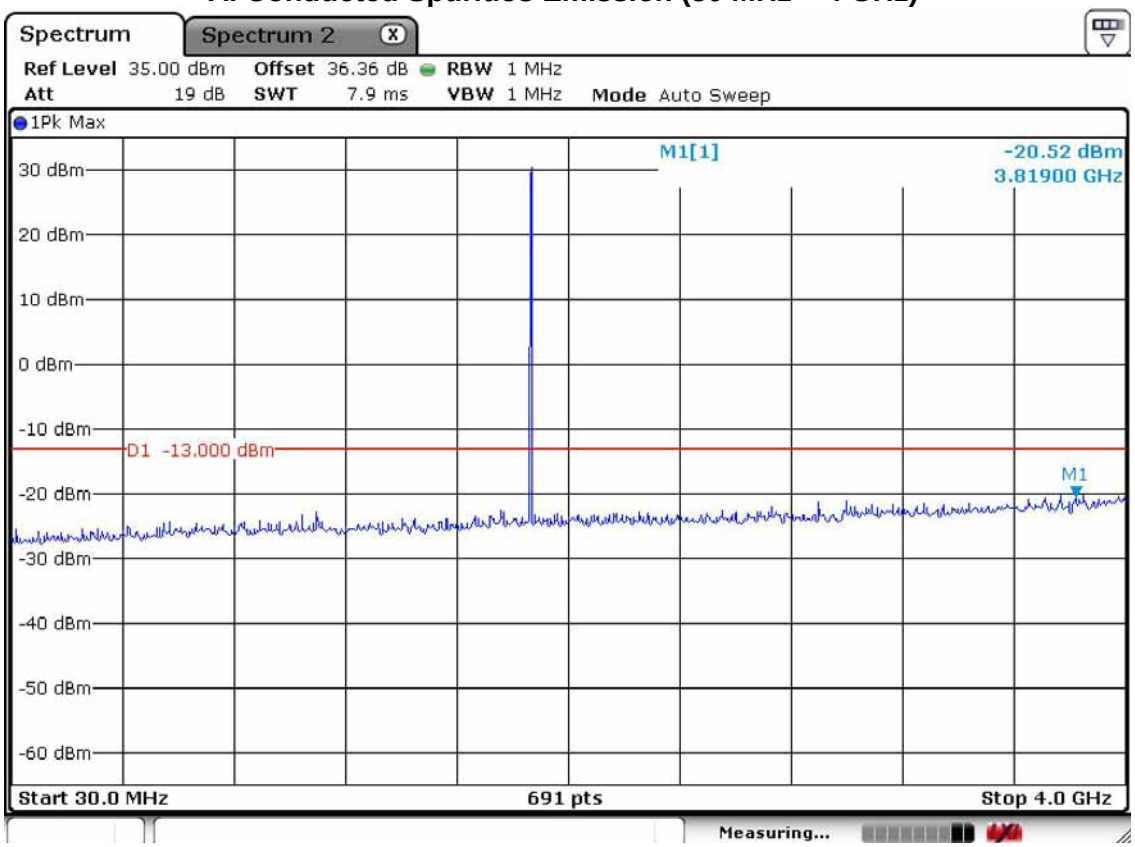
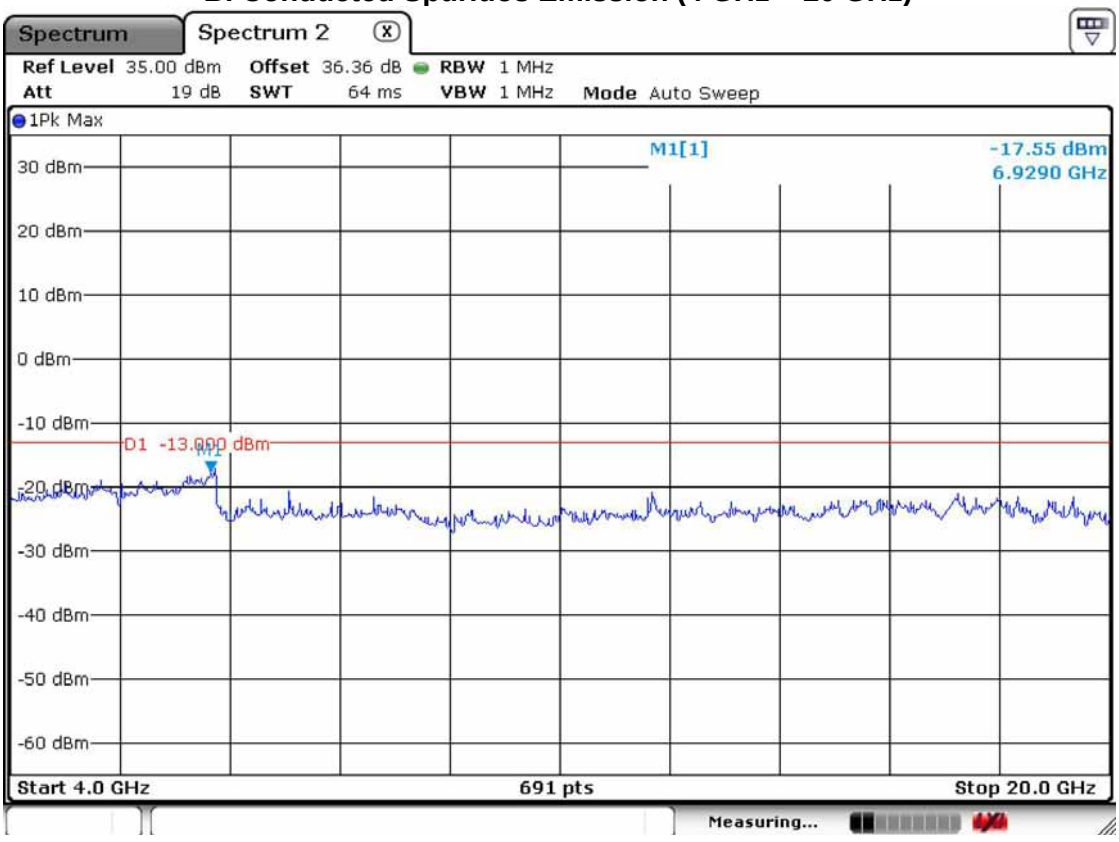
GSM 1900 Middle Channel (661)

A. Conducted Spuriuos Emission (30 MHz ~ 4 GHz)



B. Conducted Spuriuos Emission (4 GHz ~ 20 GHz)



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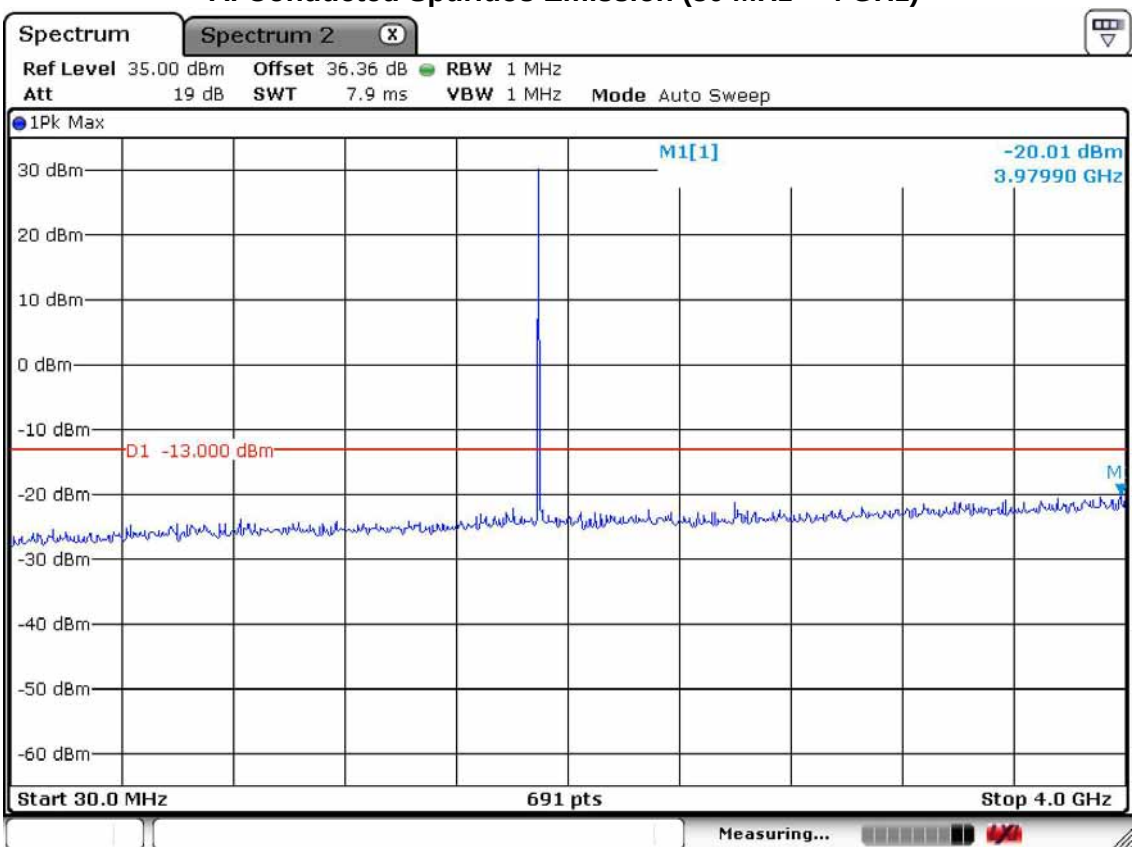
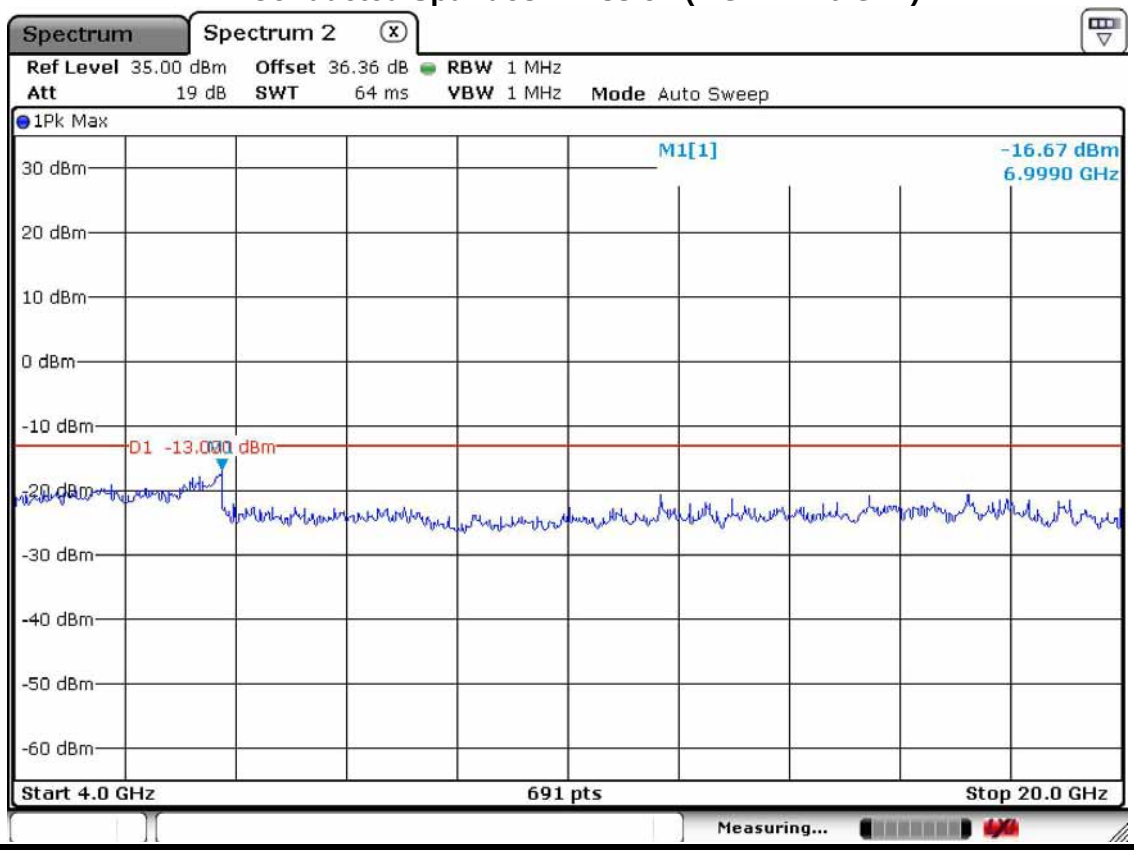
GSM 1900 High Channel (810)

A. Conducted Spuriuos Emission (30 MHz ~ 4 GHz)



B. Conducted Spuriuos Emission (4 GHz ~ 20 GHz)



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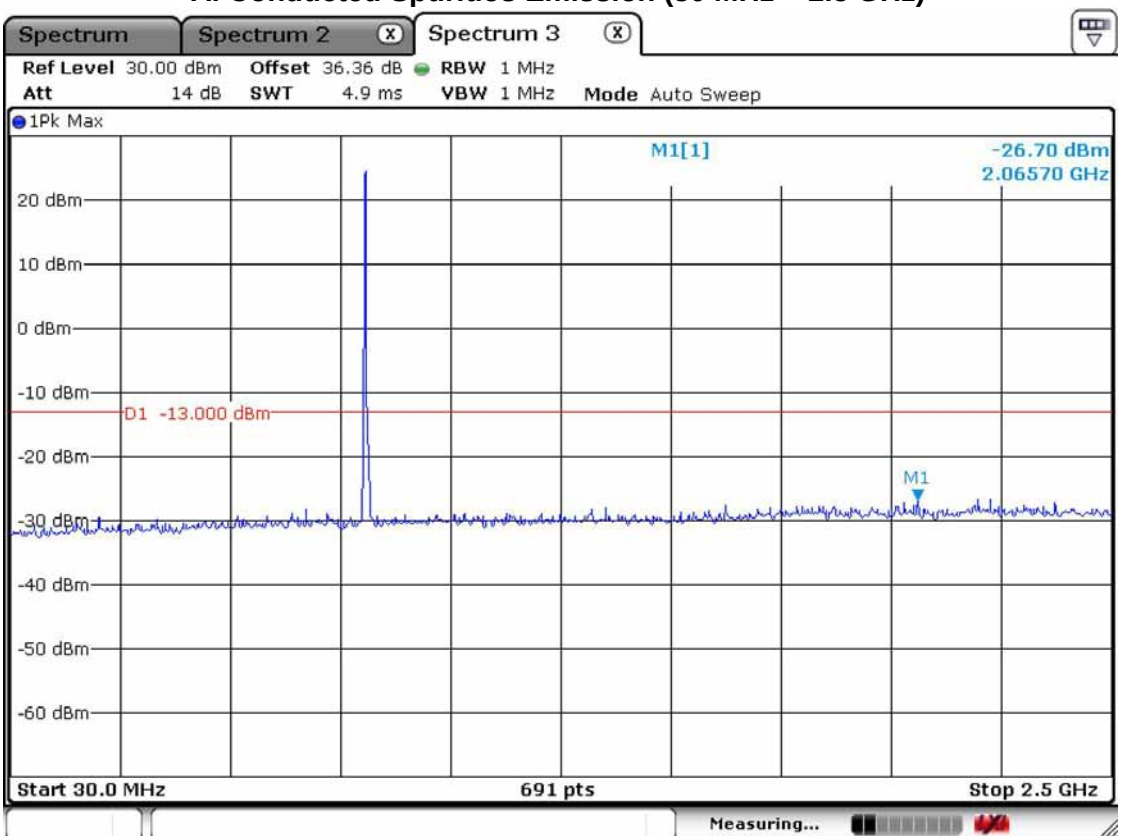
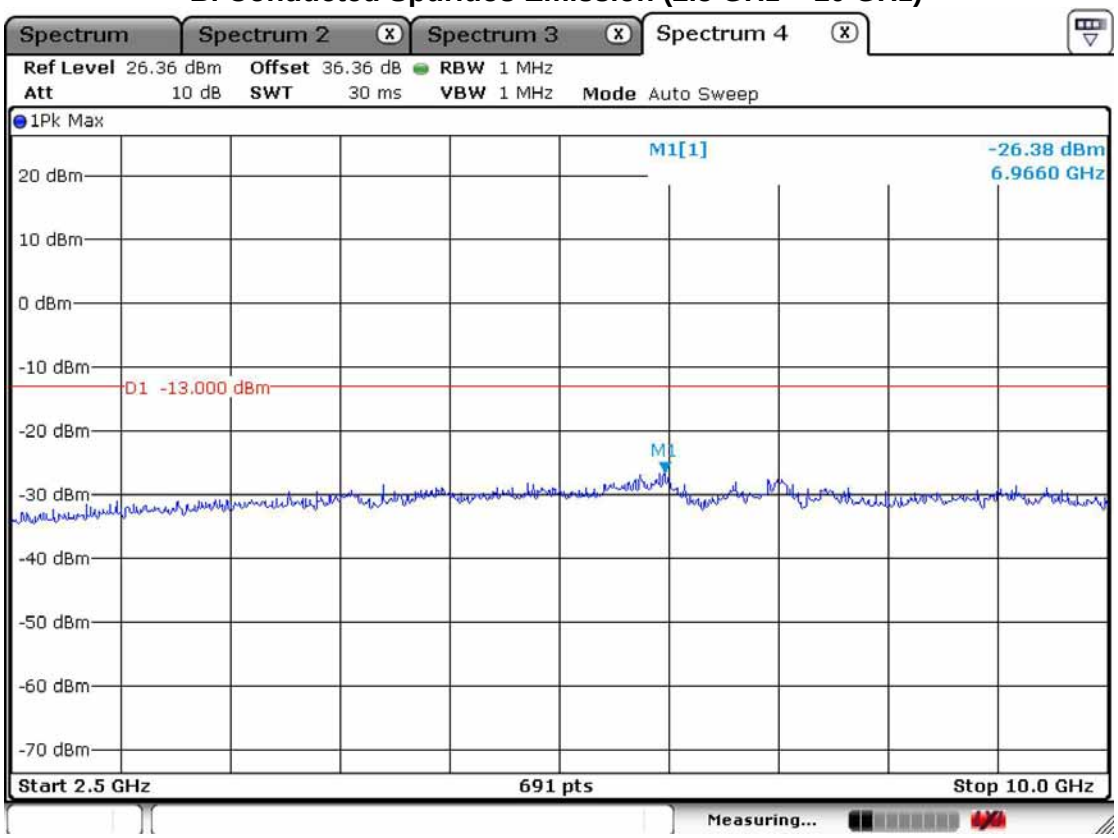
WCDMA V low Channel (4132)

A. Conducted Spuriuos Emission (30 MHz ~ 2.5 GHz)



B. Conducted Spuriuos Emission (2.5 GHz ~ 10 GHz)



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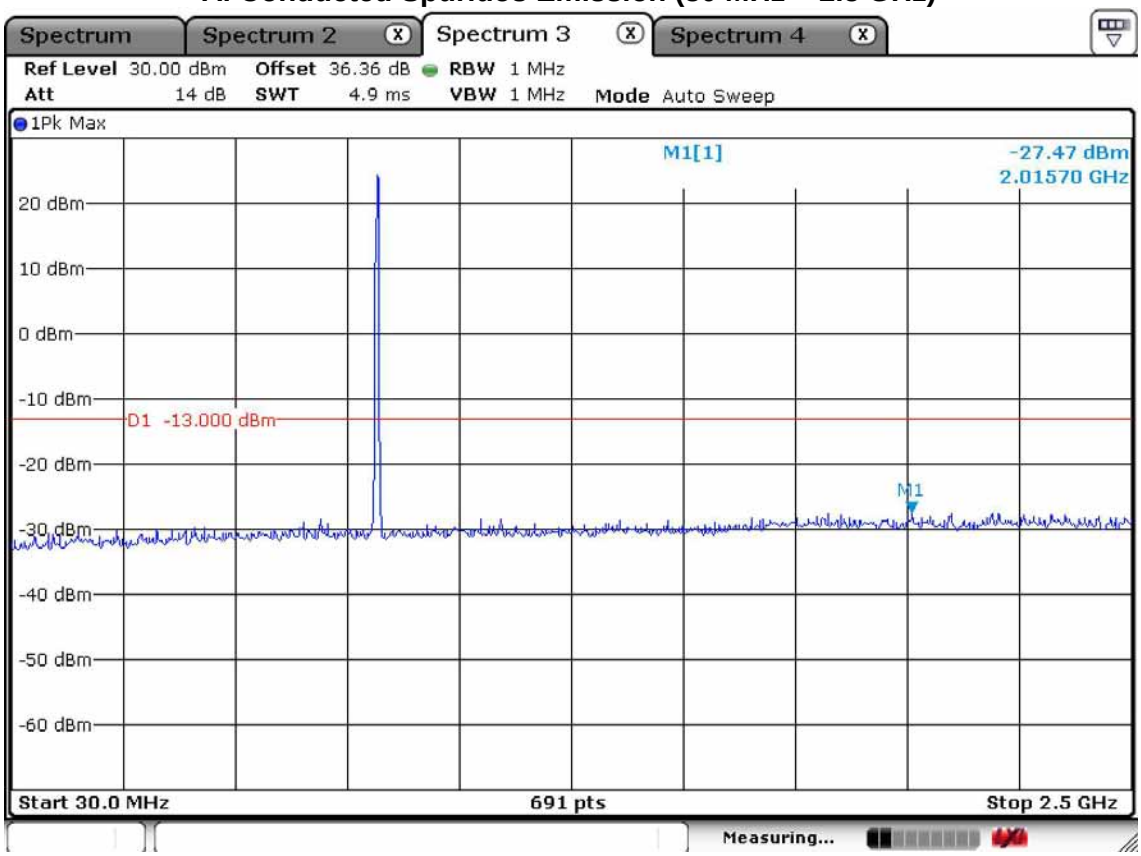
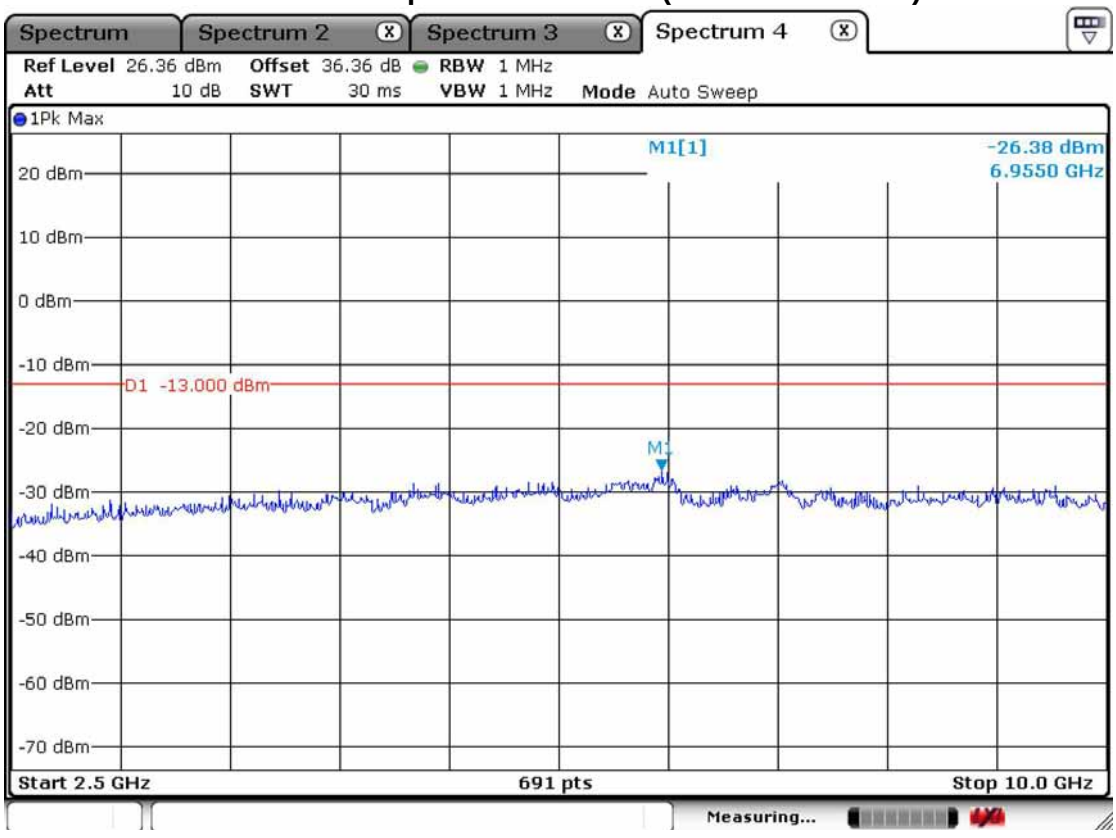
WCDMA V Middle Channel (4183)

A. Conducted Spuriuos Emission (30 MHz ~ 2.5 GHz)



B. Conducted Spuriuos Emission (2.5 GHz ~ 10 GHz)



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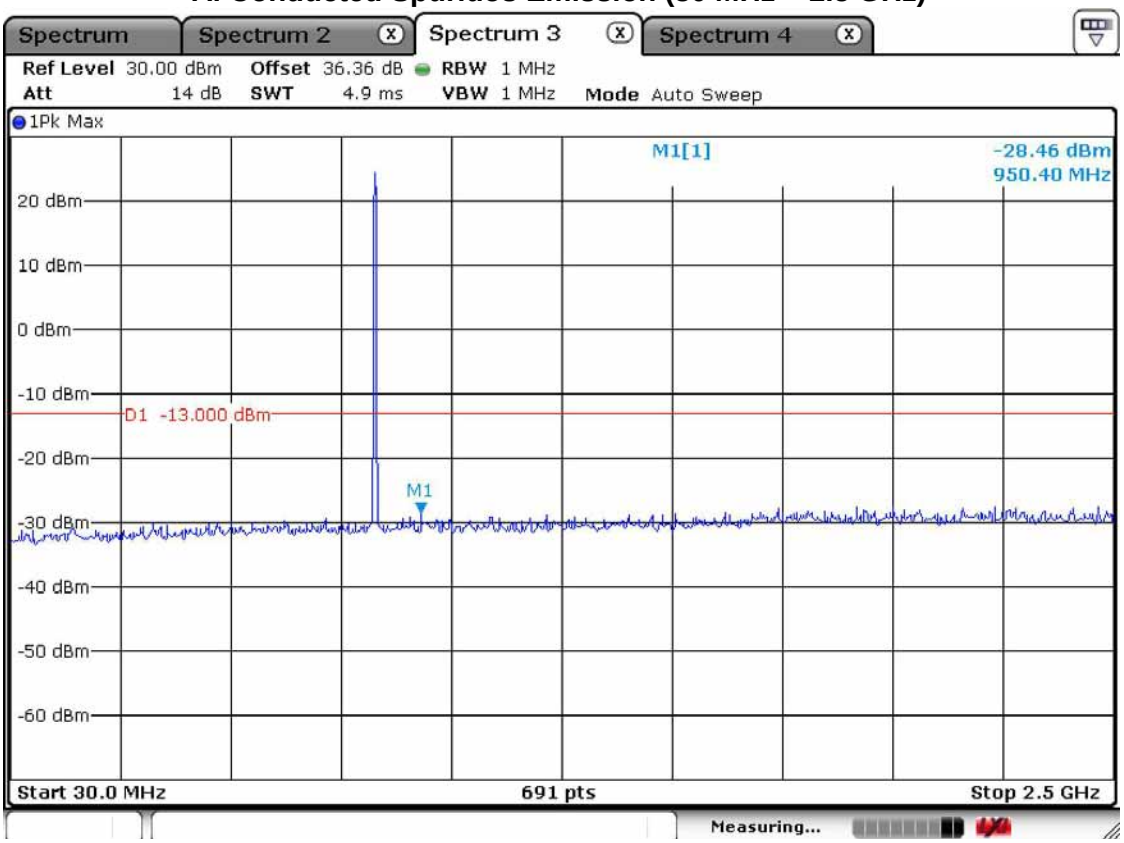
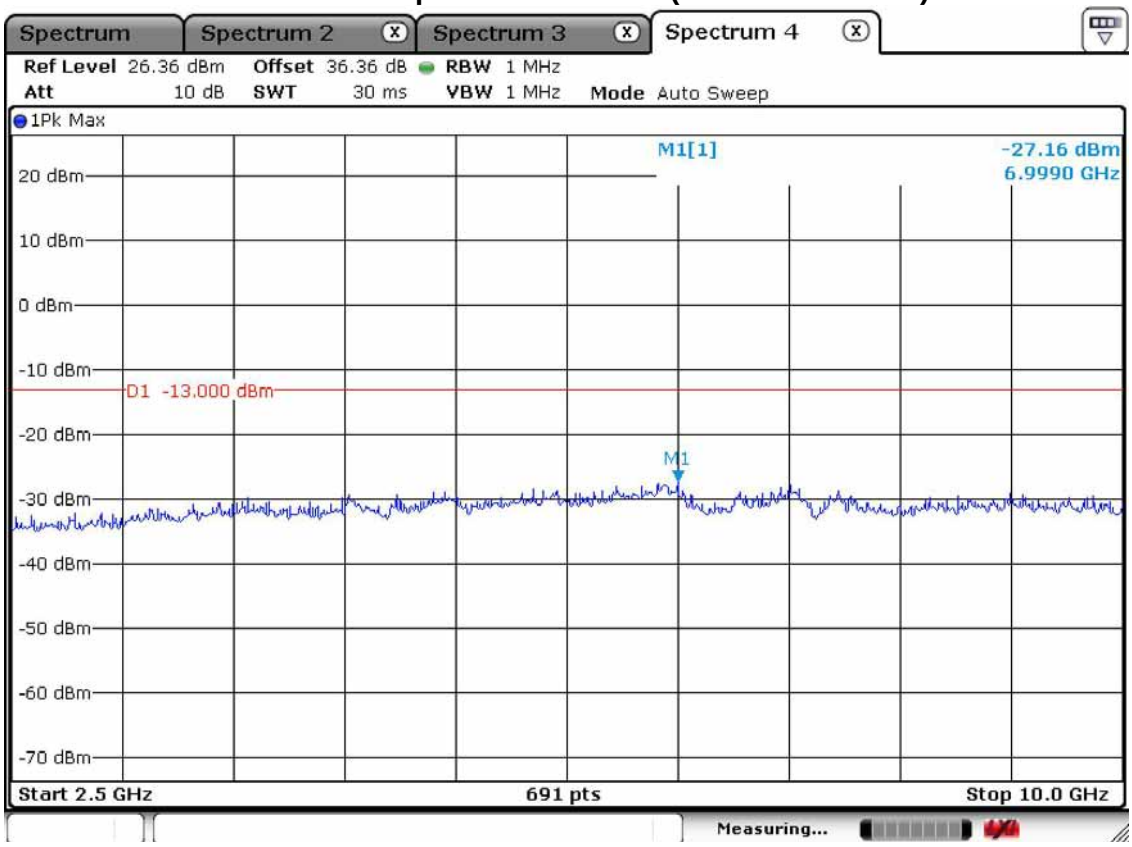
WCDMA V High Channel (4233)

A. Conducted Spuriuos Emission (30 MHz ~ 2.5 GHz)



B. Conducted Spuriuos Emission (2.5 GHz ~ 10 GHz)



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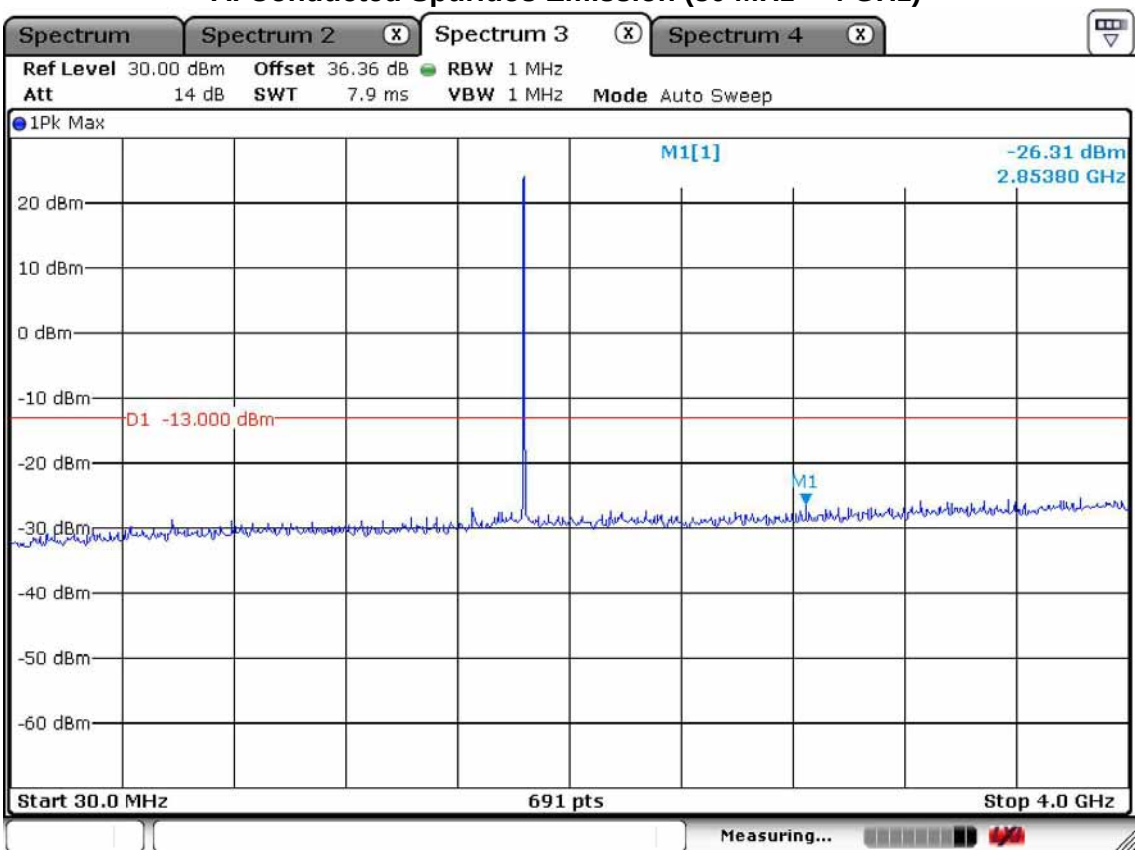
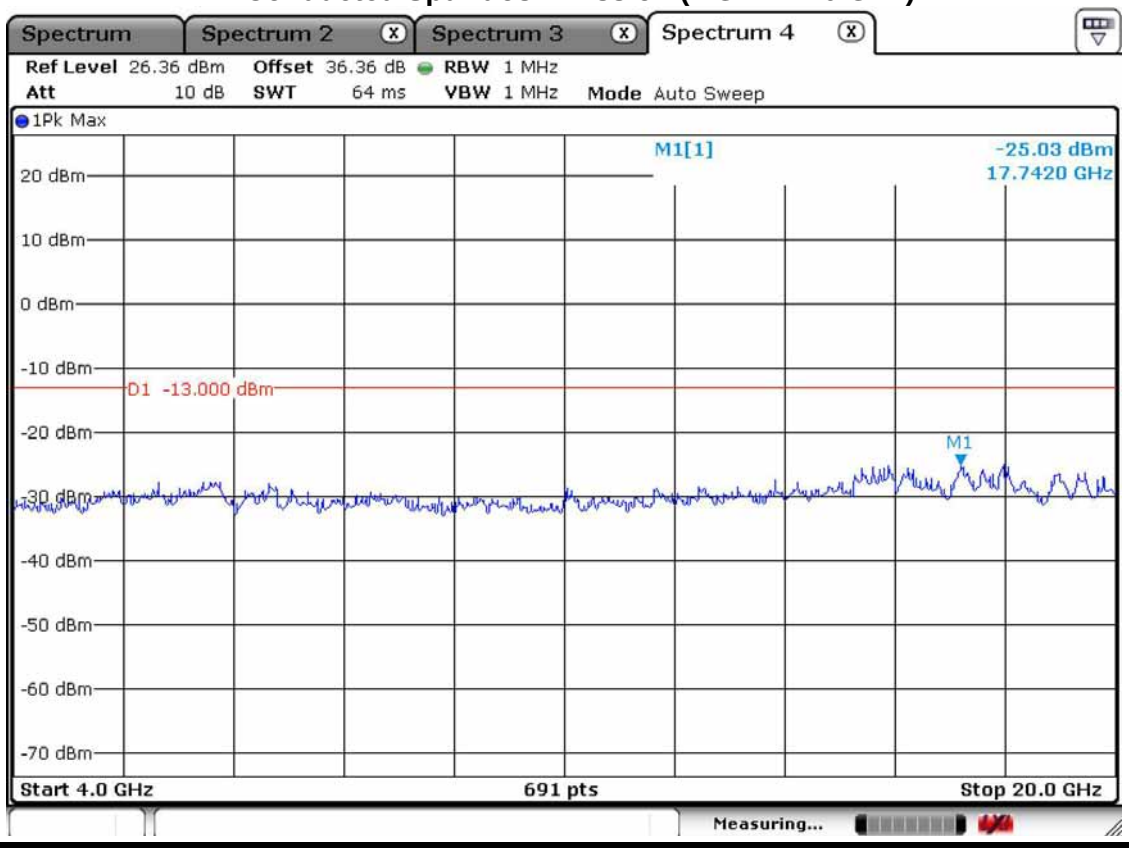
WCDMA II low Channel (9262)

A. Conducted Spuriuos Emission (30 MHz ~ 4 GHz)



B. Conducted Spuriuos Emission (4 GHz ~ 20 GHz)



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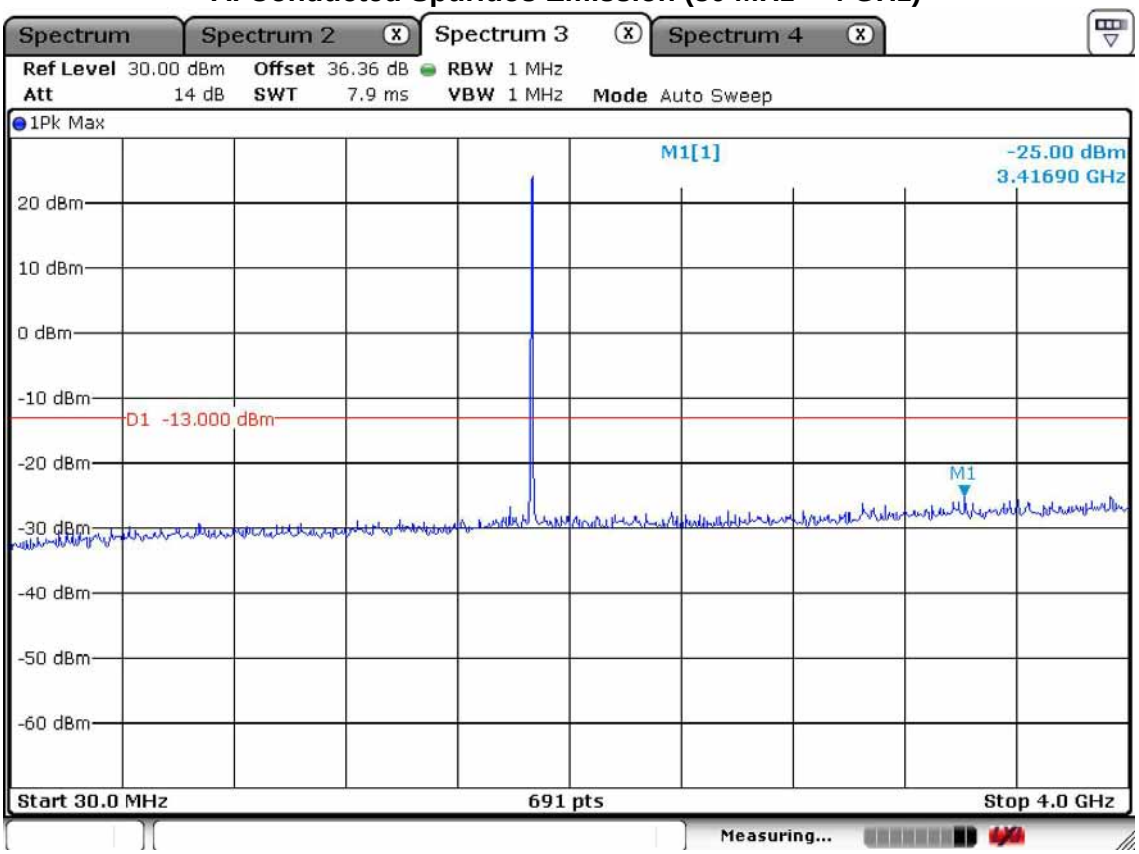
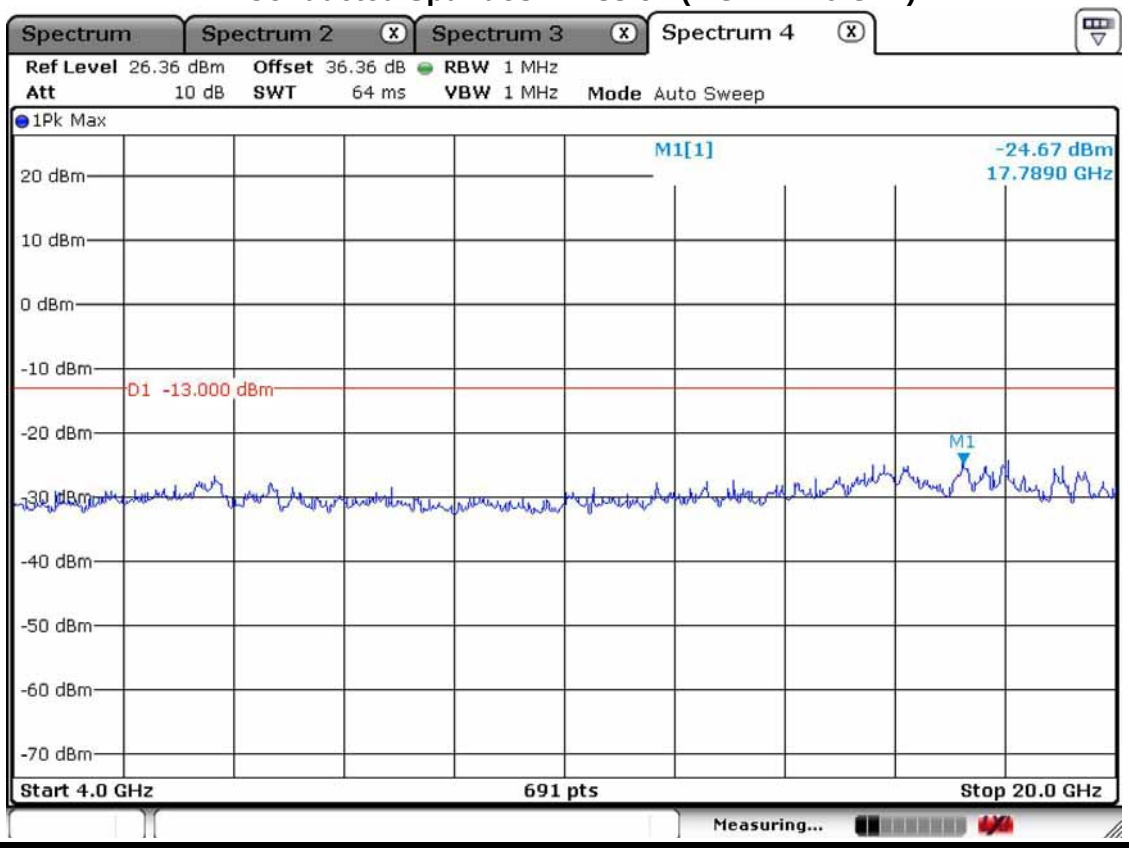
WCDMA II Middle Channel (9400)

A. Conducted Spuriuos Emission (30 MHz ~ 4 GHz)



B. Conducted Spuriuos Emission (4 GHz ~ 20 GHz)



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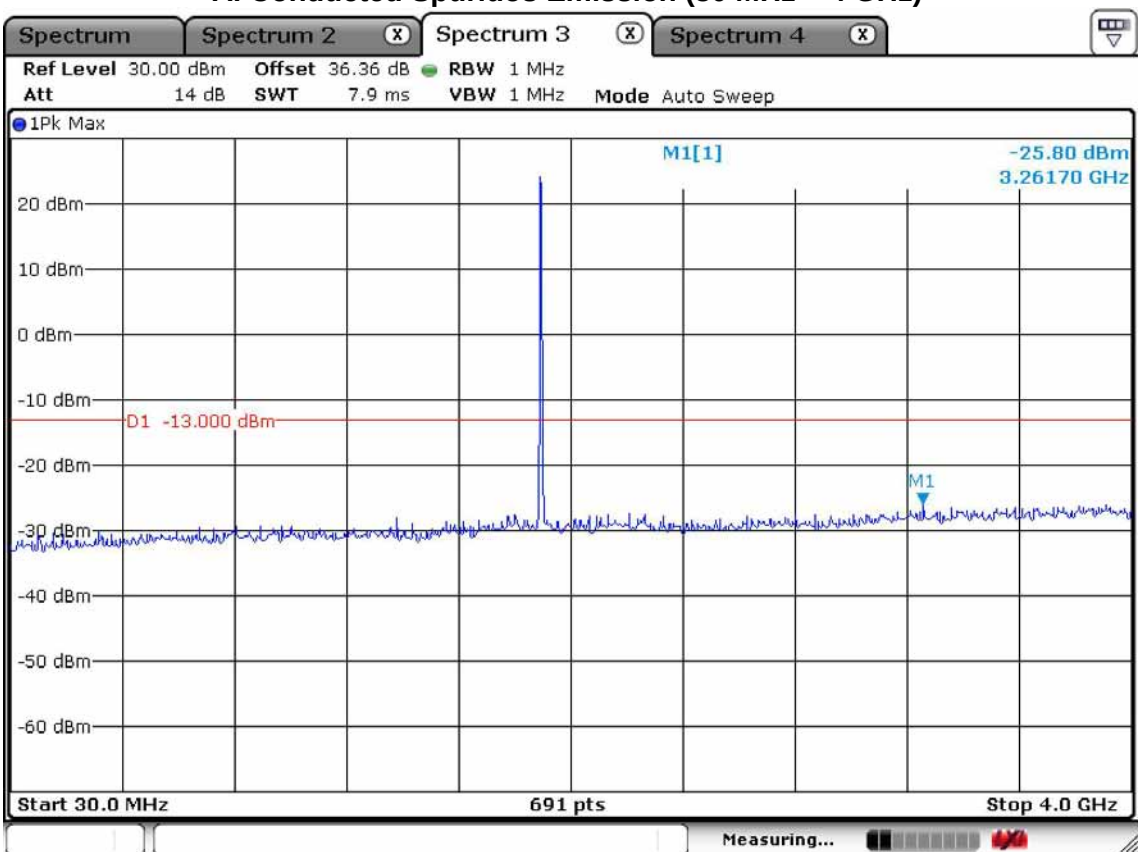
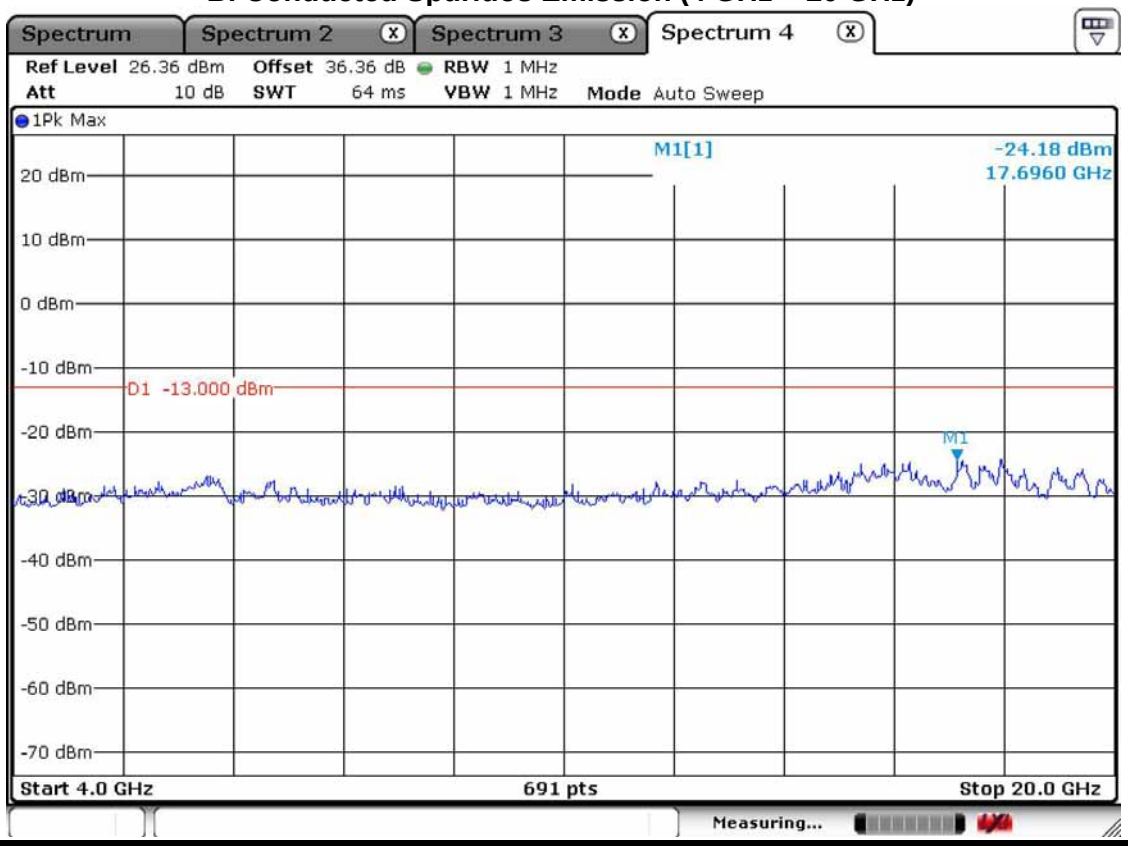
WCDMA II High Channel (9538)

A. Conducted Spuriuos Emission (30 MHz ~ 4 GHz)



B. Conducted Spuriuos Emission (4 GHz ~ 20 GHz)



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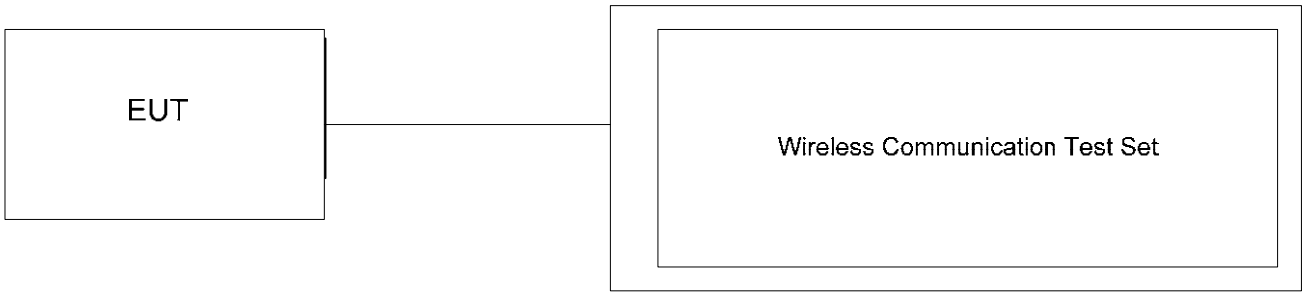
6. Conducted Output Power

6.1 Test setup



6.2 Test Procedure

Conducted output power is tested in accordance with KDB971168 D01

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported.

6.3 Test results

Ambient temperature: 23 ℃

Relative humidity: 45 % R.H.

GSM Conducted Maximum Output Powers

Band	Channel	Voice	GPRS Data		EDGE Data	
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)
GSM 850	128	33.56	32.82	32.92	33.04	32.83
	190	33.81	33.02	33.13	33.26	33.03
	251	33.62	33.15	32.95	33.15	32.86
GSM 1900	512	30.28	29.53	29.34	29.82	29.67
	661	30.39	29.27	29.71	29.76	29.64
	810	30.29	29.49	29.31	29.79	29.67

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WCDMA V Conducted Output Powers

3GPP Release Version	Mode	3GPP 34.121	Cellular Band [dBm]			MPR
		Subtest	UL 4132 (826.4)	UL 4183 (836.8)	UL 4233 (846.6)	
			DL 4357	DL 4408	DL 4458	
99	WCDMA	12.2 kbps RMC	20.25	20.18	20.51	-
99	WCDMA	12.2 kbps AMR	20.32	20.66	20.60	-
5	HSDPA	Subtest 1	20.10	19.73	19.95	0
5	HSDPA	Subtest 2	19.32	18.93	18.74	0
5	HSDPA	Subtest 3	17.70	17.96	17.78	0
5	HSDPA	Subtest 4	17.72	17.98	17.71	0

WCDMA II Conducted Output Powers

3GPP Release Version	Mode	3GPP 34.121	Cellular Band [dBm]			MPR
		Subtest	UL 9262 (1852.4)	UL 9400 (1880.0)	UL 9538 (1907.6)	
			DL 9662	DL 9800	DL 9938	
99	WCDMA	12.2 kbps RMC	20.24	20.01	20.66	-
99	WCDMA	12.2 kbps AMR	20.51	20.14	20.68	-
5	HSDPA	Subtest 1	19.98	19.53	19.99	0
5	HSDPA	Subtest 2	19.84	19.55	19.99	0
5	HSDPA	Subtest 3	17.92	17.60	18.15	0
5	HSDPA	Subtest 4	17.79	17.64	18.22	0

※ Note
Detecting mode is average.

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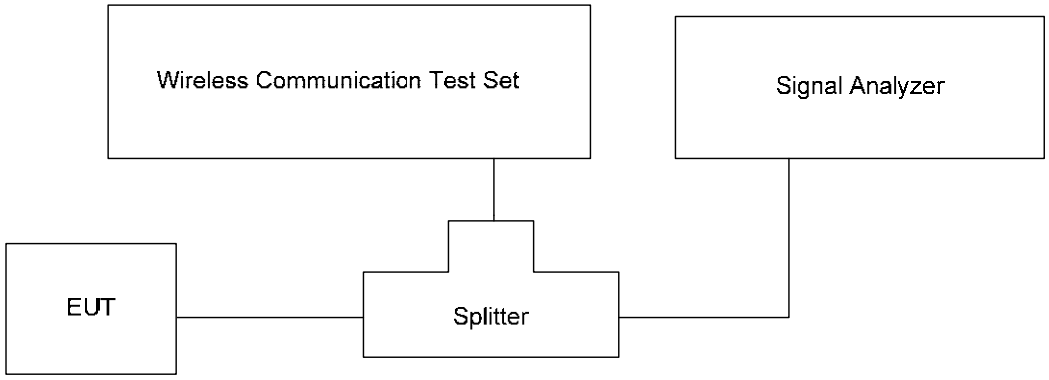
7. Peak-To-Average-Ratio

7.1 Test setup



7.2. Test procedure

Peak to Average Power Ratio is tested in accordance with KDB971168 D01

-Section 5.7.1 CCDF Procedure

a) Set resolution / measurement bandwidth ≥ signal's occupied bandwidth;
b) Set the number of courts to a value that stabilizes the measured CCDF curve;
c) Set the measurement interval as follows;
1) for continous transmissions, set to 1ms,
2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst Timing sequence, or use the internal burst trigger with a trgger with a trgger level that allows The burst to stabilize and set the measurement interval to a time that is less than or equal to The burst duration.
d) Record the maximum PAPR level associated with a probability of 0.1 %.

- Section 5.7.2 Alternate Procedure

Use one of the procedures presented in 5.1 to measure the total peak power and record as P_{PK} Use one of the applicable procedures presented 5.2 to measure the total average power and record as P_{Avg} Determine the P.A.R from $P.A.R_{(dB)} = P_{PK(dBm)} – P_{Avg(dBm)}$($P_{Avg}$ = Average Power + Duty cycle Factor)

5.1.1 Peak power measurements with a spectrum/signal analyzer or EMI receiver

The following procedure can be used to determine the total peak output power.

a) Set the RBW ≥ OBW
b) Set the VBW ≥ 3 x RBW
c) Set the Span ≥ 2 x RBW
d) Sweep time = auto couple
e) Detector = peak
f) Ensure that the number of measurement points ≥ span/RBW.
g) Trace mode = max hold
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the peak amplitude level.

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5.2.2 Procedures for use with a spectrum/signal analyzer when EUT cannot be configured to transmit continuously and sweep triggering/signal gating cannot be properly implemented

If the EUT cannot be configured to transmit continuously (burst duty cycle < 98 %), then one of the following procedures can be used. The selection of the applicable procedure will depend on the characteristics of the measured burst duty cycle.
Measured the burst duty cycle with a spectrum/signal analyzer or EMC receiver can be used in zero-span mode if the response time and spacing between bins on the sweep are sufficient to permit accurate measurement of the burst on/off time of the transmitted signal.

5.2.2.2. Constant burst duty cycle

If the measured burst duty cycle is constant (i.e., duty cycle variantions are less than ±2 percent), then:

a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 x RBW.
d) Number of points in sweep ≥ 2 x span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = RMS)power averaging).
g) Set sweep trigger to “free run”.
h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
i) Compute power by intergrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) an intervals equal to the RBW extending across the entire OBW of the spectrum.
j) Add 10 log (1/x). where x is the duty cycle, to the measured power in order to compute the average over both the on and off times of the transmission).
For example, add 10 log (1/0.25) = 6 dB if the duty cycle is a constant 25 %.

7.3. Limits

Less than 13 dB

7.4. Test results : **Comply** (refer to Next page – test plots)

Ambient temperature: 23 ℃
Relative humidity: 45 % R.H.

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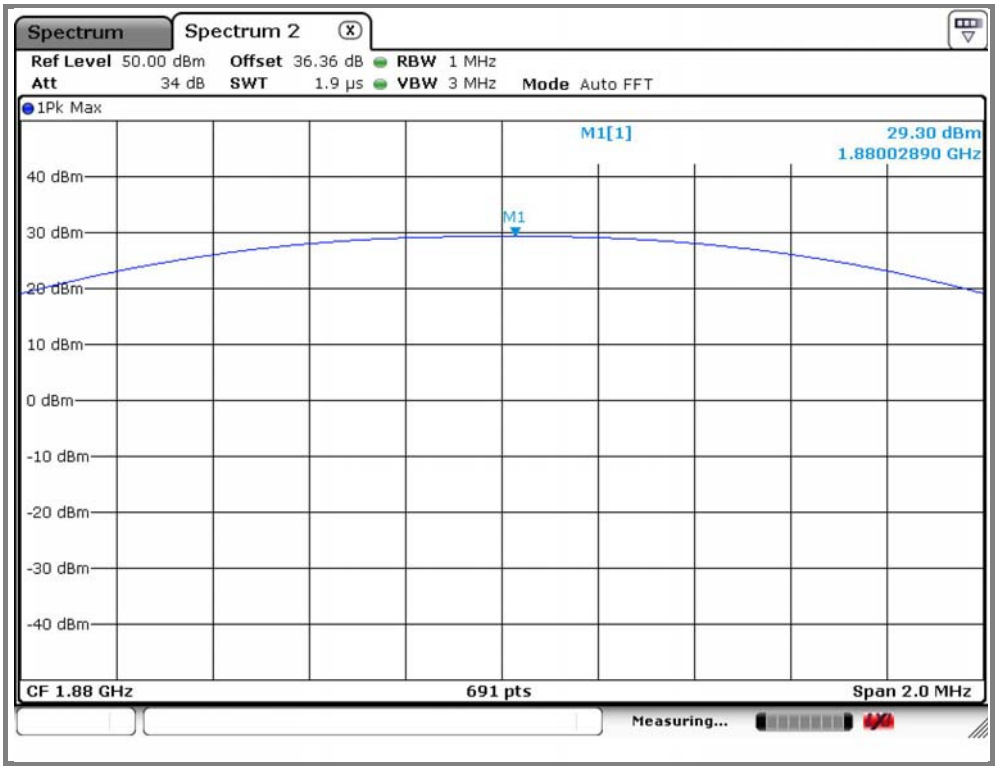
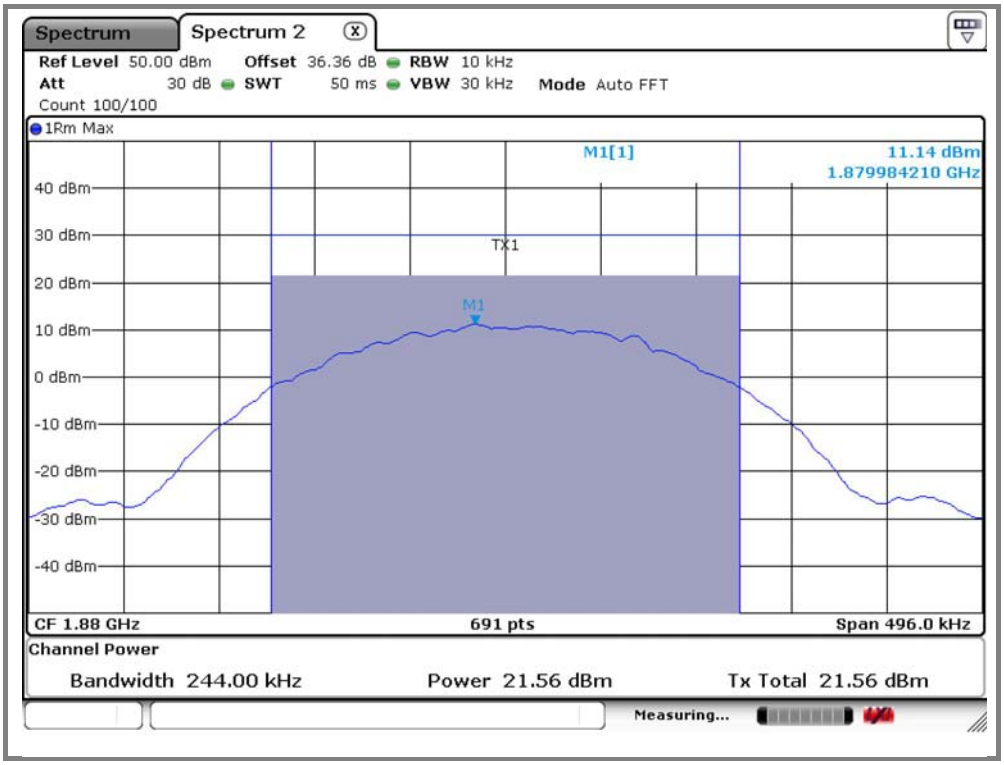
7.5. Test Plots

GSM 1900 MODE (661) Peak-to-Average Ratio P_{PK}



GSM 1900 MODE (661) Peak-to-Average Ratio P_{Avg}



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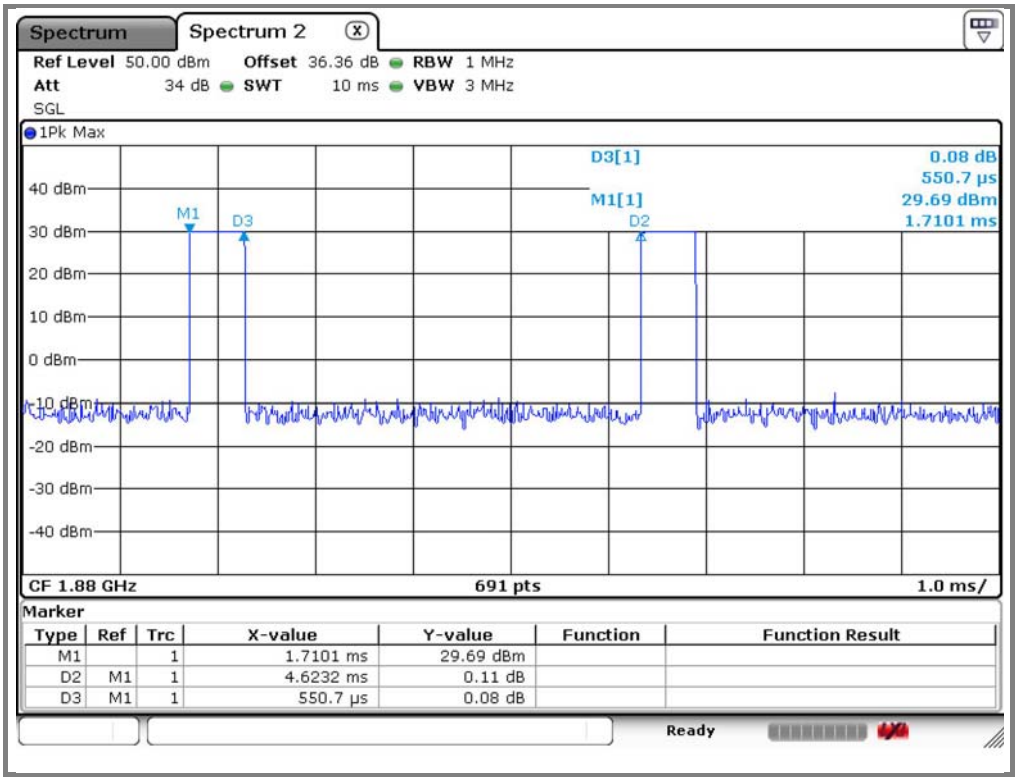
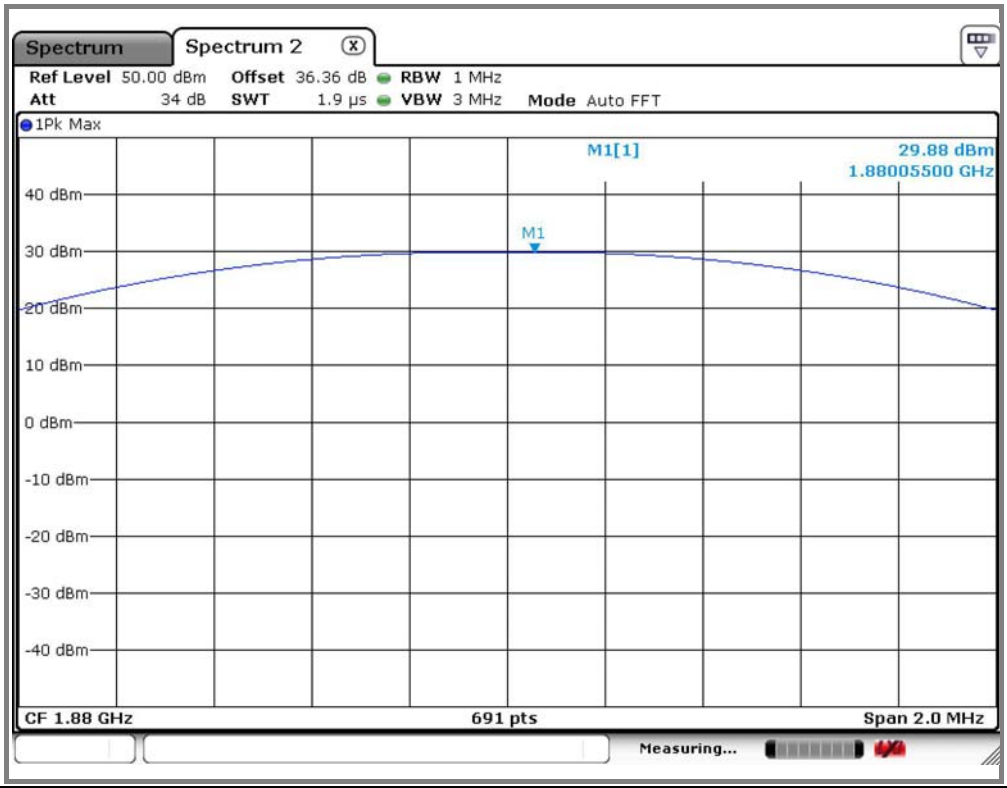
GSM 1900 MODE (661) Peak-to-Average Ratio P_{Avg}



GSM 1900 EDGE MODE (661) Peak-to-Average Ratio P_{PK}



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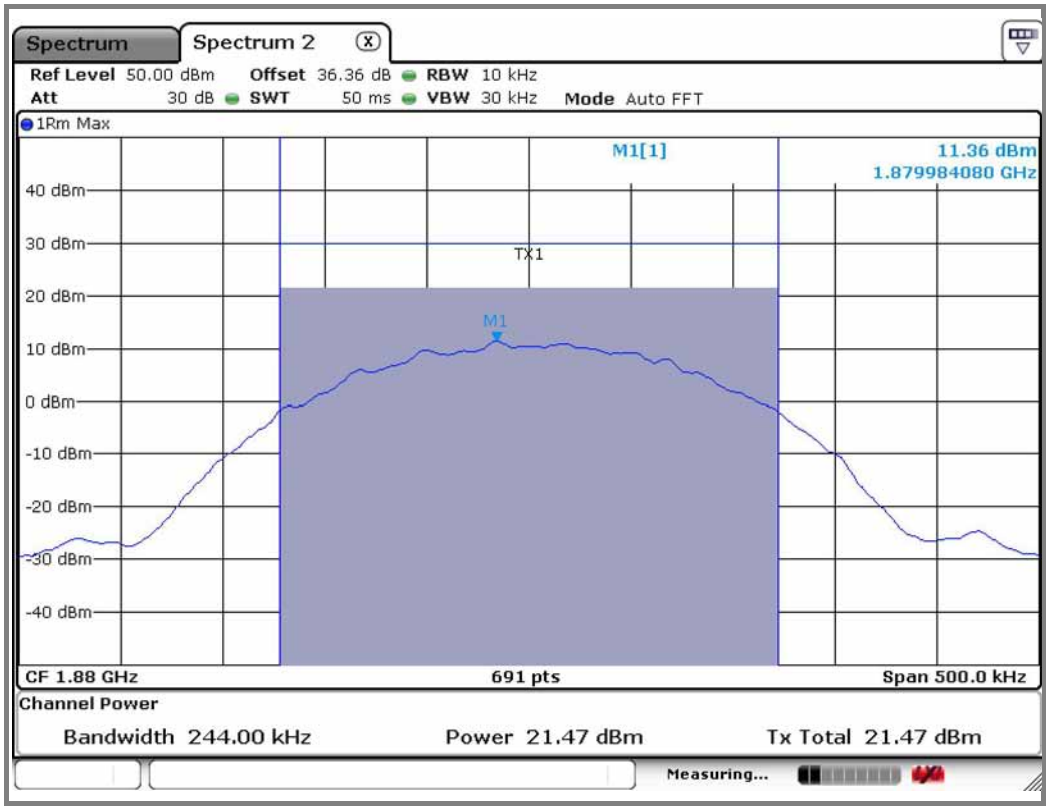
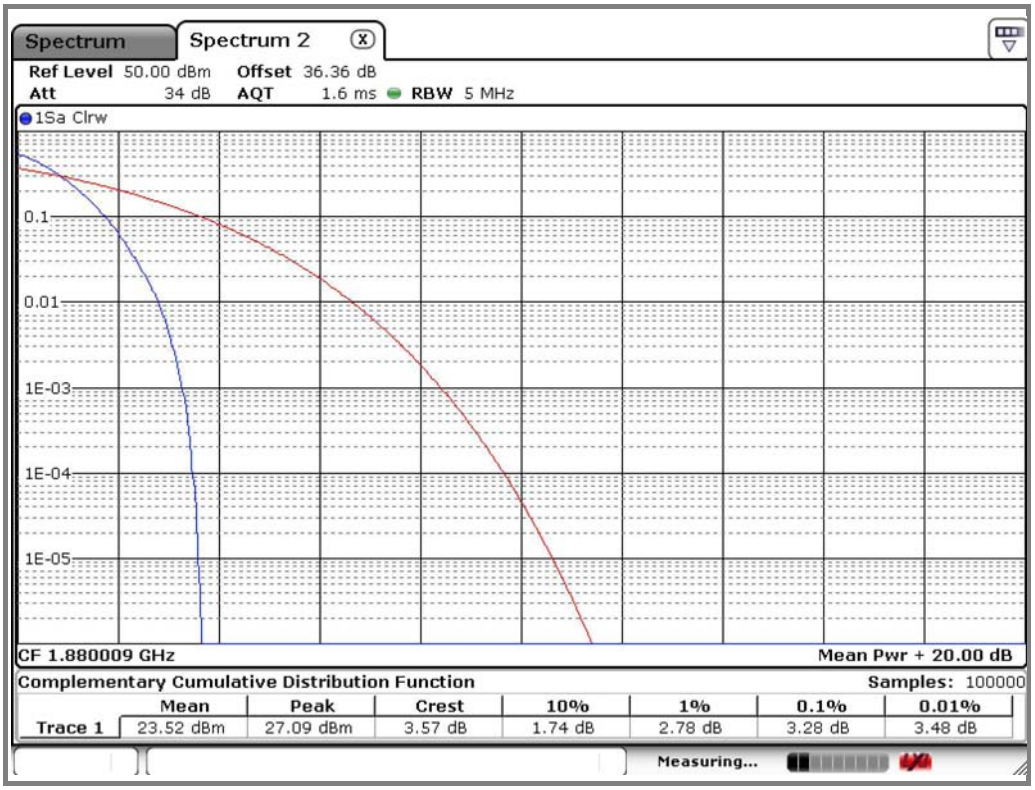
GSM 1900 EDGE (661) Peak-to-Average Ratio P_{Avg}



WCDMA II MODE (9400) Peak-to-Average Ratio



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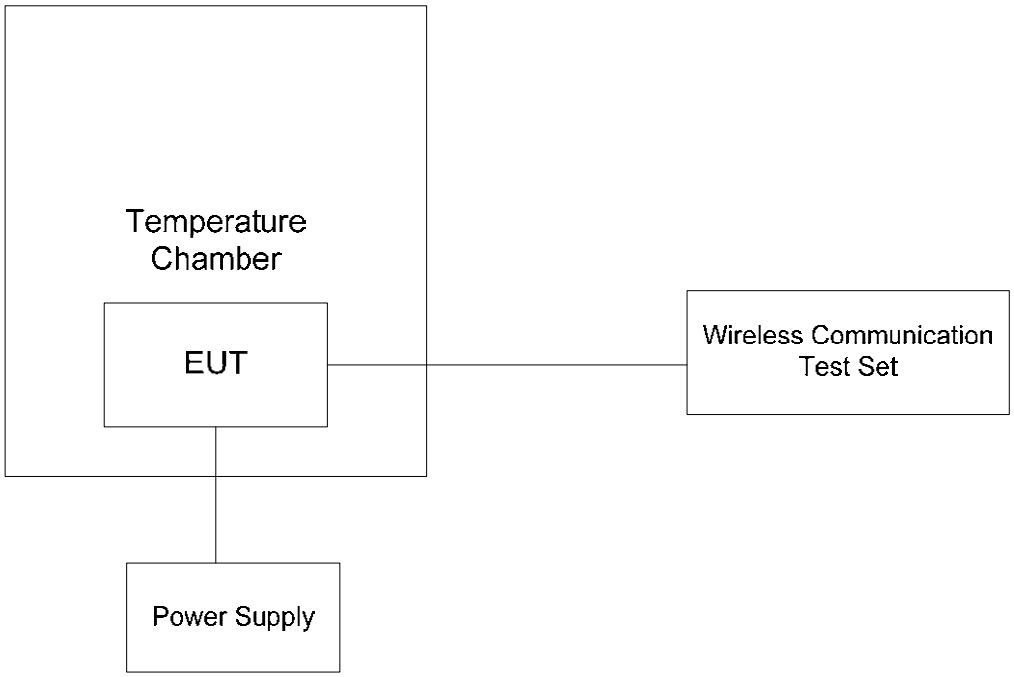
8. Frequency Stability / Variation of Ambient Temperature

8.1. Test setup



8.2. Test procedure

Frequency stability is tested in accordance with ANSI/TIA-603-C-2009 section 2.2.2.

The frequency stability of the transmitter is measured by:

a) Temperature: The temperature is varied from - 30℃ to + 50℃ using an environmental chamber.
b) Primary Supply Voltage: The primary supply voltage is varied from battery end point to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification – the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block(GSM1900/WCDMA1900). The frequency stability of the transmitter shall be maintained within ± 0.000 25 %(±2.5 ppm) of the center frequency(GSM850/WCDMA850)

Time Period and Procedure:
The carrier frequency of the transmitter is measured at room temperature (20℃ to provide a reference).

1. The equipment is turned on in a “stanby” condition for one minute before applying power to the tranmistter.
   Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
2. Frequency measurements are made at 10℃ intervals ranging from -30℃ to +50℃. A period of at least one half hour is provided to allow stabilization of the equipment at each temperature level.

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8.3. Limits

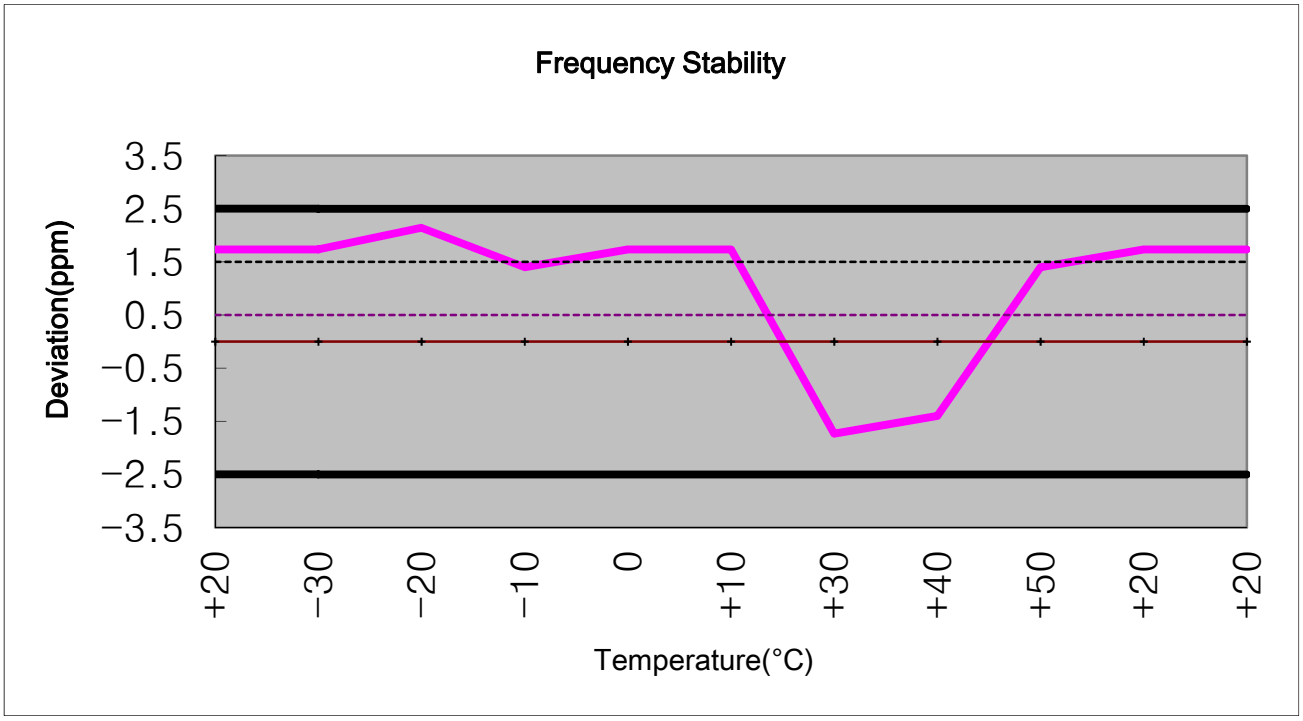
Less than 2.5 ppm.

8.4. Test results

A. GSM850

- **Operating Frequency : 836 600 000 Hz**
- **Channel : 190**
- **Reference Voltage : 12.0 Vdc**

Voltage (%)	Power (VDC)	Temp (℃)	Frequency (㎐)	Frequency Error (㎐)	Deviation (%)	Deviation (ppm)
100	12.0	+20(Ref)	836 598 550	1 450	0.000 173	1.733
100		-30	836 598 550	1 450	0.000 173	1.733
100		-20	836 598 210	1 790	0.000 214	2.140
100		-10	836 598 830	1 170	0.000 140	1.399
100		0	836 598 550	1 450	0.000 173	1.733
100		+10	836 598 550	1 450	0.000 173	1.733
100		+30	836 601 450	1 450	0.000 173	1.733
100		+40	836 601 170	1 170	0.000 140	1.399
100		+50	836 598 830	1 170	0.000 140	1.399
115	13.8	+20	836 598 550	1 450	0.000 173	1.733
85	10.2	+20	836 598 550	1 450	0.000 173	1.733



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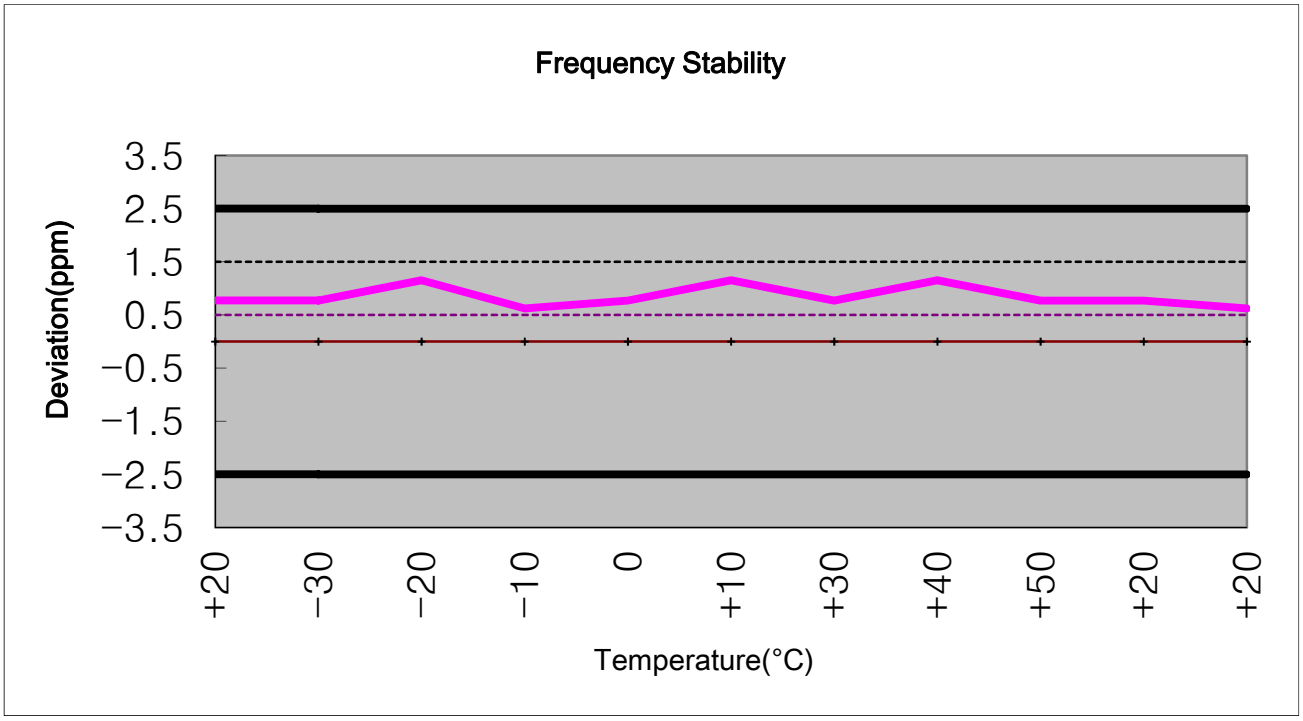
B. GSM1900

- **Operating Frequency : 1 880 000 000 Hz**
- **Channel : 661**
- **Reference Voltage : 12.0 Vdc**

Voltage (%)	Power (VDC)	Temp (℃)	Frequency (㎐)	Frequency Error (㎐)	Deviation (%)	ppm
100	12.0	+20(Ref)	1 879 998 550	1 450	0.000 077	0.771
100		-30	1 879 998 550	1 450	0.000 077	0.771
100		-20	1 879 997 830	2 170	0.000 115	1.154
100		-10	1 879 998 830	1 170	0.000 062	0.622
100		0	1 879 998 550	1 450	0.000 077	0.771
100		+10	1 879 997 830	2 170	0.000 115	1.154
100		+20	1 879 998 550	1 450	0.000 077	0.771
100		+30	1 879 997 830	2 170	0.000 115	1.154
100		+40	1 879 998 550	1 450	0.000 077	0.771
100		+50	1 879 998 550	1 450	0.000 077	0.771
115	13.8	+20	1 879 998 830	1 170	0.000 062	0.622
85	10.2		1 879 998 550	1 450	0.000 077	0.771



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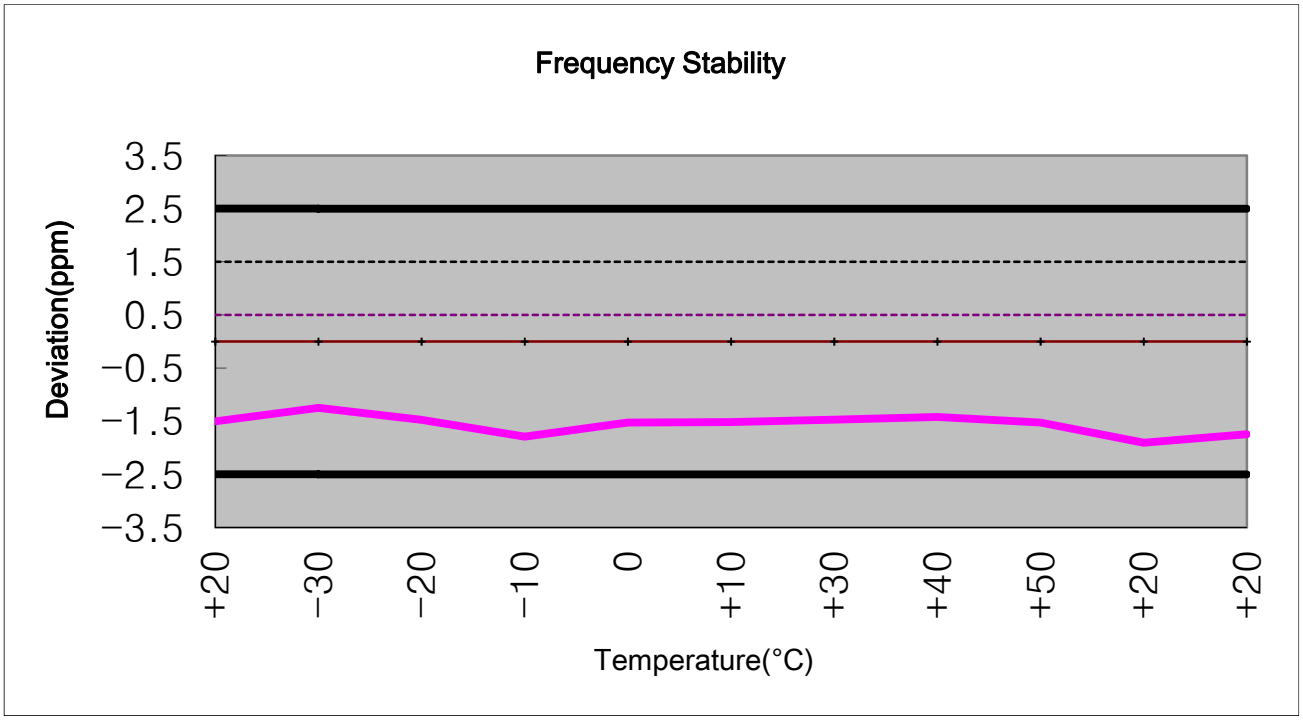
C. WCDMA V

- **Operating Frequency : 836 600 000 Hz**
- **Channel : 4183**
- **Reference Voltage : 12.0 Vdc**

Voltage (%)	Power (VDC)	Temp (℃)	Frequency (㎐)	Frequency Error (㎐)	Deviation (%)	ppm
100	12.0	+20(Ref)	836 601 257	1 257	0.000 150	1.503
100		-30	836 601 045	1 045	0.000 125	1.249
100		-20	836 601 233	1 233	0.000 147	1.474
100		-10	836 601 498	1 498	0.000 179	1.791
100		0	836 601 275	1 275	0.000 152	1.524
100		+10	836 601 269	1 269	0.000 152	1.517
100		+20	836 601 230	1 230	0.000 147	1.470
100		+30	836 601 188	1 188	0.000 142	1.420
100		+40	836 601 275	1 275	0.000 152	1.524
100		+50	836 601 594	1 594	0.000 191	1.905
115	13.8	+20	836 601 460	1 460	0.000 175	1.745
85	10.2		836 601 257	1 257	0.000 150	1.503



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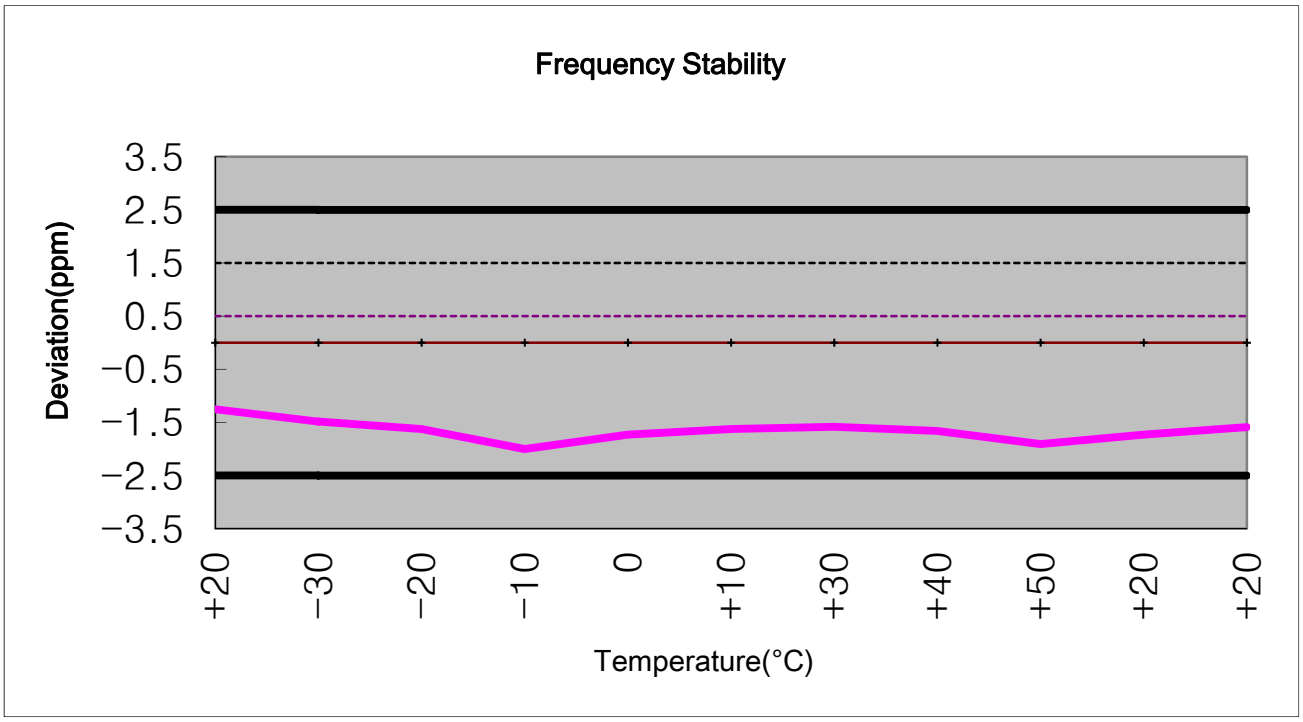
D. WCDMA II

- **Operating Frequency : 1 880 000 000 Hz**
- **Channel : 9400**
- **Reference Voltage : 12.0 Vdc**

Voltage (%)	Power (VDC)	Temp (℃)	Frequency (㎐)	Frequency Error (㎐)	Deviation (%)	ppm
100	12.0	+20(Ref)	1880 002 354	2 354	0.000 125	1.252
100		-30	1880 002 789	2 789	0.000 148	1.484
100		-20	1880 003 054	3 054	0.000 162	1.624
100		-10	1880 003 763	3 763	0.000 200	2.002
100		0	1880 003 249	3 249	0.000 173	1.728
100		+10	1880 003 055	3 055	0.000 162	1.625
100		+20	1880 002 975	2 975	0.000 158	1.582
100		+30	1880 003 120	3 120	0.000 166	1.660
100		+40	1880 003 584	3 584	0.000 191	1.906
100		+50	1880 003 251	3 251	0.000 173	1.729
115	13.8	+20	1880 002 988	2 988	0.000 159	1.589
85	10.2		1880 002 354	2 354	0.000 125	1.252



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9. Effective Radiated Power

9.1. ERP Sample Calculation

Mode	Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
	Channel	Freq.(MHz)						W	dBm
GSM850	128	824.20	-15.19	33.71	-10.54	1.61	V	0.143	21.56

ERP=Substitude Level(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive tunable is 0.8 meter above test site ground level.
2) During the test, the turn table is ratated until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUt with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3)
6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (ERP).

9.2 Limits

Less than 7 Watts max. ERP

9.3 Test Results

A. GSM850 (External Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
128	824.20	-3.20	25.00	6.55	1.10	H	1.109	30.45
190	836.60	-3.33	24.50	6.55	1.10	H	0.989	29.95
251	848.80	-2.01	26.00	6.55	1.10	H	1.396	31.45
EDGE 190	836.60	-2.68	25.30	6.55	1.10	H	1.189	30.75

B. GSM850 (Internal Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
128	824.20	-36.26	-9.00	6.55	1.10	H	0.000	-3.55
190	836.60	-36.12	-8.50	6.55	1.10	H	0.000	-3.05
251	848.80	-35.13	-7.50	6.55	1.10	H	0.001	-2.05
EDGE 190	836.60	-35.64	-7.70	6.55	1.10	H	0.001	-2.25

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C. WCDMA V (External Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
4132	826.40	-21.23	7.00	6.55	1.10	H	0.018	12.45
4183	836.60	-22.02	5.50	6.55	1.10	H	0.012	10.95
4233	846.60	-23.86	4.00	6.55	1.10	H	0.017	12.25

D. WCDMA V (Internal Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
4132	826.40	-40.03	-12.00	6.55	1.10	H	0.001	-6.55
4183	836.60	-42.48	-15.00	6.55	1.10	H	0.001	-9.55
4233	846.60	-43.41	-16.00	6.55	1.10	H	0.001	-10.55

※ Note
Detecting mode is peak.

Effective Radiated Power Output Measurements by Substitution Method According to ANSI/TIA/EIA-603-C-2009

The EUT was placed on a non-cunductive Styrofoam resin table 3-meters from the receive antenna. Turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For WCDMA, GSM signals, a peak detector is used, with RBW ≥ OBW, VBW ≥ 3 x RBW. A half-wave dipoles was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.
This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits all set to “1” and in GSM mode using a Power Control Level of “0” in the PCS Band and “5” in the Cellular Band. This unit was tested with its standard battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUt is x plane in GSM850 and WCDMA V mode. Also, worst case of detecting Antenna is in horizontal polarization in GSM850 and WCDMA V mode.

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10. Equivalent Isotropic Radiated Power

10.1 Limits

Less than 2 Watts max. EIRP.

10.2 Test Results

A. GSM1900 (External Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
512	1 850.20	-13.38	22.00	8.59	1.50	H	0.811	29.09
661	1 880.00	-11.80	25.00	8.59	1.50	H	1.618	32.09
810	1 909.80	-11.22	25.00	8.59	1.50	H	1.618	32.09
EDGE 661	1 880.00	-12.30	24.00	8.59	1.50	H	1.285	31.09

B. GSM1900 (Internal Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
512	1 850.20	-44.77	-10.00	8.59	1.50	H	0.001	-2.91
661	1 880.00	-42.88	-7.00	8.59	1.50	H	0.001	0.09
810	1 909.80	-42.77	-7.00	8.59	1.50	H	0.001	0.09
EDGE 661	1 880.00	-43.34	-8.00	8.59	1.50	H	0.001	-0.91

※ Note

Detecting mode is peak.

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C. WCDMA II (External Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
9262	1 852.40	-19.80	16.00	8.59	1.50	H	0.204	23.09
9400	1 880.00	-19.12	17.00	8.59	1.50	H	0.256	24.09
9538	1 907.60	-19.14	16.00	8.59	1.50	H	0.204	23.09

D. WCDMA II (Internal Antenna)

Ch/ Freq.		Measured Level(dBm)	Substitude Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	ERP	
Channel	Freq.(MHz)						W	dBm
9262	1 852.40	-48.28	-15.00	8.59	1.50	H	0.000	-7.91
9400	1 880.00	-45.90	-10.00	8.59	1.50	H	0.001	-2.91
9538	1 907.60	-50.70	-17.00	8.59	1.50	H	0.000	-9.91

※ Note
Detecting mode is peak.

Effective Radiated Power Output Measurements by Substitution Method According to ANSI/TIA/EIA-603-C-2009

The EUT was placed on a non-cunductive Styrofoam resin table 3-meters from the receive antenna. Turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For WCDMA, GSM signals, a peak detector is used, with RBW ≥ OBW, VBW ≥ 3 x RBW. A half-wave dipoles was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The EIRP is recorded.
This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits all set to “1” and in GSM mode using a Power Control Level of “0” in the PCS Band and “5” in the Cellular Band. This unit was tested with its standard battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUt is x plane in GSM1900 and WCDMA II mode. Also, worst case of detecting Antenna is in horizontal polarization in GSM1900 and WCDMA II mode.

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11. Radiated Spurious Emissions

11.1 Limits

Less than 43 + 10log10(P[Watts]) for all out-of band emissions

11.2 Test Results (MQ_HS-CAN, Model name: TUVM01IU-G / TUVM01IU-R)

A. GSM850 (External Antenna)

- **Measured Output Power : 31.45 dBm (1.396 W)**
- **Modulation Signal : GSM850**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 44.45 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
128	1648.14	-23.41	9.18	-29.00	1.40	H	-21.22	52.67
	3296.77	-46.24	9.72	-47.10	2.60	H	-39.98	71.43
	4120.49	-52.20	10.42	-53.00	2.80	H	-45.38	76.83
190	1673.17	-30.94	9.18	-35.50	1.40	H	-27.72	59.17
	3346.38	-34.15	10.08	-34.20	2.60	H	-26.72	58.17
	-	-	-	-	-	-	-	-
251	3395.32	-40.87	10.08	-40.87	2.60	H	-33.39	64.84
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

B. GSM850 (Internal Antenna)

- **Measured Output Power : -2.05 dBm (0.00062 W)**
- **Modulation Signal : GSM850**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 10.92 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
128	1648.73	-38.90	9.18	-44.00	1.40	H	-36.22	34.17
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
190	1673.05	-38.20	9.18	-43.00	1.40	H	-35.22	33.17
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
251	1697.97	-39.34	9.18	-43.94	1.40	H	-36.16	34.11
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Method According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without the written approval of MOVON CORPORATION.

A. GSM1900 (External Antenna)

- **Measured Output Power : 32.09 dBm (1.618 W)**
- **Modulation Signal : GSM1900**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 45.09 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
512	3701.85	-20.34	10.08	-26.00	2.70	H	-18.62	50.71
	5553.60	-24.77	11.06	-23.50	3.20	H	-15.64	47.73
	-	-	-	-	-	-	-	-
661	3762.89	-20.48	10.08	-23.50	2.70	H	-16.12	48.21
	5644.44	-25.63	11.06	-24.60	3.20	H	-16.74	48.83
	-	-	-	-	-	-	-	-
810	3812.17	-19.84	10.42	-22.40	2.70	H	-14.68	46.77
	5718.74	-29.79	11.06	-29.50	3.20	H	-21.64	53.73
	-	-	-	-	-	-	-	-

B. GSM1900 (Internal Antenna)

- **Measured Output Power : 0.09 dBm (0.001 W)**
- **Modulation Signal : GSM1900**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 13.00 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
512	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
661	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
810	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Method According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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A. WCDMA V (External Antenna)

- **Measured Output Power : 12.45 dBm (0.018 W)**
- **Modulation Signal : WCDMA V**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 25.55 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	1650.31	-17.61	9.18	-26.50	1.40	H	-18.72	31.17
	2475.11	-16.99	9.32	-23.90	2.00	H	-16.58	29.03
	4127.55	-26.37	10.42	-29.40	2.80	H	-21.78	34.23
4 183	1675.54	-18.60	9.18	-27.40	1.40	H	-19.62	32.07
	2513.37	-17.38	9.32	-26.00	2.00	H	-18.68	31.13
	-	-	-	-	-	-	-	-
4 233	1695.66	-17.13	9.18	-25.50	1.40	H	-17.72	30.17
	2543.88	-18.07	9.32	-26.50	2	H	-19.18	31.63
	4236.79	-25.07	10.42	-28.00	2.8	H	-20.38	32.83

B. WCDMA V (Internal Antenna)

- **Measured Output Power : -6.55 dBm (0.00022 W)**
- **Modulation Signal : WCDMA V**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 6.42 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	1650.80	-47.32	9.18	-44.00	1.40	H	-36.22	29.67
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 183	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 233	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Method
According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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A. WCDMA II (External Antenna)

- **Measured Output Power : 24.09 dBm (0.256 W)**
- **Modulation Signal : WCDMA II**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 37.08 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	3701.85	-20.34	10.08	-26.00	2.70	H	-18.62	50.71
	5553.60	-24.77	11.06	-23.50	3.20	H	-15.64	47.73
	-	-	-	-	-	-	-	-
4 183	3762.89	-20.48	10.08	-23.50	2.70	H	-16.12	48.21
	5644.44	-25.63	11.06	-24.60	3.20	H	-16.74	48.83
	-	-	-	-	-	-	-	-
4 233	3812.17	-19.84	10.42	-22.40	2.70	H	-14.68	46.77
	5718.74	-29.79	11.06	-29.50	3.2	H	-21.64	53.73
	-	-	-	-	-	-	-	-

B. WCDMA II (Internal Antenna)

- **Measured Output Power : -2.91 dBm (0.00051 W)**
- **Modulation Signal : WCDMA II**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 10.07 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 183	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 233	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Methode
According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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11.3 Test Results (PA_LS-CAN, Model name: TUVP01IU-G / TUVP01IU-R)

A. GSM850 (External Antenna)

- **Measured Output Power : 31.45 dBm (1.396 W)**
- **Modulation Signal : GSM850**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 44.45 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
128	1648.05	-24.84	9.18	-30.00	1.40	H	-22.22	53.67
	3296.52	-45.98	9.72	-47.00	2.60	H	-39.88	71.33
	-	-	-	-	-	-	-	-
190	1672.59	-31.12	9.18	-36.00	1.40	H	-28.22	59.67
	3346.05	-36.09	10.08	-35.50	2.60	H	-28.02	59.47
	-	-	-	-	-	-	-	-
251	3393.98	-42.22	10.08	-41.90	2.60	H	-34.42	65.87
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

B. GSM850 (Internal Antenna)

- **Measured Output Power : -2.05 dBm (0.00062 W)**
- **Modulation Signal : GSM850**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 10.92 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
128	1649.66	-39.34	9.18	-45.10	1.40	H	-37.32	35.27
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
190	1673.48	-38.66	9.18	-43.20	1.40	H	-35.42	33.37
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
251	1698.20	-39.10	9.18	-43.94	1.40	H	-36.16	34.11
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Method
   According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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A. GSM1900 (External Antenna)

- **Measured Output Power : 32.09 dBm (1.618 W)**
- **Modulation Signal : GSM1900**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 45.09 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
512	3702.50	-20.28	10.08	-26.50	2.70	H	-19.12	51.21
	5553.50	-25.33	11.06	-24.00	3.20	H	-16.14	48.23
	-	-	-	-	-	-	-	-
661	3762.55	-20.51	10.08	-23.50	2.70	H	-16.12	48.21
	5644.18	-25.90	11.06	-24.80	3.20	H	-16.94	49.03
	-	-	-	-	-	-	-	-
810	3812.59	-20.20	10.42	-23.00	2.70	H	-15.28	47.37
	5719.06	-31.11	11.06	-30.50	3.20	H	-22.64	54.73
	-	-	-	-	-	-	-	-

B. GSM1900 (Internal Antenna)

- **Measured Output Power : 0.09 dBm (0.001 W)**
- **Modulation Signal : GSM1900**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 13.00 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
512	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
661	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
810	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Method According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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A. WCDMA V (External Antenna)

- **Measured Output Power : 12.45 dBm (0.018 W)**
- **Modulation Signal : WCDMA V**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 25.55 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	1651.15	-18.09	9.18	-26.50	1.40	H	-18.72	31.17
	2475.33	-16.99	9.32	-23.90	2.00	H	-16.58	29.03
	4125.48	-25.02	10.42	-27.60	2.80	H	-19.98	32.43
4 183	1675.40	-18.10	9.18	-27.00	1.40	H	-19.22	31.67
	2516.92	-19.52	9.32	-28.30	2.00	H	-20.98	33.43
	-	-	-	-	-	-	-	-
4 233	1692.12	-17.56	9.18	-25.60	1.40	H	-17.82	30.27
	2542.56	-18.33	9.32	-26.80	2.00	H	-19.48	31.93
	-	-	-	-	-	-	-	-

B. WCDMA V (Internal Antenna)

- **Measured Output Power : -6.55 dBm (0.00022 W)**
- **Modulation Signal : WCDMA V**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 6.42 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	1650.48	-45.09	9.18	-42.50	1.40	H	-34.72	28.17
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 183	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 233	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Method According to ANSI/TIA/EIA-603-C-2009
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A. WCDMA II (External Antenna)

- **Measured Output Power : 24.09 dBm (0.256 W)**
- **Modulation Signal : WCDMA II**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 37.08 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	3703.00	-20.55	10.08	-26.00	2.70	H	-18.62	42.71
	5554.52	-24.87	11.06	-23.50	3.20	H	-15.64	39.73
	-	-	-	-	-	-	-	-
4 183	3758.35	-20.20	10.08	-23.50	2.70	H	-16.12	40.21
	5640.21	-26.50	11.06	-24.90	3.20	H	-17.04	41.13
	-	-	-	-	-	-	-	-
4 233	3815.99	-20.21	10.42	-22.80	2.70	H	-15.08	39.17
	5718.49	-29.34	11.06	-29.00	3.20	H	-21.14	45.23
	-	-	-	-	-	-	-	-

B. WCDMA II (Internal Antenna)

- **Measured Output Power : -2.91 dBm (0.00051 W)**
- **Modulation Signal : WCDMA II**
- **Distance : 3 meters**
- **Limit 43 + 10 log(W) : 10.07 dBc**

Channel	Freq. (MHz)	Measured Level (dBm)	Ant, Gain (dBi)	Substitute Level (dBm)	C.L.	Pol	ERP (dBm)	dBc
4 132	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 183	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
4 233	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

※ Note

1. Radiated Spuriuos Emission Measurements at 3 meters by Substitution Methode
According to ANSI/TIA/EIA-603-C-2009
2. We are performed all frequency to 10th harmonics from 30 MHz Measurements above show only up to 3 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e: margin > 20 dB from the applicable limit) and considered that's already beyond the back ground noise floor
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