TEST REPORT

No. I18Z61508-WMD04

for

Samsung Electronics Co., Ltd.

Model name: SM-G6200

FCC ID: ZCASMG6200

With

Hardware Version: REV0.5

Software Version: OPM1.171019.026.G6200ZCU0ARJ4

Issued Date: 2018-10-31

TESTING
NVLAP LAB CODE 600118-0

Note:

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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government..

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I18Z61508-WMD04	Rev.0	1st edition	2018-10-17
I18Z61508-WMD04	Rev.1	2nd edition Update client information and band edge compliance	2018-10-31

CONTENTS

1. Test Laboratory

1.1. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35℃

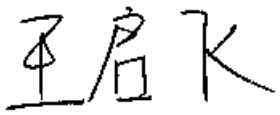
Relative Humidity: 20-80%

1.3. Project data

Testing Start Date: 2018-9-5

Testing End Date: 2018-9-14

1.4. Signature



Wang Qifei

(Prepared this test report)

Zhang Yufeng

(Reviewed this test report)

Zhao Huilin

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Samsung Electronics Co., Ltd.
Address /Post:	(Maetan dong)129,Samsung-ro Yeongtong-gu,Suwon-si, Gyeonggi-do 16677,Korea
Postal Code:	/
Contact Person:	N/A
Contact Email:	N/A
Telephone:	N/A
Fax:	N/A

2.2. Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
Address /Post:	(Maetan dong)129,Samsung-ro Yeongtong-gu,Suwon-si, Gyeonggi-do 16677,Korea
Postal Code:	/
Contact Person:	N/A
Contact Email:	N/A
Telephone:	N/A
Fax:	N/A

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN
Model	SM-G6200
FCC ID	ZCASMG6200
Frequency	CDMA800MHz(BC0);
Antenna	Embedded
Power supply	Battery or Charger (AC Adaptor)
Extreme vol. Limits	3.6VDC to 4.4VDC (nominal: 3.85 VDC)
Extreme temp. Tolerance	-10°C to +55°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT02a	359234090049620	REV0.5	OPM1.171019.026.G 6200ZCU0ARJ4	2018-08-17

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	Battery	/
AE2	Normal Charger	/

AE1

Model	EB-BG610ABE
Manufacturer	Samsung SDI Co., Ltd.
Capacitance	3300mAh
Nominal Voltage	3.85V

AE2

Model	HKC0115021-2D
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN with integrated antenna. It consists of Hand Telephone Set and normal options: lithium battery, charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the Client.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	V10-1-17
FCC Part 22	PUBLIC MOBILE SERVICES	V10-1-17
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;GENERAL RULES AND REGULATIONS	V10-1-17
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v03r01

5. LABORATORY ENVIRONMENT

Shielding chamber did not exceed following limits along the RF testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. =20 %, Max. = 80 %

6. SUMMARY OF TEST RESULTS

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)/24.232(c)	Pass
2	Frequency Stability	2.1055/22.355/24.235	Pass
3	Occupied Bandwidth	2.1049(h)(i)	Pass
4	Emission Bandwidth	22.917(b)/24.238(b)	Pass
5	Band Edge Compliance	22.917(b)/24.238(b)	Pass
6	Conducted Spurious Emission	2.1057/22.917/24.238	Pass
7	Peak to Average Power Ratio	24.232(d)	Pass

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CALIBRATION INTERVAL	CAL DUE DATE
1	Spectrum Analyzer	FSV30	101576	R&S	1 Year	2019-4-7
2	Wireless Communications Test Set	8960(E5515C)	GB46160313	Agilent	1 Year	2019-7-10
3	Climatic chamber	SH-641	92009050	ESPEC	2 Years	2019-12-21

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER (§22.913(a)/§24.232(c))

A.1.1 Summary

During the process of testing, the EUT was controlled via Agilent Wireless Communications Test Set (8960(E5515C)) to ensure max power transmission and proper modulation.
This result is max output power conducted measurements for the EUT.
In all cases, output power is within the specified limits.

A.1.2 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSV30 (average).
These measurements were done at 3 frequencies, 1851.25 MHz, 1880.0 MHz and 1908.75 MHz for PCS CDMA band, 824.7MHz, 836.52MHz and 848.31MHz for CDMA 800 band (bottom, middle and top of operational frequency range) for 1x RTT and 1xEVDO .
The measurement method is from KDB 971168 D01 5.2.1:
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 × RBW.
d) Set number of points in sweep ≥ 2 × span / RBW.
e) Sweep time = auto-couple.
f) Detector = RMS (power averaging).
g) If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
h) If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
i) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

A1.3 Measurement results

CDMA 800

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)		
		1x RTT	1xEVDO	
			Rev0	RevA
1013	824.70	24.42	24.43	24.46
384	836.52	24.53	24.51	24.60
777	848.31	24.44	24.42	24.51

A.2 FREQUENCY STABILITY (§2.1055/§22.355/§24.235)

A.2.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of Agilent 8960(E5515C) Wireless Communications Test Set.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3. With the EUT, powered via nominal voltage, connected to the 8960(E5515C) and in a simulated call on channel 384 for CDMA 800 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the 8960(E5515C) and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10℃ decrements from +50℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

A.2.2 Measurement Limit

A.2.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.4VDC, with a nominal voltage of 3.85VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

For CDMA800, according to section. 22.355, frequency tolerance cab be maintained within 2.5ppm.

A.2.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec.

24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
For CDMA800, according to section. 22.355, frequency tolerance cab be maintained within 2.5ppm.

A.2.3 Measurement results

CDMA 800

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.6	2.13	0.003
3.85	2.22	0.003
4.4	2.54	0.003

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	/	/
-20	/	/
-10	2.26	0.003
0	2.38	0.003
10	2.47	0.003
20	2.77	0.003
30	2.46	0.003
40	2.67	0.003
50	2.72	0.003

A.3 OCCUPIED BANDWIDTH (§2.1049(h)(i))

A.3.1 Occupied Bandwidth Results

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the CDMA frequency band. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

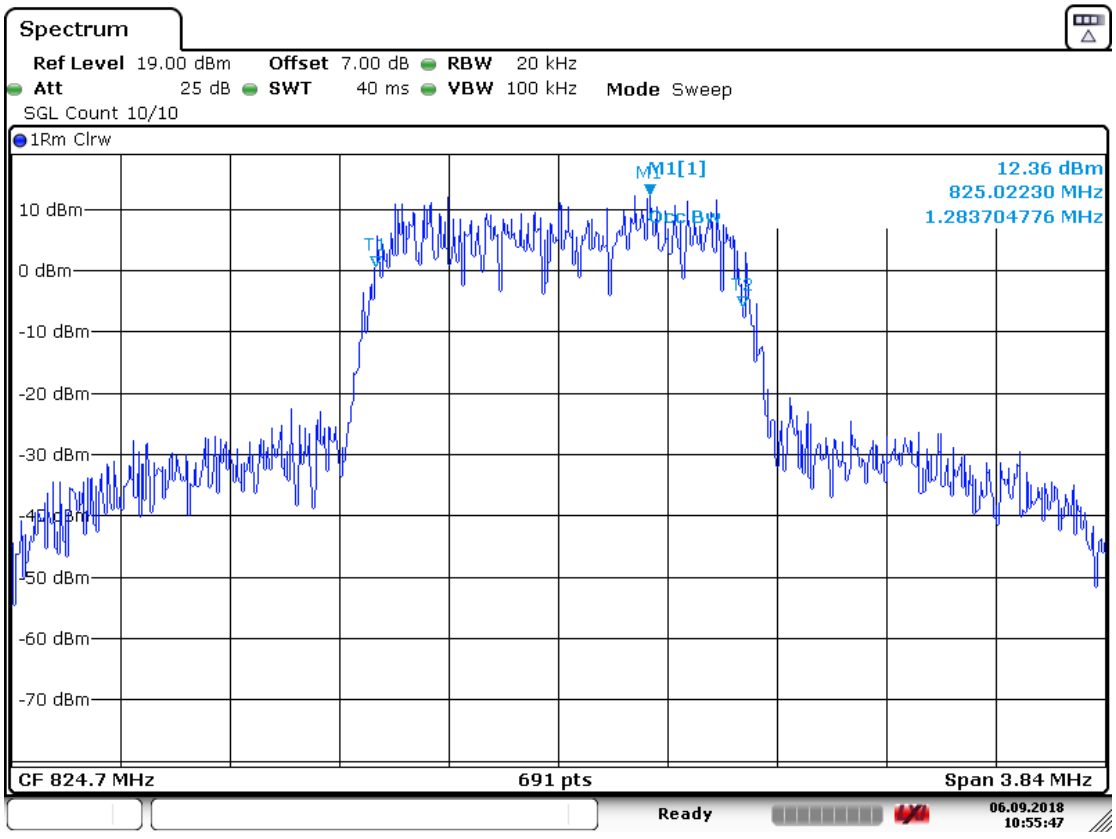
CDMA 800 (99% BW)

Channel	Occupied Bandwidth (99% BW)(MHz)
1013	1.284
384	1.278
777	1.273

ANALYZER SETTINGS: RBW=20 kHz, VBW=100 kHz

CDMA 800

Channel 1013-Occupied Bandwidth (99% BW)



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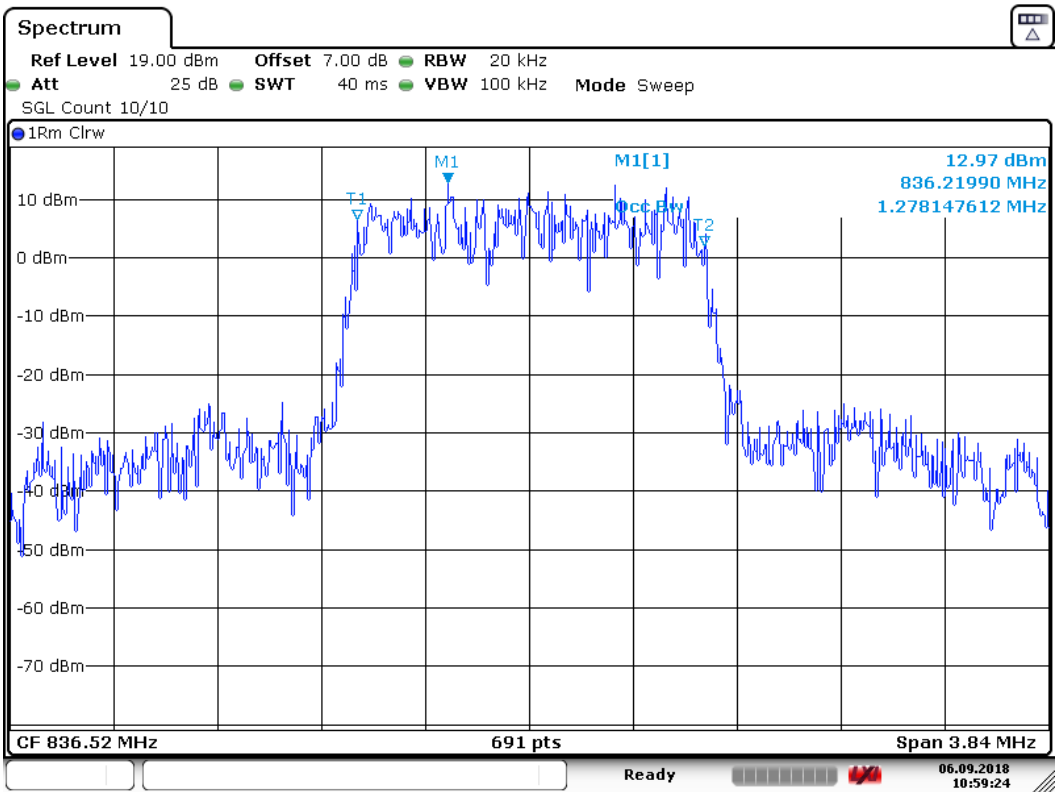
Channel 384-Occupied Bandwidth (99% BW)



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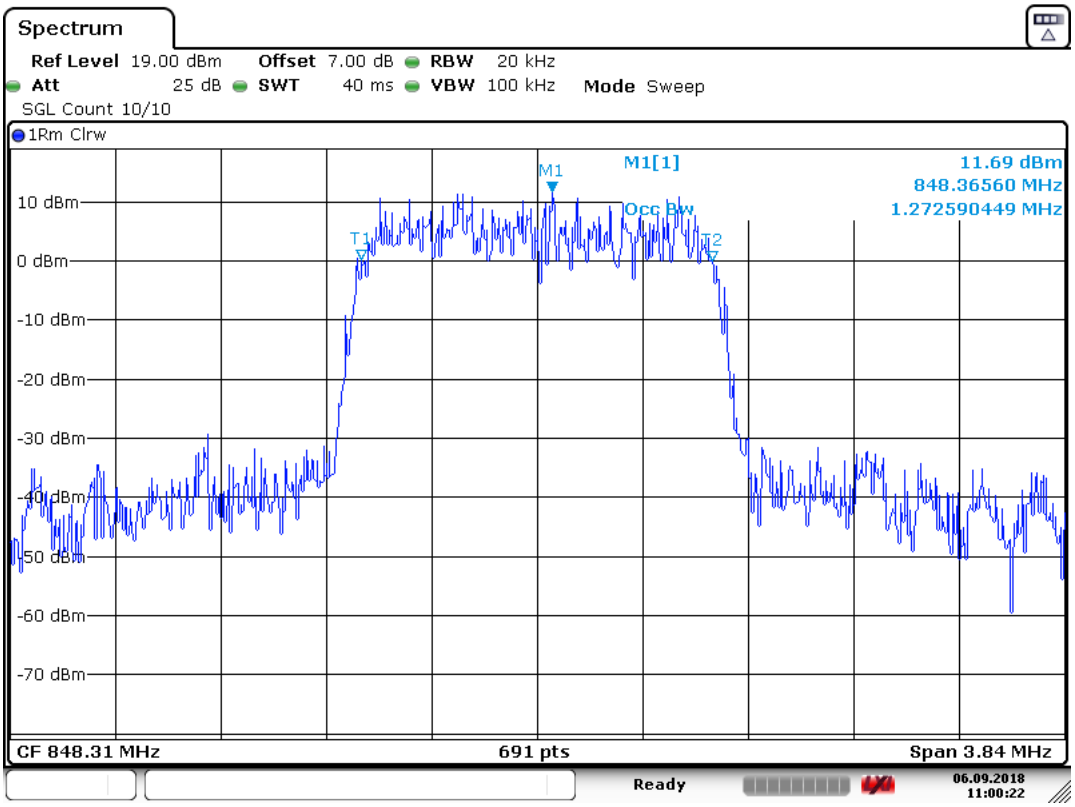
Channel 777-Occupied Bandwidth (99% BW)



Date: 6.SEP.2018 11:00:22

A.4 EMISSION BANDWIDTH (§22.917(b)/§24.238(b))

A.4.1Emission Bandwidth Results

Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the CDMA 800. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

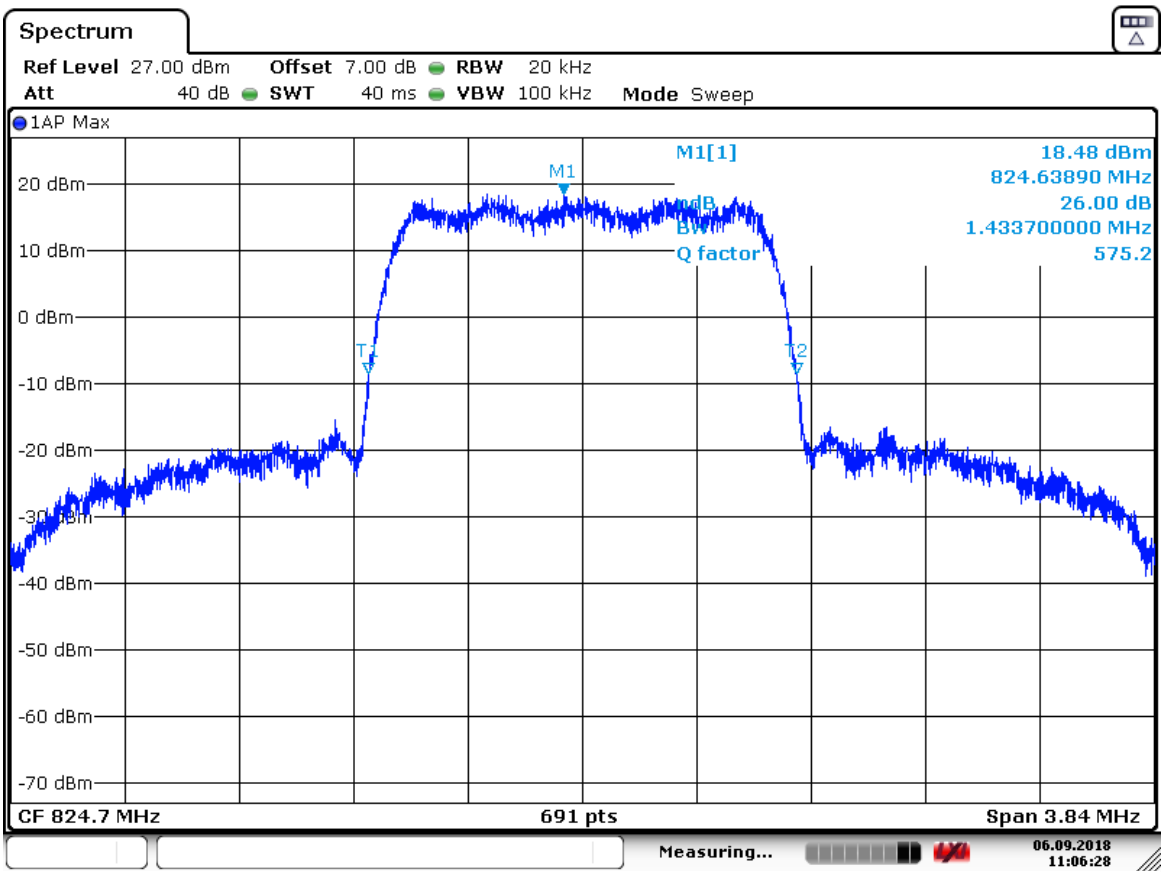
CDMA 800 (-26dBc BW)

Channel	Occupied Bandwidth (–26dBc BW)(MHz)
1013	1.434
384	1.412
777	1.423

ANALYZER SETTINGS: RBW=20 kHz, VBW=100 kHz

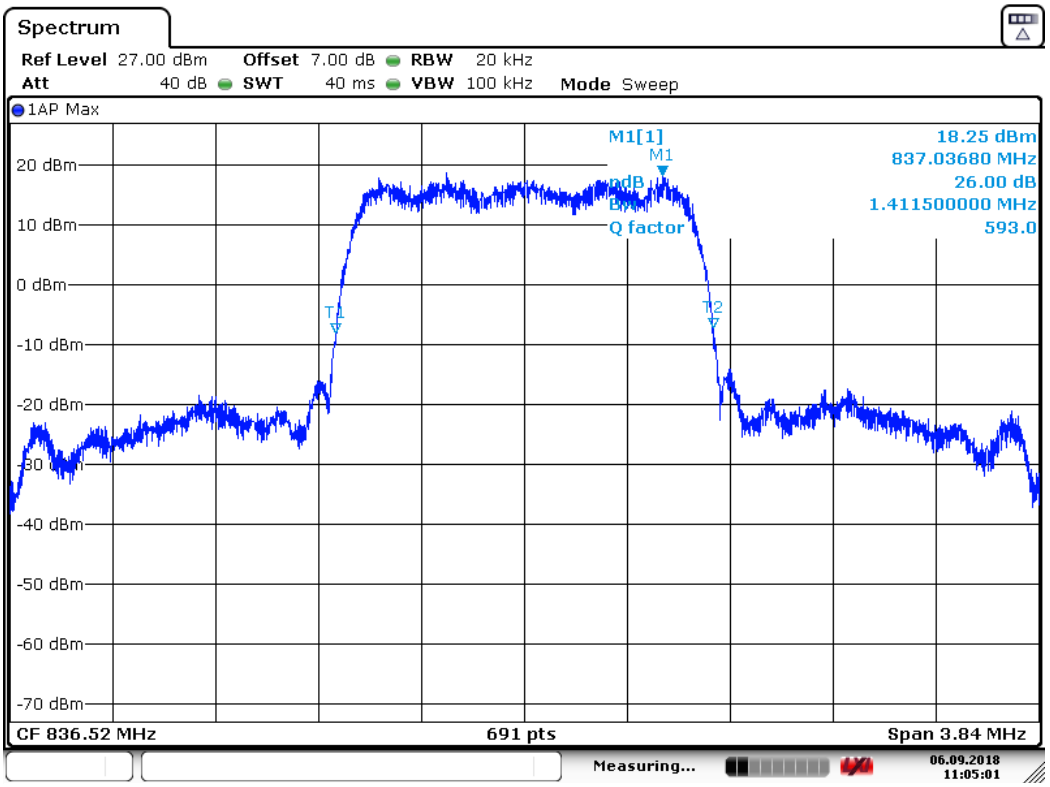
CDMA 800

Channel 1013-Occupied Bandwidth (-26dBc BW)



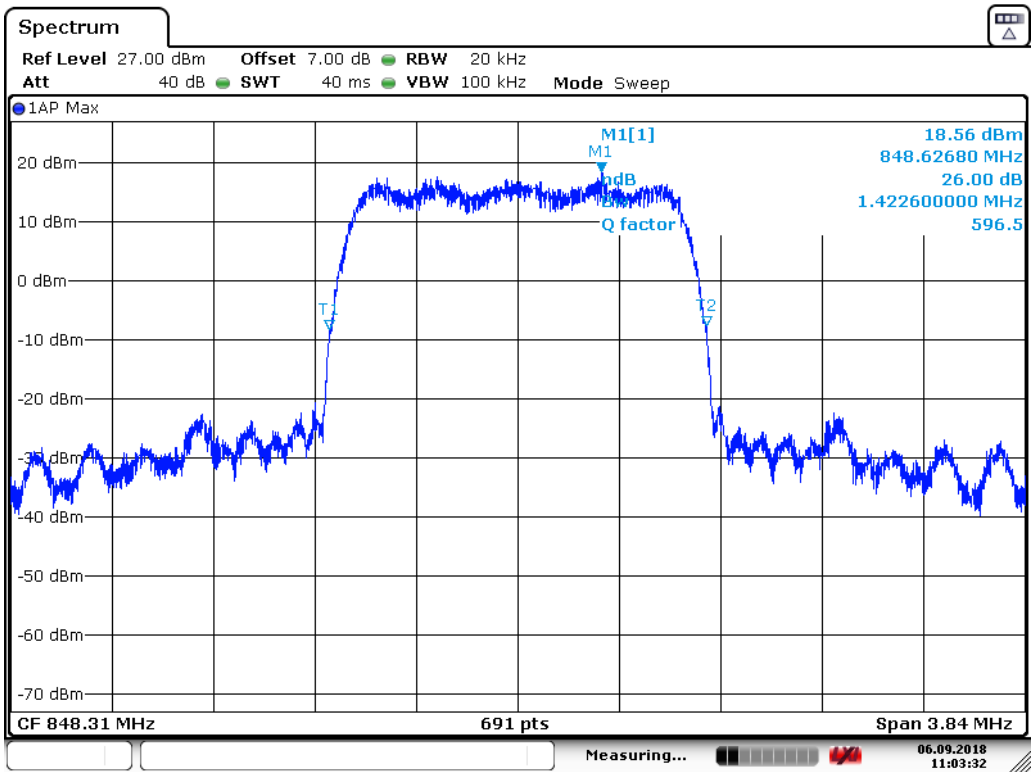
Date: 6.SEP.2018 11:06:29

Channel 384-Occupied Bandwidth (-26dBc BW)



Date: 6.SEP.2018 11:05:01

Channel 777-Occupied Bandwidth (-26dBc BW)

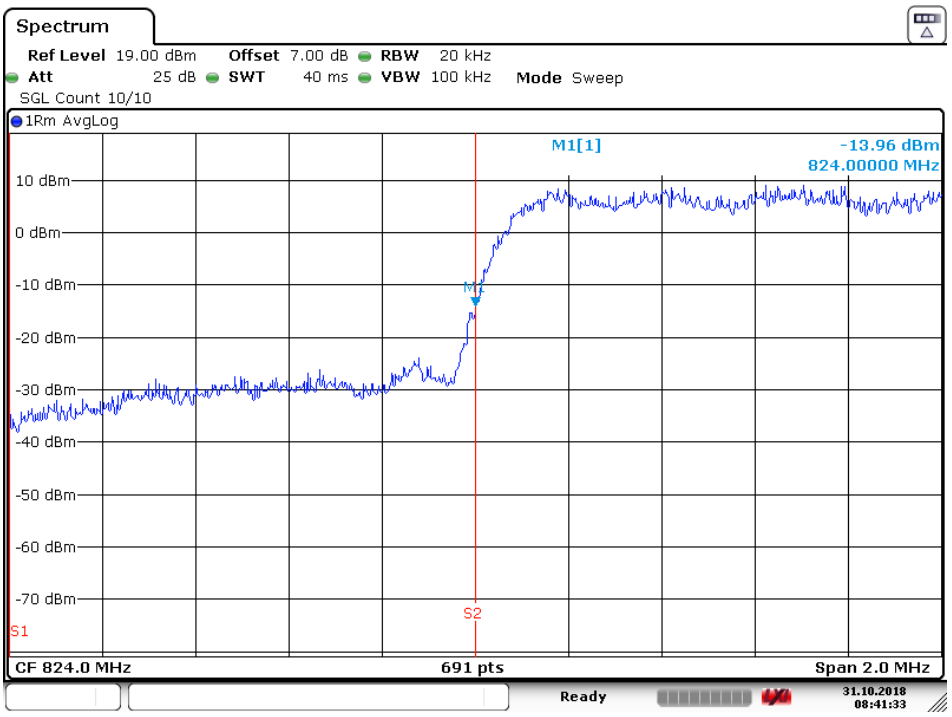


Date: 6.SEP.2018 11:03:32

A.5 BAND EDGE COMPLIANCE (§22.917(b)/§24.238(b))

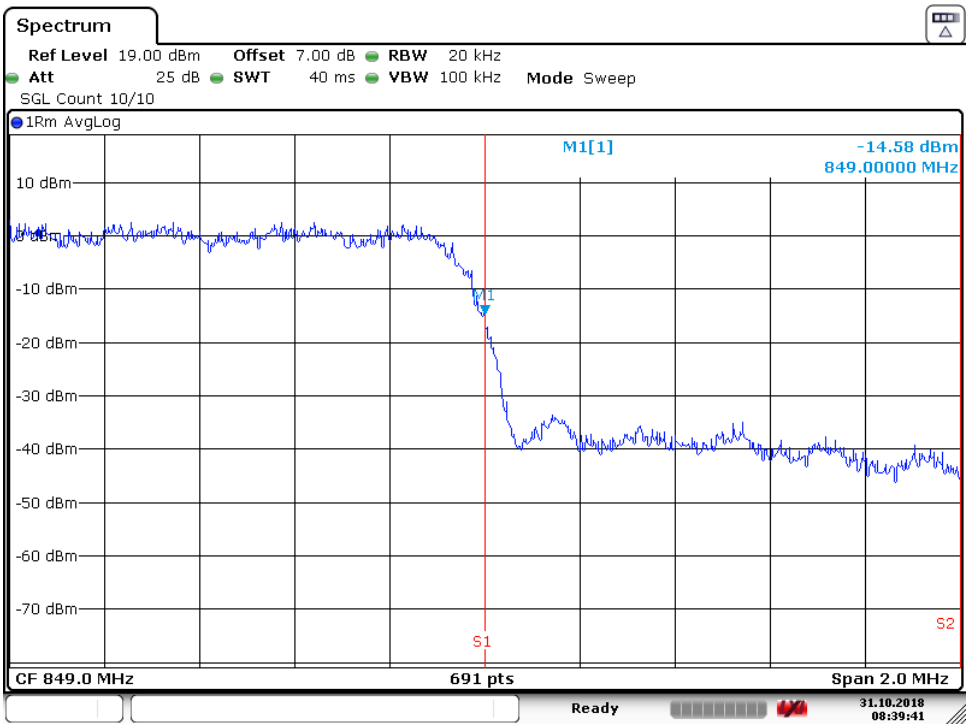
CDMA 800

BAND EDGE BLOCK-Channel 1013



Date: 31.OCT.2018 08:41:33

BAND EDGE BLOCK-Channel 777



Date: 31.OCT.2018 08:39:41

A.6 CONDUCTED SPURIOUS EMISSION (§2.1057/§22.917/§24.238)

A.6.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

CDMA 800 Transmitter

Channel	Frequency (MHz)
1013	824.70
384	836.52
777	848.31

A. 6.2 Measurement Limit

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

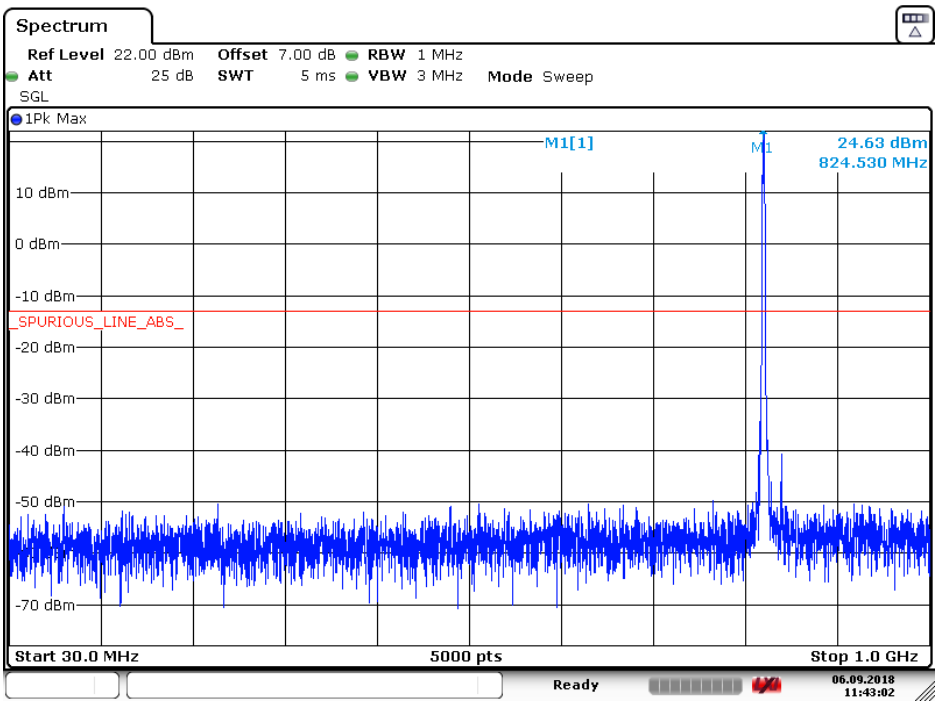
A. 6.3 Measurement result

CDMA 800

A. 6.3.1 Channel 1013: 30MHz –1GHz

Spurious emission limit –13dBm.

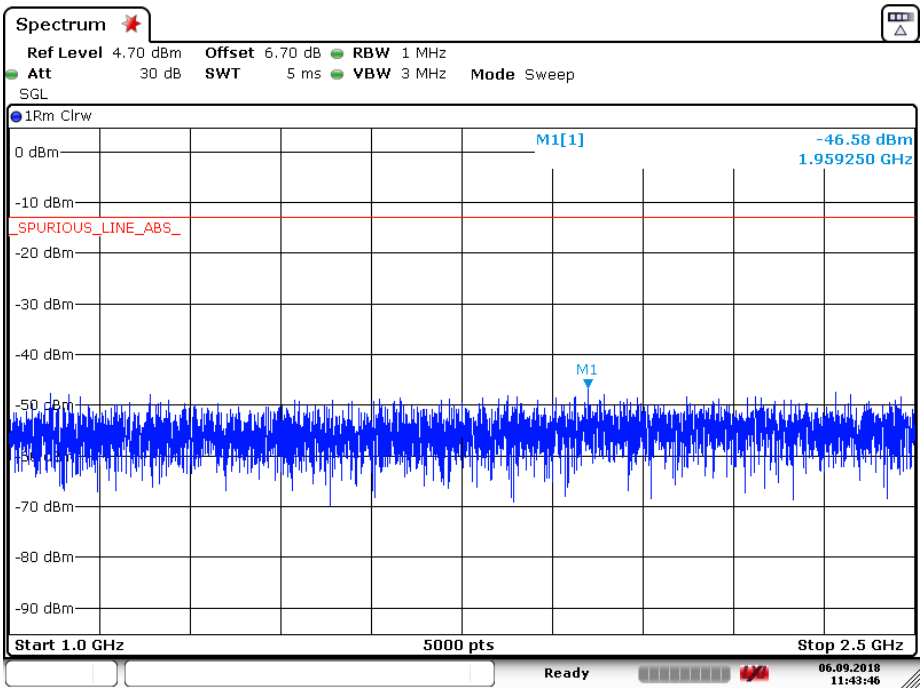
NOTE: peak above the limit line is the carrier frequency.



Date: 6.SEP.2018 11:43:02

A. 6.3.2 Channel 1013: 1GHz – 2.5GHz

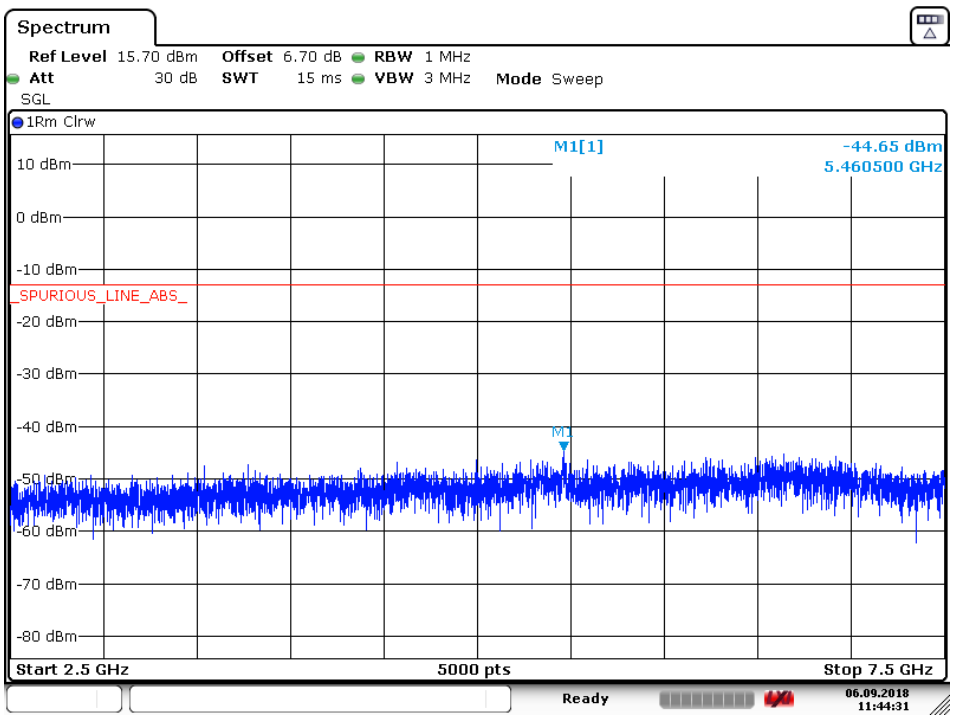
Spurious emission limit –13dBm.



Date: 6.SEP.2018 11:43:47

A. 6.3.3 Channel 1013: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.



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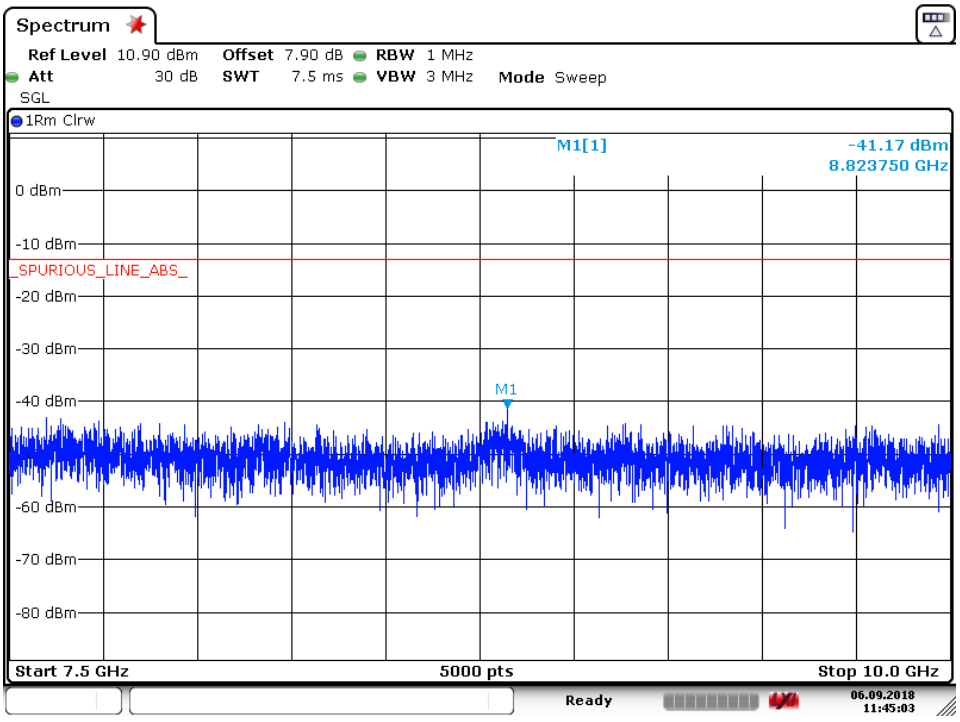
A. 6.3.4 Channel 1013: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

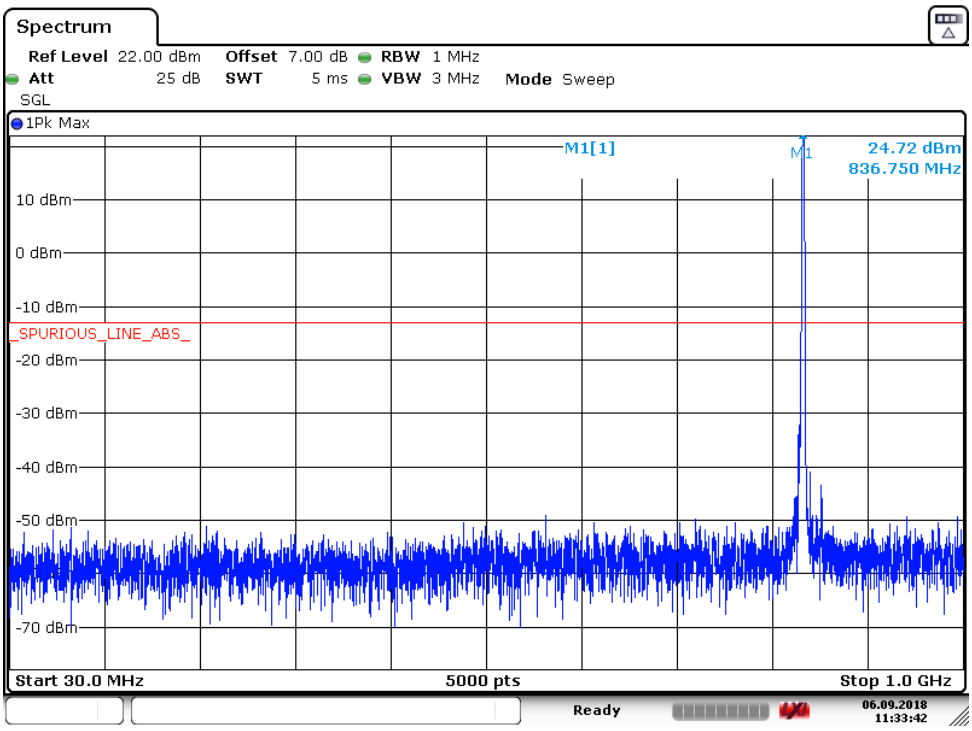


Date: 6.SEP.2018 11:45:04

A. 6.3.5 Channel 384: 30MHz –1GHz

Spurious emission limit –13dBm.

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



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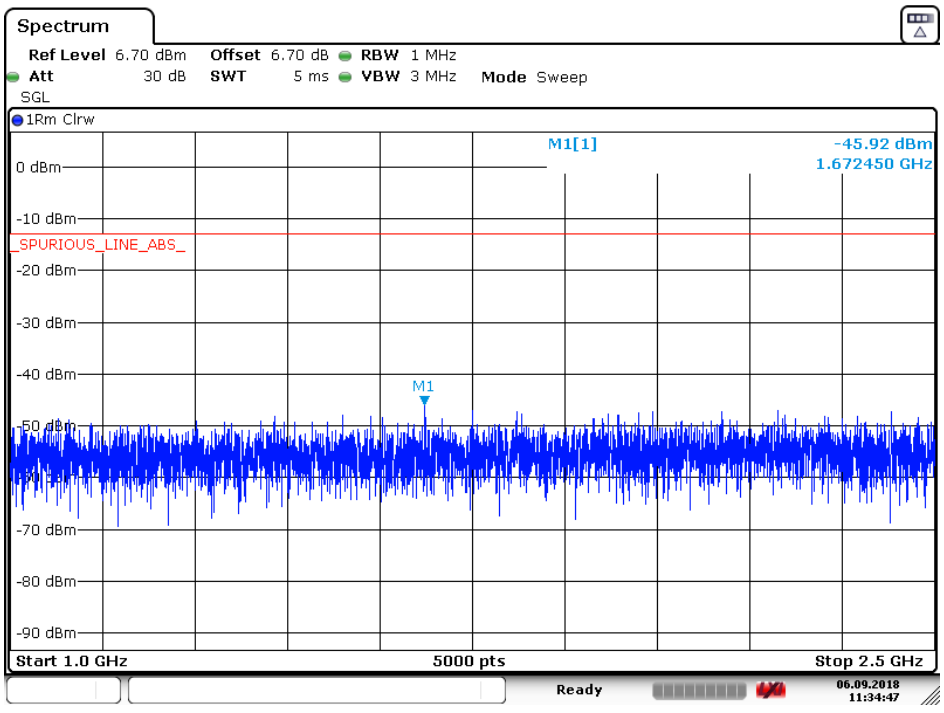
A.6.3.6 Channel 384: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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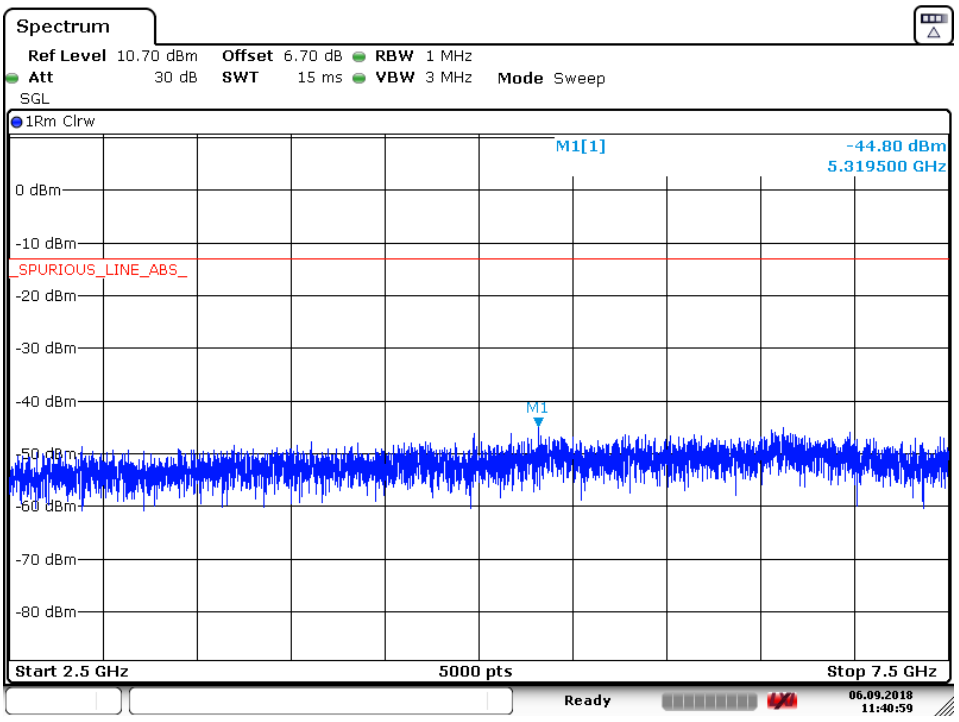
A. 6.3.7 Channel 384: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.



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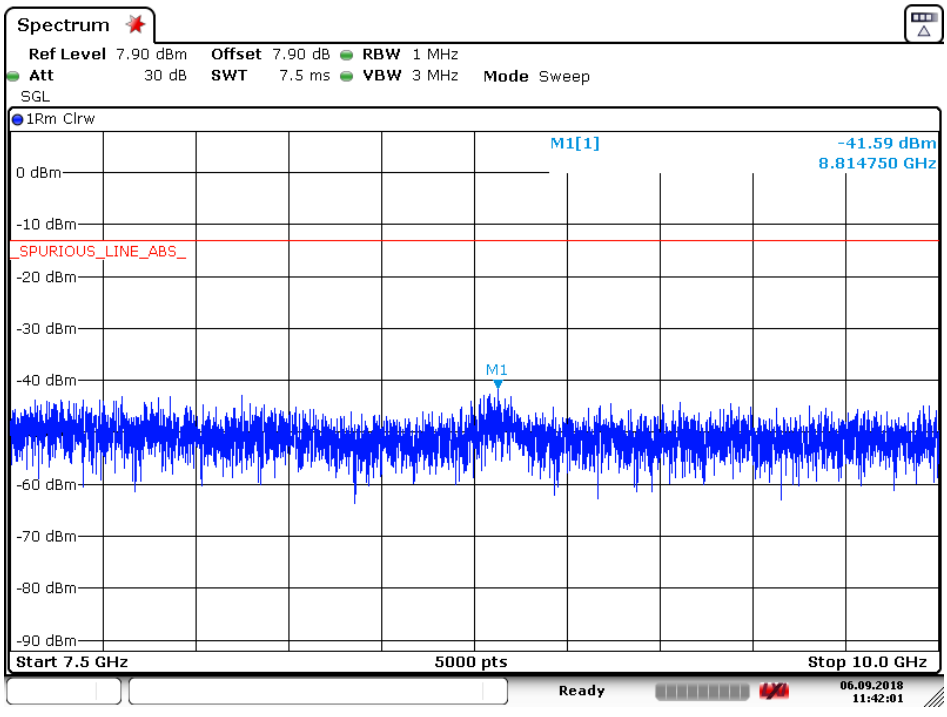
A. 6.3.8 Channel 384: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

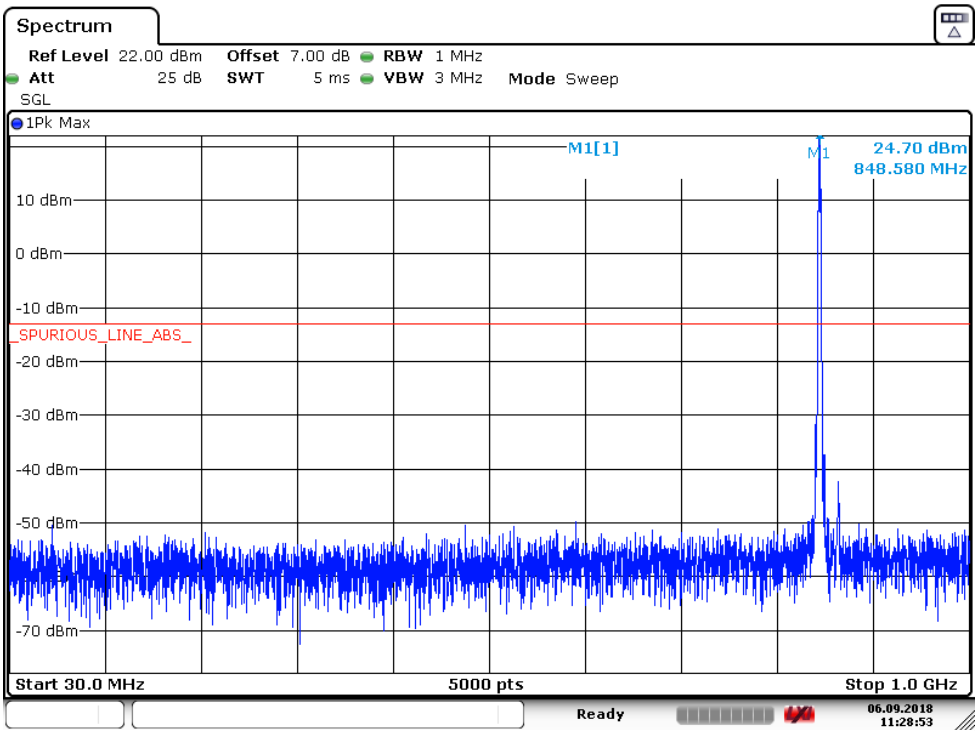


Date: 6.SEP.2018 11:42:01

A. 6.3.9 Channel 777: 30MHz –1GHz

Spurious emission limit –13dBm.

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



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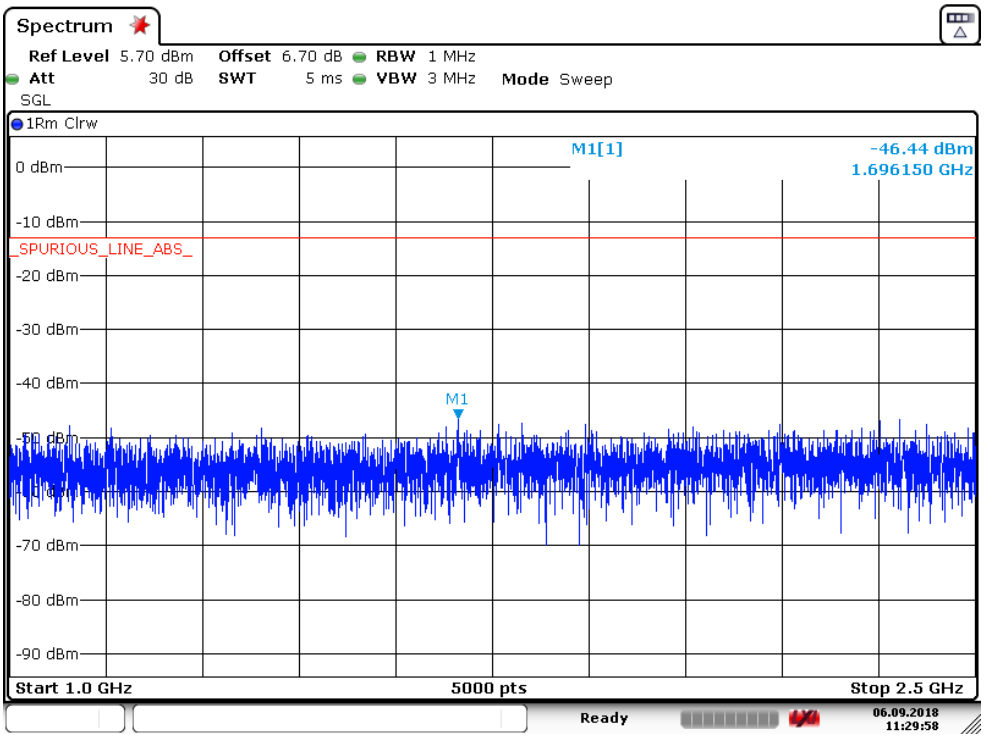
A. 6.3.10 Channel 777: 1GHz – 2.5GHz

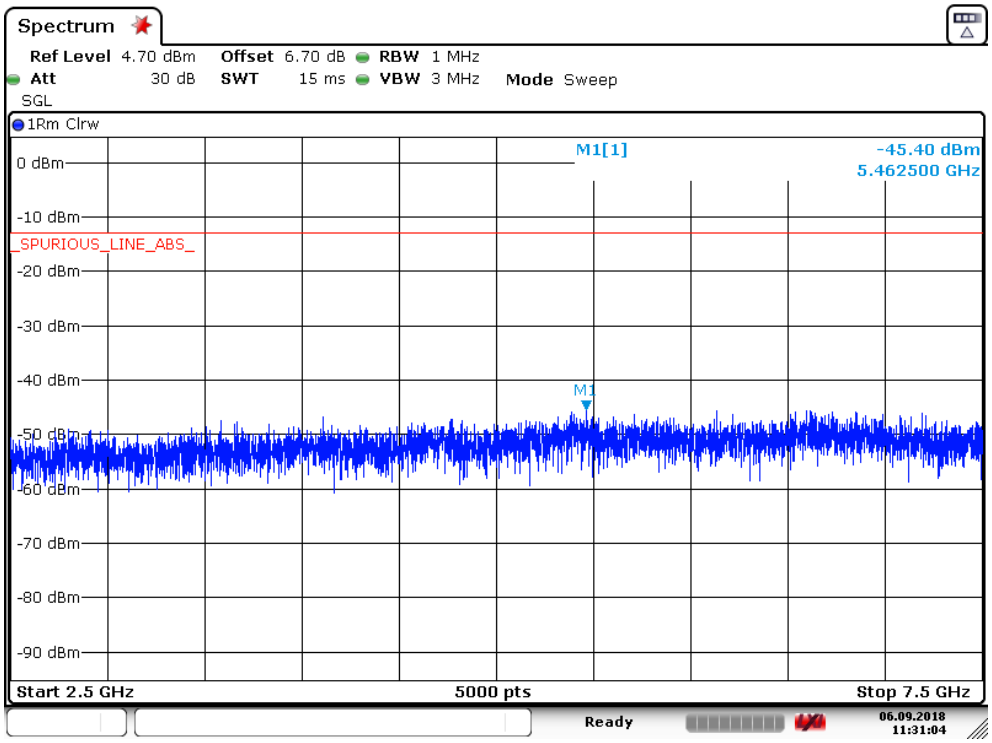
Spurious emission limit –13dBm.



Date: 6.SEP.2018 11:29:58

A. 6.3.11 Channel 777: 2.5GHz –7.5GHz

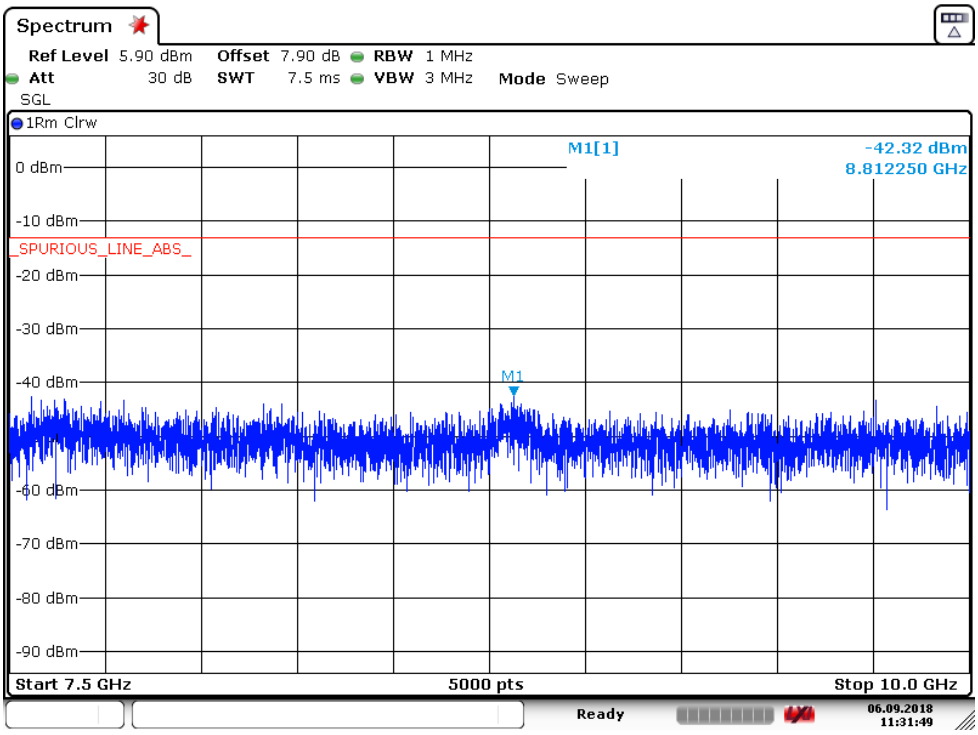
Spurious emission limit –13dBm.



Date: 6.SEP.2018 11:31:05

A. 6.3.12 Channel 777: 7.5GHz – 10GHz

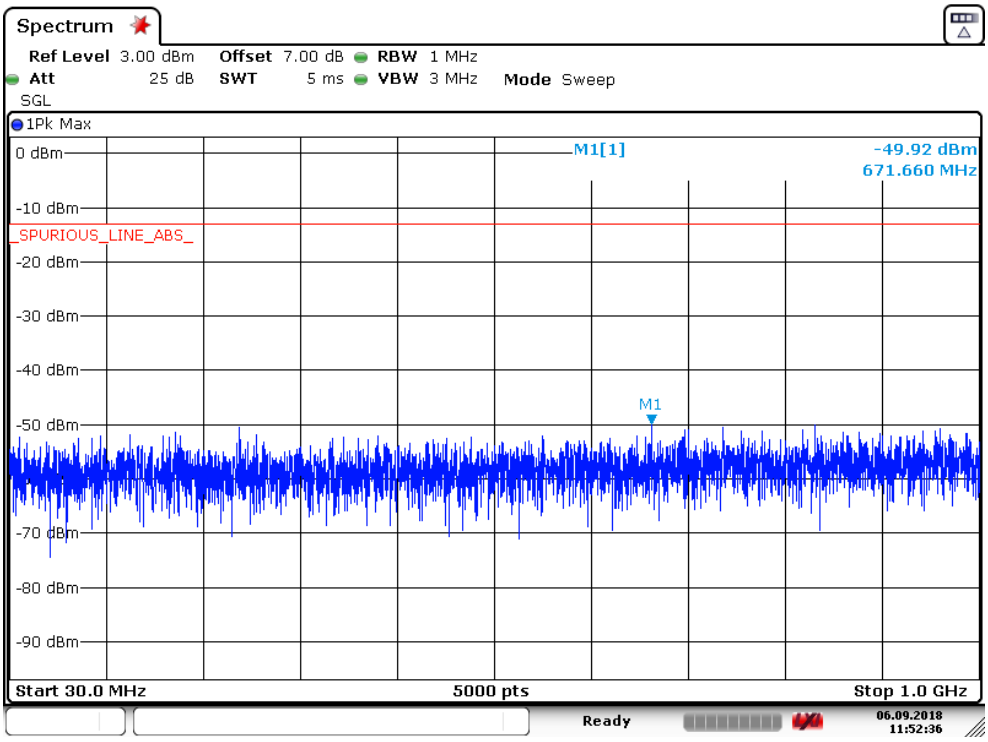
Spurious emission limit –13dBm.



Date: 6.SEP.2018 11:31:50

A. 6.3.13 Idle mode: 30MHz – 1GHz

Spurious emission limit -13dBm.



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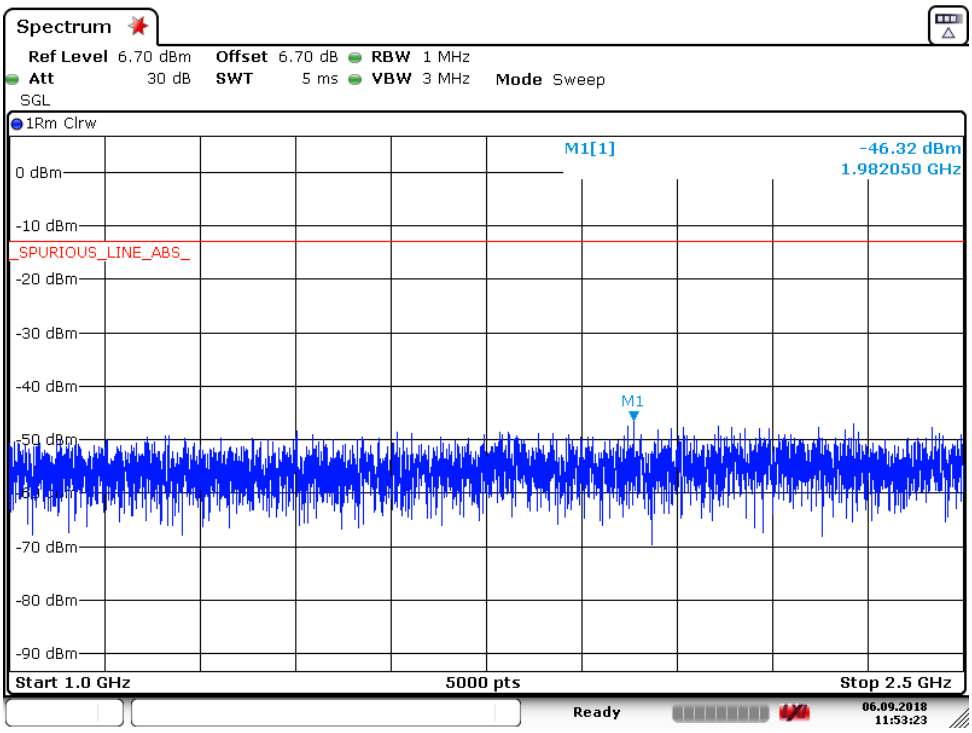
A.6.3.38 Idle mode: 1GHz – 2.5GHz

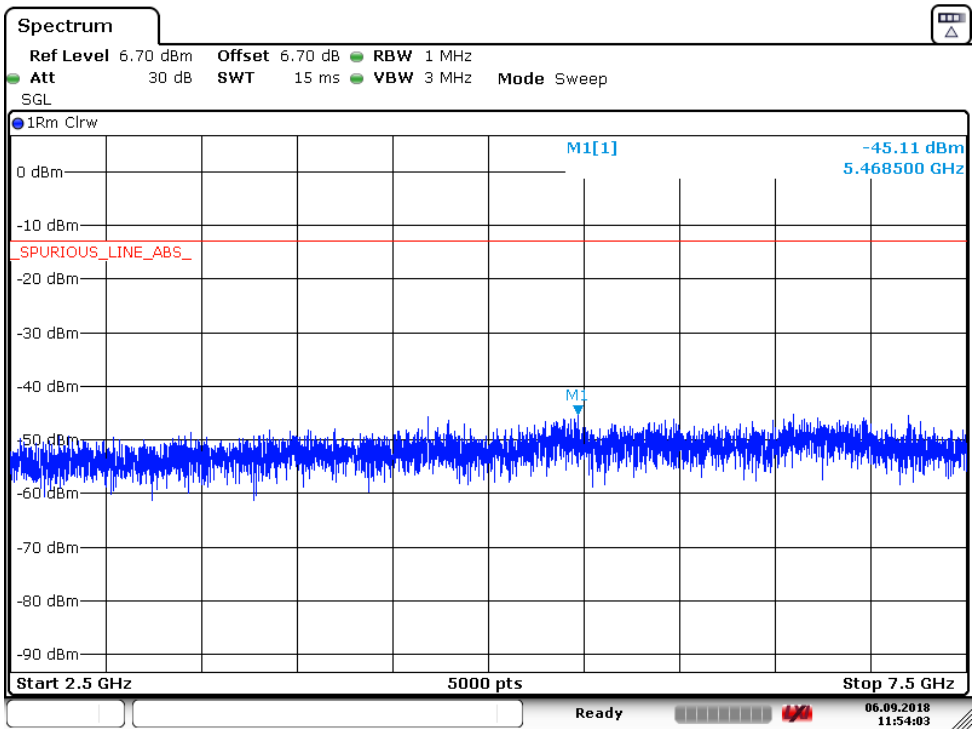
Spurious emission limit -13dBm.



Date: 6.SEP.2018 11:53:23

A.6.3.39 Idle mode: 2.5GHz – 7.5GHz

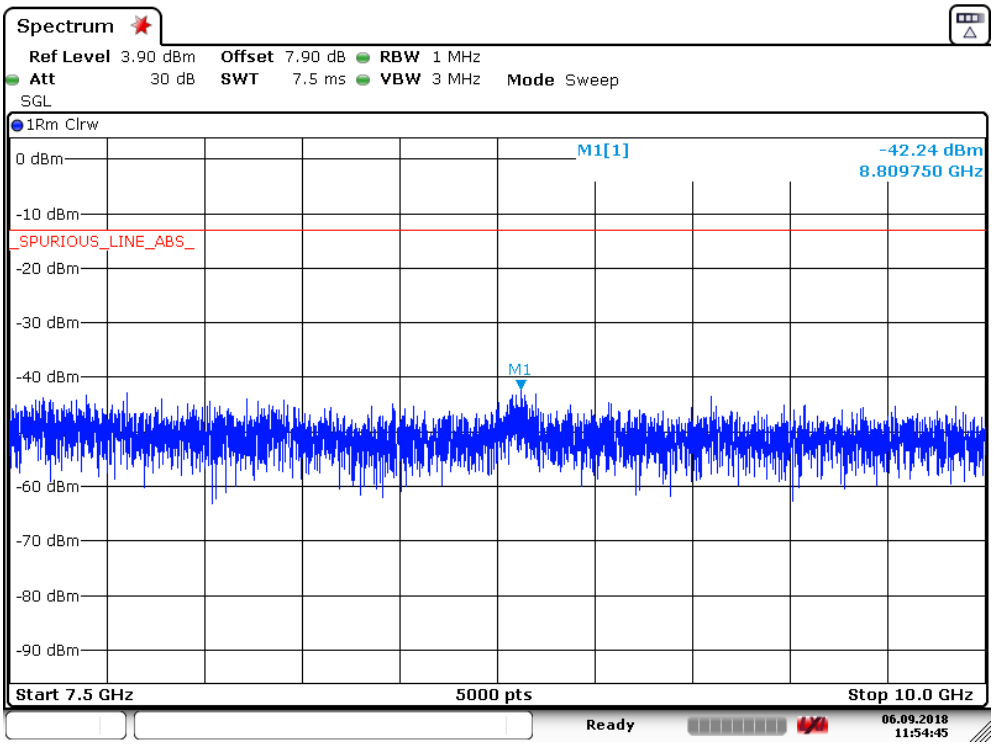
Spurious emission limit -13dBm.



Date: 6.SEP.2018 11:54:03

A.6.3.40 Idle mode: 7.5GHz – 10GHz

Spurious emission limit -13dBm.



Date: 6.SEP.2018 11:54:45

A.7 PEAK-TO-AVERAGE POWER RATIO (§24.232(d))

Reference

FCC: CFR Part 24.232(d)

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

According to KDB 971168 D01 v03 5.7.1:

a) Refer to instrument's analyzer instruction manual for details on how to use the power Statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms;

e) Record the maximum PAPR level associated with a probability of 0.1%.

A.7.1 Measurement limit

Not exceed 13 dB

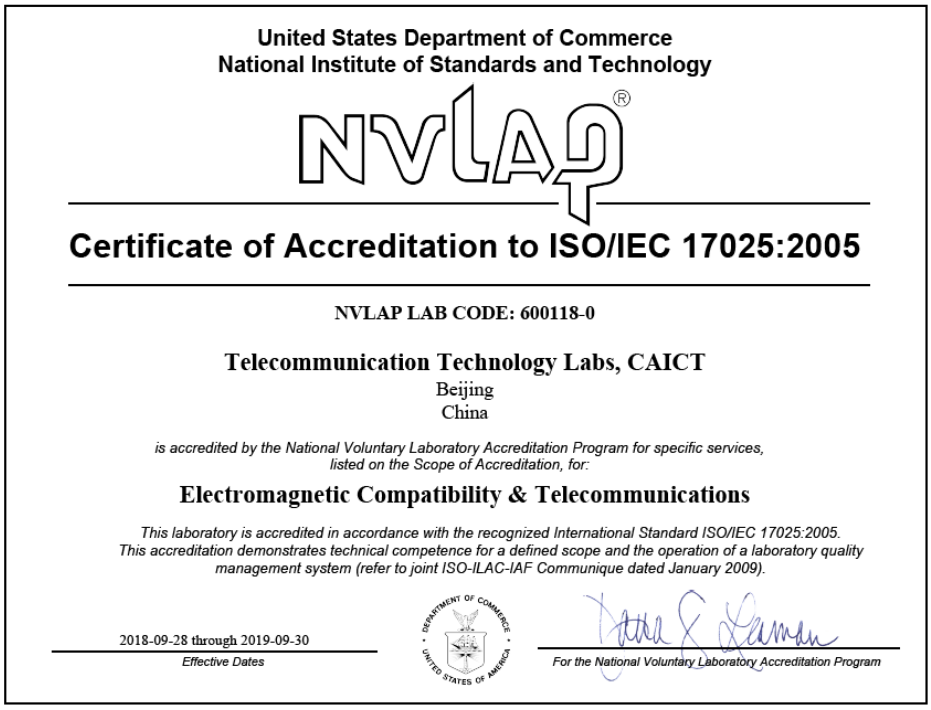
A.7.2 Measurement results

CDMA 800

Measurement result

Channel	Frequency(MHz)	PAPR(dB)		
		1x RTT	1xEVDO	
			Rev0	RevA
384	836.52	4.12	4.54	4.52

ANNEX B: Accreditation Certificate



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2018-09-28 through 2019-09-30
Effective Dates

For the National Voluntary Laboratory Accreditation Program

*****END OF REPORT*****