

TEST REPORT

of

FCC Part 22 Subpart H, Part 24 Subpart E and Part 27 Subpart C
FCC ID: TQ8-AT240DPAN

Equipment Under Test : DIGITAL CAR AVNT SYSTEM

Model Name : AT240DPAN

Applicant : Hyundai MOBIS Co., Ltd.

Manufacturer : Hyundai MOBIS Co., Ltd.

Date of Test(s) : 2015.03.28 ~ 2015.04.26

Date of Issue : 2015.05.19

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

Tested By:



Youngmin Park

Date:

2015.05.19

Approved By:



Hyunchae You

Date:

2015.05.19

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-837

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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1.2. Details of applicant

Applicant : Hyundai MOBIS Co., Ltd.

Address : 203, Teheran-ro, Gangnam-gu, Seoul, 135-977, Korea

Contact Person : Choi, Seung-Hoon

Phone No. : + 82 31 260 0098

1.3. Description of EUT

Kind of Product	DIGITAL CAR AVNT SYSTEM
Model Name	AT240DPAN
Power Supply	DC 14.4 V (Vehicle Battery)
Rated Power	CDMA 850 : 24 dB m, CDMA 1 900 : 24 dB m, LTE Band 4 (1.4 MHz) : 23 dB m, LTE Band 4 (3 MHz) : 23 dB m, LTE Band 4 (5 MHz) : 23 dB m, LTE Band 4 (10 MHz) : 23 dB m, LTE Band 4 (15 MHz) : 23 dB m, LTE Band 4 (20 MHz) : 23 dB m, LTE Band 13 (5 MHz) : 23 dB m, LTE Band 13 (10 MHz) : 23 dB m
Frequency Range	CDMA 850: 824.70 MHz ~ 848.31 MHz, CDMA 1 900 : 1 851.25 MHz ~ 1 908.75 MHz, LTE Band 4 (1.4 MHz) : 1 710.7 MHz ~ 1 754.3 MHz, LTE Band 4 (3 MHz) : 1 711.5 MHz ~ 1 753.5 MHz, LTE Band 4 (5 MHz) : 1 712.5 MHz ~ 1 752.5 MHz, LTE Band 4 (10 MHz) : 1 715.0 MHz ~ 1 750.0 MHz, LTE Band 4 (15 MHz) : 1 717.5 MHz ~ 1 747.5 MHz, LTE Band 4 (20 MHz) : 1 720.0 MHz ~ 1 745.0 MHz, LTE Band 13 (5 MHz) : 779.5 MHz ~ 784.5 MHz, LTE Band 13 (10 MHz) : 782 MHz
Emission Designator	CDMA 850 : 1M27F9D (1xRTT) / 1M27F9D (1xEV-DO), CDMA 1 900 : 1M26F9D (1xRTT) / 1M27F9D (1xEV-DO), LTE Band 4 (1.4 MHz) : 1M11G7D (QPSK) / 1M11W7D (16QAM), LTE Band 4 (3 MHz) : 2M77G7D (QPSK) / 2M75W7D (16QAM), LTE Band 4 (5 MHz) : 4M53G7D (QPSK) / 4M52W7D (16QAM), LTE Band 4 (10 MHz) : 8M94G7D (QPSK) / 8M94W7D (16QAM), LTE Band 4 (15 MHz) : 13M5G7D (QPSK) / 13M5W7D (16QAM), LTE Band 4 (20 MHz) : 17M9G7D (QPSK) / 17M9W7D (16QAM), LTE Band 13 (5 MHz) : 4M52G7D (QPSK) / 4M52W7D (16QAM), LTE Band 13 (10 MHz) : 8M91G7D (QPSK) / 8M97W7D (16QAM)

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1.4. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	R&S	FSV30	100768	Mar. 04, 2015	Annual	Mar. 04, 2016
Mobile Test Unit	Agilent	E5515C	GB43345198	Mar. 24, 2015	Annual	Mar. 24, 2016
Mobile Test Unit	R&S	CMW500	144035	Mar. 03, 2015	Annual	Mar. 03, 2016
Power Meter	Anritsu	ML2495A	1223004	Jun. 10, 2014	Annual	Jun. 10, 2015
Power Sensor	Anritsu	MA2411B	1207272	Jun. 10, 2014	Annual	Jun. 10, 2015
Directional Coupler	KRYTAR	152613	140972	Jun. 10, 2014	Annual	Jun. 10, 2015
High Pass Filter	Wainwright Instrument GmbH	WHK3.0/18G-10SS	344	Jun. 10, 2014	Annual	Jun. 10, 2015
High Pass Filter	Wainwright Instrument GmbH	WHKX2.2/12.75G-10SS	8	Apr. 14, 2015	Annual	Apr. 14, 2016
High Pass Filter	Wainwright Instrument GmbH	WHKX1.5/15G-6SS	4	Mar. 13, 2015	Annual	Mar. 13, 2016
High Pass Filter	Mini-Circuits	NHP-800+	VUU16801113-2	Jul. 01, 2014	Annual	Jul. 01, 2015
DC Power Supply	Agilent	U8002A	MY50060028	Mar. 23, 2015	Annual	Mar. 23, 2016
Preamplifier	H.P.	8447F	2944A03909	Aug. 27, 2014	Annual	Aug. 27, 2015
Preamplifier	R&S	SCU 18	10117	Dec. 26, 2014	Annual	Dec. 26, 2015
Preamplifier	TESTEK	TK-PA1840H	130016	Oct. 14, 2014	Annual	Oct. 14, 2015
Test Receiver	R&S	ESU26	100109	Mar. 03, 2015	Annual	Mar. 03, 2016
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	396	Jun. 07, 2013	Biennial	Jun. 07, 2015
Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA9170	BBHA9170223	Sep. 01, 2014	Biennial	Sep. 01, 2016
Antenna Master	INNCO	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	INNCO	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.4 m)	N/A	N.C.R.	N/A	N.C.R.

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1.5. Summary of test results

The EUT has been tested according to the following specifications:

APPLIED STANDARD		
Section in FCC part	Test Item	Result
§2.1046 §22.913(a)(2) §24.232(c) §27.50(b)(10) §27.50(d)(4)	RF Radiated Output Power	Complied
§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(h)(1)	Spurious Radiated Emission	Complied
§2.1046	Conducted Output Power	Complied
§2.1049	Occupied Bandwidth 99 %	Complied
§24.232(d)	Peak-Average Ratio	Complied
§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g)(1)	Spurious Emission at Antenna Terminal	Complied
§22.917(a) §24.238(a) §27.53(c)(2)(4) §27.53(h)(1)	Band Edge	Complied
§2.1055 §22.355 §24.235 §27.54	Frequency Stability	Complied

1.6. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL008661	2015.04.27	Initial
1	F690501/RF-RTL008661-1	2015.05.19	Added comments about Spurious Radiated Emissions

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1.7. Sample calculation for offset

Where relevant, the following sample calculation is provided:

1.7.1. Conducted test

Offset value (dB) = Directional Coupler (dB) + Cable loss (dB)

1.7.2. Radiation test

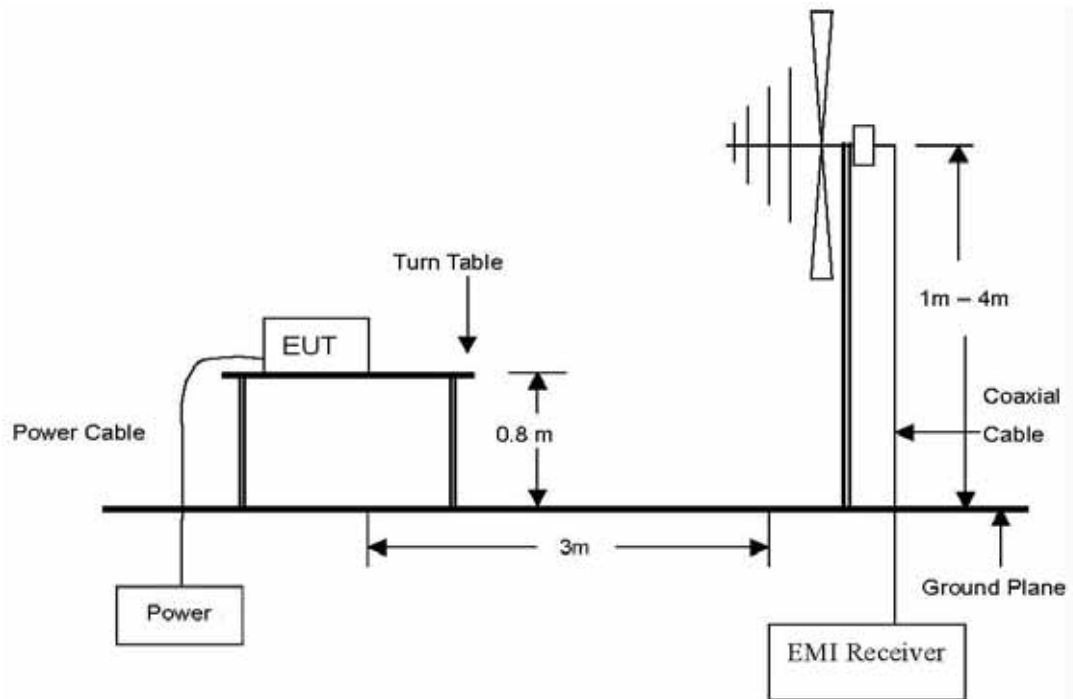
E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dB i)

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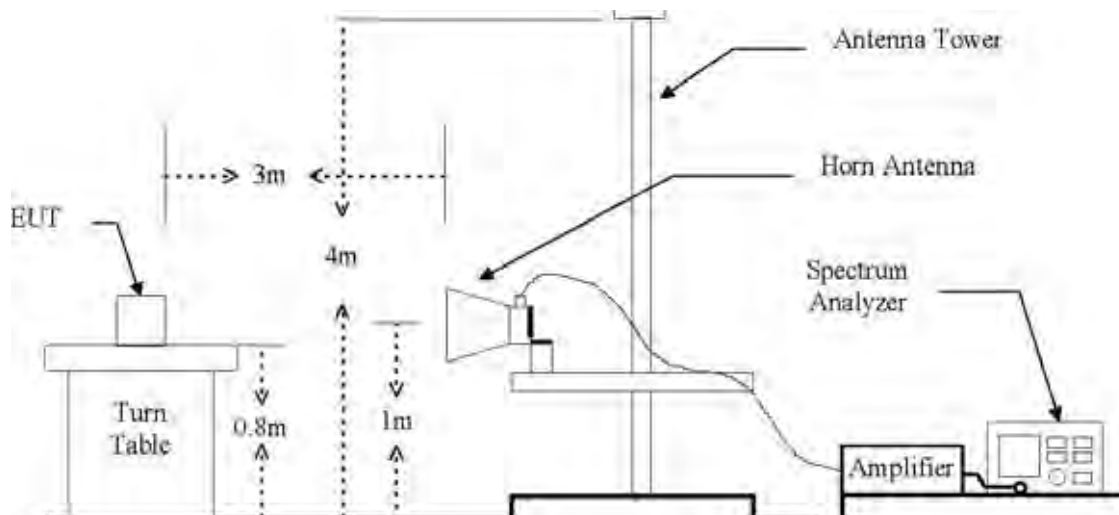
2. RF Radiated Output Power & Spurious Radiated Emission

2.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.

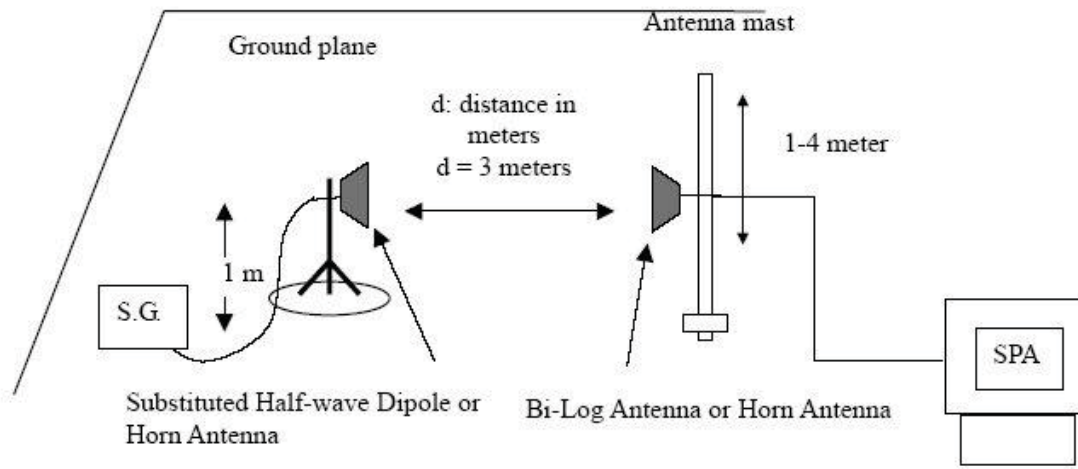


The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 20 GHz Emissions.



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The diagram below shows the test setup for substituted method.



2.2. Limit

2.2.1. Limit of radiated output power

FCC §22.913(a)(2), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

FCC §24.232(c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means to limiting power to the minimum necessary for successful communications.

FCC §27.50(b)(10), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

FCC §27.50(d), the following power and antenna height requirements apply to stations transmitting in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz and 2 180-2 200 MHz bands:

(4) Fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 MHz band and mobile and portable stations operating in the 1 695-1 710 MHz and 1 755-1 780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1 710-1 755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

2.2.2. Limit of spurious radiated emission

FCC §22.917(a), the 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.

FCC §24.238(a), the 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.

FCC §27.53(c), for operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

FCC §27.53(h), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

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2.3. Test procedure: Based on ANSI/TIA 603C: 2004

1. On a test site, the EUT shall be placed at 80 cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions occupied bandwidth, RBW = 1-5 % of the OBW (not to exceed 1 MHz), VBW $\geq 3 \times$ RBW, Detector = RMS, sweep time = auto, trace average at least 100 traces in power averaging (i.e., RMS) mode, per the guidelines of KDB 971168 D01 v02r02.
5. Radiated spurious emissions measurement method was set as follows:
RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz, VBW $\geq 3 \times$ RBW, Detector = Peak, trace mode = max hold, per the guidelines of KDB 971168 D01 v02r02.
6. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
7. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
8. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
9. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
10. The maximum signal level detected by the measuring receiver shall be noted.
11. The EUT was replaced by half-wave dipole (1 GHz below) or horn antenna (1 GHz above) connected to a signal generator.
12. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dB m, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

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2.4. Test result for RF radiated output power

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

CDMA 850 1xRTT mode

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
824.70	V	26.80	3.42	-2.83	20.55	113.50
824.70	H	26.95	3.42	-2.83	20.70	117.49
836.52	V	26.32	3.44	-3.04	19.84	96.38
836.52	H	27.16	3.44	-3.04	20.68	116.95
848.31	V	25.13	3.48	-3.26	18.39	69.02
848.31	H	27.09	3.48	-3.26	20.35	108.39

CDMA 1 900 1xRTT mode

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 851.25	V	18.51	5.03	7.87	21.35	136.46
1 851.25	H	23.48	5.03	7.87	26.32	428.55
1 880.00	V	17.98	5.11	7.86	20.73	118.30
1 880.00	H	24.40	5.11	7.86	27.15	518.80
1 908.75	V	17.14	5.17	7.84	19.81	95.72
1 908.75	H	24.26	5.17	7.84	26.93	493.17

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

CDMA 850 1xEV-DO mode

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
824.70	H	25.45	3.42	-2.83	19.20	83.18
824.70	V	27.25	3.42	-2.83	21.00	125.89
836.52	H	26.04	3.44	-3.04	19.56	90.36
836.52	V	27.50	3.44	-3.04	21.02	126.47
848.31	H	24.79	3.48	-3.26	18.05	63.83
848.31	V	27.31	3.48	-3.26	20.57	114.02

CDMA 1 900 1xEV-DO mode

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 851.25	H	17.33	5.03	7.87	20.17	103.99
1 851.25	V	22.32	5.03	7.87	25.16	328.10
1 880.00	H	16.60	5.11	7.86	19.35	86.10
1 880.00	V	24.10	5.11	7.86	26.85	484.17
1 908.75	H	16.91	5.17	7.84	19.58	90.78
1 908.75	V	23.32	5.17	7.84	25.99	397.19

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 4 (1.4 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 710.7	V	20.36	4.58	7.93	23.71	234.96
1 710.7	H	21.49	4.58	7.93	24.84	304.79
1 732.5	V	20.70	4.65	7.92	23.97	249.46
1 732.5	H	21.98	4.65	7.92	25.25	334.97
1 754.3	V	20.54	4.73	7.92	23.73	236.05
1 754.3	H	21.68	4.73	7.92	24.87	306.90

* 1.4 BW 1RB size / 0 Offset for B4

LTE band 4 (1.4 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 710.7	V	19.35	4.58	7.93	22.70	186.21
1 710.7	H	20.36	4.58	7.93	23.71	234.96
1 732.5	V	19.40	4.65	7.92	22.67	184.93
1 732.5	H	20.93	4.65	7.92	24.20	263.03
1 754.3	V	19.32	4.73	7.92	22.51	178.24
1 754.3	H	20.11	4.73	7.92	23.30	213.80

* 1.4 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 4 (3 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 711.5	V	20.90	4.58	7.93	24.25	266.07
1 711.5	H	21.34	4.58	7.93	24.69	294.44
1 732.5	V	19.44	4.65	7.92	22.71	186.64
1 732.5	H	22.01	4.65	7.92	25.28	337.29
1 753.5	V	20.03	4.73	7.92	23.22	209.89
1 753.5	H	21.37	4.73	7.92	24.56	285.76

* 3 BW 1RB size / 0 Offset for B4

LTE band 4 (3 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 711.5	V	19.78	4.58	7.93	23.13	205.59
1 711.5	H	20.50	4.58	7.93	23.85	242.66
1 732.5	V	18.62	4.65	7.92	21.89	154.53
1 732.5	H	20.33	4.65	7.92	23.60	229.09
1 753.5	V	18.34	4.73	7.92	21.53	142.23
1 753.5	H	20.19	4.73	7.92	23.38	217.77

* 3 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 4 (5 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 712.5	V	20.83	4.58	7.93	24.18	261.82
1 712.5	H	22.13	4.58	7.93	25.48	353.18
1 732.5	V	20.07	4.65	7.92	23.34	215.77
1 732.5	H	22.76	4.65	7.92	26.03	400.87
1 752.5	V	20.11	4.72	7.92	23.31	214.29
1 752.5	H	21.78	4.72	7.92	24.98	314.77

* 5 BW 1RB size / 0 Offset for B4

LTE band 4 (5 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 712.5	V	19.65	4.58	7.93	23.00	199.53
1 712.5	H	21.01	4.58	7.93	24.36	272.90
1 732.5	V	19.13	4.65	7.92	22.40	173.78
1 732.5	H	21.43	4.65	7.92	24.70	295.12
1 752.5	V	18.86	4.72	7.92	22.06	160.69
1 752.5	H	20.75	4.72	7.92	23.95	248.31

* 5 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 4 (10 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 715.0	V	21.24	4.59	7.93	24.58	287.08
1 715.0	H	22.20	4.59	7.93	25.54	358.10
1 732.5	V	20.38	4.65	7.92	23.65	231.74
1 732.5	H	23.65	4.65	7.92	26.92	492.04
1 750.0	V	21.03	4.72	7.92	24.23	264.85
1 750.0	H	22.08	4.72	7.92	25.28	337.29

* 10 BW 1RB size / 0 Offset for B4

LTE band 4 (10 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 715.0	V	20.15	4.59	7.93	23.49	223.36
1 715.0	H	21.68	4.59	7.93	25.02	317.69
1 732.5	V	19.47	4.65	7.92	22.74	187.93
1 732.5	H	22.18	4.65	7.92	25.45	350.75
1 750.0	V	19.83	4.72	7.92	23.03	200.91
1 750.0	H	20.66	4.72	7.92	23.86	243.22

* 10 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

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A4(210 mm x 297 mm)

LTE band 4 (15 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 717.5	V	21.67	4.60	7.92	24.99	315.50
1 717.5	H	22.79	4.60	7.92	26.11	408.32
1 732.5	V	19.71	4.65	7.92	22.98	198.61
1 732.5	H	23.93	4.65	7.92	27.20	524.81
1 747.5	V	21.18	4.71	7.92	24.39	274.79
1 747.5	H	23.01	4.71	7.92	26.22	418.79

* 15 BW 1RB size / 0 Offset for B4

LTE band 4 (15 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 717.5	V	20.86	4.60	7.92	24.18	261.82
1 717.5	H	21.74	4.60	7.92	25.06	320.63
1 732.5	V	18.67	4.65	7.92	21.94	156.31
1 732.5	H	22.84	4.65	7.92	26.11	408.32
1 747.5	V	18.34	4.71	7.92	21.55	142.89
1 747.5	H	21.78	4.71	7.92	24.99	315.50

* 15 BW 1RB size / 0 Offset for B4

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A4(210 mm x 297 mm)

LTE band 4 (20 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 720.0	V	21.07	4.61	7.92	24.38	274.16
1 720.0	H	22.83	4.61	7.92	26.14	411.15
1 732.5	V	21.88	4.65	7.92	25.15	327.34
1 732.5	H	24.26	4.65	7.92	27.53	566.24
1 745.0	V	19.40	4.70	7.92	22.62	182.81
1 745.0	H	22.32	4.70	7.92	25.54	358.10

* 20 BW 1RB size / 0 Offset for B4

LTE band 4 (20 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 720.0	V	20.01	4.61	7.92	23.32	214.78
1 720.0	H	21.89	4.61	7.92	25.20	331.13
1 732.5	V	20.77	4.65	7.92	24.04	253.51
1 732.5	H	23.25	4.65	7.92	26.52	448.75
1 745.0	V	18.65	4.70	7.92	21.87	153.82
1 745.0	H	21.52	4.70	7.92	24.74	297.85

* 20 BW 1RB size / 0 Offset for B4

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A4(210 mm x 297 mm)

LTE band 13 (5 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
779.5	V	23.07	3.19	-2.45	17.43	55.34
779.5	H	30.99	3.19	-2.45	25.35	342.77
784.5	V	22.66	3.22	-2.43	17.01	50.23
784.5	H	29.33	3.22	-2.43	23.68	233.35

* 5 BW 1RB size / 0 Offset for B13

LTE band 13 (5 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
779.5	V	21.86	3.19	-2.45	16.22	41.88
779.5	H	30.12	3.19	-2.45	24.48	280.54
784.5	V	21.78	3.22	-2.43	16.13	41.02
784.5	H	28.05	3.22	-2.43	22.40	173.78

* 5 BW 1RB size / 0 Offset for B13

LTE band 13 (10 MHz – QPSK)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
782.0	V	21.92	3.20	-2.44	16.28	42.46
782.0	H	27.71	3.20	-2.44	22.07	161.06

* 10 BW 1RB size / 0 Offset for B13

LTE band 13 (10 MHz – 16QAM)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
782.0	V	21.07	3.20	-2.44	15.43	34.91
782.0	H	26.74	3.20	-2.44	21.10	128.82

* 10 BW 1RB size / 0 Offset for B13

Remark:

1. E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dB i)
2. This device was tested under all bandwidths, and RB configurations, and modulations.
3. The data reported in the table above was measured in worst case.

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A4(210 mm x 297 mm)

2.5. Spurious radiated emission

- Measured output Power : 20.70 dB m = 0.117 W
- Modulation Signal : CDMA 850 1xRTT
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 33.68$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel (824.70 MHz)							
2 473.15	V	-29.54	6.25	6.76	-29.03	49.73	16.05
2 473.75	H	-28.15	6.25	6.77	-27.63	48.33	14.65
Above 2 500.00	-	-	-	-	Not detected	-	-
Middle Channel (836.52 MHz)							
1 673.65	V	-30.49	4.45	5.78	-29.16	49.86	16.18
2 510.80	V	-26.05	6.31	6.83	-25.53	46.23	12.55
2 510.78	H	-24.65	6.31	6.83	-24.13	44.83	11.15
Above 2 600.00	-	-	-	-	Not detected	-	-
High Channel (848.31 MHz)							
1 697.45	V	-26.68	4.53	5.78	-25.43	46.13	12.45
2 544.82	V	-26.17	6.37	6.85	-25.69	46.39	12.71
2 545.01	H	-25.81	6.37	6.85	-25.33	46.03	12.35
Above 2 600.00	-	-	-	-	Not detected	-	-

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- Measured output Power : 27.15 dB m = 0.519 W
- Modulation Signal : CDMA 1 900 1xRTT
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 40.15$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel (1 851.25 MHz)							
7 406.66	V	-39.28	11.64	11.67	-39.25	66.40	26.25
7 405.27	H	-41.30	11.63	11.67	-41.26	68.41	28.26
Above 7 500.00	-	-	-	-	Not detected	-	-
Middle Channel (1 880.00 MHz)							
3 760.64	V	-37.04	7.56	9.10	-35.50	62.65	22.50
3 760.65	H	-40.56	7.56	9.10	-39.02	66.17	26.02
Above 3 800.00	-	-	-	-	Not detected	-	-
High Channel (1 908.75 MHz)							
3 816.54	V	-21.81	7.63	9.12	-20.32	47.47	7.32
3 818.35	H	-22.42	7.63	9.12	-20.93	48.08	7.93
5 727.08	V	-25.26	10.18	10.63	-24.81	51.96	11.81
5 727.11	H	-24.37	10.18	10.63	-23.92	51.07	10.92
9 542.24	V	-32.03	13.37	12.52	-32.88	60.03	19.88
9 545.15	H	-27.81	13.37	12.52	-28.66	55.81	15.66
Above 9 600.00	-	-	-	-	Not detected	-	-

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- Measured output Power : 21.02 dB m = 0.126 W
- Modulation Signal : CDMA 850 1xEV-DO
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 34.00$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel (824.70 MHz)							
2 473.13	V	-29.78	6.25	6.76	-29.27	50.29	16.29
2 473.68	H	-28.17	6.25	6.76	-27.66	48.68	14.68
Above 2 500.00	-	-	-	-	Not detected	-	-
Middle Channel (836.52 MHz)							
1 673.60	V	-30.81	4.45	5.78	-29.48	50.50	16.50
2 510.74	V	-26.14	6.31	6.83	-25.62	46.64	12.64
2 510.79	H	-24.72	6.31	6.83	-24.20	45.22	11.22
Above 2 600.00	-	-	-	-	Not detected	-	-
High Channel (848.31 MHz)							
1 697.44	V	-26.80	4.53	5.78	-25.55	46.57	12.57
2 544.78	V	-26.29	6.37	6.85	-25.81	46.83	12.83
2 545.00	H	-25.83	6.37	6.85	-25.35	46.37	12.37
Above 2 600.00	-	-	-	-	Not detected	-	-

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- Measured output Power : 26.85 dB m = 0.484 W
- Modulation Signal : CDMA 1 900 1xEV-DO
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 39.85$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel (1 851.25 MHz)							
7 406.70	V	-39.32	11.64	11.67	-39.29	66.14	26.29
7 405.30	H	-41.31	11.63	11.67	-41.27	68.12	28.27
Above 7 500.00	-	-	-	-	Not detected	-	-
Middle Channel (1 880.00 MHz)							
3 760.67	V	-37.08	7.56	9.10	-35.54	62.39	22.54
3 760.78	H	-40.58	7.56	9.10	-39.04	65.89	26.04
Above 3 800.00	-	-	-	-	Not detected	-	-
High Channel (1 908.75 MHz)							
3 816.71	V	-21.84	7.63	9.12	-20.35	47.20	7.35
3 818.46	H	-22.44	7.63	9.12	-20.95	47.80	7.95
5 727.22	V	-25.42	10.18	10.64	-24.96	51.81	11.96
5 727.19	H	-24.44	10.18	10.63	-23.99	50.84	10.99
9 545.63	H	-27.93	13.37	12.52	-28.78	55.63	15.78
Above 9 600.00	-	-	-	-	Not detected	-	-

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- Measured output Power : 25.25 dB m = 0.335 W
- Modulation Signal : LTE band 4 (1.4 MHz - QPSK)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 38.25$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 710.7 MHz)							
8 551.13	V	-40.06	12.52	12.11	-40.47	65.72	27.47
8 551.24	H	-39.53	12.52	12.11	-39.94	65.19	26.94
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 660.28	V	-37.22	12.65	12.14	-37.73	62.98	24.73
8 660.15	H	-42.54	12.65	12.14	-43.05	68.30	30.05
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 754.3 MHz)							
5 261.64	V	-45.89	9.59	10.06	-45.42	70.67	32.42
5 261.78	H	-44.51	9.59	10.06	-44.04	69.29	31.04
Above 5 300.00	-	-	-	-	Not detected	-	-

* 1.4 BW 1RB size / 0 Offset for B4

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A4(210 mm x 297 mm)

- Measured output Power : 25.28 dB m = 0.337 W
- Modulation Signal : LTE band 4 (3 MHz - QPSK)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 38.28$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 711.5 MHz)							
8 551.27	V	-39.94	12.52	12.11	-40.35	65.63	27.35
8 551.07	H	-41.93	12.52	12.11	-42.34	67.62	29.34
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 656.10	V	-39.19	12.65	12.14	-39.70	64.98	26.70
8 656.00	H	-42.08	12.65	12.14	-42.59	67.87	29.59
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 753.5 MHz)							
8 761.14	V	-43.65	12.74	12.16	-44.23	69.51	31.23
8 761.17	H	-42.43	12.74	12.16	-43.01	68.29	30.01
Above 8 800.00	-	-	-	-	Not detected	-	-

* 3 BW 1RB size / 0 Offset for B4

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A4(210 mm x 297 mm)

- Measured output Power : 26.03 dB m = 0.401 W
- Modulation Signal : LTE band 4 (5 MHz - QPSK)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 39.03$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 712.5 MHz)							
8 551.62	-	-39.15	12.52	12.11	-39.56	65.59	26.56
8 551.55		-41.24	12.52	12.11	-41.65	67.68	28.65
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 651.84	-	-39.55	12.65	12.14	-40.06	66.09	27.06
8 651.71		-42.37	12.65	12.14	-42.88	68.91	29.88
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 752.5 MHz)							
8 751.69	-	-38.90	12.73	12.16	-39.47	65.50	26.47
8 751.75		-42.10	12.73	12.16	-42.67	68.70	29.67
Above 8 800.00	-	-	-	-	Not detected	-	-

* 5 BW 1RB size / 0 Offset for B4

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A4(210 mm x 297 mm)

- Measured output Power : 26.92 dB m = 0.492 W
- Modulation Signal : LTE band 4 (10 MHz - QPSK)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 39.92$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 715.0 MHz)							
8 552.83	V	-38.82	12.52	12.12	-39.22	66.14	26.22
8 552.98	H	-40.67	12.52	12.12	-41.07	67.99	28.07
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 640.22	V	-39.41	12.64	12.14	-39.91	66.83	26.91
8 640.30	H	-41.76	12.64	12.14	-42.26	69.18	29.26
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 750.0 MHz)							
8 728.16	V	-36.17	12.71	12.16	-36.72	63.64	23.72
8 727.99	H	-39.44	12.71	12.16	-39.99	66.91	26.99
Above 8 800.00	-	-	-	-	Not detected	-	-

* 10 BW 1RB size / 0 Offset for B4

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A4(210 mm x 297 mm)

- Measured output Power : 27.20 dB m = 0.525 W
- Modulation Signal : LTE band 4 (15 MHz - QPSK)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 40.20$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 717.5 MHz)							
8 554.23	V	-39.90	12.53	12.12	-40.31	67.51	27.31
8 554.29	H	-41.31	12.53	12.12	-41.72	68.92	28.72
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 628.86	V	-42.30	12.63	12.14	-42.79	69.99	29.79
8 629.44	H	-42.68	12.63	12.14	-43.17	70.37	30.17
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 747.5 MHz)							
8 704.23	V	-35.96	12.69	12.15	-36.50	63.70	23.50
8 704.29	H	-41.14	12.69	12.15	-41.68	68.88	28.68
Above 8 800.00	-	-	-	-	Not detected	-	-

* 15 BW 1RB size / 0 Offset for B4

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<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 27.53 dB m = 0.566 W
- Modulation Signal : LTE band 4 (20 MHz - QPSK)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 40.53$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 720.0 MHz)							
8 555.48	V	-39.28	12.53	12.12	-39.69	67.22	26.69
8 555.19	H	-40.88	12.53	12.12	-41.29	68.82	28.29
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 618.03	V	-38.99	12.62	12.13	-39.48	67.01	26.48
8 618.17	H	-41.87	12.62	12.13	-42.36	69.89	29.36
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 745.0 MHz)							
8 680.69	V	-	-33.57	12.67	12.15	-34.09	61.62
8 680.56	H	-	-38.57	12.67	12.15	-39.09	66.62
Above 8 700.00	-	-	-	-	Not detected	-	-

* 20 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 24.20 dB m = 0.263 W
- Modulation Signal : LTE band 4 (1.4 MHz - 16QAM)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 37.20$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 710.7 MHz)							
8 551.42	V	-40.39	12.52	12.11	-40.80	65.00	27.80
8 551.10	H	-40.91	12.52	12.11	-41.32	65.52	28.32
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 660.35	V	-38.11	12.65	12.14	-38.62	62.82	25.62
8 660.15	H	-41.97	12.65	12.14	-42.48	66.68	29.48
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 754.3 MHz)							
5 261.48	V	-45.71	9.59	10.06	-45.24	69.44	32.24
5 261.52	H	-44.59	9.59	10.06	-44.12	68.32	31.12
Above 5 300.00	-	-	-	-	Not detected	-	-

* 1.4 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 23.85 dB m = 0.243 W
- Modulation Signal : LTE band 4 (3 MHz - 16QAM)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 36.86$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 711.5 MHz)							
8 551.43	V	-39.95	12.52	12.11	-40.36	64.21	27.35
8 550.81	H	-44.15	12.52	12.11	-44.56	68.41	31.55
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 656.19	V	-39.61	12.65	12.14	-40.12	63.97	27.11
8 655.99	H	-42.59	12.65	12.14	-43.10	66.95	30.09
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 753.5 MHz)							
8 761.34	V	-45.12	12.74	12.16	-45.70	69.55	32.69
8 761.41	H	-42.46	12.74	12.16	-43.04	66.89	30.03
Above 8 800.00	-	-	-	-	Not detected	-	-

* 3 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 24.70 dB m = 0.295 W
- Modulation Signal : LTE band 4 (5 MHz - 16QAM)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 37.70$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 712.5 MHz)							
8 551.62	V	-39.73	12.52	12.11	-40.14	64.84	27.14
8 551.70	H	-42.26	12.52	12.11	-42.67	67.37	29.67
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 651.90	V	-40.08	12.65	12.14	-40.59	65.29	27.59
8 651.96	H	-42.27	12.65	12.14	-42.78	67.48	29.78
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 752.5 MHz)							
8 751.51	V	-42.11	12.73	12.16	-42.68	67.38	29.68
8 751.62	H	-42.63	12.73	12.16	-43.20	67.90	30.20
Above 8 800.00	-	-	-	-	Not detected	-	-

* 5 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 25.45 dB m = 0.351 W
- Modulation Signal : LTE band 4 (10 MHz - 16QAM)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 38.45$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 715.0 MHz)							
8 552.23	V	-38.67	12.52	12.11	-39.08	64.53	26.08
8 552.88	H	-40.60	12.52	12.12	-41.00	66.45	28.00
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 640.25	V	-39.59	12.64	12.14	-40.09	65.54	27.09
8 640.29	H	-41.82	12.64	12.14	-42.32	67.77	29.32
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 750.0 MHz)							
8 728.12	V	-36.20	12.71	12.16	-36.75	62.20	23.75
8 727.96	H	-39.48	12.71	12.16	-40.03	65.48	27.03
Above 8 800.00	-	-	-	-	Not detected	-	-

* 10 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 26.11 dB m = 0.408 W
- Modulation Signal : LTE band 4 (15 MHz - 16QAM)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 39.11$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 717.5 MHz)							
8 554.21	V	-39.95	12.53	12.12	-40.36	66.47	27.36
8 554.24	H	-41.38	12.53	12.12	-41.79	67.90	28.79
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 628.88	V	-42.31	12.63	12.14	-42.80	68.91	29.80
8 629.45	H	-42.71	12.63	12.14	-43.20	69.31	30.20
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 747.5 MHz)							
8 704.21	V	-35.99	12.69	12.15	-36.53	62.64	23.53
8 704.32	H	-41.14	12.69	12.15	-41.68	67.79	28.68
Above 8 800.00	-	-	-	-	Not detected	-	-

* 15 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 26.52 dB m = 0.449 W
- Modulation Signal : LTE band 4 (20 MHz - 16QAM)
- Distance : 3 meters
- Limit : $43 + 10\log_{10}(W) = 39.52$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 720.0 MHz)							
8 555.65	V	-39.31	12.53	12.12	-39.72	66.24	26.72
8 555.54	H	-40.89	12.53	12.12	-41.30	67.82	28.30
Above 8 600.00	-	-	-	-	Not detected	-	-
Middle Channel(1 732.5 MHz)							
8 618.04	V	-39.10	12.62	12.13	-39.59	66.11	26.59
8 618.63	H	-41.97	12.62	12.13	-42.46	68.98	29.46
Above 8 700.00	-	-	-	-	Not detected	-	-
High Channel(1 745.0 MHz)							
8 680.40	V	-33.62	12.67	12.15	-34.14	60.66	21.14
8 680.56	H	-38.61	12.67	12.15	-39.13	65.65	26.13
Above 8 700.00	-	-	-	-	Not detected	-	-

* 20 BW 1RB size / 0 Offset for B4

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 25.35 dB m = 0.343 W
- Modulation Signal : LTE band 13 (5 MHz - QPSK)
- Distance : 3 meters
- Limit : $55 + 10\log_{10}(W) = 50.35$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel(779.5 MHz)							
1 554.47	V	-49.97	4.09	7.91	-46.15	71.50	21.15
1 554.67	H	-51.90	4.09	7.91	-48.08	73.43	23.08
Above 1 600.00	-	-	-	-	Not detected	-	-
High Channel(784.5 MHz)							
1 564.83	V	-50.27	4.12	7.92	-46.47	71.82	21.47
1 564.79	H	-52.11	4.11	7.92	-48.30	73.65	23.30
Above 1 600.00	-	-	-	-	Not detected	-	-

* 5 BW 1RB size / 0 Offset for B13

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 22.07 dB m = 0.161 W
- Modulation Signal : LTE band 13 (10 MHz - QPSK)
- Distance : 3 meters
- Limit : $55 + 10\log_{10}(W) = 47.07$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P. (dB m)	dB c	Margin (dB)
Middle Channel(782.0 MHz)							
1 555.28	V	-50.13	4.09	7.91	-46.31	68.38	21.31
1 555.05	H	-52.31	4.09	7.91	-48.49	70.56	23.49
Above 1 600.00	-	-	-	-	Not detected	-	-

* 10 BW 1RB size / 0 Offset for B13

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 24.48 dB m = 0.281 W
- Modulation Signal : LTE band 13 (5 MHz - 16QAM)
- Distance : 3 meters
- Limit : $55 + 10\log_{10}(W) = 49.49$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P. (dB m)	dB c	Margin (dB)
Low Channel(779.5 MHz)							
1 554.48	V	-50.09	4.09	7.91	-46.27	70.75	21.26
1 554.65	H	-51.95	4.09	7.91	-48.13	72.61	23.12
Above 1 600.00	-	-	-	-	Not detected	-	-
High Channel(784.5 MHz)							
1 564.80	V	-50.54	4.11	7.92	-46.73	71.21	21.72
1 564.83	H	-52.29	4.12	7.92	-48.49	72.97	23.48
Above 1 600.00	-	-	-	-	Not detected	-	-

* 5 BW 1RB size / 0 Offset for B13

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- Measured output Power : 21.10 dB m = 0.129 W
- Modulation Signal : LTE band 13 (10 MHz - 16QAM)
- Distance : 3 meters
- Limit : $55 + 10\log_{10}(W) = 46.11$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Substituted Ant. gain (dB d)	E.R.P. (dB m)	dB c	Margin (dB)
Middle Channel(782.0 MHz)							
1 555.30	V	-50.59	4.09	7.91	-46.77	67.87	21.76
1 555.11	H	-52.48	4.09	7.91	-48.66	69.76	23.65
Above 1 600.00	-	-	-	-	Not detected	-	-

* 10 BW 1RB size / 0 Offset for B13

Remark:

1. E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dB i)
E.I.R.P. = E.R.P. + 2.15 dB m
2. This device was tested under all bandwidths, and RB configurations, and modulations.
3. The data reported in the table above was measured in worst case.
4. The device has a reference clock operating 26 MHz.
Measuring frequencies from 26 MHz to the 10th harmonic of highest fundamental frequency.
5. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value is not reported as "Not detected".

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3. Conducted Output Power

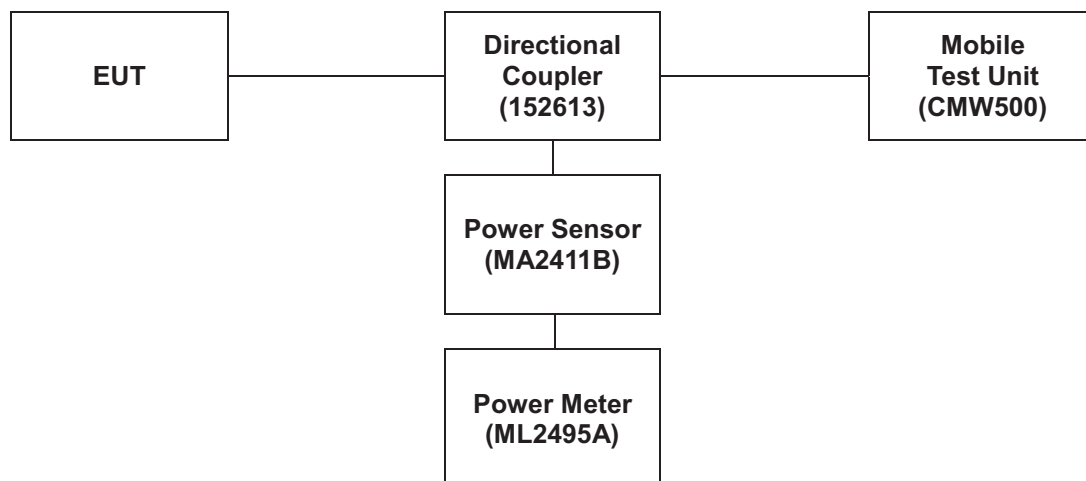
3.1. Limit

Requirements: CFR 47, Section §2.1046

3.2. Test Procedure

In compliance with §2.1046, power output shall be measured at the RF output terminals for all configurations.

1. The RF output of the transmitter was connected to the input of the mobile test unit in order to establish communication with the EUT.
2. The EUT was set up for the max. output power with pseudo random data modulation by using mobile test unit parameters.
3. The measurement performed using a wideband RF power meter.
4. This EUT was tested under all configurations and the highest power was investigated and reported.



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3.3. Test Result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

CDMA 1xRTT

- Cellular band

Radio Configuration (RC)	Service Option (SO)	Average Output Power (dB m)		
		Ch. 1 013 / 824.70 MHz	Ch. 384 / 836.52 MHz	Ch. 777 / 848.31 MHz
RC1 (Fwd1, Rvs1)	1 (Voice)	-	-	-
	2 (Loopback)	24.04	24.03	23.91
	3 (Voice)	-	-	-
	6 (SMS)	-	-	-
	55 (Loopback)	24.07	24.07	24.02
	68 (Voice)	-	-	-
RC2 (Fwd2, Rvs2)	70 (Voice)	-	-	-
	9 (Loopback)	24.04	24.06	24.08
	14 (SMS)	-	-	-
	17 (Voice)	-	-	-
	55 (Loopback)	24.11	24.05	23.97
RC3 (Fwd3, Rvs3)	32768 (Voice)	-	-	-
	1 (Voice)	-	-	-
	2 (Loopback)	24.14	24.03	24.02
	3 (Voice)	-	-	-
	6 (SMS)	-	-	-
	55 (Loopback)	24.10	24.10	24.02
	32 (+F-SCH)	24.08	24.10	24.05
	32 (+SCH)	24.09	24.11	24.03
	68 (Voice)	-	-	-
RC4 (Fwd4, Rvs3)	70 (Voice)	-	-	-
	1 (Voice)	-	-	-
	2 (Loopback)	23.98	24.00	23.82
	3 (Voice)	-	-	-
	6 (SMS)	-	-	-
	55 (Loopback)	24.01	24.02	23.98
	32 (+F-SCH)	24.02	23.84	23.96
	32 (+SCH)	24.03	23.95	23.98
	68 (Voice)	-	-	-
RC5 (Fwd5, Rvs4)	70 (Voice)	-	-	-
	9 (Loopback)	24.02	23.94	23.86
	14 (SMS)	-	-	-
	17 (Voice)	-	-	-
	55 (Loopback)	24.03	24.02	23.95
	32768 (Voice)	-	-	-

- The service option 2 of RC3 of worst case is bigger than other power compared with each service option.

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- PCS band

Radio Configuration (RC)	Service Option (SO)	Average Output Power (dB m)		
		Ch. 25 / 1 851.25 MHz	Ch. 600 / 1 880.00 MHz	Ch. 1 175 / 1 908.75 MHz
RC1 (Fwd1, Rvs1)	1 (Voice)	-	-	-
	2 (Loopback)	23.77	23.82	23.49
	3 (Voice)	-	-	-
	6 (SMS)	-	-	-
	55 (Loopback)	23.76	23.80	23.49
	68 (Voice)	-	-	-
	70 (Voice)	-	-	-
RC2 (Fwd2, Rvs2)	9 (Loopback)	23.78	23.81	23.50
	14 (SMS)	-	-	-
	17 (Voice)	-	-	-
	55 (Loopback)	23.51	23.55	23.47
	32768 (Voice)	-	-	-
RC3 (Fwd3, Rvs3)	1 (Voice)	-	-	-
	2 (Loopback)	23.55	23.55	23.15
	3 (Voice)	-	-	-
	6 (SMS)	-	-	-
	55 (Loopback)	23.49	23.49	23.15
	32 (+F-SCH)	23.50	23.47	23.13
	32 (+SCH)	23.53	23.51	23.15
	68 (Voice)	-	-	-
	70 (Voice)	-	-	-
RC4 (Fwd4, Rvs3)	1 (Voice)	-	-	-
	2 (Loopback)	23.50	23.52	23.21
	3 (Voice)	-	-	-
	6 (SMS)	-	-	-
	55 (Loopback)	23.49	23.53	23.20
	32 (+F-SCH)	23.40	23.42	23.07
	32 (+SCH)	23.44	23.45	23.11
	68 (Voice)	-	-	-
	70 (Voice)	-	-	-
RC5 (Fwd5, Rvs4)	9 (Loopback)	23.50	23.32	23.09
	14 (SMS)	-	-	-
	17 (Voice)	-	-	-
	55 (Loopback)	23.46	23.43	23.06
	32768 (Voice)	-	-	-

- The service option 2 of RC1 of worst case is bigger than other power compared with each service option.

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CDMA 1xEV-DO Release 0 (Rel 0)

- Cellular band

Application Protocol	Rate	Average Output Power (dB m)		
		Ch. 1 013 / 824.70 MHz	Ch. 384 / 836.52 MHz	Ch. 777 / 848.31 MHz
RTAP	9.6	24.34	24.22	24.06
	19.2	24.32	24.25	24.10
	38.4	24.38	24.25	24.07
	76.8	24.45	24.24	24.07
	153.6	24.46	24.23	24.08
FTAP	307.2 kbps (2 slot, QPSK)	24.29	24.40	24.07

- The rate 153.6 of RTAP of worst case is bigger than other power compared with each rate.

- PCS band

Application Protocol	Rate	Average Output Power (dB m)		
		Ch. 25 / 1 851.25 MHz	Ch. 600 / 1 880.00 MHz	Ch. 1 175 / 1 908.75 MHz
RTAP	9.6	23.44	23.50	23.12
	19.2	23.46	23.41	23.08
	38.4	23.42	23.44	23.14
	76.8	23.42	23.40	23.05
	153.6	23.54	23.37	23.00
FTAP	307.2 kbps (2 slot, QPSK)	23.46	23.47	23.03

- The rate 153.6 of RTAP of worst case is bigger than other power compared with each rate.

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A4(210 mm x 297 mm)

- LTE band

Band	Bandwidth (MHz)	RB Size	RB Offset	QPSK			16QAM		
				1 710.7	1 732.5	1 754.3	1 710.7	1 732.5	1 754.3
				19957	20175	20375	19957	20175	20375
LTE 4	1.4	1	0	23.44	<u>24.00</u>	23.34	22.24	<u>23.09</u>	21.95
	1.4	1	2	23.30	23.93	23.27	22.20	22.95	21.88
	1.4	1	5	23.30	23.93	23.33	22.18	23.05	21.94
	1.4	3	0	23.35	23.96	23.39	22.41	22.91	22.63
	1.4	3	2	23.38	23.92	23.41	22.42	22.94	22.65
	1.4	3	3	23.41	23.97	23.41	22.54	22.88	22.71
	1.4	6	0	22.47	23.00	22.40	21.53	21.88	21.63
	Bandwidth (MHz)	RB Size	RB Offset	1 711.5	1 732.5	1 753.5	1 711.5	1 732.5	1 753.5
				20000	20175	20350	20000	20175	20350
	3	1	0	23.33	23.72	<u>23.87</u>	<u>22.59</u>	22.40	22.14
	3	1	7	23.42	23.82	23.31	22.54	22.47	21.95
	3	1	14	23.41	23.81	23.49	22.49	22.47	21.95
	3	8	0	22.36	22.84	22.56	21.42	21.63	21.58
	3	8	4	22.41	22.84	22.43	21.45	21.66	21.61
	3	8	7	22.43	22.73	23.04	21.47	21.64	22.38
	3	15	0	22.37	22.88	22.30	21.26	21.94	22.19
	Bandwidth (MHz)	RB Size	RB Offset	1 712.5	1 732.5	1 752.5	1 712.5	1 732.5	1 752.5
				20025	20175	20325	20025	20175	20325
	5	1	0	23.42	23.71	<u>24.00</u>	22.49	<u>23.22</u>	23.13
	5	1	12	23.74	23.86	23.78	22.80	23.13	23.02
	5	1	24	23.69	23.80	23.50	22.81	23.17	22.70
	5	12	0	23.07	22.89	22.98	21.99	21.84	22.02
	5	12	6	22.91	22.92	22.94	21.95	21.95	21.92
	5	12	13	22.55	22.94	22.55	21.64	21.87	21.53
	5	25	0	22.73	22.83	22.93	21.83	21.81	21.83
	Bandwidth (MHz)	RB Size	RB Offset	1 715.0	1 732.5	1 750.0	1 715.0	1 732.5	1 750.0
				20050	20175	20300	20050	20175	20300
	10	1	0	23.18	<u>24.03</u>	23.88	21.99	<u>23.10</u>	22.56
	10	1	25	23.43	23.98	23.70	22.23	23.05	22.44
	10	1	49	23.48	23.86	23.26	22.08	22.94	22.05
	10	25	0	22.36	22.81	22.74	21.47	21.79	21.98
	10	25	12	22.50	22.79	22.80	21.64	21.86	21.93
	10	25	25	22.57	22.79	22.49	21.76	21.82	21.46
	10	50	0	22.22	22.67	22.45	21.26	21.67	21.61

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Band	Bandwidth (MHz)	RB Size	RB Offset	QPSK			16QAM		
				1 717.5	1 732.5	1 747.5	1 717.5	1 732.5	1 747.5
				20025	20175	20325	20025	20175	20325
LTE 4	15	1	0	23.18	23.52	<u>23.96</u>	22.29	<u>22.96</u>	22.50
	15	1	36	23.61	23.81	23.80	22.84	22.83	22.47
	15	1	74	23.57	23.87	23.51	22.69	22.73	22.27
	15	36	0	22.16	22.57	22.82	21.31	21.56	21.75
	15	36	18	22.45	22.61	22.67	21.37	21.60	21.69
	15	36	37	22.44	22.77	23.26	21.75	21.70	21.37
	15	75	0	22.43	22.55	22.64	21.37	21.57	21.70
	Bandwidth (MHz)	RB Size	RB Offset	1 720.0	1 732.5	1 745.0	1 720.0	1 732.5	1 745.0
				20050	20175	20300	20050	20175	20300
	20	1	0	23.25	23.42	<u>23.94</u>	22.46	22.52	<u>22.93</u>
	20	1	50	23.41	23.67	23.83	22.52	22.81	22.84
	20	1	99	23.63	23.71	23.37	22.77	22.76	22.49
	20	50	0	22.19	22.39	22.68	21.20	21.42	21.77
	20	50	25	22.31	22.58	22.70	21.39	21.57	21.70
	20	50	50	22.29	22.59	22.61	21.38	21.63	21.61
	20	100	0	23.34	22.59	22.68	21.35	21.63	21.68

Band	Bandwidth (MHz)	RB Size	RB Offset	QPSK			16QAM		
				779.5	-	784.5	779.5	-	784.5
				23205	-	23255	23205	-	23255
LTE 13	5	1	0	<u>24.23</u>	-	24.17	<u>24.22</u>	-	23.49
	5	1	12	24.10	-	24.16	24.20	-	23.48
	5	1	24	24.14	-	23.83	23.21	-	23.16
	5	12	0	23.02	-	23.02	22.10	-	22.06
	5	12	6	23.00	-	22.98	22.14	-	21.99
	5	12	13	23.08	-	23.07	22.21	-	22.12
	5	25	0	23.06	-	22.91	22.14	-	21.88
	Bandwidth (MHz)	RB Size	RB Offset	-	782.0	-	-	782.0	-
				-	23230	-	-	23230	-
	10	1	0	-	<u>24.18</u>	-	-	<u>23.28</u>	-
	10	1	25	-	24.17	-	-	23.27	-
	10	1	49	-	23.97	-	-	23.03	-
	10	25	0	-	23.02	-	-	22.14	-
	10	25	12	-	23.02	-	-	22.08	-
	10	25	25	-	23.03	-	-	22.16	-
	10	50	0	-	22.90	-	-	21.93	-

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4. Occupied Bandwidth 99 %

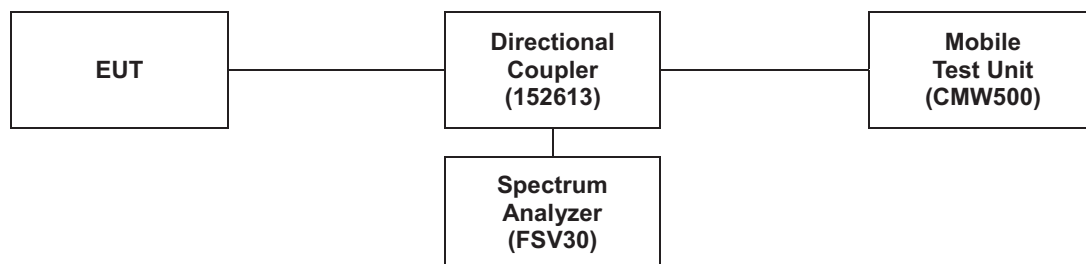
4.1. Limit

Requirements: CFR 47, Section §2.1049.

4.2. Test Procedure

The test follows section 4.1 of FCC KDB Publication 971168 D01 v02r02.

1. Set span = 2 – 5 x OBW.
2. Set resolution bandwidth (RBW) = 1 – 5 % of OBW.
3. Set video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.



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A4(210 mm x 297 mm)

4.3 Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

Band	Mode	Frequency (MHz)	Occupied Bandwidth (MHz)
CDMA 850	1xRTT RC3 2 (Loopback)	824.70	1.27
		836.52	1.27
		848.31	1.27
CDMA 1 900	1xRTT RC1 2 (Loopback)	1 851.25	1.27
		1 880.00	1.27
		1 908.75	1.28

Band	Mode	Frequency (MHz)	Occupied Bandwidth (MHz)
CDMA 850	1xEV-DO(Rel0) RTAP 153.6	824.70	1.27
		836.52	1.27
		848.31	1.27
CDMA 1 900	1xEV-DO(Rel0) RTAP 153.6	1 851.25	1.27
		1 880.00	1.27
		1 908.75	1.27

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Band	Mode	Frequency (MHz)	Occupied Bandwidth (MHz)
LTE 4 (1.4 MHz)	QPSK	1 710.7	1.10
		1 732.5	1.09
		1 754.3	1.11
LTE 4 (3 MHz)	QPSK	1 711.5	2.74
		1 732.5	2.74
		1 753.5	2.77
LTE 4 (5 MHz)	QPSK	1 712.5	4.50
		1 732.5	4.53
		1 752.5	4.50
LTE 4 (10 MHz)	QPSK	1 715.0	8.94
		1 732.5	8.94
		1 750.0	8.94
LTE 4 (15 MHz)	QPSK	1 717.5	13.46
		1 732.5	13.50
		1 747.5	13.50
LTE 4 (20 MHz)	QPSK	1 720.0	17.89
		1 732.5	17.89
		1 745.0	17.89
LTE 4 (1.4 MHz)	16QAM	1 710.7	1.11
		1 732.5	1.09
		1 754.3	1.10
LTE 4 (3 MHz)	16QAM	1 711.5	2.74
		1 732.5	2.74
		1 753.5	2.75
LTE 4 (5 MHz)	16QAM	1 712.5	4.52
		1 732.5	4.52
		1 752.5	4.52
LTE 4 (10 MHz)	16QAM	1 715.0	8.94
		1 732.5	8.94
		1 750.0	8.94
LTE 4 (15 MHz)	16QAM	1 717.5	13.46
		1 732.5	13.50
		1 747.5	13.50
LTE 4 (20 MHz)	16QAM	1 720.0	17.89
		1 732.5	17.95
		1 745.0	17.89

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Band	Mode	Frequency (MHz)	Occupied Bandwidth (MHz)
LTE 13 (5 MHz)	QPSK	779.5	4.52
		784.5	4.52
LTE 13 (10 MHz)	QPSK	782.0	8.91
LTE 13 (5 MHz)	16QAM	779.5	4.52
		784.5	4.50
LTE 13 (10 MHz)	16QAM	782.0	8.97

Please refer to the following plots.

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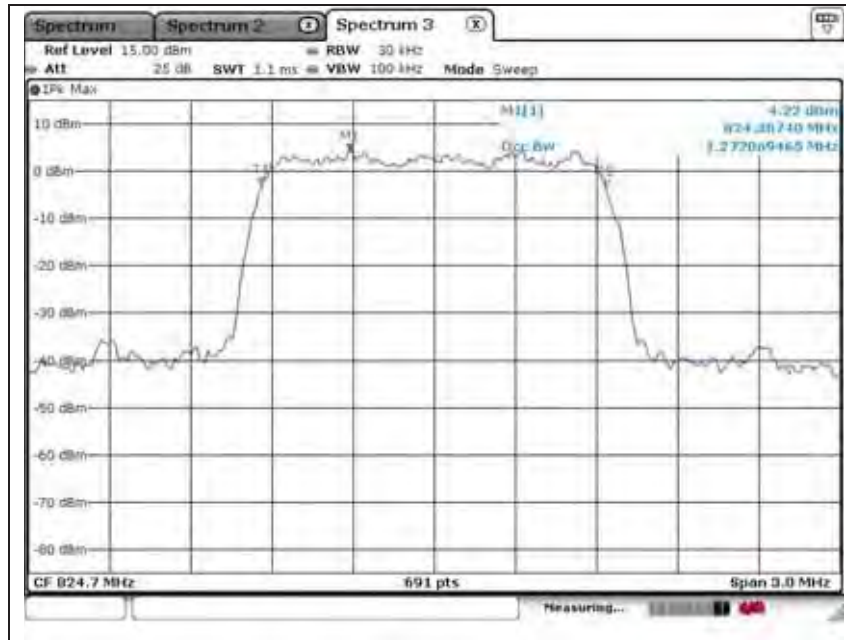
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

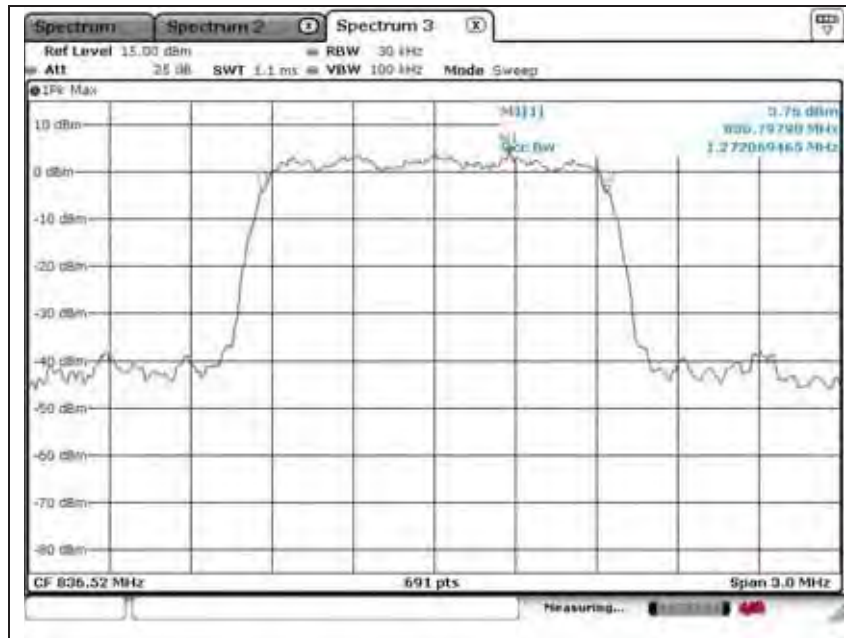
CDMA 850 1xRTT

99 %

Low Channel

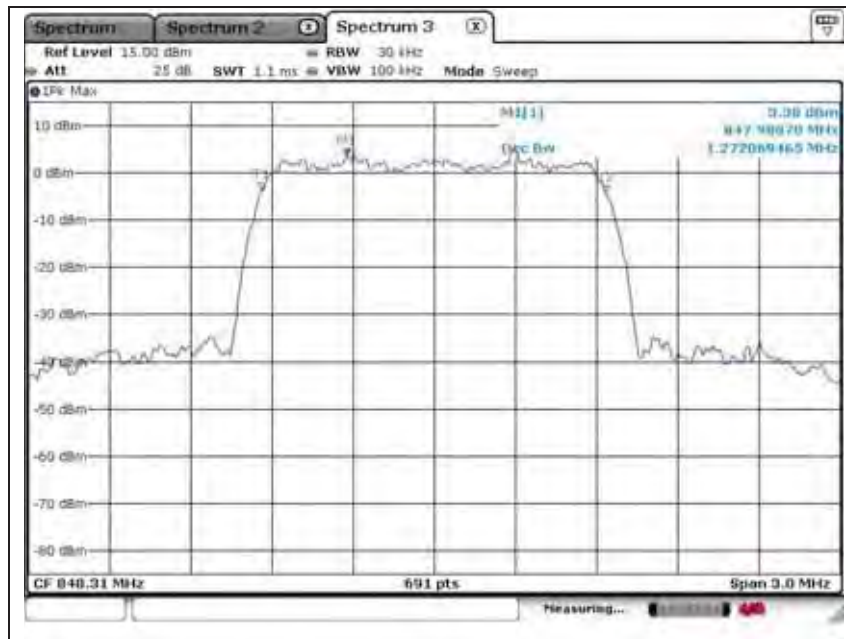


Middle Channel



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High Channel



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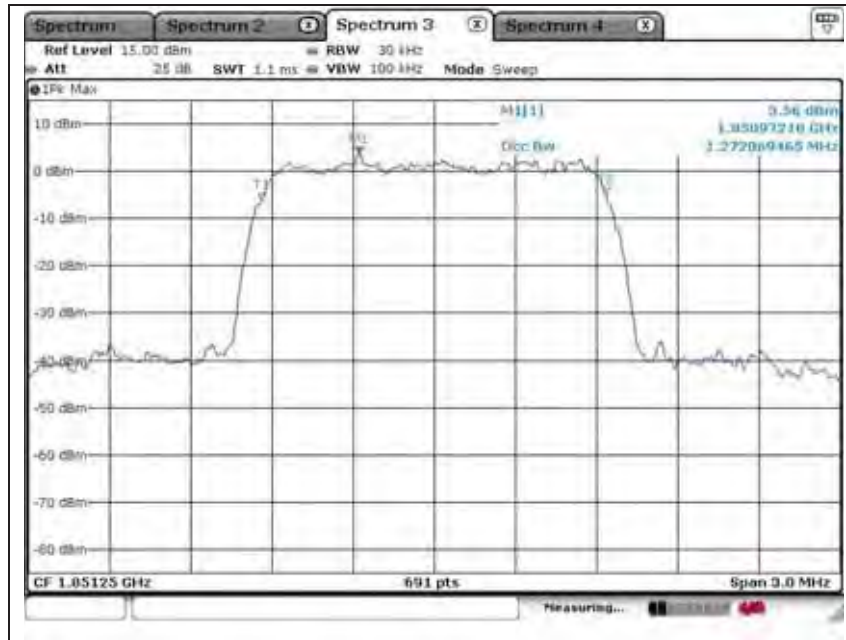
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

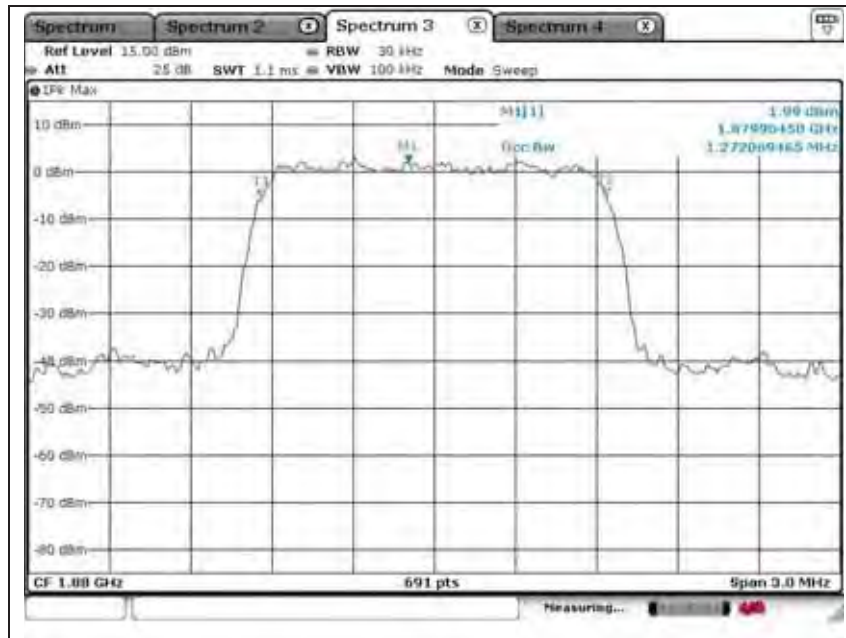
CDMA 1 900 1xRTT

99 %

Low Channel



Middle Channel



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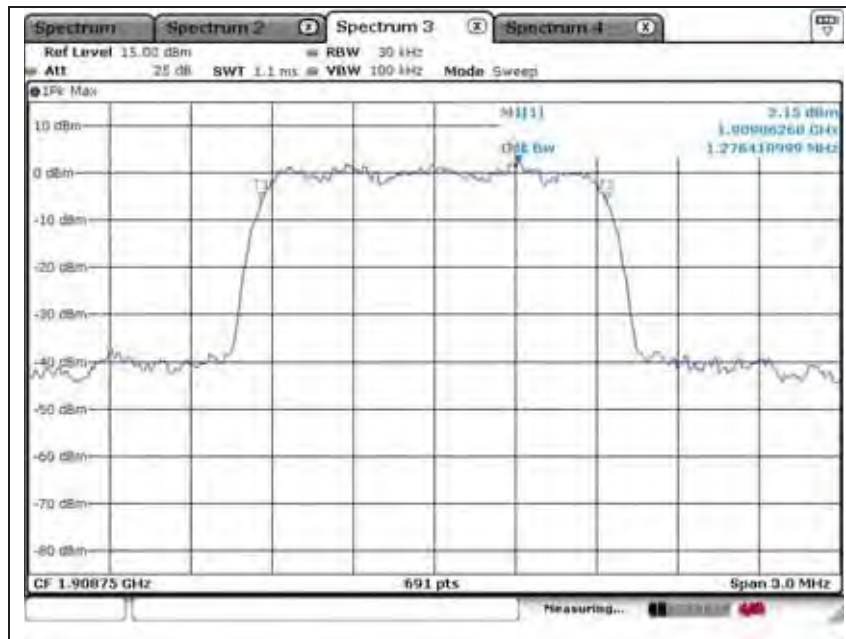
<http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

High Channel



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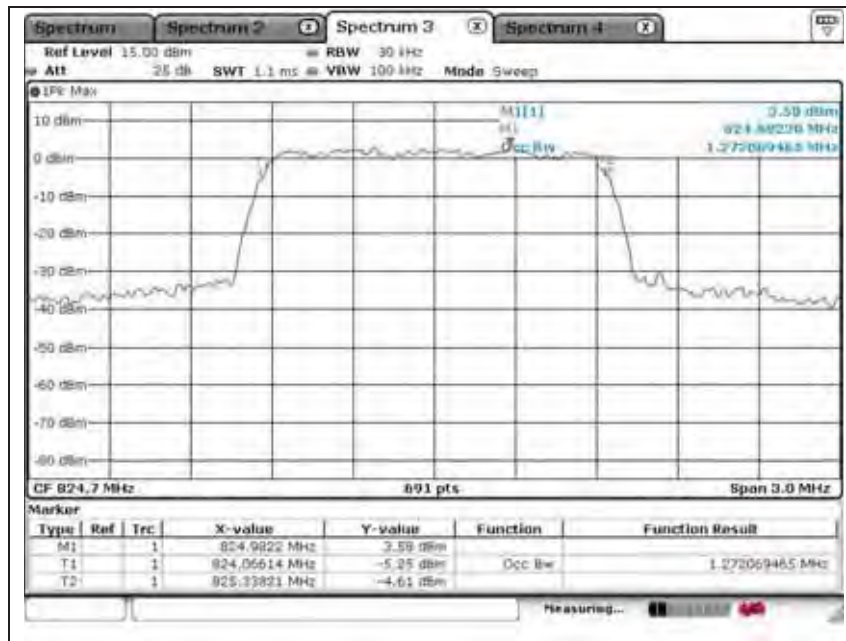
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

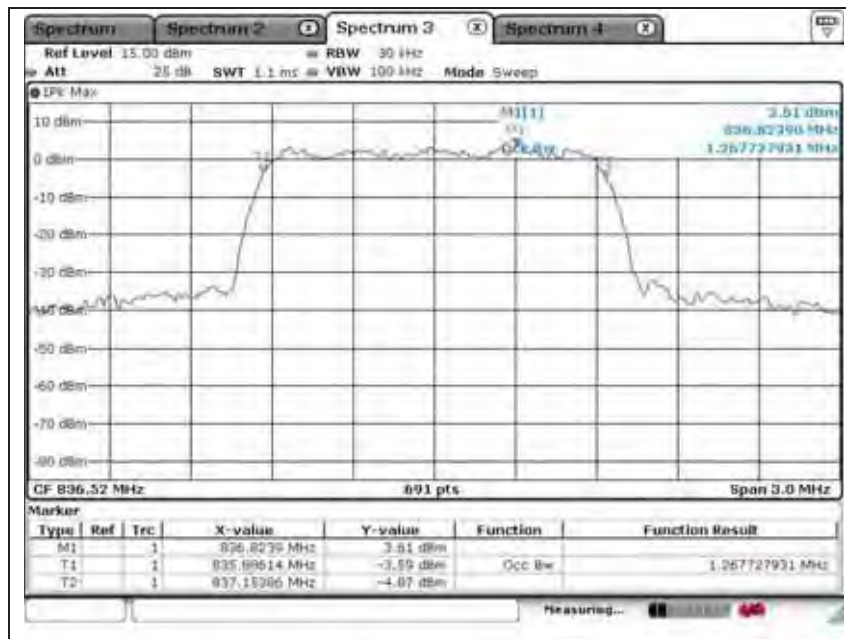
CDMA 850 1xEV-DO

99 %

Low Channel

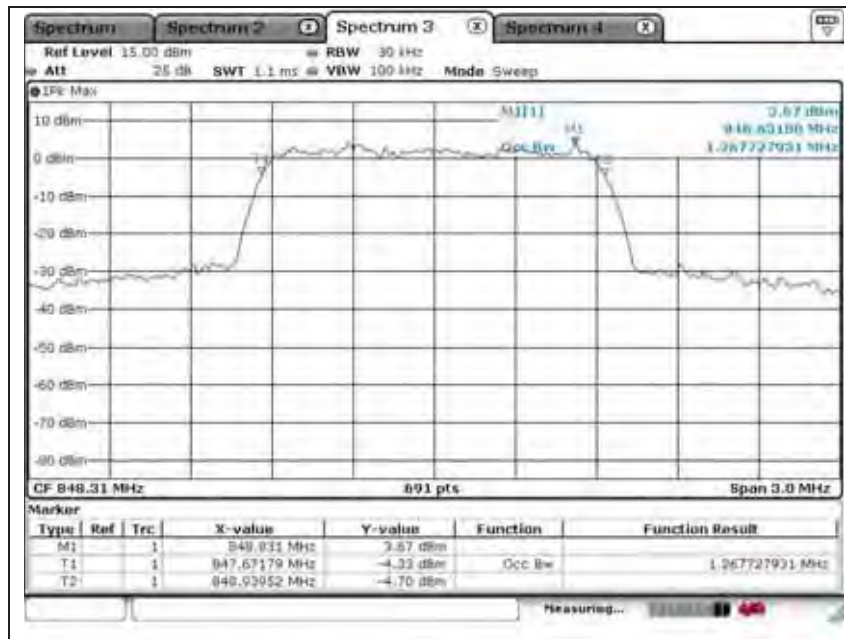


Middle Channel



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High Channel

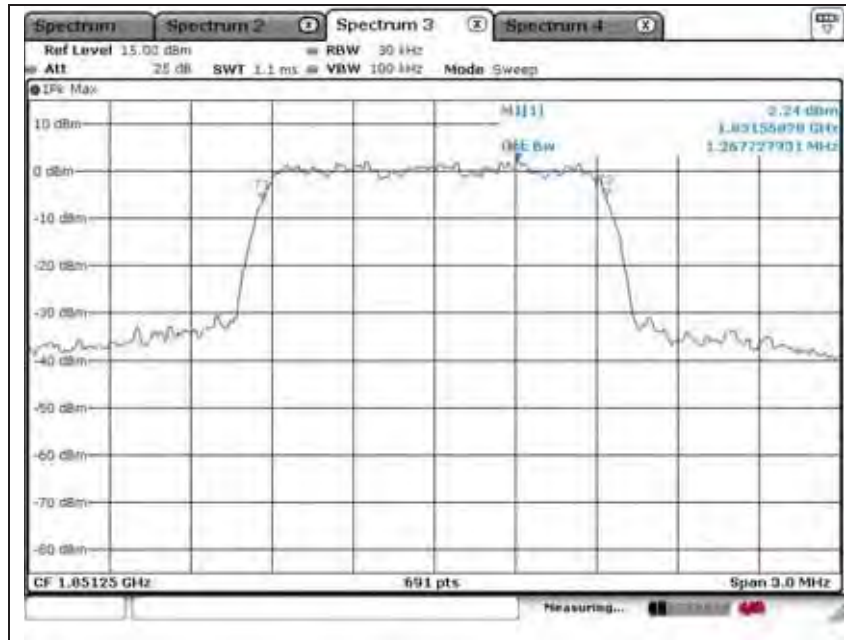


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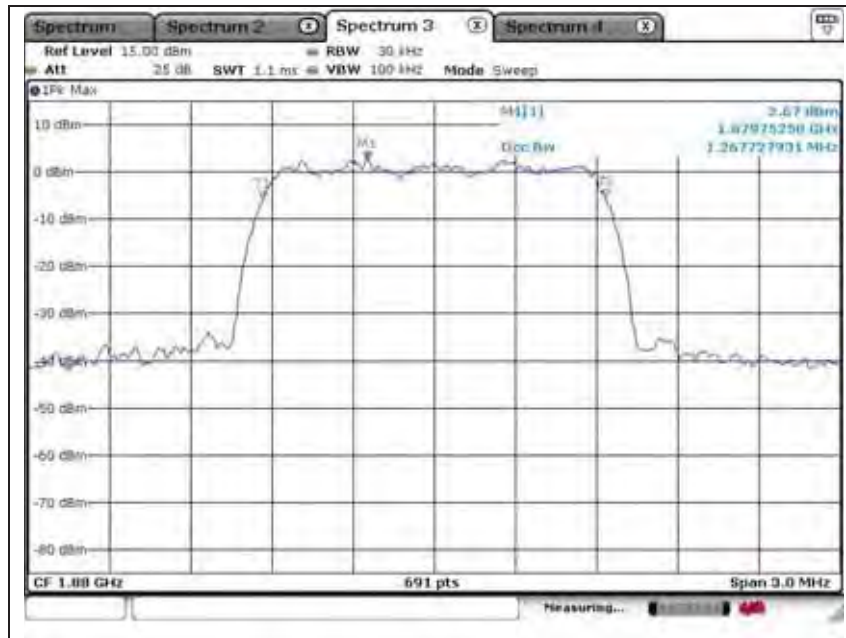
CDMA 1 900 1xEV-DO

99 %

Low Channel

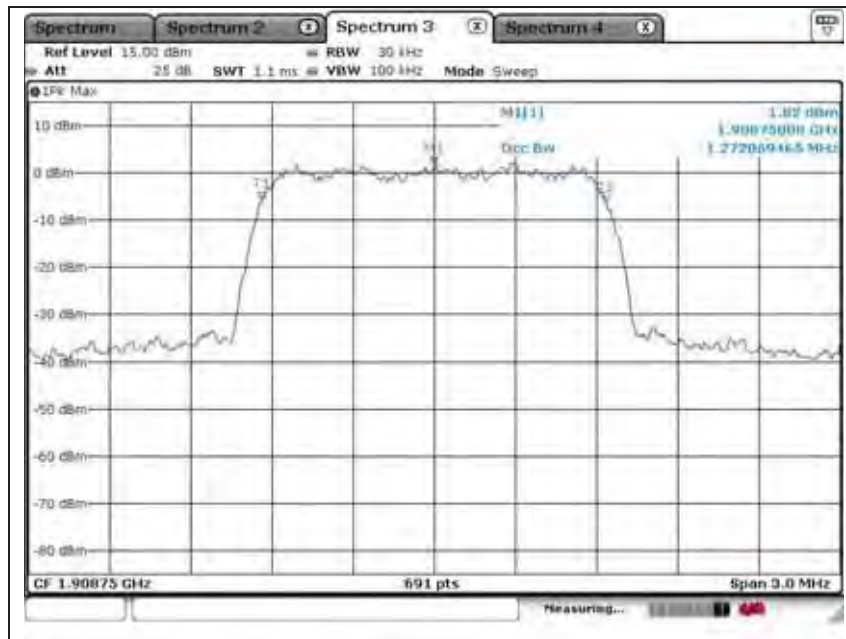


Middle Channel



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High Channel



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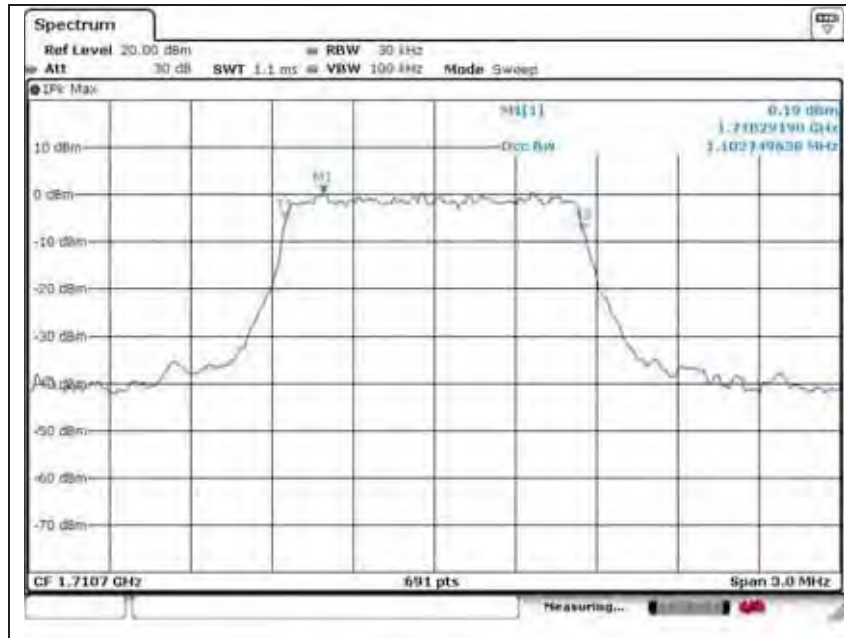
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

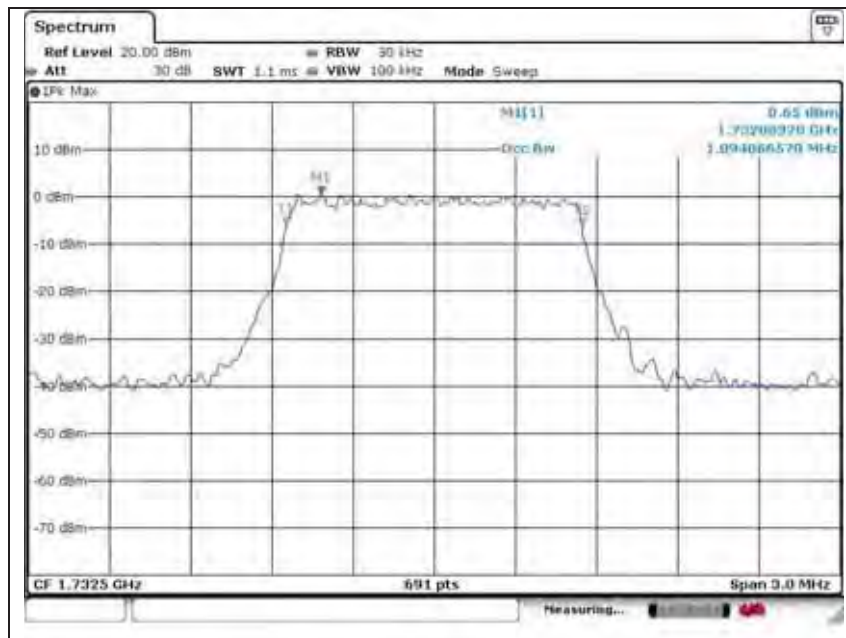
LTE band 4 (1.4 MHz – QPSK_RB 6)

99 %

Low Channel



Middle Channel



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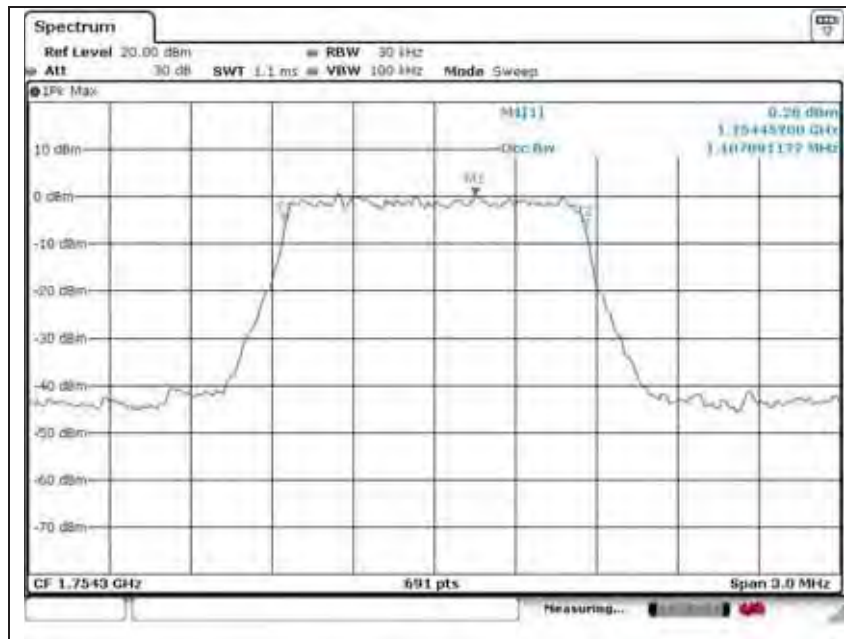
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A4(210 mm x 297 mm)

High Channel

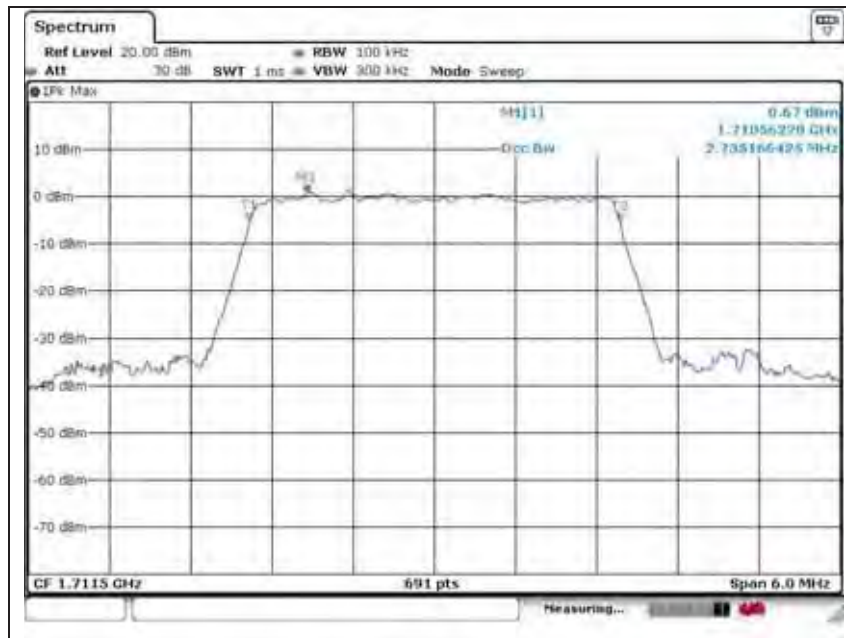


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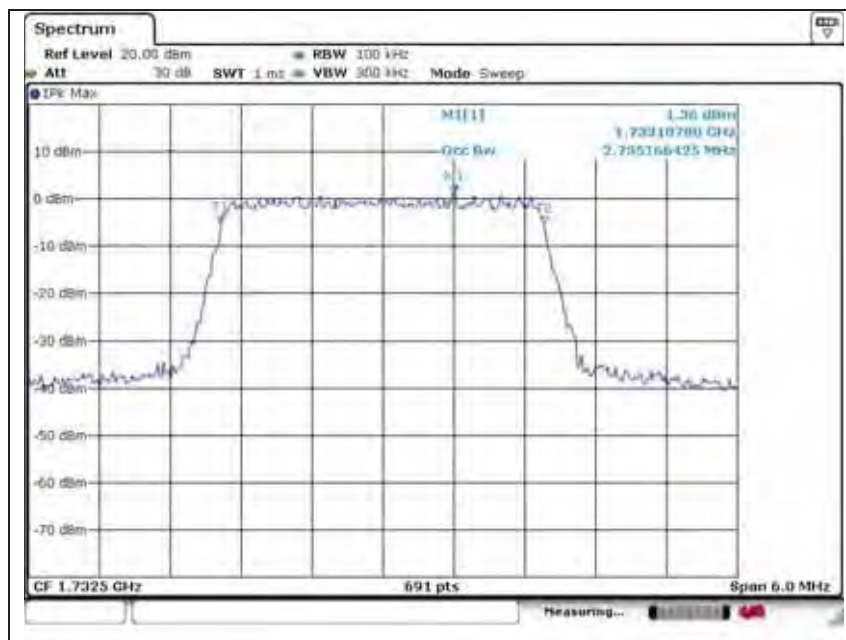
LTE band 4 (3 MHz – QPSK_RB 15)

99 %

Low Channel



Middle Channel



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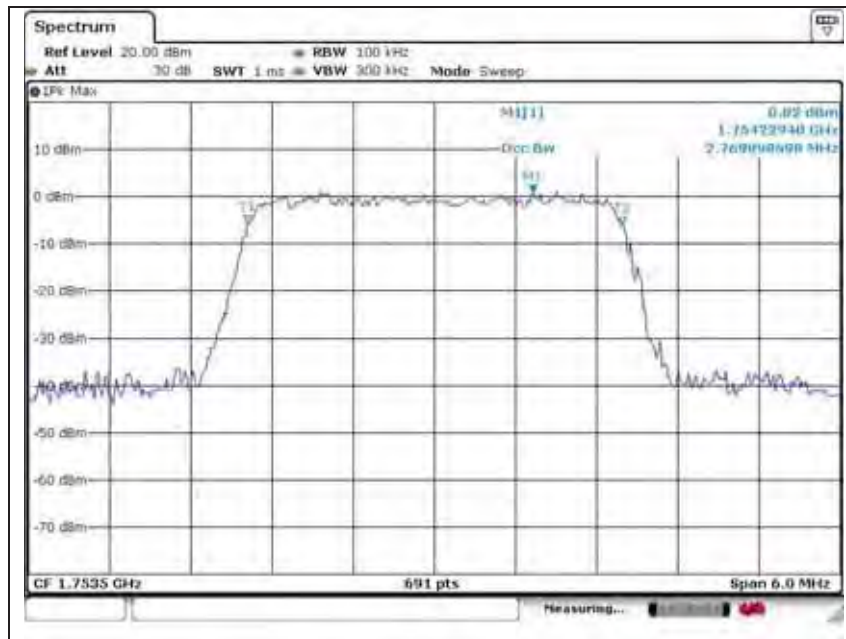
<http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

High Channel



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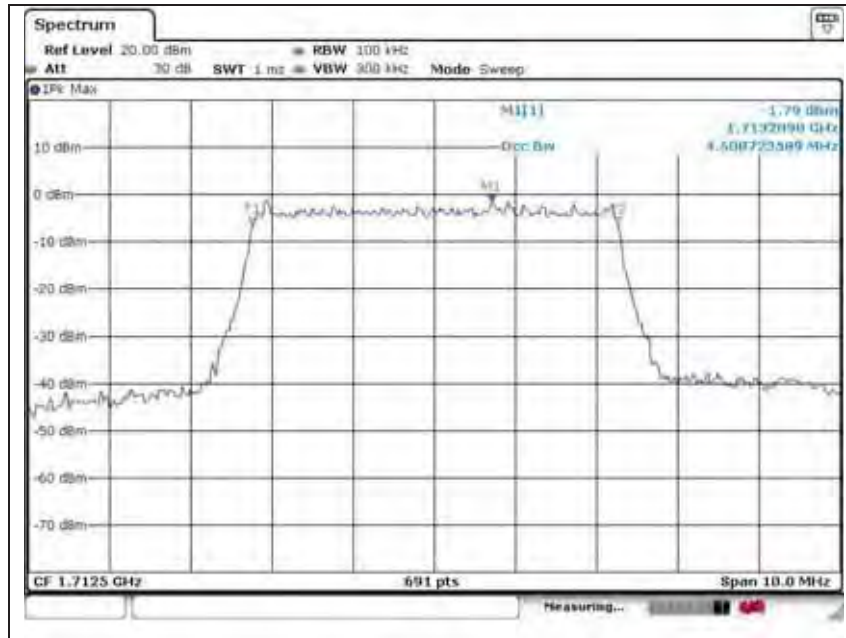
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

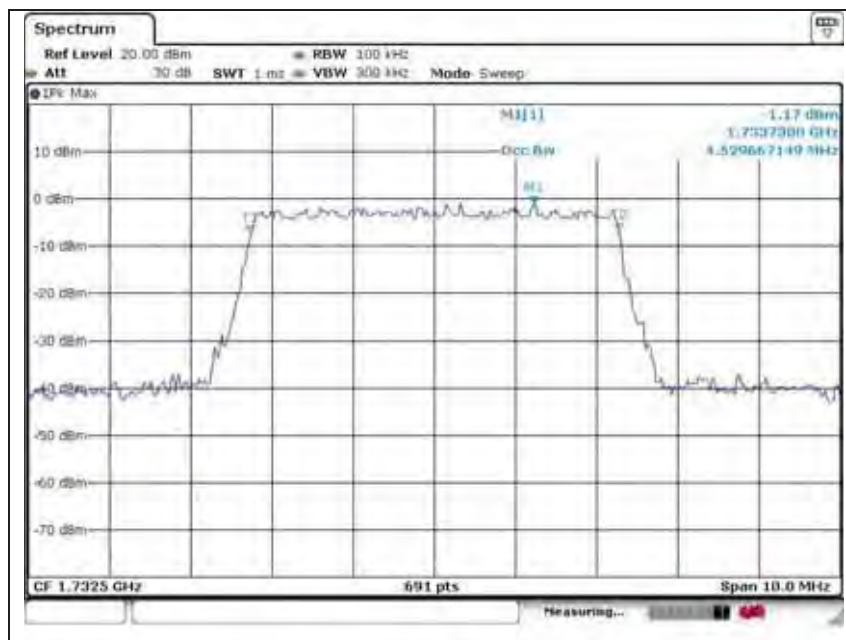
LTE band 4 (5 MHz – QPSK_RB 25)

99 %

Low Channel



Middle Channel



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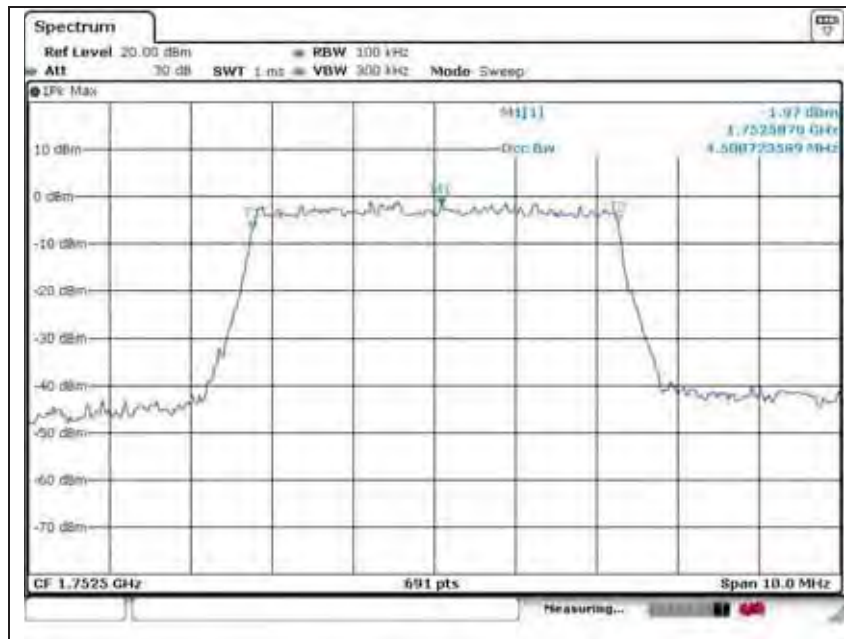
<http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

High Channel



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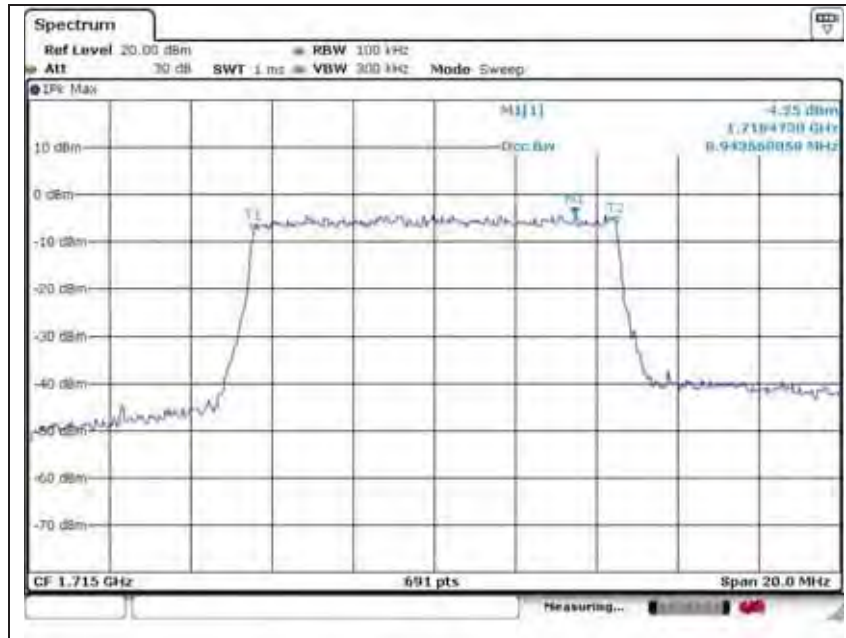
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

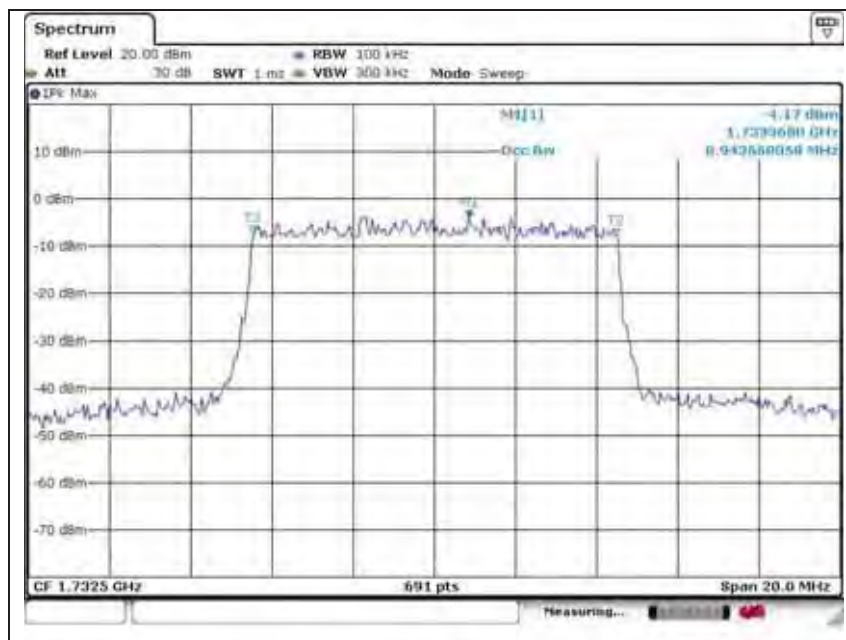
LTE band 4 (10 MHz – QPSK_RB 50)

99 %

Low Channel



Middle Channel



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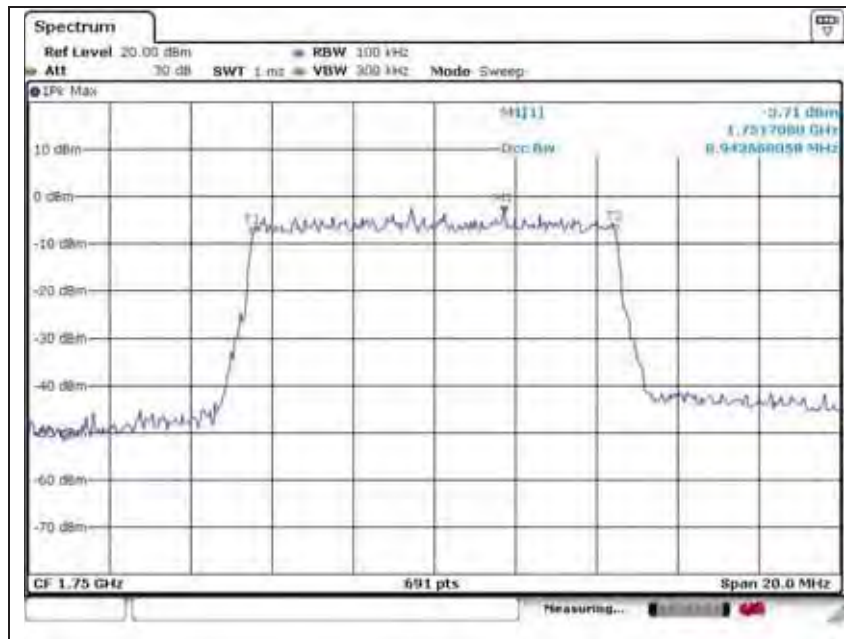
<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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RTT5041-20(2014.01.20)(2)

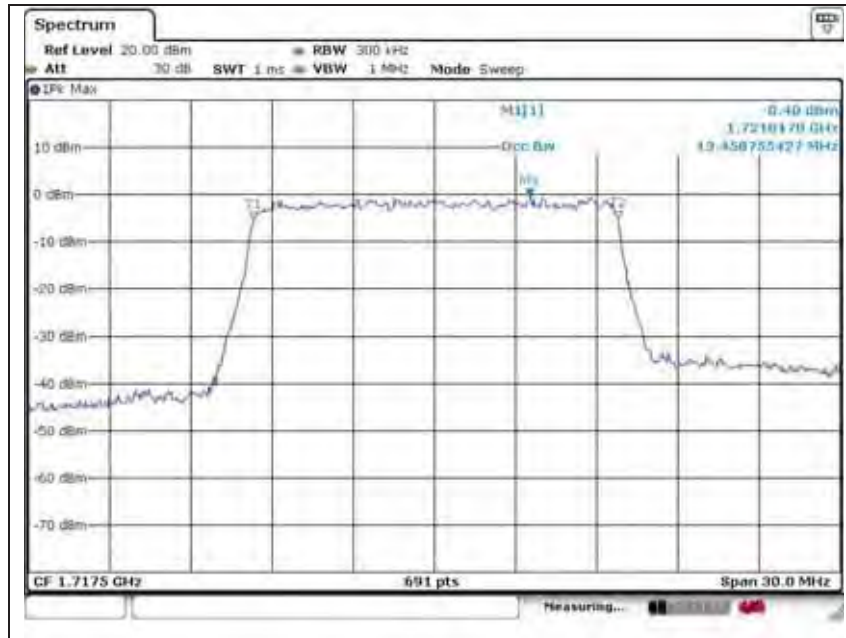
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 4 (15 MHz – QPSK_RB 75)

99 %

Low Channel

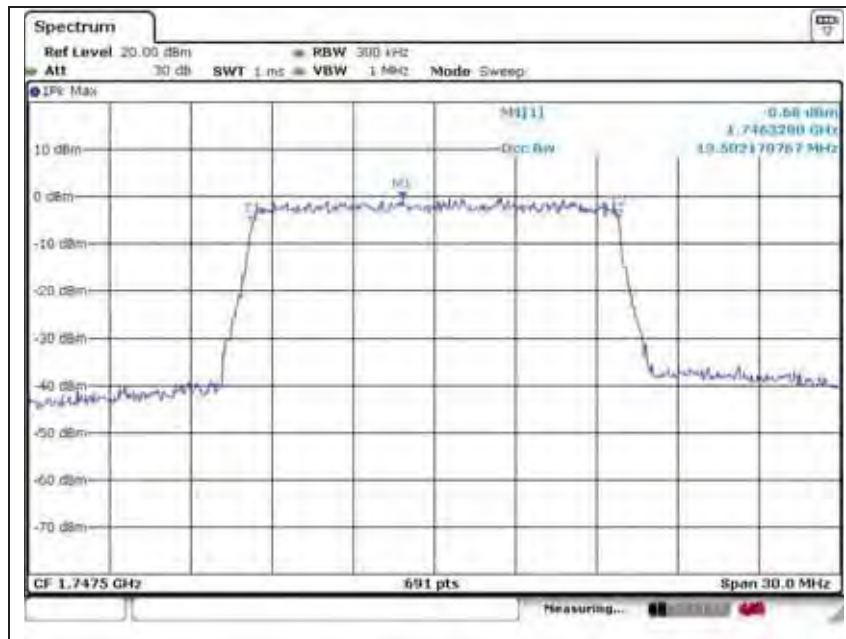


Middle Channel



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High Channel



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RTT5041-20(2014.01.20)(2)

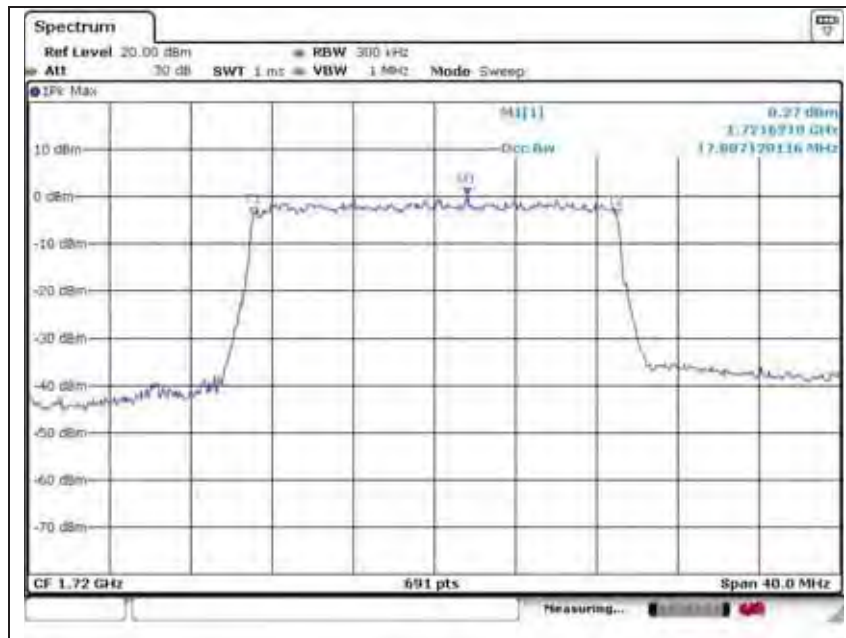
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

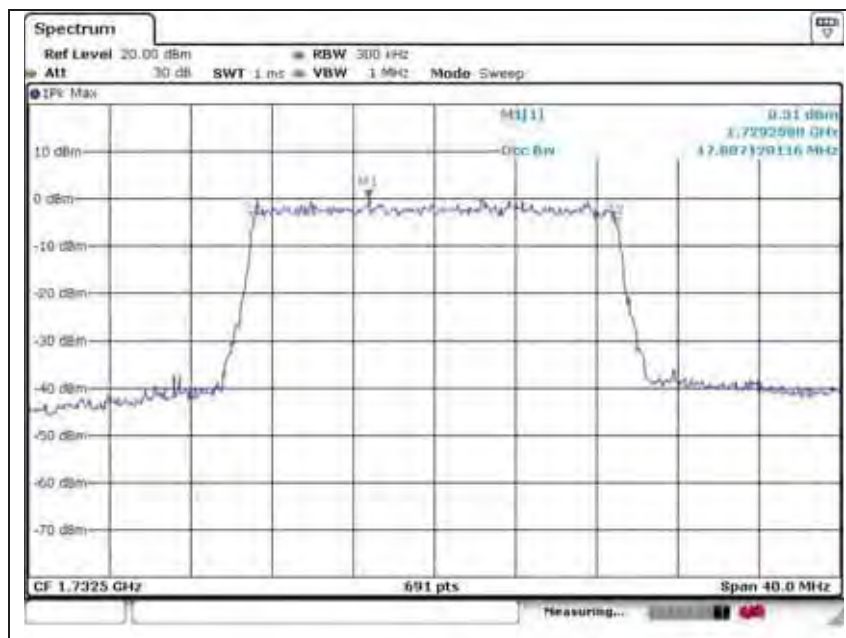
LTE band 4 (20 MHz – QPSK_RB 100)

99 %

Low Channel



Middle Channel



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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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RTT5041-20(2014.01.20)(2)

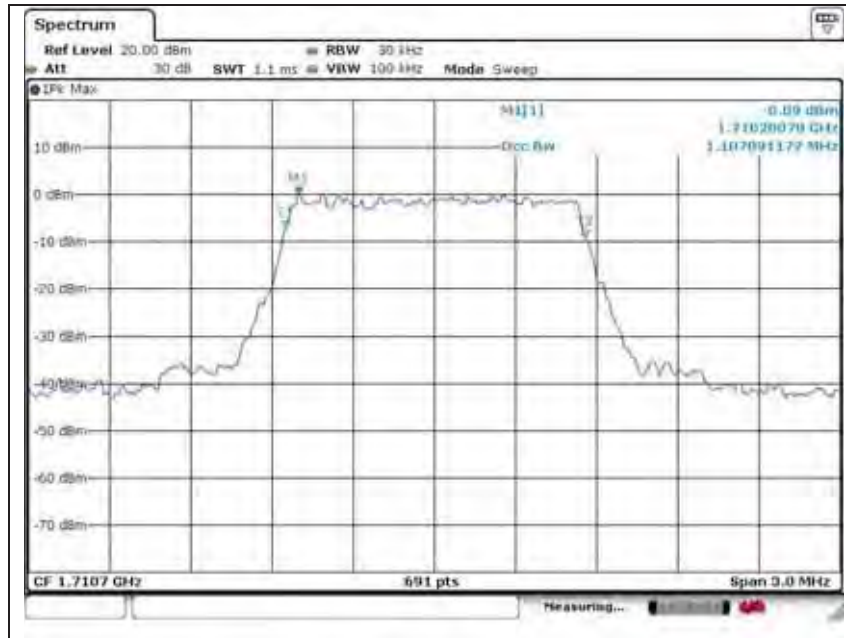
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

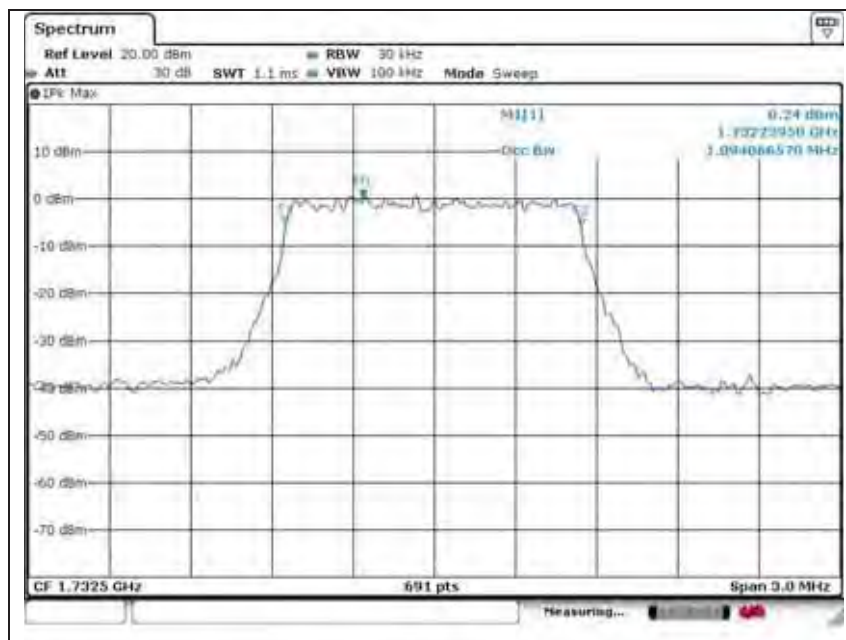
LTE band 4 (1.4 MHz – 16QAM_RB 6)

99 %

Low Channel



Middle Channel



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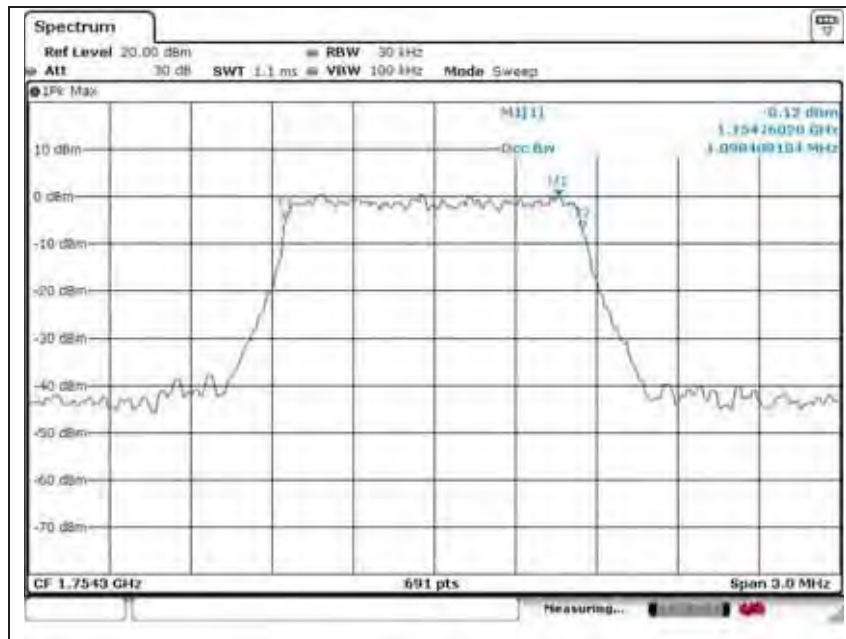
<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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RTT5041-20(2014.01.20)(2)

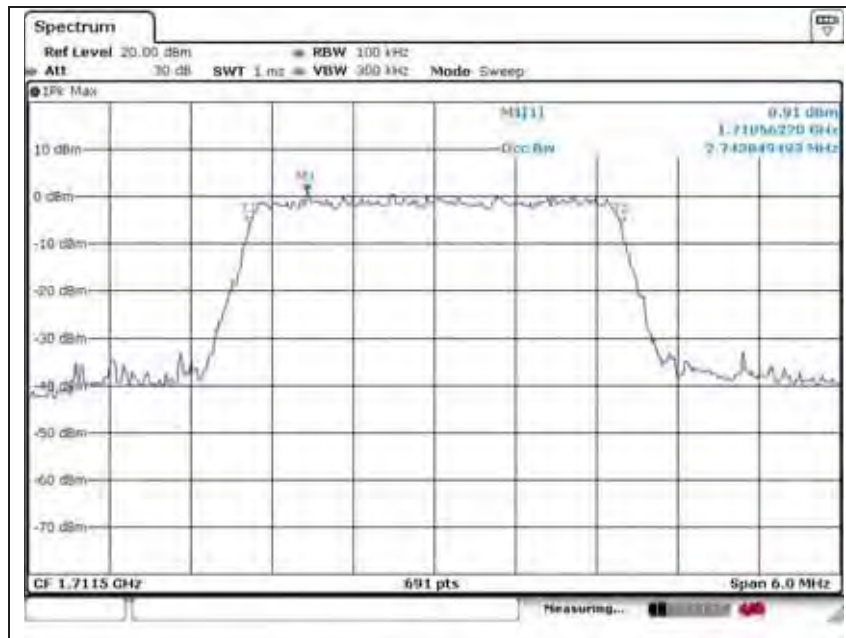
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

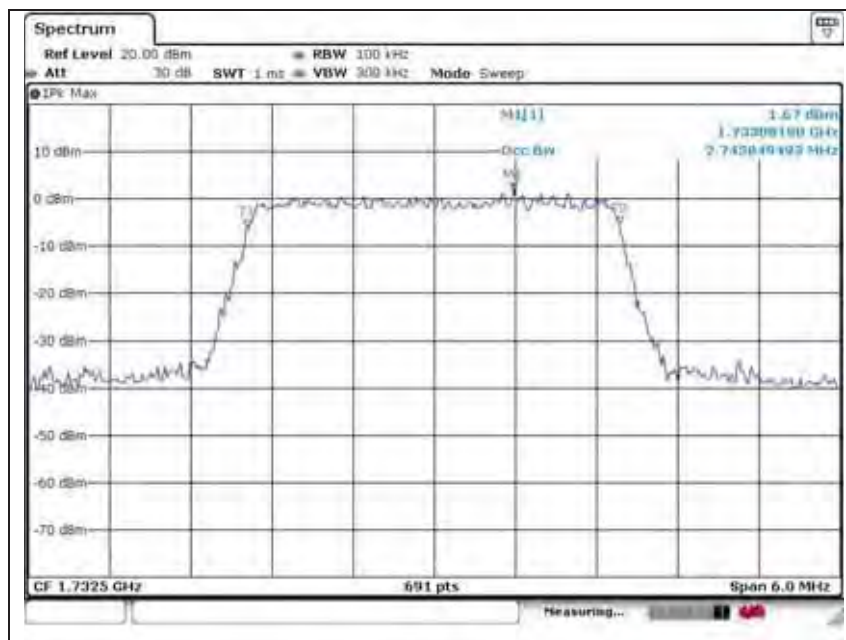
LTE band 4 (3 MHz – 16QAM_RB 15)

99 %

Low Channel



Middle Channel



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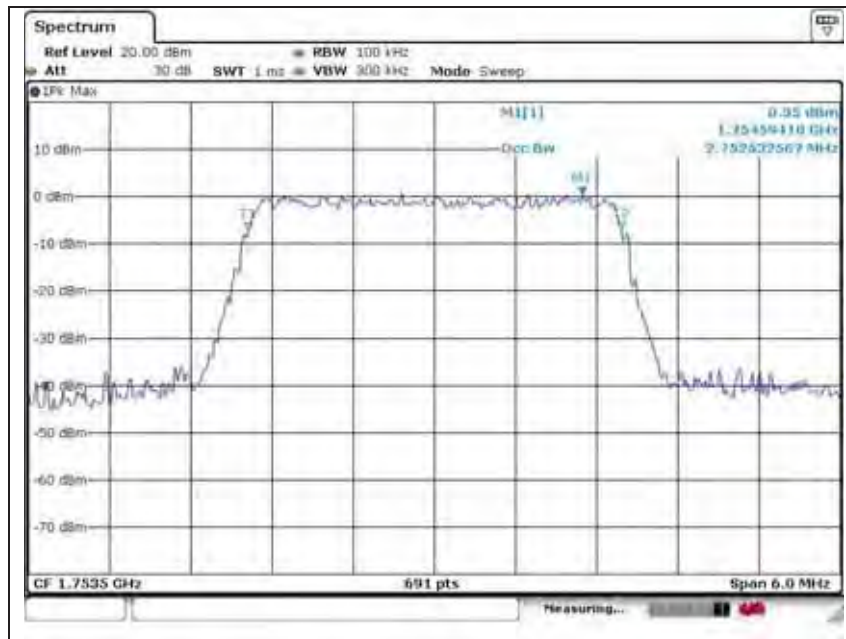
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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RTT5041-20(2014.01.20)(2)

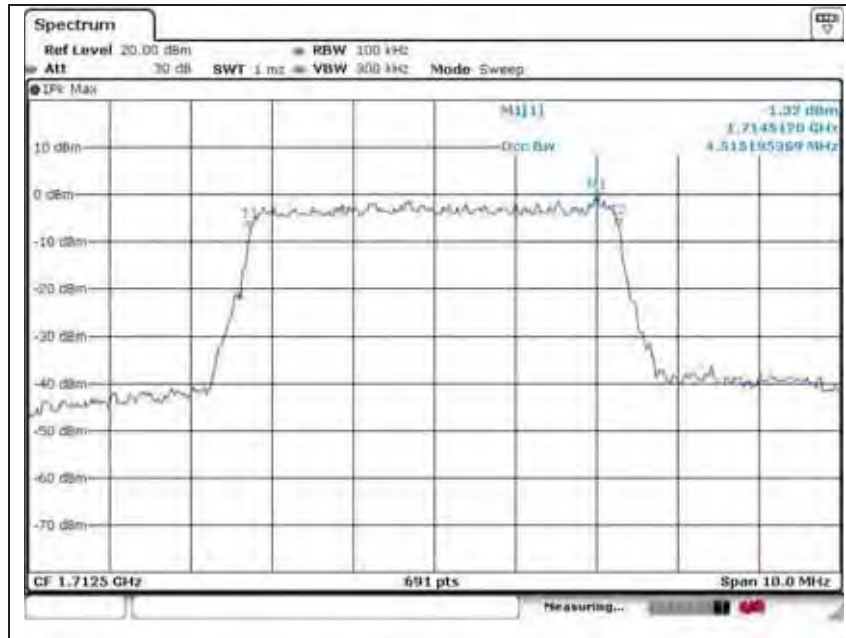
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

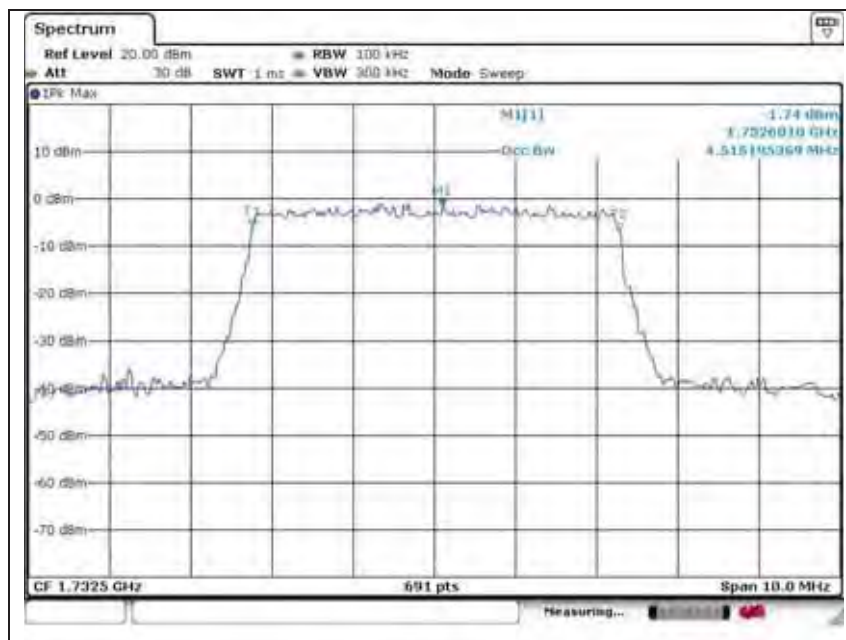
LTE band 4 (5 MHz – 16QAM_RB 25)

99 %

Low Channel



Middle Channel



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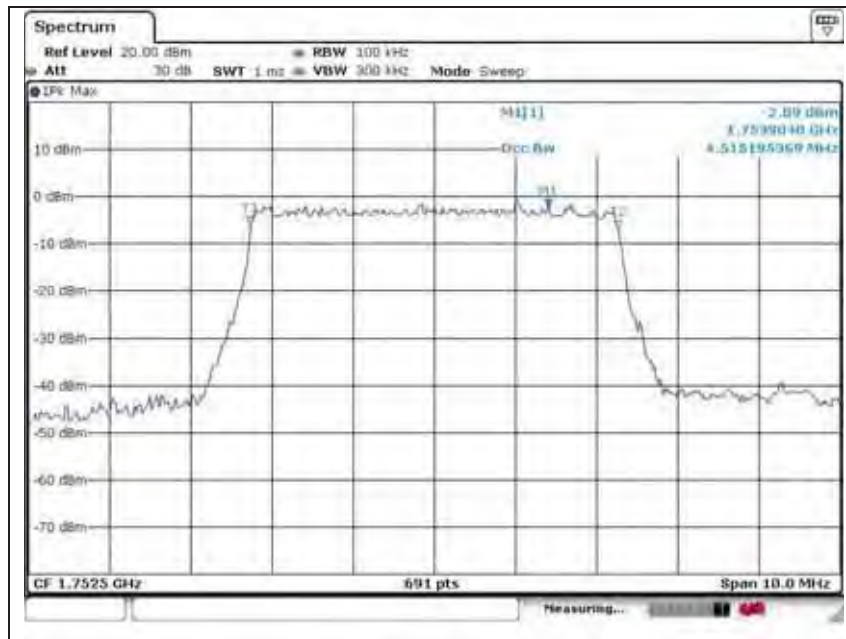
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel

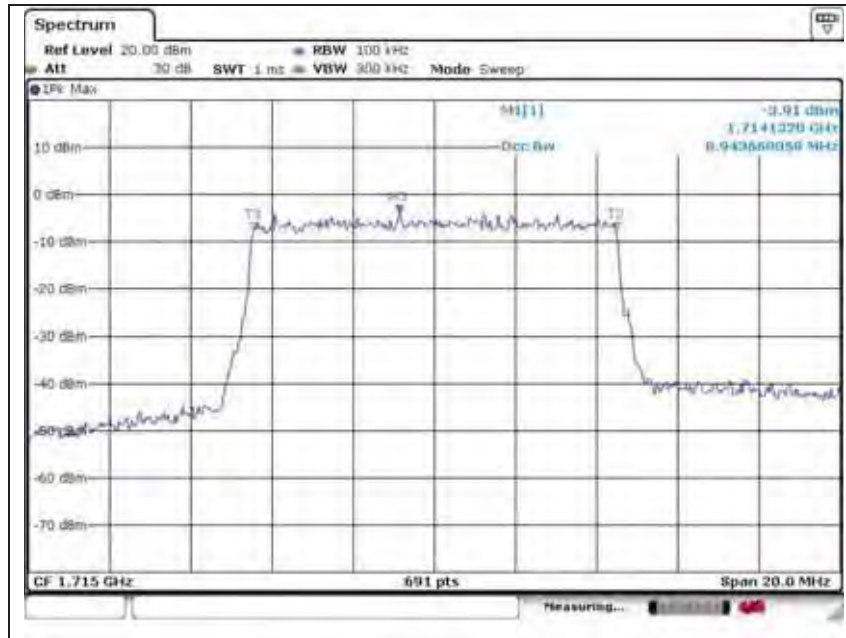


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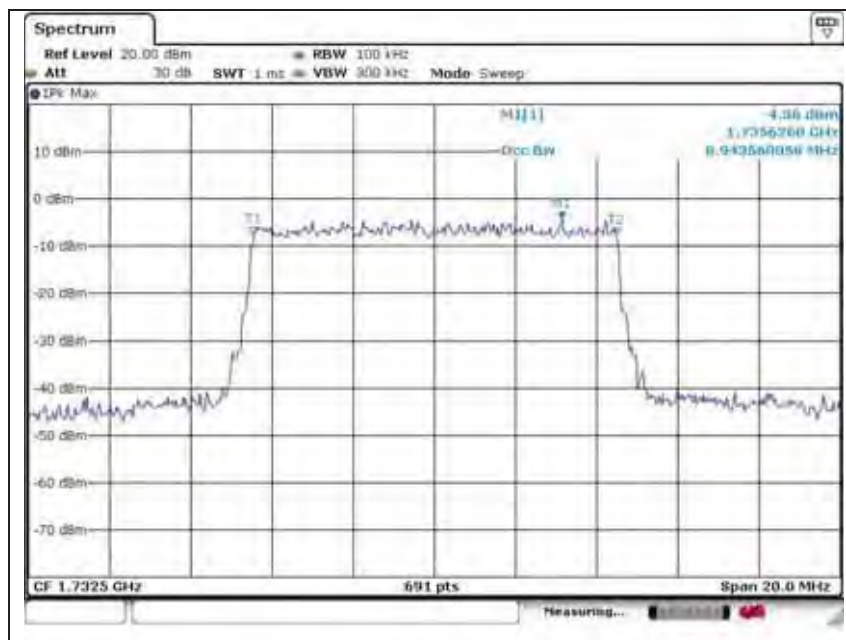
LTE band 4 (10 MHz – 16QAM_RB 50)

99 %

Low Channel



Middle Channel



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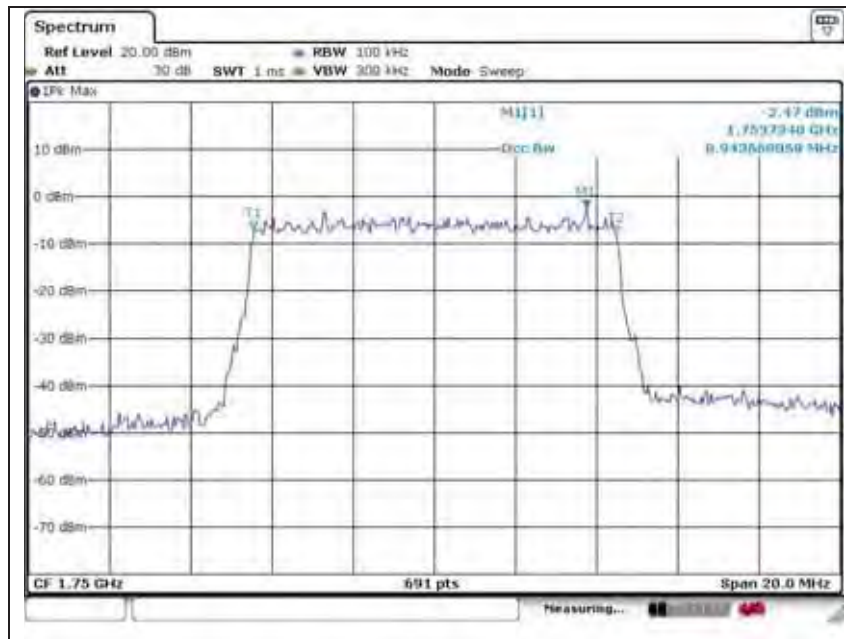
<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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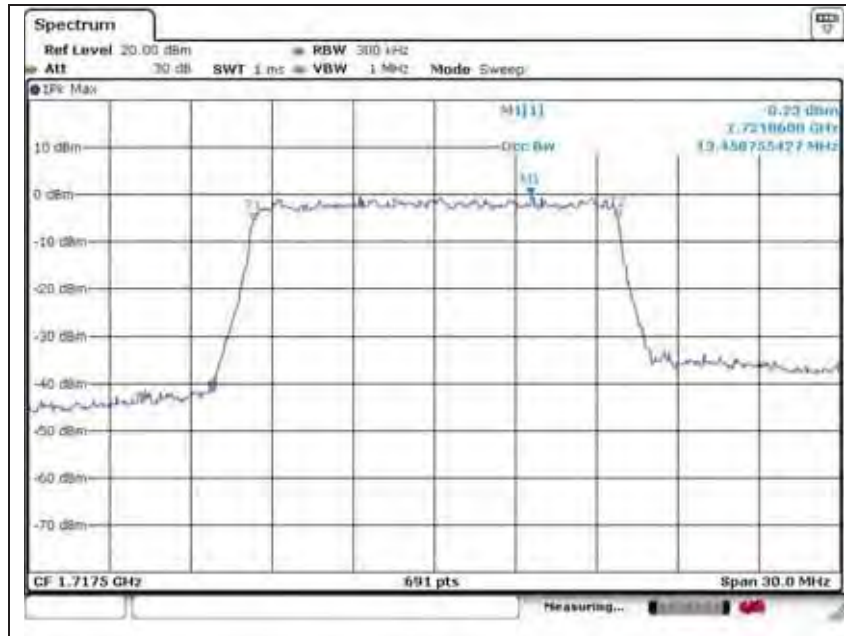
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

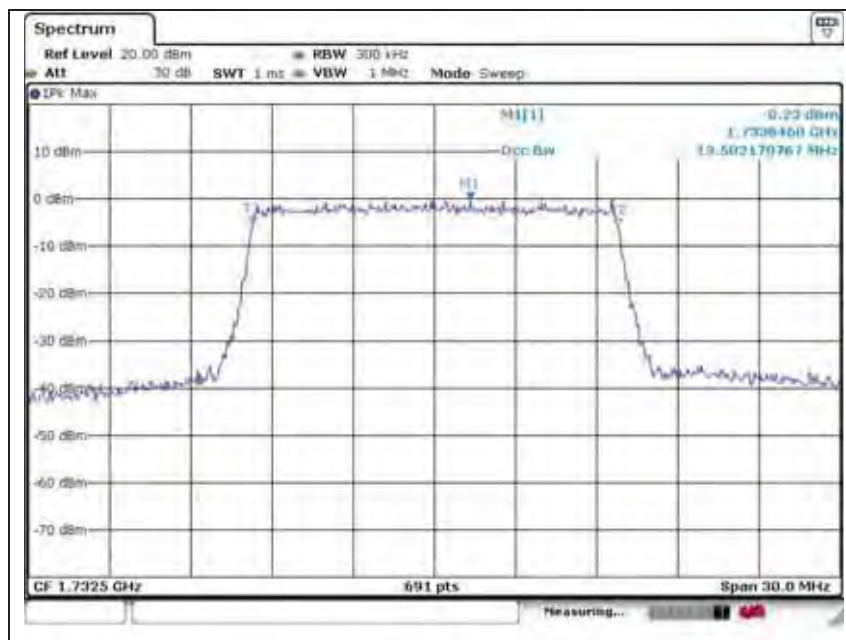
LTE band 4 (15 MHz – 16QAM_RB 75)

99 %

Low Channel



Middle Channel



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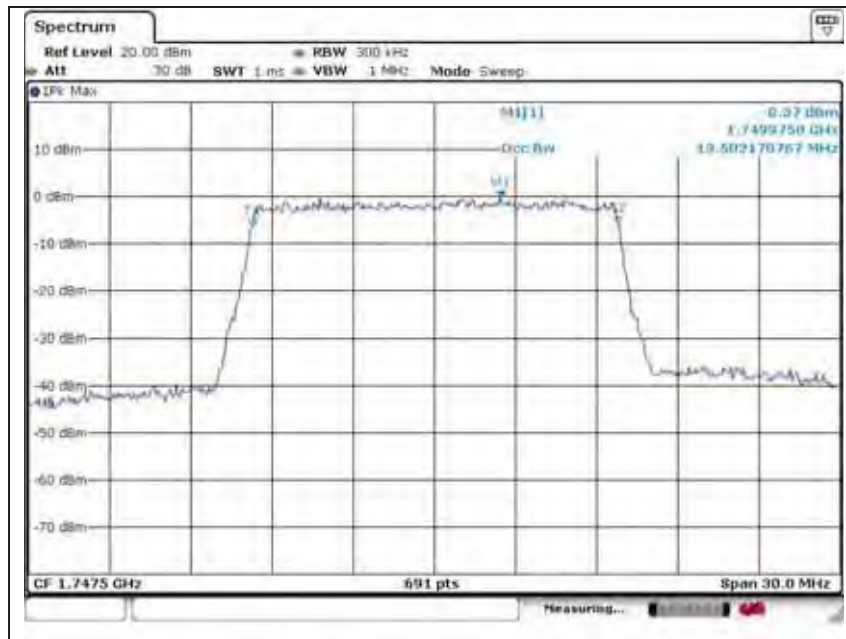
<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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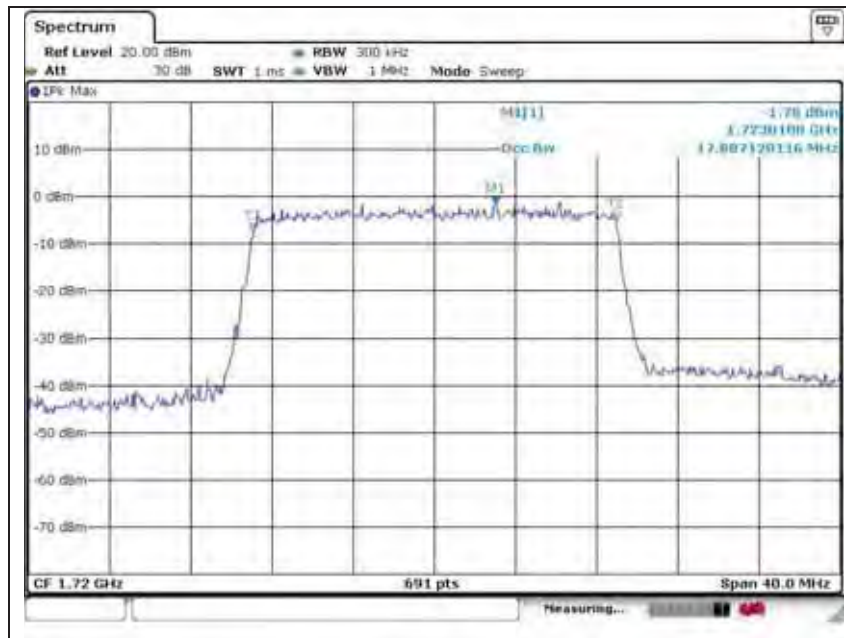
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

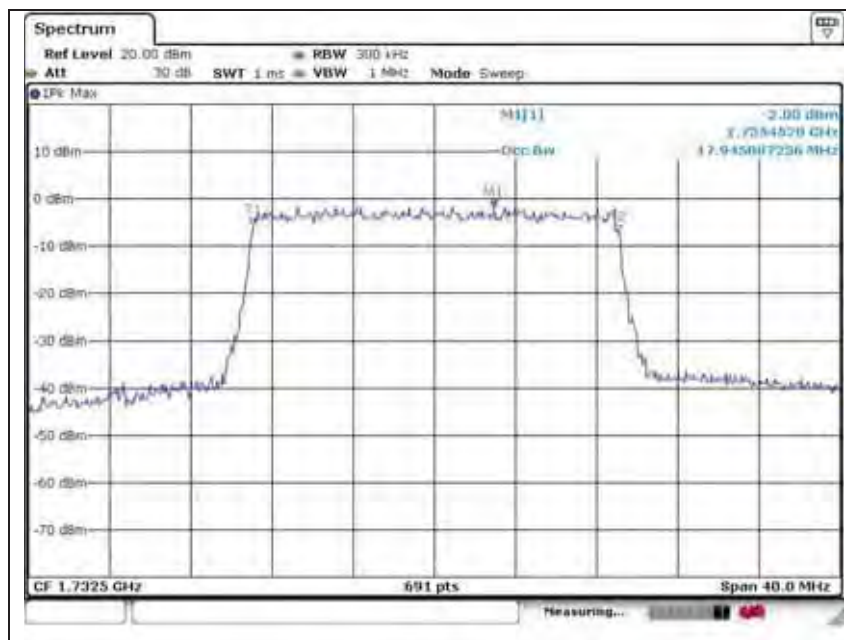
LTE band 4 (20 MHz – 16QAM_RB 100)

99 %

Low Channel



Middle Channel



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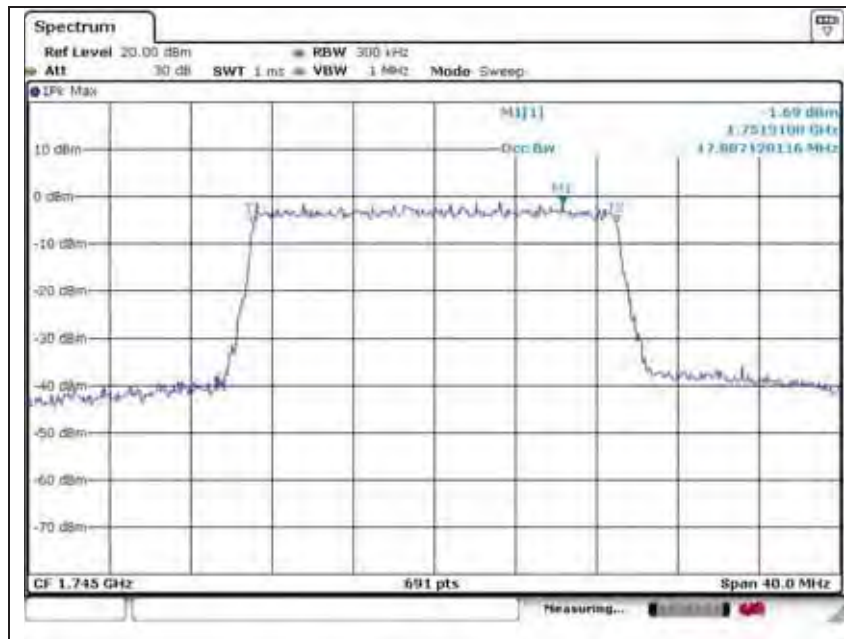
<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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RTT5041-20(2014.01.20)(2)

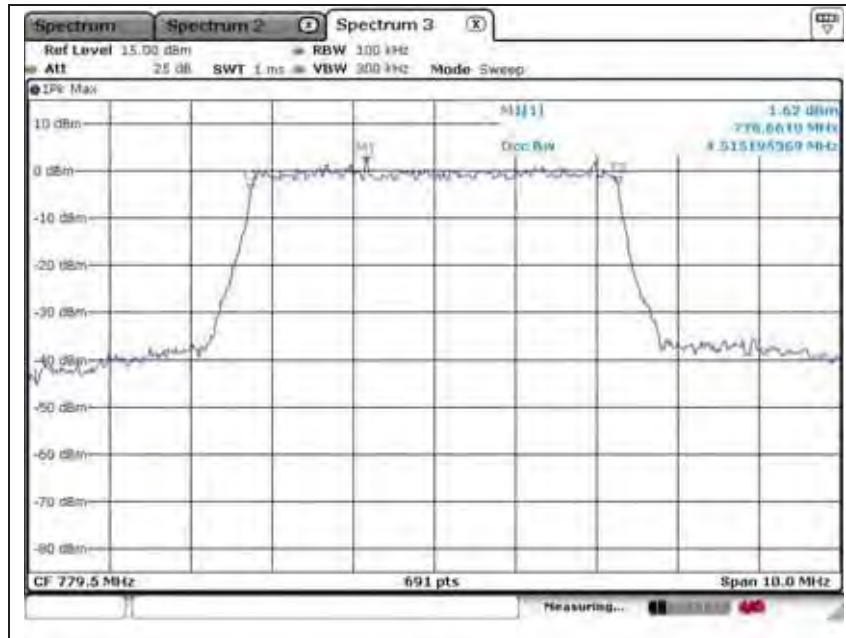
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

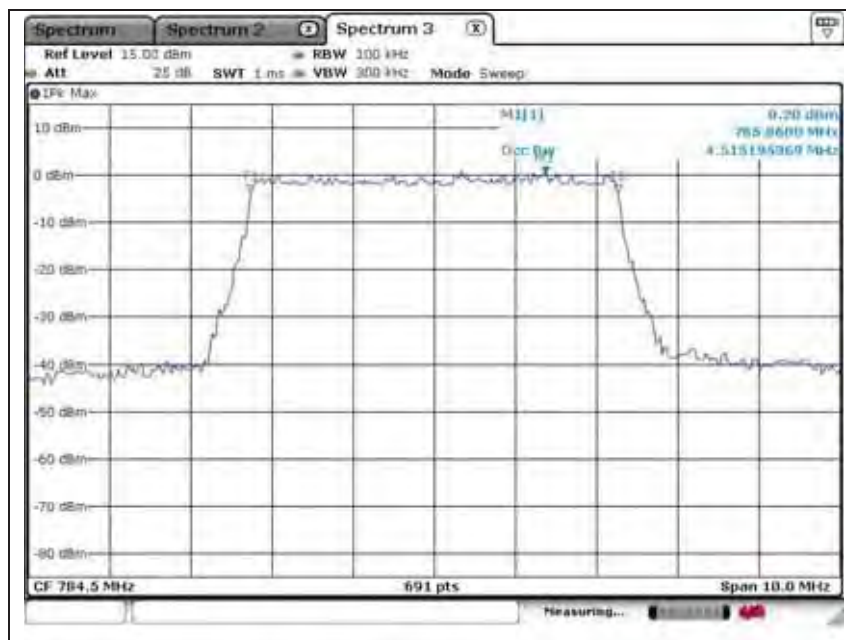
LTE band 13 (5 MHz – QPSK_RB 25)

99 %

Low Channel



High Channel



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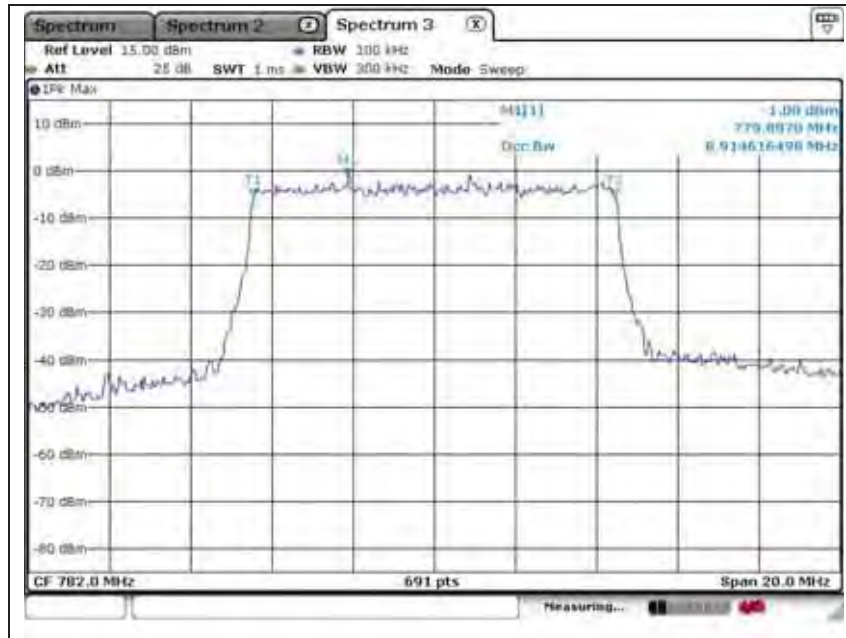
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 13 (10 MHz – QPSK_RB 50)

99 %

Middle Channel



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RTT5041-20(2014.01.20)(2)

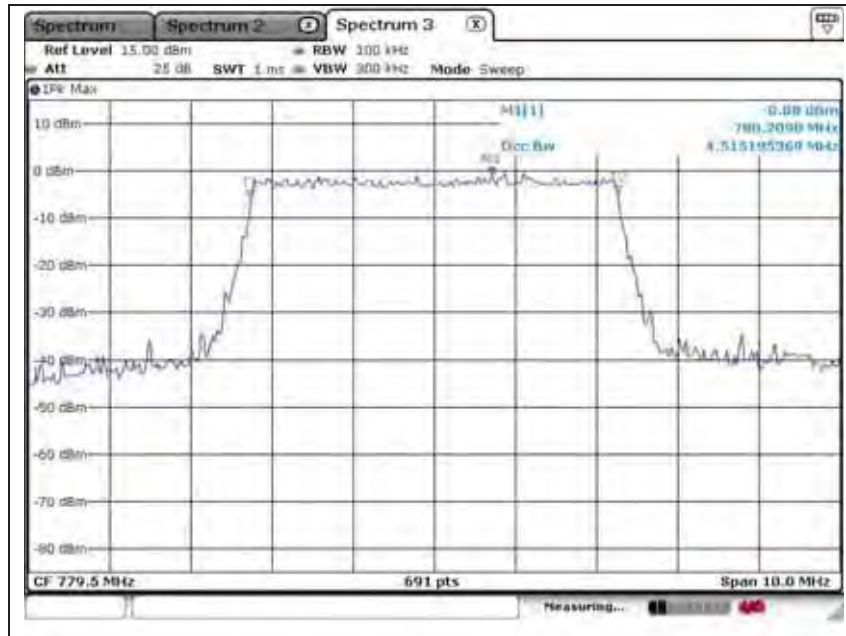
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

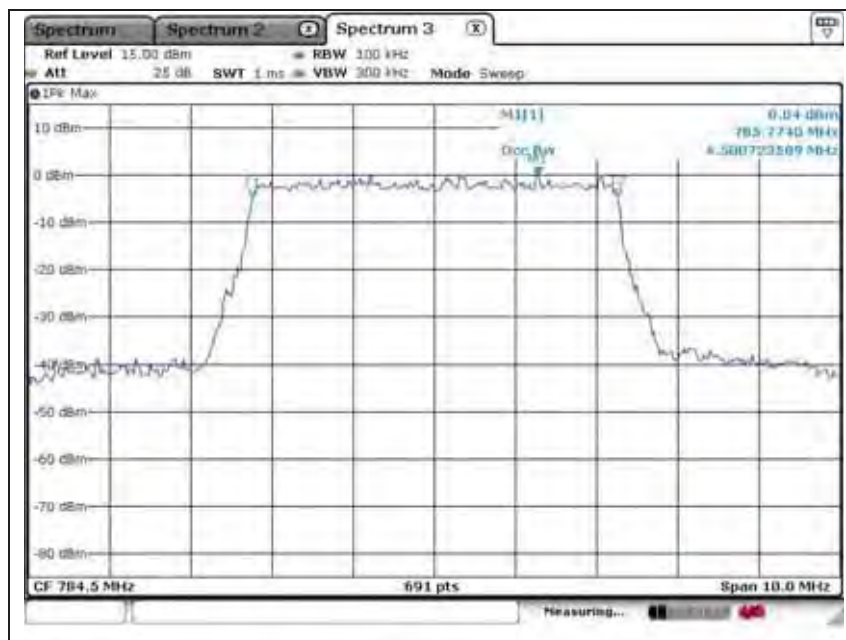
LTE band 13 (5 MHz – 16QAM_RB 25)

99 %

Low Channel



High Channel

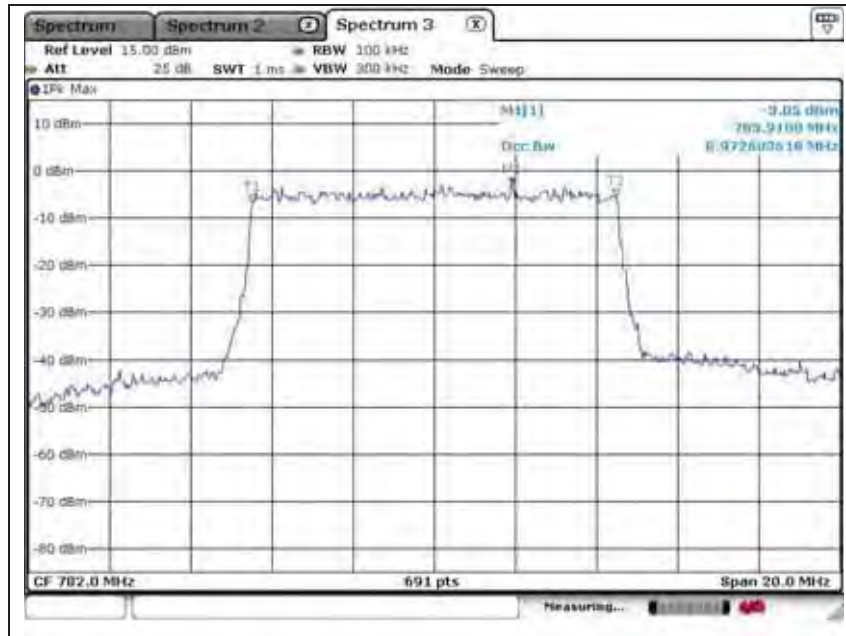


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LTE band 13 (10 MHz – 16QAM_RB 50)

99 %

Middle Channel



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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

5. Peak-Average Ratio

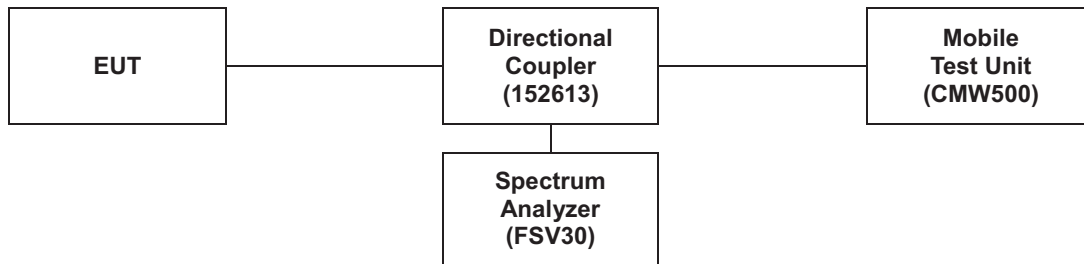
5.1. Limit

§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.

5.2. Test Procedure

The test follows section 5.7.1 of FCC KDB publication 971168 D01 v02r02.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The CCDF function of the spectrum analyzer was set.
3. Set resolution/measurement bandwidth \geq signal's occupied bandwidth.
4. PAR was measured with spectrum analyzer for each channel.



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5.3 Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

Band	Mode	Frequency (MHz)	PAR (dB)
CDMA 1 900	1xRTT RC5 9 (Loopback)	1 851.25	3.45
		1 880.00	3.77
		1 908.75	3.59
CDMA 1 900	1xEV-DO(Rel0) RTAP 19.2	1 851.25	4.38
		1 880.00	4.90
		1 908.75	4.58
LTE 4 (1.4 MHz)	QPSK	1 710.7	5.54
		1 732.5	5.16
		1 754.3	5.62
LTE 4 (3 MHz)	QPSK	1 711.5	5.25
		1 732.5	5.01
		1 753.5	5.45
LTE 4 (5 MHz)	QPSK	1 712.5	5.36
		1 732.5	5.01
		1 752.5	5.22
LTE 4 (10 MHz)	QPSK	1 715.0	5.36
		1 732.5	5.13
		1 750.0	5.25
LTE 4 (15 MHz)	QPSK	1 717.5	5.80
		1 732.5	5.45
		1 747.5	5.57
LTE 4 (20 MHz)	QPSK	1 720.0	5.25
		1 732.5	5.16
		1 745.0	5.13

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Band	Mode	Frequency (MHz)	PAR (dB)
LTE 4 (1.4 MHz)	16QAM	1 710.7	6.46
		1 732.5	6.26
		1 754.3	6.38
LTE 4 (3 MHz)	16QAM	1 711.5	6.38
		1 732.5	6.00
		1 753.5	6.32
LTE 4 (5 MHz)	16QAM	1 712.5	6.32
		1 732.5	5.97
		1 752.5	6.35
LTE 4 (10 MHz)	16QAM	1 715.0	6.20
		1 732.5	6.06
		1 750.0	6.09
LTE 4 (15 MHz)	16QAM	1 717.5	6.43
		1 732.5	6.06
		1 747.5	6.20
LTE 4 (20 MHz)	16QAM	1 720.0	6.26
		1 732.5	6.03
		1 745.0	6.06

Please refer to the following plots.

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RTT5041-20(2014.01.20)(2)

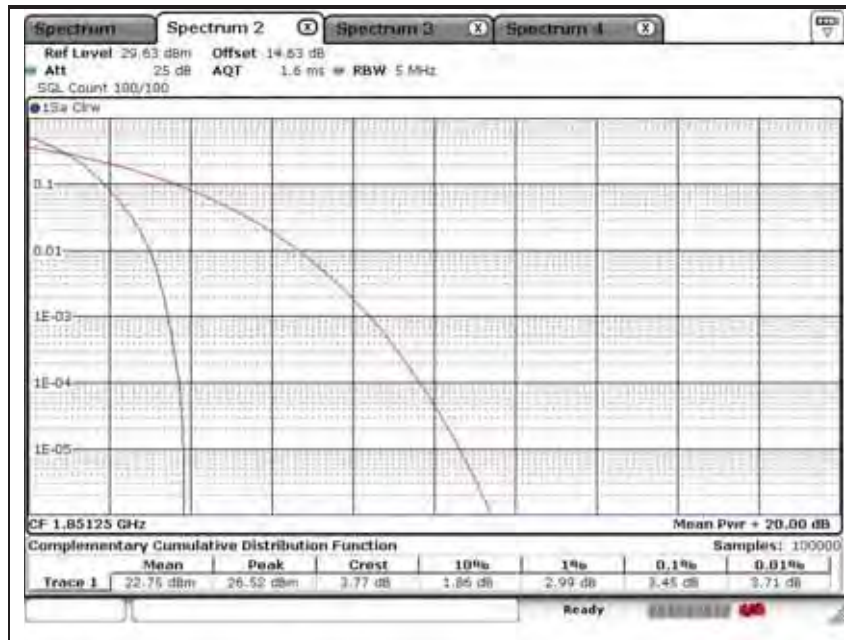
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

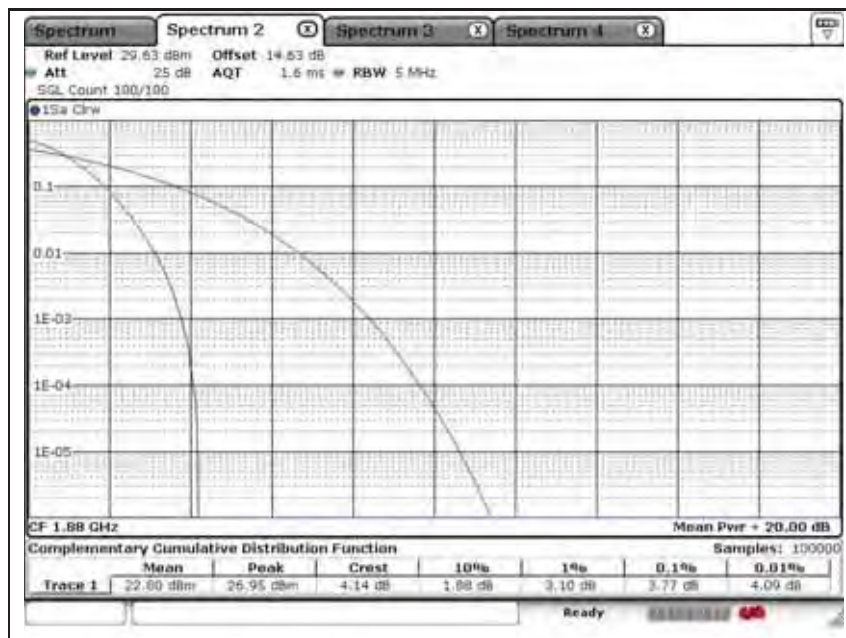
Peak-Average Ratio

CDMA 1 900 1xRTT

Low Channel

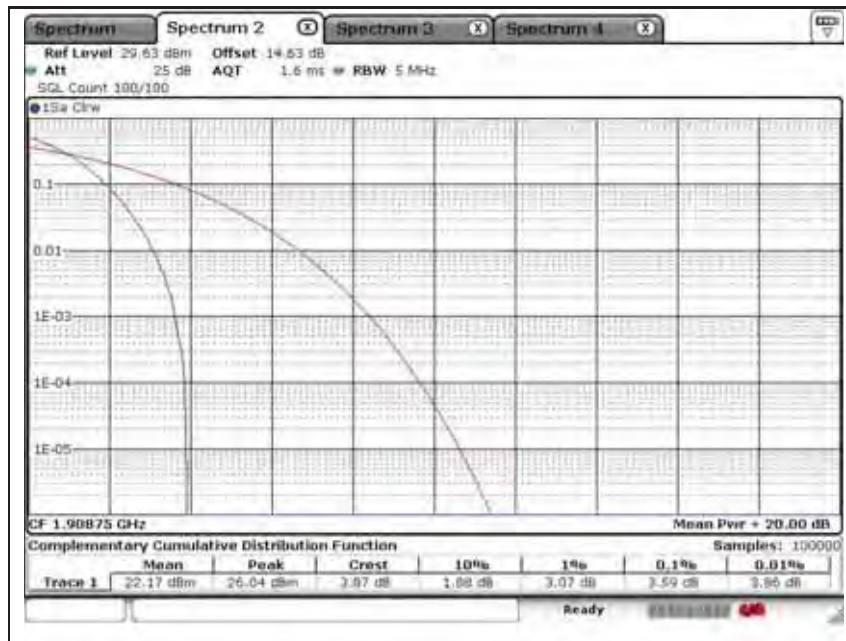


Middle Channel



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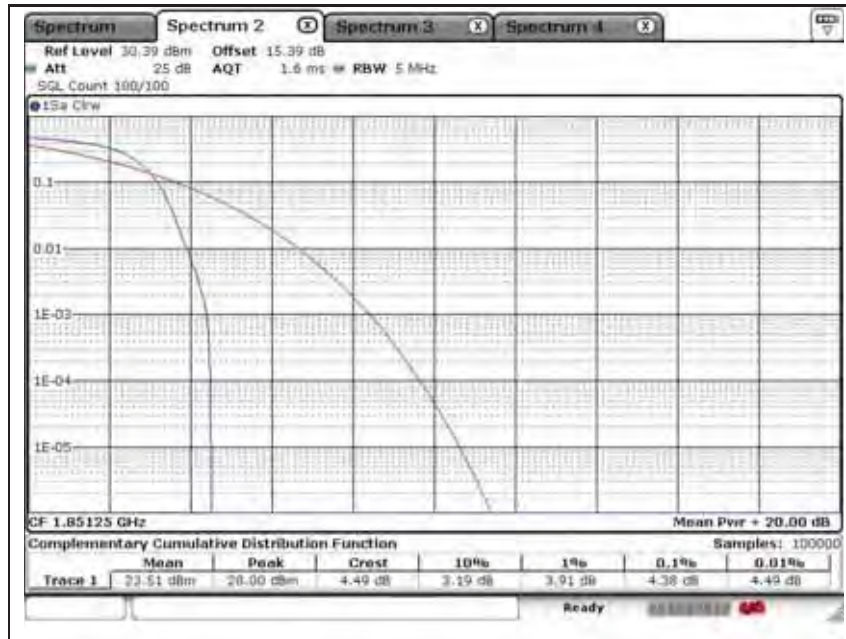
High Channel



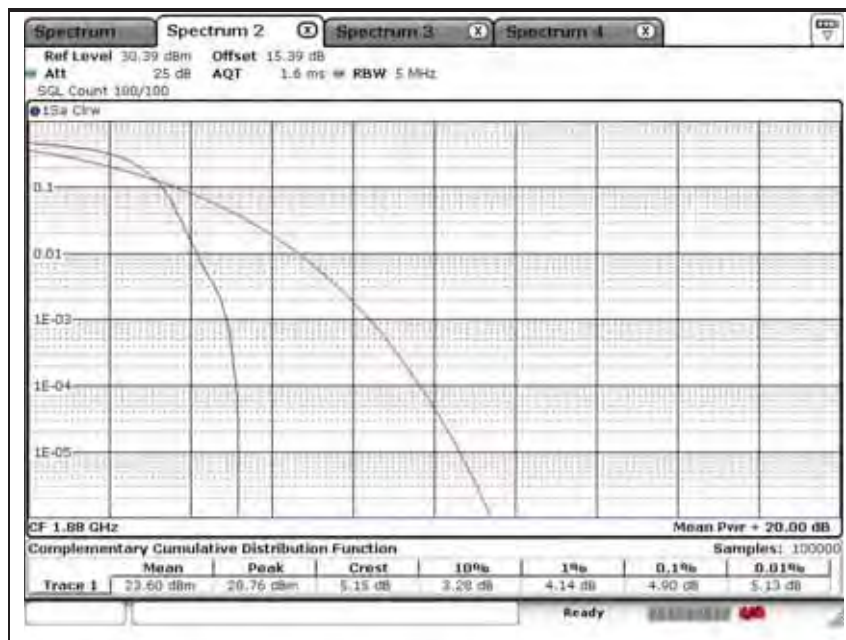
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

CDMA 1 900 1xEV-DO

Low Channel

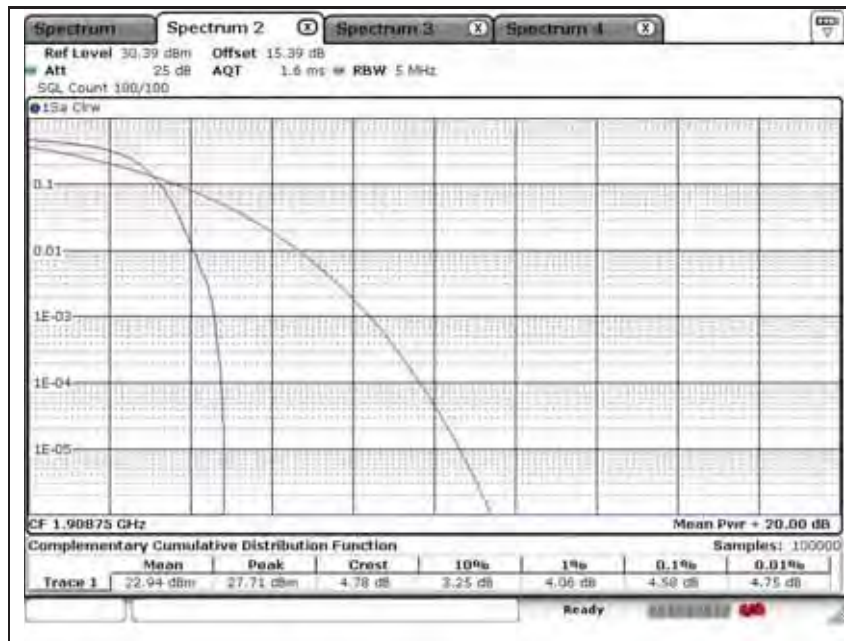


Middle Channel



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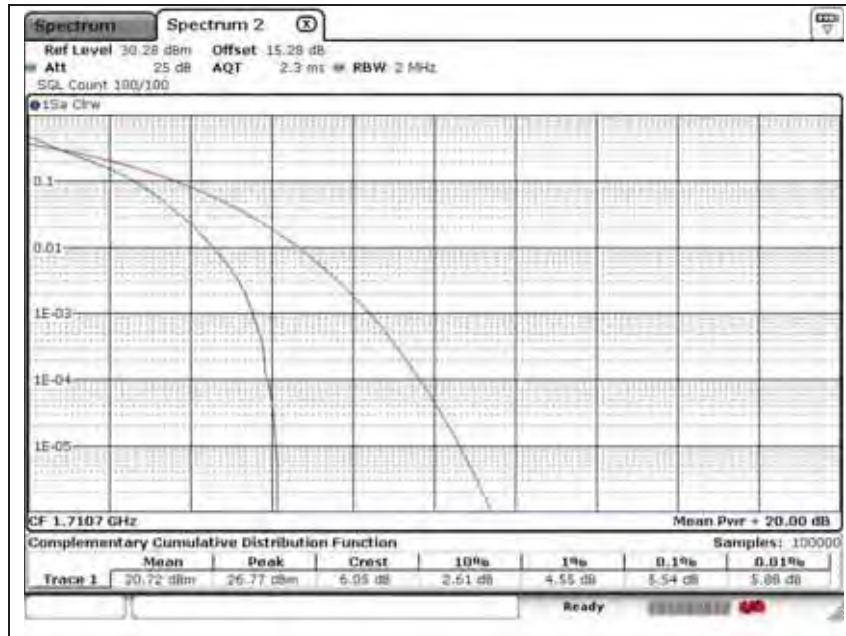
High Channel



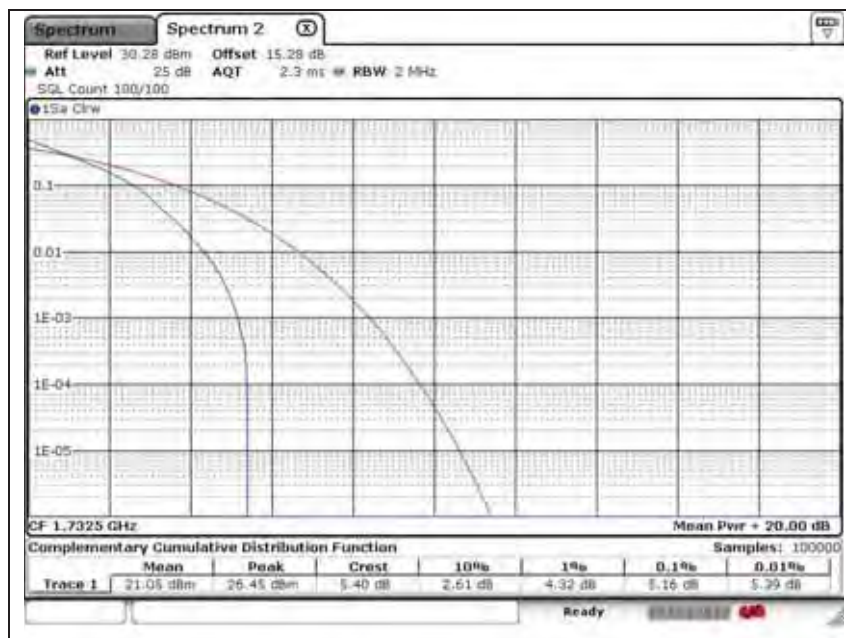
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LTE band 4 (1.4 MHz – QPSK_RB 6)

Low Channel

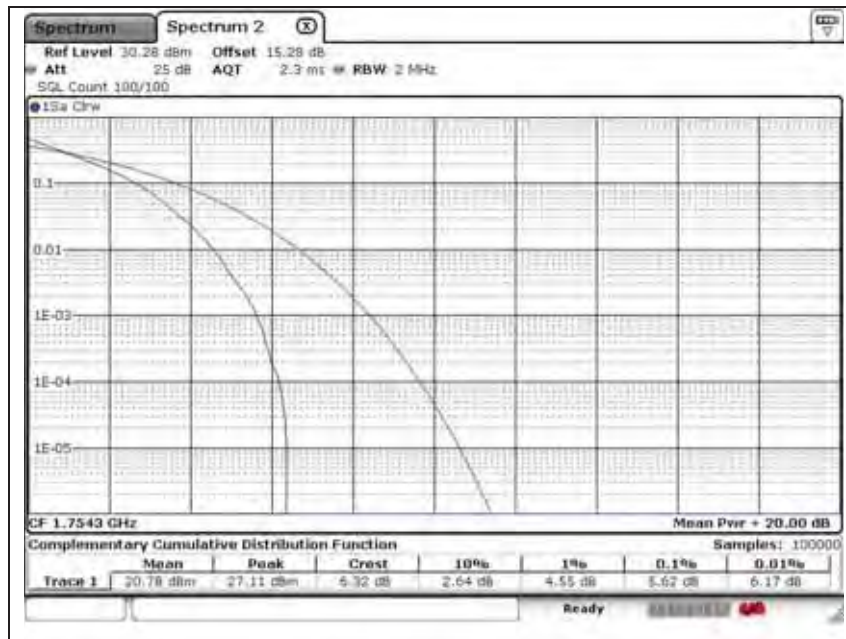


Middle Channel



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High Channel



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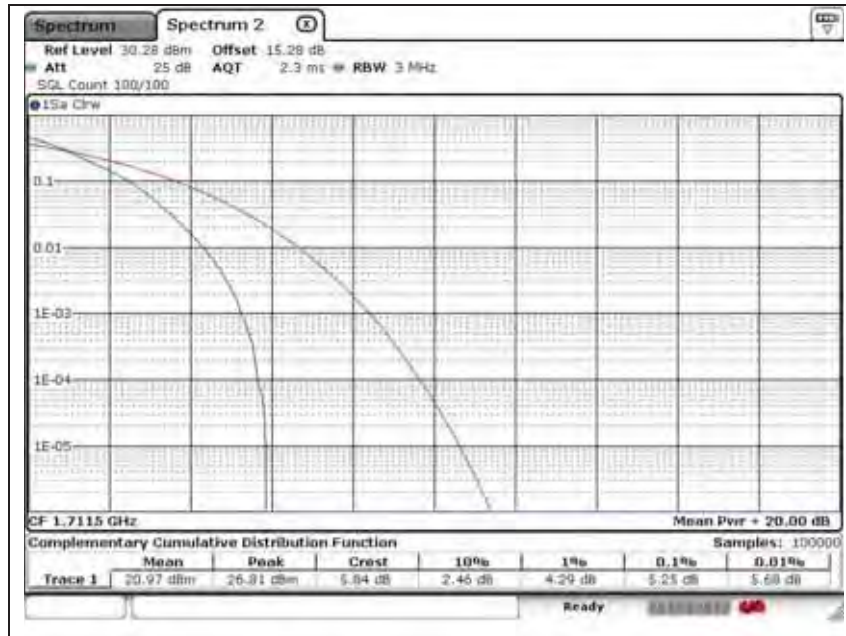
RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

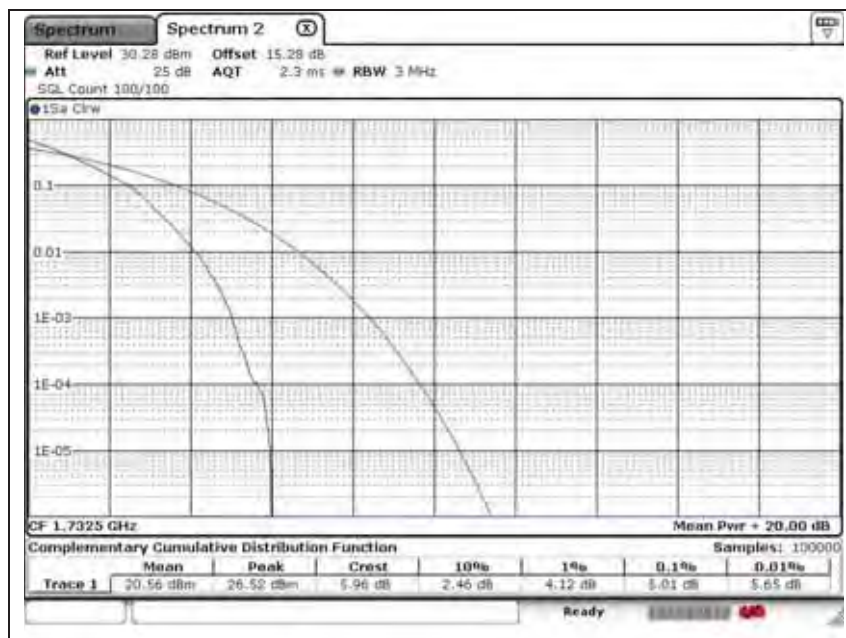
A4(210 mm x 297 mm)

LTE band 4 (3 MHz – QPSK_RB 15)

Low Channel

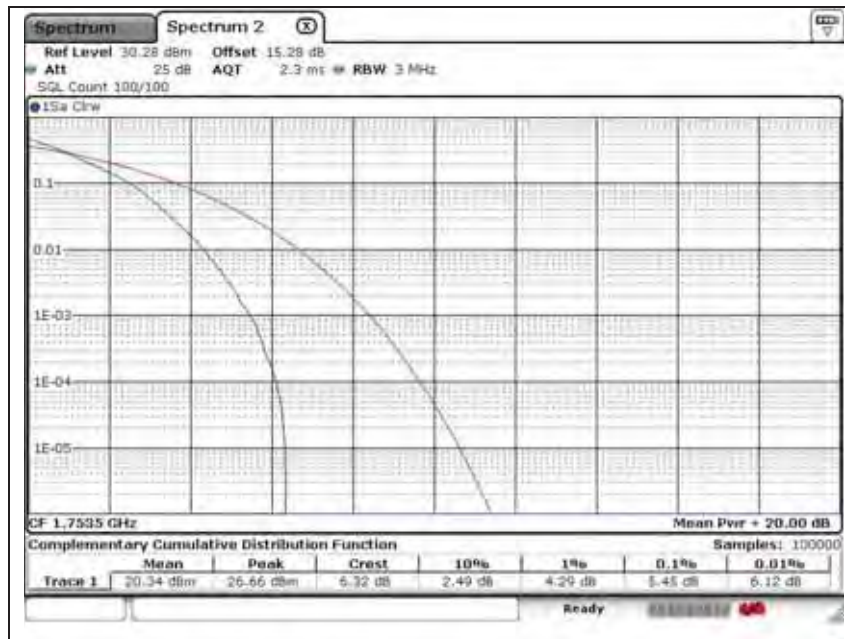


Middle Channel



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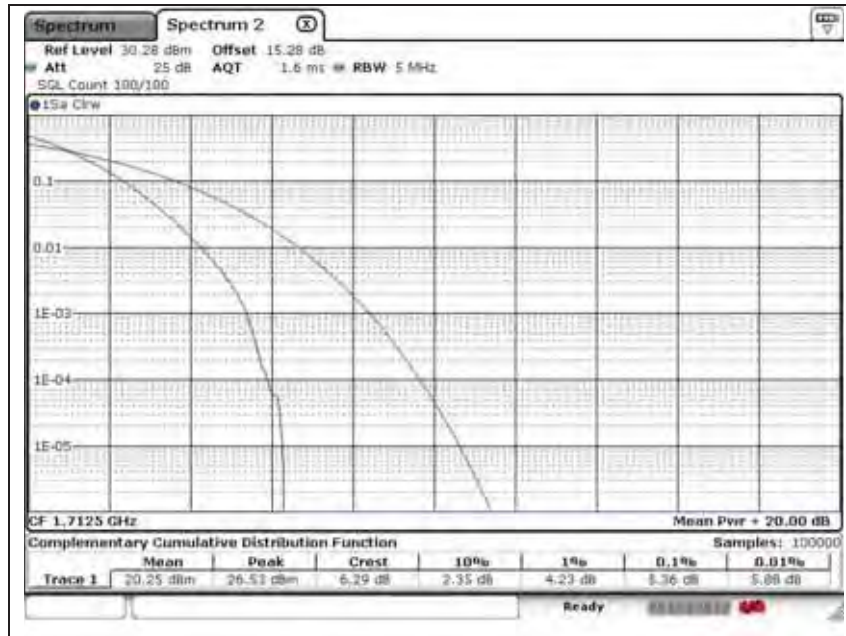
High Channel



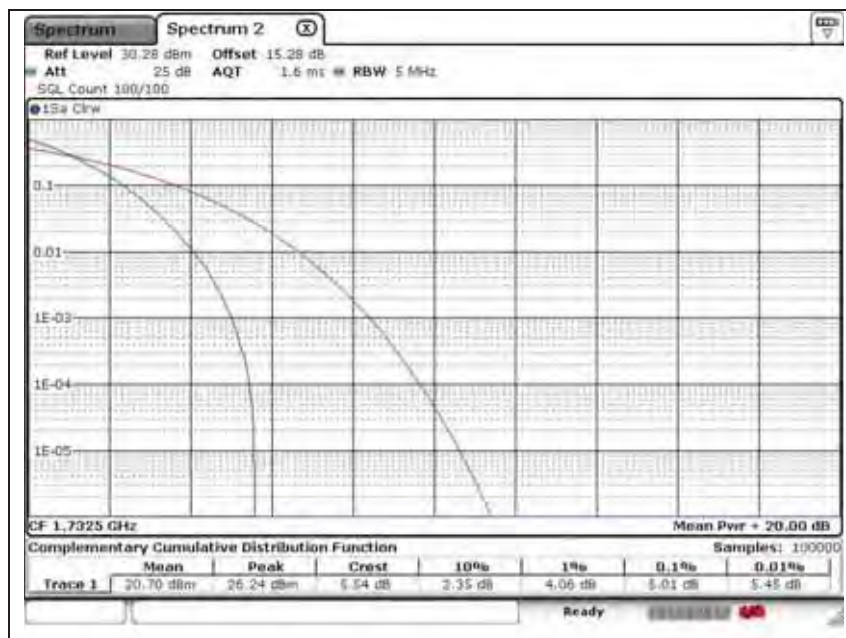
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (5 MHz – QPSK_RB 25)

Low Channel



Middle Channel



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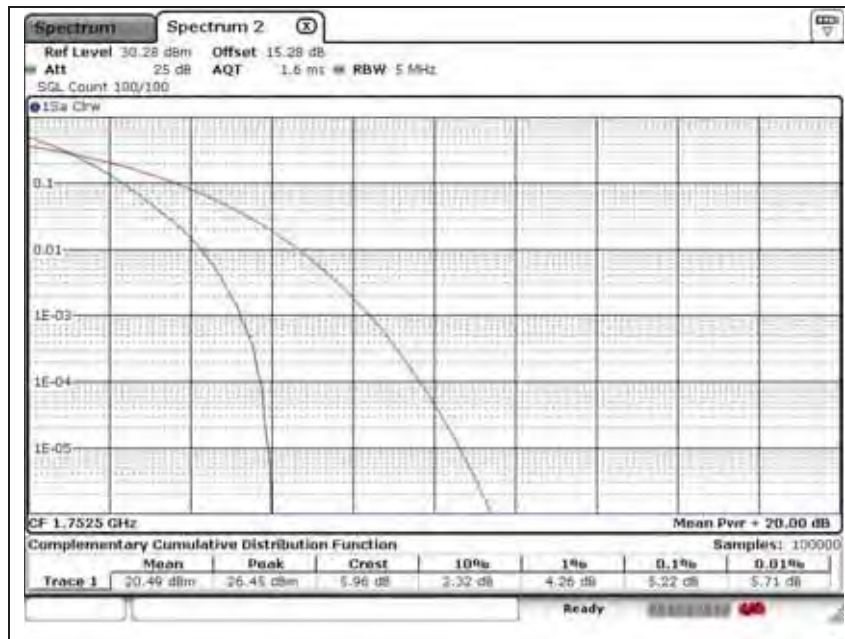
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

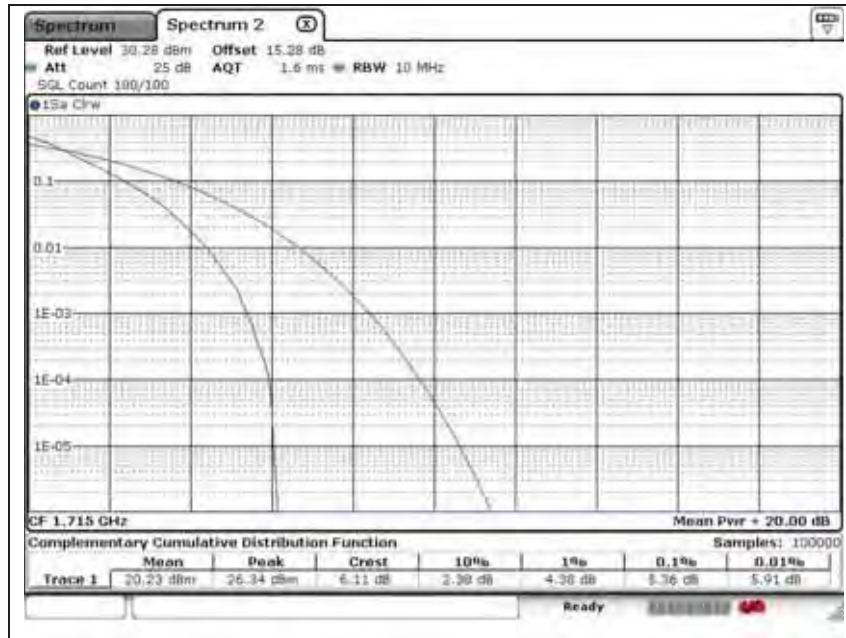
High Channel



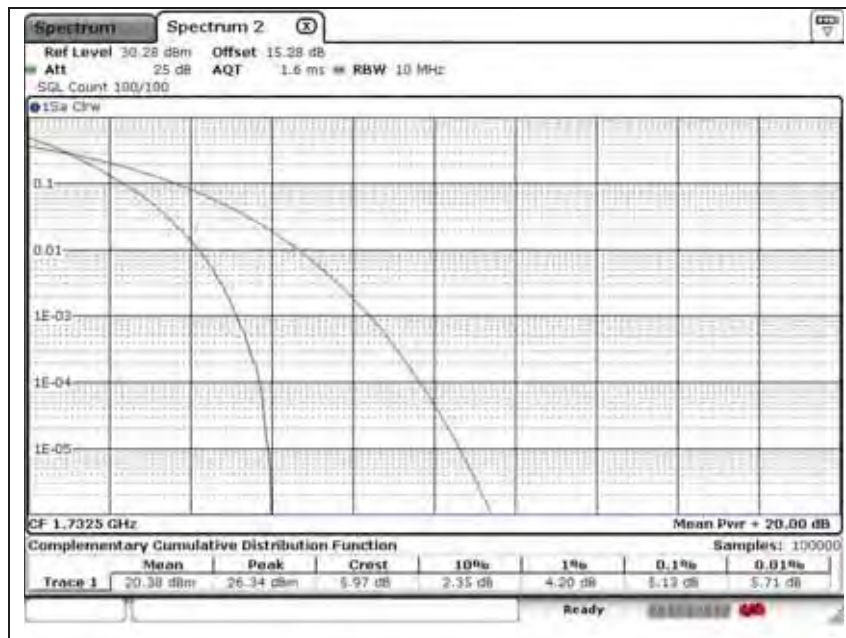
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (10 MHz – QPSK_RB 50)

Low Channel

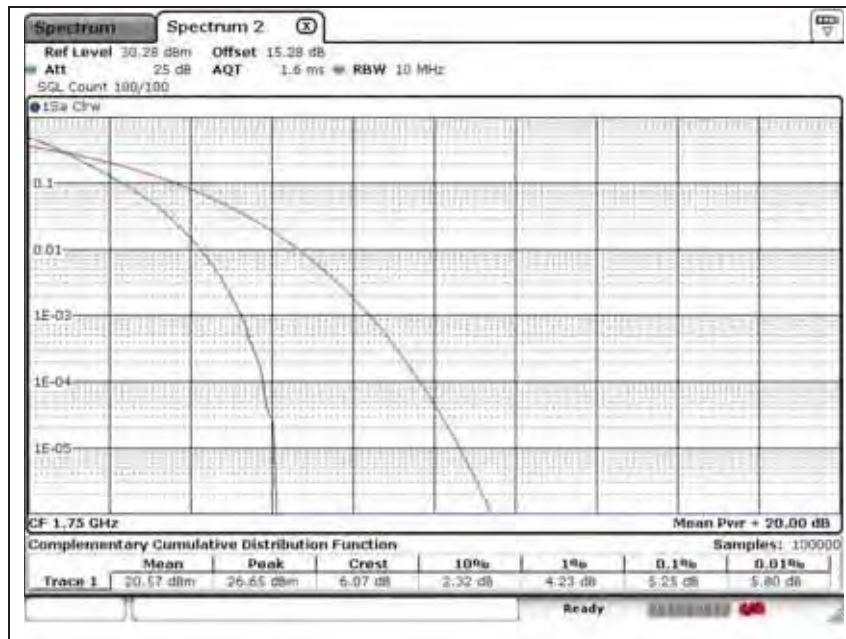


Middle Channel



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High Channel



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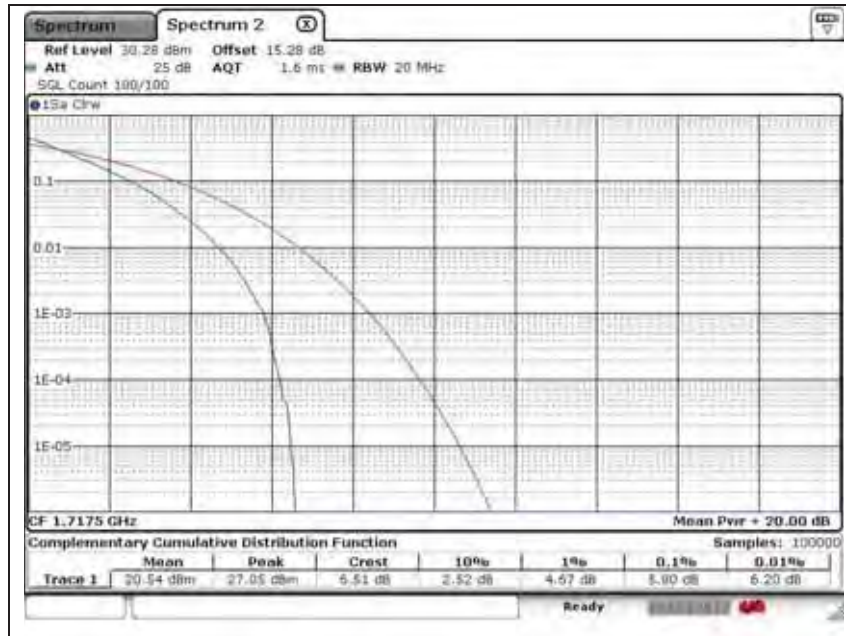
RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

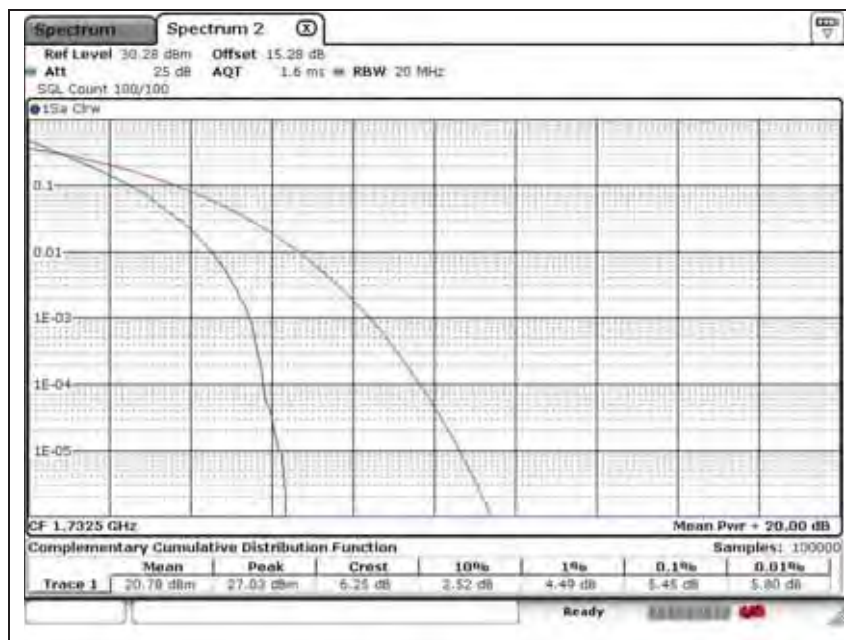
A4(210 mm x 297 mm)

LTE band 4 (15 MHz – QPSK_RB 75)

Low Channel



Middle Channel



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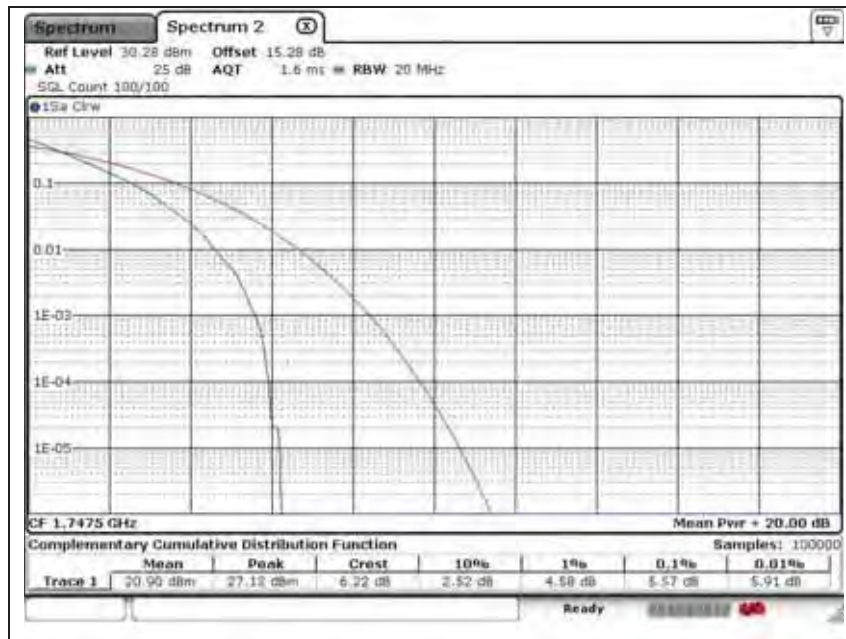
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

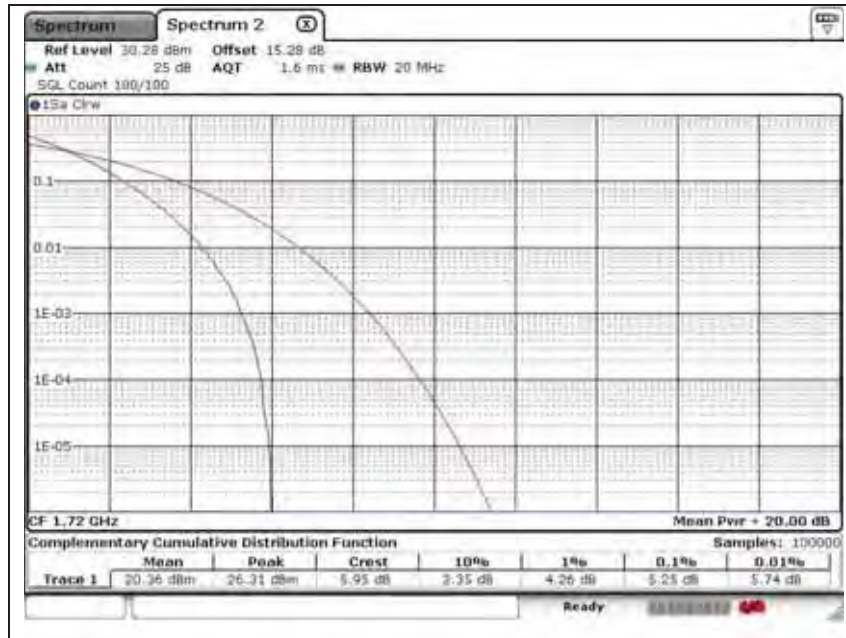
High Channel



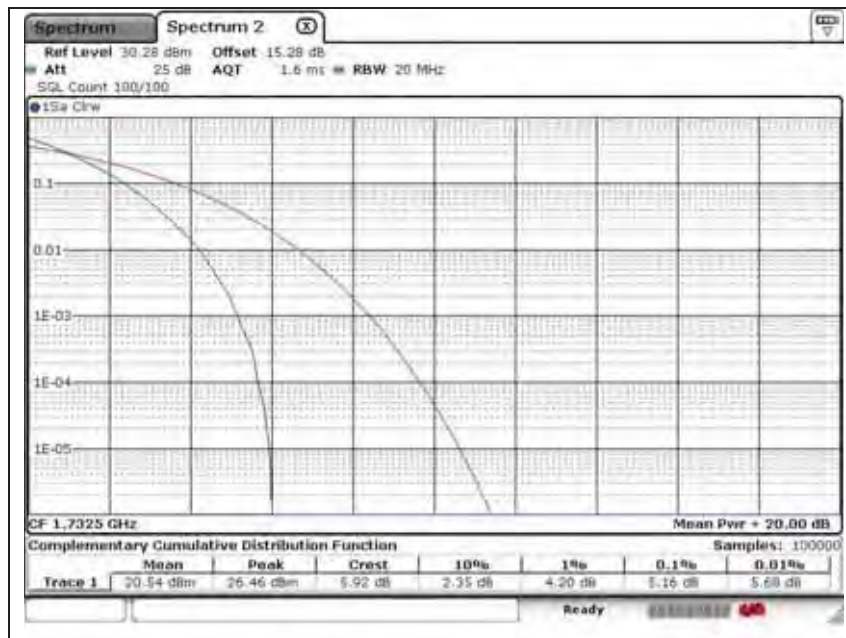
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (20 MHz – QPSK_RB 100)

Low Channel



Middle Channel



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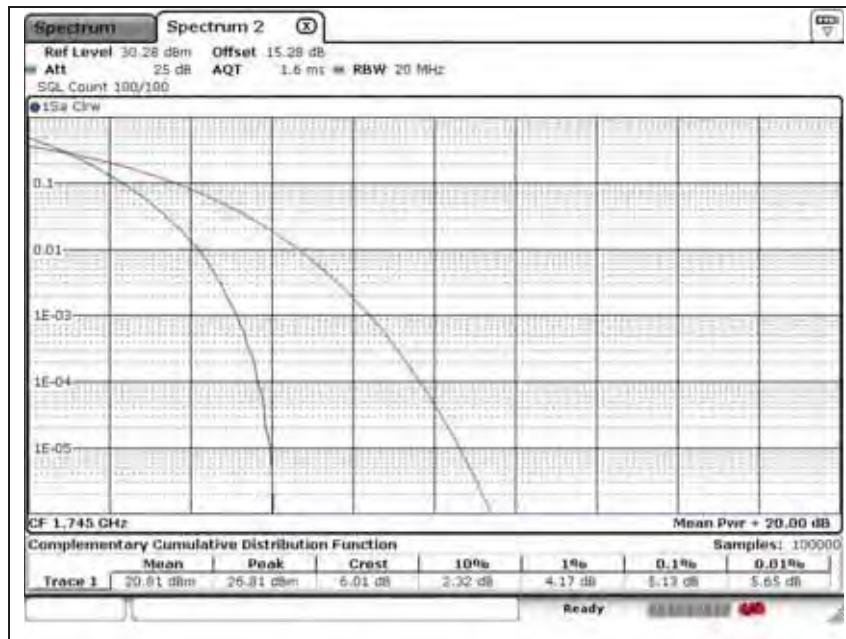
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

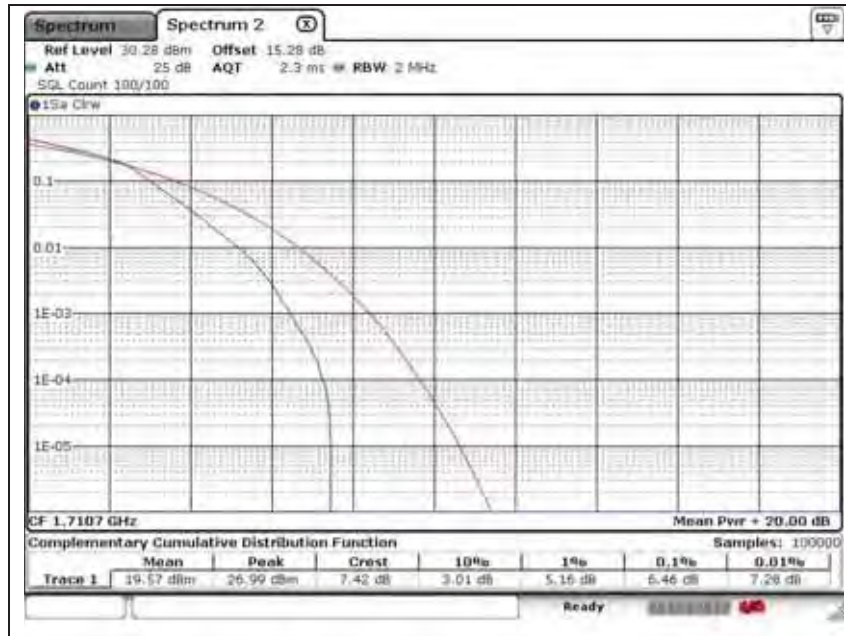
High Channel



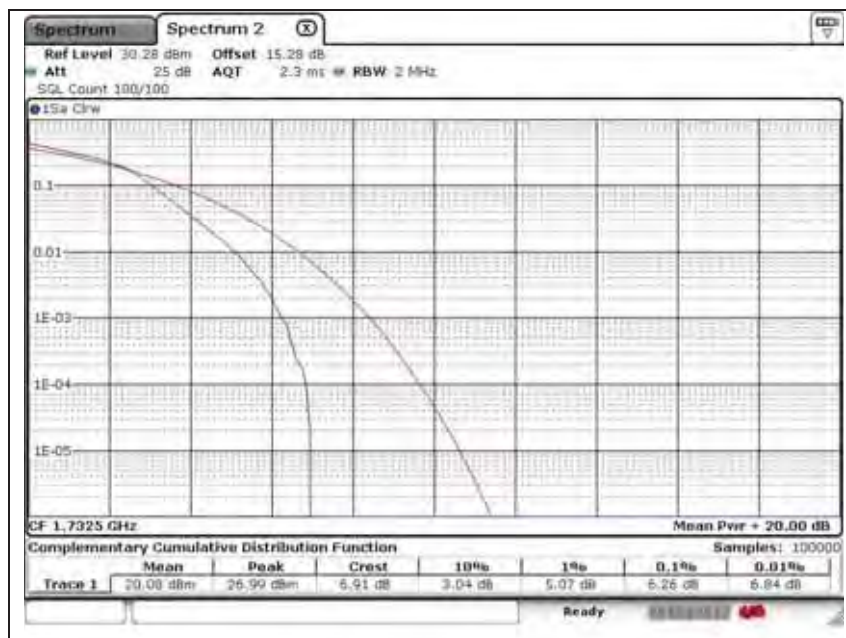
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (1.4 MHz – 16QAM_RB 6)

Low Channel

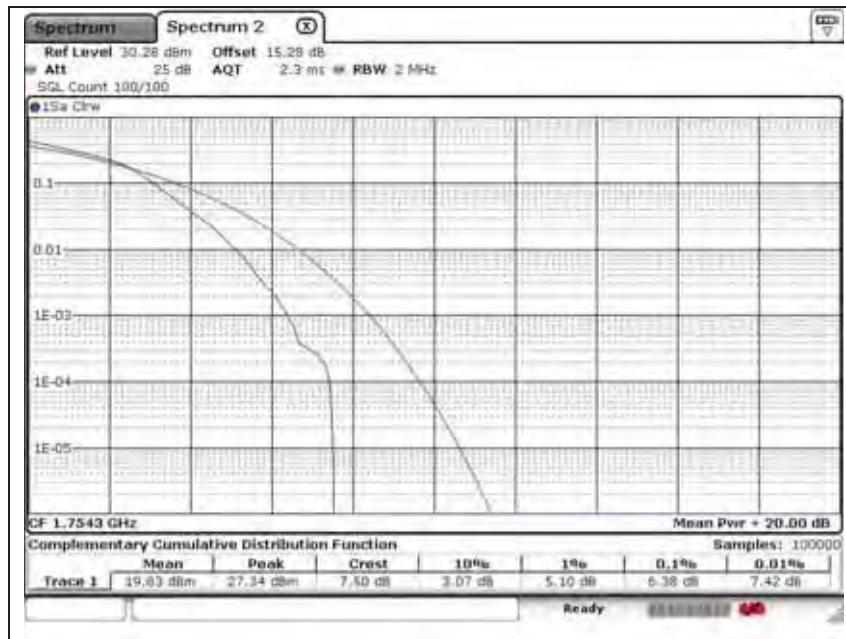


Middle Channel



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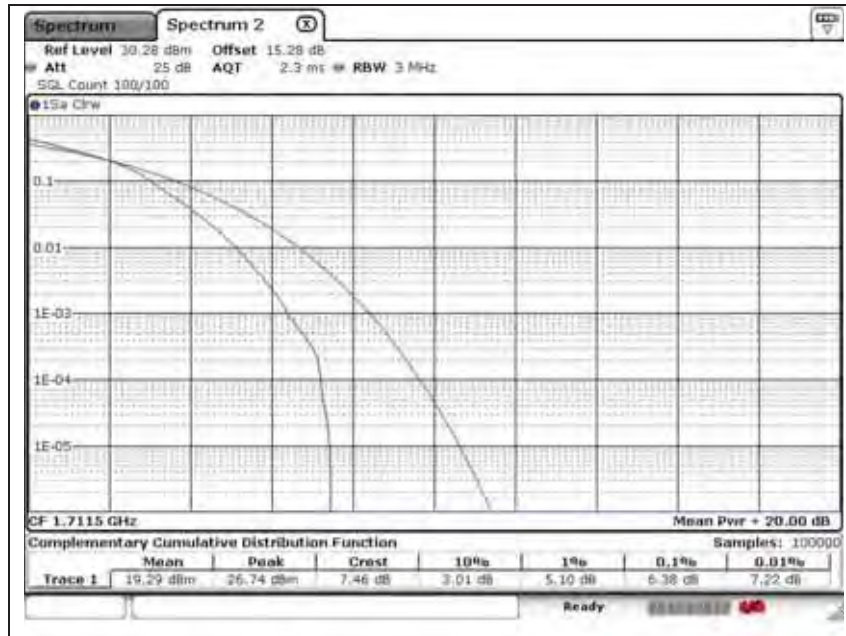
High Channel



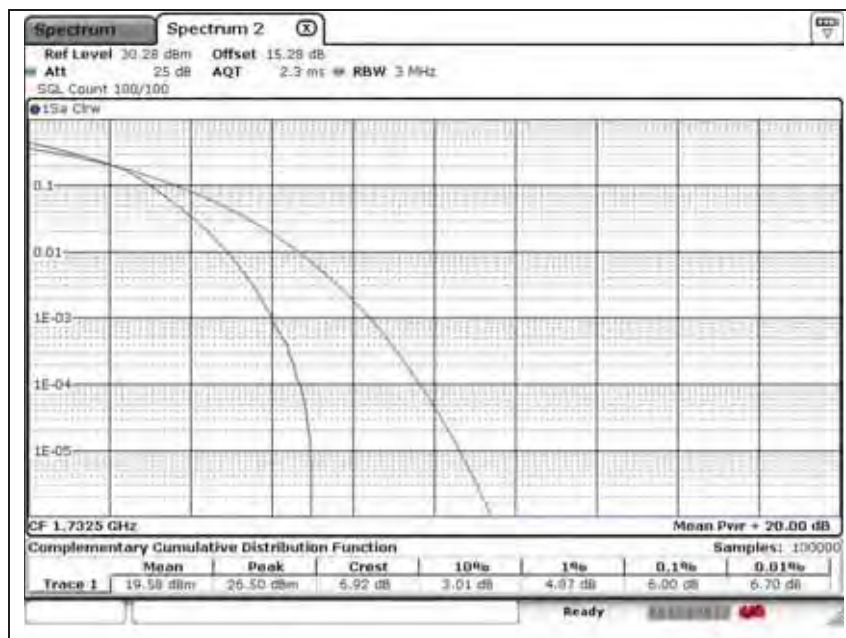
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (3 MHz – 16QAM_RB 15)

Low Channel

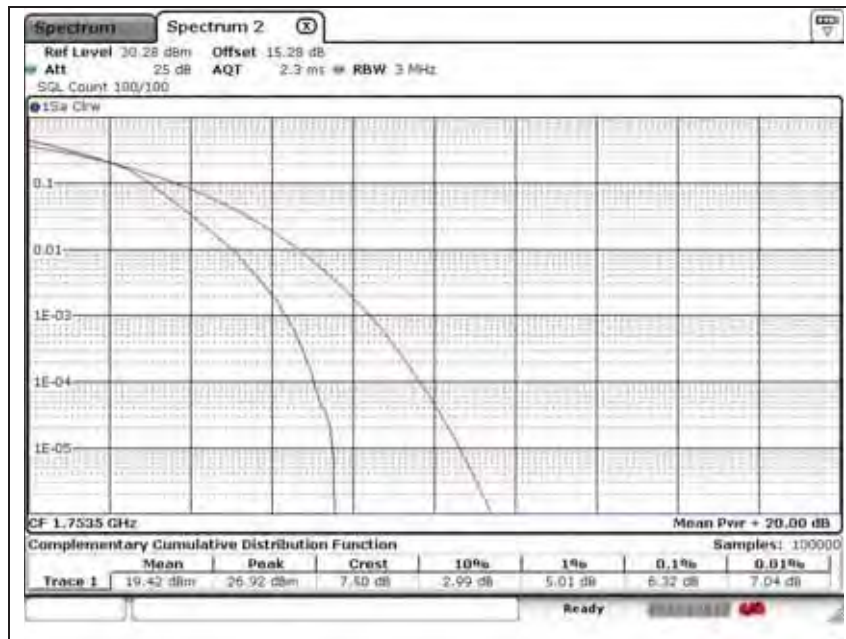


Middle Channel



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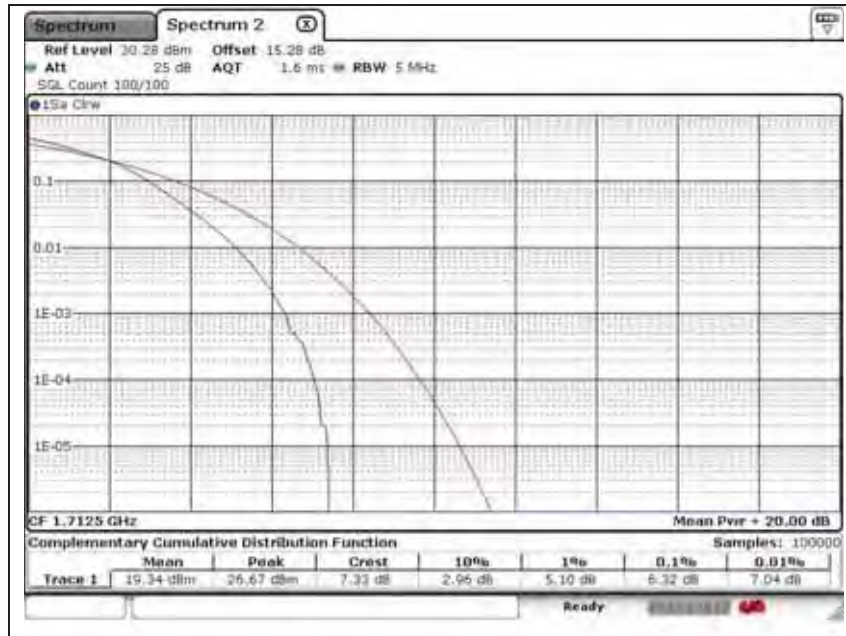
High Channel



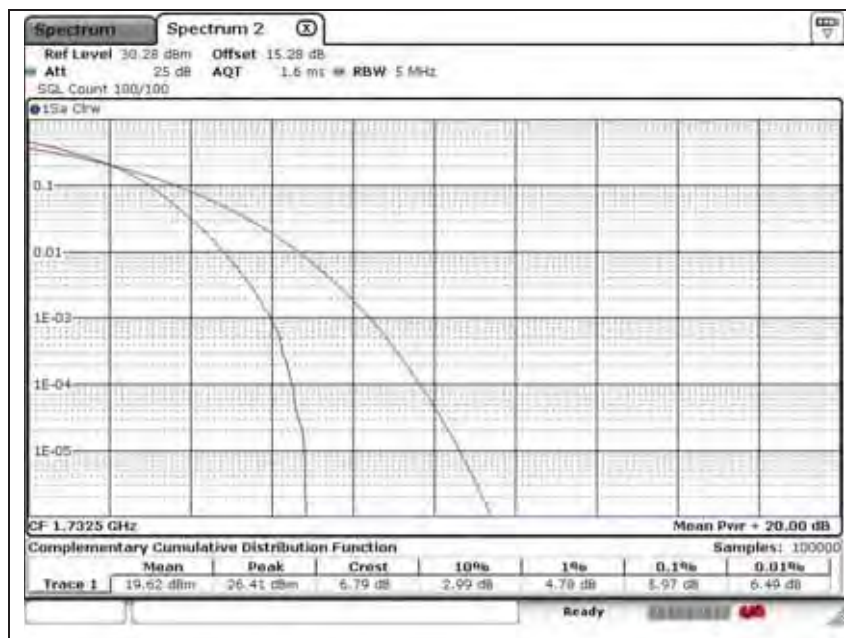
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (5 MHz – 16QAM_RB 25)

Low Channel



Middle Channel



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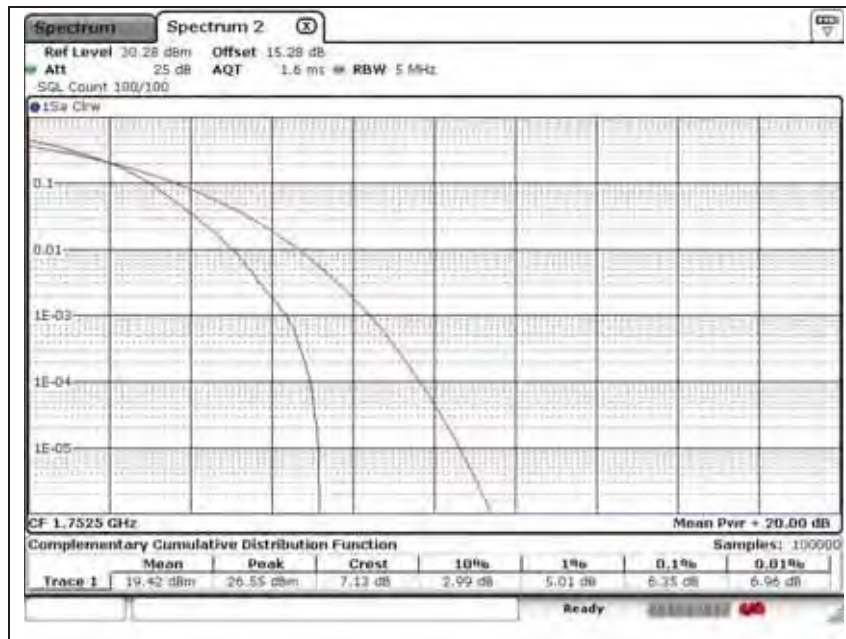
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A4(210 mm x 297 mm)

High Channel



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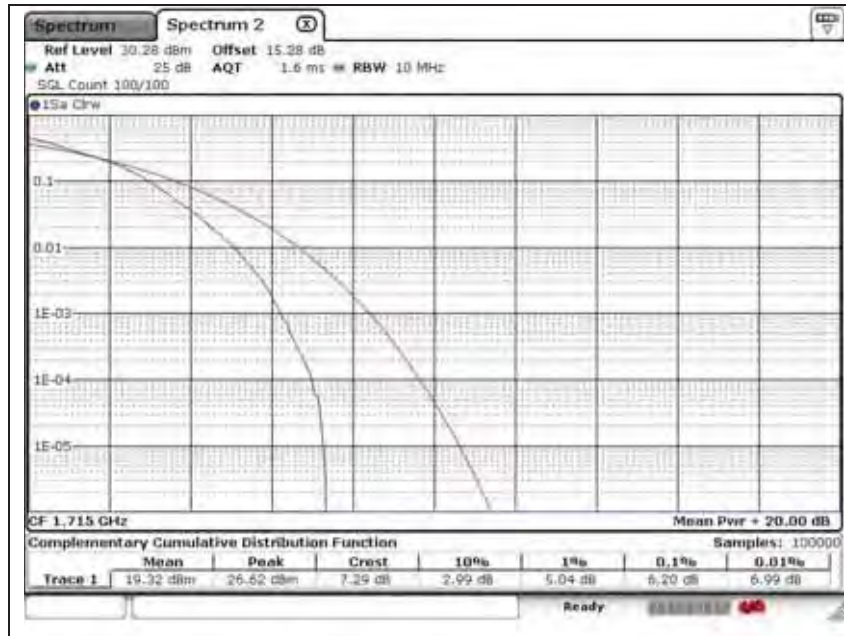
RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

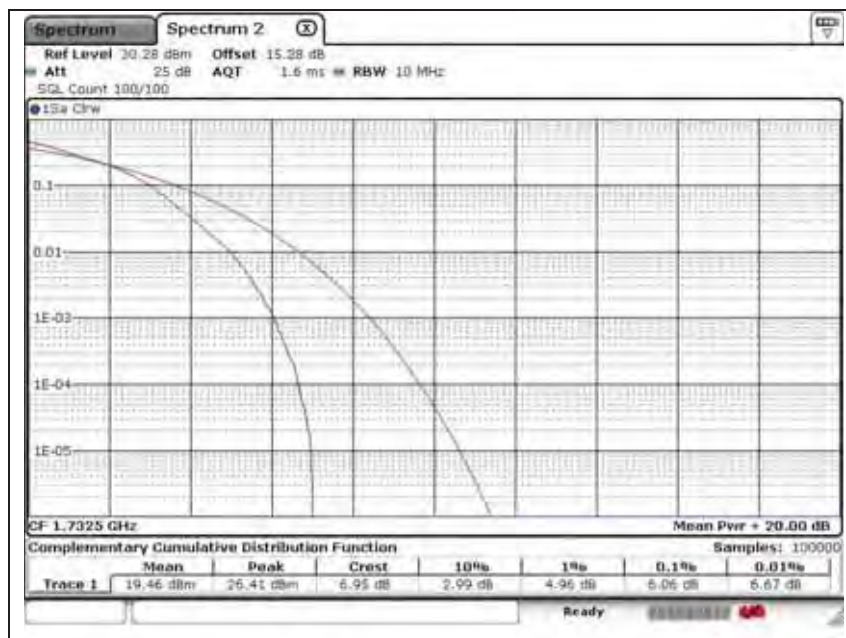
A4(210 mm x 297 mm)

LTE band 4 (10 MHz – 16QAM_RB 50)

Low Channel

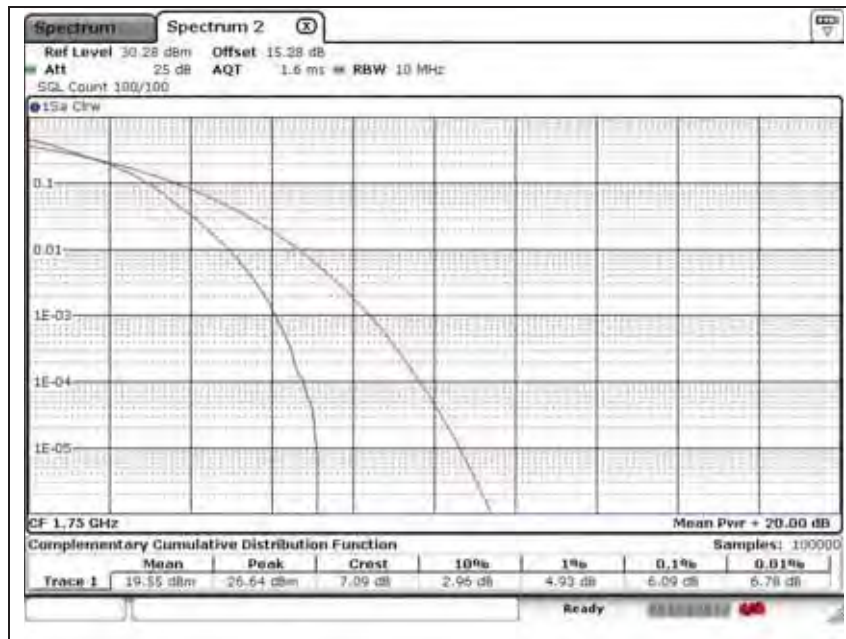


Middle Channel



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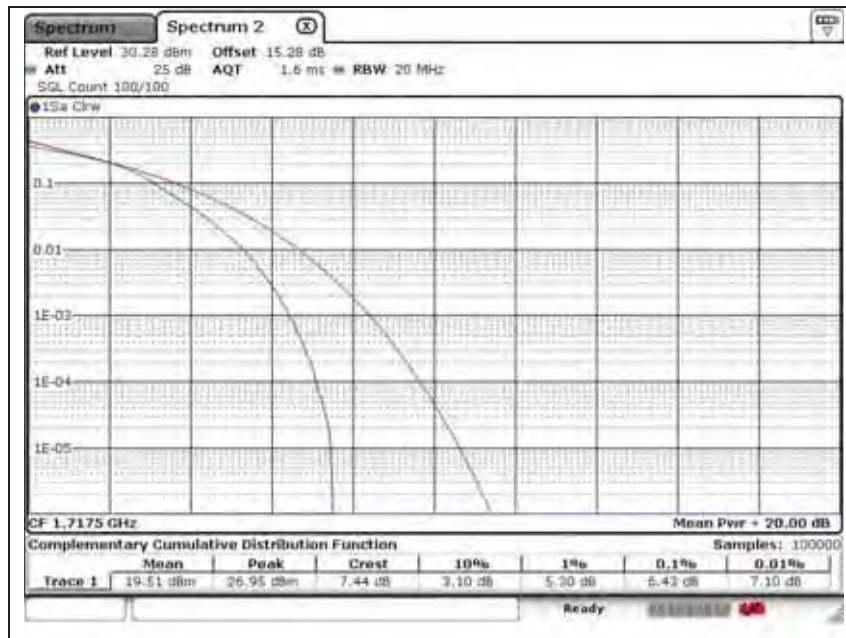
High Channel



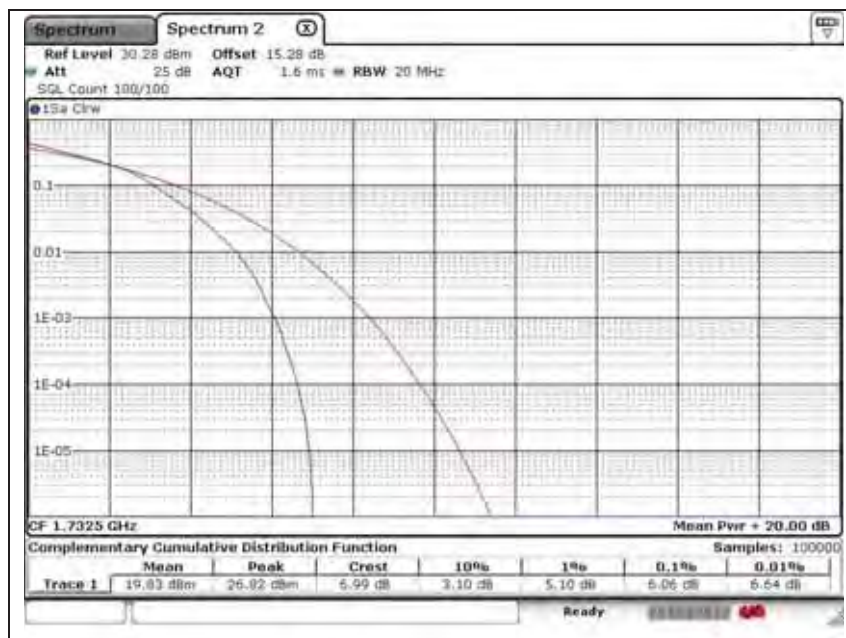
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (15 MHz – 16QAM_RB 75)

Low Channel

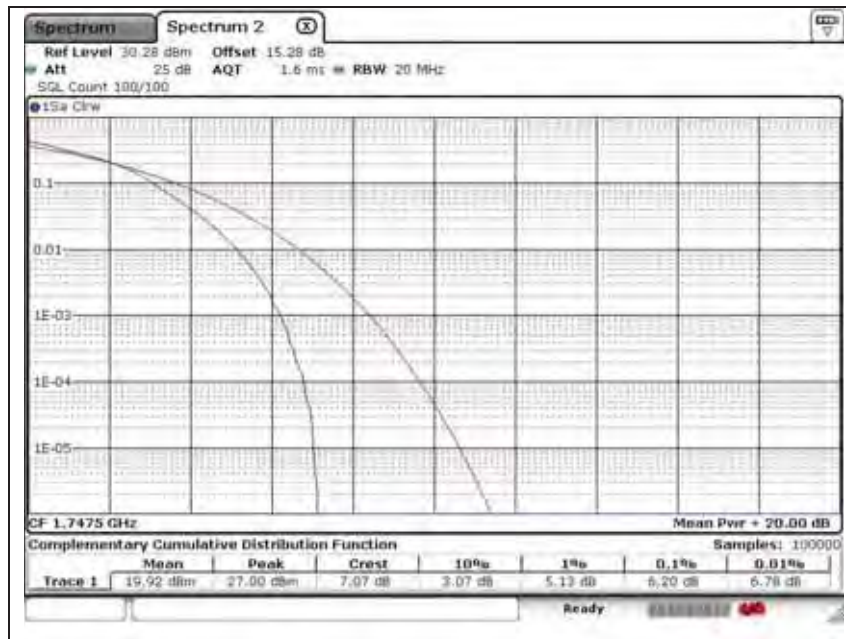


Middle Channel



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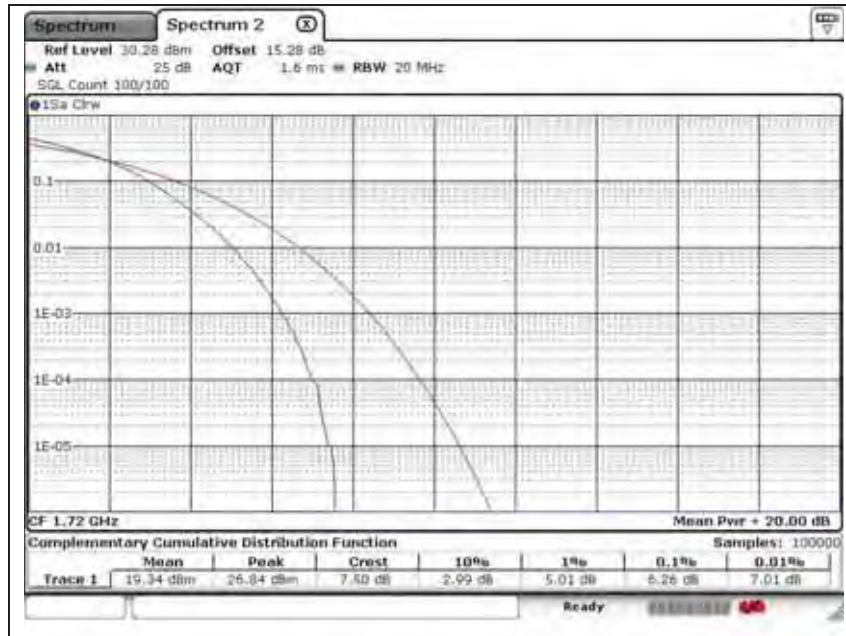
High Channel



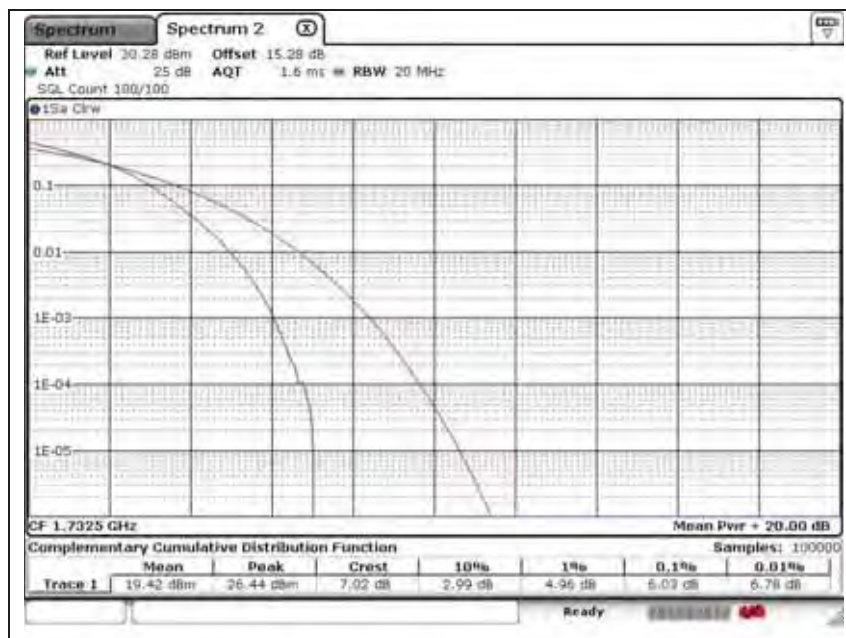
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

LTE band 4 (20 MHz – 16QAM_RB 100)

Low Channel



Middle Channel



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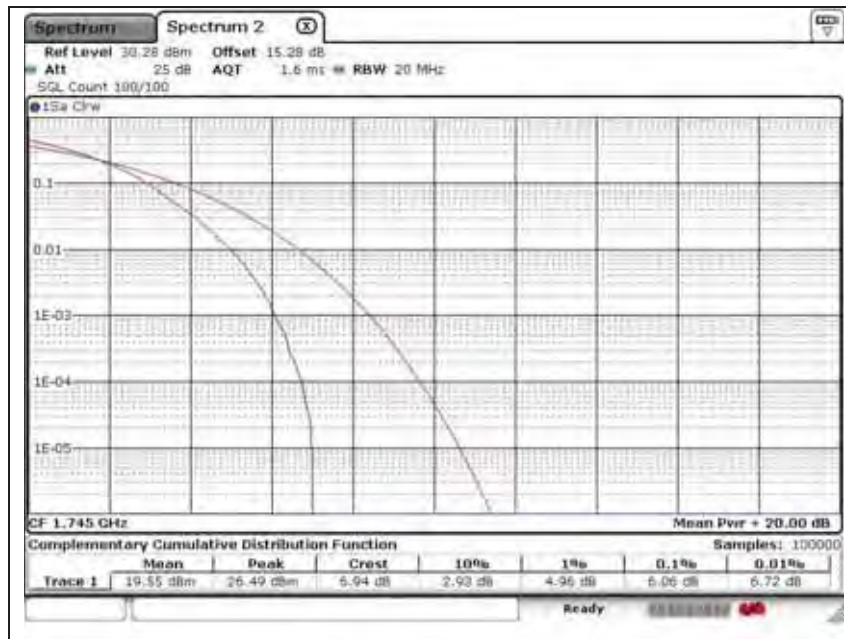
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

High Channel



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6. Spurious Emissions at Antenna Terminal

6.1. Limit

FCC §22.917(a), the 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.

FCC §24.238(a), the 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.

FCC §27.53(c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

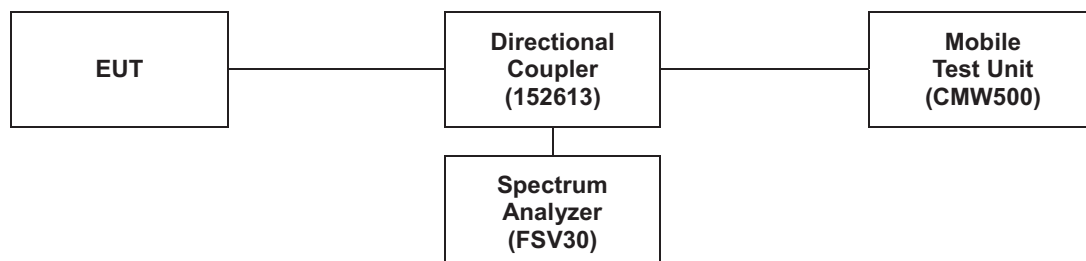
(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.

FCC §27.53(h)(1), Except as otherwise specified below, for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

6.2. Test Procedure

The test follows section 6.0 of FCC KDB publication 971168 D01 v02r02.

1. Start frequency was set to 30 MHz and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = max hold.
4. Sweep time = auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 30 MHz to 20 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as Correction function.



Notes;

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for part 22, part 27 and 1 MHz or greater for part 24. However, 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 fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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6.3. Test Results

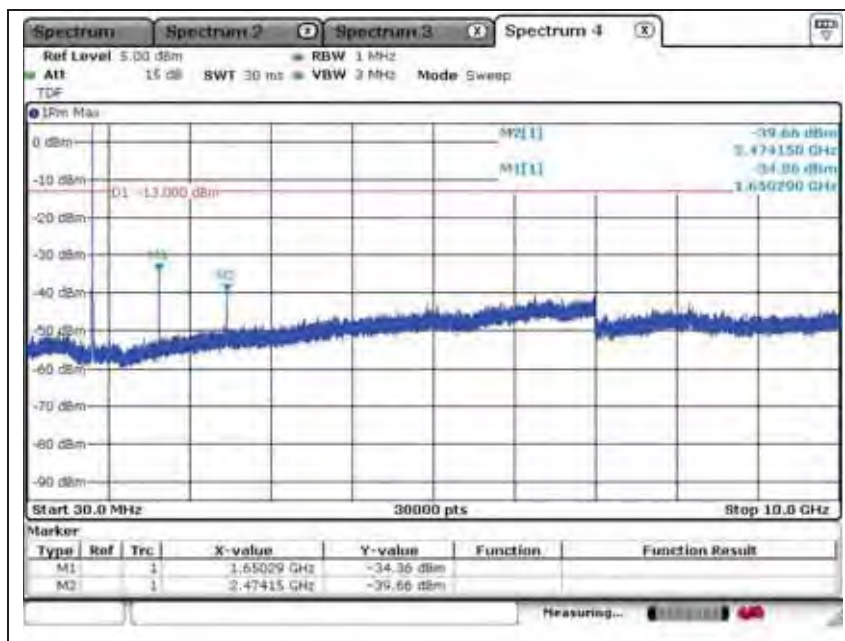
Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

Please refer to the following plots.

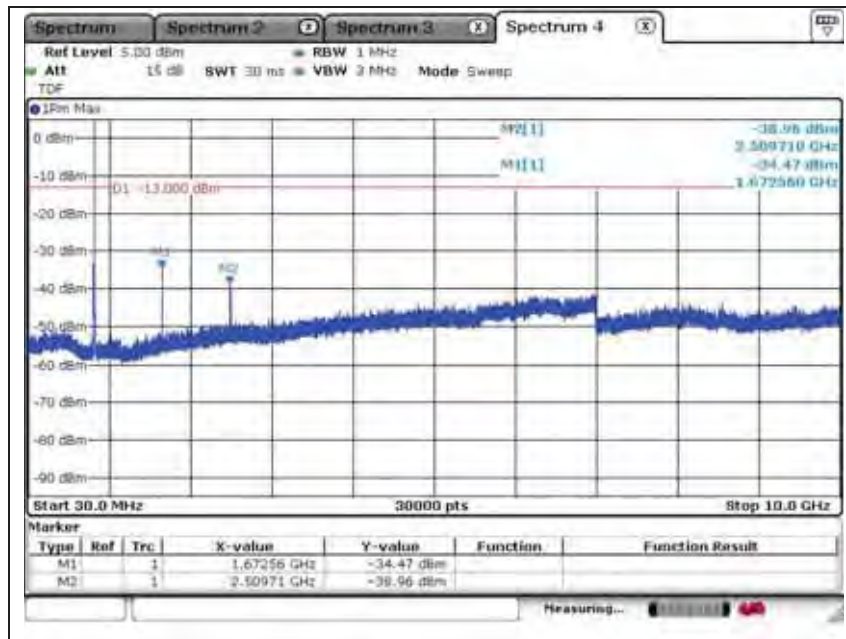
CDMA 850 1xRTT

Low Channel

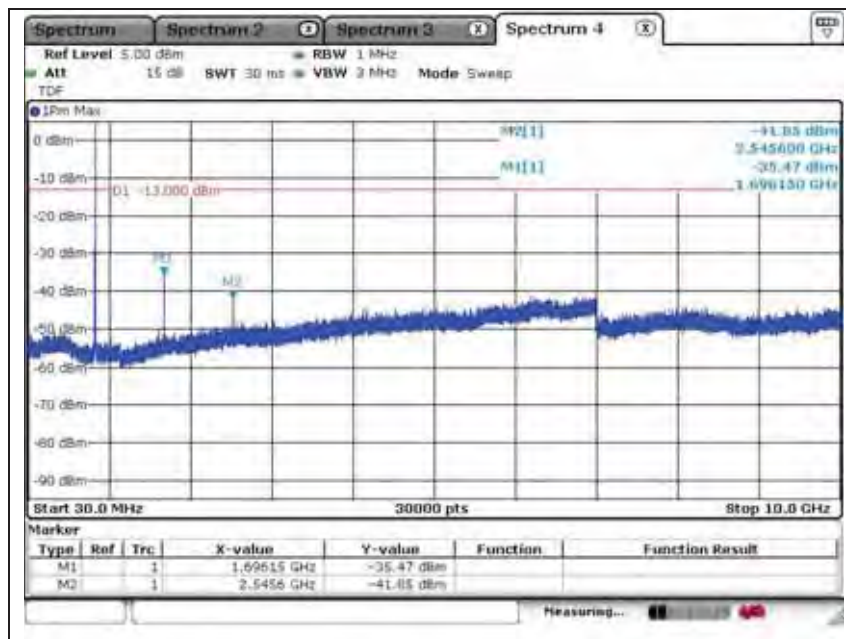


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Middle Channel



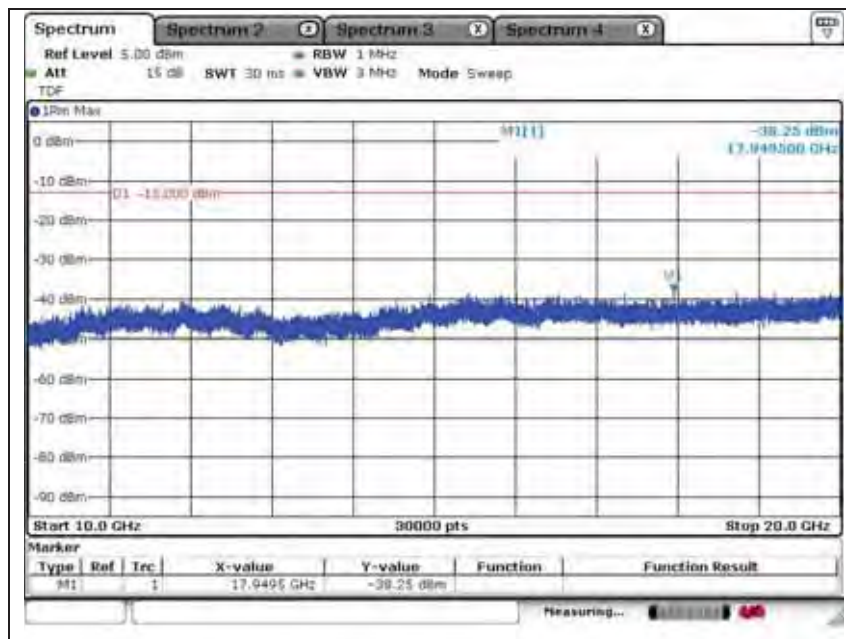
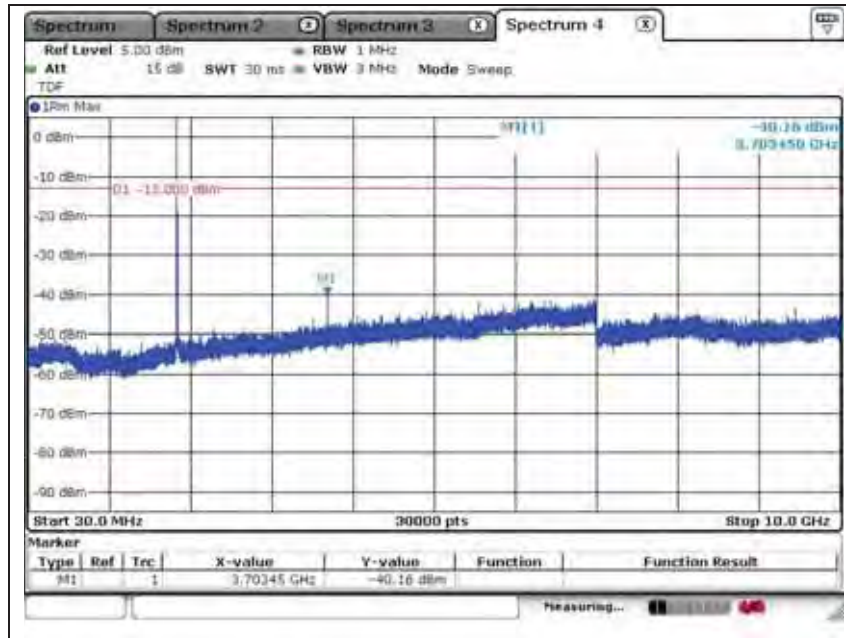
High Channel



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CDMA 1 900 1xRTT

Low Channel



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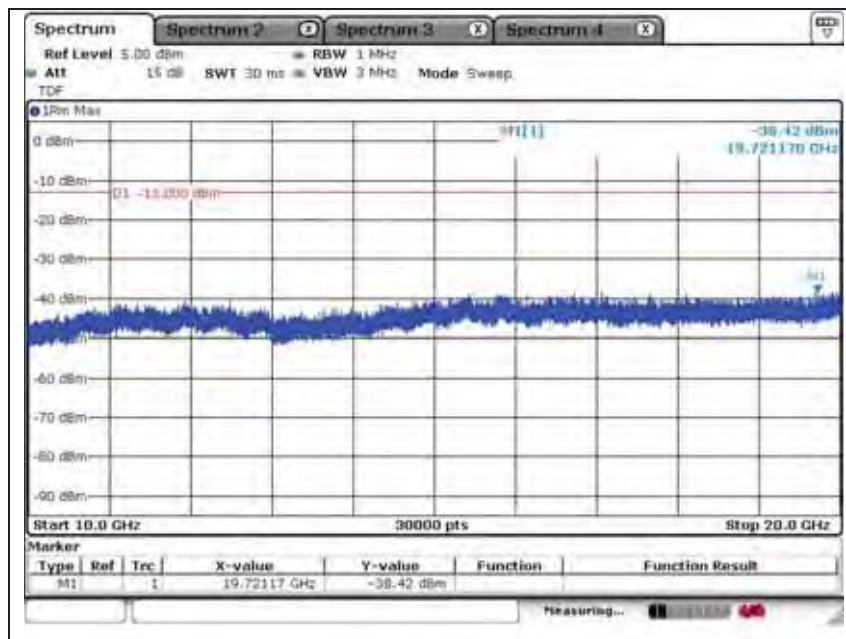
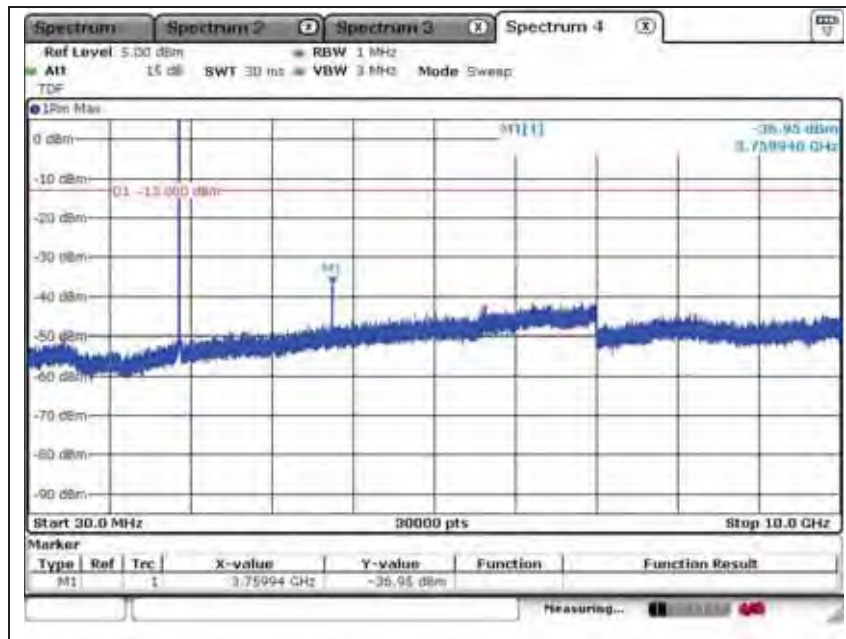
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Middle Channel



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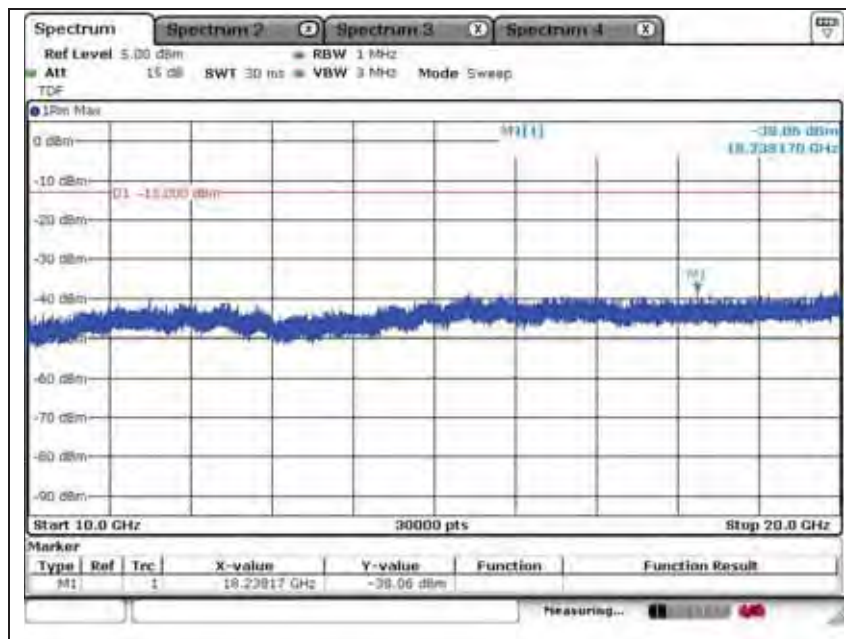
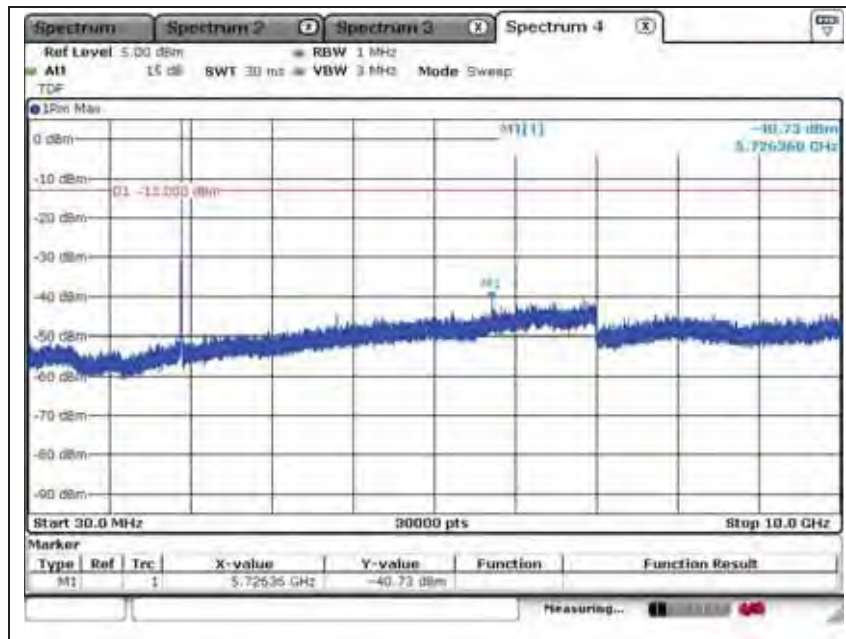
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

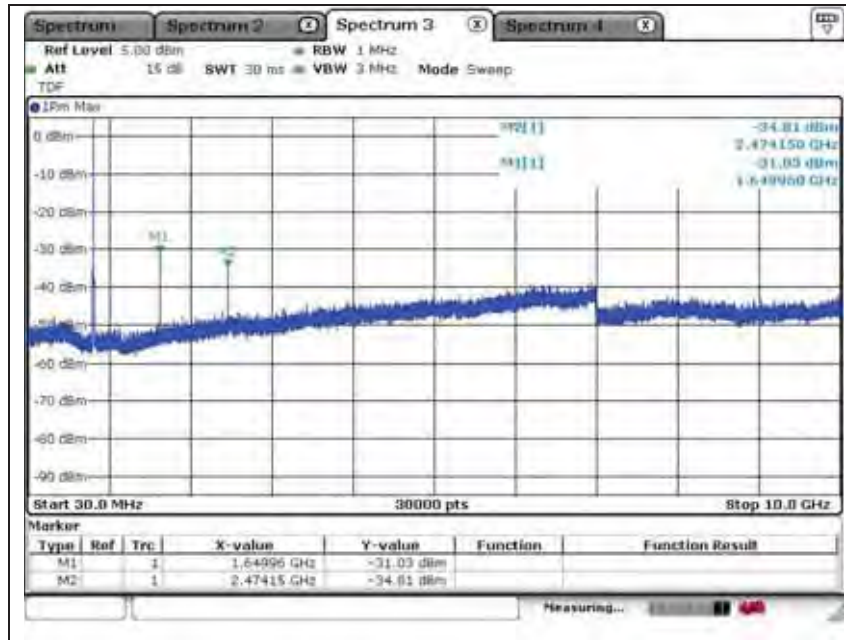
High Channel



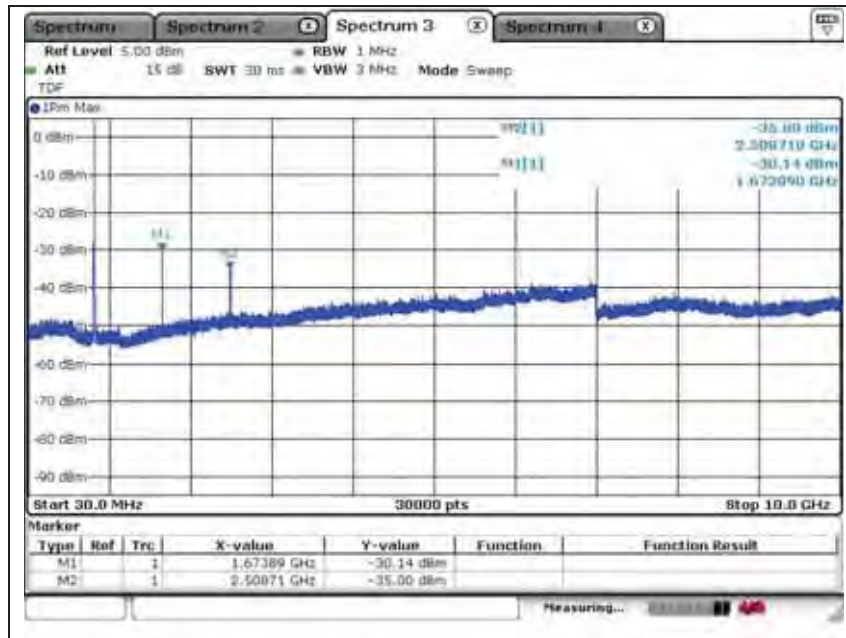
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

CDMA 850 1xEV-DO

Low Channel

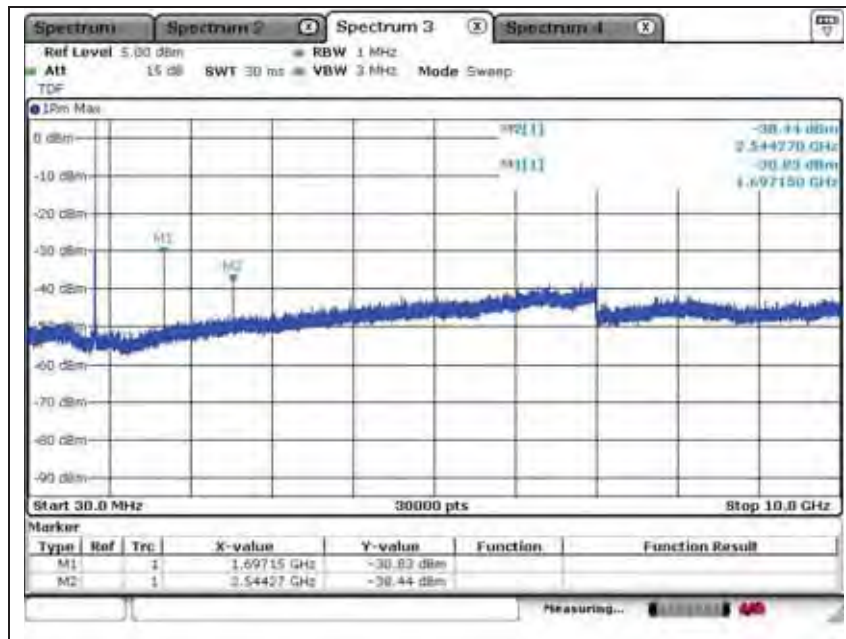


Middle Channel



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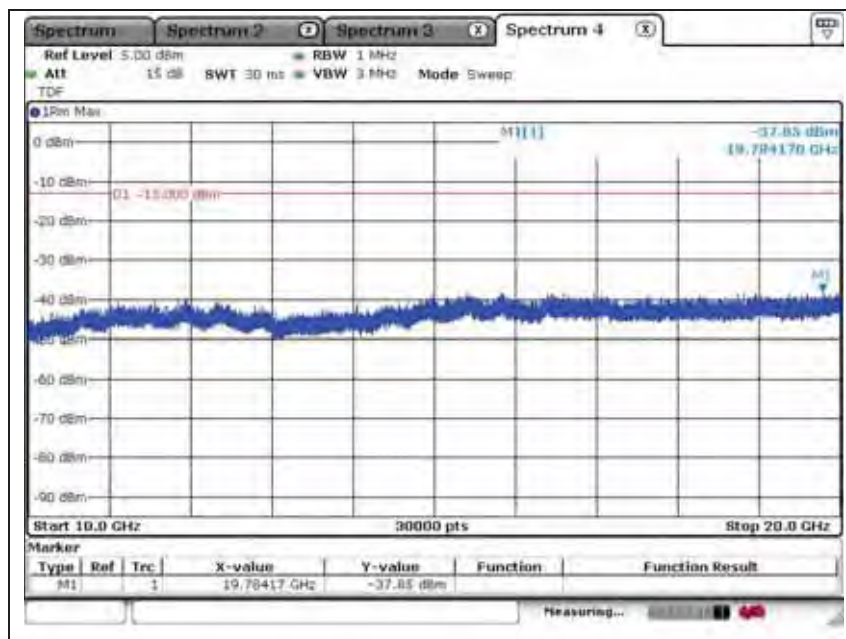
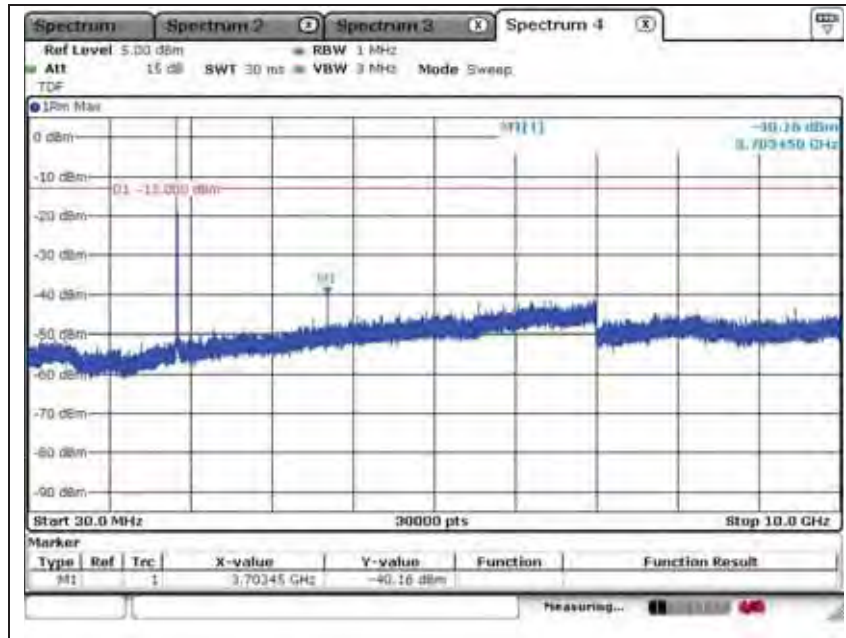
High Channel



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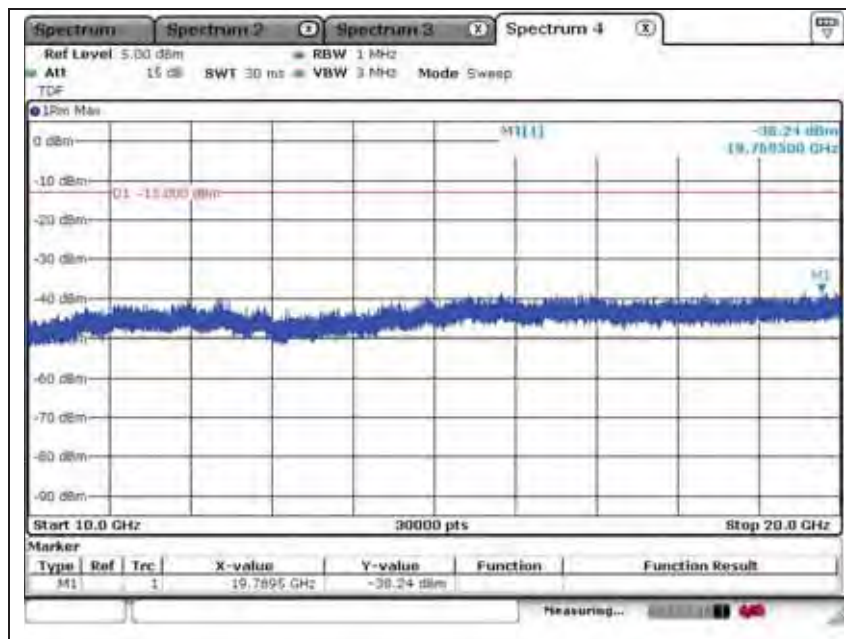
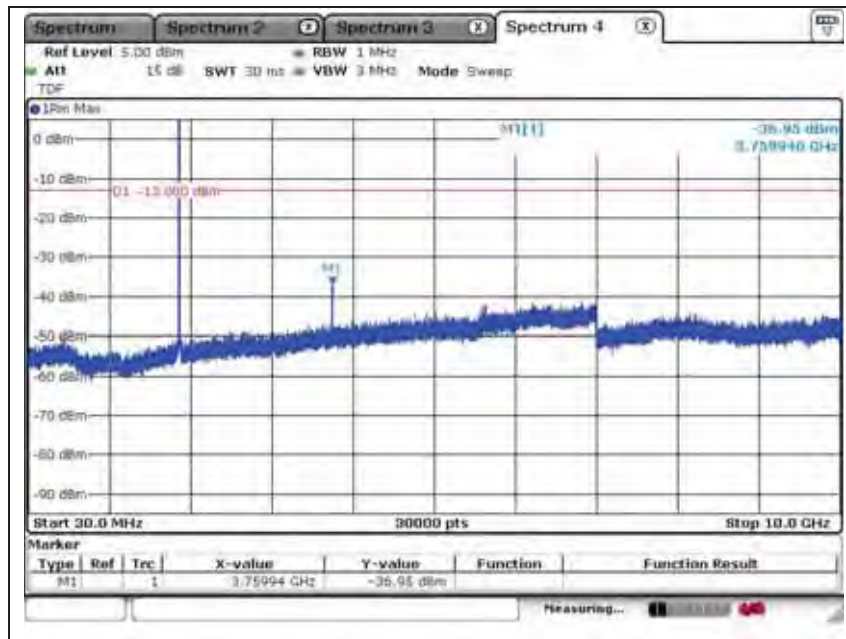
CDMA 1 900 1xEV-DO

Low Channel



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Middle Channel



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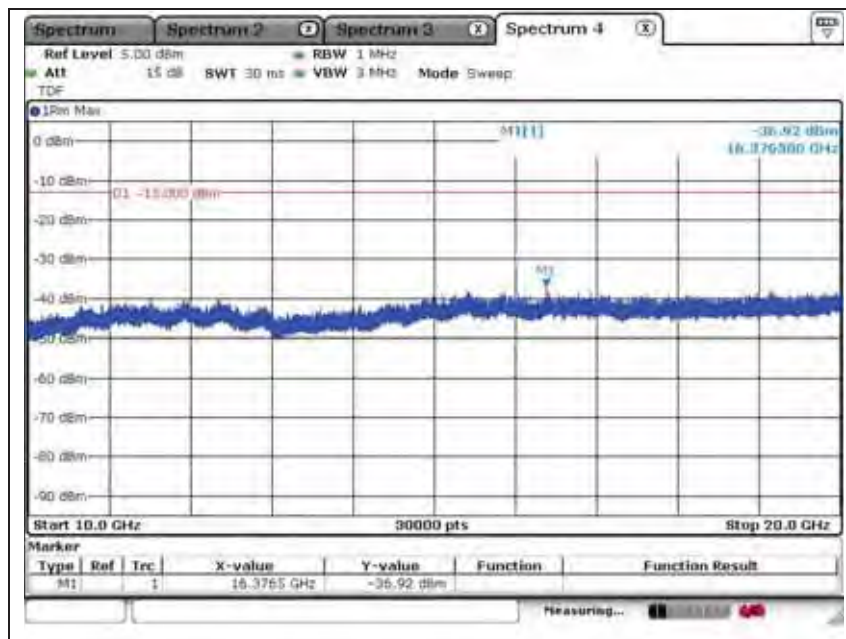
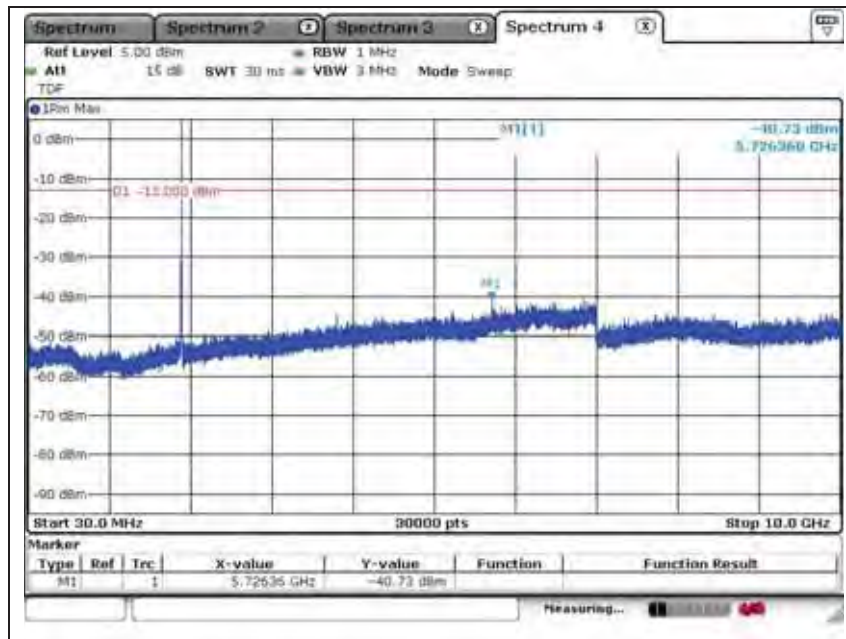
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

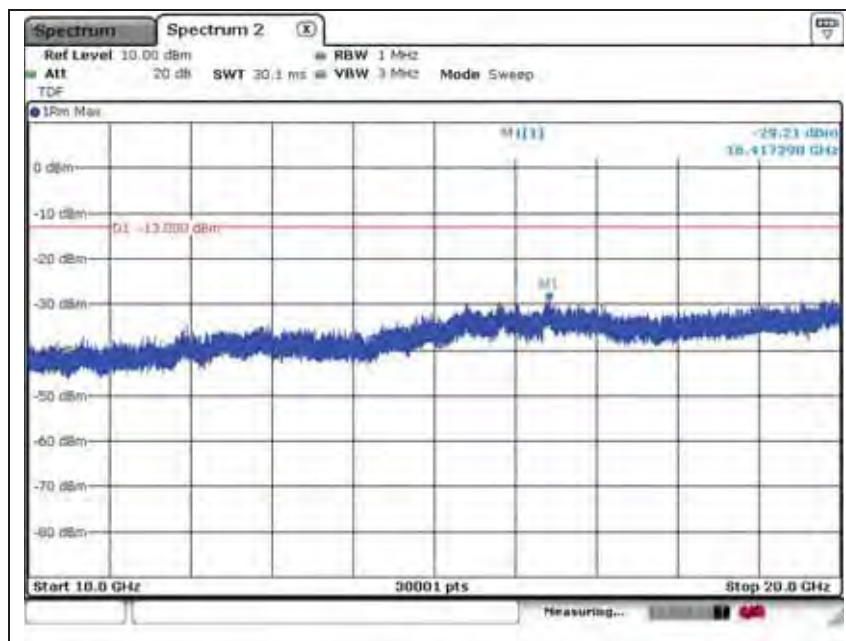
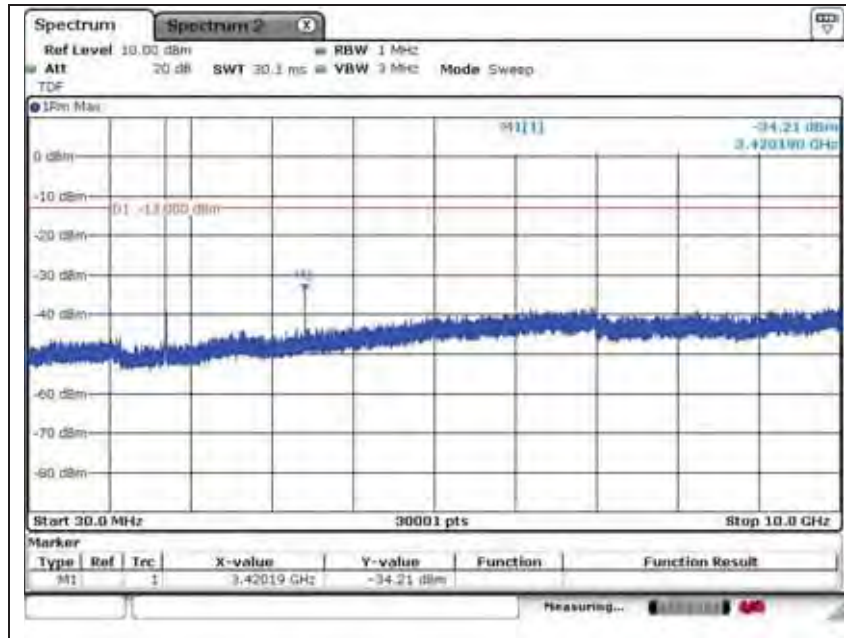
High Channel



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LTE band 4 (1.4 MHz – QPSK_RB 1_Offset 0)

Low Channel



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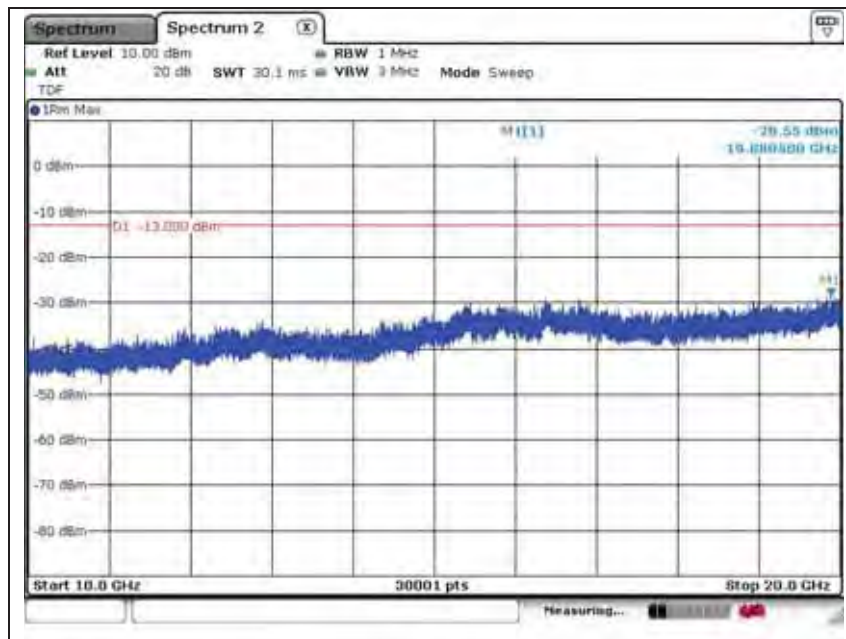
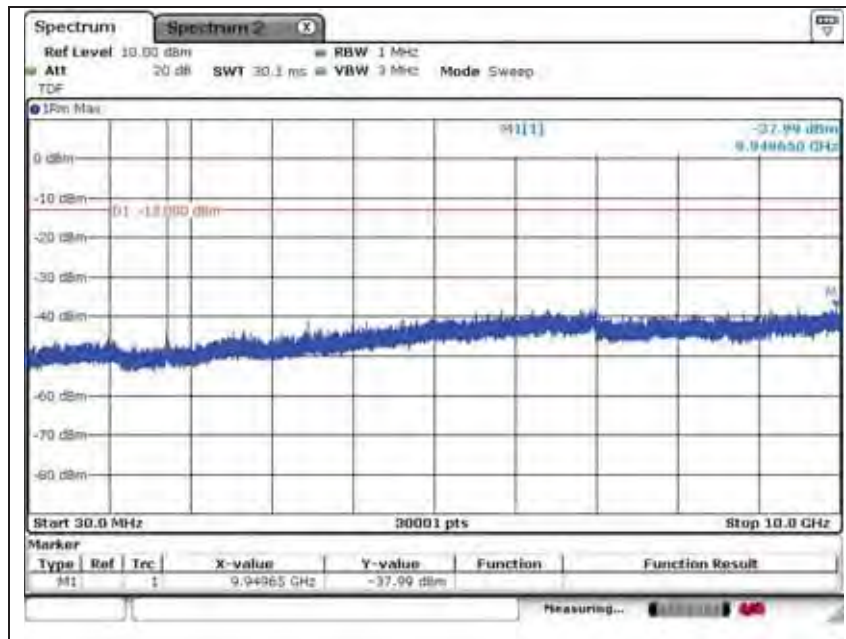
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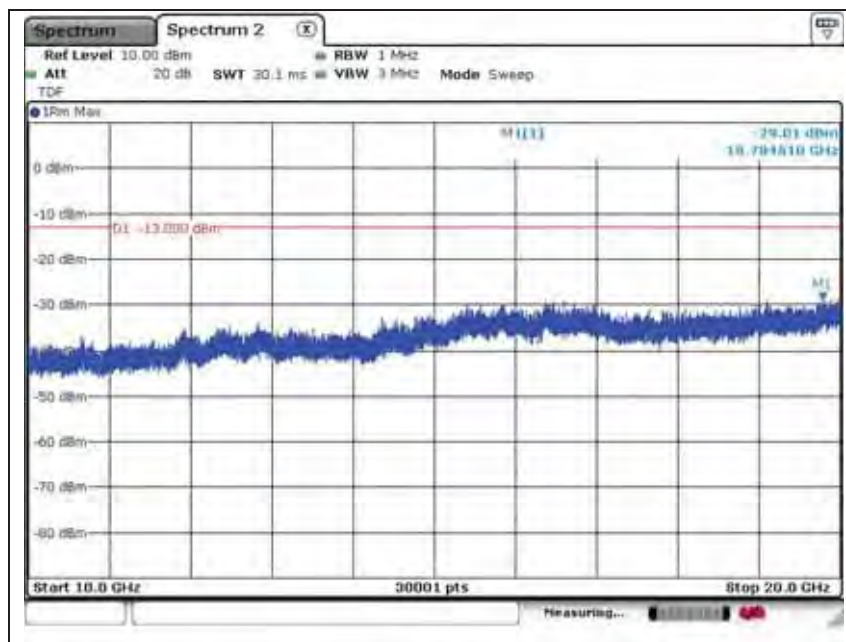
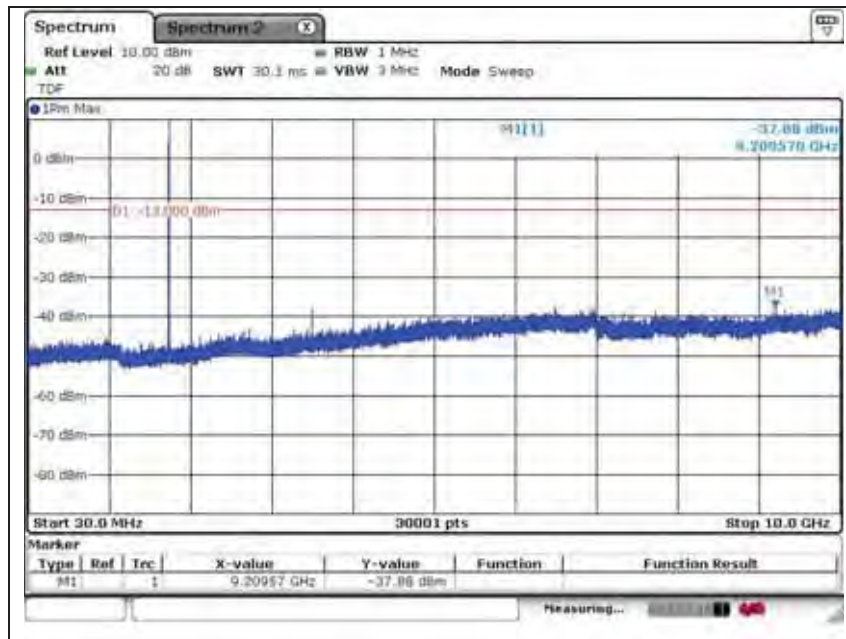
A4(210 mm x 297 mm)

Middle Channel



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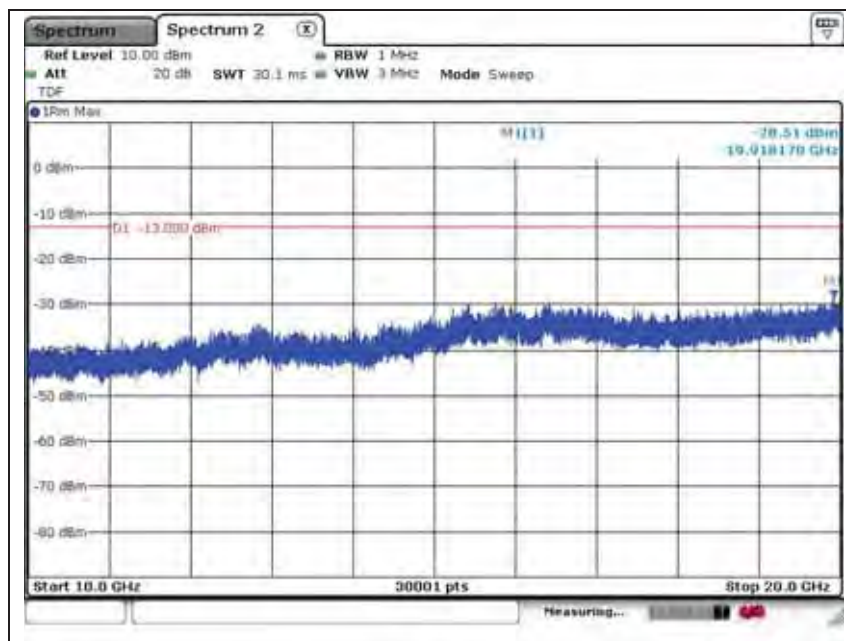
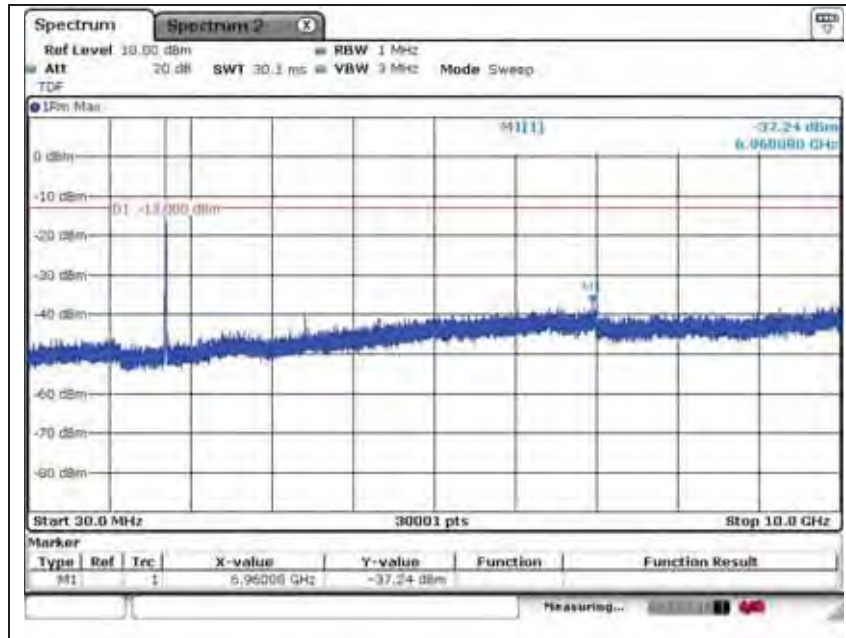
High Channel



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LTE band 4 (3 MHz – QPSK_RB 1_Offset 0)

Low Channel



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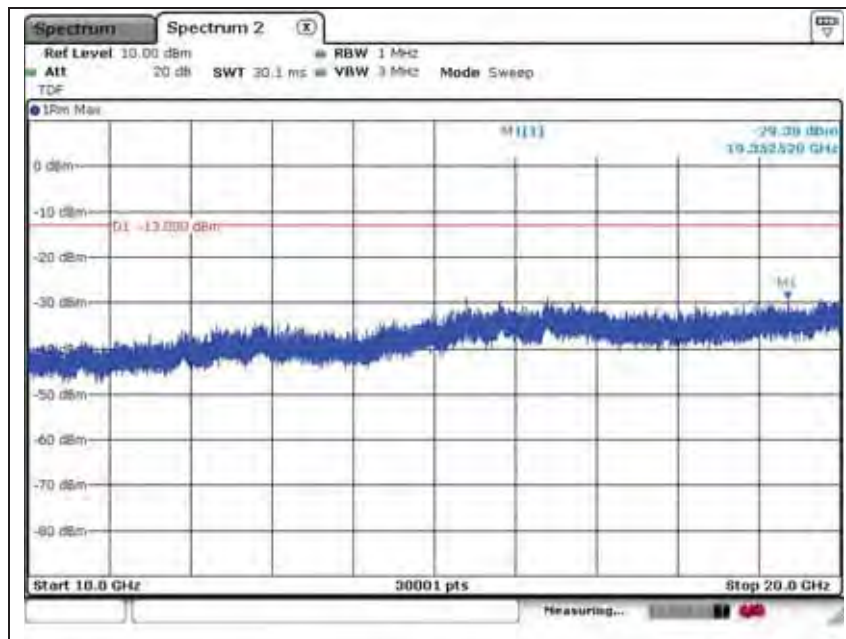
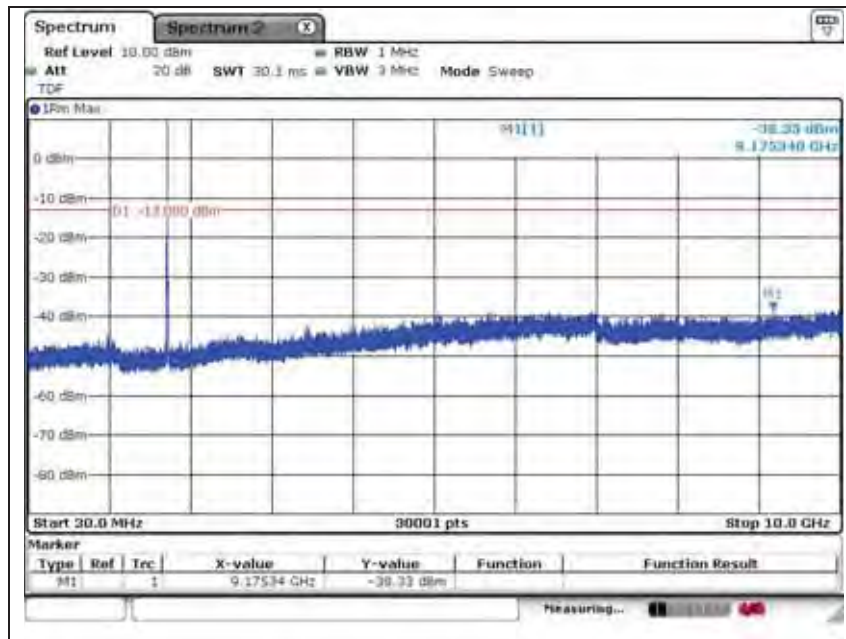
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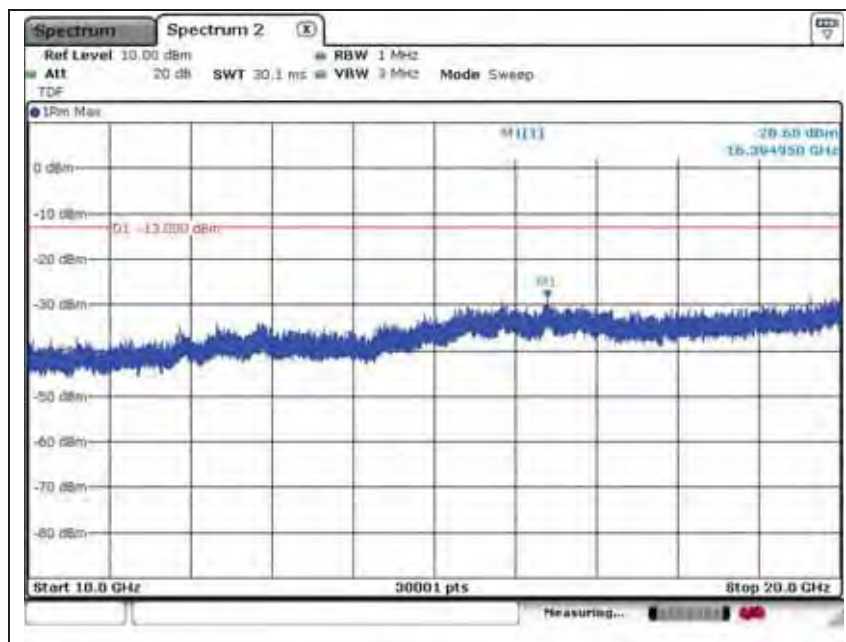
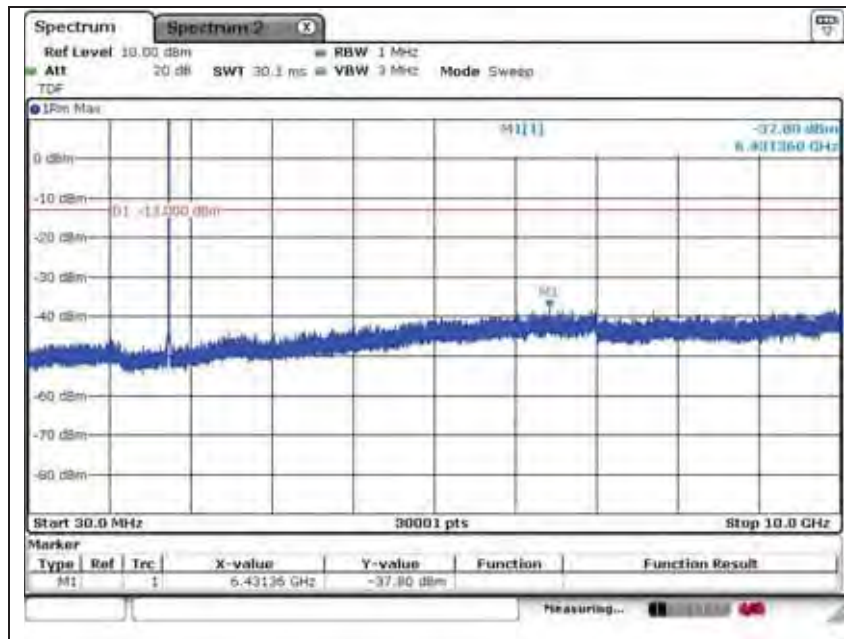
A4(210 mm x 297 mm)

Middle Channel



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High Channel



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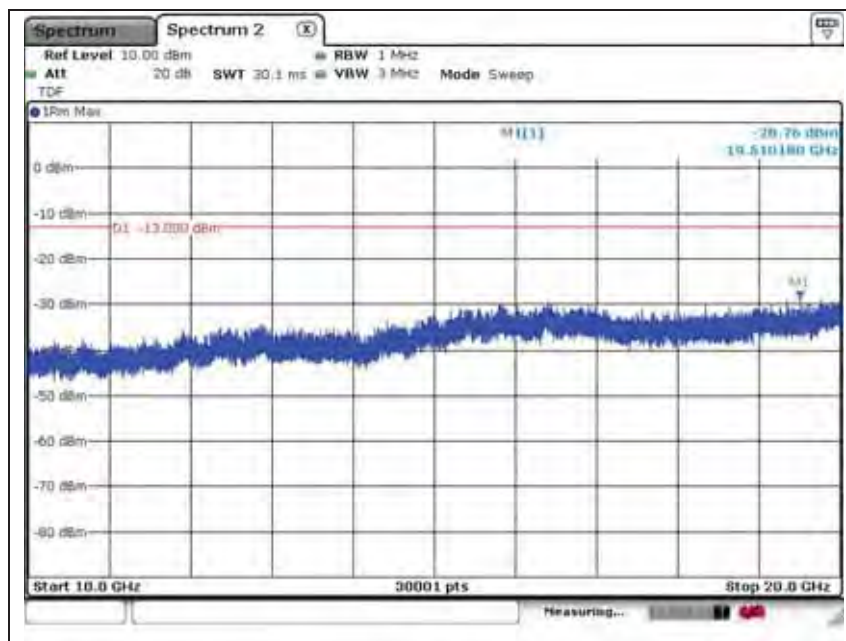
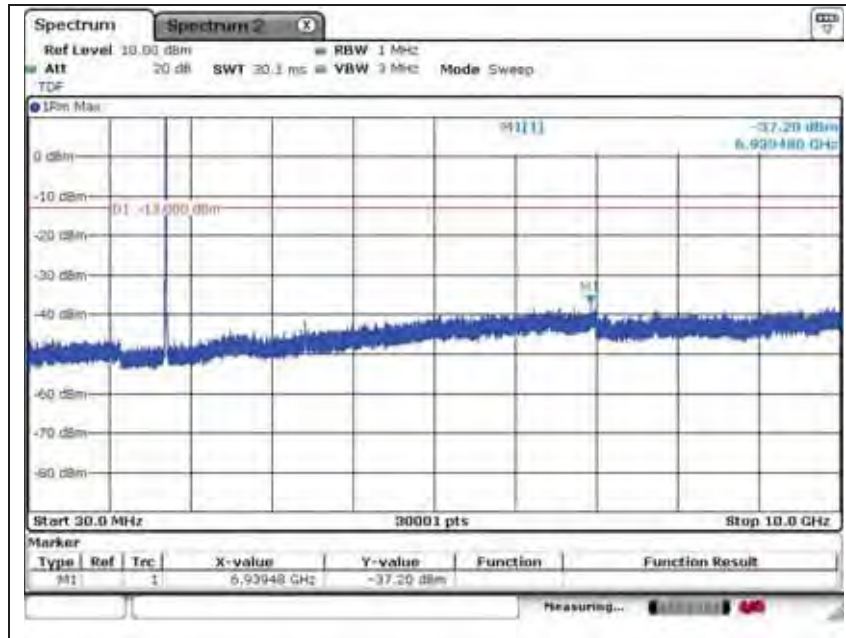
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A4(210 mm x 297 mm)

LTE band 4 (5 MHz – QPSK_RB 1_Offset 0)

Low Channel



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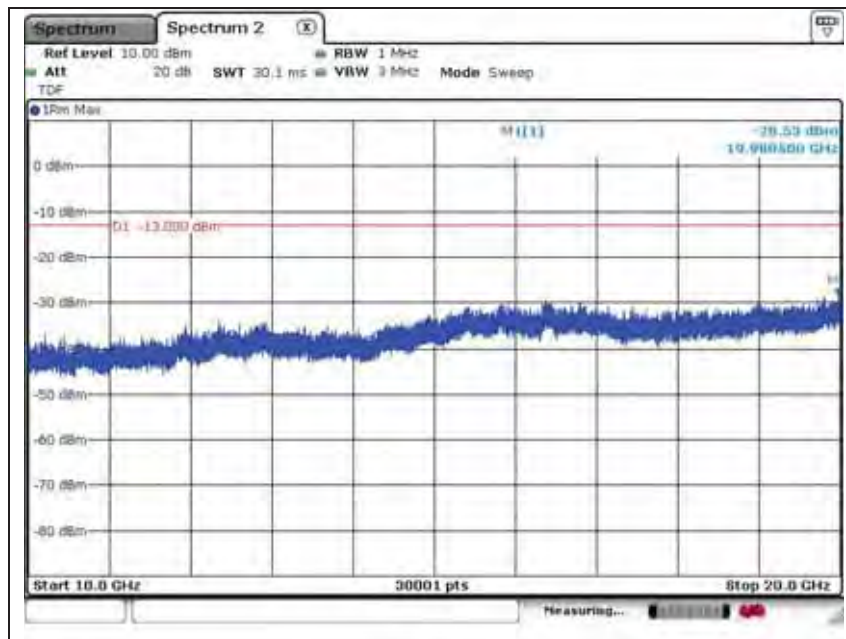
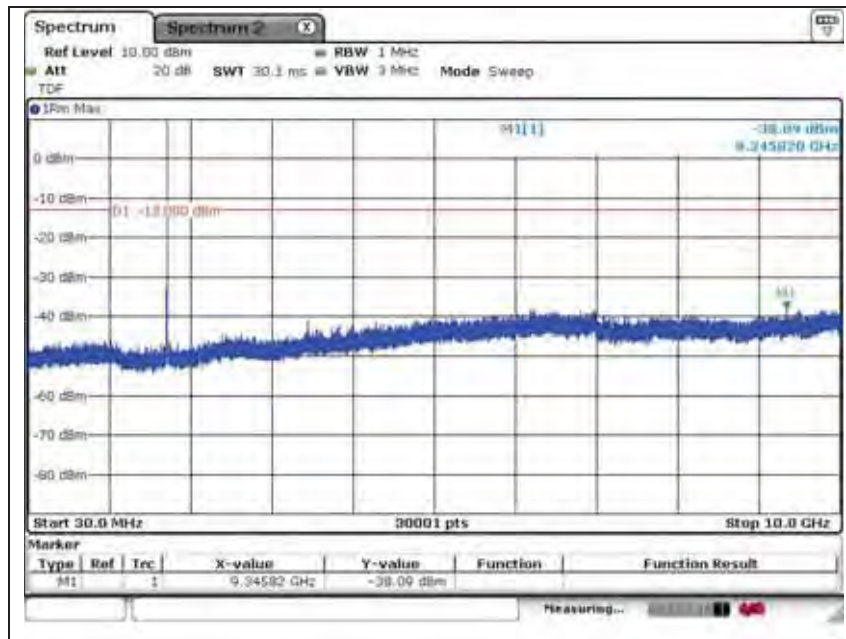
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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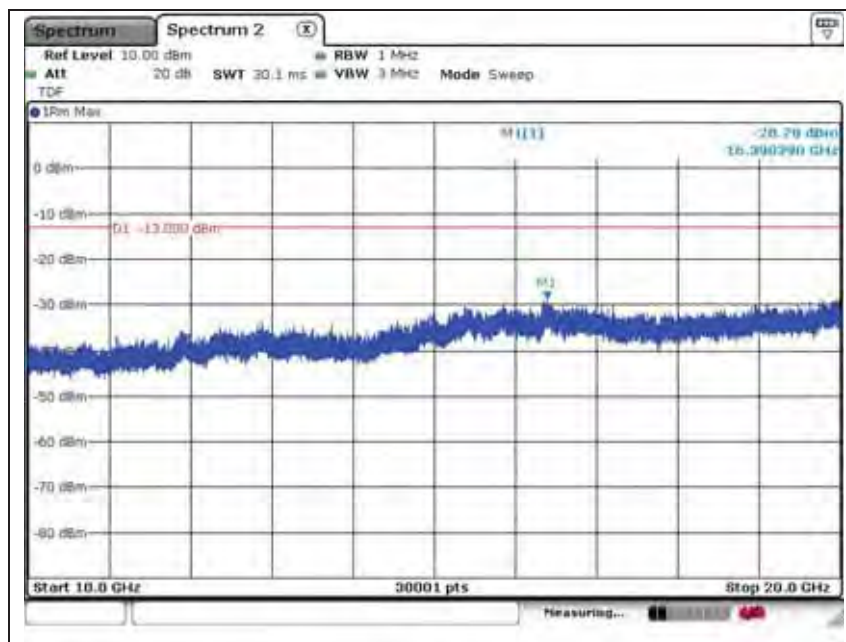
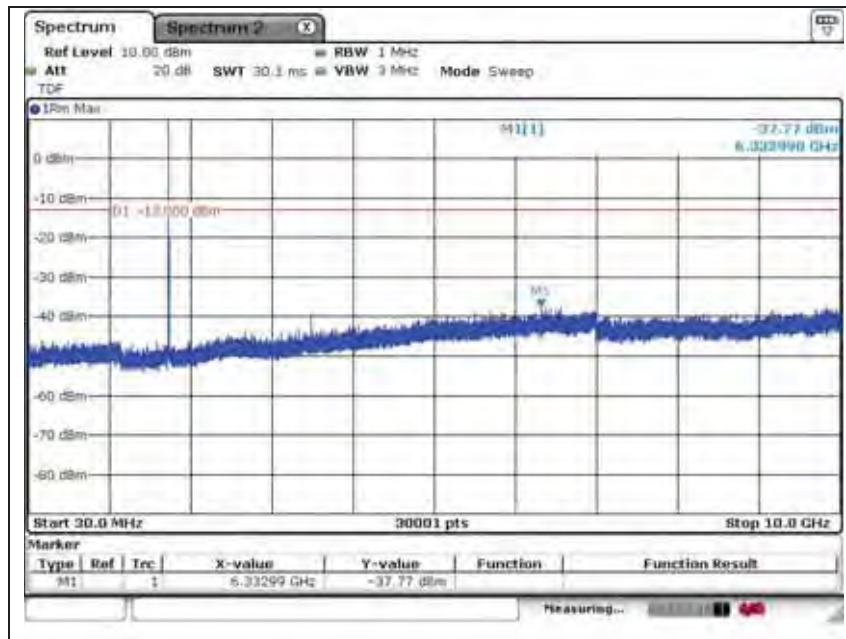
A4(210 mm x 297 mm)

Middle Channel



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High Channel



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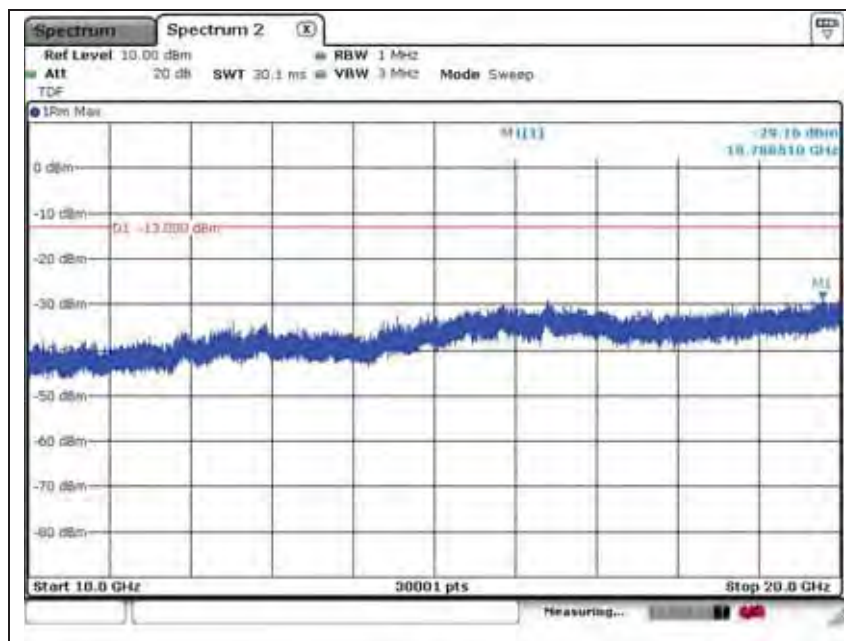
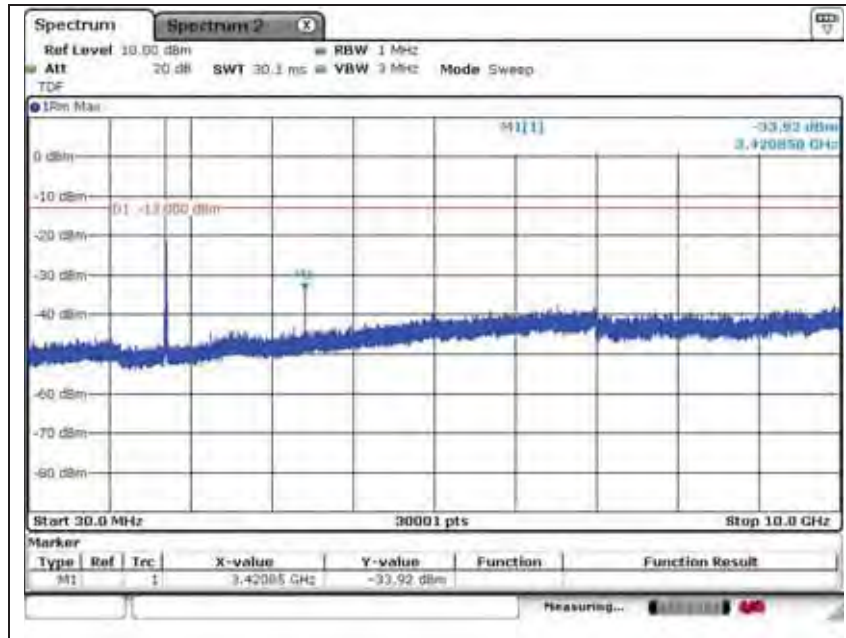
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A4(210 mm x 297 mm)

LTE band 4 (10 MHz – QPSK_RB 1_Offset 0)

Low Channel



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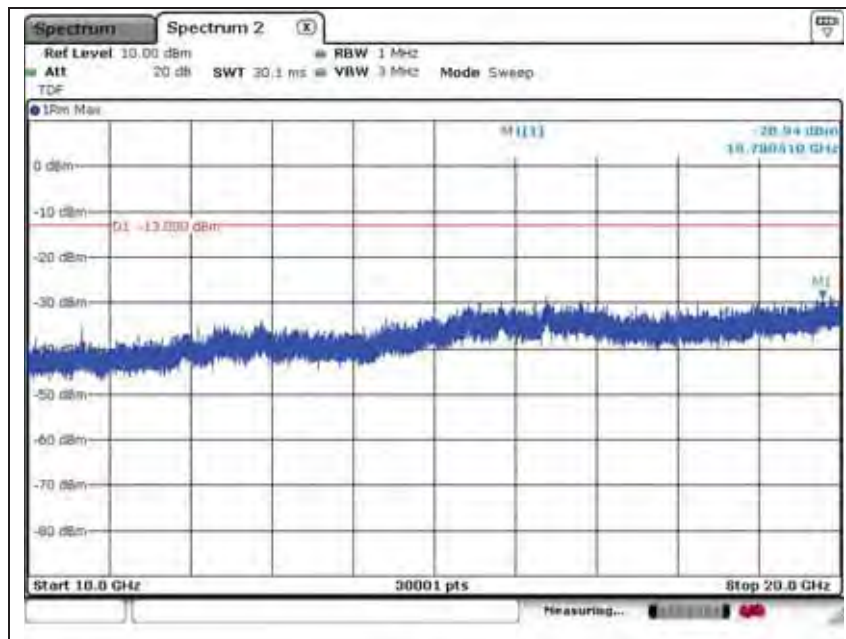
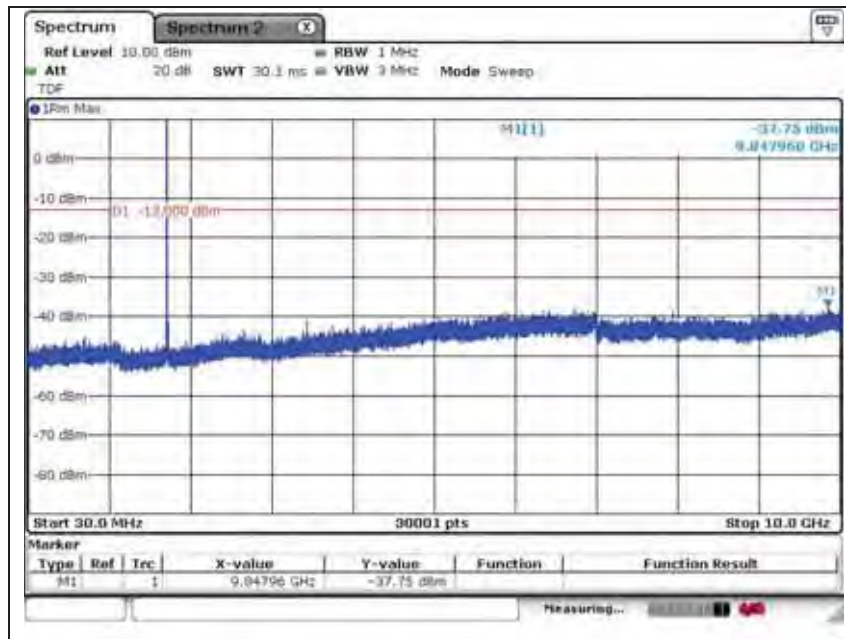
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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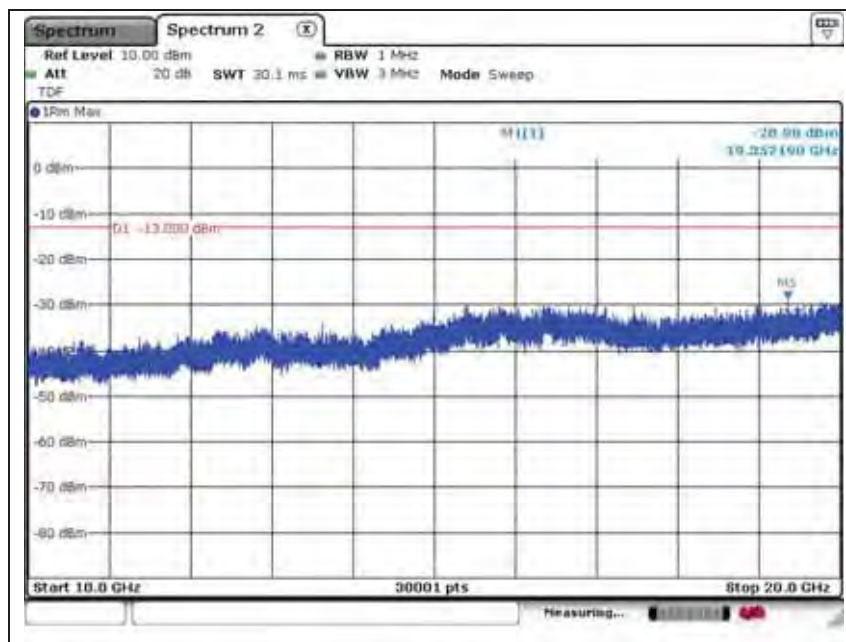
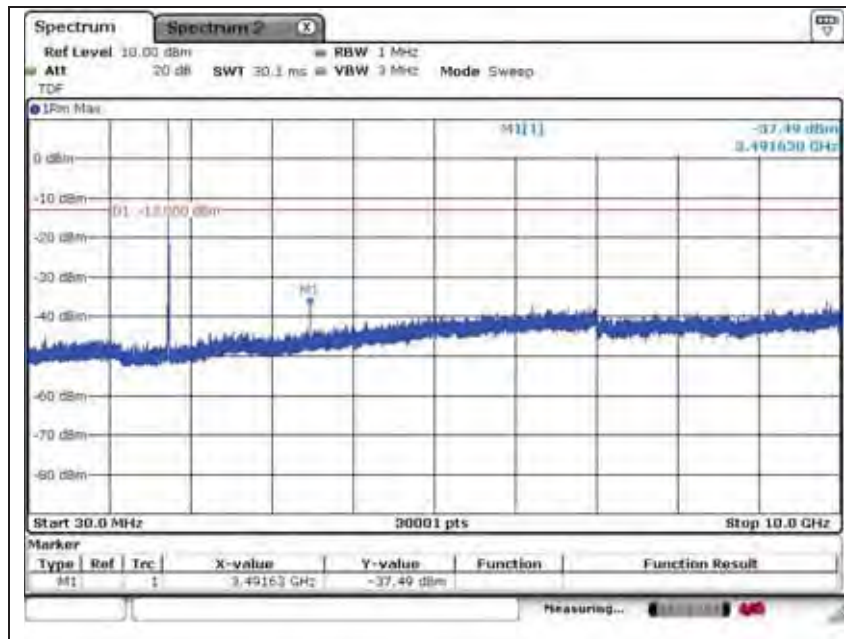
A4(210 mm x 297 mm)

Middle Channel



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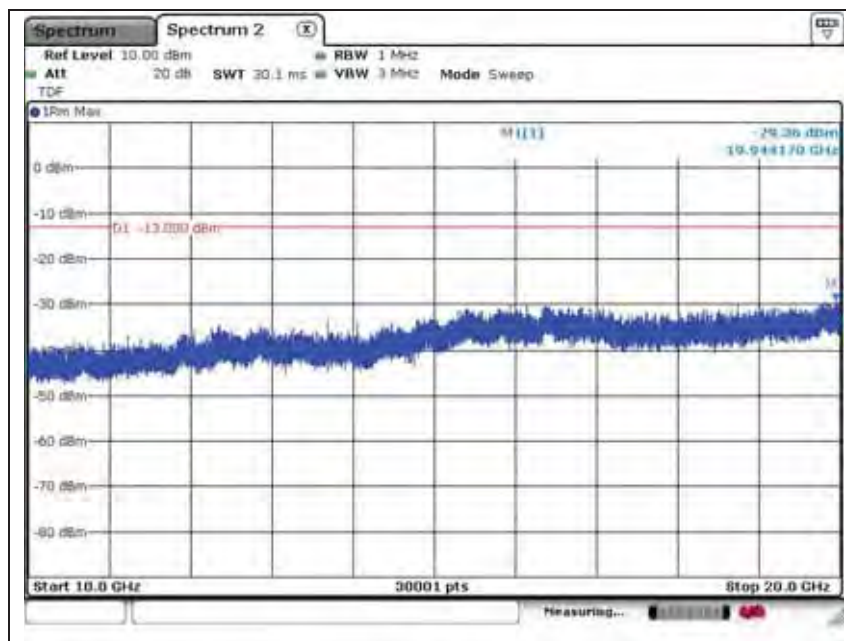
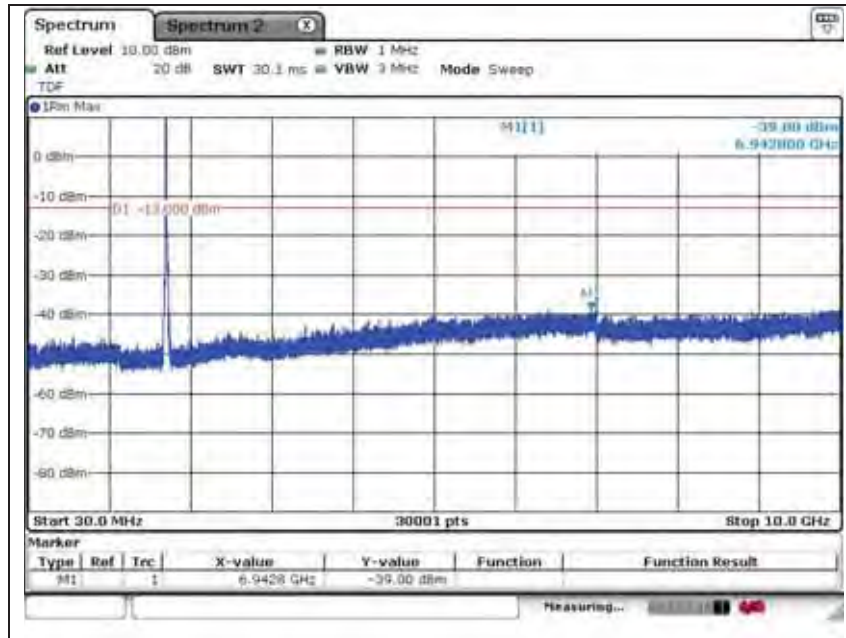
High Channel



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LTE band 4 (15 MHz – QPSK_RB 1_Offset 0)

Low Channel



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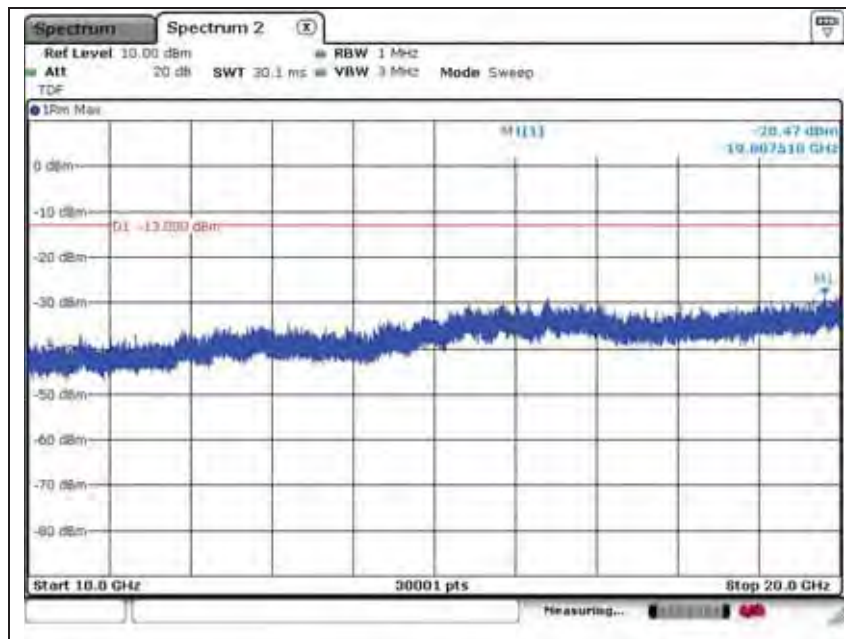
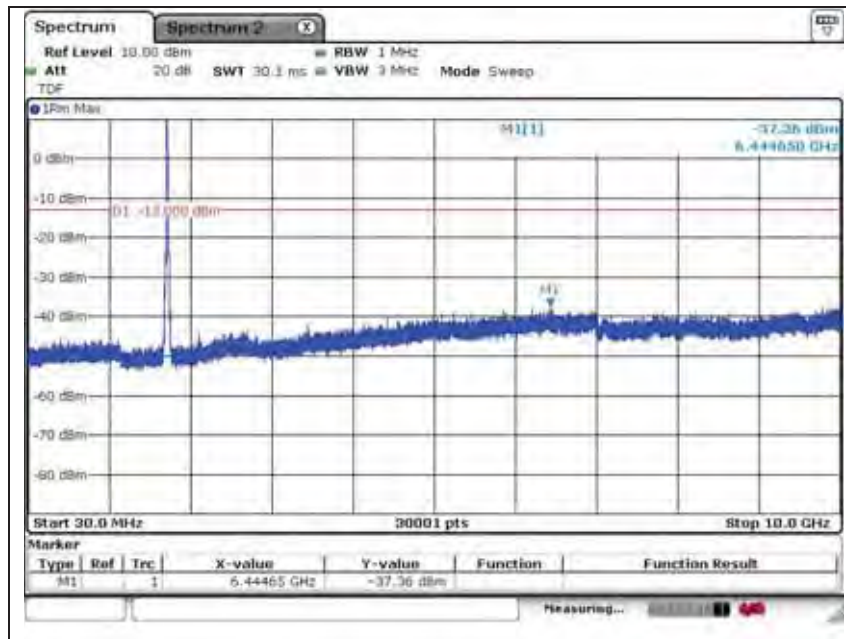
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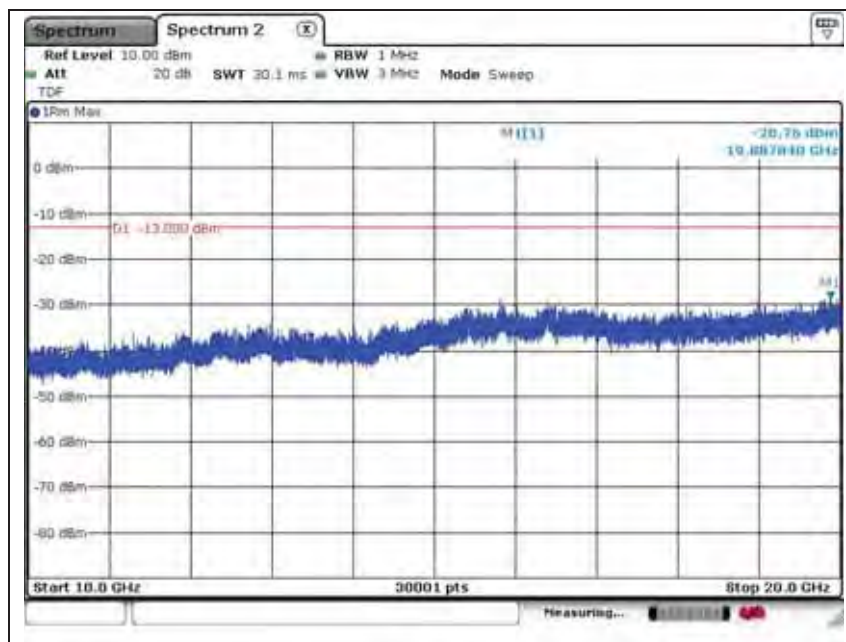
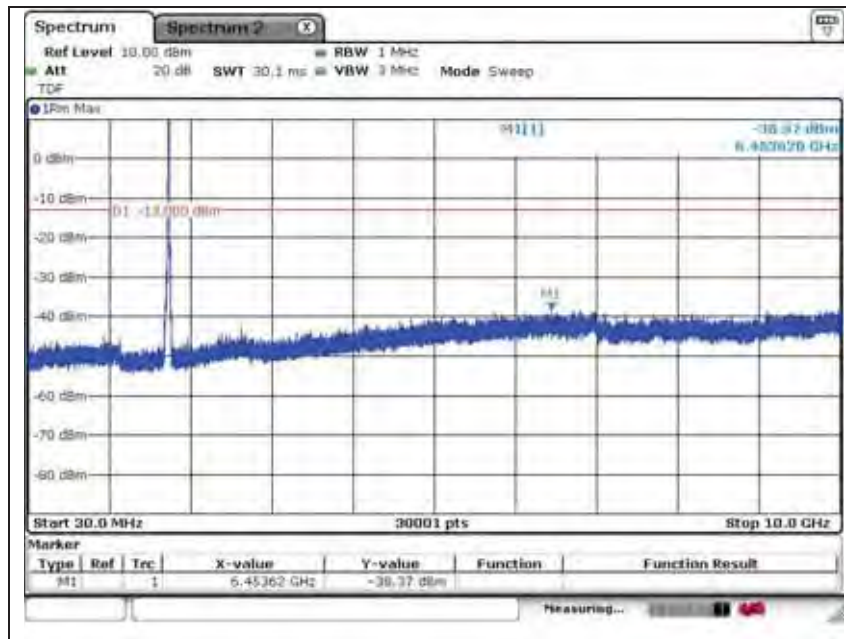
A4(210 mm x 297 mm)

Middle Channel



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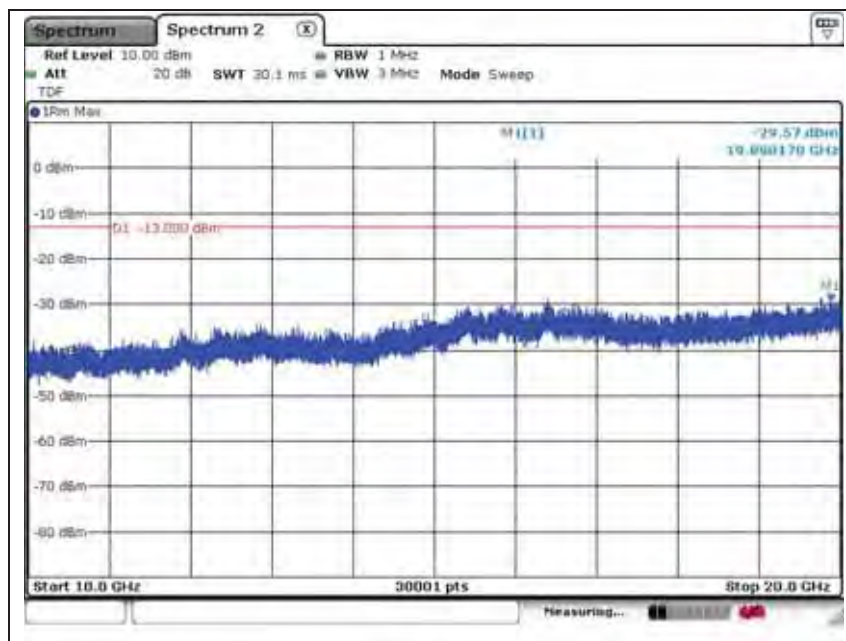
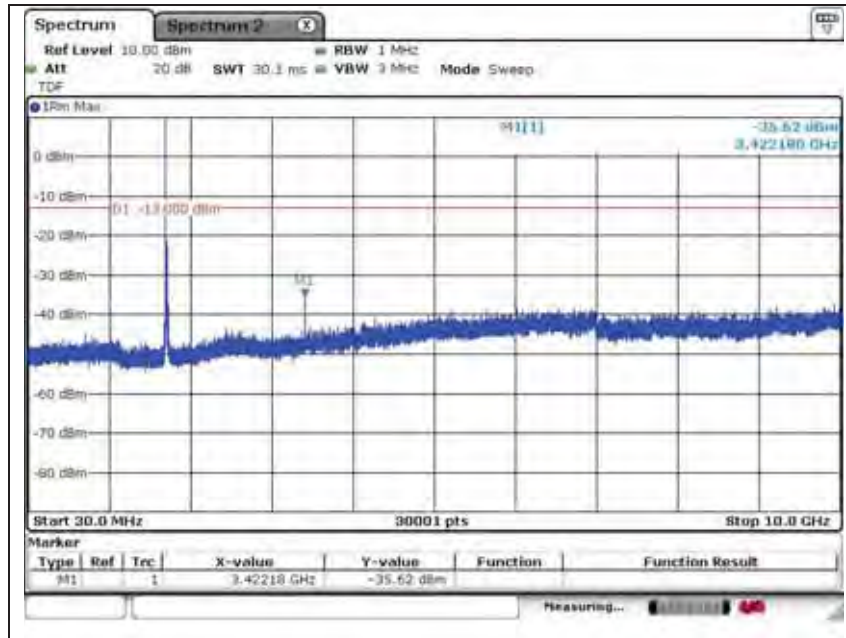
High Channel



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LTE band 4 (20 MHz – QPSK_RB 1_Offset 0)

Low Channel



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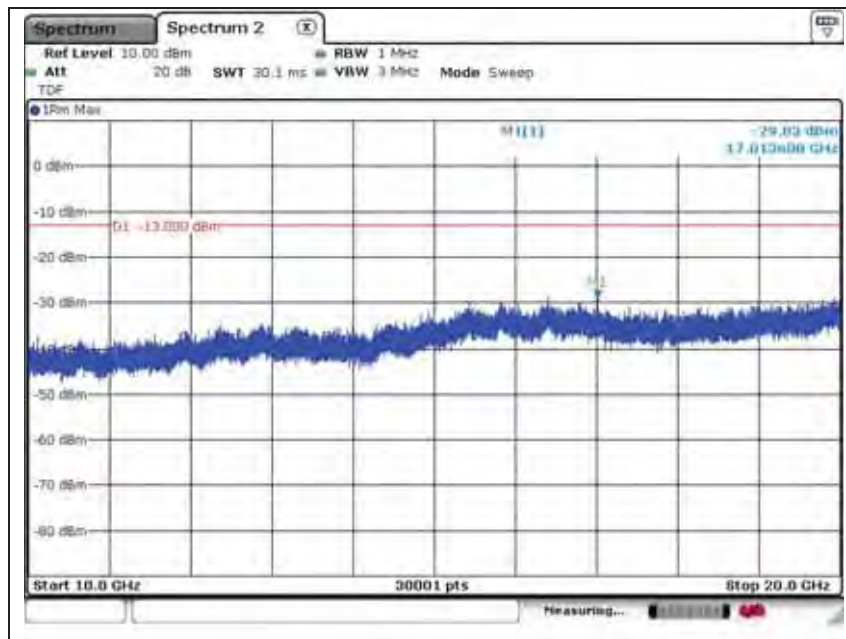
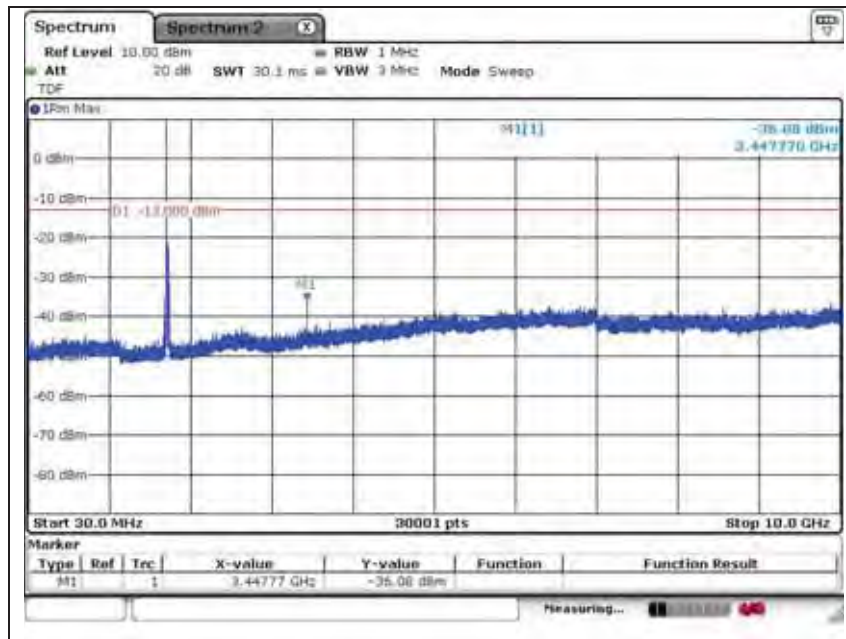
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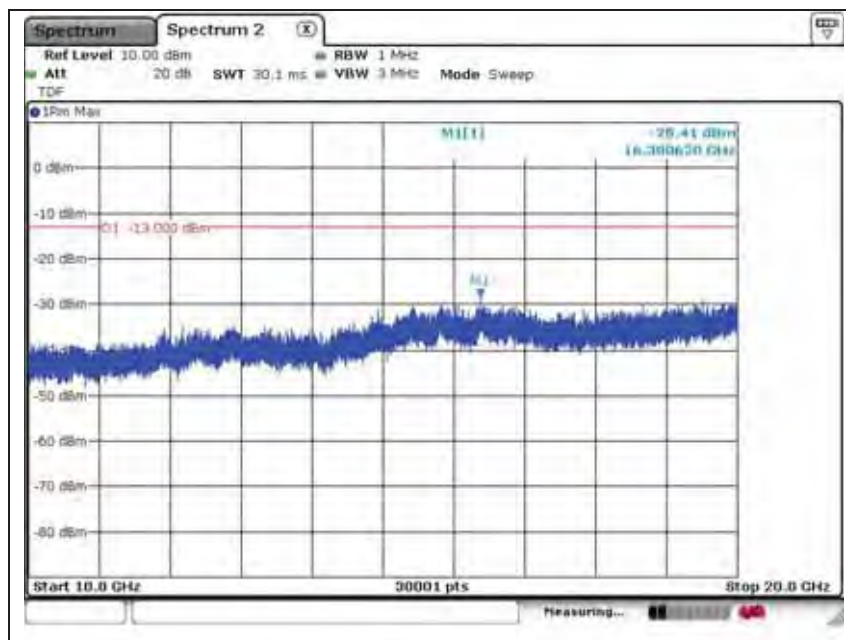
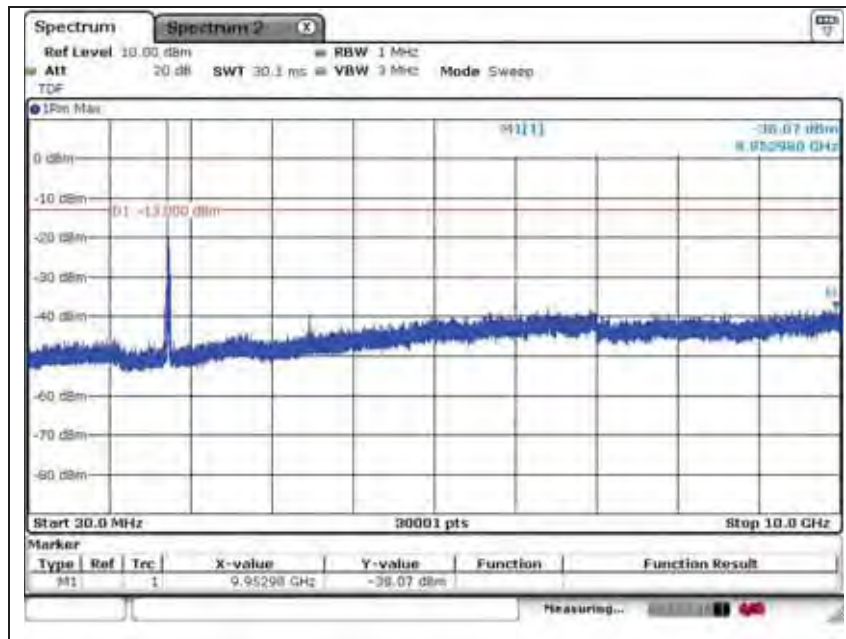
A4(210 mm x 297 mm)

Middle Channel



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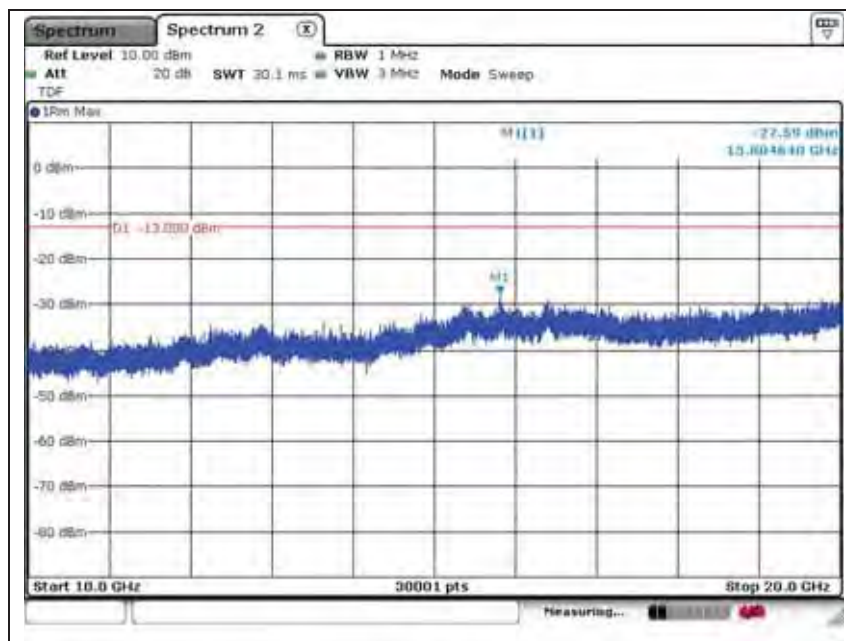
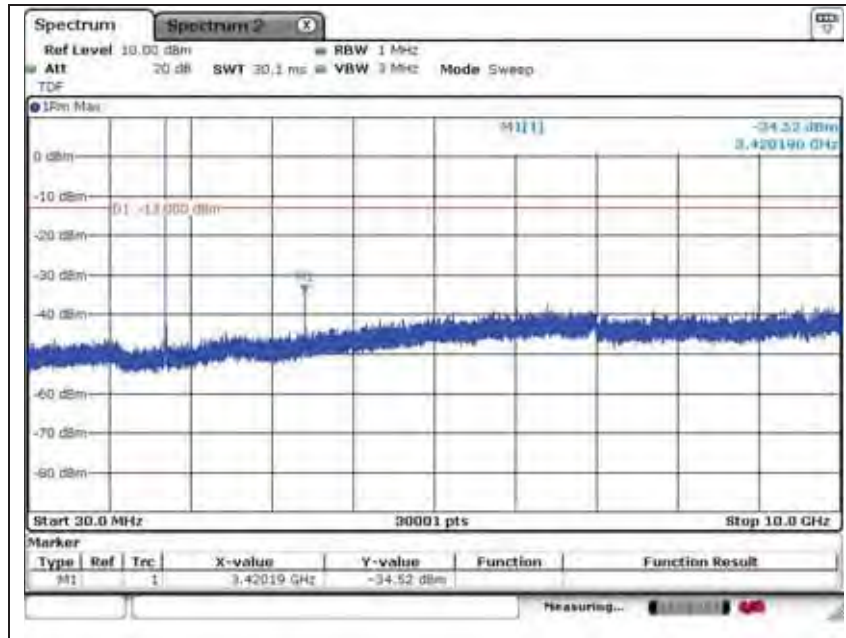
High Channel



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LTE band 4 (1.4 MHz – 16QAM_RB 1_Offset 0)

Low Channel



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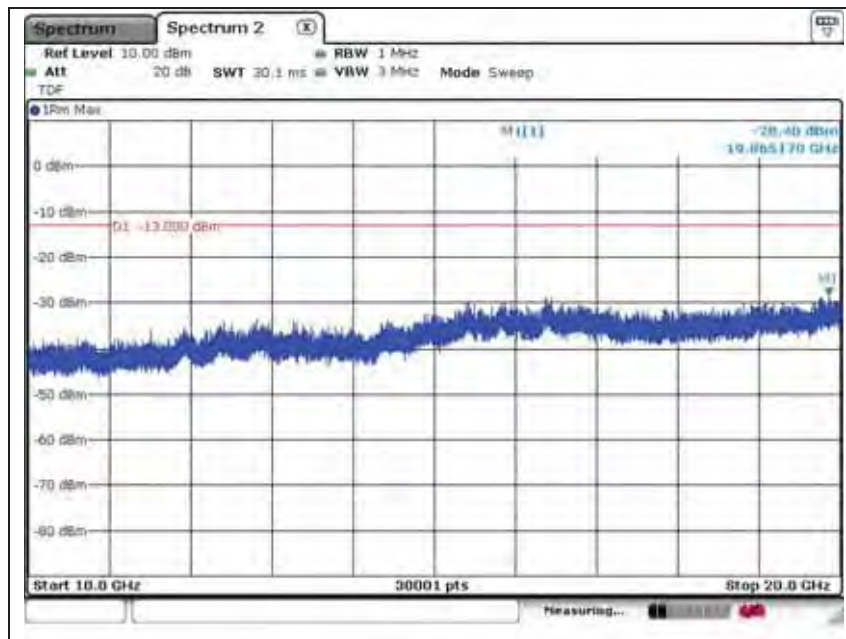
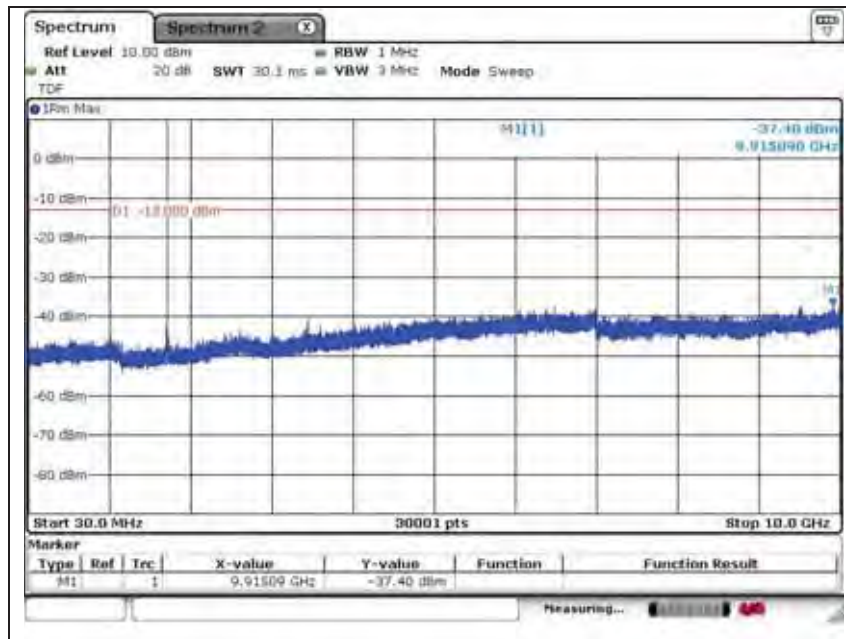
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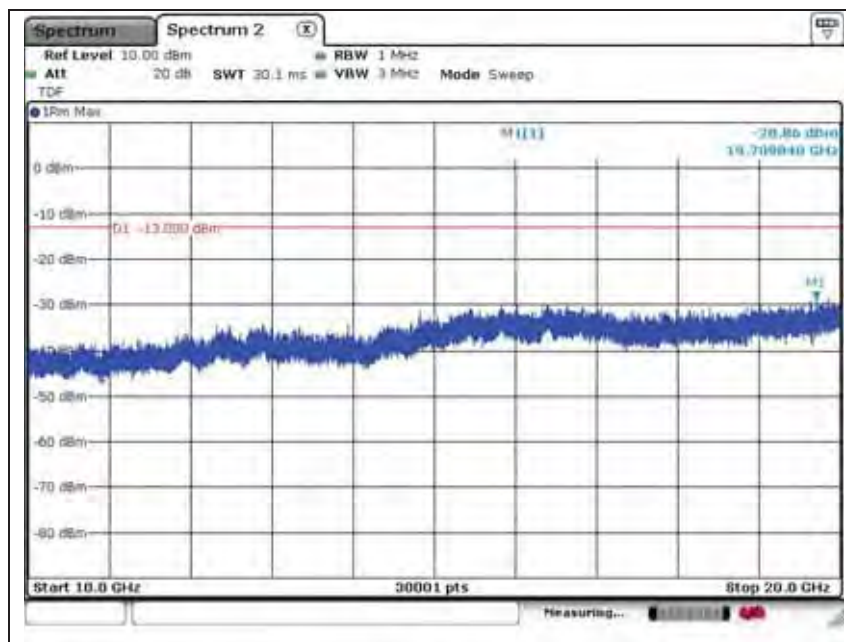
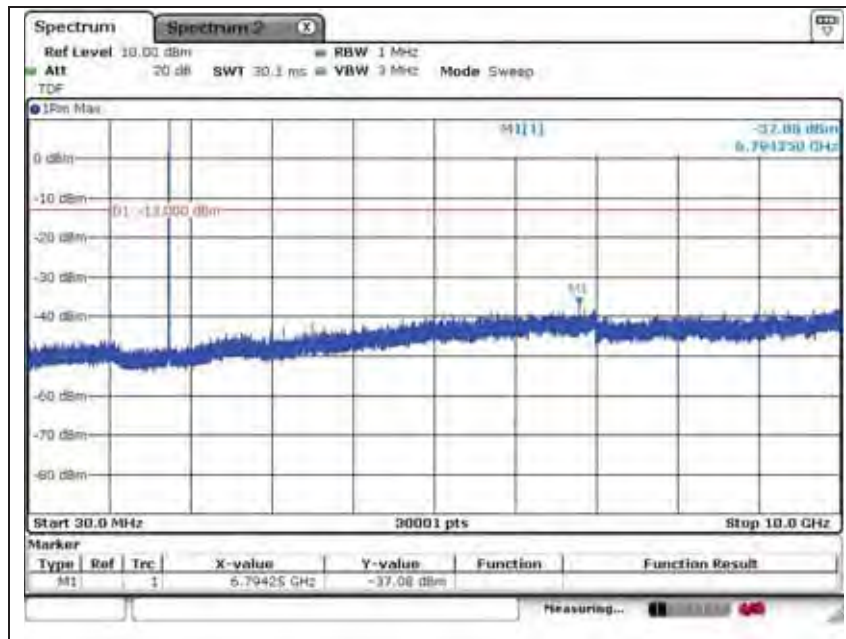
A4(210 mm x 297 mm)

Middle Channel



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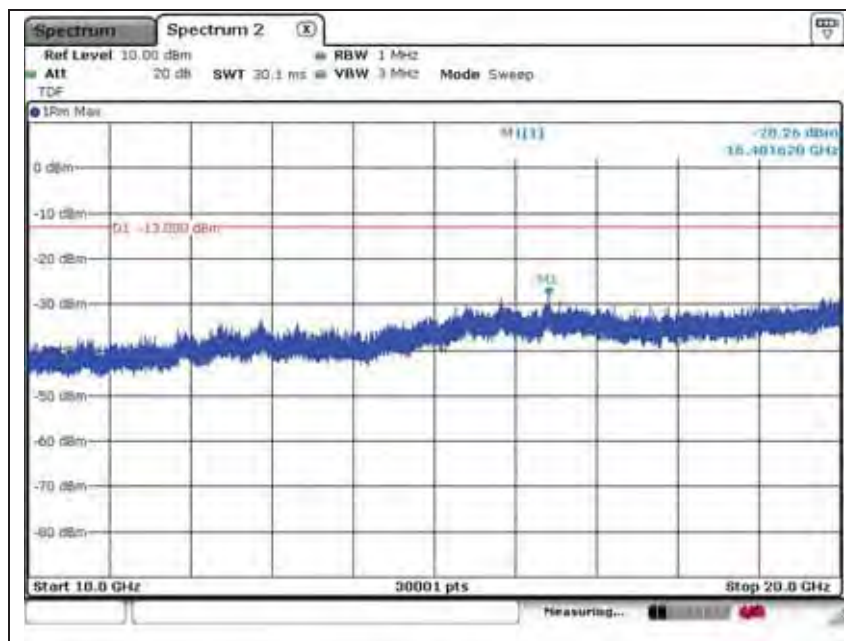
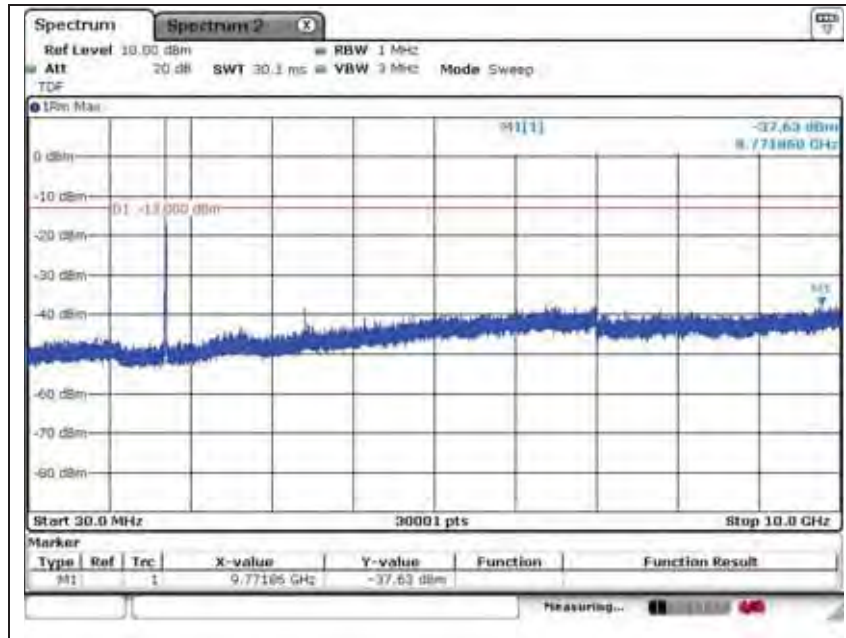
High Channel



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LTE band 4 (3 MHz – 16QAM_RB 1_Offset 0)

Low Channel



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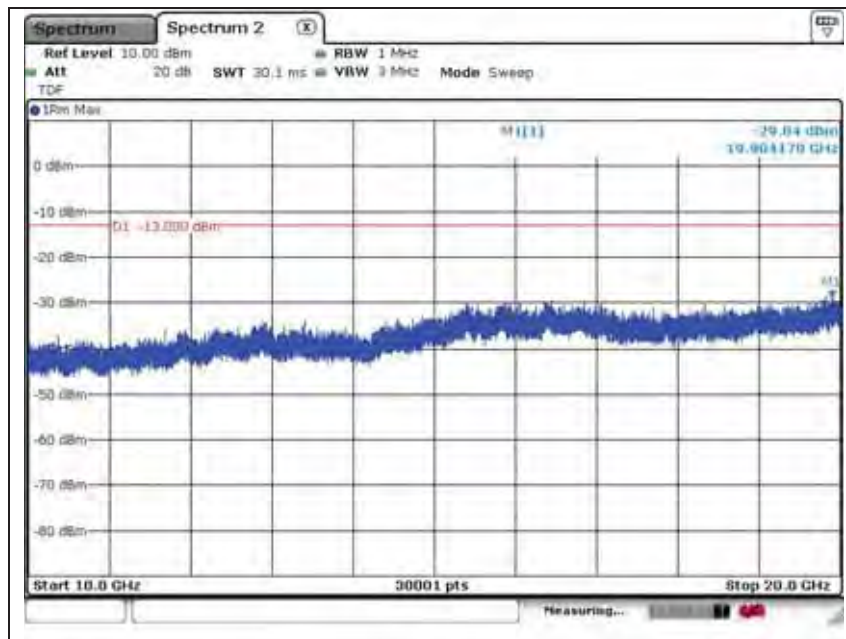
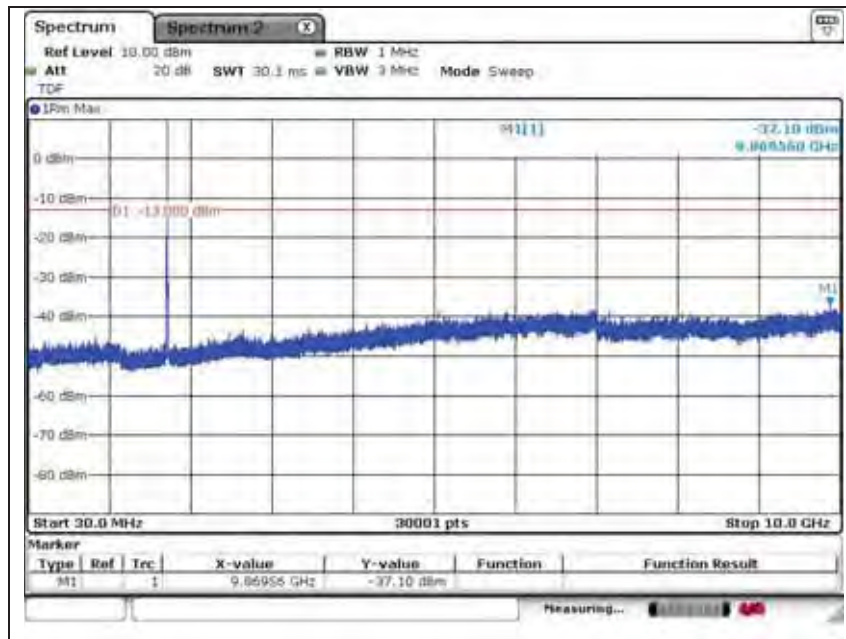
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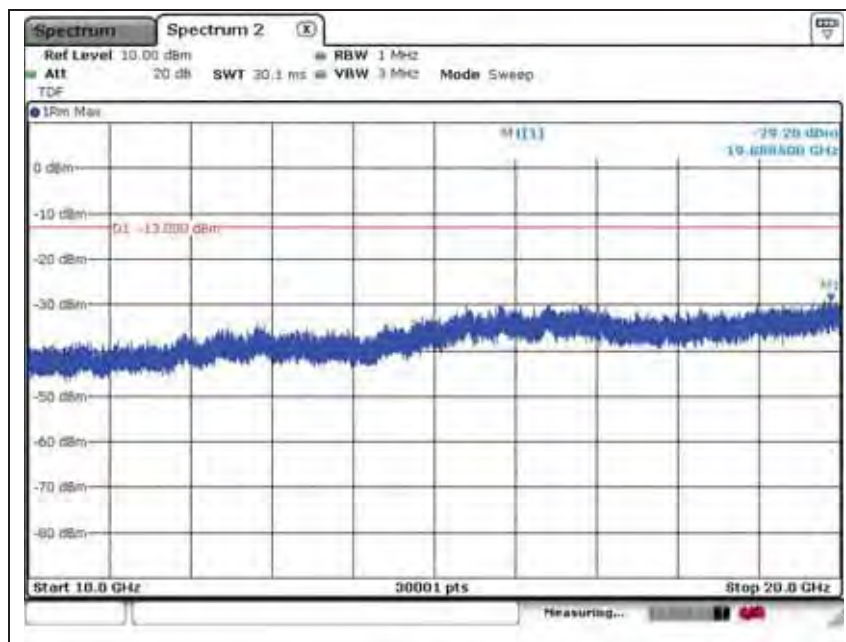
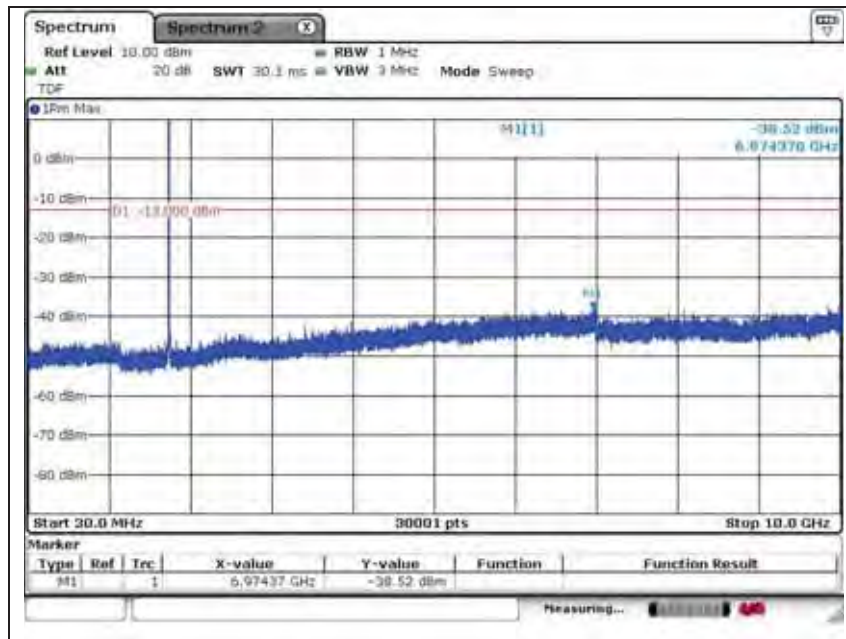
A4(210 mm x 297 mm)

Middle Channel



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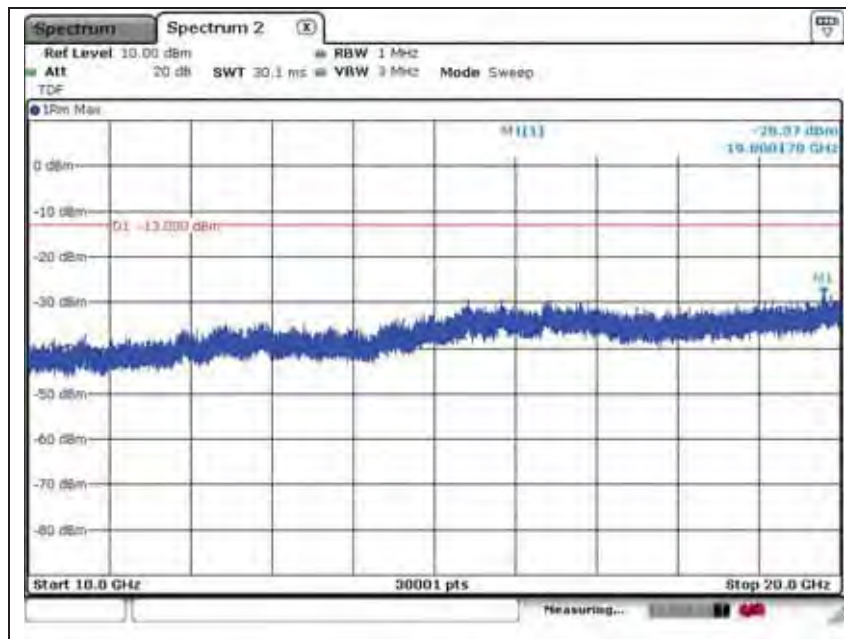
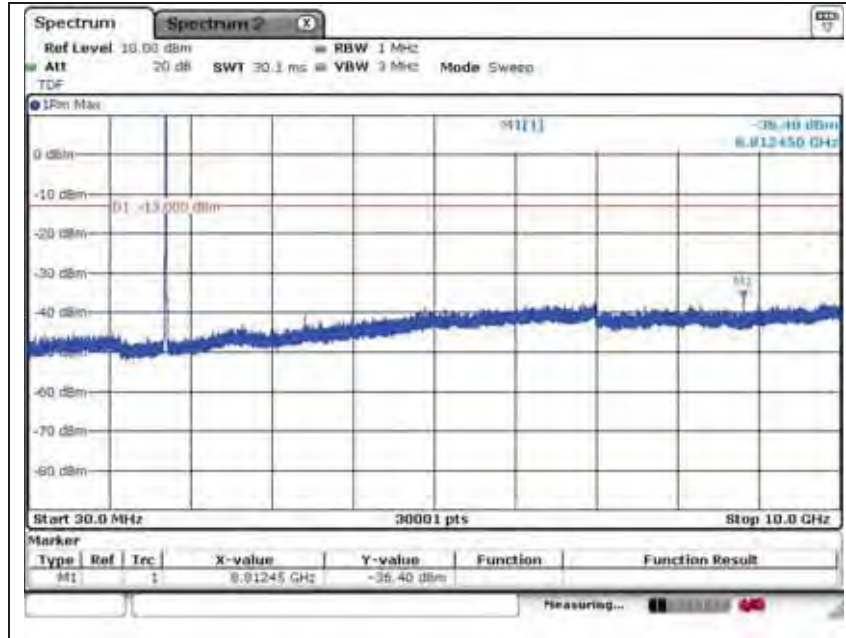
High Channel



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LTE band 4 (5 MHz – 16QAM_RB 1_Offset 0)

Low Channel



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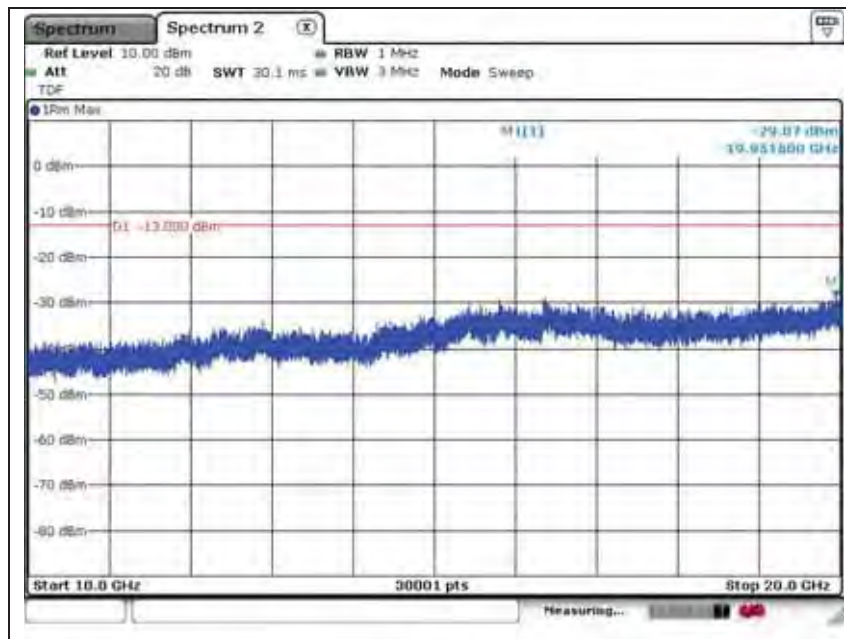
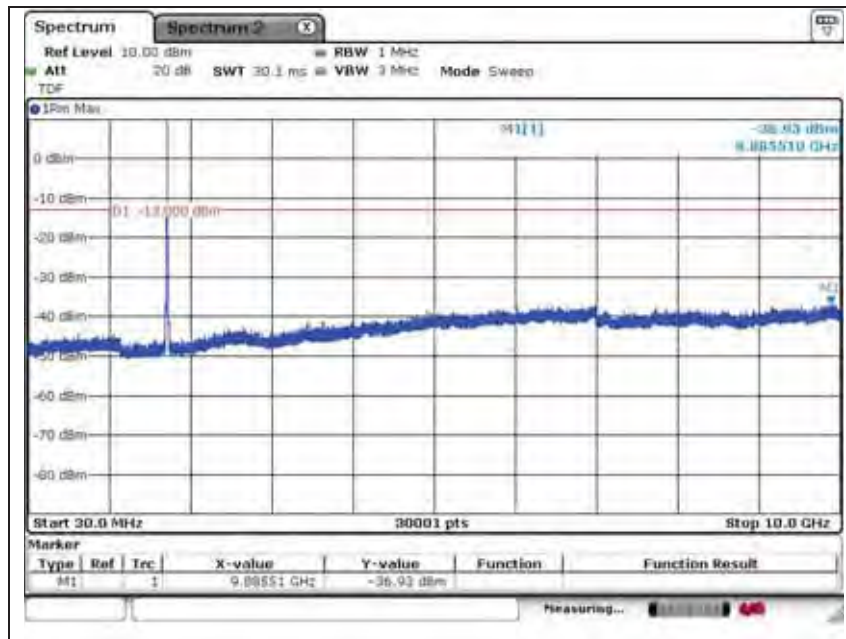
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A4(210 mm x 297 mm)

Middle Channel



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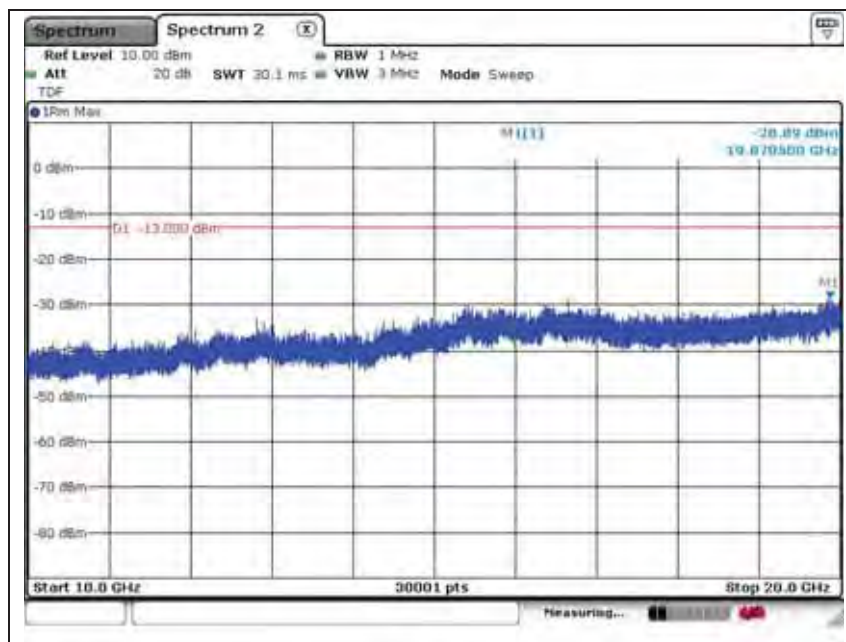
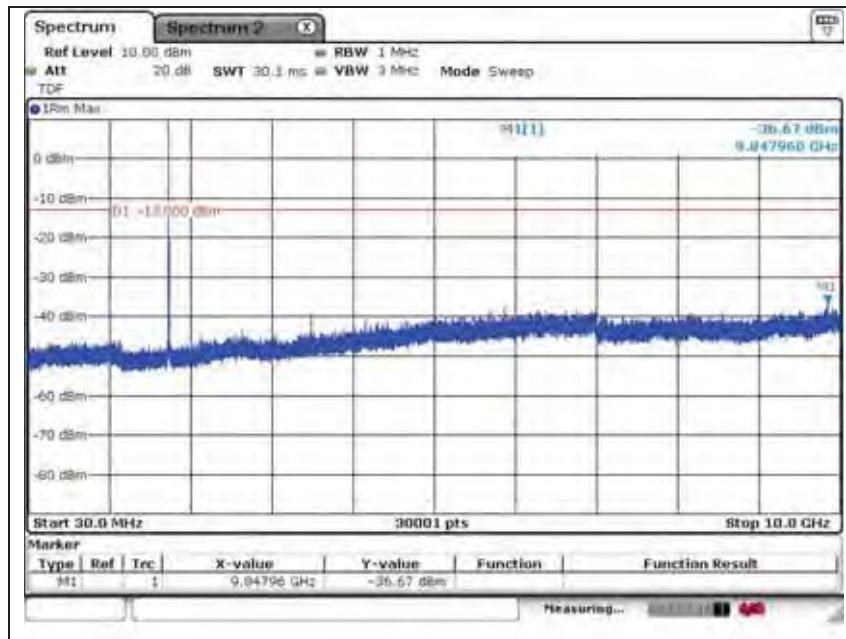
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A4(210 mm x 297 mm)

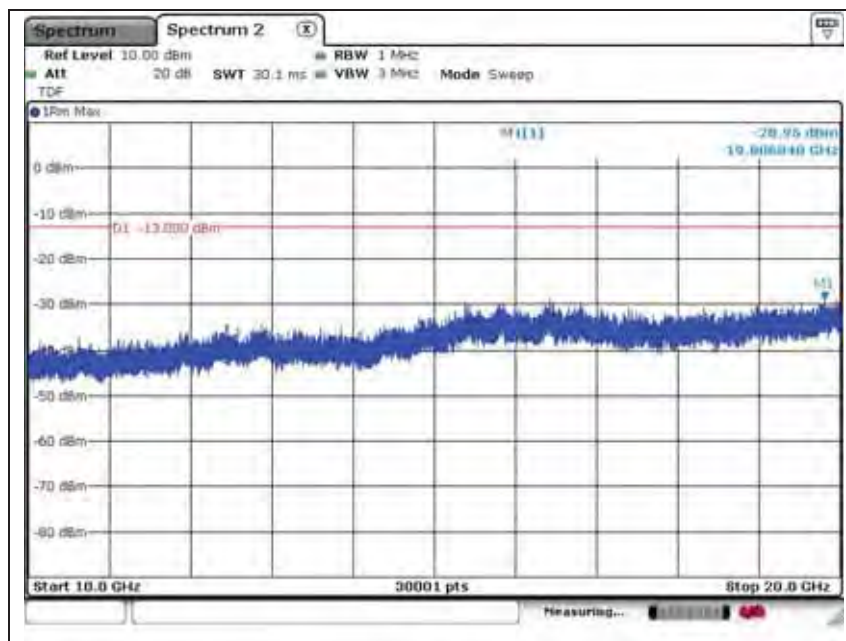
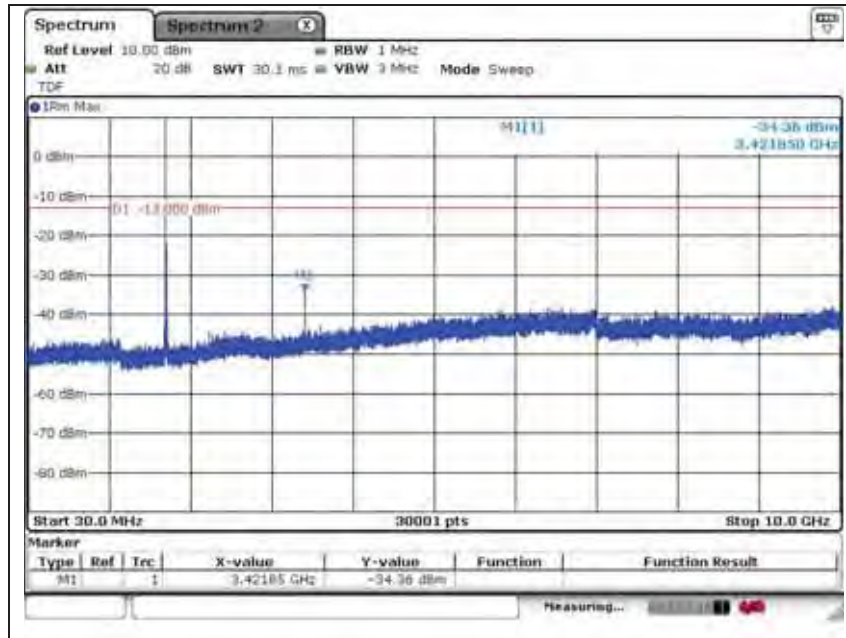
High Channel



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LTE band 4 (10 MHz – 16QAM_RB 1_Offset 0)

Low Channel



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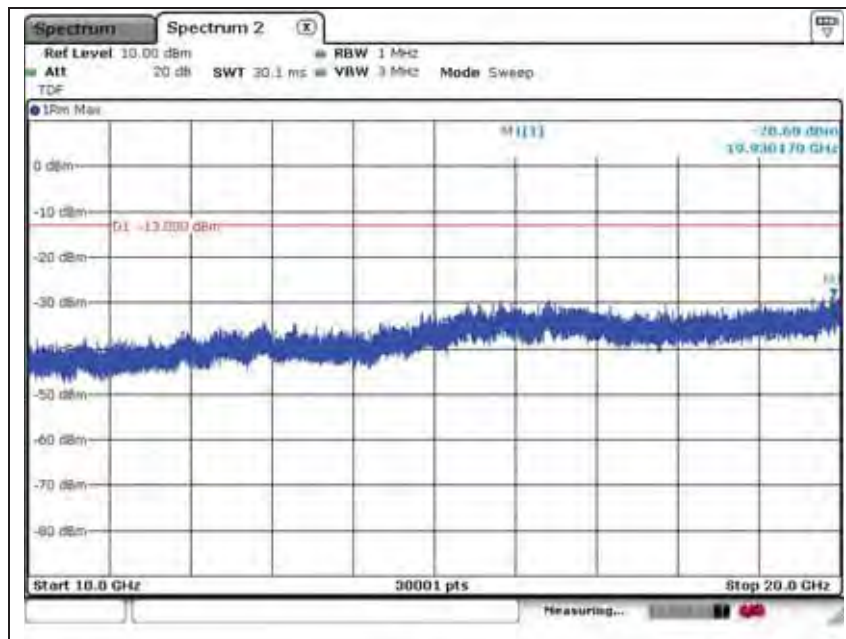
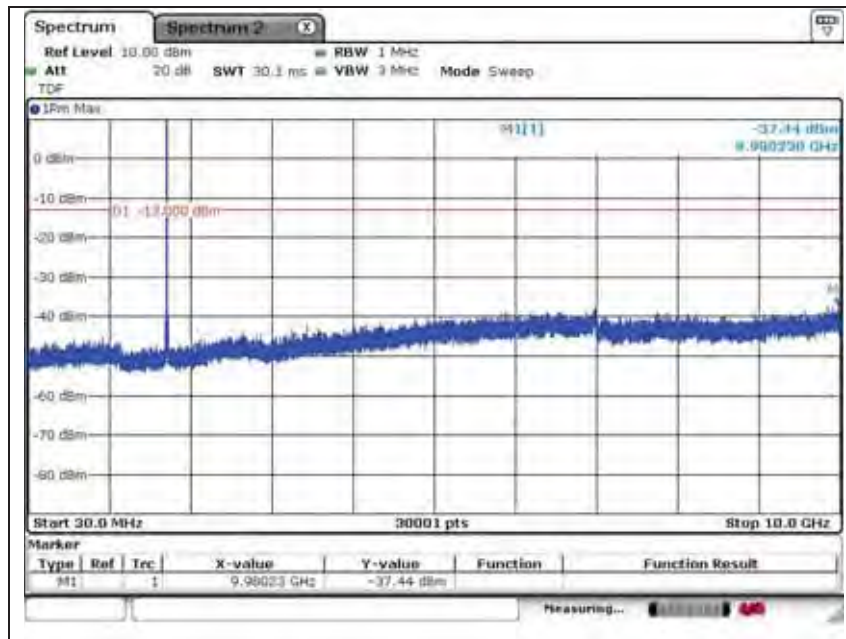
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A4(210 mm x 297 mm)

Middle Channel



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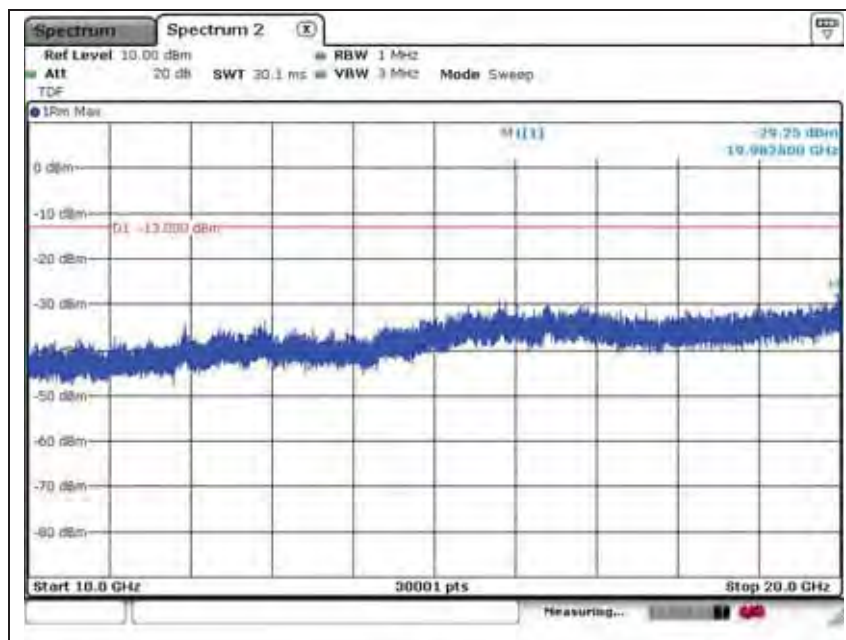
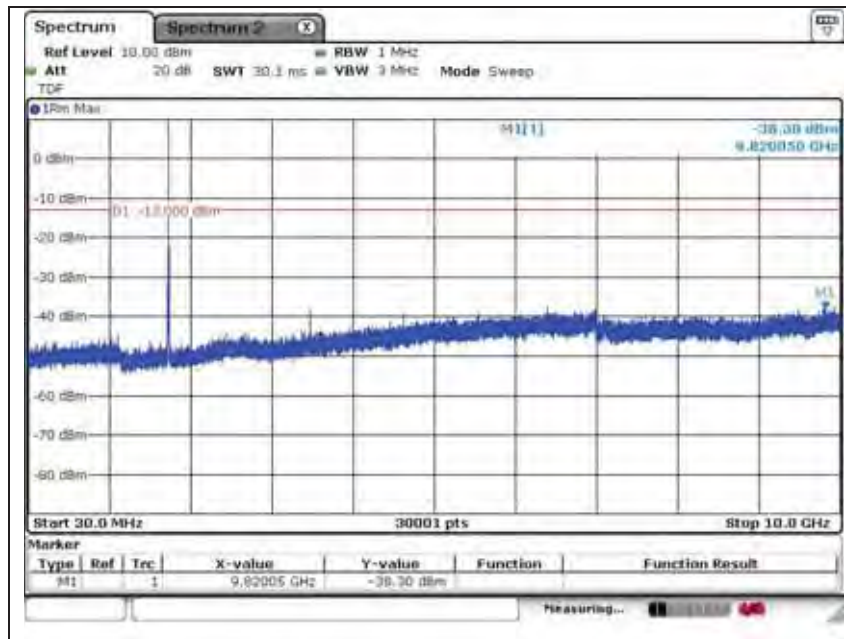
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

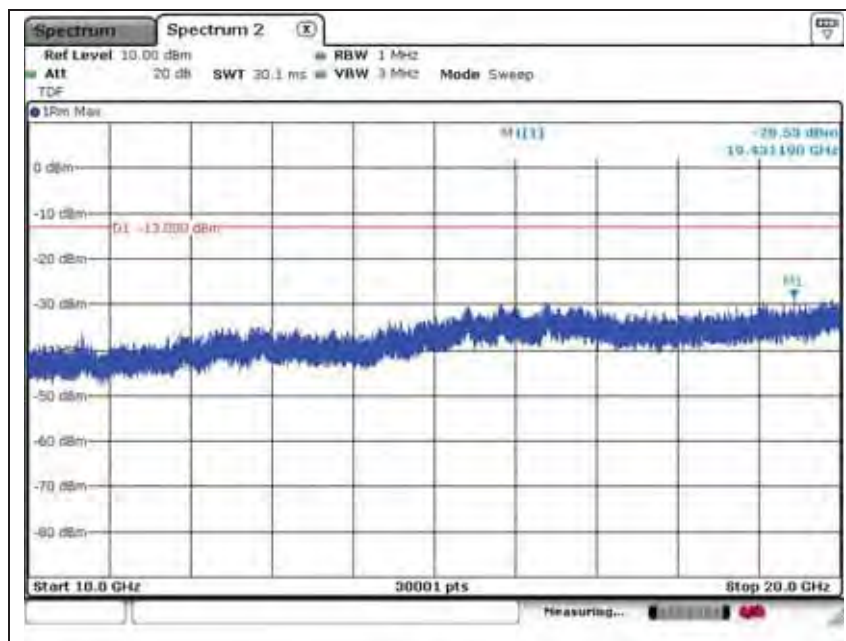
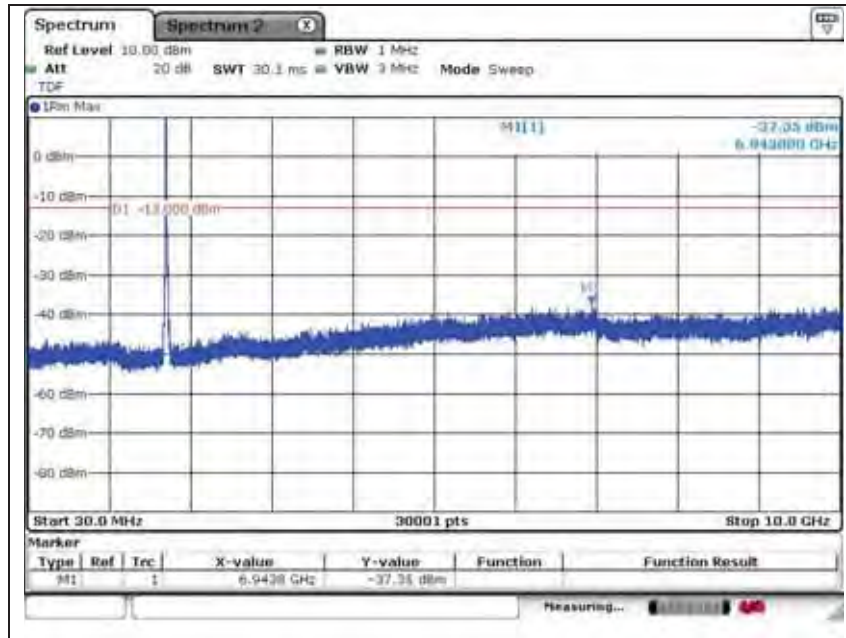
High Channel



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LTE band 4 (15 MHz – 16QAM_RB 1_Offset 0)

Low Channel



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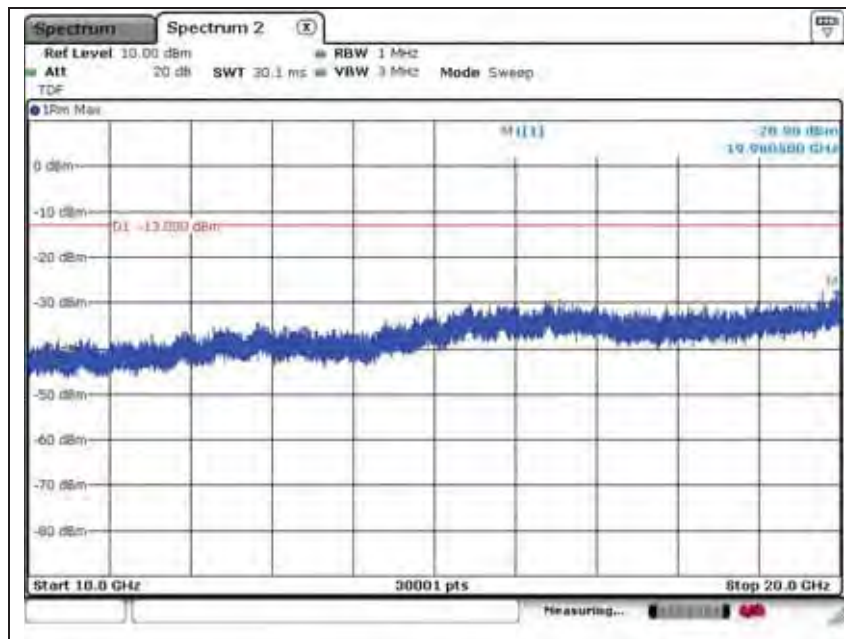
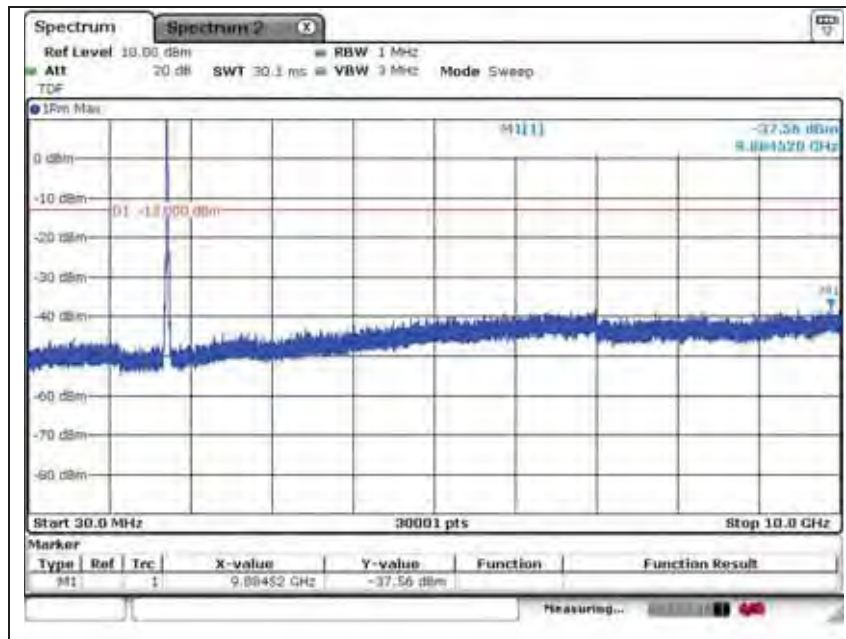
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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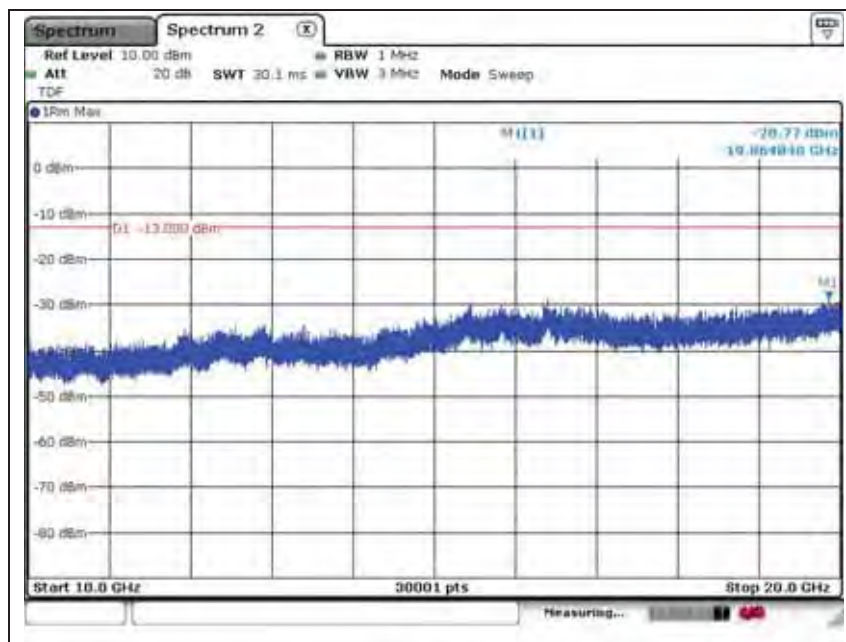
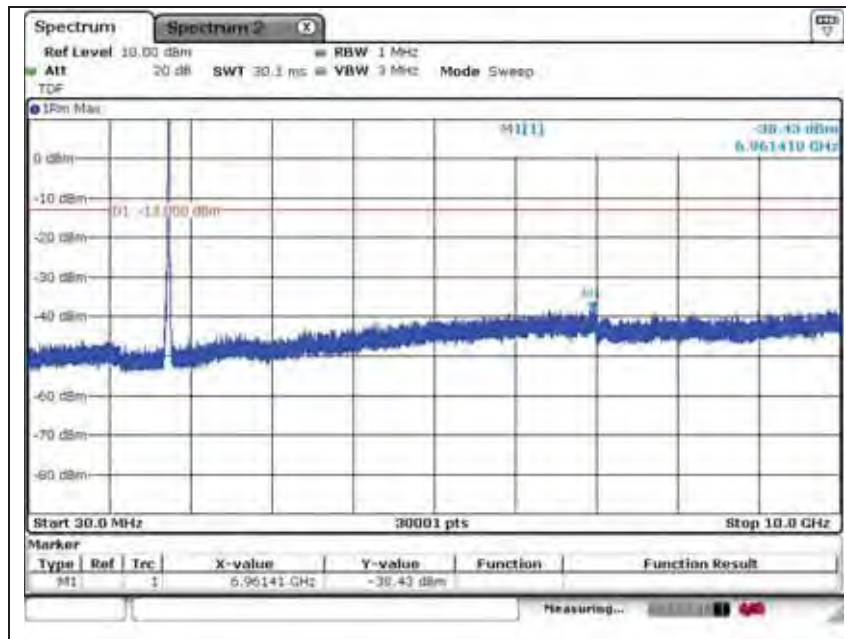
A4(210 mm x 297 mm)

Middle Channel



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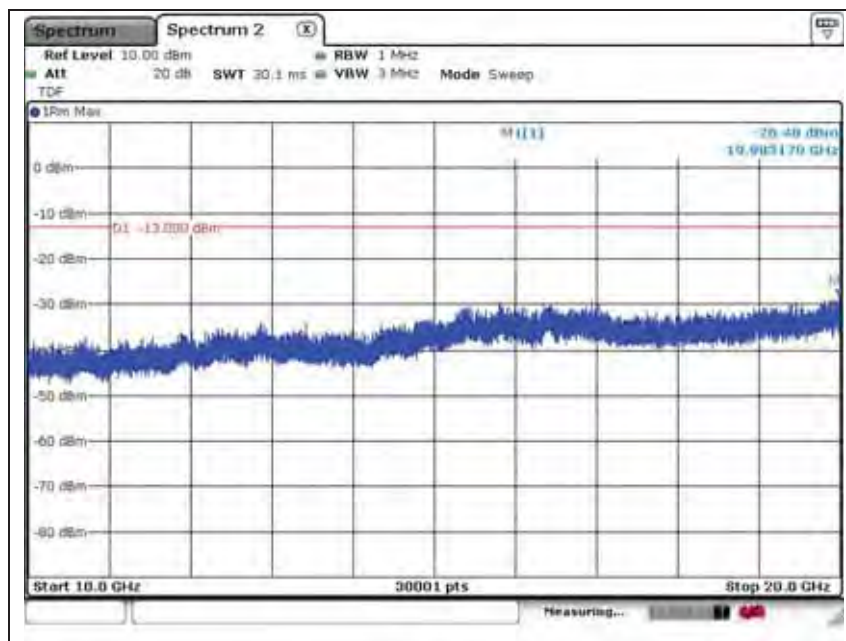
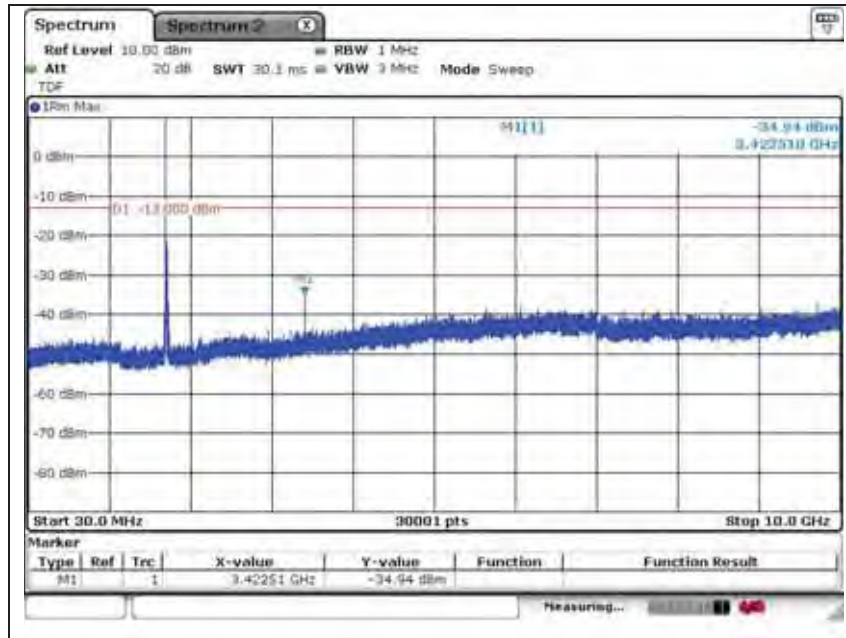
High Channel



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LTE band 4 (20 MHz – 16QAM_RB 1_Offset 0)

Low Channel



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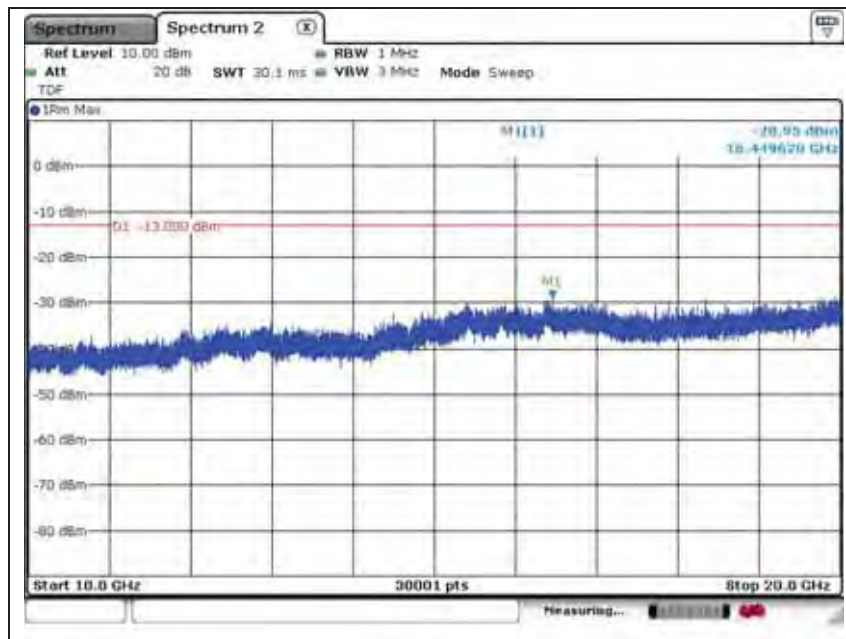
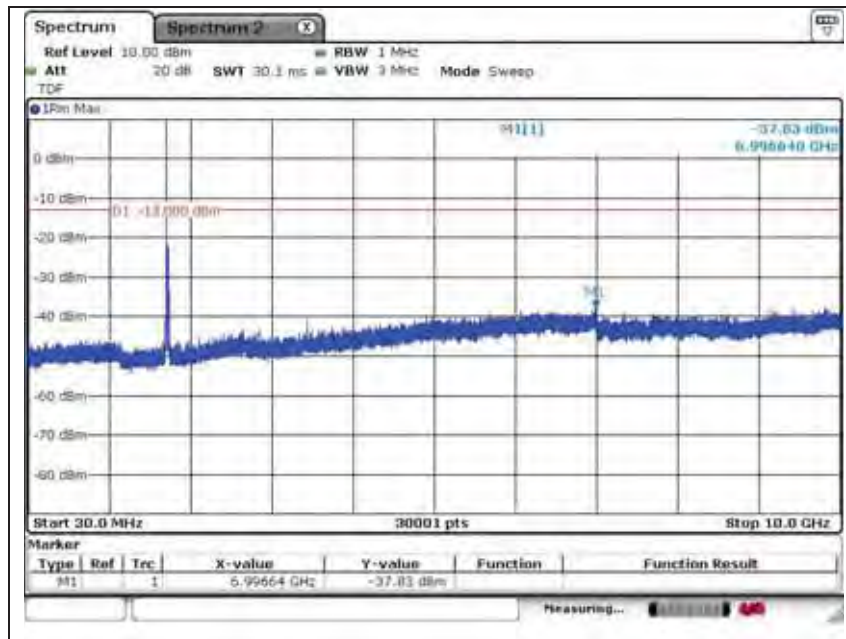
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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Middle Channel



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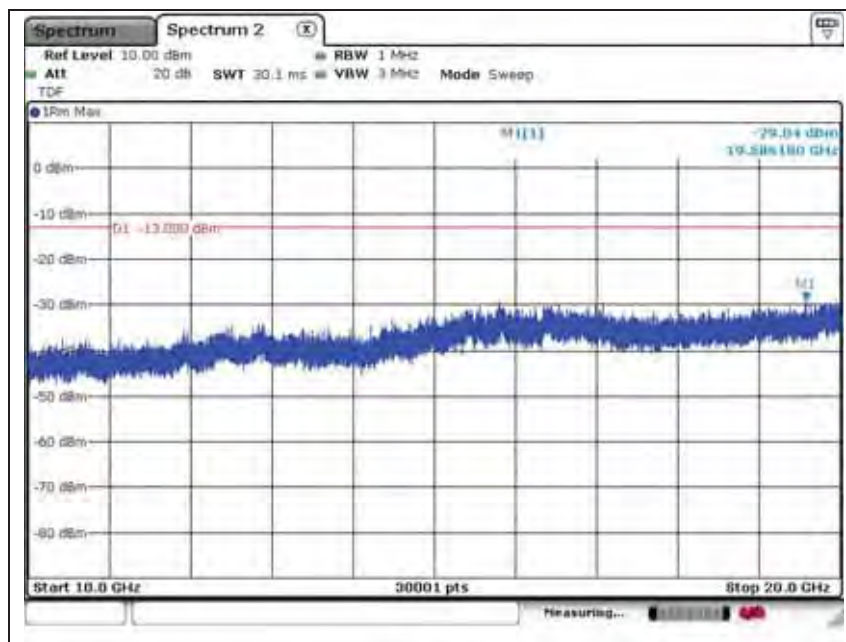
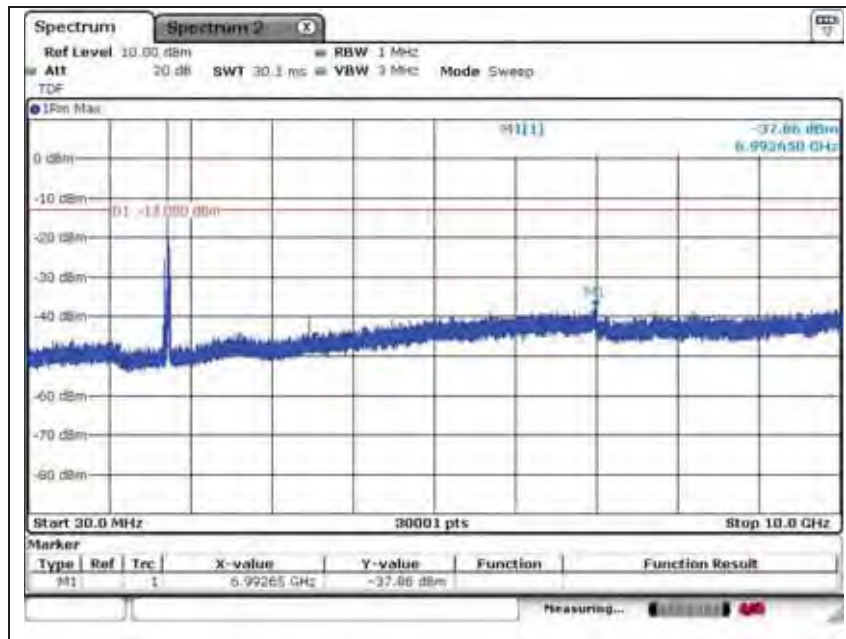
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

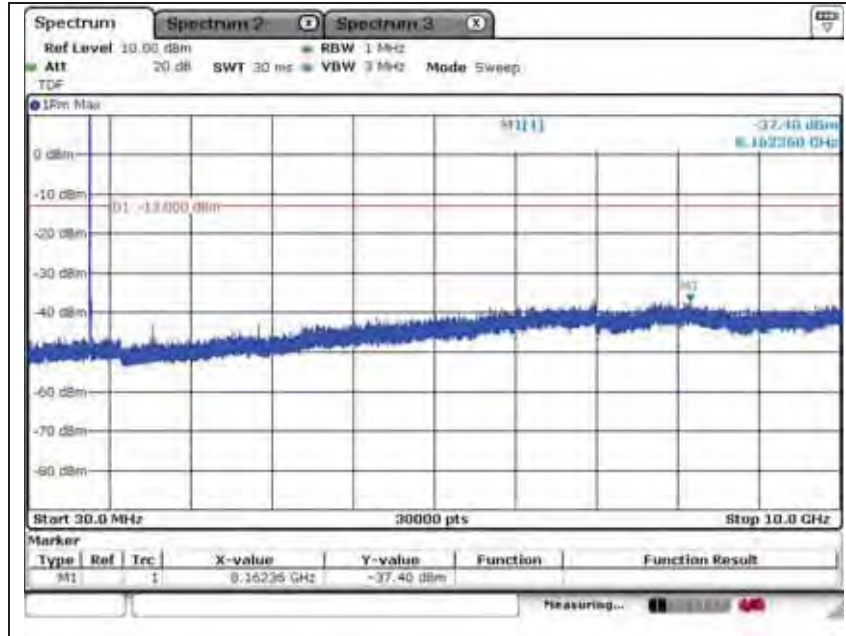
High Channel



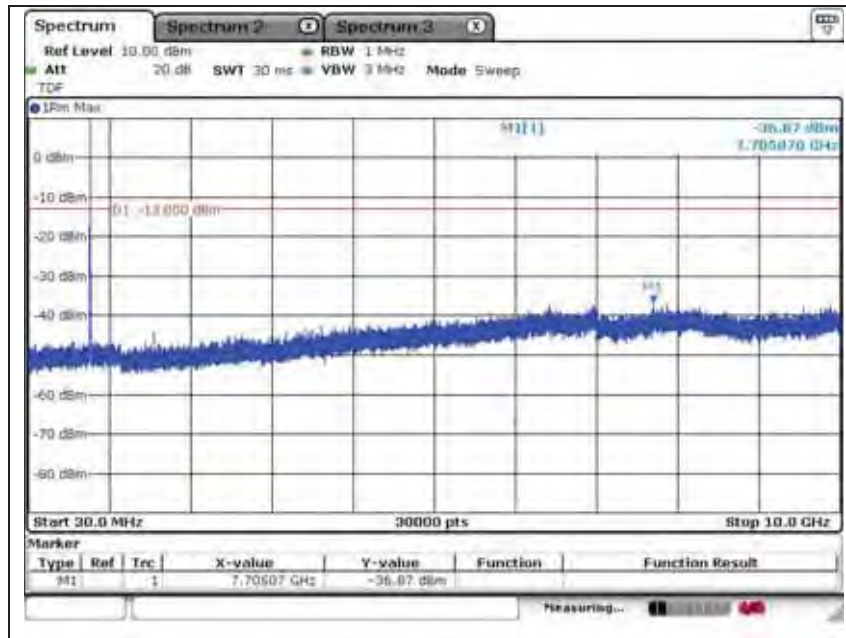
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LTE band 13 (5 MHz – QPSK_RB 1_Offset 0)

Low Channel



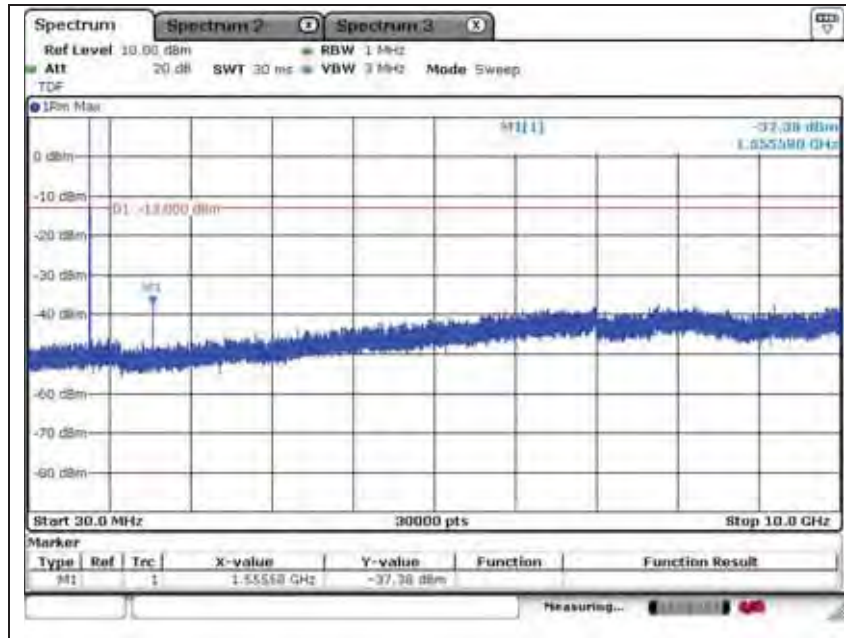
High Channel



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LTE band 13 (10 MHz – QPSK_RB 1_Offset 0)

Middle Channel



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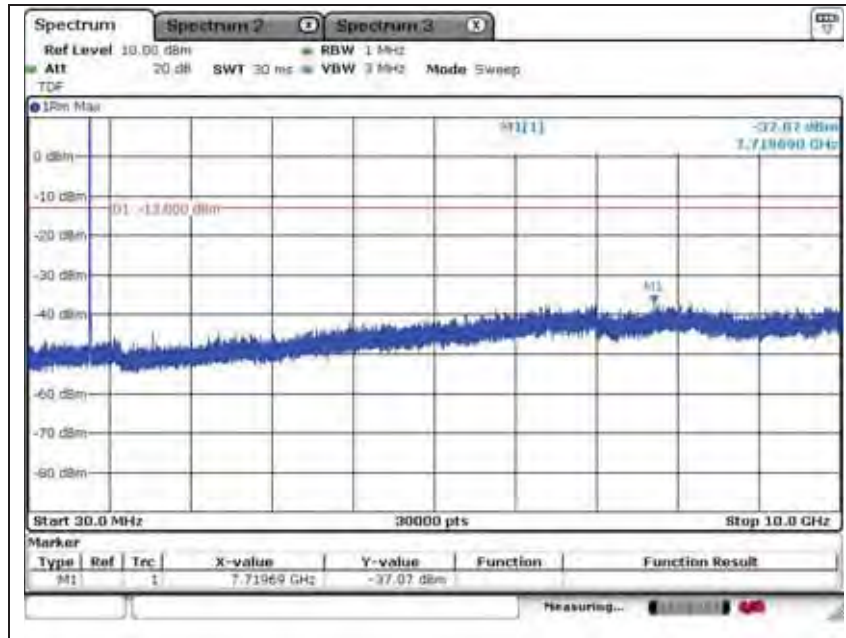
RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

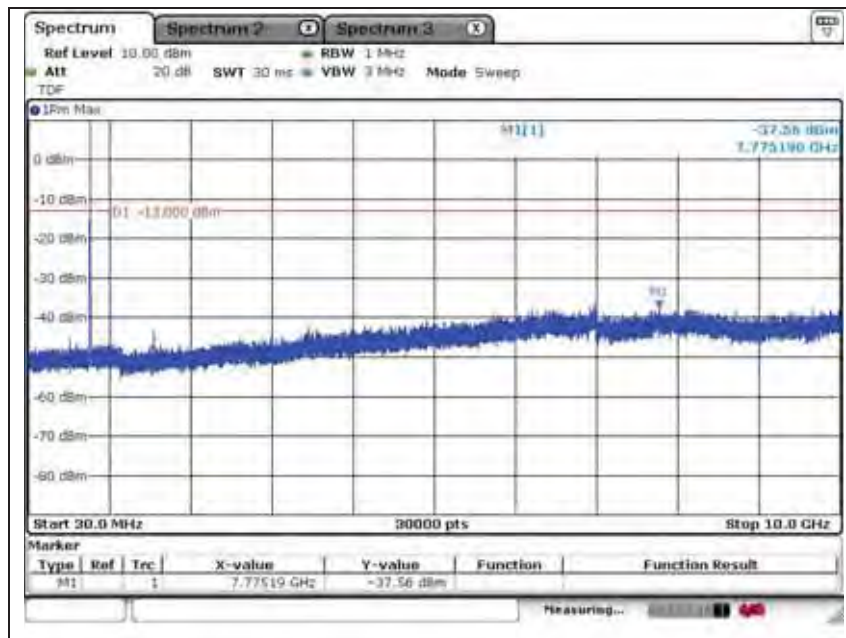
A4(210 mm x 297 mm)

LTE band 13 (5 MHz – 16QAM_RB 1_Offset 0)

Low Channel



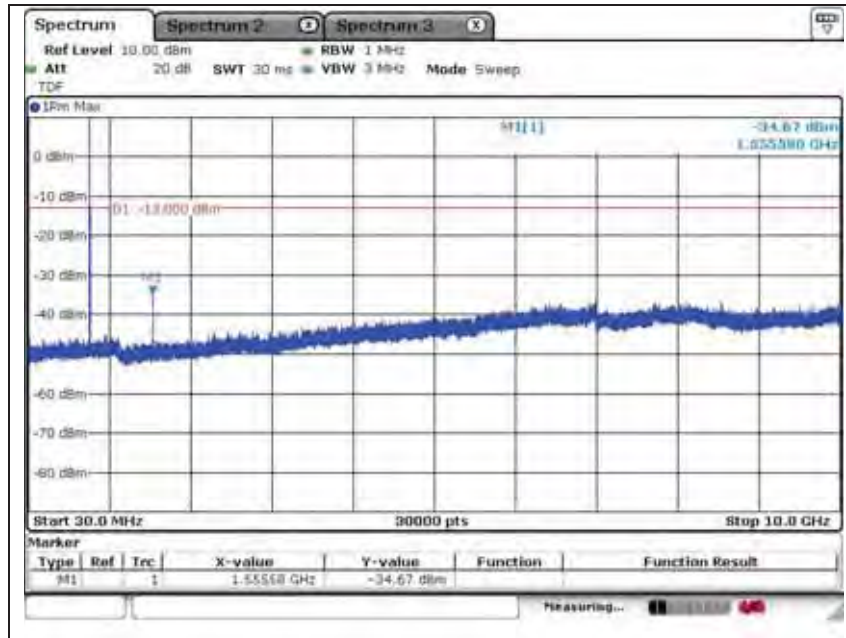
High Channel



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LTE band 4 (10 MHz – 16QAM_RB 1_Offset 0)

Middle Channel



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A4(210 mm x 297 mm)

7. Band Edge

7.1. Limit

FCC §22.917(a), the 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.

FCC §24.238(a), the 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.

FCC §27.53(c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

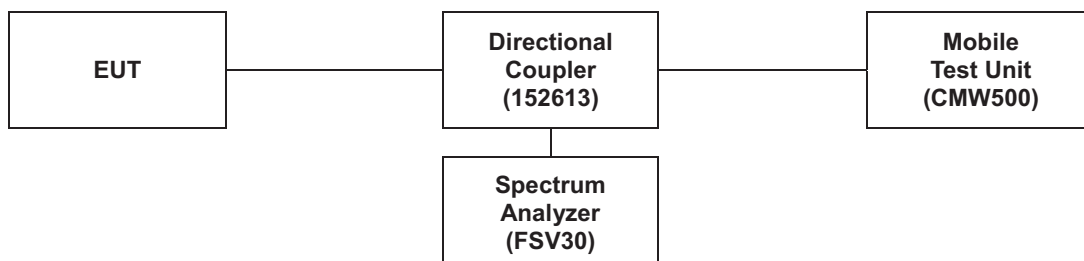
(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

FCC §27.53(h)(1), Except as otherwise specified below, for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

7.2. Test Procedure

The test follows section 6.0 of FCC KDB publication 971168 D01 v02r02.

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot.
2. Span was set large enough so as to capture all out of band emissions near the band edge.
3. RBW ≥ 1 % of OBW.
4. VBW \geq RBW.
5. Detector = RMS.
6. Trace mode = max hold.
7. Sweep time = auto couple.
8. The trace was allowed to stabilize.
9. All path loss of frequency range was investigated and compensated to spectrum analyzer as Correction function.



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7.3. Test Results

Ambient temperature : (23 ± 1) °C

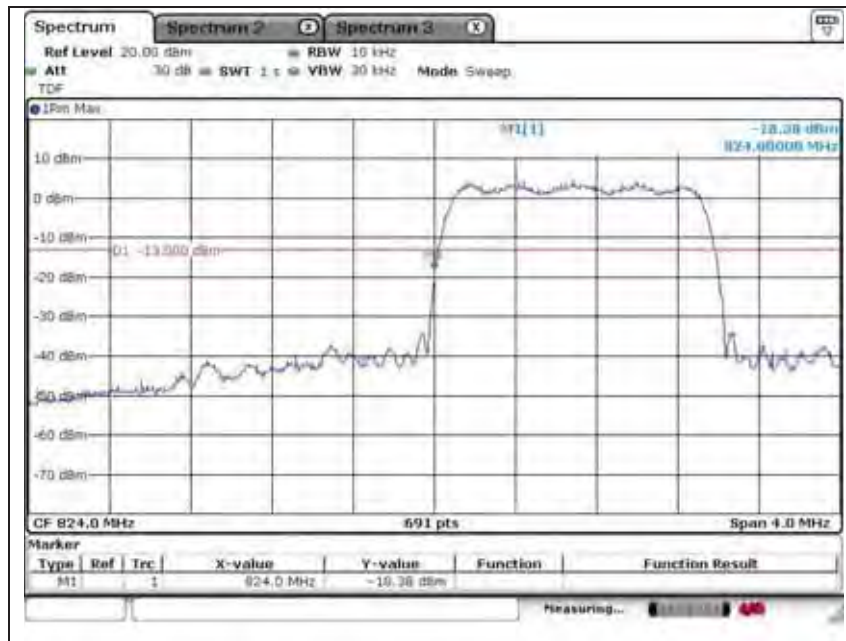
Relative humidity : 47 % R.H.

Please refer to the following plots.

Band edge

CDMA 850 1xRTT

Low Channel



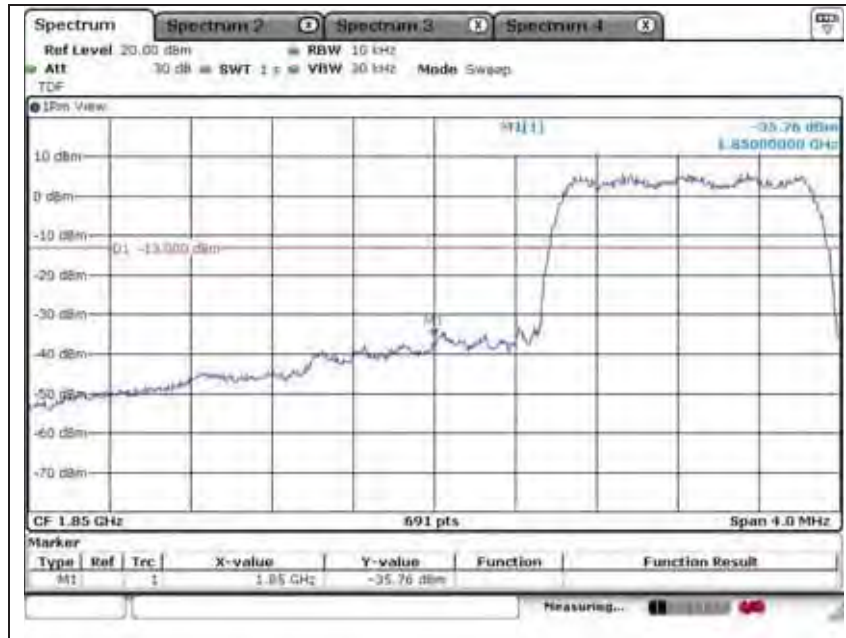
High Channel



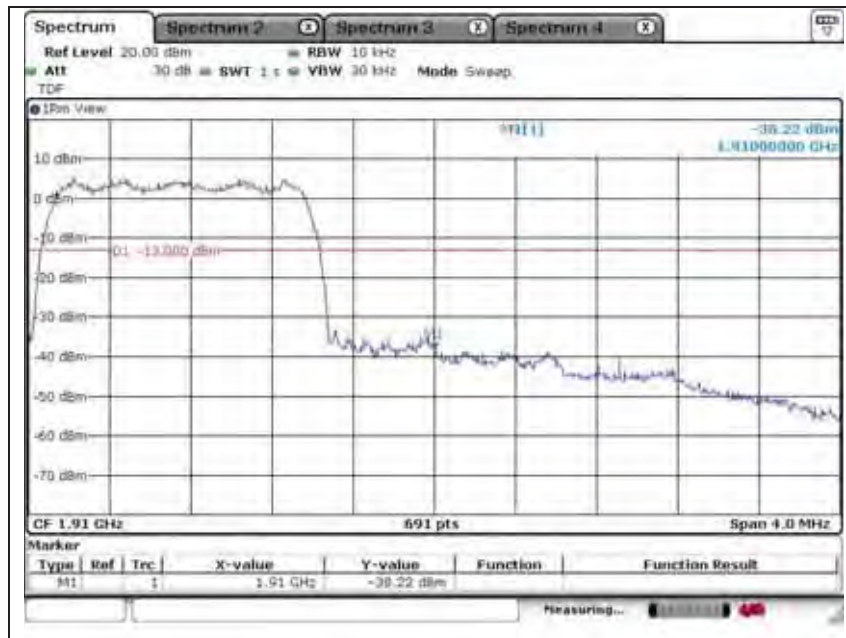
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CDMA 1 900 1xRTT

Low Channel



High Channel



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RTT5041-20(2014.01.20)(2)

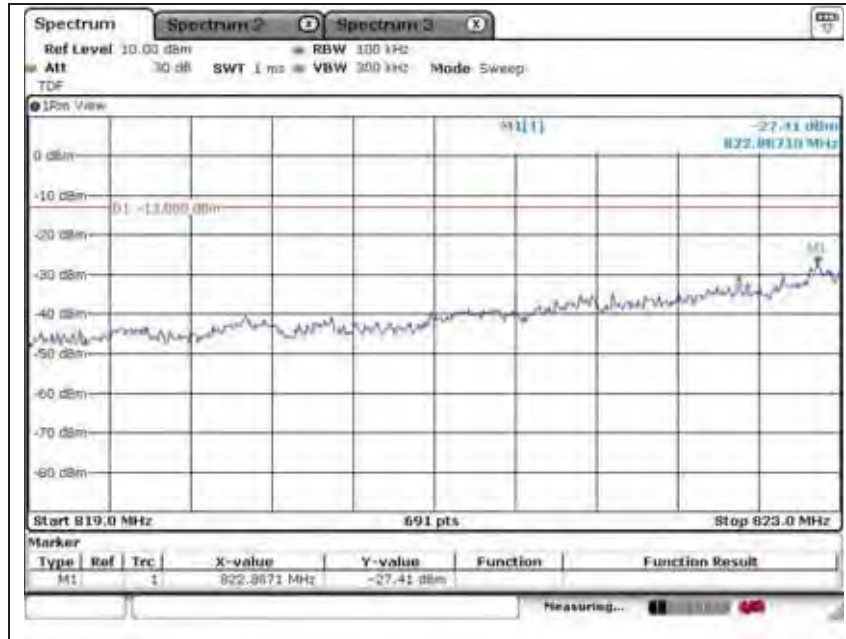
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

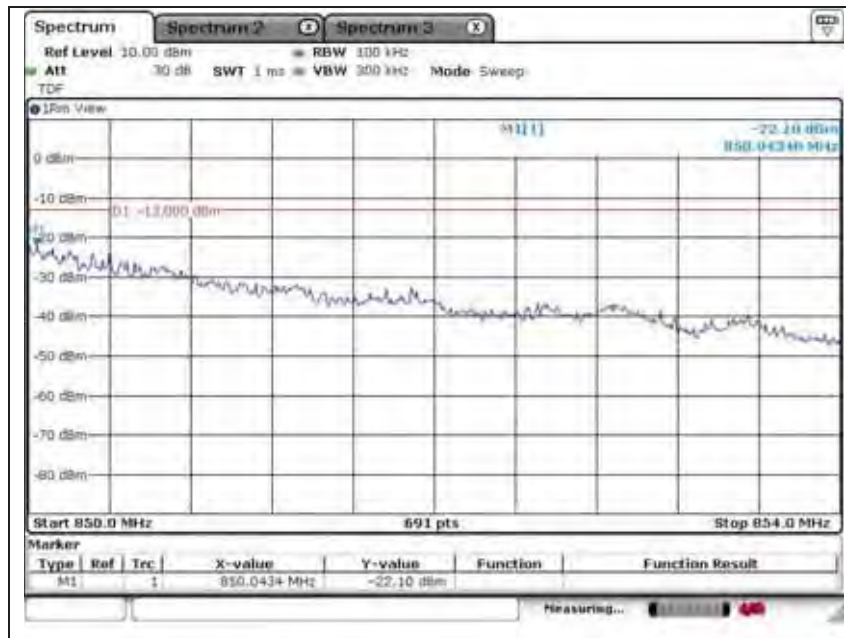
4 MHz SPAN

CDMA 850 1xRTT

Low Channel



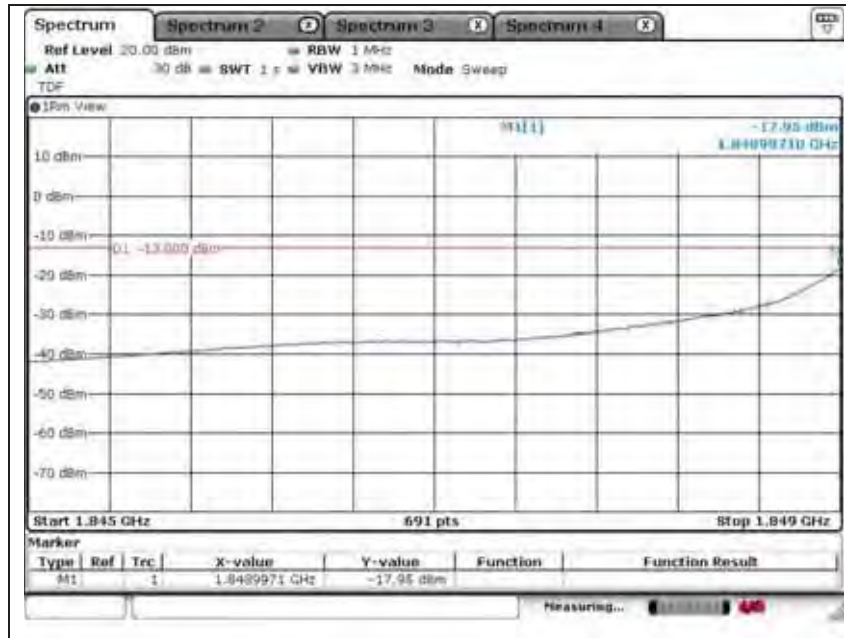
High Channel



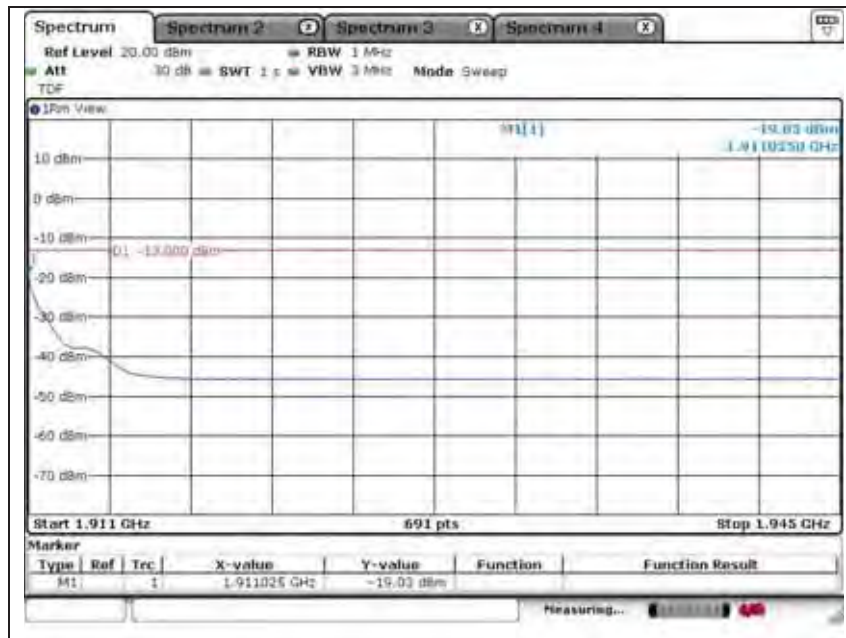
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CDMA 1 900 1xRTT

Low Channel



High Channel

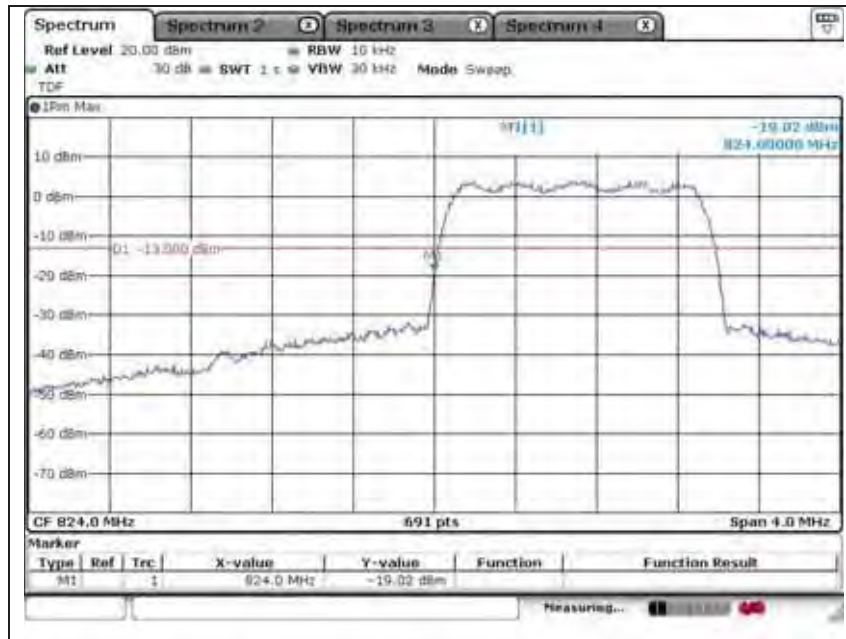


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Band edge

CDMA 850 1xEV-DO

Low Channel



High Channel



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CDMA 1 900 1xEV-DO

Low Channel



High Channel

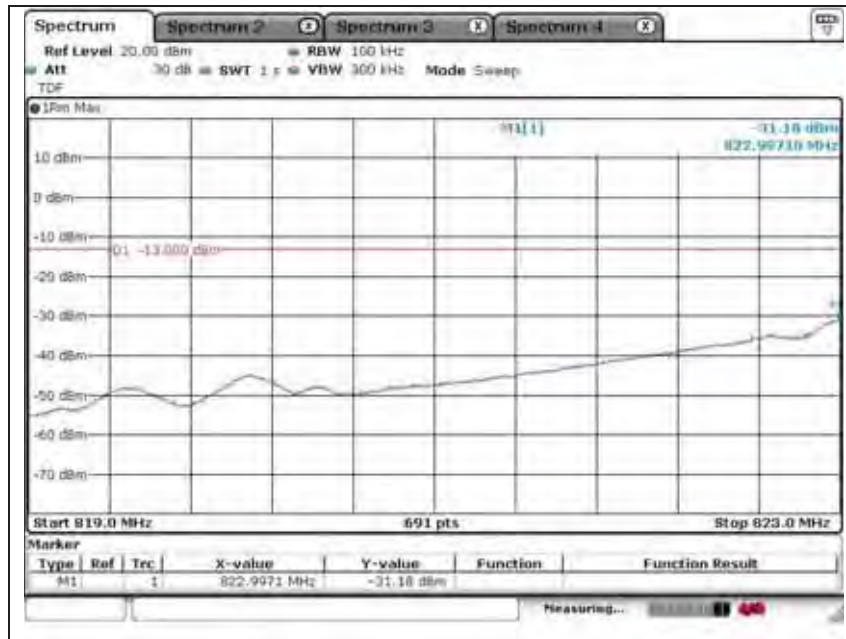


The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

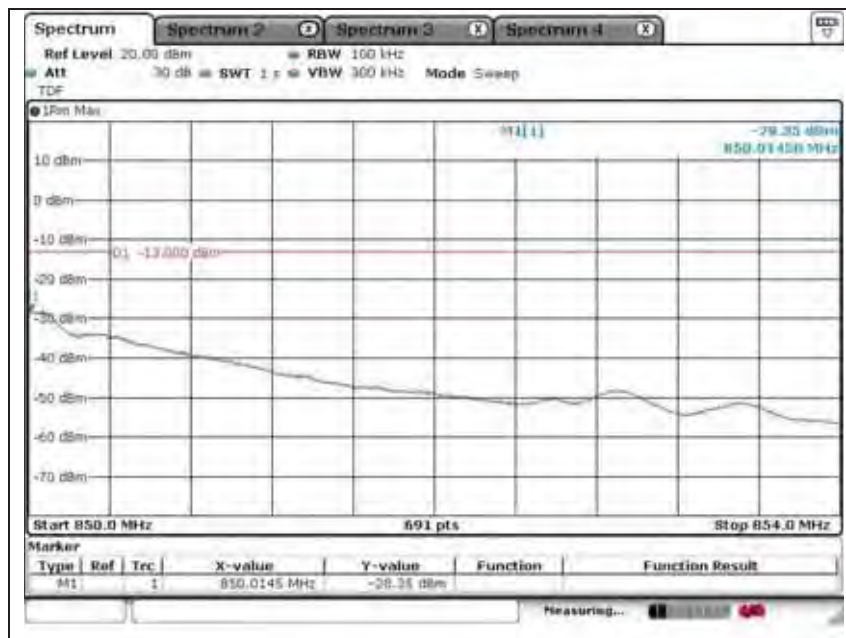
4 MHz SPAN

CDMA 850 1xEV-DO

Low Channel



High Channel



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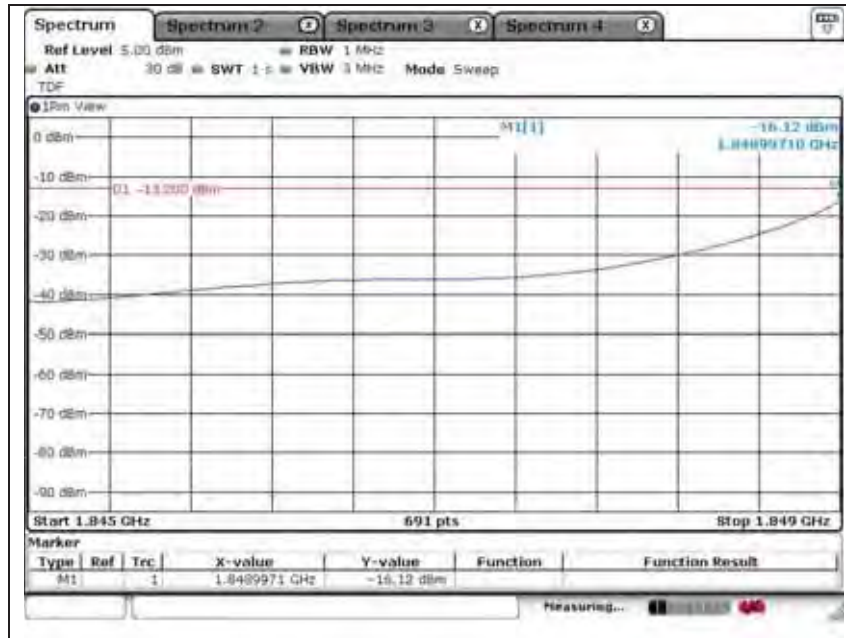
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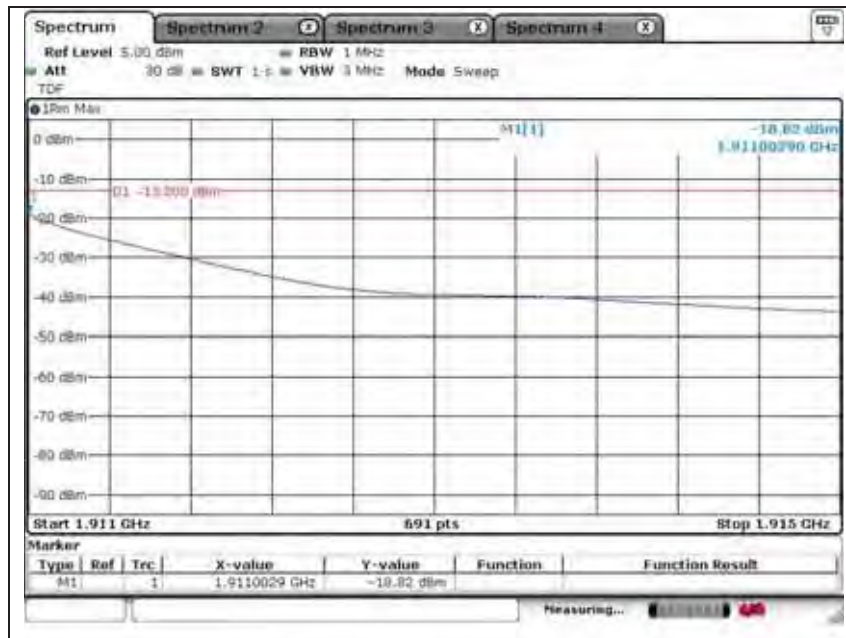
A4(210 mm x 297 mm)

CDMA 1 900 1xEV-DO

Low Channel



High Channel



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Band edge

LTE band 4 (1.4 MHz – QPSK_RB 6)

Low Channel



High Channel

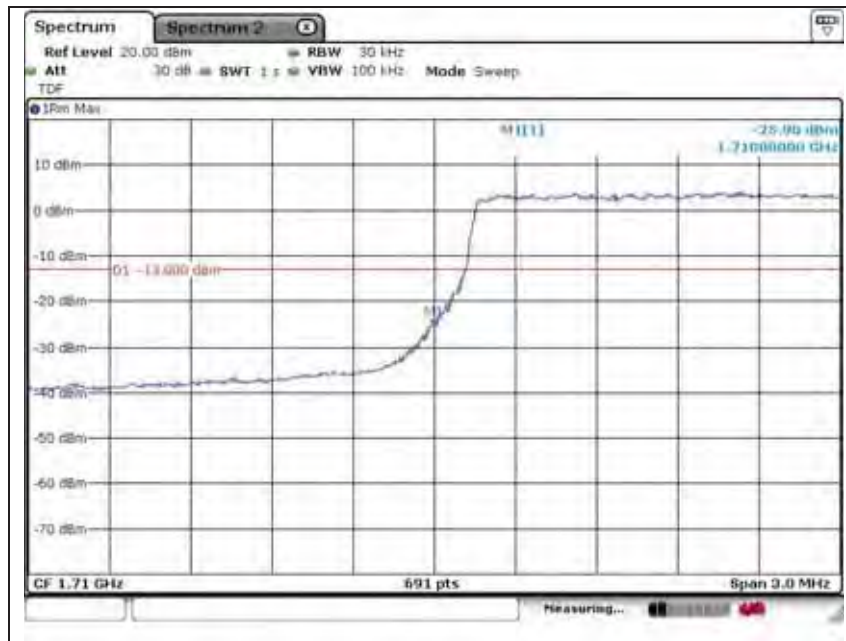


The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

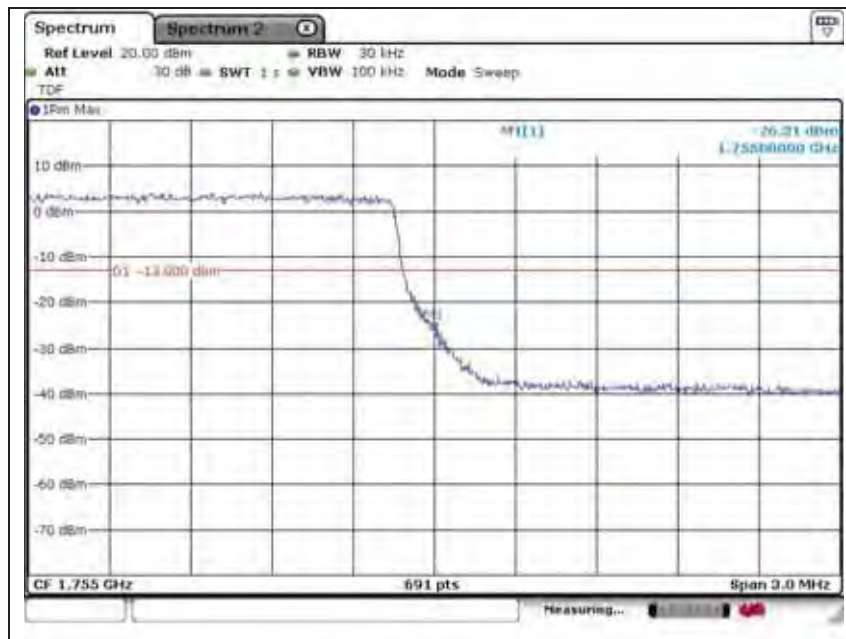
Band edge

LTE band 4 (3 MHz – QPSK_RB 15)

Low Channel



High Channel



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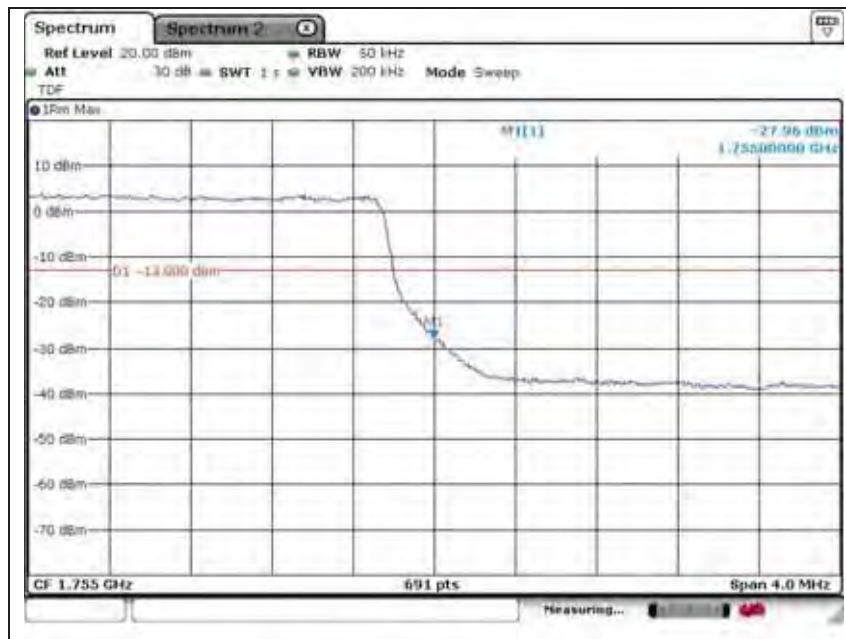
Band edge

LTE band 4 (5 MHz – QPSK_RB 25)

Low Channel



High Channel



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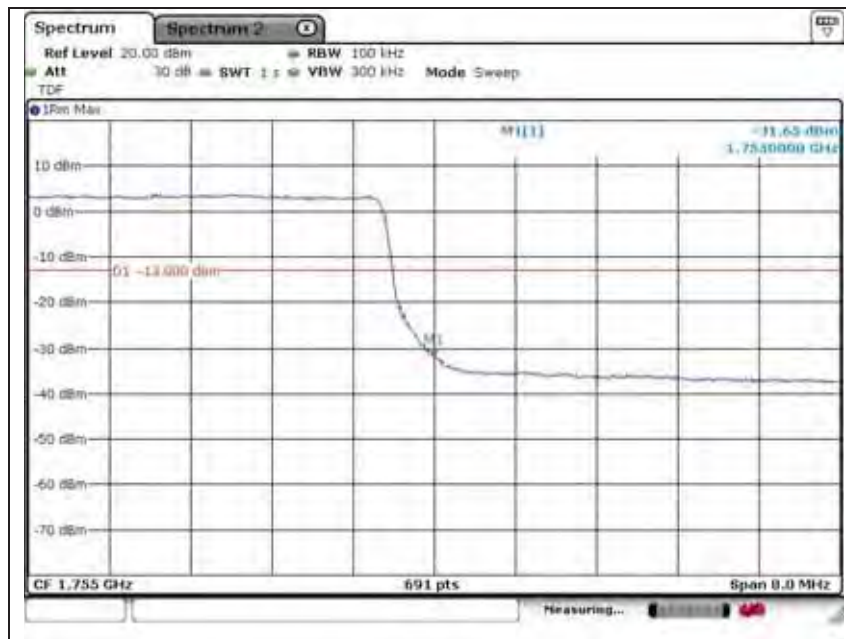
Band edge

LTE band 4 (10 MHz – QPSK_RB 50)

Low Channel



High Channel



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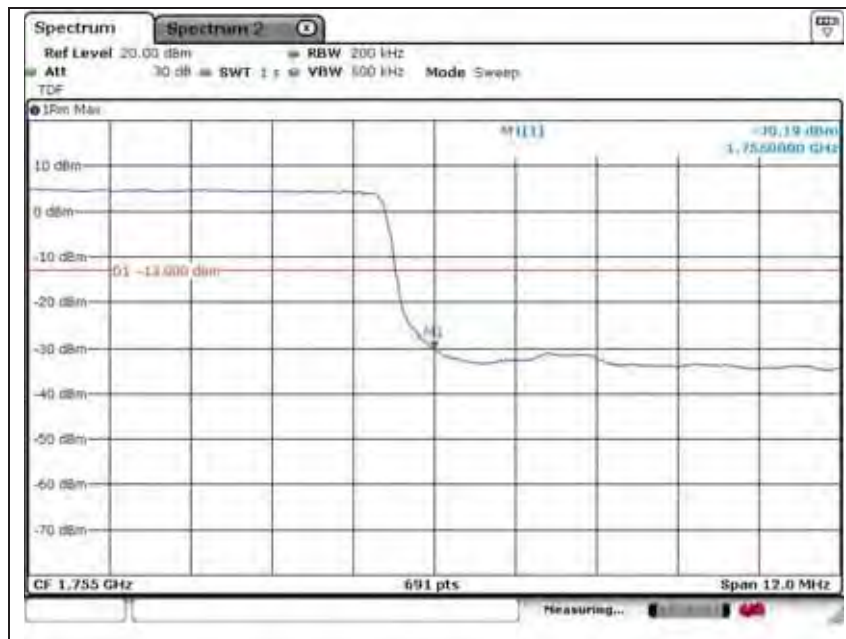
Band edge

LTE band 4 (15 MHz – QPSK_RB 75)

Low Channel



High Channel



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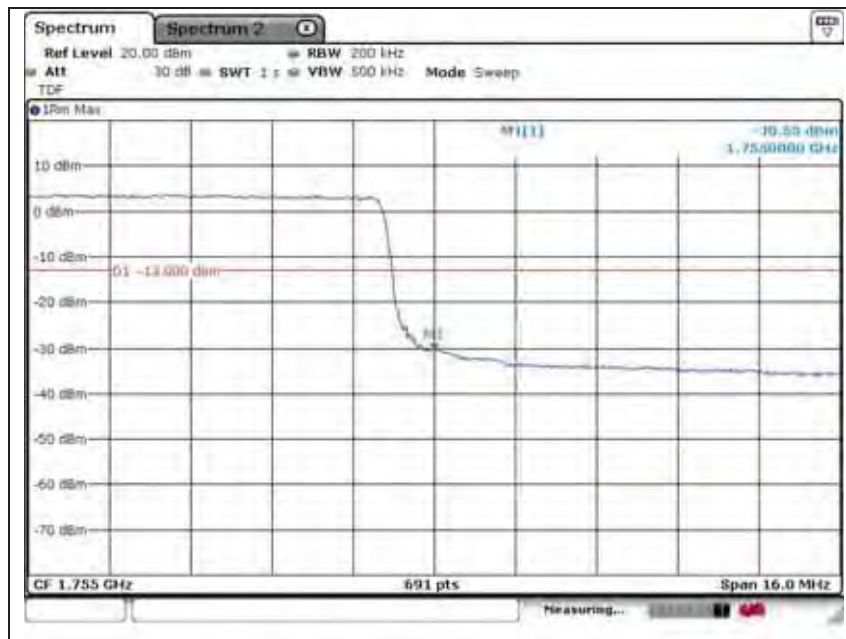
Band edge

LTE band 4 (20 MHz – QPSK_RB 100)

Low Channel



High Channel

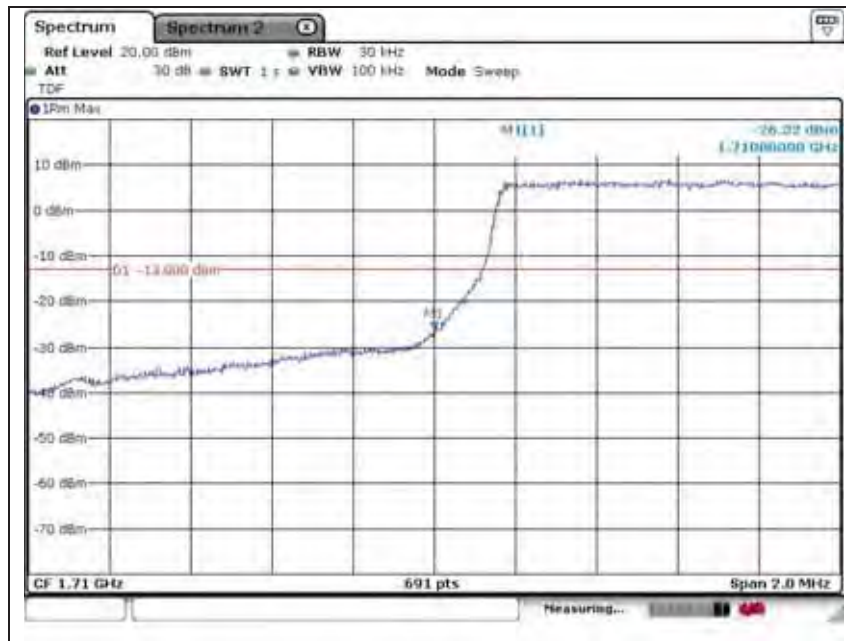


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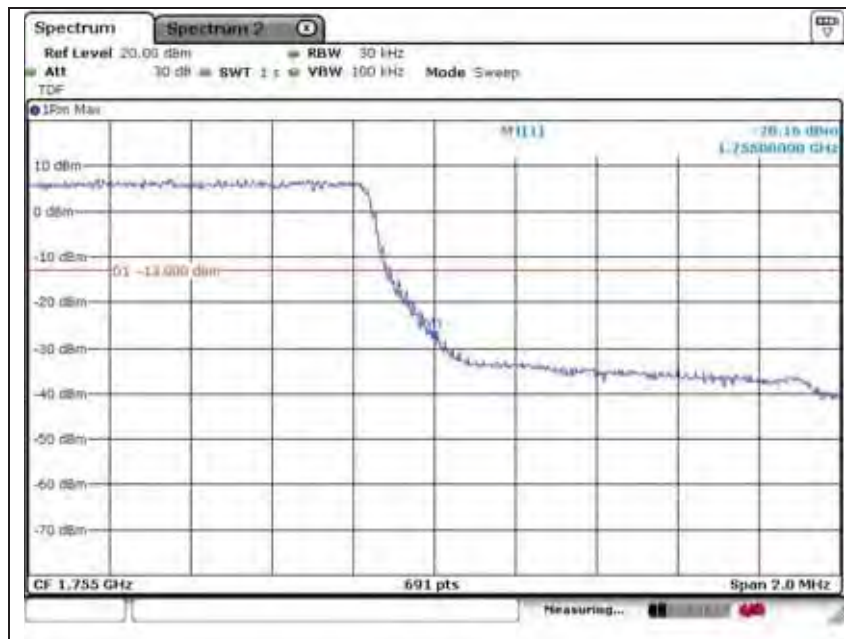
Band edge

LTE band 4 (1.4 MHz – 16QAM_RB 6)

Low Channel



High Channel

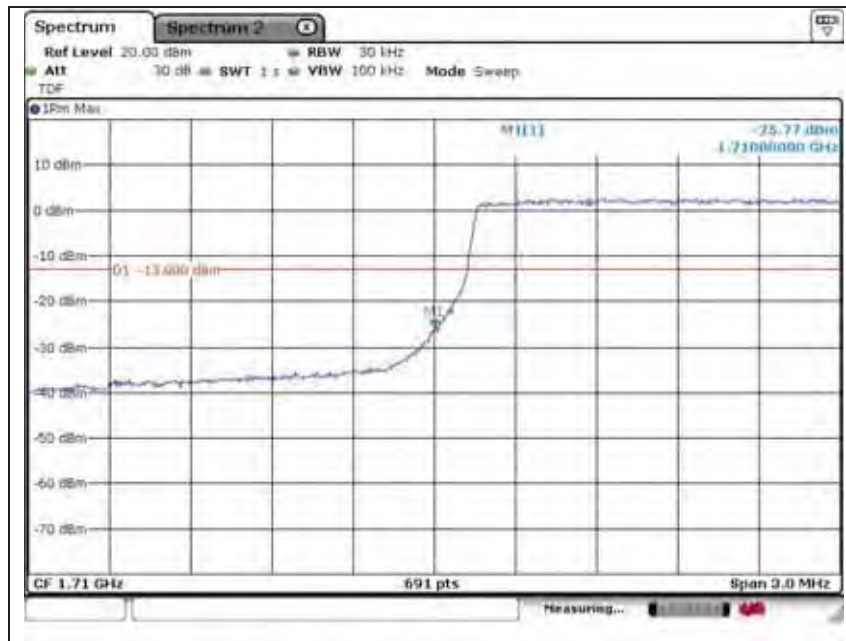


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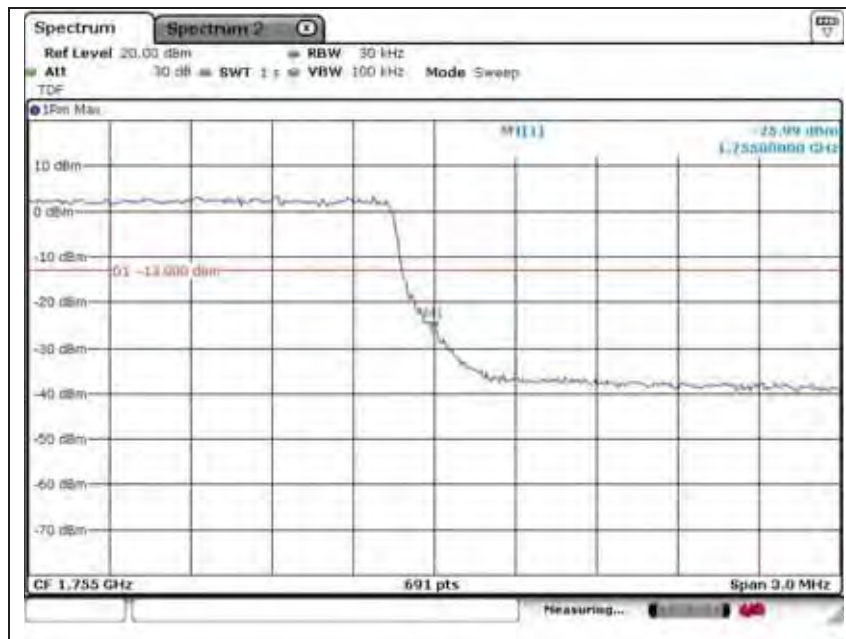
Band edge

LTE band 4 (3 MHz – 16QAM_RB 15)

Low Channel



High Channel

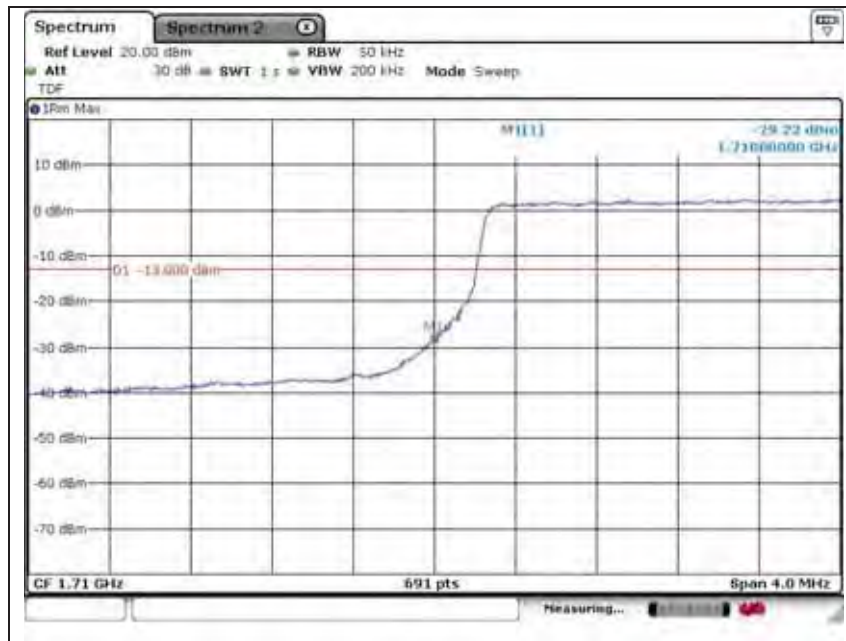


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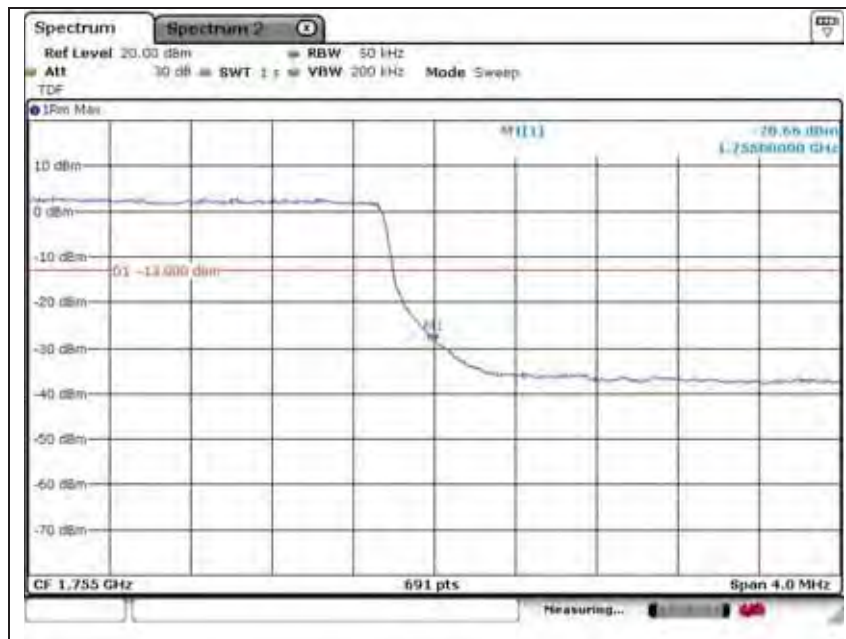
Band edge

LTE band 4 (5 MHz – 16QAM_RB 25)

Low Channel



High Channel



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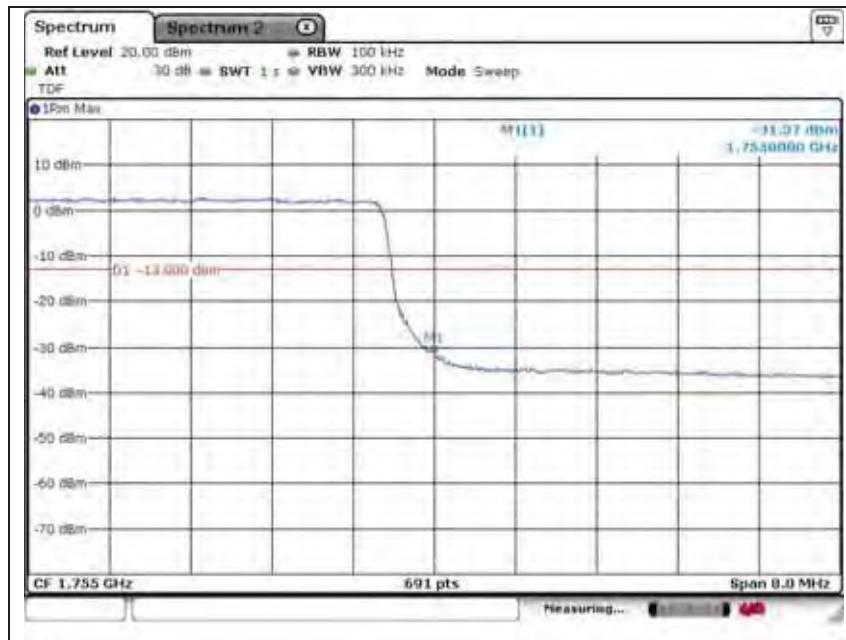
Band edge

LTE band 4 (10 MHz – 16QAM_RB 50)

Low Channel



High Channel



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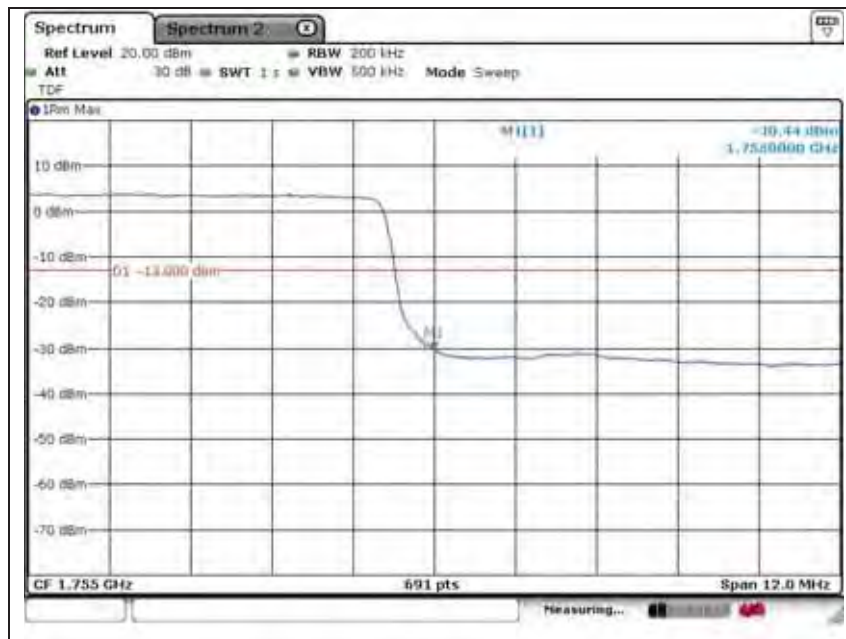
Band edge

LTE band 4 (15 MHz – 16QAM_RB 75)

Low Channel



High Channel



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Band edge

LTE band 4 (20 MHz – 16QAM_RB 100)

Low Channel



High Channel



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Band edge

LTE band 13 (5 MHz – QPSK_RB 25)

Low Channel



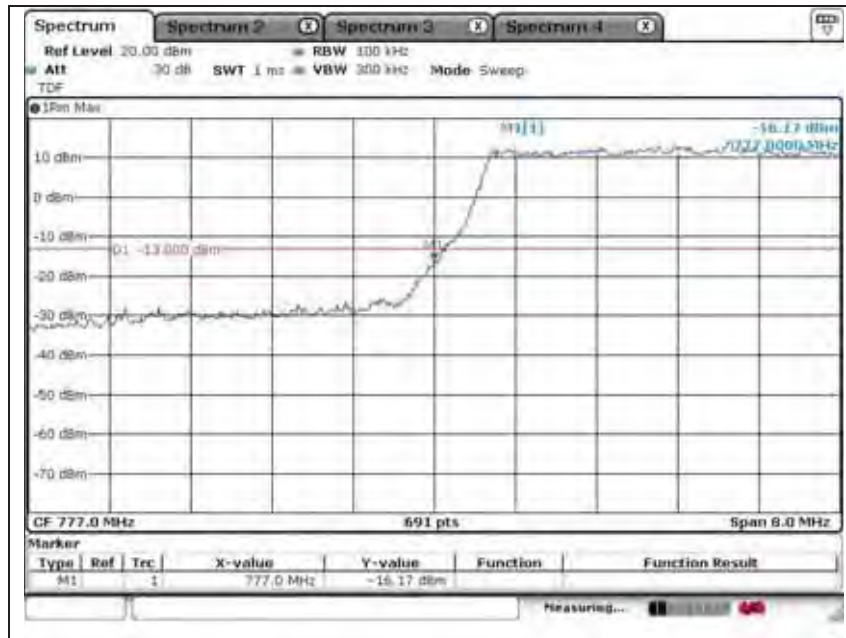
High Channel



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LTE band 13 (10 MHz – QPSK_RB 50)

Middle Channel



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A4(210 mm x 297 mm)

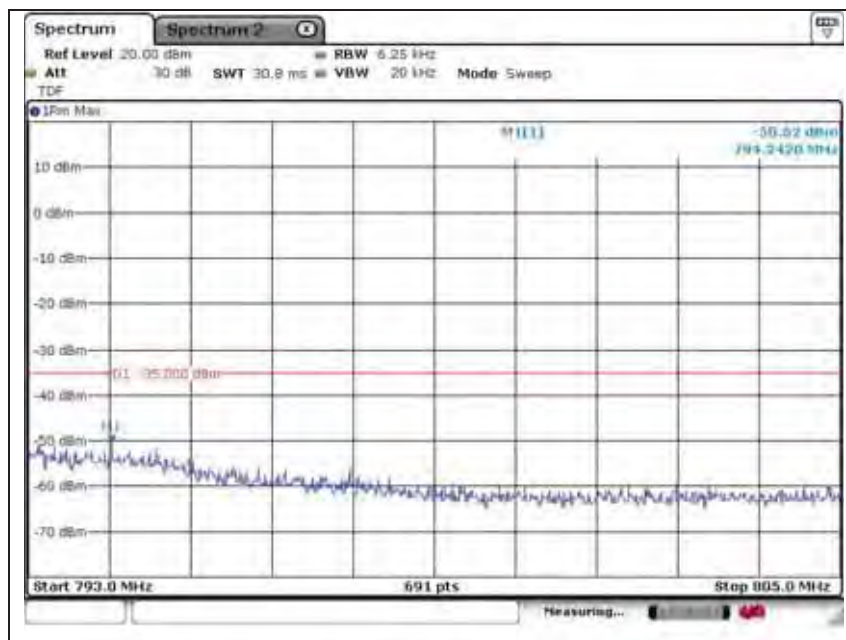
12 MHz SPAN

LTE band 13 (5 MHz – QPSK_RB 25)

Low Channel



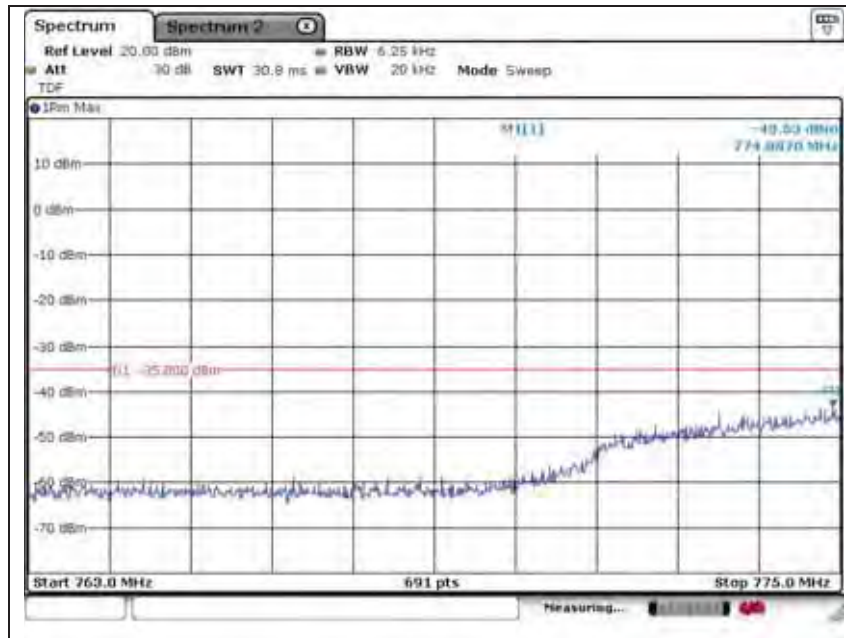
High Channel



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LTE band 13 (10 MHz – QPSK_RB 50)

Middle Channel



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A4(210 mm x 297 mm)

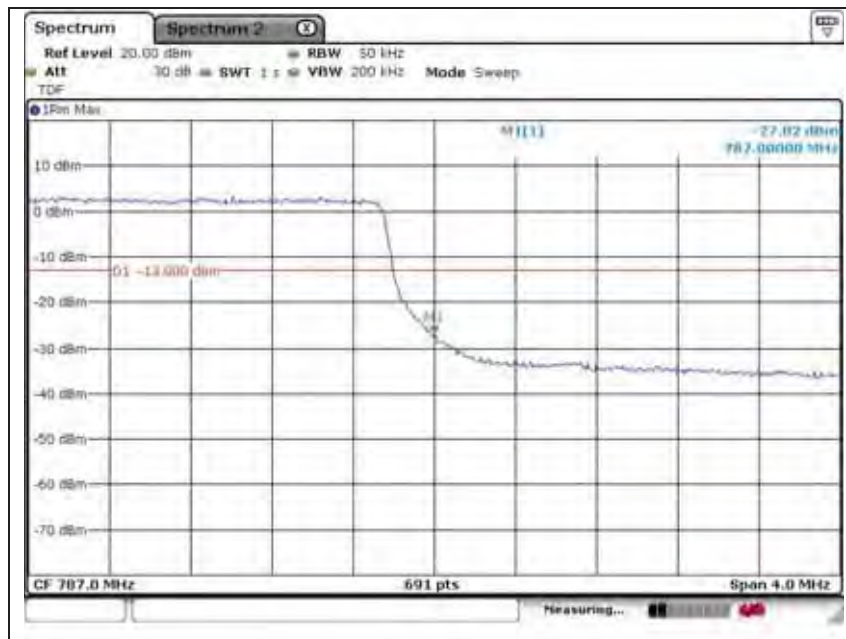
Band edge

LTE band 13 (5 MHz – 16QAM_RB 25)

Low Channel



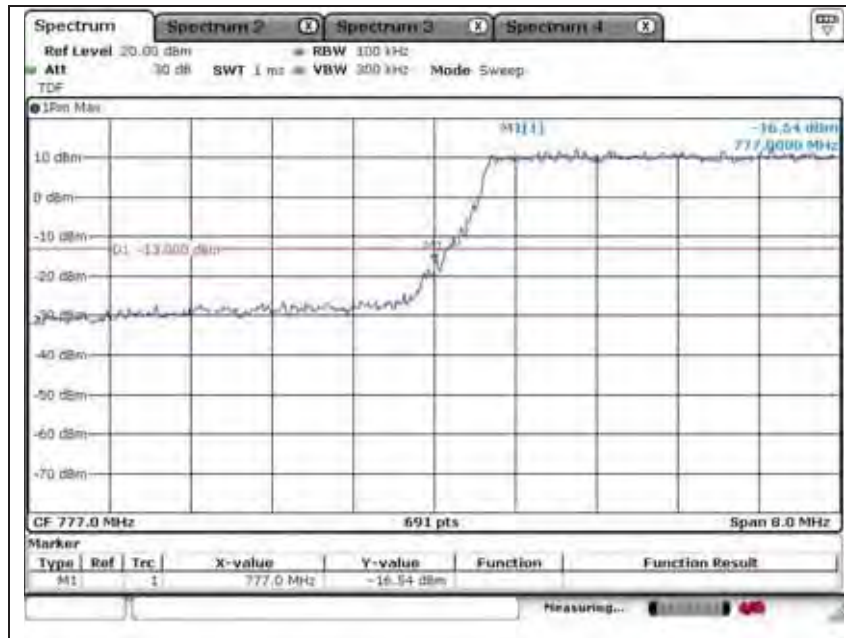
High Channel



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LTE band 13 (10 MHz – 16QAM_RB 50)

Middle Channel



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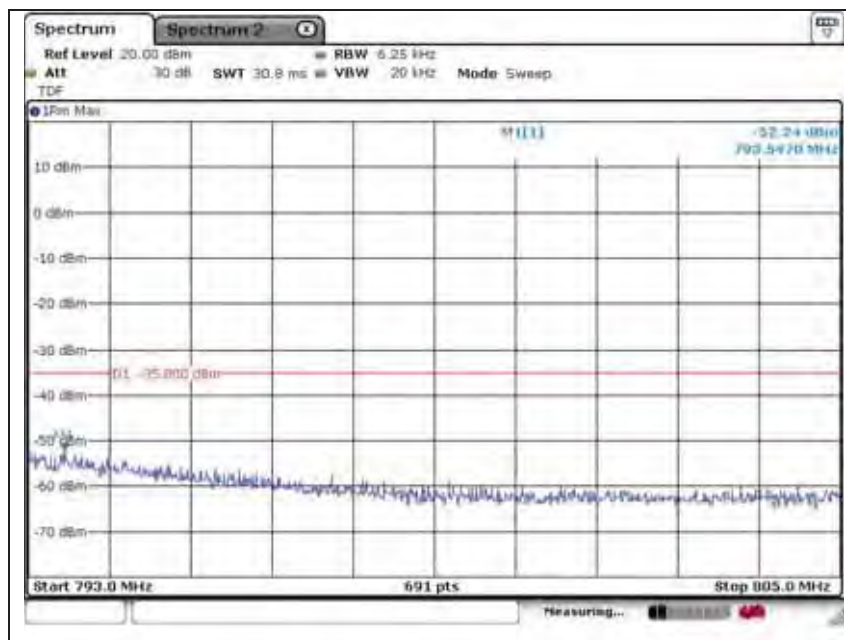
12 MHz SPAN

LTE band 13 (5 MHz – 16QAM_RB 25)

Low Channel



High Channel



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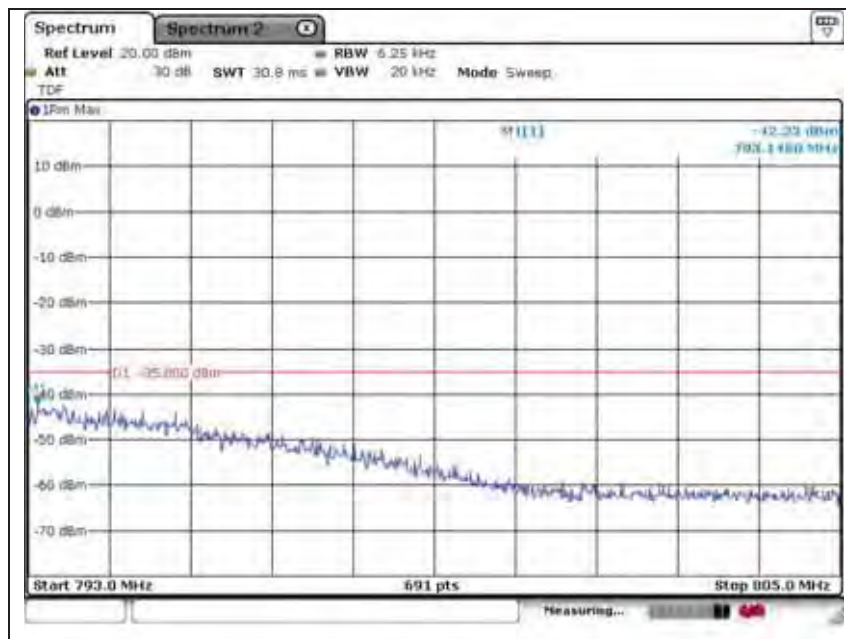
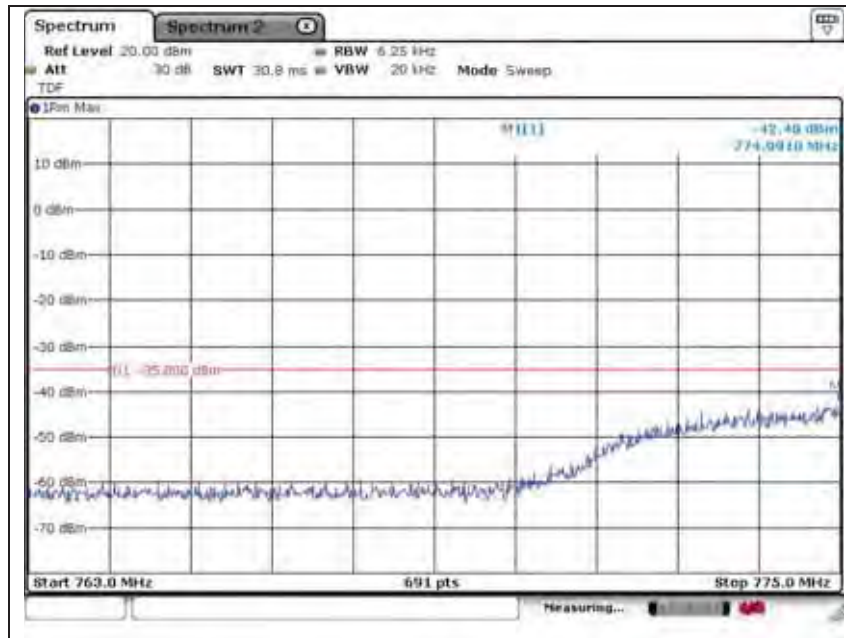
RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

LTE band 13 (10 MHz – 16QAM_RB 50)

Middle Channel



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A4(210 mm x 297 mm)

8. Frequency Stability

8.1. Limit

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

FCC §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

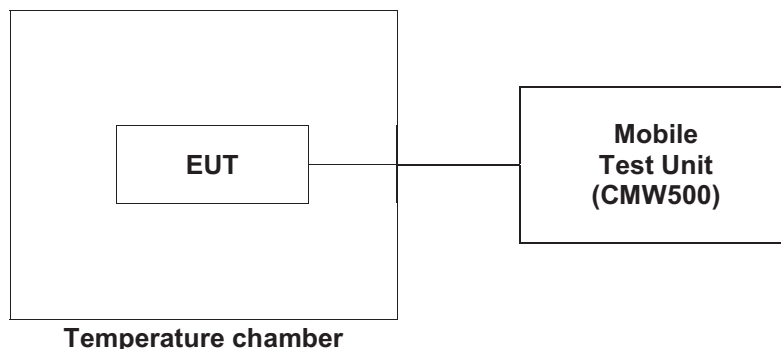
For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

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

FCC §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



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8.3. Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

CDMA 850 mode at middle channel

Reference Frequency: 836.52 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
-30	14.4	9	0.008 106
-20		-11	-0.015 055
-10		-13	-0.017 371
0		13	0.012 739
10		12	0.011 581
24		2	Ref.
30		5	0.003 474
40		-10	-0.013 897
50		8	0.006 948
Frequency Stability versus power Supply			
Environment Temperature (°C)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	16.56 (+15 %)	8	0.006 948
	12.24 (-15 %)	3	0.001 158

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RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

CDMA 1 900 mode at middle channel

Reference Frequency: 1 880.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
-30	14.4	14	0.019 687
-20		10	0.015 055
-10		-7	-0.004 632
0		12	0.017 371
10		-8	-0.005 790
24		-3	Ref.
30		-7	-0.004 632
40		2	0.005 790
50		3	0.006 948
Frequency Stability versus power Supply			
Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	16.56 (+15 %)	2	0.005 790
	12.24 (-15 %)	-2	0.001 158

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A4(210 mm x 297 mm)

LTE band 4 at middle channel

Reference Frequency: 1 732.5 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
-30	14.4	3	0.008 106
-20		-1	0.003 474
-10		-7	-0.003 474
0		-10	-0.006 948
10		-6	-0.002 316
24		-4	Ref.
30		1	0.005 790
40		-10	-0.006 948
50		-7	-0.003 474
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	16.56 (+15 %)	-7	-0.003 474
	12.24 (-15 %)	-4	0.000 000

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RTT5041-20(2014.01.20)(2)

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A4(210 mm x 297 mm)

LTE band 13 at middle channel

Reference Frequency: 782.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
-30	14.4	8	0.017 371
-20		12	0.022 003
-10		-10	-0.003 474
0		-3	0.004 632
10		-4	0.003 474
24		-7	Ref.
30		-15	-0.009 264
40		-13	-0.006 948
50		-12	-0.005 790
Frequency Stability versus Power Supply			
Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	16.56 (+15 %)	-5	0.002 316
	12.24 (-15 %)	-4	0.003 474

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A4(210 mm x 297 mm)