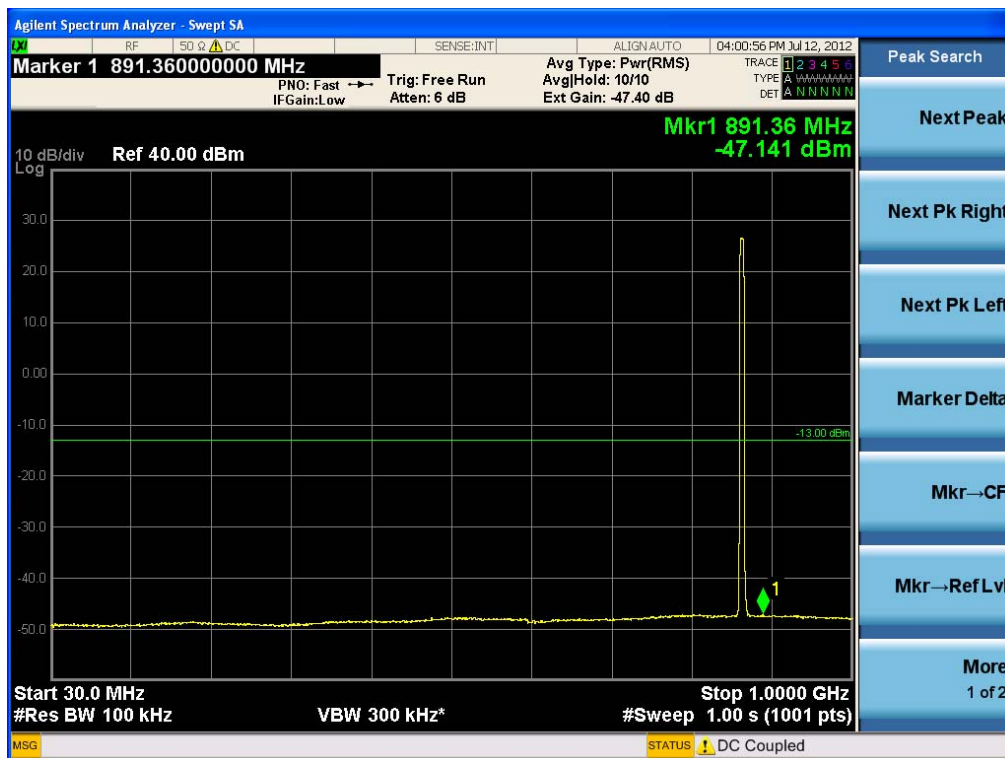


(Band Edge)



(LTE_64QAM) High

(30 MHz ~ 1 GHz)



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(1 GHz ~ 26.5 GHz)



(Band Edge)



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(LTE_QPSK) Middle

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



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(LTE_16QAM) Middle

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



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(LTE_64QAM) Middle

(30 MHz ~ 1 GHz)



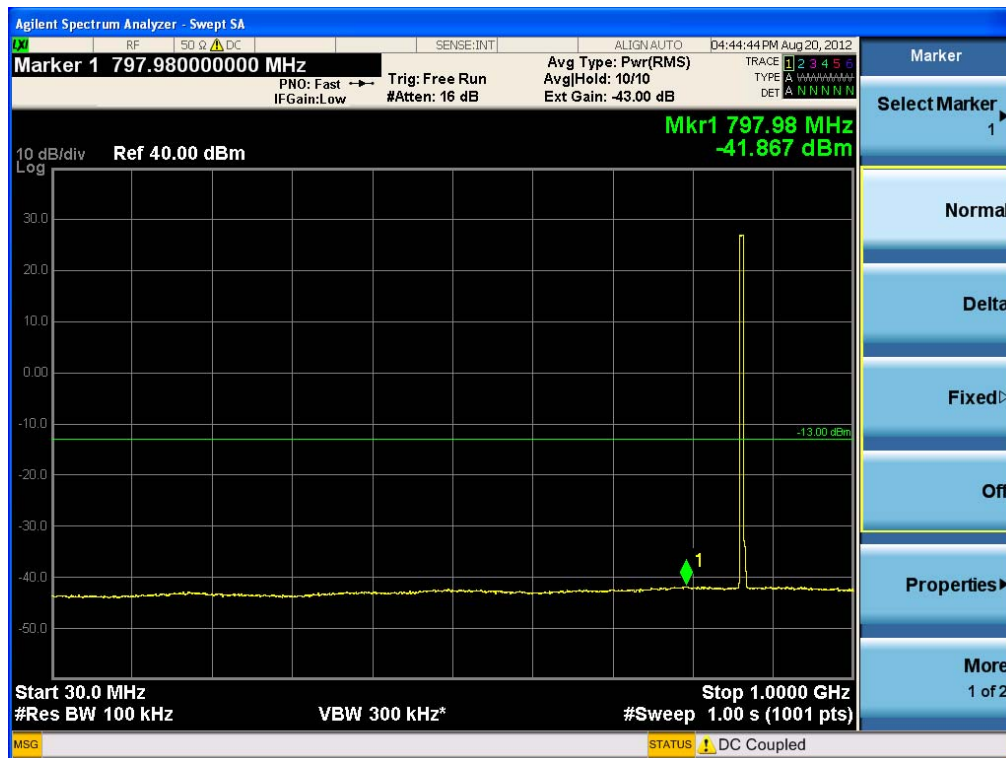
(1 GHz ~ 26.5 GHz)



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(LTE_QPSK) Low

(30 MHz ~ 1 GHz)

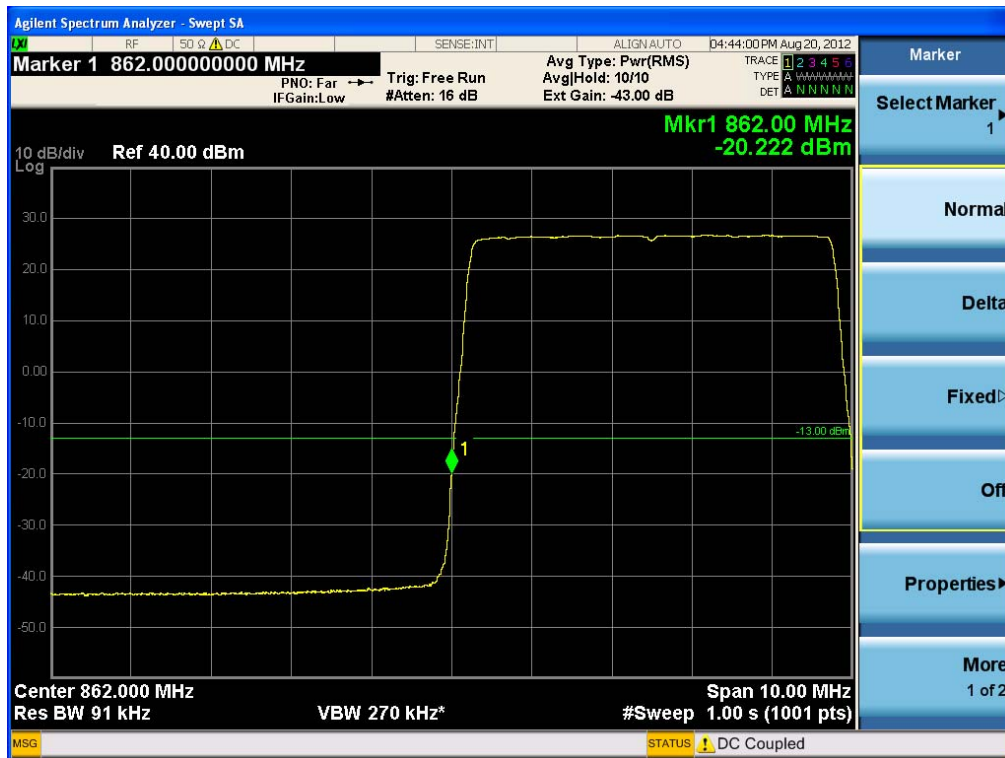


(1 GHz ~ 26.5 GHz)



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(Band Edge)



(LTE_16QAM) Low

(30 MHz ~ 1 GHz)

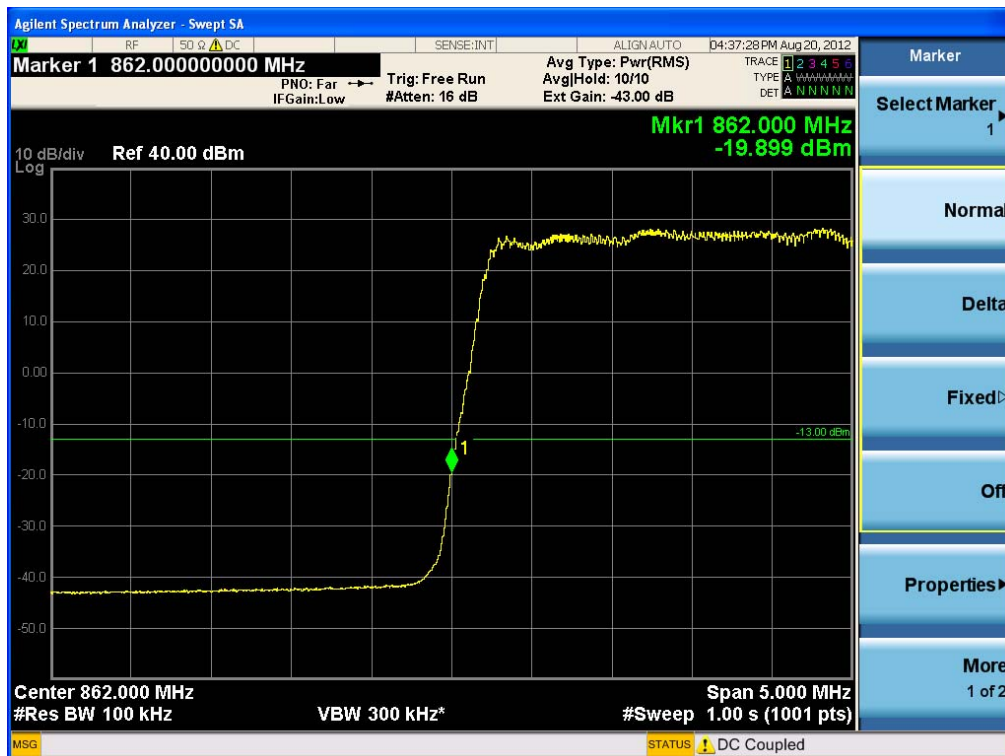


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(1 GHz ~ 26.5 GHz)



(Band Edge)



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(LTE_64QAM) Low

(30 MHz ~ 1 GHz)

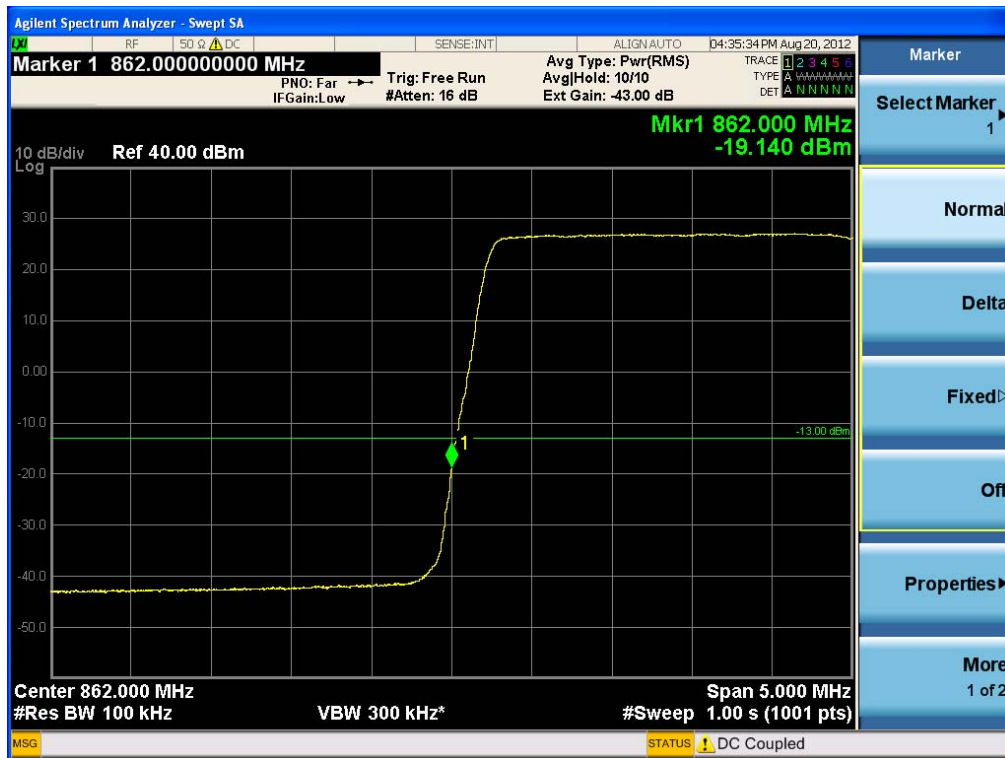


(1 GHz ~ 26.5 GHz)



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(Band Edge)



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(CDMA & LTE_QPSK)

(30 MHz ~ 1 GHz)

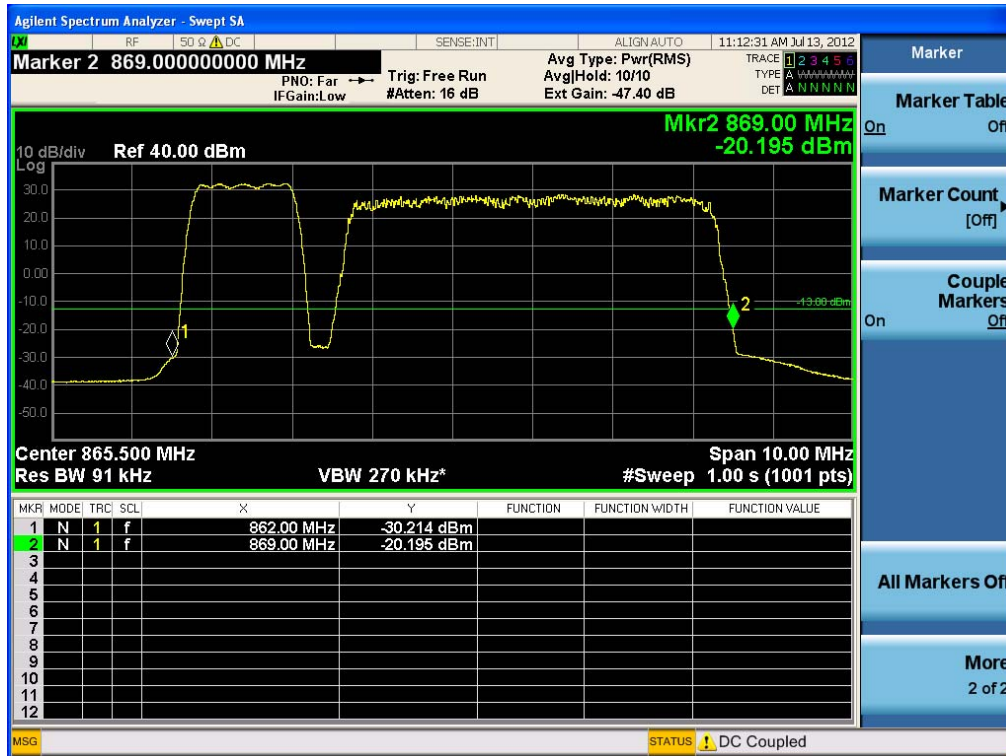


(1 GHz ~ 26.5 GHz)



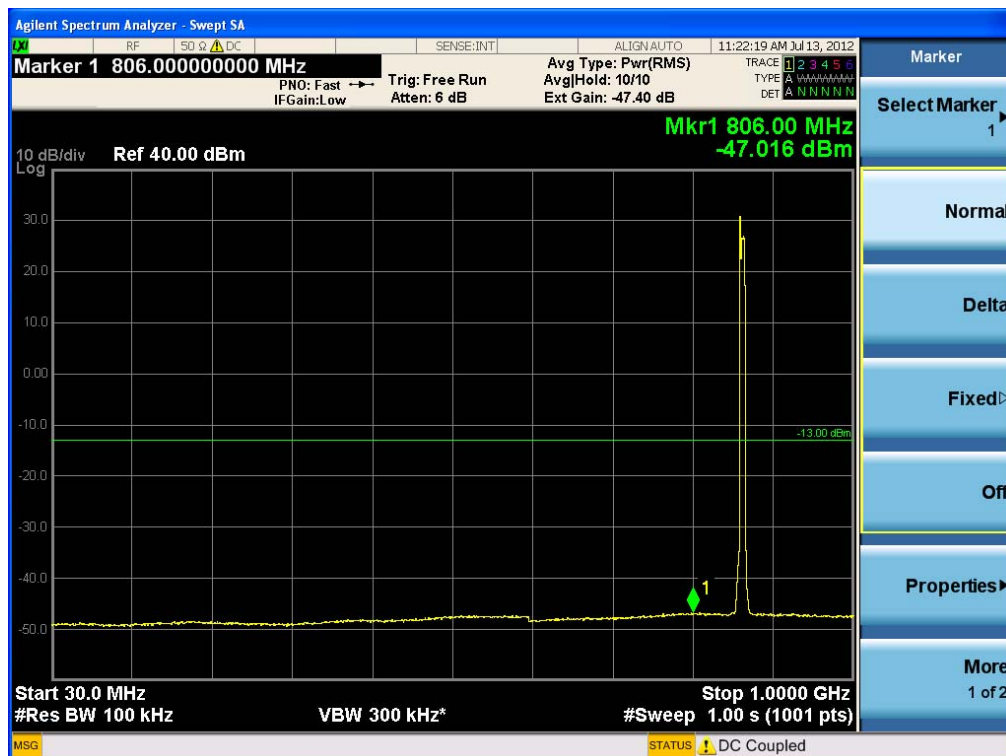
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(Band Edge)



(CDMA & LTE_16QAM)

(30 MHz ~ 1 GHz)

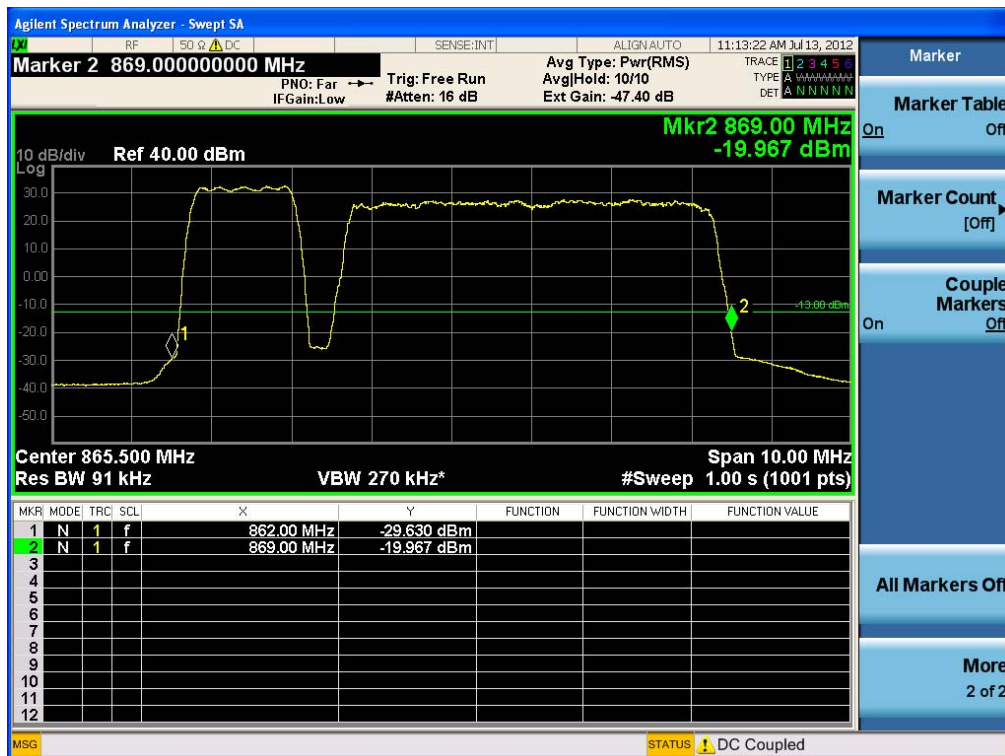


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(1 GHz ~ 26.5 GHz)



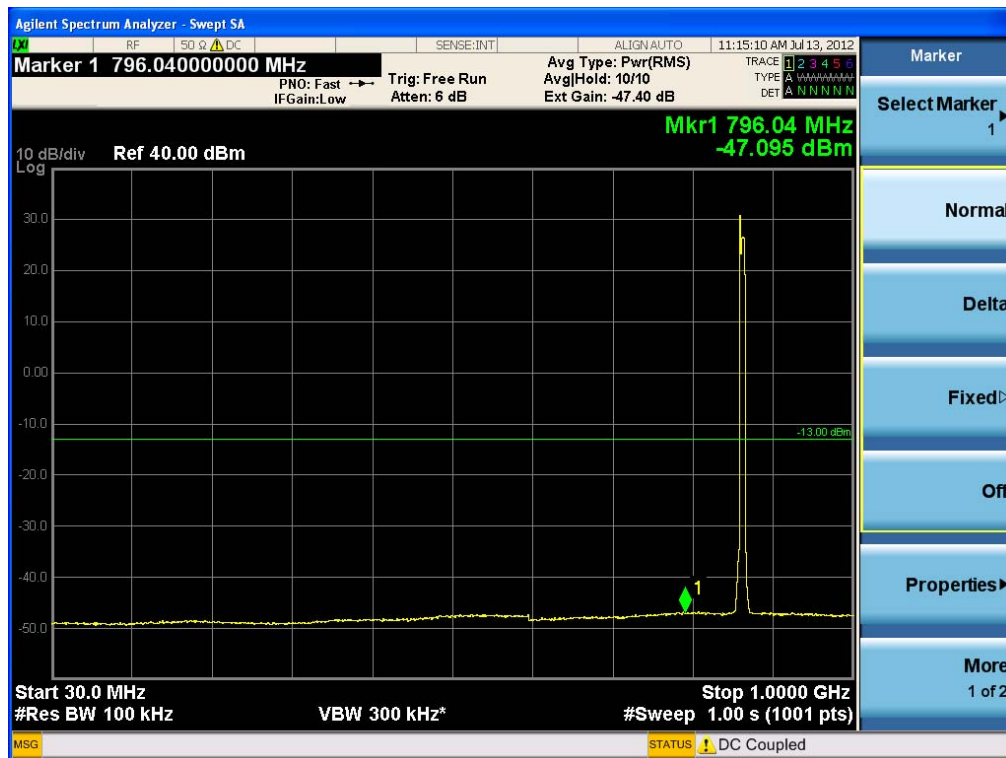
(Band Edge)



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(CDMA & LTE_64QAM)

(30 MHz ~ 1 GHz)

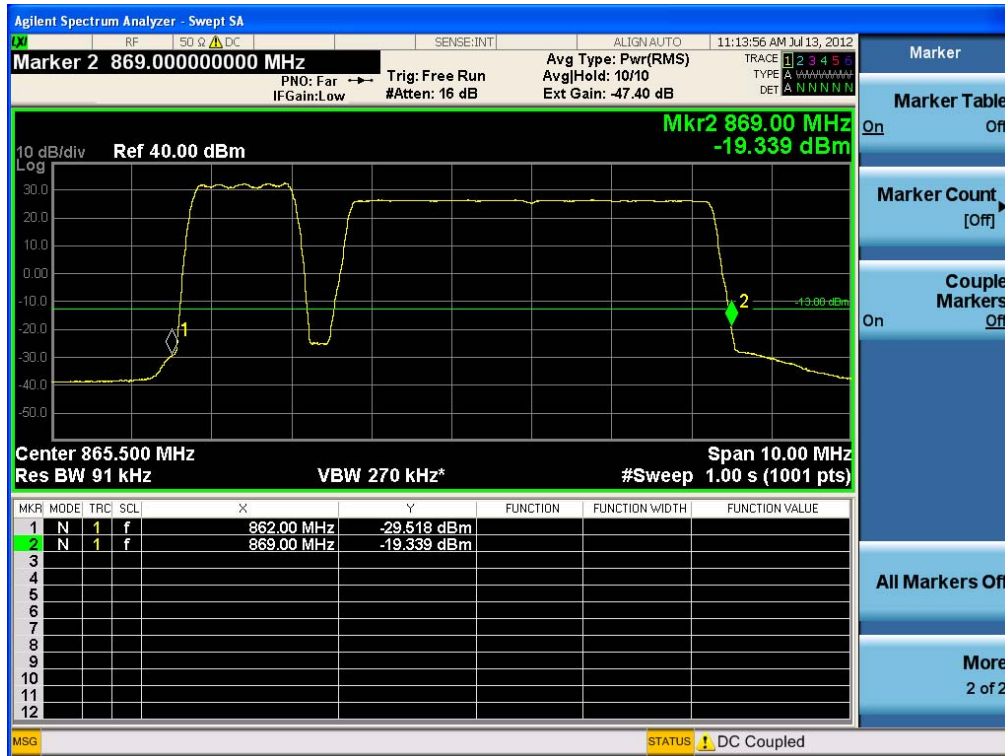


(1 GHz ~ 26.5 GHz)



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(Band Edge)



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8. RADIATED SPURIOUS EMISSION

8.1 Applicable Standard

According to FCC § 90.691

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

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8.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	147	05/15/2014
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	937	10/17/2013
Schwarzbeck	VULB 9168 / TRILOG Antenna	9168-200	02/19/2013
HD	MA240 / Antenna Position Tower	556	N/A
EMCO	1050 / Turn Table	114	N/A
HD GmbH	HD 100 / Controller	13	N/A
HD GmbH	KMS 560 / SlideBar	12	N/A
MITEQ	AMF-6B-180265-35-10P / POWER AMP	667624	04/16/2013
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
Agilent	5182A / Signal Generator	MY50141649	01/13/2013
WEINSCHTEL	67-30-33 / Attenuator	BU5347	11/07/2012
WEINSCHTEL	67-30-33 / Attenuator	BR0530	11/07/2012
WEINSCHTEL	AF9003-69-31 / Attenuator	11787	11/07/2012
WEINSCHTEL	AF9003-69-31 / Attenuator	5701	11/07/2012

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8.3 Test Procedure

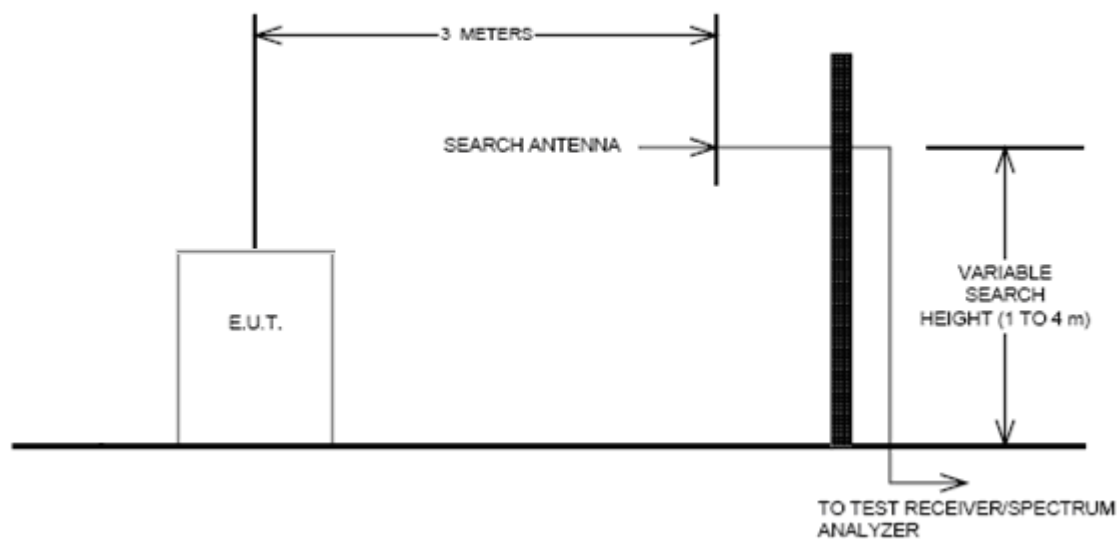
Radiated emission measurements were performed at an semi-anechoic chamber.

The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360⁰ and the receiving antenna scanned from 1-4m in order to capture the maximum emission.

A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated.

The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

8.3.1 Radiated Spurious Emissions Test Setup



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8.4 Test Result

: PASS

Frequency	Freq.(MHz)	<u>Measured</u> <u>Level</u> [dBm]	Ant. Gain (dBd)	C.L	<u>SigGen</u> <u>Level</u> [dBm]	Pol.	ERP (dBm)	Margin (dB)
862.9 & 866.5	1124.00	-67.00	4.12	3.98	-38.10	V	-37.95	-24.95
	1848.00	-66.35	8.55	5.37	-41.10	V	-37.92	-24.92
	3354.00	-63.06	9.82	7.44	-34.65	V	-32.27	-19.27

9. FREQUENCY STABILITY

9.1 Applicable Standard

Requirements: FCC § 2.1055 (a), §90.213 following:

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	^{1,2,3} 100	100	200
25–50	20	20	50
72–76	5		50
150–174	^{5,11} 5	⁶ 5	^{4,6} 50
216–220	1.0		1.0
220–222 ¹²	0.1	1.5	1.5
421–512	^{7,11,14} 2.5	⁸ 5	⁸ 5
806–809	¹⁴ 1.0	1.5	1.5
809–824	¹⁴ 1.5	2.5	2.5
851–854	1.0	1.5	1.5
854–869	1.5	2.5	2.5
896–901	¹⁴ 0.1	1.5	1.5
902–928	2.5	2.5	2.5
902–928 ¹³	2.5	2.5	2.5
929–930	1.5		
935–940	0.1	1.5	1.5
1427–1435	⁹ 300	300	300
Above 2450 ¹⁰			

9.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
WEINSCHEL	67-30-33 / Attenuator	BU5347	11/07/2012
WEINSCHEL	67-30-33 / Attenuator	BR0530	11/07/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2012
WEINSCHEL	AF9003-69-31 / Attenuator	5701	11/07/2012
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
Nang-Yeoul	NY-THR18750 / Temperature Chamber	NY-2009012201A	11/08/2012

9.3 Test Procedure

Frequency Stability over Temperature variation:

The equipment under test was connected to an external DC power supply and the RF output was connected to a Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 30 minutes, the frequency output was recorded from the VSA8960 S/W via MXA Signal Analyzer.

Frequency stability over Voltage variation: An external variable DC power supply Source. The voltage was set to 85% and 115% of the nominal value. The output frequency was recorded for each voltage.

9.4. Test Result

: Pass

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9.4.1. Frequency Stability over Temperature and Voltage variation

Modulation: BPSK

Reference: - 48 Vdc at 20°C **Freq.** = 862.9 MHz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	862 899 984	-16.0	0.0	0.0000
	-30	862 899 984	-16.3	-0.3	-0.0003
	-20	862 899 984	-16.2	-0.2	-0.0003
	-10	862 899 984	-15.7	0.3	0.0003
	0	862 899 983	-17.0	-1.0	-0.0011
	+10	862 899 984	-16.2	-0.2	-0.0003
	+30	862 899 984	-16.5	-0.5	-0.0006
	+40	862 899 984	-15.8	0.2	0.0002
	+50	862 899 984	-16.1	-0.1	-0.0001
115%	+20	862 899 984	-16.3	-0.3	-0.0003
85%	+20	862 899 984	-16.4	-0.4	-0.0005

Modulation: QPSK

Reference: - 48 Vdc at 20°C **Freq.** = 864.5 MHz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	864 499 983	-16.6	0.0	0.0000
	-30	864 499 983	-16.6	0.0	0.0000
	-20	864 499 986	-14.2	2.4	0.0028
	-10	864 499 983	-16.6	0.0	0.0000
	0	864 499 987	-13.5	3.1	0.0036
	+10	864 499 986	-14.4	2.2	0.0025
	+30	864 499 986	-14.2	2.4	0.0028
	+40	864 499 986	-14.0	2.6	0.0030
	+50	864 499 986	-14.1	2.5	0.0029
115%	+20	864 499 986	-14.1	2.5	0.0029
85%	+20	864 499 986	-14.1	2.5	0.0029

Modulation: 16QAM**Reference: - 48 Vdc at 20°C Freq. = 865.5 MHz**

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	865 499 986	-13.6	0.0	0.0000
	-30	865 499 985	-14.9	-1.3	-0.0015
	-20	865 499 983	-16.9	-3.3	-0.0038
	-10	865 499 983	-16.6	-3.0	-0.0035
	0	865 499 986	-14.5	-0.9	-0.0010
	+10	865 499 983	-16.6	-3.0	-0.0035
	+30	865 499 986	-14.1	-0.5	-0.0006
	+40	865 499 986	-14.3	-0.7	-0.0008
	+50	865 499 986	-14.1	-0.5	-0.0006
115%	+20	865 499 986	-14.0	-0.4	-0.0005
85%	+20	865 499 986	-14.1	-0.5	-0.0006

Modulation: 64QAM**Reference: - 48 Vdc at 20°C Freq. = 866.5 MHz**

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	866 499 984	-15.7	0.0	0.0000
	-30	866 499 984	-16.2	-0.5	-0.0006
	-20	866 499 984	-16.4	-0.7	-0.0008
	-10	866 499 984	-15.9	-0.2	-0.0002
	0	866 499 983	-16.7	-1.0	-0.0012
	+10	866 499 984	-16.5	-0.8	-0.0009
	+30	866 499 983	-16.7	-1.0	-0.0012
	+40	866 499 984	-16.5	-0.8	-0.0009
	+50	866 499 984	-16.3	-0.6	-0.0007
115%	+20	866 499 984	-16.4	-0.7	-0.0008
85%	+20	866 499 984	-16.5	-0.8	-0.0009

10. RF EXPOSURE STATEMENT

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
0.3 - 1.34.....	614	1.63	*(100)	30
1.34 - 30.....	824/f	2.19/f	*(180/ f ²)	30
30 - 300.....	27.5	0.073	0.2	30
300 - 1500.....			f/1500	30
1500 - 100.000.....			1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

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3. RESULTS

[CDMA]

Max Peak output Power at antenna input terminal	42.870	dBm
Max Peak output Power at antenna input terminal	19.364	W
Prediction distance	400.000	cm
Prediction frequency	862.9000	MHz
Antenna Gain(typical)	14.000	dBi
Antenna Gain(numeric)	25.119	–
Power density at prediction frequency(S)	0.242	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	0.575	mW/cm ²

[LTE]

Max Peak output Power at antenna input terminal	42.620	dBm
Max Peak output Power at antenna input terminal	18.281	W
Prediction distance	400.000	cm
Prediction frequency	866.5000	MHz
Antenna Gain(typical)	14.000	dBi
Antenna Gain(numeric)	25.119	–
Power density at prediction frequency(S)	0.228	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	0.578	mW/cm ²

The power density level at 400 cm is 0.242 mw/cm² (CDMA), 0.228 mw/cm² (LTE) which is below the uncontrolled exposure limit.

Simultaneous MPE at 400 cm is $(0.242/0.575) + (0.228/0.578) < 1$

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