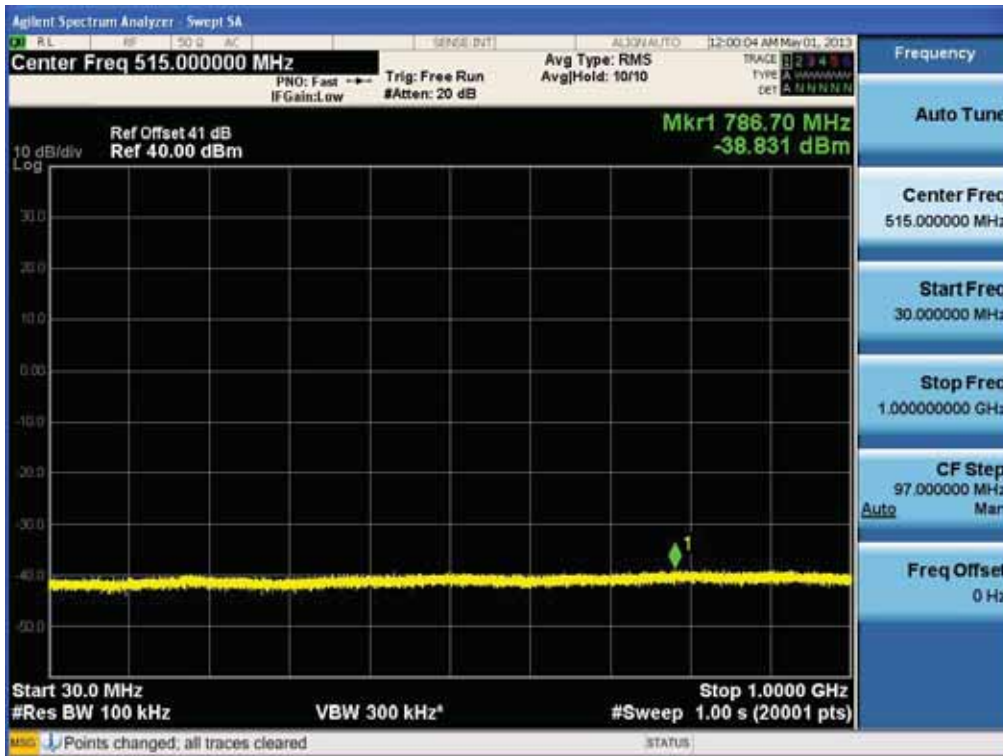


(16QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 81 of 156

(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 82 of 196

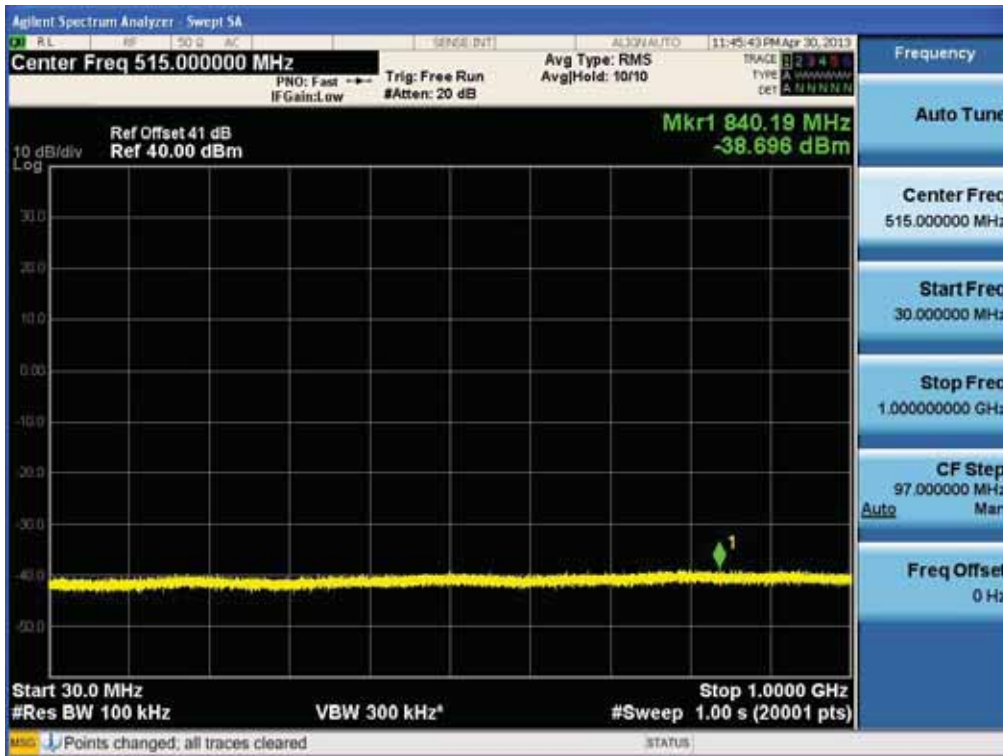
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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. Plot Data for LTE 5 MHz : 2 Carrier , Output Port 0
(QPSK Low Channel)

(30 MHz ~ 1 GHz)

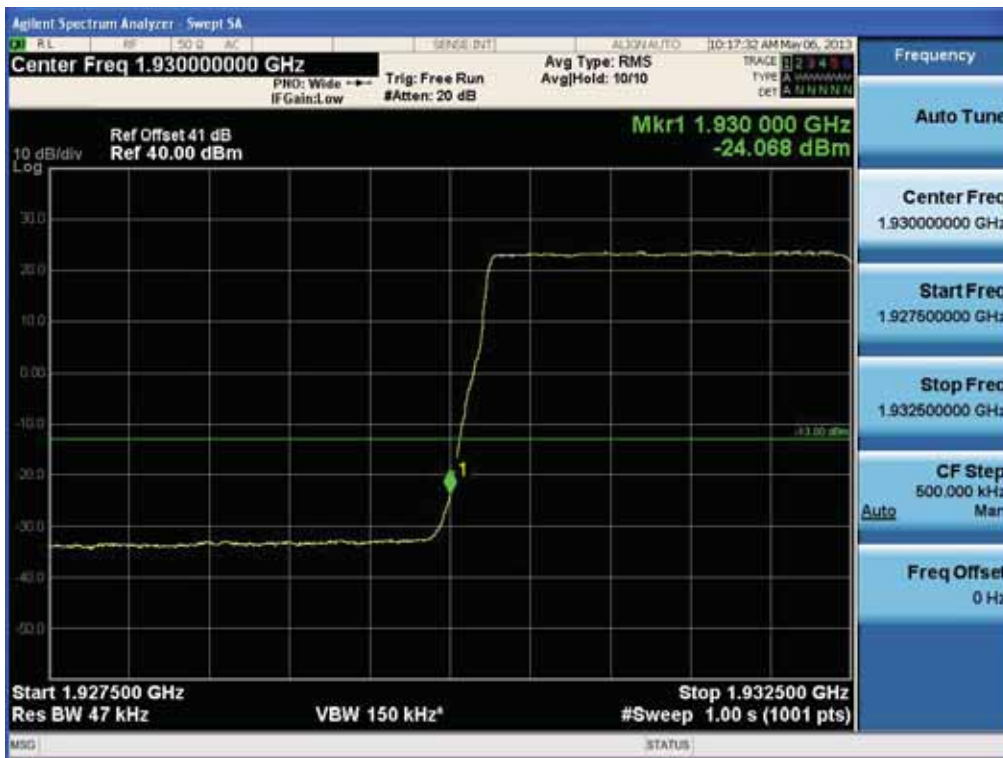


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 89 of 156

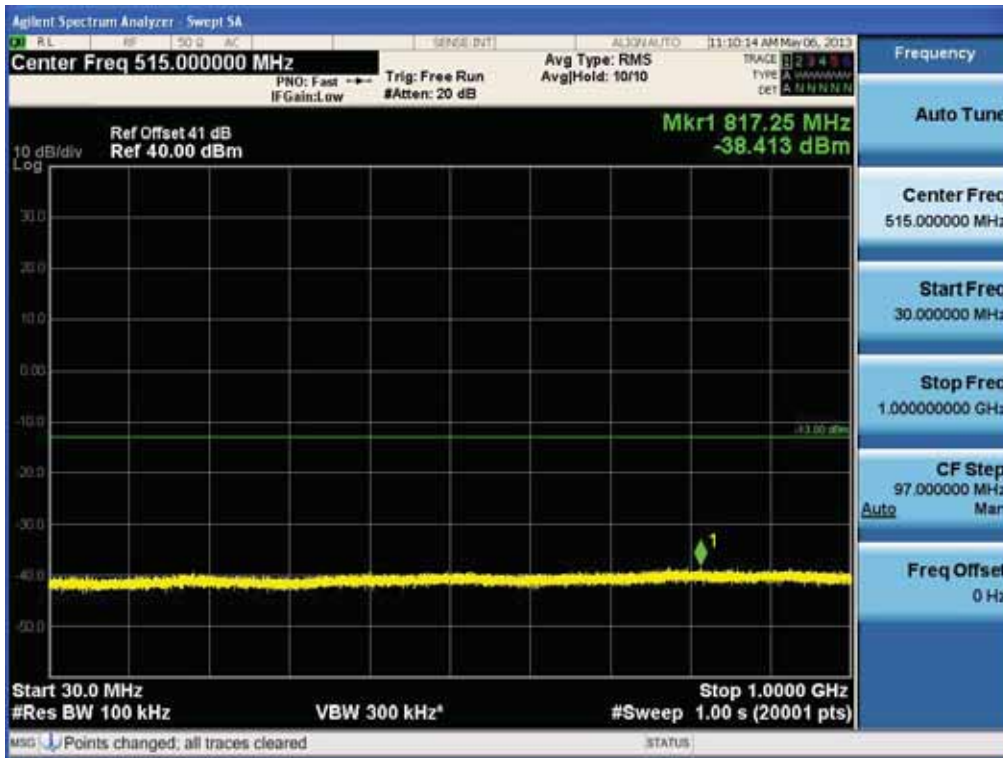
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 90 of 156

(QPSK Middle Channel)

(30 MHz ~ 1 GHz)



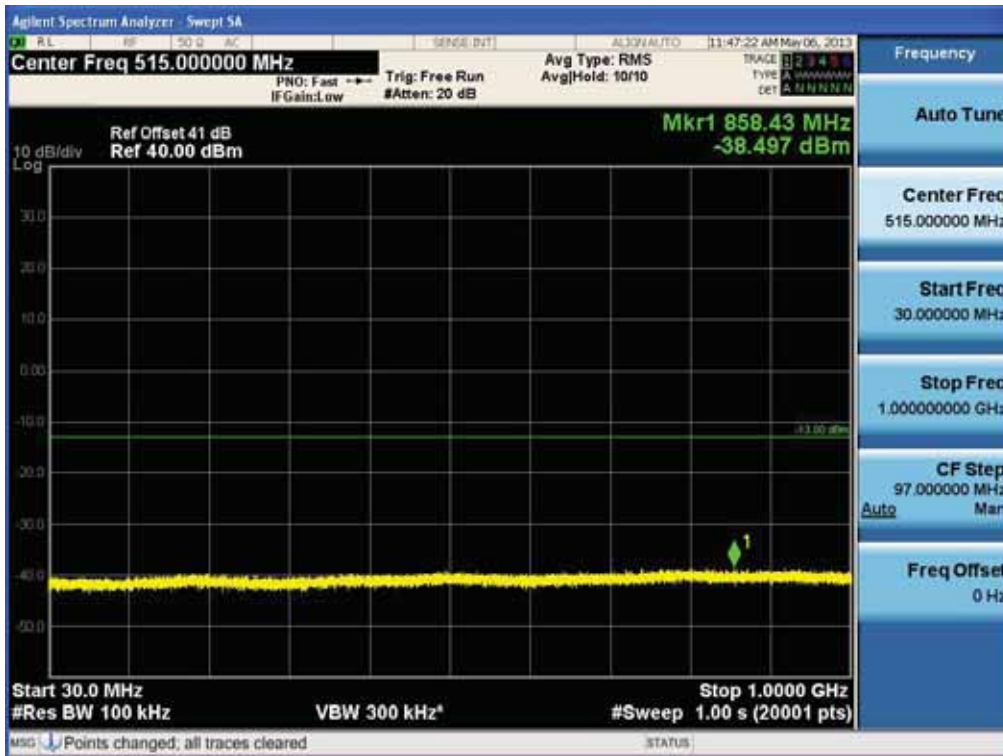
(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 91 of 156

(QPSK High Channel)

(30 MHz ~ 1 GHz)

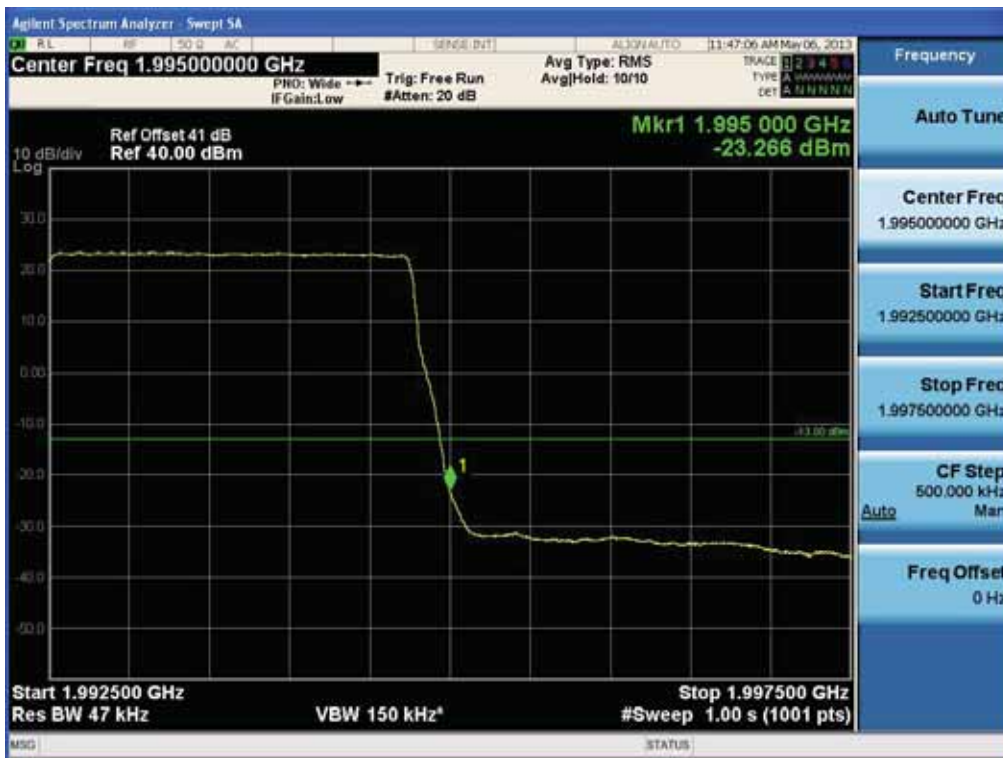


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Low Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 97 of 156

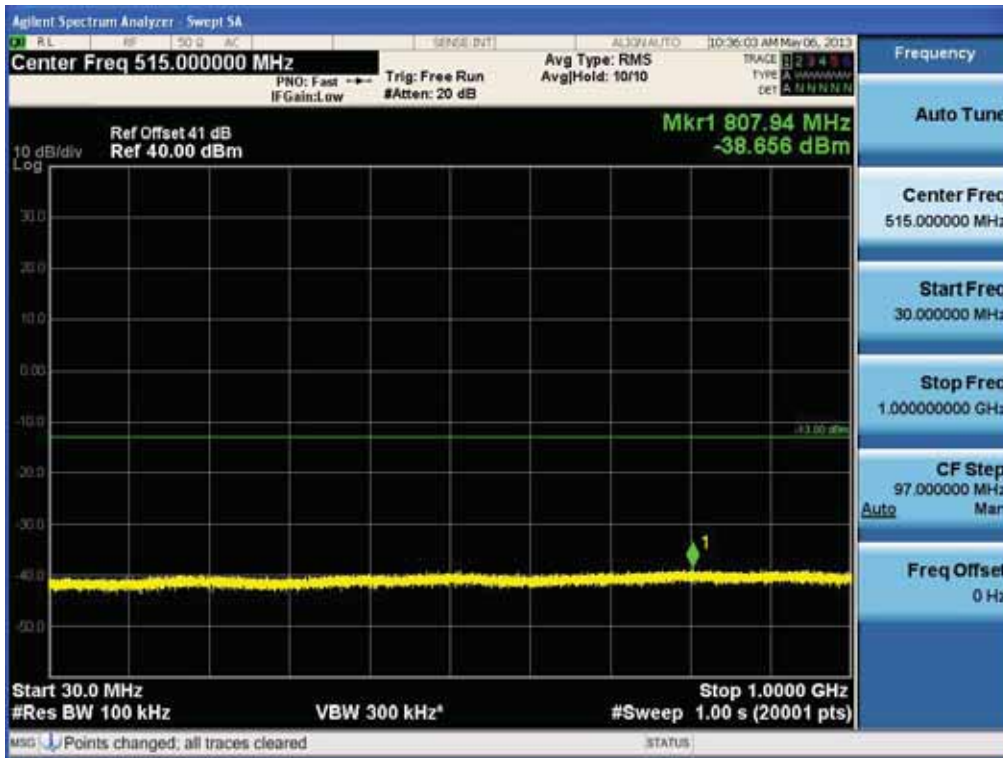
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)

(30 MHz ~ 1 GHz)

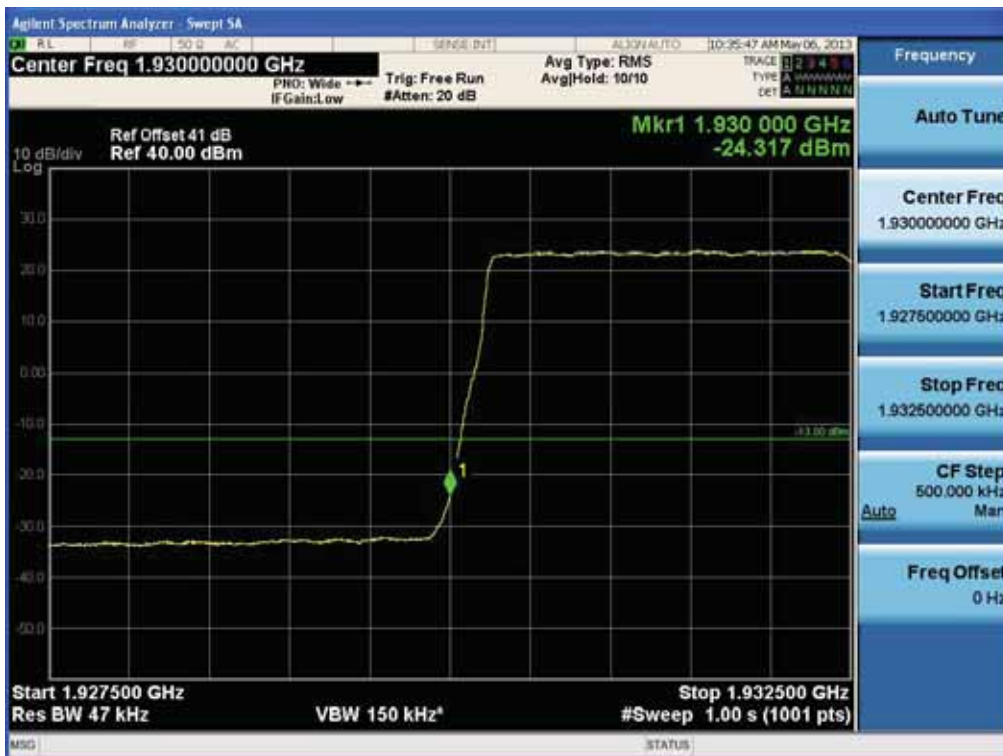


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 99 of 156

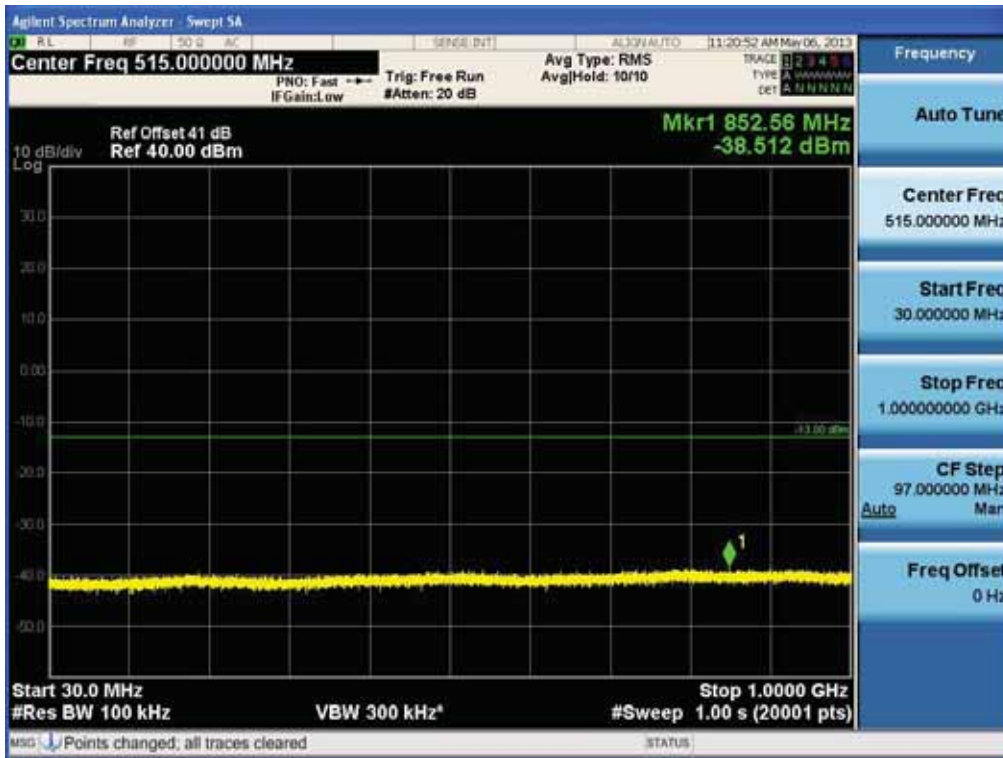
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
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. Plot Data for LTE 5 MHz : 2 Carrier , Output Port 1
(QPSK Low Channel)

(30 MHz ~ 1 GHz)

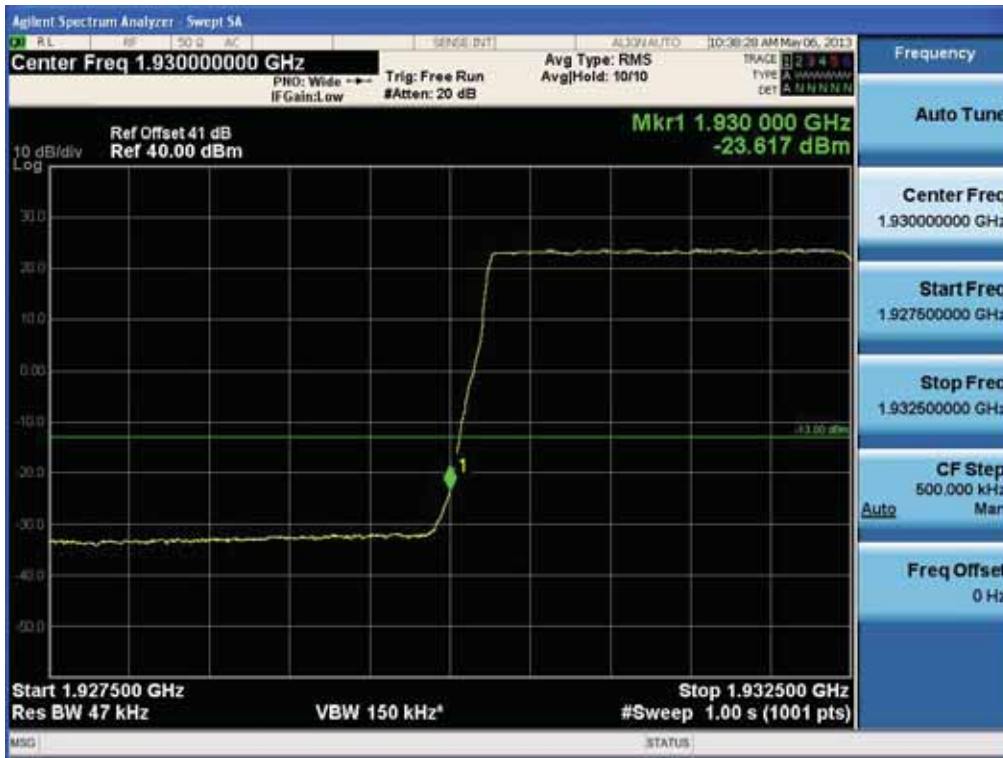


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 104 of 156

(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Low Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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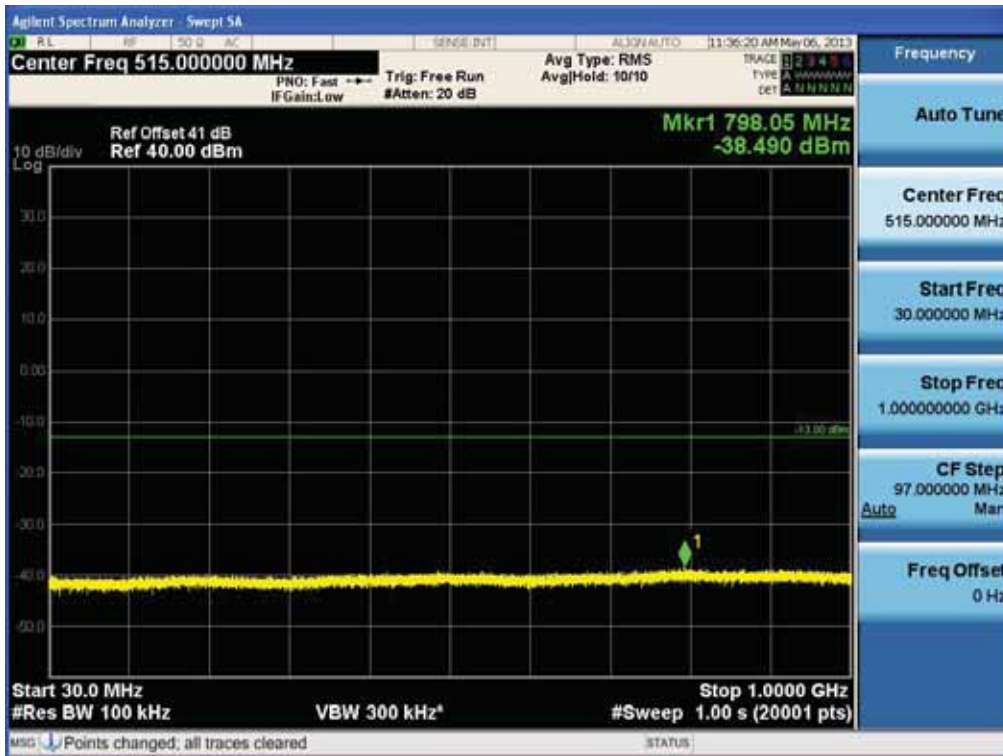
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Middle Channel)

(30 MHz ~ 1 GHz)



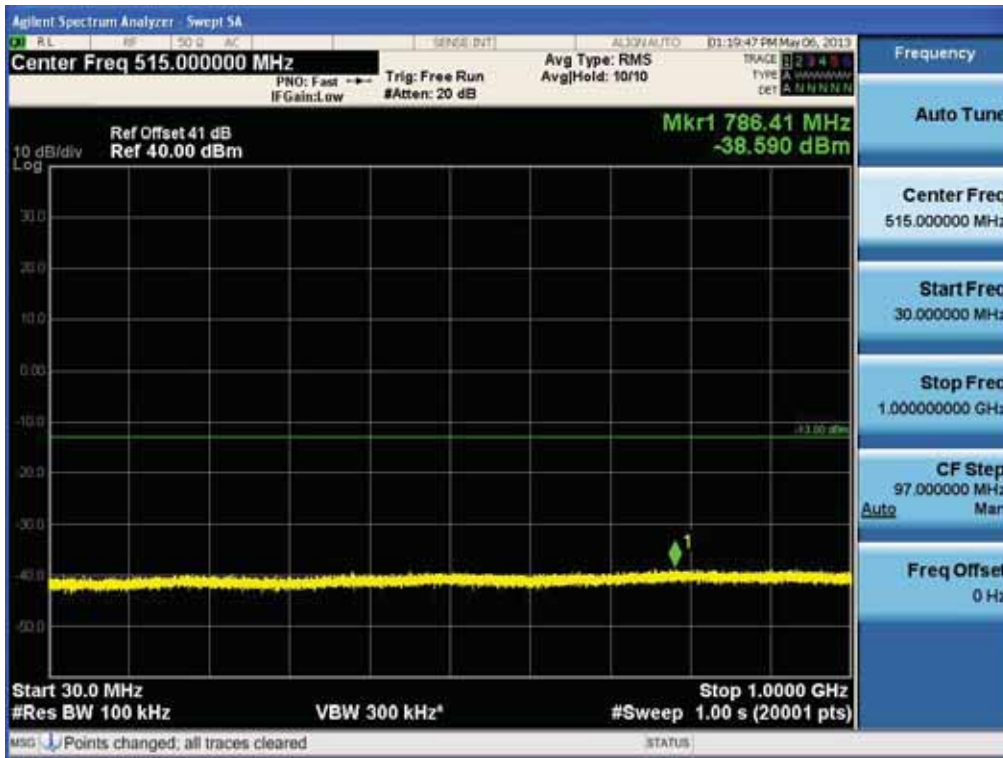
(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
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(64QAM Low Channel)

(30 MHz ~ 1 GHz)

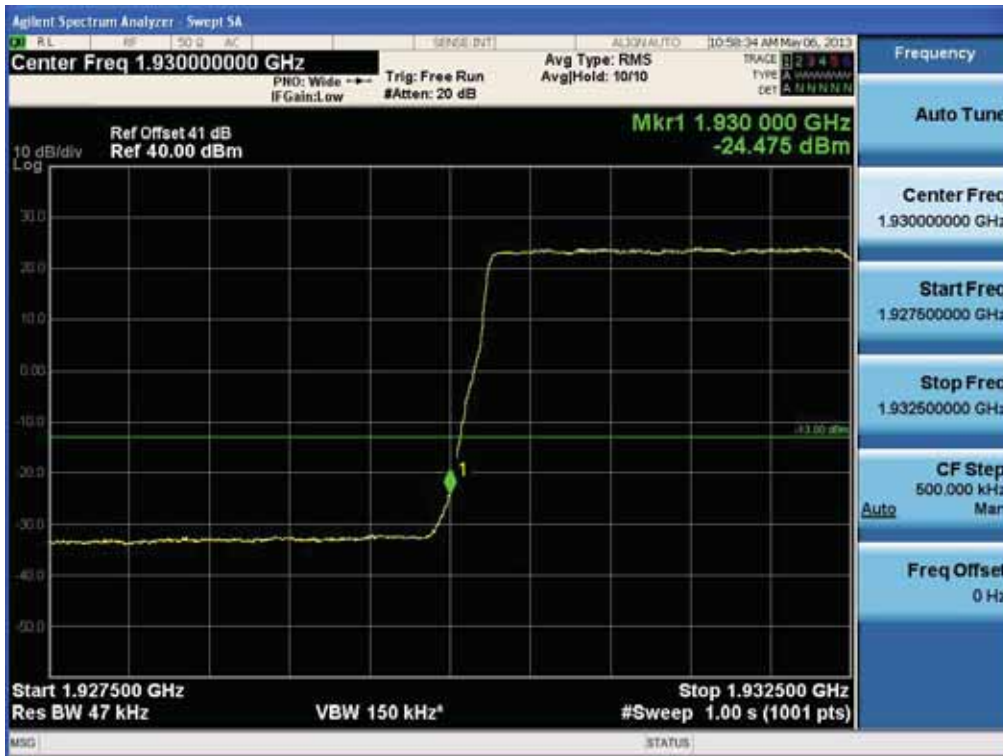


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 117 of 156

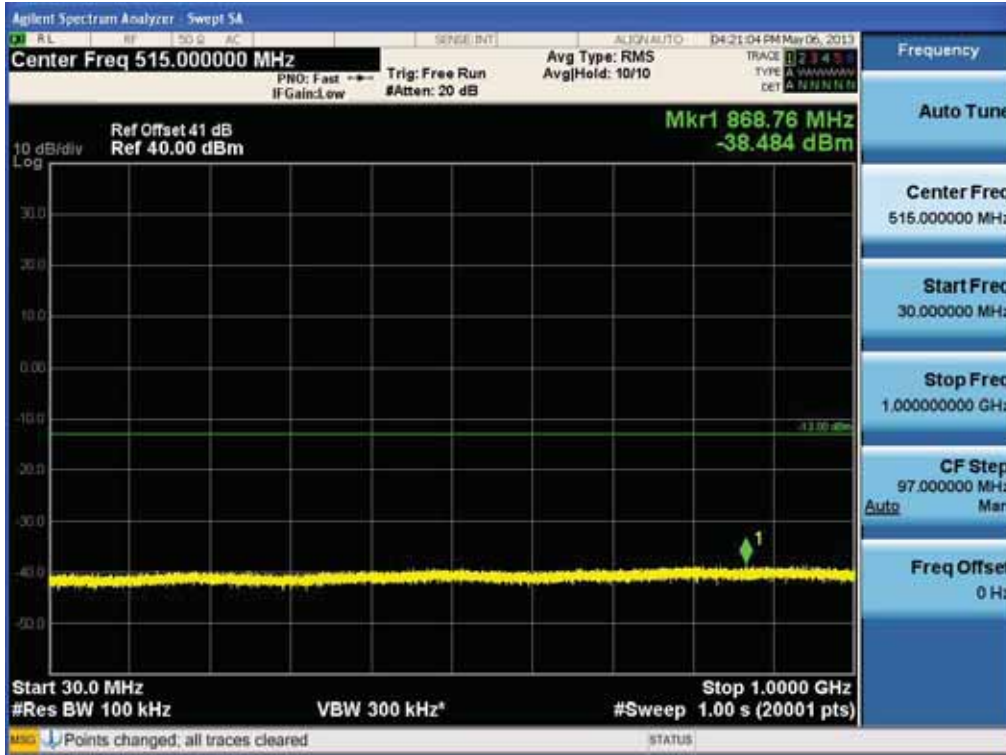
(Band Edge)



FCC PT.24 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
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. Plot Data for LTE + CDMA, Output Port 0
(QPSK Low Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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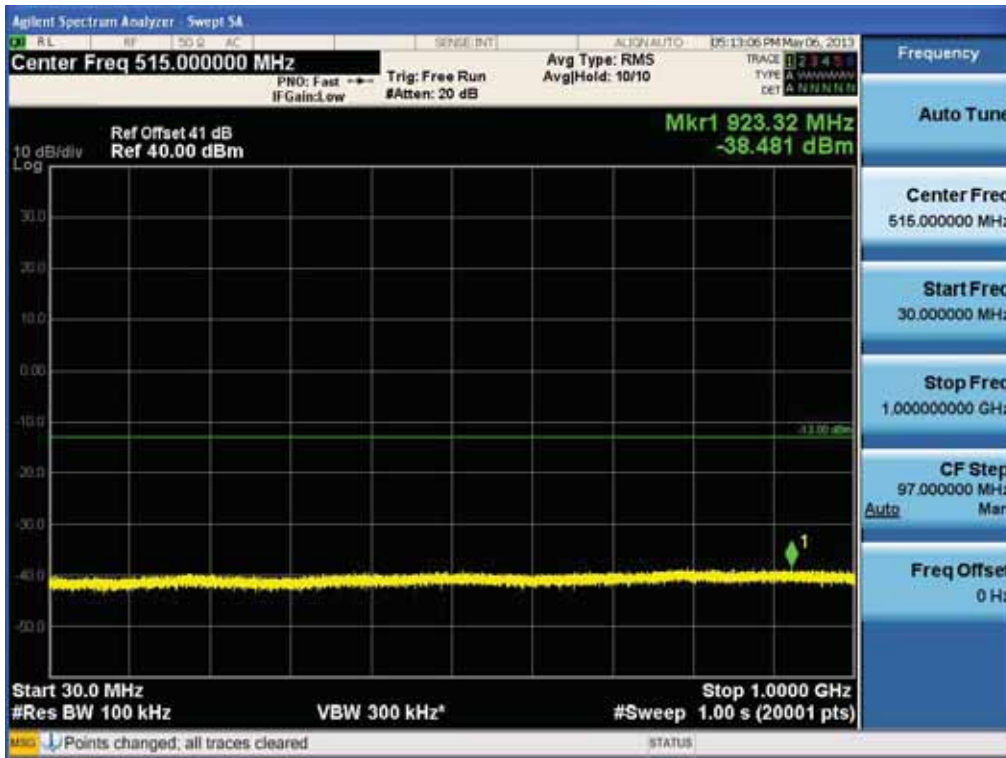
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Low Channel)

(30 MHz ~ 1 GHz)

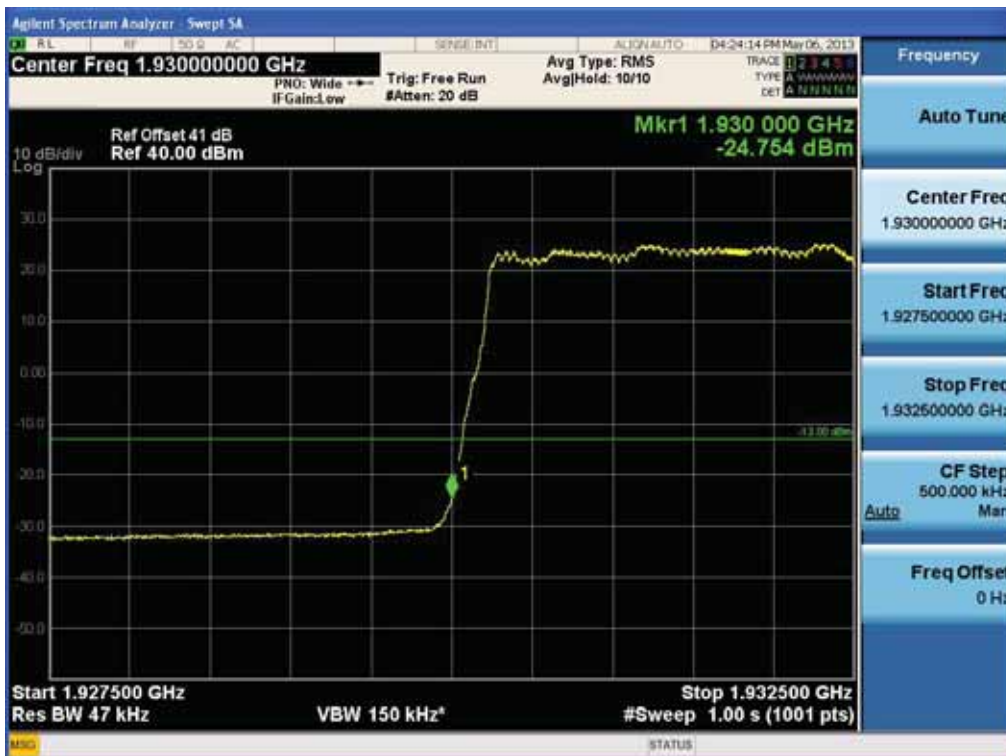


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Middle Channel)

(30 MHz ~ 1 GHz)



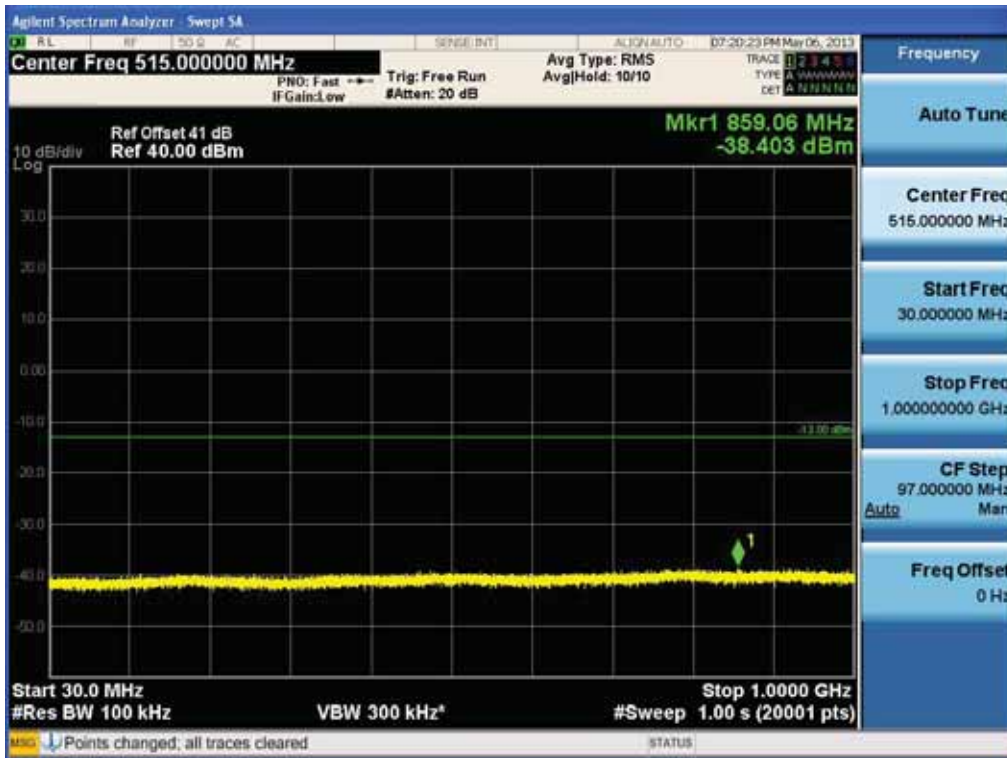
(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)

(30 MHz ~ 1 GHz)

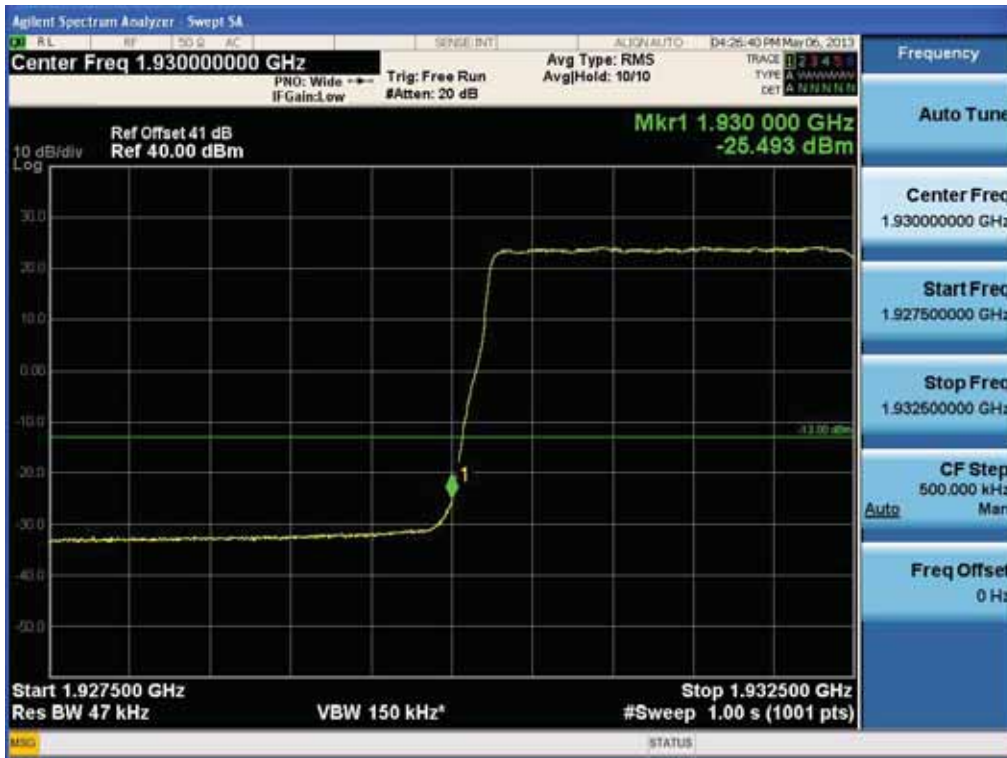


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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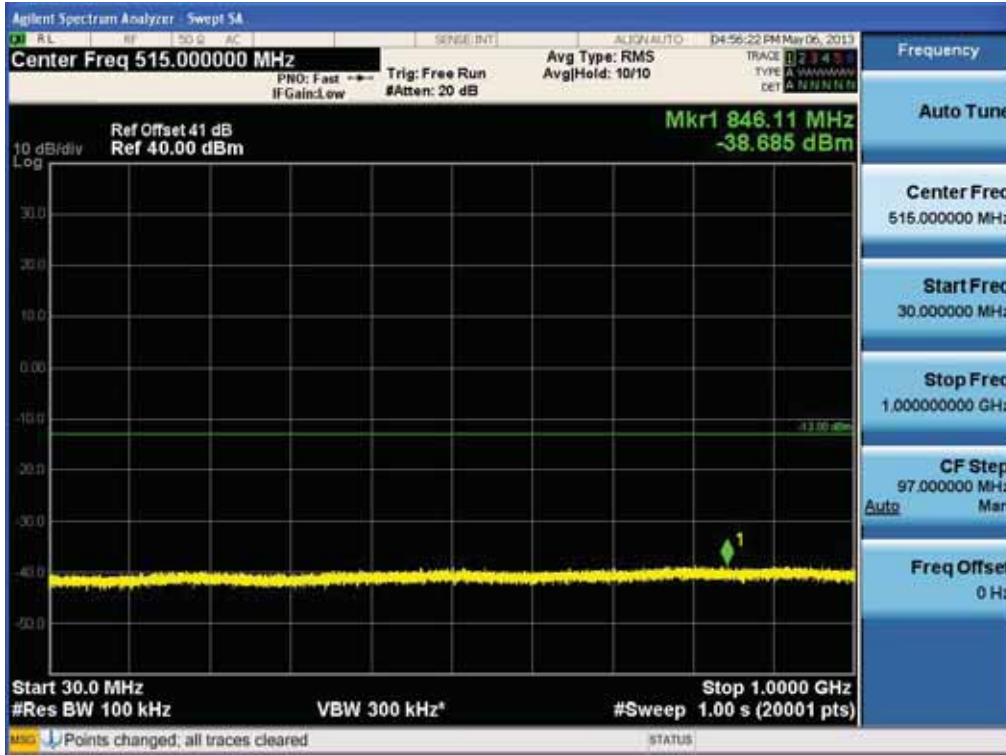
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 133 of 156

. Plot Data for LTE + CDMA, Output Port 1
(QPSK Low Channel)

(30 MHz ~ 1 GHz)

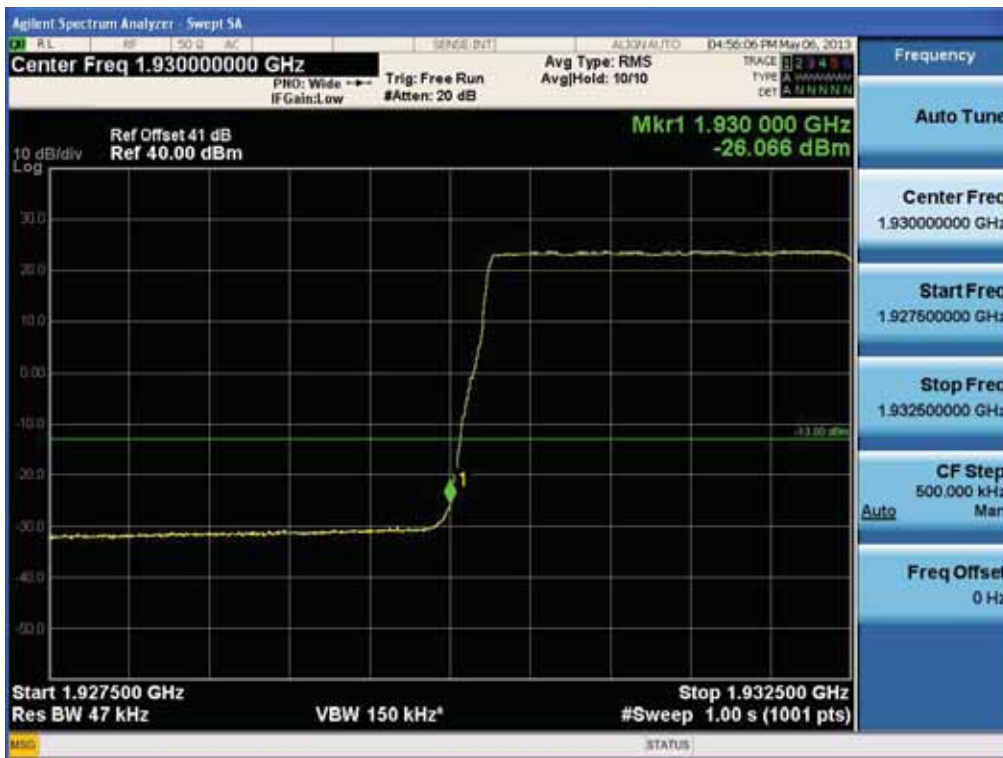


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 134 of 156

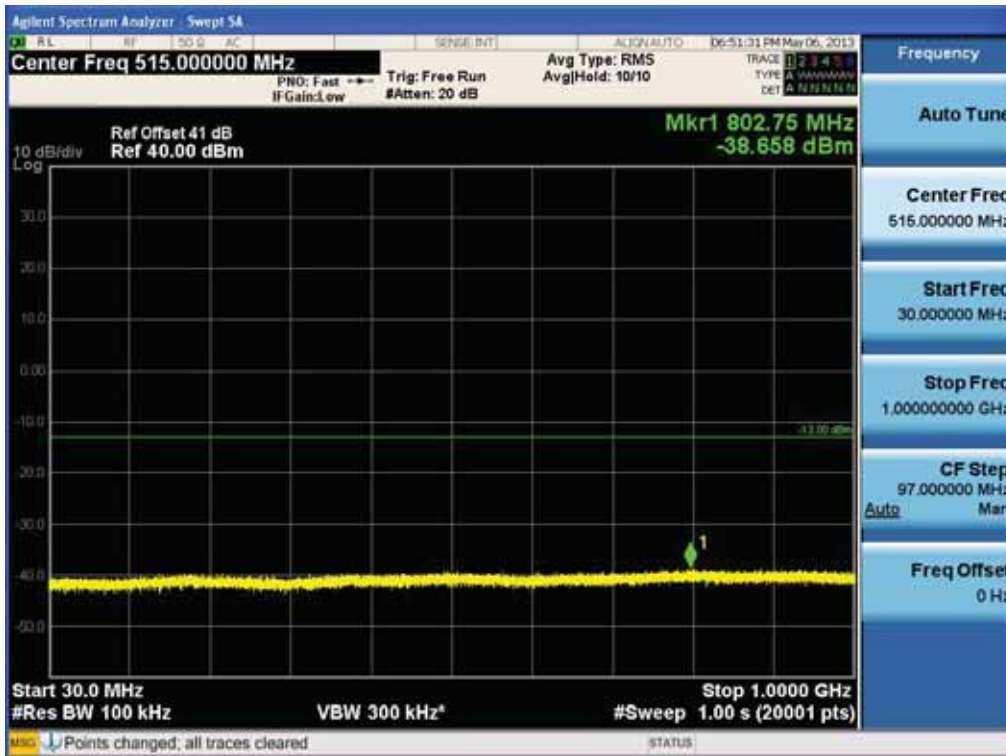
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
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(16QAM Low Channel)

(30 MHz ~ 1 GHz)

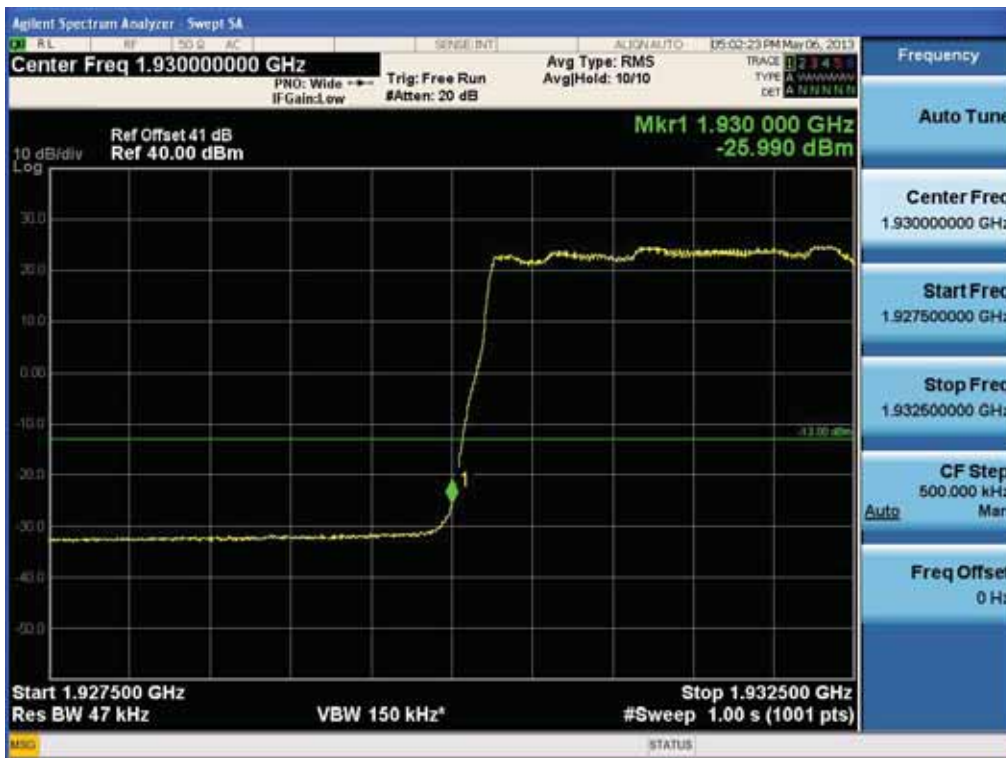


(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1305FR15	Date of Issue: May 22, 2013	EUT Type: Remote Radio Head	FCC ID: A3LSMM-2LD0581902	Page 139 of 156

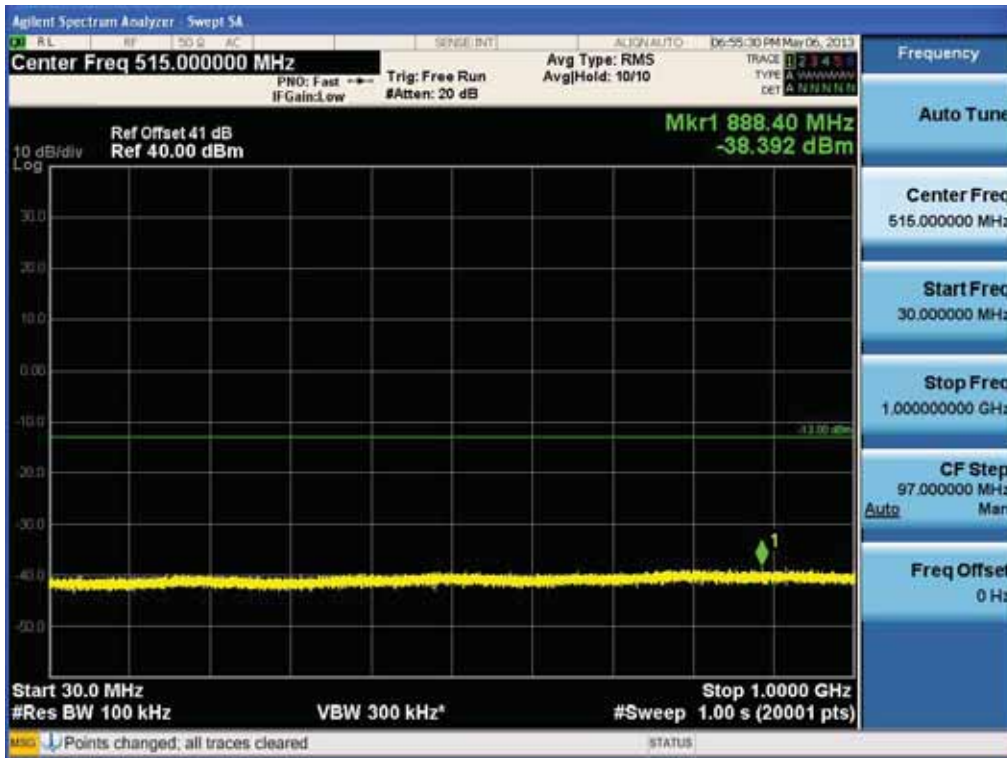
(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Middle Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM High Channel)

(30 MHz ~ 1 GHz)



(1 GHz ~ 26.5 GHz)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(Band Edge)



FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)

(30 MHz ~ 1 GHz)

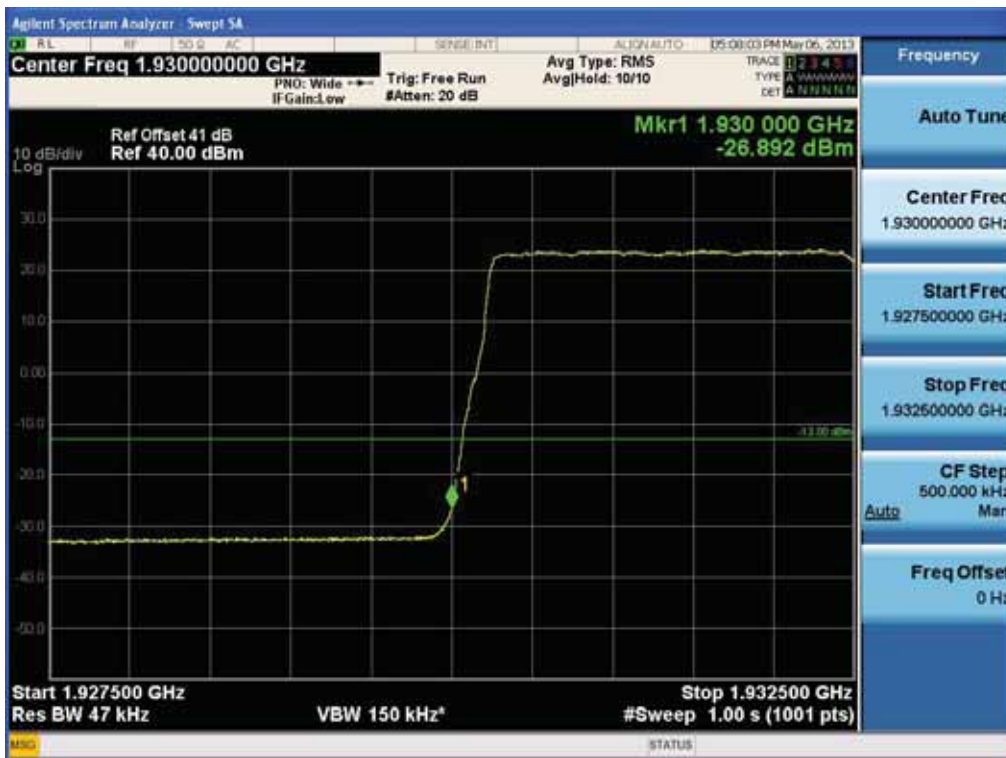


(1 GHz ~ 26.5 GHz)



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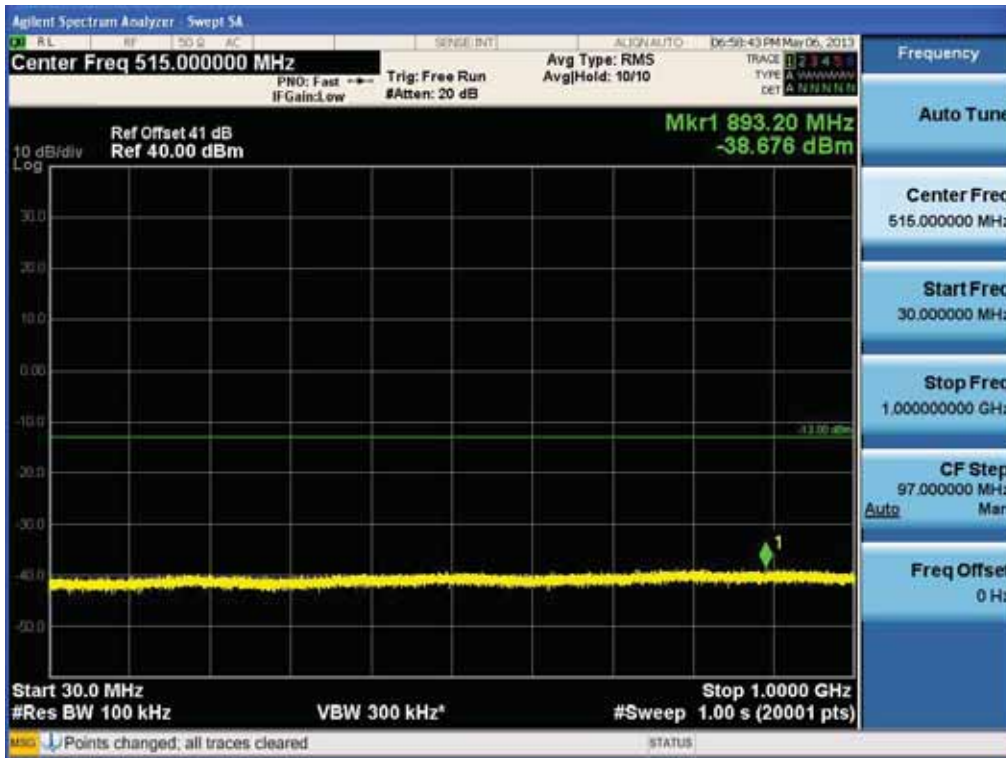
(Band Edge)



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(64QAM Middle Channel)

(30 MHz ~ 1 GHz)



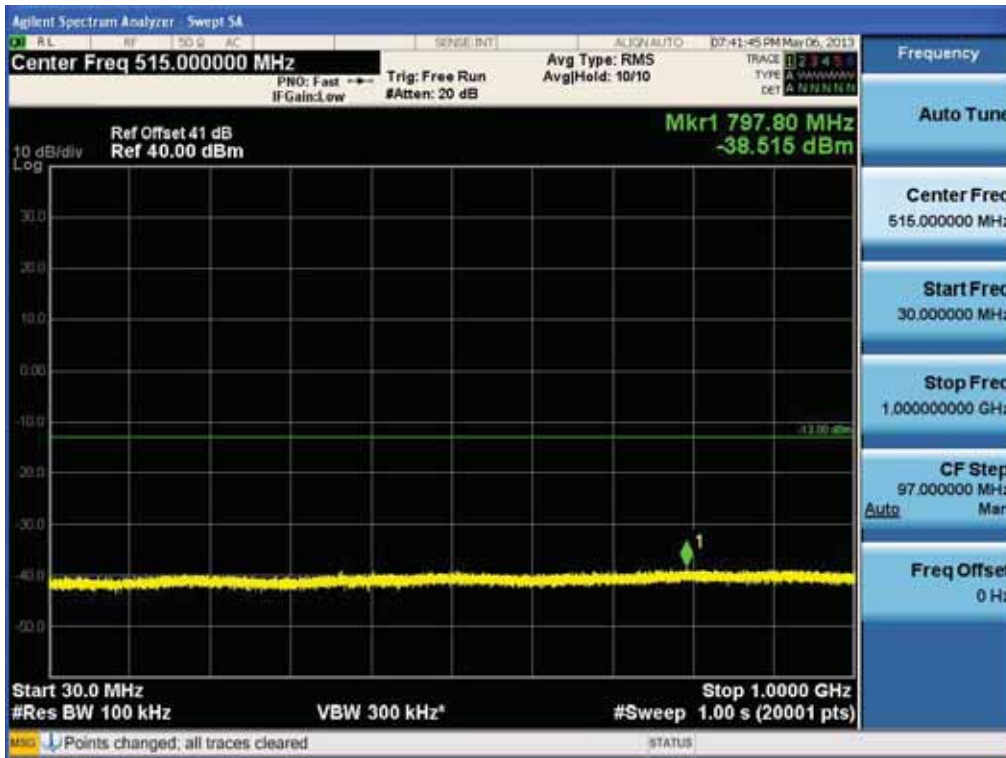
(1 GHz ~ 26.5 GHz)



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(64QAM High Channel)

(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 § 24.238

(a) *Out of band emissions.* 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.

8.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	937	10/17/2013
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	147	05/15/2014
Schwarzbeck	VULB 9160 / TRILOG Antenna	3150	12/17/2014
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	04/16/2014
EMCO	6502/Loop Antenna	9009-2536	01/11/2014
Agilent	N9020A /Signal Analyzer	US46220219	04/25/2014
Agilent	6674A / DC Power Supply	3501A00901	04/16/2014

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 360^0 and the receiving antenna scanned from 1-4m in order to capture the maximum emission.

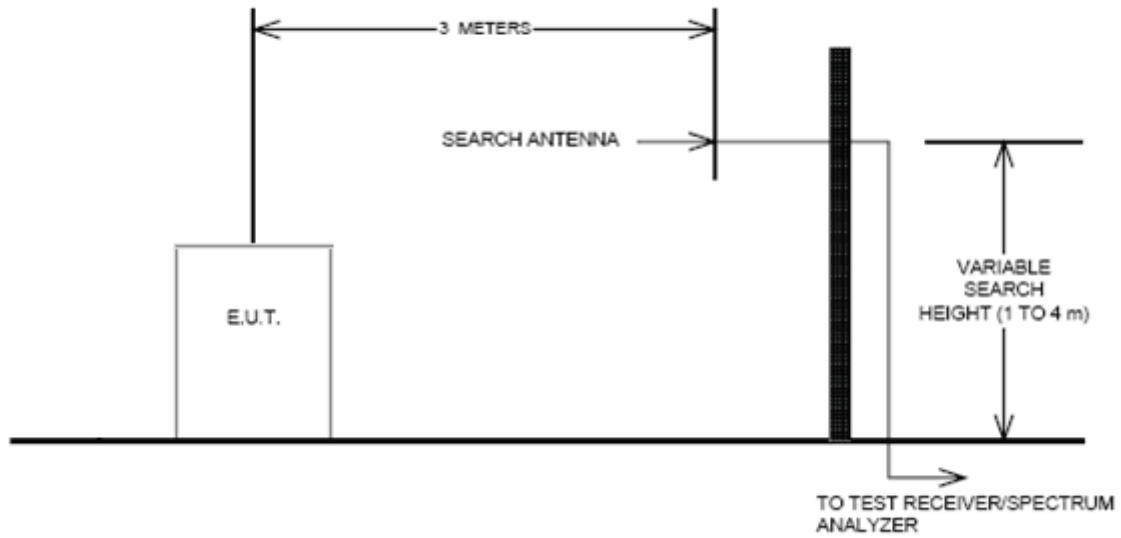
A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated.

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

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horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

8.3.1 Radiated Spurious Emissions Test Setup



8.4 Test Result

: PASS

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Test Frequency	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	C.L	SigGen Level [dBm]	Pol.	ERP (dBm)	Margin (dB)
1962.5	3936	-73.64	10.53	8.60	-44.33	H	-42.40	29.40
	5160	-73.96	10.49	9.94	-42.13	H	-41.59	28.59
	5892	-72.17	10.94	10.45	-39.64	H	-39.15	26.15

● It was tested when 2 carriers simultaneously transmitted.

9. FREQUENCY STABILITY

9.1 Applicable Standard

Requirements: FCC § 2.1055 (a), §24.235 following: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

9.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	04/25/2014
Agilent	6674A / DC Power Supply	3501A00901	04/16/2014
WEINSCHEL	67-30-33 / Attenuator	BU5347	11/07/2013
WEINSCHEL	67-30-33 / Attenuator	BR0530	11/07/2013
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2013
WEINSCHEL	AF9003-69-31 / Attenuator	5701	11/07/2013

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

(LTE)

Modulation: QPSK

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1932 499 998	-1.6	0.0	0.0000
	-30	1932 500 003	2.6	4.2	0.0022
	-20	1932 499 997	-3.4	-1.8	-0.0009
	-10	1932 500 001	1.5	3.1	0.0016
	0	1932 499 999	-1.2	0.4	0.0002
	+10	1932 499 998	-2.0	-0.4	-0.0002
	+30	1932 500 000	0.5	2.1	0.0011
	+40	1932 499 998	-1.6	0.0	0.0000
	+50	1932 500 001	1.4	3.0	0.0016
115%	+20	1932 499 999	-1.3	0.3	0.0002
85%	+20	1932 500 000	0.4	2.0	0.0010

Reference: - 48 Vdc at 20°C Freq. = 1932,500,000 MHz

Modulation: 16QAM

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1962 499 998	-1.5	0.0	0.0000
	-30	1962 499 998	-1.6	-0.1	-0.0001
	-20	1962 500 000	-0.4	1.1	0.0006
	-10	1962 499 998	-1.6	-0.1	-0.0001
	0	1962 499 999	-1.1	0.5	0.0002
	+10	1962 500 000	0.1	1.6	0.0008
	+30	1962 500 001	0.8	2.3	0.0012
	+40	1962 500 000	0.4	1.9	0.0010
	+50	1962 500 000	0.3	1.9	0.0010
115%	+20	1962 500 001	0.9	2.5	0.0013
85%	+20	1962 500 001	1.4	3.0	0.0015

Reference: - 48 Vdc at 20°C Freq. = 1962,500,000 MHz

Modulation: 64QAM

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1992 499 997	-2.8	0.0	0.0000
	-30	1992 499 997	-2.8	0.0	0.0000
	-20	1992 500 000	0.1	3.0	0.0015
	-10	1992 500 001	0.6	3.4	0.0018
	0	1992 499 998	-2.0	0.8	0.0004
	+10	1992 499 998	-1.5	1.3	0.0007
	+30	1992 499 999	-0.5	2.3	0.0012
	+40	1992 500 000	0.2	3.0	0.0016
	+50	1992 500 002	2.1	4.9	0.0026
115%	+20	1992 500 001	1.4	4.2	0.0022
85%	+20	1992 500 003	2.6	5.4	0.0028

Reference: - 48 Vdc at 20°C **Freq.** = 1992,500,000 MHz

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	45.96000	dBm
Max Peak output Power at antenna input terminal	39.44573	W
Prediction distance	500.00000	cm
Prediction frequency	1963.12500	MHz
Antenna Gain(typical)	18.00000	dBi
Antenna Gain(numeric)	63.09573	-
Power density at prediction frequency (S)	0.79223	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm ²

(LTE)

Max Peak output Power at antenna input terminal	46.10000	dBm
Max Peak output Power at antenna input terminal	40.73803	W
Prediction distance	500.00000	cm
Prediction frequency	1962.50000	MHz
Antenna Gain(typical)	18.00000	dBi
Antenna Gain(numeric)	63.09573	-
Power density at prediction frequency (S)	0.81818	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm ²

The power density level at 500 cm is 0.81818 mW/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at PCS Band.

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