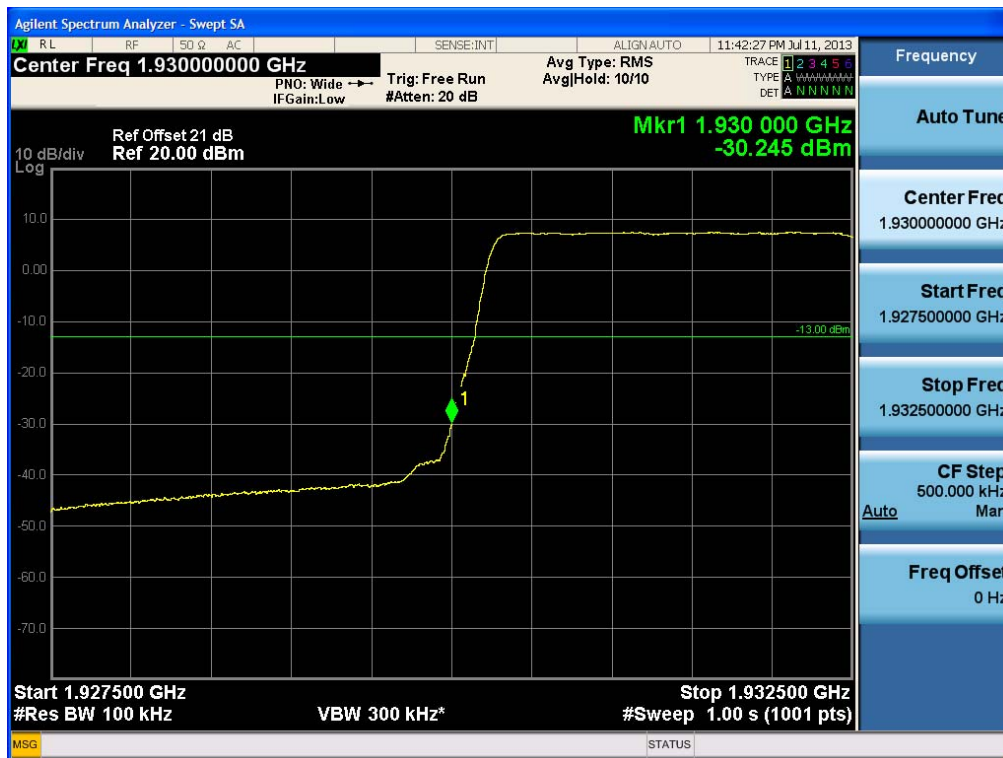


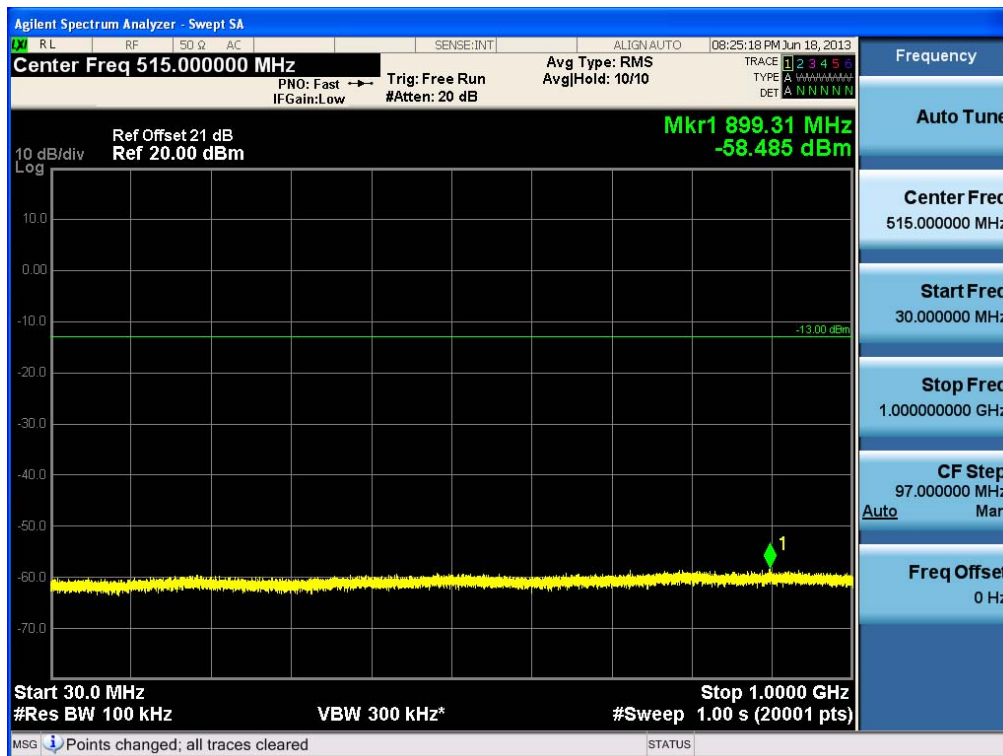
(Band Edge)



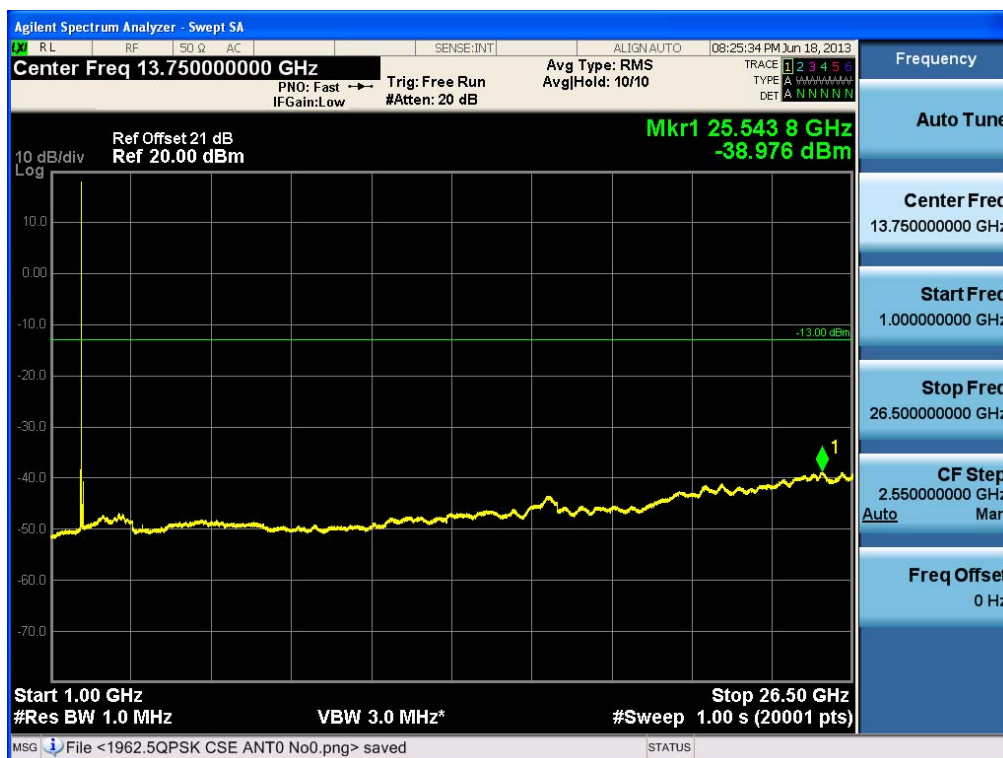
FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK Middle Channel)

(30 MHz ~ 1 GHz)



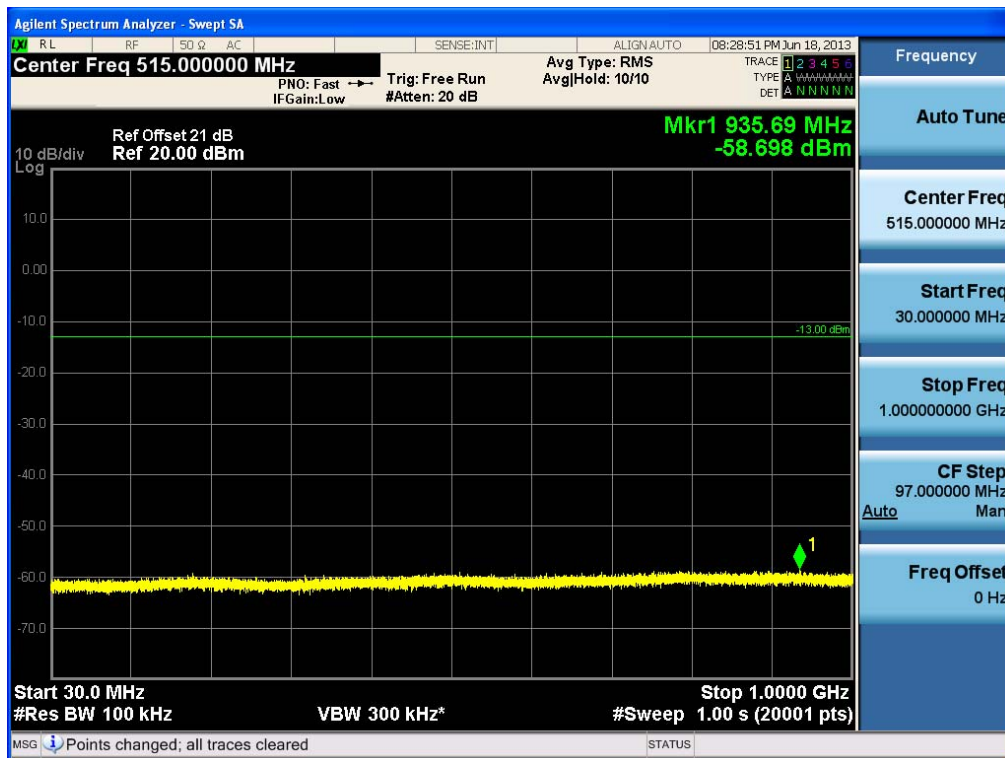
(1 GHz ~ 26.5 GHz)



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)



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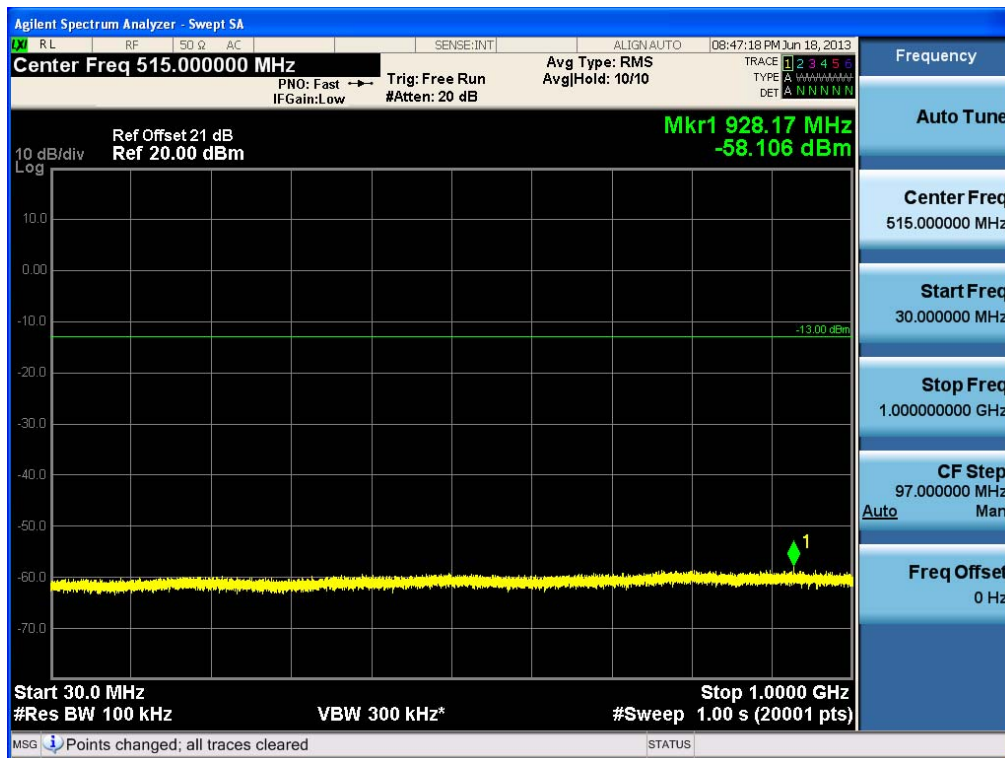
(Band Edge)



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

(30 MHz ~ 1 GHz)

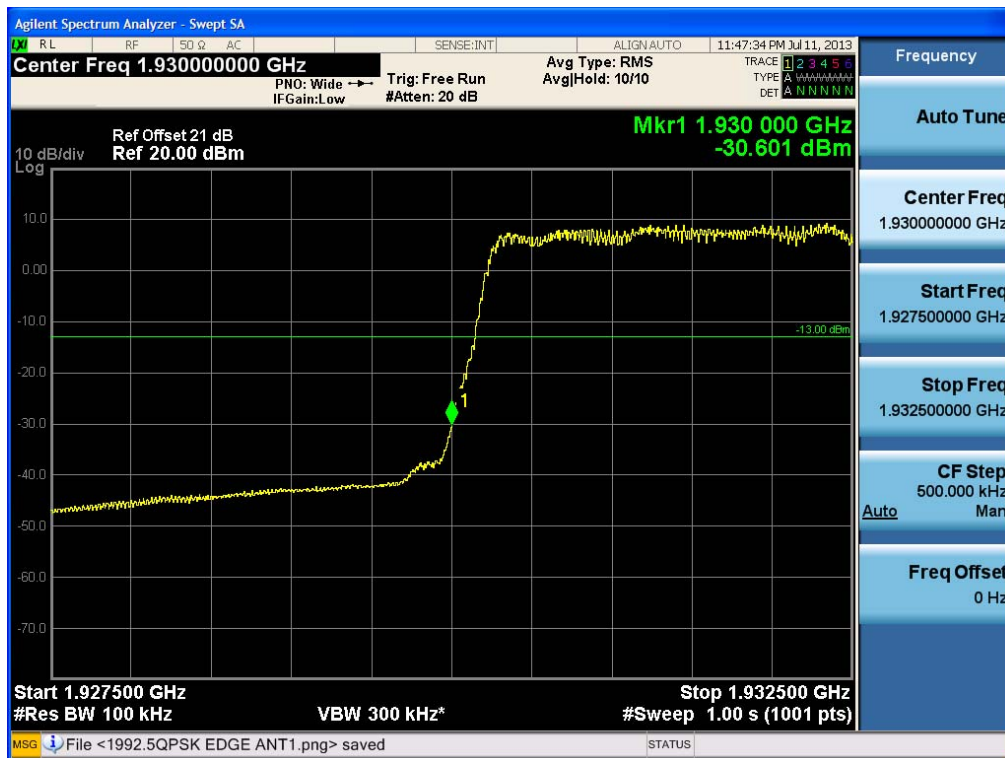


(1 GHz ~ 26.5 GHz)



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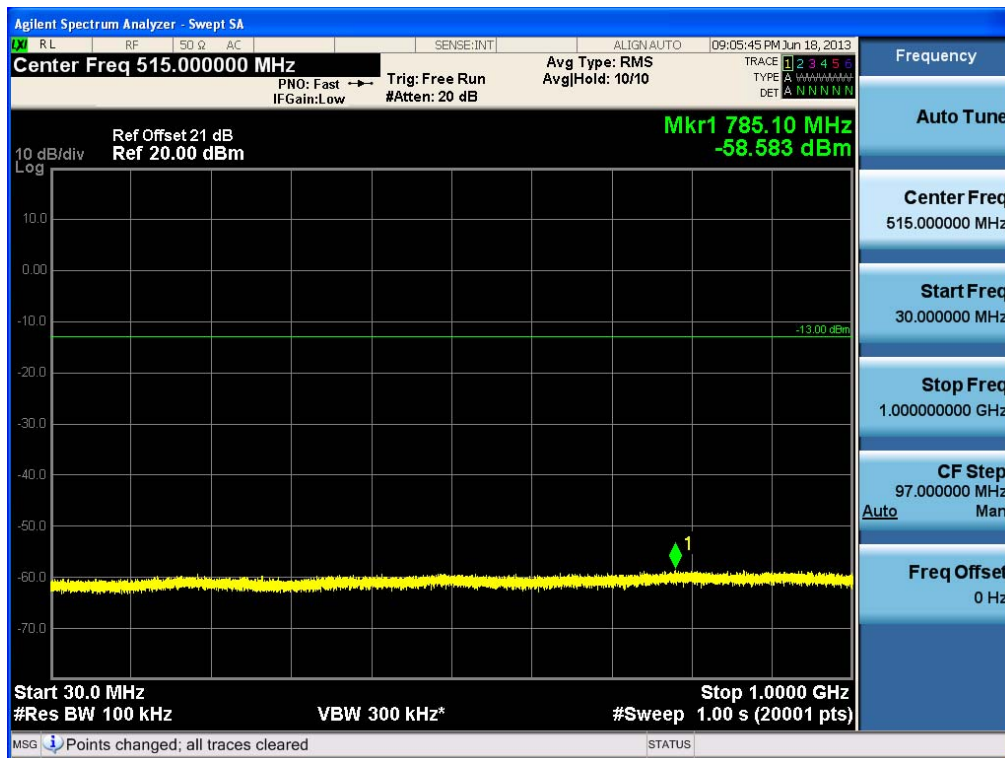
(Band Edge)



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

(30 MHz ~ 1 GHz)



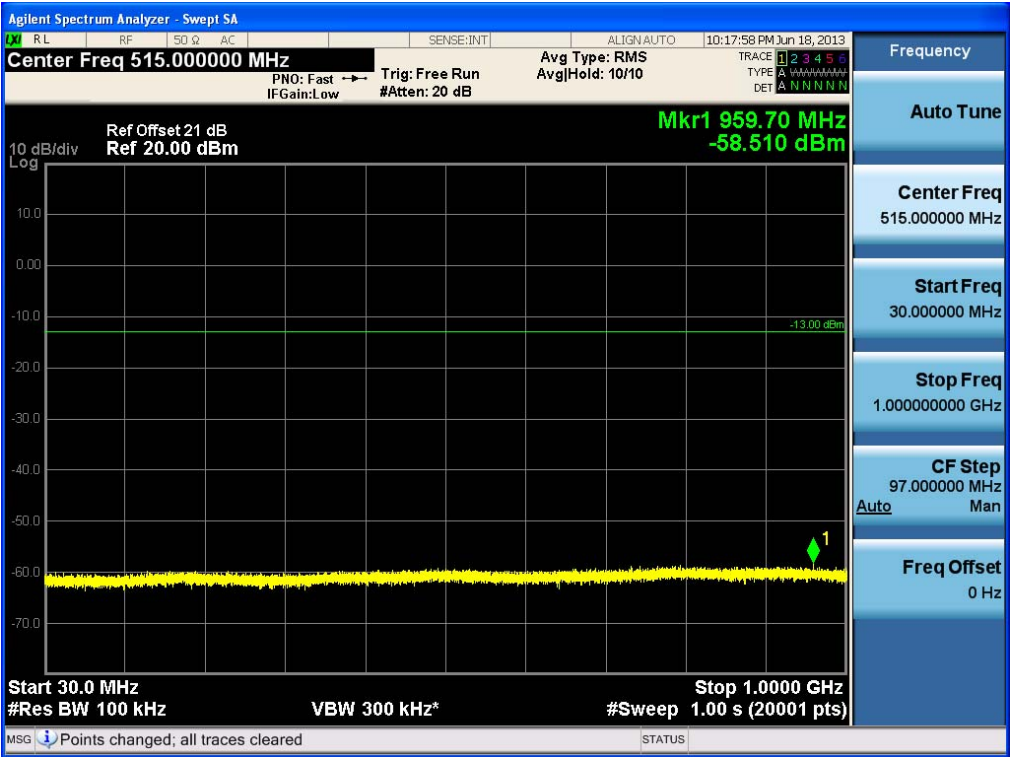
(1 GHz ~ 26.5 GHz)



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

(30 MHz ~ 1 GHz)

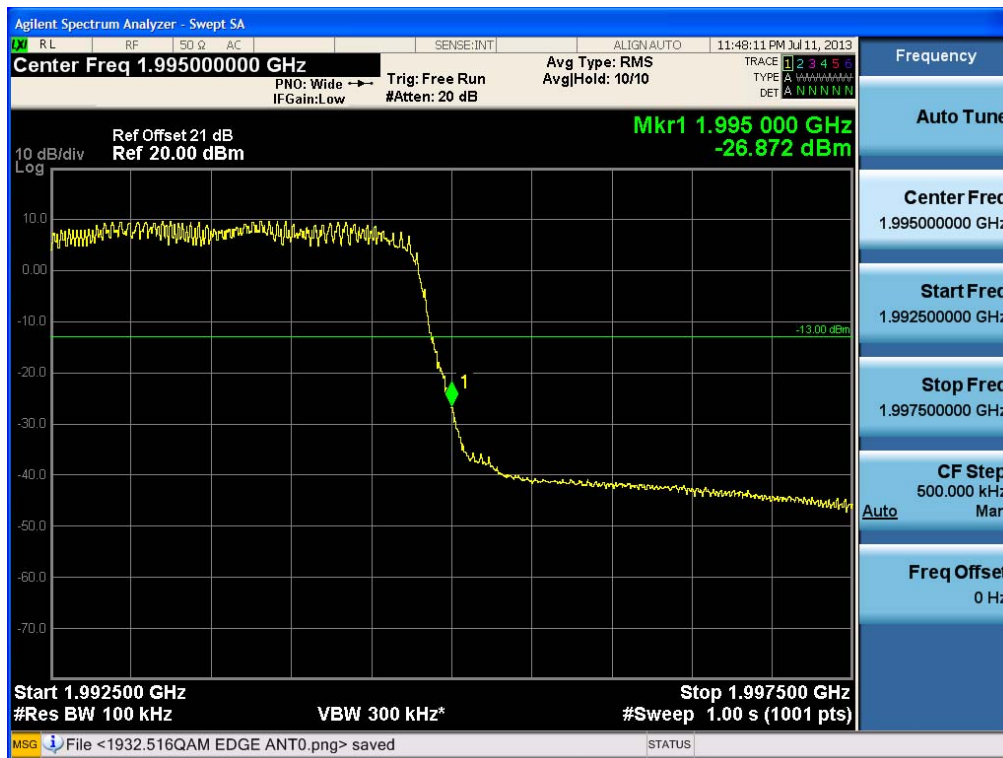


(1 GHz ~ 26.5 GHz)



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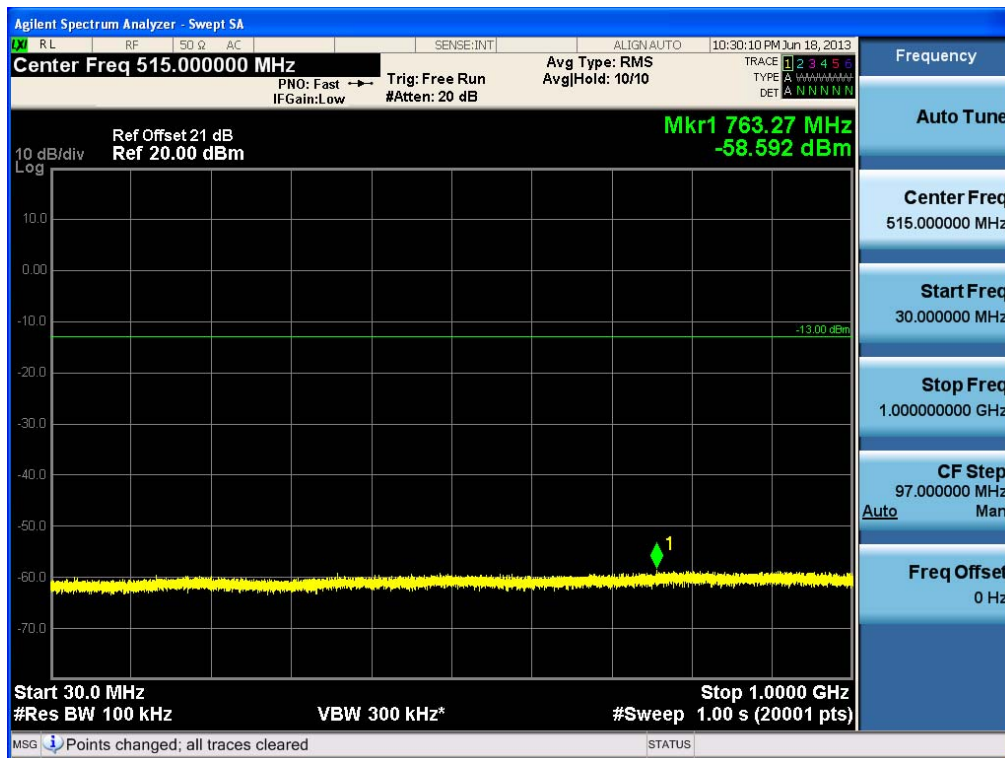
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FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)

(30 MHz ~ 1 GHz)

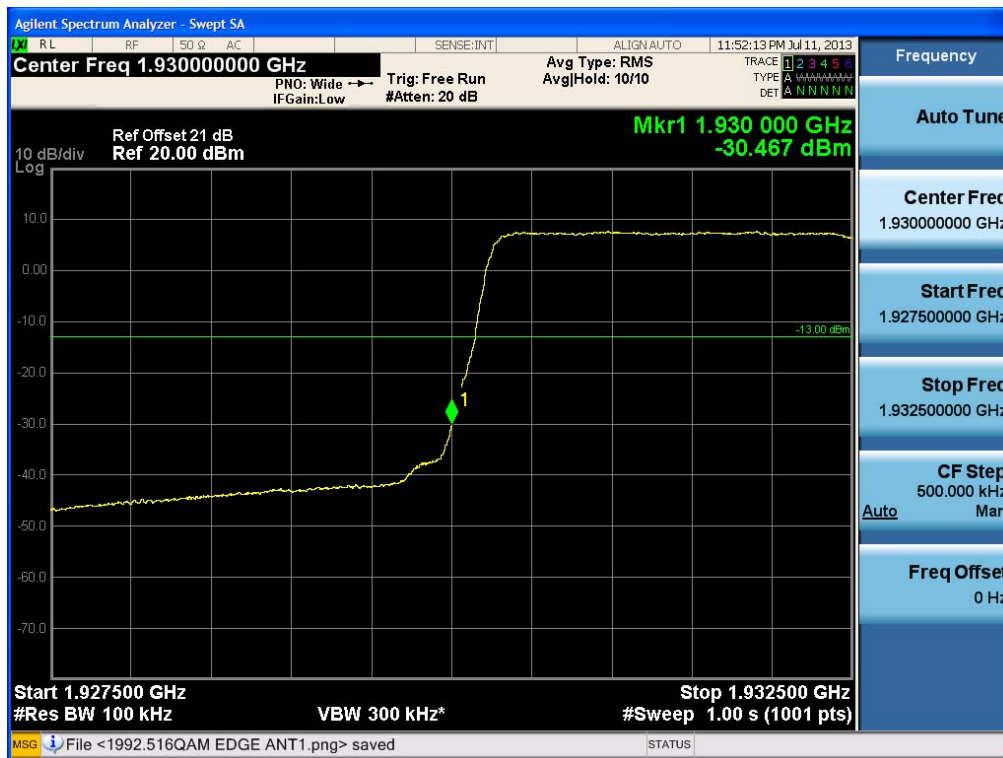


(1 GHz ~ 26.5 GHz)



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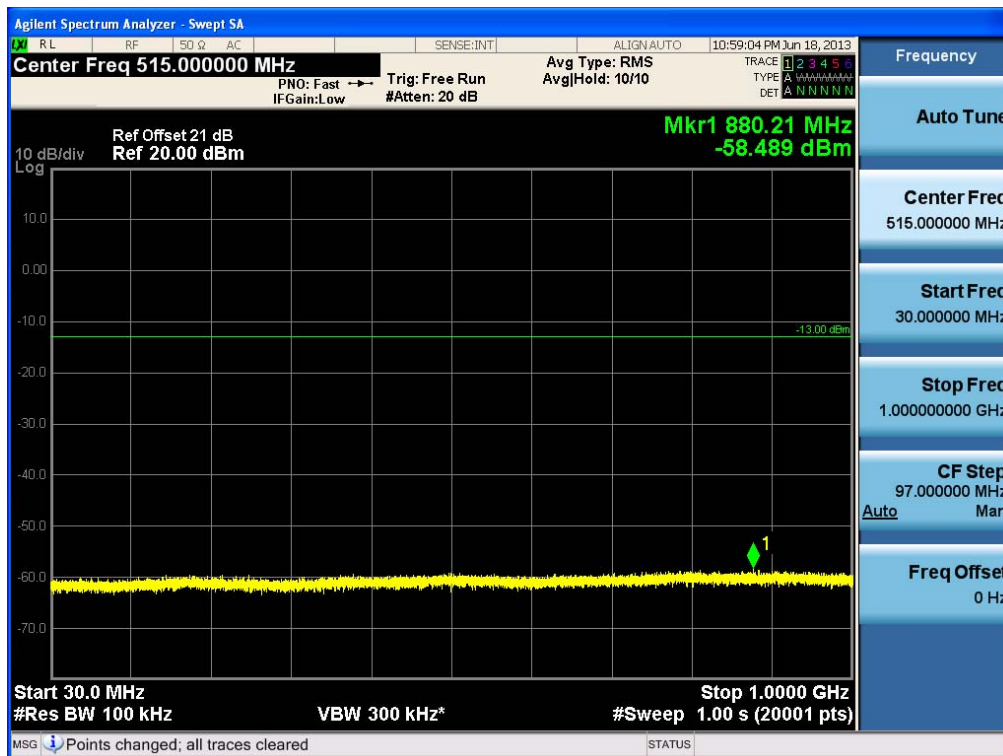
(Band Edge)



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

(30 MHz ~ 1 GHz)



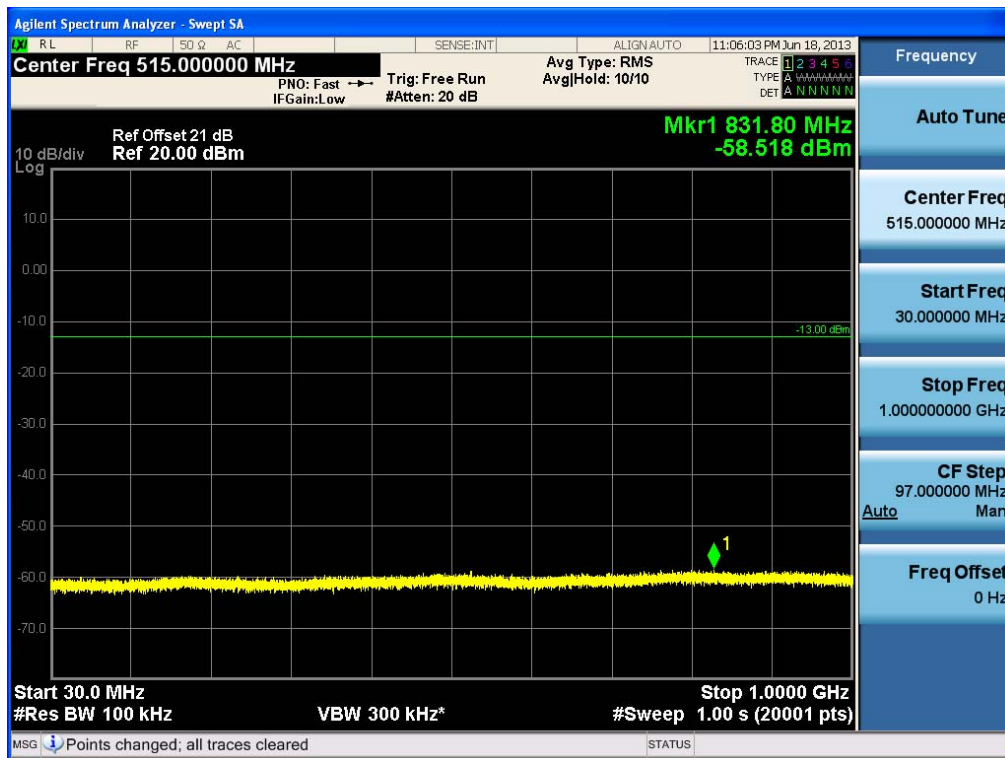
(1 GHz ~ 26.5 GHz)



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)



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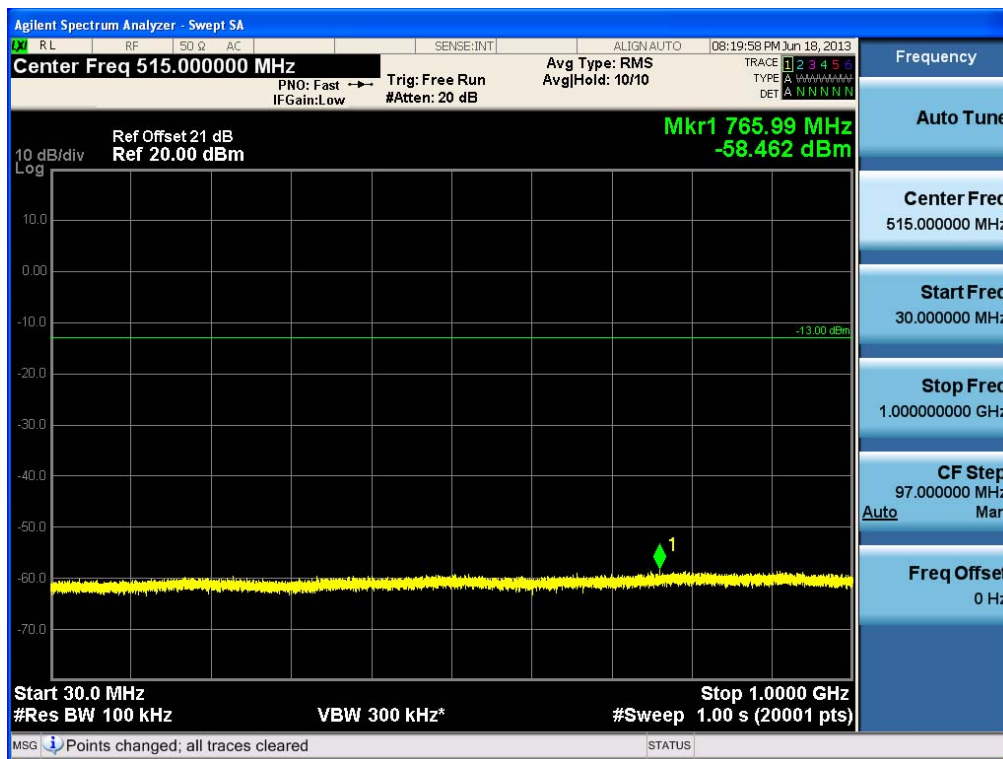
(Band Edge)



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

(30 MHz ~ 1 GHz)

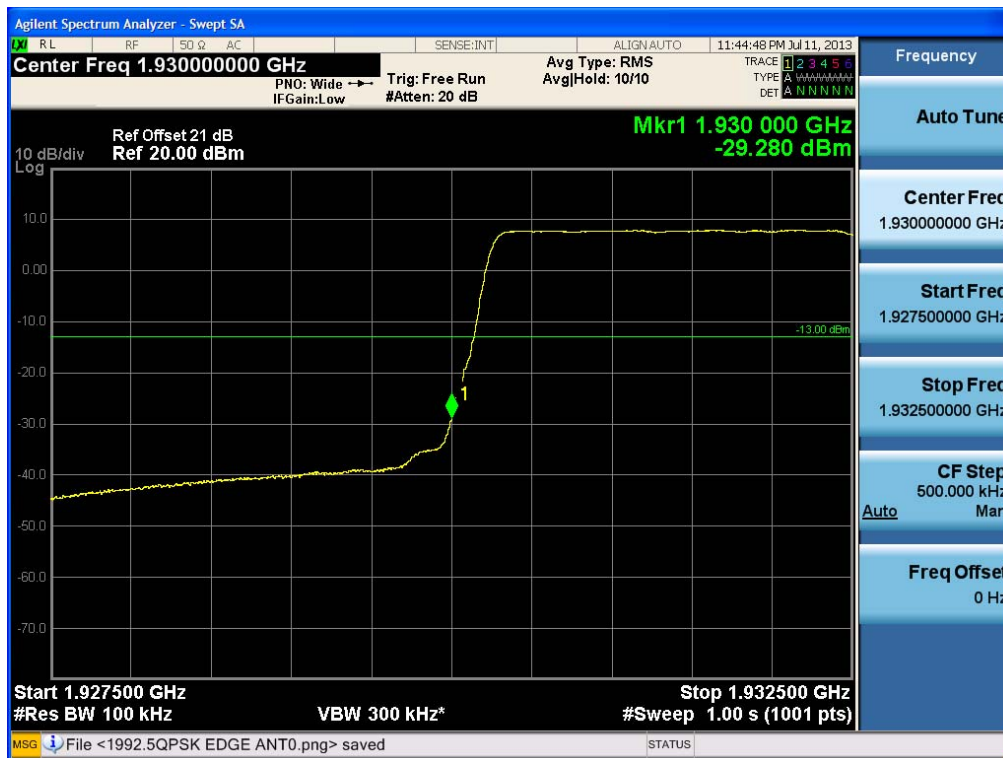


(1 GHz ~ 26.5 GHz)



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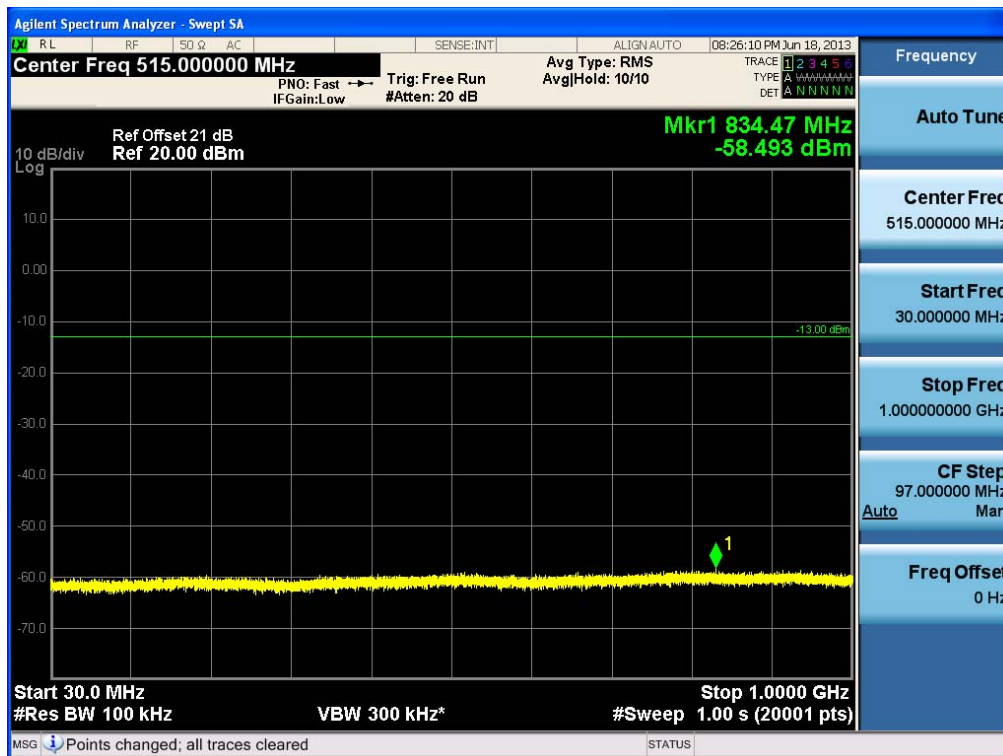
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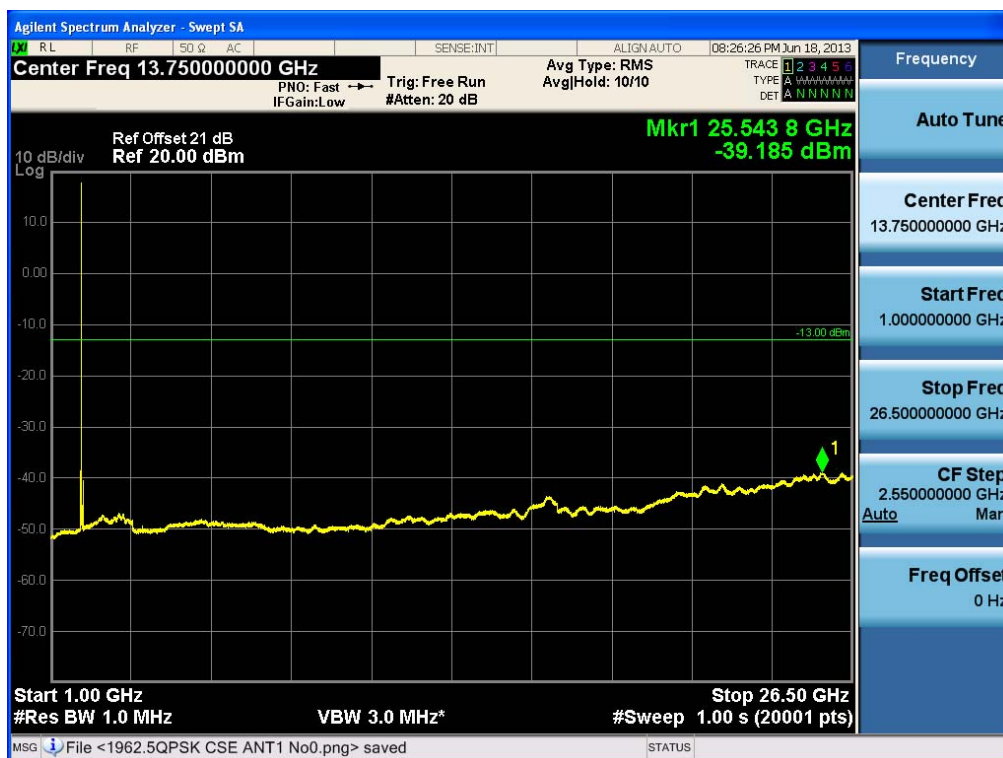
FCC PT.24 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(QPSK Middle Channel)

(30 MHz ~ 1 GHz)



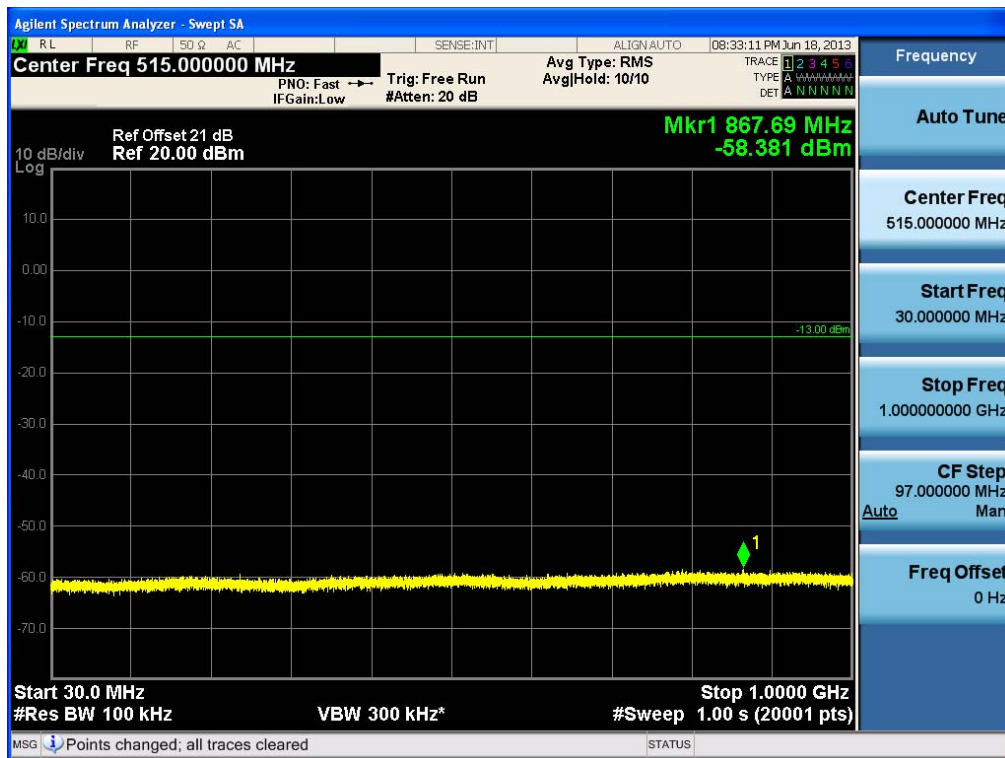
(1 GHz ~ 26.5 GHz)



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)



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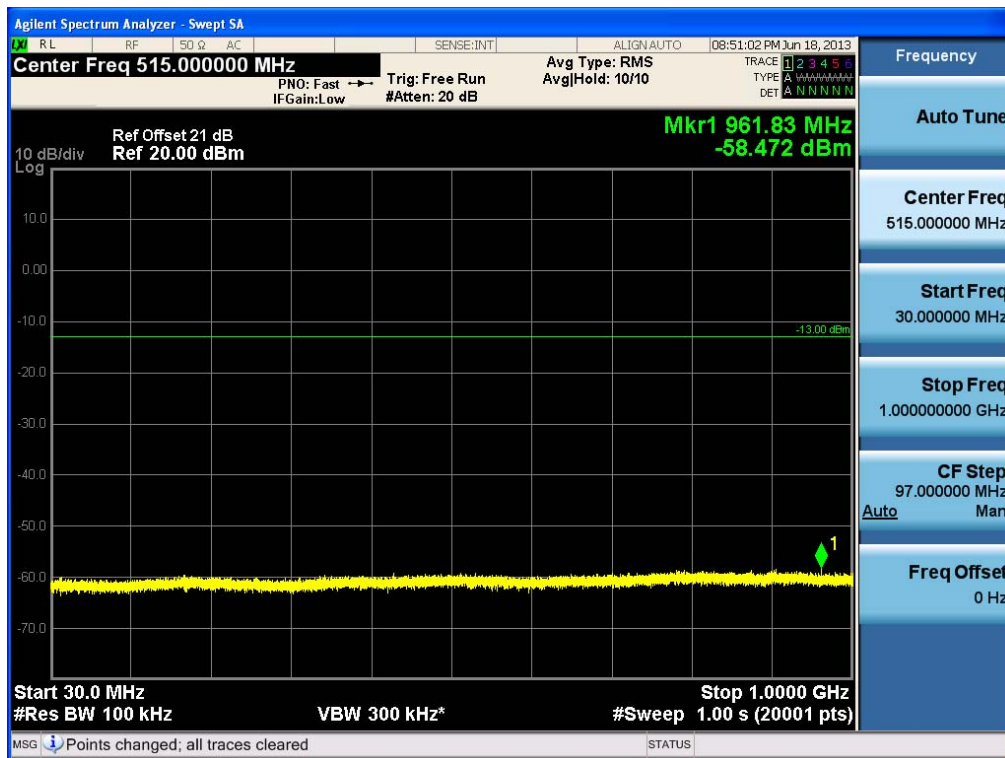
(Band Edge)



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

(30 MHz ~ 1 GHz)

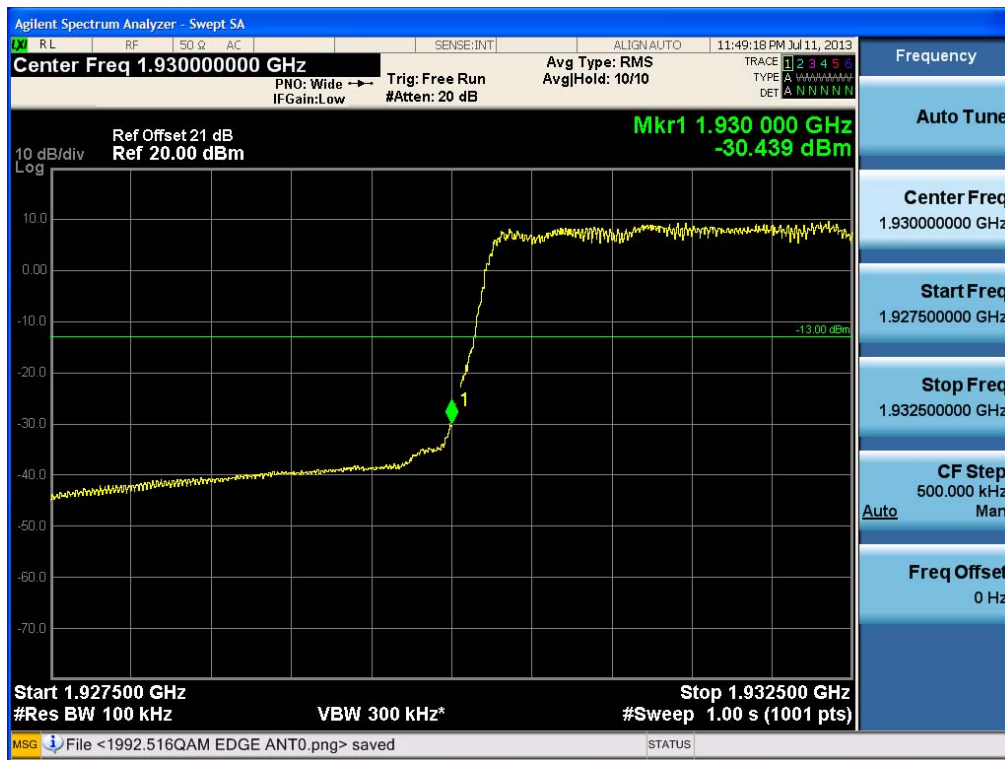


(1 GHz ~ 26.5 GHz)



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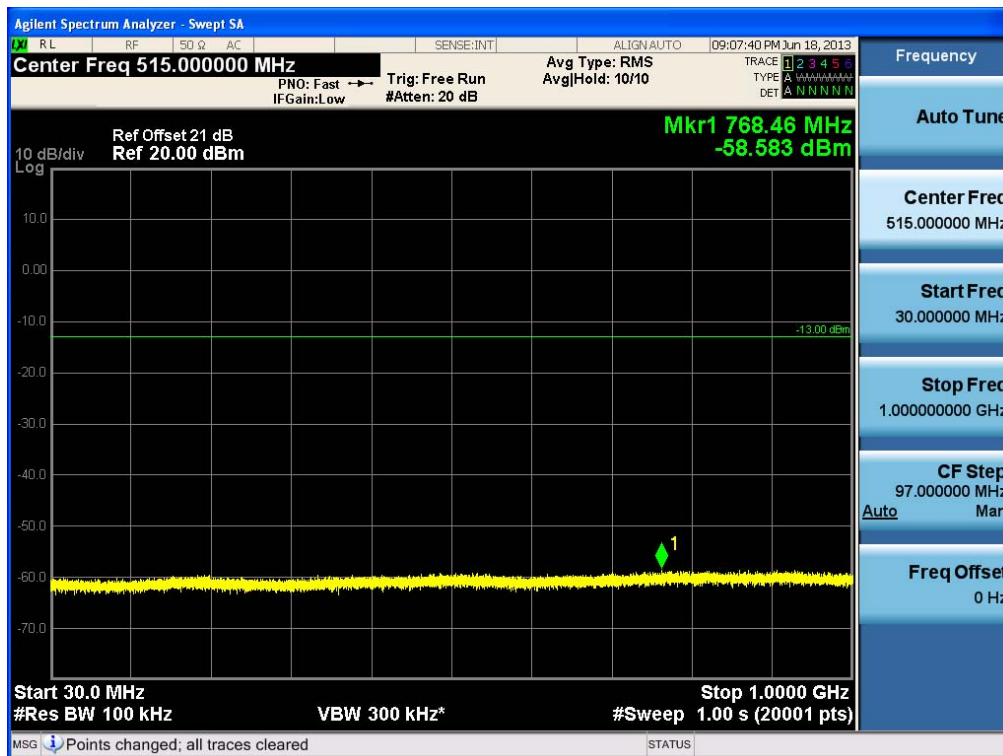
(Band Edge)



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

(30 MHz ~ 1 GHz)



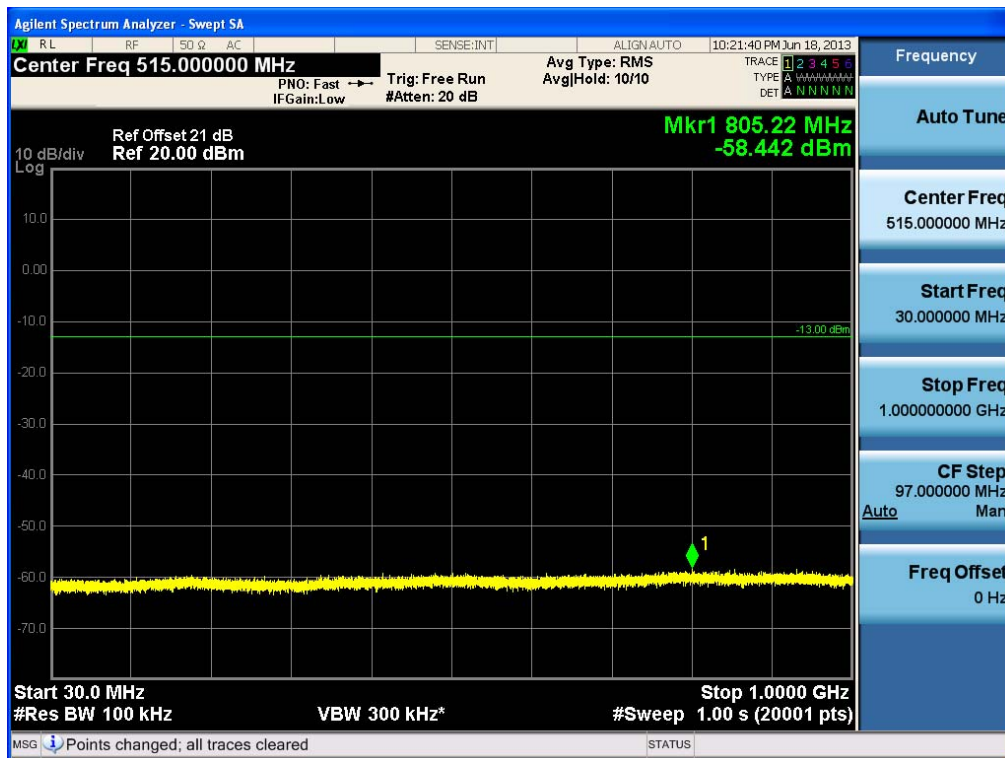
(1 GHz ~ 26.5 GHz)



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)



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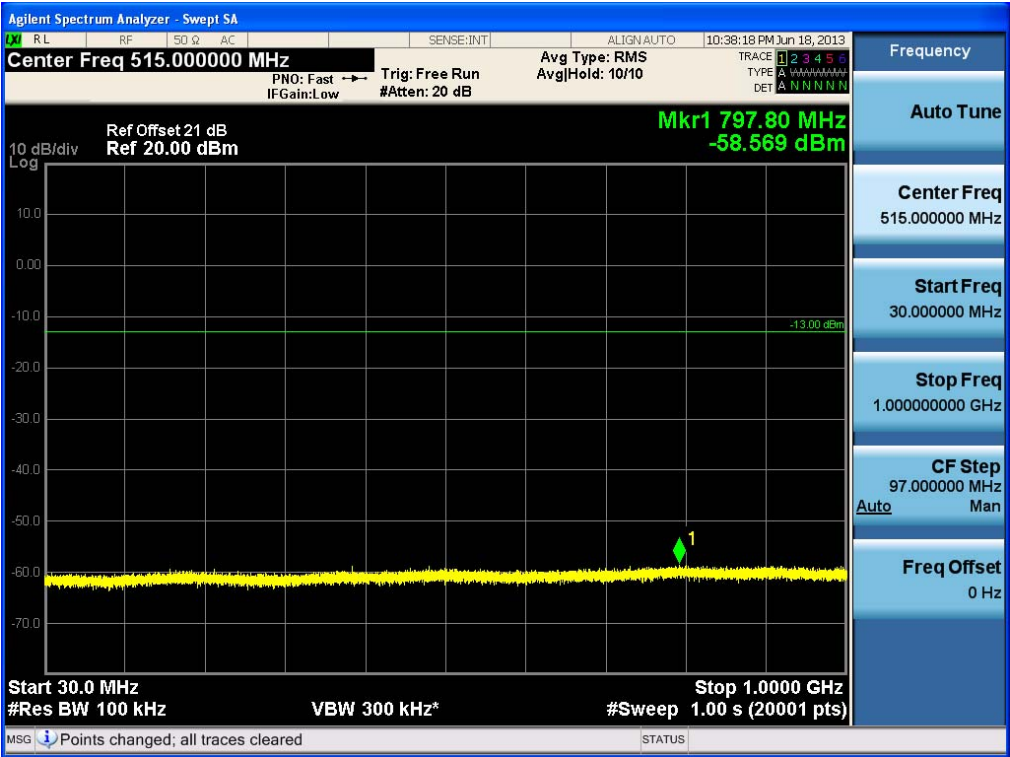
(Band Edge)



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

(30 MHz ~ 1 GHz)

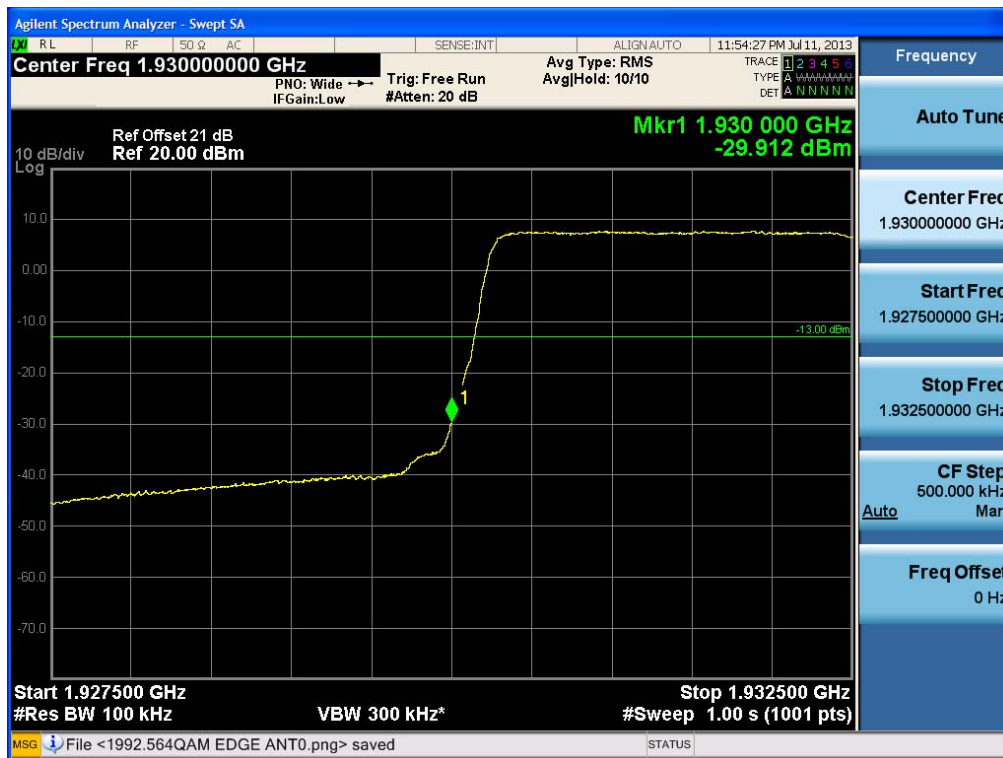


(1 GHz ~ 26.5 GHz)



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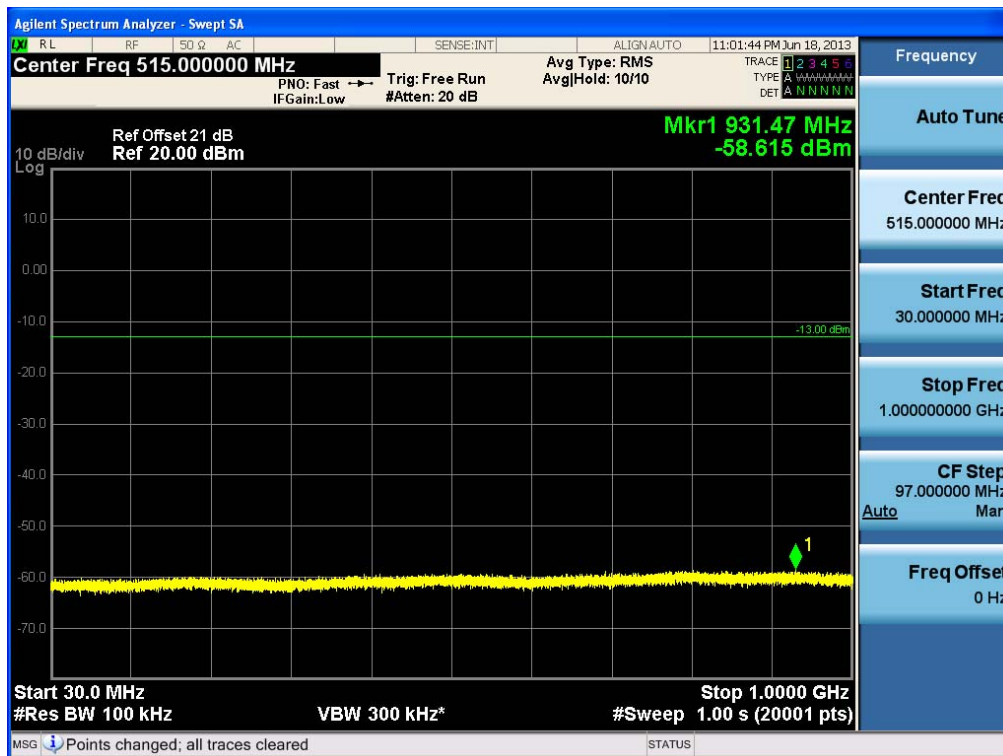
(Band Edge)



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

(30 MHz ~ 1 GHz)



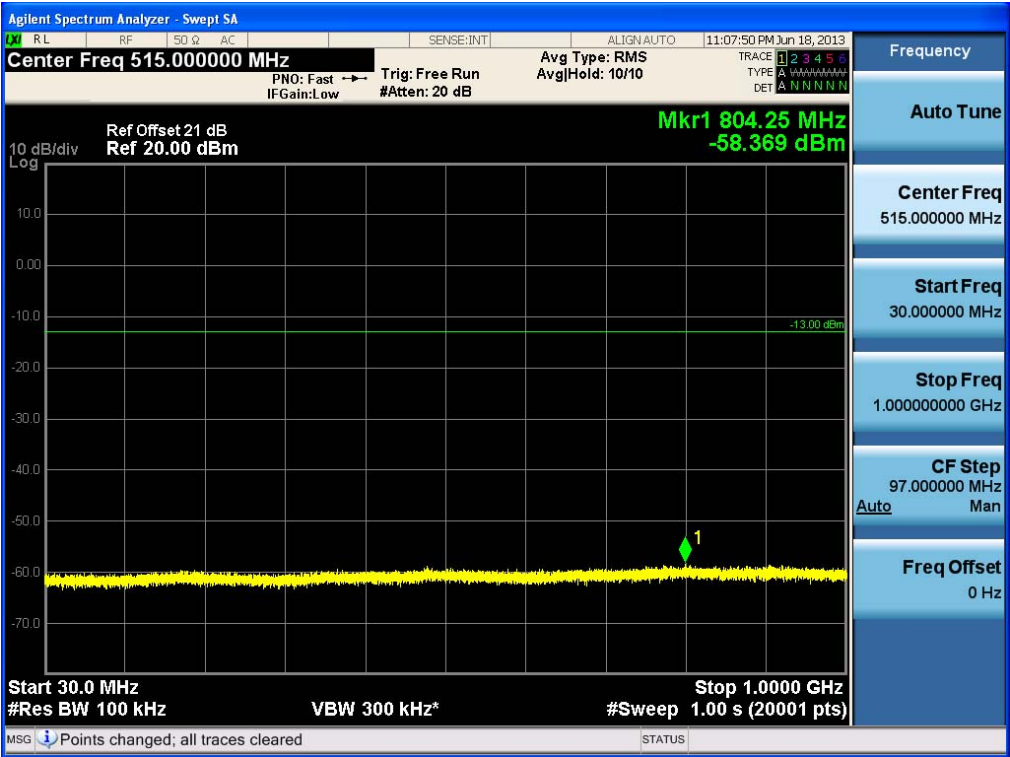
(1 GHz ~ 26.5 GHz)



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)



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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	296	02/20/2014
Schwarzbeck	VULB 9160 / TRILOG Antenna	3150	12/17/2014
REOHDE&SCHWARZ	FSV40/Spectrum Analyzer	1307.9002K40-100931-NK	06/11/2013
Wainwright	WHK3.3/18G-10EF/H.P.F	1	04/25/2014
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	09/11/2013
EMCO	6502/Loop Antenna	9009-2536	01/11/2014

8.3 Test Procedure

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

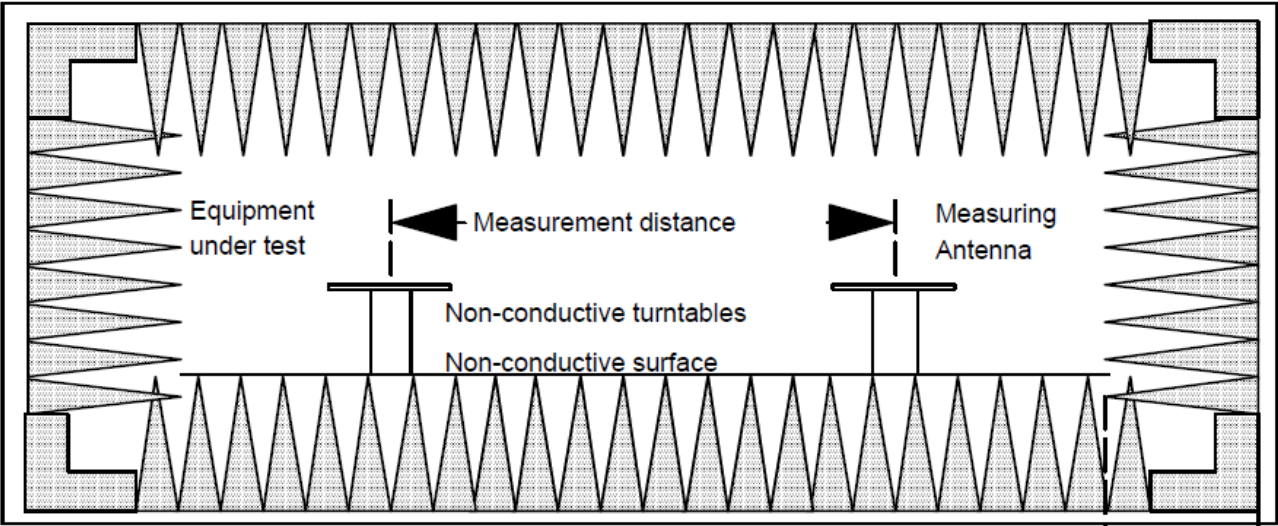
The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were connected to external antenna. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360° and the receiving antenna scans in order to determine the level of the maximized emission. The level and position of the maximized emission is recorded with the spectrum analyzer using a positive peak detector.

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.

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8.3.1 Radiated Spurious Emissions Test Setup



8.4 Test Result

: PASS

TX Freq.(MHz)	Freq.(MHz)	Measured Level(dBm)	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	Margin (dB)
1932.5	3,865.00	-49.72	12.44	-54.19	2.11	V	-43.86	30.86
	5,797.50	-44.00	13.41	-42.44	3.04	V	-32.07	19.07
	7,730.00	-56.41	11.77	-46.89	3.28	V	-38.40	25.40
1962.5	3,925.00	-47.87	12.48	-52.53	2.19	V	-42.24	29.24
	5,887.50	-46.27	13.35	-44.48	3.02	V	-34.15	21.15
	7,850.00	-58.57	11.64	-48.01	3.34	V	-39.71	26.71
1992.5	3,985.00	-49.14	12.55	-53.65	2.24	V	-43.34	30.34
	5,977.50	-47.87	13.33	-45.96	3.02	V	-35.65	22.65
	7,970.00	-57.78	11.42	-46.86	2.96	V	-38.40	25.40

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
DAE YOUNG ELECTRIC & TECHNOLOGY	DFSS60 / AC Power Source	1003030-1	04/16/2014
HEWLETT PACKARD	8394C / Fixed Attenuator	10342	05/06/2014
Korea Engineering	KR-1005L / Chamber	KRAB05063-3CH	11/07/2013

9.3 Test Procedure

Frequency Stability over Temperature variation:

The equipment under test was connected to an external AC Power Source 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 AC Power Source 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 499 999	-0.88619	0.0	0.0000
	0	1932 499 999	-0.87592	0.0	0.0000
	+10	1932 499 999	-0.77760	0.1	0.0001
	+30	1932 499 999	-0.93277	0.0	0.0000
	+40	1932 499 999	-0.99450	-0.1	-0.0001
	+50	1932 499 999	-0.90309	0.0	0.0000
115%	+20	1932 499 999	-0.88397	0.0	0.0000
85%	+20	1932 499 999	-0.92452	0.0	0.0000

Reference: 120 Vac 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 500 000	-0.16127	0.0	0.0000
	0	1962 500 000	-0.24412	-0.1	0.0000
	+10	1962 500 000	-0.27816	-0.1	-0.0001
	+30	1962 500 000	-0.46901	-0.3	-0.0002
	+40	1962 500 000	0.38330	0.5	0.0003
	+50	1962 500 000	-0.29799	-0.1	-0.0001
115%	+20	1962 500 000	-0.15395	0.0	0.0000
85%	+20	1962 500 000	-0.41392	-0.3	-0.0001

Reference: 120 Vac 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 499 998	-1.67420	0.0	0.0000
	0	1992 499 999	-1.35300	0.3	0.0002
	+10	1992 499 998	-1.59350	0.1	0.0000
	+30	1992 499 998	-1.58280	0.1	0.0000
	+40	1992 499 999	-1.47600	0.2	0.0001
	+50	1992 499 998	-1.54990	0.1	0.0001
115%	+20	1992 499 998	-1.61360	0.1	0.0000
85%	+20	1992 499 998	-1.85200	-0.2	-0.0001

Reference: 120 Vac at 20°C **Freq.** = 1992,500,000 MHz

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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

Port 0

Max Peak output Power at antenna input terminal	24.08	dBm
Max Peak output Power at antenna input terminal	255.9	mW
Prediction distance	100.000	cm
Prediction frequency	1962.5	MHz
Antenna Gain(typical)	2.5	dBi
Antenna Gain(numeric)	1.77828	–
Power density at prediction frequency (S)	0.003621	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm ²

Port 1

Max Peak output Power at antenna input terminal	23.98	dBm
Max Peak output Power at antenna input terminal	250.0	mW
Prediction distance	100.000	cm
Prediction frequency	1932.5	MHz
Antenna Gain(typical)	2.5	dBi
Antenna Gain(numeric)	1.77828	–
Power density at prediction frequency (S)	0.003538	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm ²

The power density level at 100 cm is 0.003621 mW/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at Port 0

The power density level at 100 cm is 0.003538 mW/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at Port 1

Simultaneous MPE at 100 cm is $(0.003621/1.0)+(0.003538/1.0) < 1$

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