

FCC LTE REPORT

FCC Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

November 03, 2015

Test Site/Location:

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Address:

129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Rep. of Korea

Report No.: HCT-R-1510-F043-1

HCT FRN: 0005866421

FCC ID:

A3LSMW2016

APPLICANT:

SAMSUNG Electronics Co., Ltd.

FCC Model(s):

SM-W2016

EUT Type:

Mobile Phone

FCC Classification:

Licensed Portable Transmitter Held to Ear (PCE)

FCC Rule Part(s):

§22.917, §2

CLOSE

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE - Band26 (1.4)	824.7 – 848.3	1M08G7D	QPSK	0.010	10.07
		1M08W7D	16QAM	0.008	9.27
LTE - Band26 (3)	825.5 – 847.5	2M69G7D	QPSK	0.011	10.54
		2M69W7D	16QAM	0.010	9.79
LTE - Band26 (5)	826.5 – 846.5	4M47G7D	QPSK	0.011	10.60
		4M47W7D	16QAM	0.010	9.91
LTE - Band26 (10)	829.0 – 844.0	8M93G7D	QPSK	0.011	10.36
		8M91W7D	16QAM	0.009	9.69
LTE - Band26 (15)	831.5 – 841.5	13M4G7D	QPSK	0.010	10.16
		13M4W7D	16QAM	0.009	9.38

OPEN

Mode (MHz)	Tx Frequency (MHz)	Modulation	ERP	
			Max. Power (W)	Max. Power (dBm)
LTE - Band26 (1.4)	824.7 – 848.3	QPSK	0.010	10.09
		16QAM	0.009	9.42
LTE - Band26 (3)	825.5 – 847.5	QPSK	0.011	10.46
		16QAM	0.009	9.71
LTE - Band26 (5)	826.5 – 846.5	QPSK	0.011	10.49
		16QAM	0.009	9.66
LTE - Band26 (10)	829.0 – 844.0	QPSK	0.010	10.06
		16QAM	0.008	9.28
LTE - Band26 (15)	831.5 – 841.5	QPSK	0.011	10.32
		16QAM	0.009	9.32

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C. 853(a)



Report prepared by
: Ki Hyun Kim
Test engineer of RF Team



Approved by
: Sang Jun Lee
Manager of RF Team

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Report Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1510-F043	October 26, 2015	- First Approval Report
HCT-R-1510-F043-1	November 03, 2015	- Revised the Calibration Due - Revised 10 MHz Tx Frequency range

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name: SAMSUNG Electronics Co., Ltd.

Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

FCC ID: A3LSMW2016

Application Type: Certification

FCC Classification: Licensed Portable Transmitter Held to Ear (PCE)

FCC Rule Part(s): §22.917, §2

EUT Type: Mobile Phone

FCC Model(s): SM-W2016

Tx Frequency: 824.7 MHz – 848.3 MHz (LTE – Band 26 (1.4 MHz))
825.5 MHz – 847.5 MHz (LTE – Band 26 (3 MHz))
826.5 MHz – 846.5 MHz (LTE – Band 26 (5 MHz))
829.0 MHz – 844.0 MHz (LTE – Band 26 (10 MHz))
831.5 MHz – 841.5 MHz (LTE – Band 26 (15 MHz))

Max. RF Output Power: **CLOSE**

Band 26 (1.4 MHz) :	0.010 W (QPSK) (10.07 dBm)
	0.008 W (16-QAM) (9.27 dBm)
Band 26 (3 MHz) :	0.011 W (QPSK) (10.54 dBm)
	0.010 W (16-QAM) (9.79 dBm)
Band 26 (5 MHz) :	0.011 W (QPSK) (10.60 dBm)
	0.010 W (16-QAM) (9.91 dBm)
Band 26 (10 MHz) :	0.011 W (QPSK) (10.36 dBm)
	0.009 W (16-QAM) (9.69 dBm)
Band 26 (15 MHz) :	0.010 W (QPSK) (10.16 dBm)
	0.009 W (16-QAM) (9.38 dBm)

OPEN

Band 26 (1.4 MHz) :	0.010 W (QPSK) (10.09 dBm)
	0.009 W (16-QAM) (9.42 dBm)
Band 26 (3 MHz) :	0.011 W (QPSK) (10.46 dBm)
	0.009 W (16-QAM) (9.71 dBm)
Band 26 (5 MHz) :	0.011 W (QPSK) (10.49 dBm)
	0.009 W (16-QAM) (9.66 dBm)
Band 26 (10 MHz) :	0.010 W (QPSK) (10.06 dBm)
	0.008 W (16-QAM) (9.28 dBm)
Band 26 (15 MHz) :	0.011 W (QPSK) (10.32 dBm)
	0.009 W (16-QAM) (9.32 dBm)

Emission Designator(s): Band 26 (1.4 MHz) : 1M08G7D (QPSK) / 1M08W7D (16-QAM)
Band 26 (3 MHz) : 2M69G7D (QPSK) / 2M69W7D (16-QAM)
Band 26 (5 MHz) : 4M47G7D (QPSK) / 4M47W7D (16-QAM)
Band 26 (10 MHz) : 8M93G7D (QPSK) / 8M91W7D (16-QAM)
Band 26 (15 MHz) : 13M4G7D (QPSK) / 13M4W7D (16-QAM)

Date(s) of Tests: September 01, 2015 ~ October 26, 2015

Antenna Specification Manufacturer: SAMSUNG ELECTRONICS
Antenna type: Internal Antenna
Peak Gain: Band 26 : -3.91 dBi

2. INTRODUCTION

2.1. EUT DESCRIPTION

The SAMSUNG Electronics Co., Ltd. SM-W2016 Mobile Phone consists of LTE 26.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.**

3. DESCRIPTION OF TESTS

3.1 ERP RADIATED POWER AND RADIATED SPURIOUS EMISSIONS

Note: ERP(Effective Radiated Power)

Test Procedure

Radiated emission measurements are performed in the Fully-anechoic chamber. The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-D-2010 Clause 2.2.17. The turntable is rotated through 360 degrees, 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 RMS detector.

A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The power is calculated by the following formula;

$$P_{d(dBm)} = P_{g(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dB)}$$

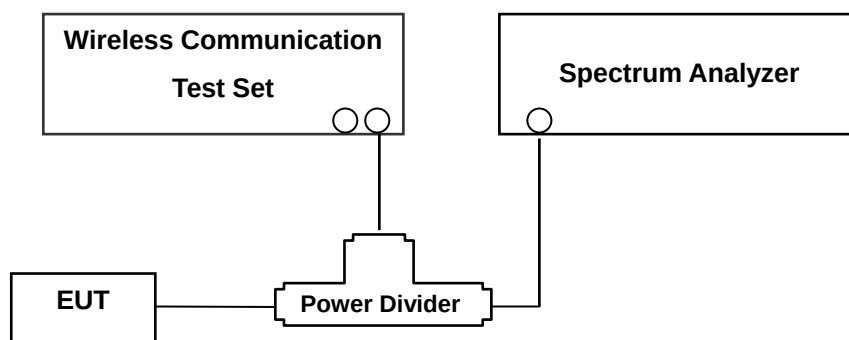
Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

Radiated spurious emissions

1. Frequency Range : 30 MHz ~ 10th Harmonics of highest channel fundamental frequency.

3.2 OCCUPIED BANDWIDTH.

Test set-up



(Configuration of conducted Emission measurement)

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

Test Procedure

OBW is tested in accordance with KDB971168 D01 Power Meas License Digital Systems v02r02, October 17, 2014, Section 4.2.

The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels(low, middle and high operational range.)

The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

Test Procedure

Spurious and harmonic emissions at antenna terminal is tested in accordance with KDB971168 D01 Power Meas License Digital Systems v02r02, October 17, 2014, Section 6.0.

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

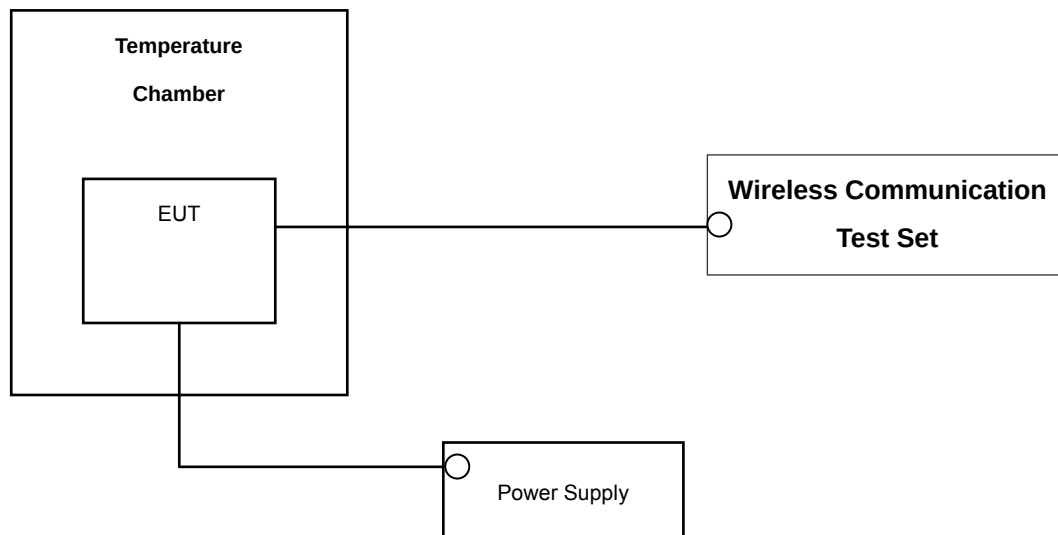
The minimum permissible attenuation level of any spurious emission is $43 + 10\text{Log}_{10}(P_{[\text{Watts}]})$, where P is the transmitter power in Watts.

NOTES: The analyzer plot offsets were determined by below conditions.

- For LTE Band 26, total offset 26.1 dBm = 20 dBm attenuator + 6 dBm Divider + 0.1 dBm RF cables.

3.4 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



* Nominal Operating Voltage

Test Procedure

Frequency stability is tested in accordance with ANSI/TIA-603-D-2010 section 2.2.2

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from the end point to 100 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification — the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

1. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

NOTE: The EUT is tested down to the battery endpoint.

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
Agilent	N1921A/ Power Sensor	MY45241059	Annual	07/09/2016
Agilent	N1911A/ Power Meter	MY45100523	Annual	07/09/2016
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	Annual	09/03/2016
Wainwright	WHK1.2/15G-10EF/H.P.F	4	Annual	04/27/2016
Wainwright	WHK3.3/18G-10EF/H.P.F	2	Annual	04/27/2016
Hewlett Packard	11667B / Power Splitter	10545	Annual	02/16/2016
Hewlett Packard	11667B / Power Splitter	11275	Annual	04/29/2016
ITECT	IT6720/ Power Supply	010002156267001199	Annual	11/04/2015
Schwarzbeck	UHAP/ Dipole Antenna	557	Biennial	03/23/2017
Schwarzbeck	UHAP/ Dipole Antenna	558	Biennial	03/23/2017
EXP	EX-TH400/ Chamber	None	Annual	05/29/2016
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	09/01/2016
Schwarzbeck	BBHA 9120D/ Horn Antenna	1299	Biennial	05/15/2017
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	Biennial	04/30/2017
Schwarzbeck	BBHA 9170/ Horn Antenna(15~35GHz)	BBHA9170124	Biennial	04/30/2017
Agilent	N9020A/ Signal Analyzer	MY47380318	Annual	09/07/2016
WEINSCHTEL	ATTENUATOR	BR0592	Annual	10/21/2016
REOHDE&SCHWARZ	FSV40/Spectrum Analyzer	1307.9002K40-100931-NK	Annual	06/04/2016
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201274518	Annual	11/21/2015

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 22.917(a)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	$< 43 + 10\log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS
2.1046	*Conducted Output Power	N/A		PASS
2.1055, 22.355	Frequency stability / variation of ambient temperature	$< 2.5 \text{ ppm}$		PASS
22.913(a)(2)	Effective Radiated Power	$< 7 \text{ Watts}$	RADIATED	PASS
2.1053, 22.917(a)	Undesirable Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of band emissions		PASS

*See SAR Report

6. SAMPLE CALCULATION

A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured Level(dBm)	Substitute LEVEL(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
LTE Band26	26865	831.5	-33.04	28.94	-10.56	0.89	V	0.056	17.49

ERP = Substitute LEVEL (dBm) + Ant. Gain – CL(Cable Loss)

- 1) The EUT mounted on a wooden tripod is 2.5 meter above test site ground level.
- 2) During the test , the turn table is rotated and the antenna height is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (ERP).

B. Emission Designator

QPSK Modulation

5MHz Bandwidth

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

10MHz Bandwidth

Emission Designator = 8M95G7D

LTE BW = 8.95 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

16QAM Modulation

5MHz Bandwidth

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = main carrier modulated in a combination of two or more of the following modes;
amplitude, angle, pulse

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

10MHz Bandwidth

Emission Designator = 8M95W7D

LTE BW = 8.95 MHz

W = main carrier modulated in a combination of two or more of the following modes;
amplitude, angle, pulse

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

7. TEST DATA

7.1 EFFECTIVE RADIATED POWER (Band 26)-CLOSE

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
824.7	1.4 MHz	QPSK	-40.28	21.54	-10.59	0.88	V	0.010	10.07
		16-QAM	-41.08	20.74	-10.59	0.88	V	0.008	9.27
836.5		QPSK	-41.99	20.04	-10.58	0.88	V	0.007	8.58
		16-QAM	-42.73	19.30	-10.58	0.88	V	0.006	7.84
848.3		QPSK	-41.20	19.76	-10.49	0.89	V	0.007	8.38
		16-QAM	-41.94	19.02	-10.49	0.89	V	0.006	7.64

Effective Radiated Power Data (1.4 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
825.5	3 MHz	QPSK	-39.99	22.01	-10.59	0.88	V	0.011	10.54
		16-QAM	-40.74	21.26	-10.59	0.88	V	0.010	9.79
836.5		QPSK	-42.01	20.02	-10.58	0.88	V	0.007	8.56
		16-QAM	-42.74	19.29	-10.58	0.88	V	0.006	7.83
847.5		QPSK	-40.30	21.04	-10.49	0.89	V	0.009	9.66
		16-QAM	-41.02	20.32	-10.49	0.89	V	0.008	8.94

Effective Radiated Power Data (3 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
826.5	5 MHz	QPSK	-40.06	21.93	-10.58	0.88	V	0.011	10.47
		16-QAM	-40.81	21.18	-10.58	0.88	V	0.009	9.72
836.5		QPSK	-42.06	19.97	-10.58	0.88	V	0.007	8.51
		16-QAM	-42.78	19.25	-10.58	0.88	V	0.006	7.79
846.5		QPSK	-39.32	22.00	-10.51	0.89	V	0.011	10.60
		16-QAM	-40.01	21.31	-10.51	0.89	V	0.010	9.91

Effective Radiated Power Data (5 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
829.0	10 MHz	QPSK	-39.97	21.80	-10.61	0.87	V	0.011	10.32
		16-QAM	-40.60	21.17	-10.61	0.87	V	0.009	9.69
836.5		QPSK	-41.89	20.14	-10.58	0.88	V	0.007	8.68
		16-QAM	-42.58	19.45	-10.58	0.88	V	0.006	7.99
844.0		QPSK	-39.63	21.76	-10.51	0.89	V	0.011	10.36
		16-QAM	-40.38	21.01	-10.51	0.89	V	0.009	9.61

Effective Radiated Power Data (10 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
831.5	15 MHz	QPSK	-40.33	21.60	-10.56	0.88	V	0.010	10.16
		16-QAM	-41.11	20.82	-10.56	0.88	V	0.009	9.38
836.5		QPSK	-41.32	20.71	-10.58	0.88	V	0.008	9.25
		16-QAM	-41.99	20.04	-10.58	0.88	V	0.007	8.58
841.5		QPSK	-41.02	20.36	-10.51	0.89	V	0.008	8.96
		16-QAM	-41.12	20.26	-10.51	0.89	V	0.008	8.86

Effective Radiated Power Data (15 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

NOTES:

Effective Radiated Power Output Measurements by Substitution Method

according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:

The EUT was placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For LTE signals, RBW = 1-5% of the OBW, not to exceed 1MHz, VBW $\geq 3 \times$ RBW, Detector = RMS. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUT is y plane in LTE mode. Also worst case of detecting Antenna is vertical polarization in LTE mode.

7.2 EFFECTIVE RADIATED POWER (Band 26)-OPEN

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
824.7	1.4 MHz	QPSK	-40.26	21.56	-10.59	0.88	H	0.010	10.09
		16-QAM	-40.93	20.89	-10.59	0.88	H	0.009	9.42
836.5		QPSK	-42.02	20.01	-10.58	0.88	H	0.007	8.55
		16-QAM	-42.90	19.13	-10.58	0.88	H	0.006	7.67
848.3		QPSK	-42.65	18.31	-10.49	0.89	H	0.005	6.93
		16-QAM	-42.80	18.16	-10.49	0.89	H	0.005	6.78

Effective Radiated Power Data (1.4 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
825.5	3 MHz	QPSK	-40.07	21.93	-10.59	0.88	H	0.011	10.46
		16-QAM	-40.82	21.18	-10.59	0.88	H	0.009	9.71
836.5		QPSK	-41.87	20.16	-10.58	0.88	H	0.007	8.70
		16-QAM	-42.88	19.15	-10.58	0.88	H	0.006	7.69
847.5		QPSK	-41.88	19.46	-10.49	0.89	H	0.006	8.08
		16-QAM	-42.51	18.83	-10.49	0.89	H	0.006	7.45

Effective Radiated Power Data (3 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
826.5	5 MHz	QPSK	-40.04	21.95	-10.58	0.88	H	0.011	10.49
		16-QAM	-40.87	21.12	-10.58	0.88	H	0.009	9.66
836.5		QPSK	-41.98	20.05	-10.58	0.88	H	0.007	8.59
		16-QAM	-42.81	19.22	-10.58	0.88	H	0.006	7.76
846.5		QPSK	-41.31	20.01	-10.51	0.89	H	0.007	8.61
		16-QAM	-42.17	19.15	-10.51	0.89	H	0.006	7.75

Effective Radiated Power Data (5 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
829.0	10 MHz	QPSK	-40.23	21.54	-10.61	0.87	H	0.010	10.06
		16-QAM	-41.01	20.76	-10.61	0.87	H	0.008	9.28
836.5		QPSK	-41.25	20.78	-10.58	0.88	H	0.009	9.32
		16-QAM	-42.01	20.02	-10.58	0.88	H	0.007	8.56
844.0		QPSK	-41.20	20.19	-10.51	0.89	H	0.008	8.79
		16-QAM	-42.20	19.19	-10.51	0.89	H	0.006	7.79

Effective Radiated Power Data (10 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
								W	dBm
831.5	15 MHz	QPSK	-40.36	21.57	-10.56	0.88	H	0.010	10.13
		16-QAM	-41.32	20.61	-10.56	0.88	H	0.008	9.17
836.5		QPSK	-40.25	21.78	-10.58	0.88	H	0.011	10.32
		16-QAM	-41.25	20.78	-10.58	0.88	H	0.009	9.32
841.5		QPSK	-41.36	20.02	-10.51	0.89	H	0.007	8.62
		16-QAM	-42.36	19.02	-10.51	0.89	H	0.006	7.62

Effective Radiated Power Data (15 MHz Band 26 LTE)

Note: All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case

NOTES:

Effective Radiated Power Output Measurements by Substitution Method

according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:

The EUT was placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For LTE signals, RBW = 1-5% of the OBW, not to exceed 1MHz, VBW $\geq 3 \times$ RBW, Detector = RMS. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUT is z plane in LTE mode. Also worst case of detecting Antenna is horizontal polarization in LTE mode.

7.3 RADIATED SPURIOUS EMISSIONS-CLOSE

7.3.1 RADIATED SPURIOUS EMISSIONS (1.4 MHz Band 26 LTE)

- OPERATING FREQUENCY: 824.70 MHz
- MEASURED OUTPUT POWER: 10.07 dBm = 0.010 W
- MODULATION SIGNAL: 1.4 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.07 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26797 (824.7)	1,649.40	-35.07	9.71	-43.11	1.29	H	-34.69	44.76
	2,474.10	-38.15	10.54	-43.16	1.61	H	-34.23	44.30
	3,298.80	-53.70	12.24	-58.78	1.85	H	-48.39	58.46
26915 (836.5)	1,673.00	-39.47	9.77	-47.65	1.28	H	-39.16	49.23
	2,509.50	-42.23	10.65	-47.21	1.61	H	-38.17	48.24
	3,346.00	-52.20	12.41	-57.69	1.86	H	-47.14	57.21
27033 (848.3)	1,696.60	-36.18	9.84	-44.39	1.30	H	-35.86	45.93
	2,544.90	-46.73	10.72	-51.62	1.63	H	-42.53	52.60
	3,393.20	-52.85	12.40	-58.08	1.84	H	-47.52	57.59

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.3.2 RADIATED SPURIOUS EMISSIONS (3 MHz Band 26 LTE)

- OPERATING FREQUENCY: 825.50 MHz
- MEASURED OUTPUT POWER: 10.54 dBm = 0.011 W
- MODULATION SIGNAL: 3 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.54 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26805 (825.5)	1,651.00	-35.56	9.71	-43.60	1.29	H	-35.18	45.72
	2,476.50	-38.79	10.54	-43.80	1.61	H	-34.87	45.41
	3,302.00	-56.21	12.24	-61.29	1.85	H	-50.90	61.44
26915 (836.5)	1,673.00	-40.19	9.77	-48.37	1.28	H	-39.88	50.42
	2,509.50	-43.84	10.65	-48.82	1.61	H	-39.78	50.32
	3,346.00	-54.27	12.41	-59.76	1.86	H	-49.21	59.75
27025 (847.5)	1,695.00	-35.79	9.84	-44.01	1.30	H	-35.47	46.01
	2,542.50	-44.12	10.71	-48.94	1.63	H	-39.86	50.40
	3,390.00	-56.94	12.40	-62.17	1.84	H	-51.61	62.15

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.3.3 RADIATED SPURIOUS EMISSIONS (5 MHz Band 26 LTE)

- OPERATING FREQUENCY: 846.50 MHz
- MEASURED OUTPUT POWER: 10.60 dBm = 0.011 W
- MODULATION SIGNAL: 5 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.60 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26815 (826.5)	1,653.00	-35.29	9.71	-43.33	1.29	H	-34.91	45.51
	2,479.50	-39.18	10.54	-44.19	1.61	H	-35.26	45.86
	3,306.00	-56.19	12.26	-61.38	1.85	H	-50.97	61.57
26915 (836.5)	1,673.00	-39.40	9.77	-47.58	1.28	H	-39.09	49.69
	2,509.50	-43.56	10.65	-48.54	1.61	H	-39.50	50.10
	3,346.00	-53.64	12.41	-59.13	1.86	H	-48.58	59.18
27015 (846.5)	1,693.00	-35.54	9.82	-43.81	1.30	H	-35.29	45.89
	2,539.50	-43.27	10.71	-48.09	1.63	H	-39.01	49.61
	3,386.00	-55.68	12.40	-61.10	1.85	H	-50.55	61.15

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.3.4 RADIATED SPURIOUS EMISSIONS (10 MHz Band 26 LTE)

- OPERATING FREQUENCY: 844.00 MHz
- MEASURED OUTPUT POWER: 10.36 dBm = 0.011 W
- MODULATION SIGNAL: 10 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.36 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26840 (829.0)	1,658.00	-35.39	9.71	-43.43	1.29	H	-35.01	45.37
	2,487.00	-39.59	10.54	-44.77	1.60	H	-35.83	46.19
	3,316.00	-58.72	12.21	-63.80	1.84	H	-53.43	63.79
26915 (836.5)	1,673.00	-36.94	9.77	-45.12	1.28	H	-36.63	46.99
	2,509.50	-44.13	10.65	-49.11	1.61	H	-40.07	50.43
	3,346.00	-55.12	12.41	-60.61	1.86	H	-50.06	60.42
26990 (844.0)	1,688.00	-44.01	9.82	-52.28	1.30	H	-43.76	54.12
	2,532.00	-40.32	10.69	-45.08	1.62	H	-36.01	46.37
	3,376.00	-55.16	12.41	-60.66	1.85	H	-50.10	60.46

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.3.5 RADIATED SPURIOUS EMISSIONS (15 MHz Band 26 LTE)

- OPERATING FREQUENCY: 831.50 MHz
- MEASURED OUTPUT POWER: 10.16 dBm = 0.010 W
- MODULATION SIGNAL: 15 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.16 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26865 (831.5)	1,663.00	-34.66	9.74	-42.74	1.28	H	-34.28	44.44
	2,494.50	-39.63	10.59	-44.74	1.61	H	-35.77	45.93
	3,326.00	-55.27	12.34	-60.67	1.89	H	-50.23	60.39
26915 (836.5)	1,673.00	-38.69	9.77	-46.87	1.28	H	-38.38	48.54
	2,509.50	-43.75	10.65	-48.73	1.61	H	-39.69	49.85
	3,346.00	-54.61	12.41	-60.10	1.86	H	-49.55	59.71
26965 (841.5)	1,683.00	-39.39	9.79	-47.51	1.29	H	-39.01	49.17
	2,524.50	-44.91	10.68	-49.89	1.61	H	-40.82	50.98
	3,366.00	-50.89	12.41	-56.34	1.84	H	-45.77	55.93

NOTES: 1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method

according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:

2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.4 RADIATED SPURIOUS EMISSIONS-OPEN

7.4.1 RADIATED SPURIOUS EMISSIONS (1.4 MHz Band 26 LTE)

- OPERATING FREQUENCY: 824.70 MHz
- MEASURED OUTPUT POWER: 10.09 dBm = 0.010 W
- MODULATION SIGNAL: 1.4 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.09 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26797 (824.7)	1,649.40	-34.18	9.71	-42.22	1.29	H	-33.80	43.89
	2,474.10	-31.46	10.54	-36.47	1.61	H	-27.54	37.63
	3,298.80	-53.35	12.24	-58.43	1.85	H	-48.04	58.13
26915 (836.5)	1,673.00	-36.07	9.77	-44.25	1.28	H	-35.76	45.85
	2,509.50	-31.79	10.65	-36.77	1.61	H	-27.73	37.82
	3,346.00	-52.67	12.41	-58.16	1.86	H	-47.61	57.70
27033 (848.3)	1,696.60	-34.95	9.84	-43.16	1.30	H	-34.63	44.72
	2,544.90	-36.60	10.72	-41.49	1.63	H	-32.40	42.49
	3,393.20	-54.02	12.40	-59.25	1.84	H	-48.69	58.78

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.4.2 RADIATED SPURIOUS EMISSIONS (3 MHz Band 26 LTE)

- OPERATING FREQUENCY: 825.50 MHz
- MEASURED OUTPUT POWER: 10.46 dBm = 0.011 W
- MODULATION SIGNAL: 3 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.46 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26805 (825.5)	1,651.00	-33.76	9.71	-41.80	1.29	H	-33.38	43.84
	2,476.50	-30.34	10.54	-35.35	1.61	H	-26.42	36.88
	3,302.00	-54.83	12.24	-59.91	1.85	H	-49.52	59.98
26915 (836.5)	1,673.00	-34.94	9.77	-43.12	1.28	H	-34.63	45.09
	2,509.50	-36.37	10.65	-41.35	1.61	H	-32.31	42.77
	3,346.00	-54.32	12.41	-59.81	1.86	H	-49.26	59.72
27025 (847.5)	1,695.00	-34.09	9.84	-42.31	1.30	H	-33.77	44.23
	2,542.50	-37.95	10.71	-42.77	1.63	H	-33.69	44.15
	3,390.00	-55.14	12.40	-60.37	1.84	H	-49.81	60.27

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.4.3 RADIATED SPURIOUS EMISSIONS (5 MHz Band 26 LTE)

- OPERATING FREQUENCY: 826.50 MHz
- MEASURED OUTPUT POWER: 10.49 dBm = 0.011 W
- MODULATION SIGNAL: 5 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.49 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26815 (826.5)	1,653.00	-33.77	9.71	-41.81	1.29	H	-33.39	43.88
	2,479.50	-30.38	10.54	-35.39	1.61	H	-26.46	36.95
	3,306.00	-53.24	12.26	-58.43	1.85	H	-48.02	58.51
26915 (836.5)	1,673.00	-34.94	9.77	-43.12	1.28	H	-34.63	45.12
	2,509.50	-36.38	10.65	-41.36	1.61	H	-32.32	42.81
	3,346.00	-53.36	12.41	-58.85	1.86	H	-48.30	58.79
27015 (846.5)	1,693.00	-34.13	9.82	-42.40	1.30	H	-33.88	44.37
	2,539.50	-36.09	10.71	-40.91	1.63	H	-31.83	42.32
	3,386.00	-58.36	12.40	-63.78	1.85	H	-53.23	63.72

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.4.4 RADIATED SPURIOUS EMISSIONS (10 MHz Band 26 LTE)

- OPERATING FREQUENCY: 829.00 MHz
- MEASURED OUTPUT POWER: 10.06 dBm = 0.010 W
- MODULATION SIGNAL: 10 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.06 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26840 (829.0)	1,658.00	-33.53	9.71	-41.57	1.29	H	-33.15	43.21
	2,487.00	-32.84	10.54	-38.02	1.60	H	-29.08	39.14
	3,316.00	-53.92	12.21	-59.00	1.84	H	-48.63	58.69
26915 (836.5)	1,673.00	-34.13	9.77	-42.31	1.28	H	-33.82	43.88
	2,509.50	-37.74	10.65	-42.72	1.61	H	-33.68	43.74
	3,346.00	-55.44	12.41	-60.93	1.86	H	-50.38	60.44
26990 (844.0)	1,688.00	-38.87	9.82	-47.14	1.30	H	-38.62	48.68
	2,532.00	-38.39	10.69	-43.15	1.62	H	-34.08	44.14
	3,376.00	-54.24	12.41	-59.74	1.85	H	-49.18	59.24

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.4.5 RADIATED SPURIOUS EMISSIONS (15 MHz Band 26 LTE)

- OPERATING FREQUENCY: 836.50 MHz
- MEASURED OUTPUT POWER: 10.32 dBm = 0.011 W
- MODULATION SIGNAL: 15 MHz QPSK
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10}(W) =$ 23.32 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
26865 (831.5)	1,663.00	-33.11	9.74	-41.19	1.28	H	-32.73	43.05
	2,494.50	-32.66	10.59	-37.77	1.61	H	-28.80	39.12
	3,326.00	-54.70	12.34	-60.10	1.89	H	-49.66	59.98
26915 (836.5)	1,673.00	-32.30	9.77	-40.48	1.28	H	-31.99	42.31
	2,509.50	-35.84	10.65	-40.82	1.61	H	-31.78	42.10
	3,346.00	-59.41	12.41	-64.90	1.86	H	-54.35	64.67
26965 (841.5)	1,683.00	-34.54	9.79	-42.66	1.29	H	-34.16	44.48
	2,524.50	-37.46	10.68	-42.44	1.61	H	-33.37	43.69
	3,366.00	-54.11	12.41	-59.56	1.84	H	-48.99	59.31

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-D-2010 June 24, 2010:
 2. We are performed all frequency to 10th harmonics from 30 MHz. Measurements above show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. All of RB size has been tested for emissions and ERP, with the 1RB configuration observed as the worst case
 5. We are performed 16QAM and QPSK modulations. The worst case data are reported in the table above.

7.5 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Band 26	1.4 MHz	836.5	QPSK	6	0	1.0818
			16-QAM	6	0	1.0804
	3 MHz	836.5	QPSK	15	0	2.6876
			16-QAM	15	0	2.6905
	5 MHz	836.5	QPSK	25	0	4.4687
			16-QAM	25	0	4.4713
	10 MHz	836.5	QPSK	50	0	8.9339
			16-QAM	50	0	8.9139
	15 MHz	836.5	QPSK	75	0	13.4340
			16-QAM	75	0	13.3990

- Plots of the EUT's Occupied Bandwidth are shown Page 436~ 43.

7.6 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Frequency of Maximum Harmonic (GHz)	Maximum Data [dBm]
Band 26	1.4	824.7	QPSK	1	0	3.0083	-31.660
		836.5				3.0277	-32.368
		848.3				2.8274	-31.970
	3	825.5				3.2494	-32.290
		836.5				9.4289	-32.612
		847.5				2.7414	-32.500
	5	826.5				2.7006	-32.490
		836.5				9.3054	-32.780
		846.5				2.7300	-32.070
	10	829.0				2.8398	-31.620
		836.5				3.1540	-31.430
		844.0				2.6798	-31.400
	15	831.5				9.9515	-32.59
		836.5				9.3849	-32.020
		841.5				9.3699	-32.355

- Plots of the EUT's Conducted Spurious Emissions are shown Page 59 ~ 73.

7.6.1 BAND EDGE

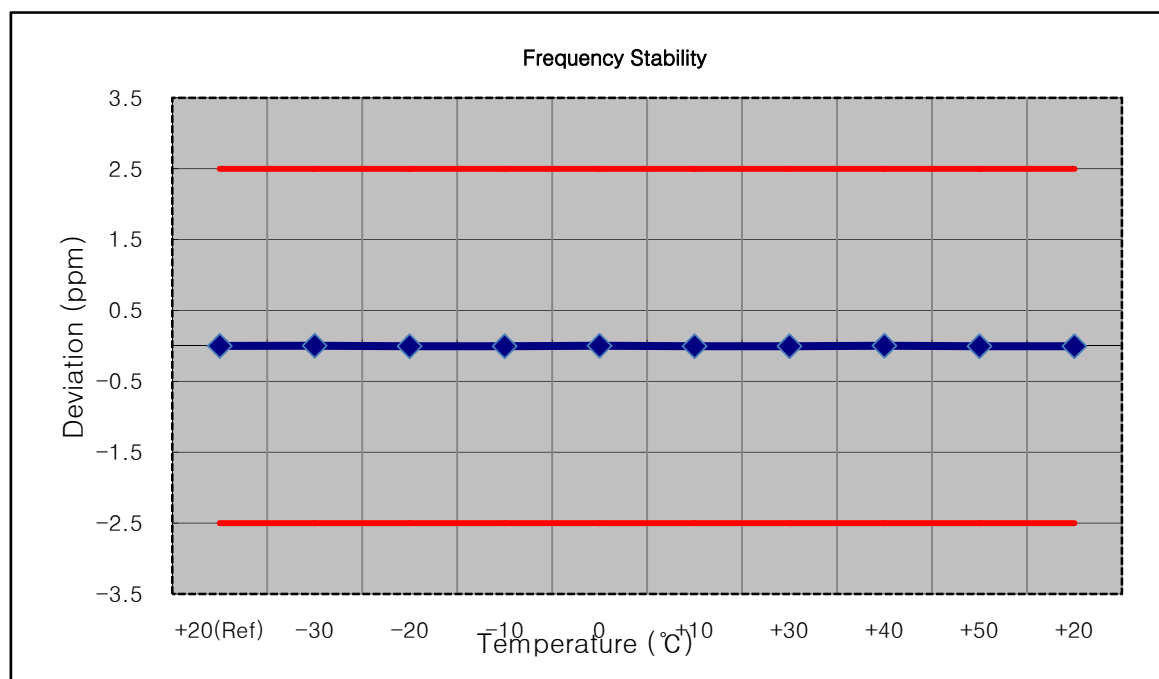
- Plots of the EUT's Band Edge are shown Page 44 ~ 58.

7.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.7.1 FREQUENCY STABILITY (1.4 MHz Band 26 LTE)

- OPERATING FREQUENCY: 836,500,000 Hz
- CHANNEL: 26915(1.4 MHz)
- REFERENCE VOLTAGE: 3.85 VDC
- DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

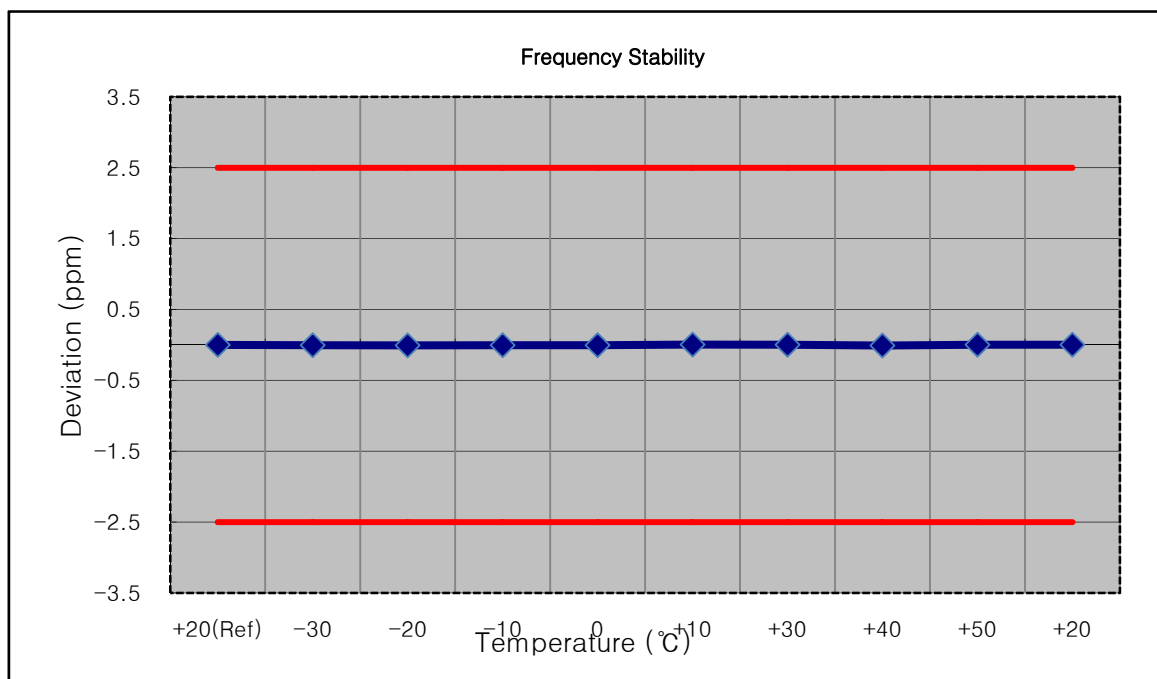
Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.85	+20(Ref)	836 499 955	0.0	0.000 000	0.000
100%		-30	836 499 957	2.5	0.000 000	0.003
100%		-20	836 499 953	-2.4	0.000 000	-0.003
100%		-10	836 499 951	-3.8	0.000 000	-0.005
100%		0	836 499 957	2.2	0.000 000	0.003
100%		+10	836 499 952	-3.4	0.000 000	-0.004
100%		+30	836 499 951	-4.0	0.000 000	-0.005
100%		+40	836 499 957	2.2	0.000 000	0.003
100%		+50	836 499 952	-3.1	0.000 000	-0.004
Batt. Endpoint	3.27	+20	836 499 952	-2.9	0.000 000	-0.003



7.7.2 FREQUENCY STABILITY (3 MHz Band 26 LTE)

- OPERATING FREQUENCY: 836,500,000 Hz
- CHANNEL: 26915(3 MHz)
- REFERENCE VOLTAGE: 3.85 VDC
- DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

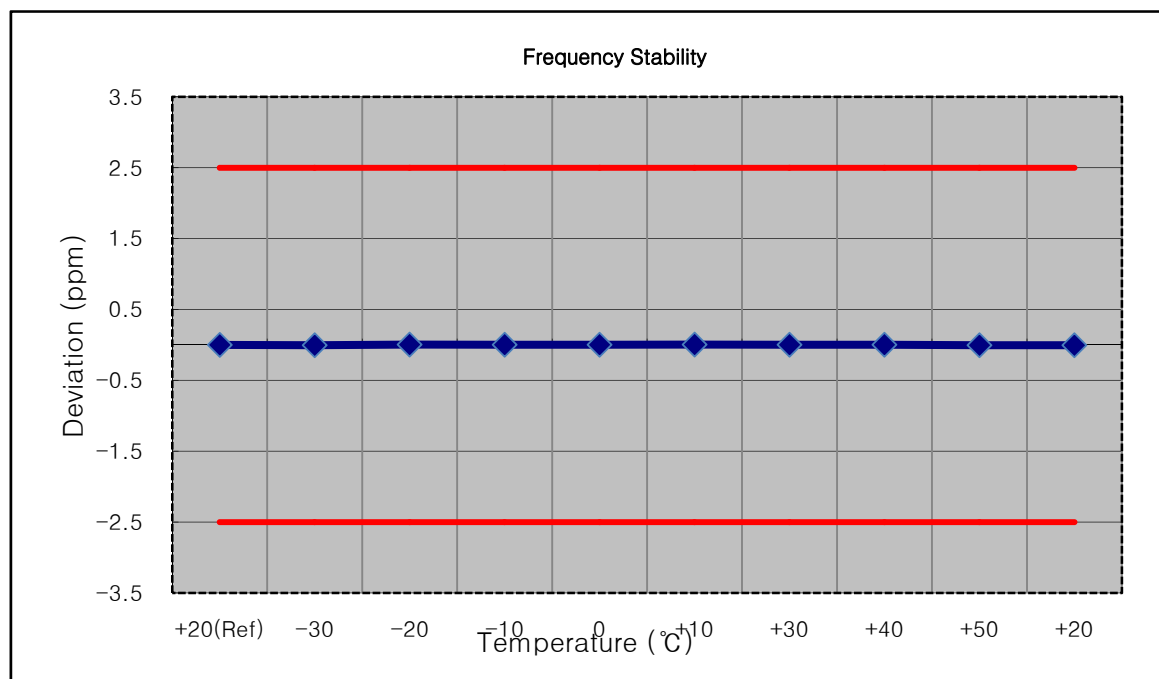
Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.85	+20(Ref)	836 499 996	0.0	0.000 000	0.000
100%		-30	836 499 993	-3.1	0.000 000	-0.004
100%		-20	836 499 992	-4.3	-0.000 001	-0.005
100%		-10	836 499 994	-2.6	0.000 000	-0.003
100%		0	836 499 994	-2.9	0.000 000	-0.003
100%		+10	836 500 000	3.7	0.000 000	0.004
100%		+30	836 499 999	2.9	0.000 000	0.003
100%		+40	836 499 990	-6.0	-0.000 001	-0.007
100%		+50	836 499 999	2.5	0.000 000	0.003
Batt. Endpoint	3.27	+20	836 499 999	2.8	0.000 000	0.003



7.7.3 FREQUENCY STABILITY (5 MHz Band 26 LTE)

- OPERATING FREQUENCY: 836,500,000 Hz
- CHANNEL: 26915(5 MHz)
- REFERENCE VOLTAGE: 3.85 VDC
- DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

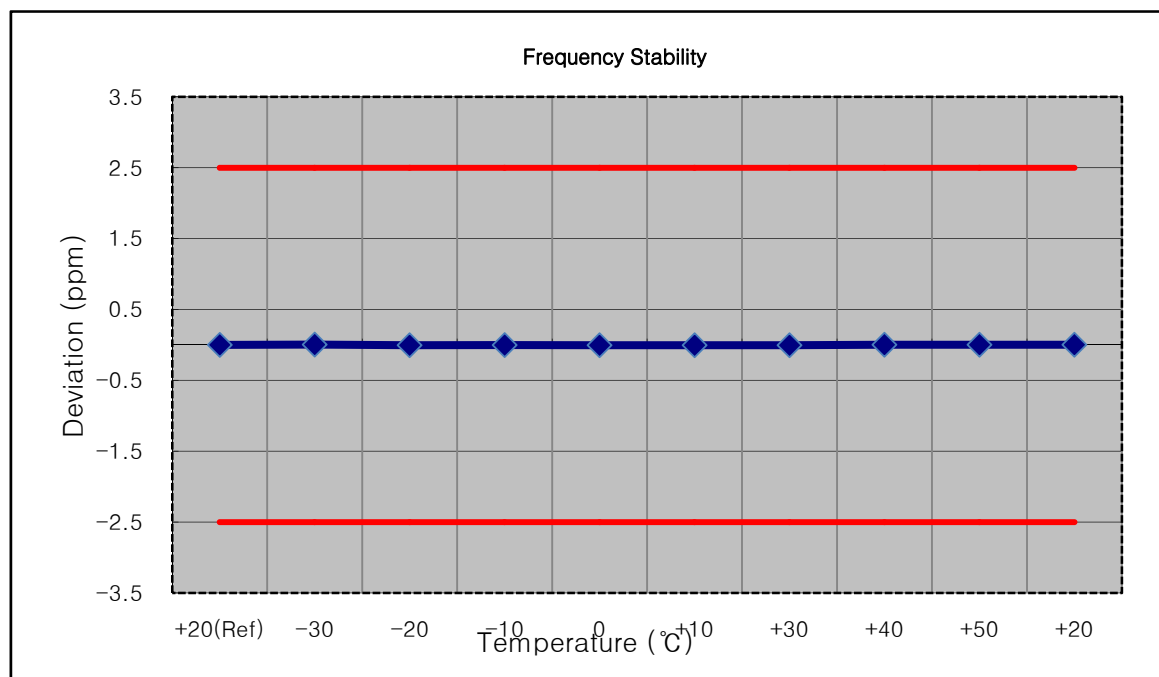
Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.85	+20(Ref)	836 500 003	0.0	0.000 000	0.000
100%		-30	836 500 001	-2.5	0.000 000	-0.003
100%		-20	836 500 007	4.1	0.000 000	0.005
100%		-10	836 500 005	1.6	0.000 000	0.002
100%		0	836 500 005	2.3	0.000 000	0.003
100%		+10	836 500 007	3.5	0.000 000	0.004
100%		+30	836 500 006	2.7	0.000 000	0.003
100%		+40	836 500 006	2.6	0.000 000	0.003
100%		+50	836 500 000	-3.1	0.000 000	-0.004
Batt. Endpoint	3.27	+20	836 499 999	-3.9	0.000 000	-0.005



7.7.4 FREQUENCY STABILITY (10 MHz Band 26 LTE)

- OPERATING FREQUENCY: 836,500,000 Hz
- CHANNEL: 26915(10 MHz)
- REFERENCE VOLTAGE: 3.85 VDC
- DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

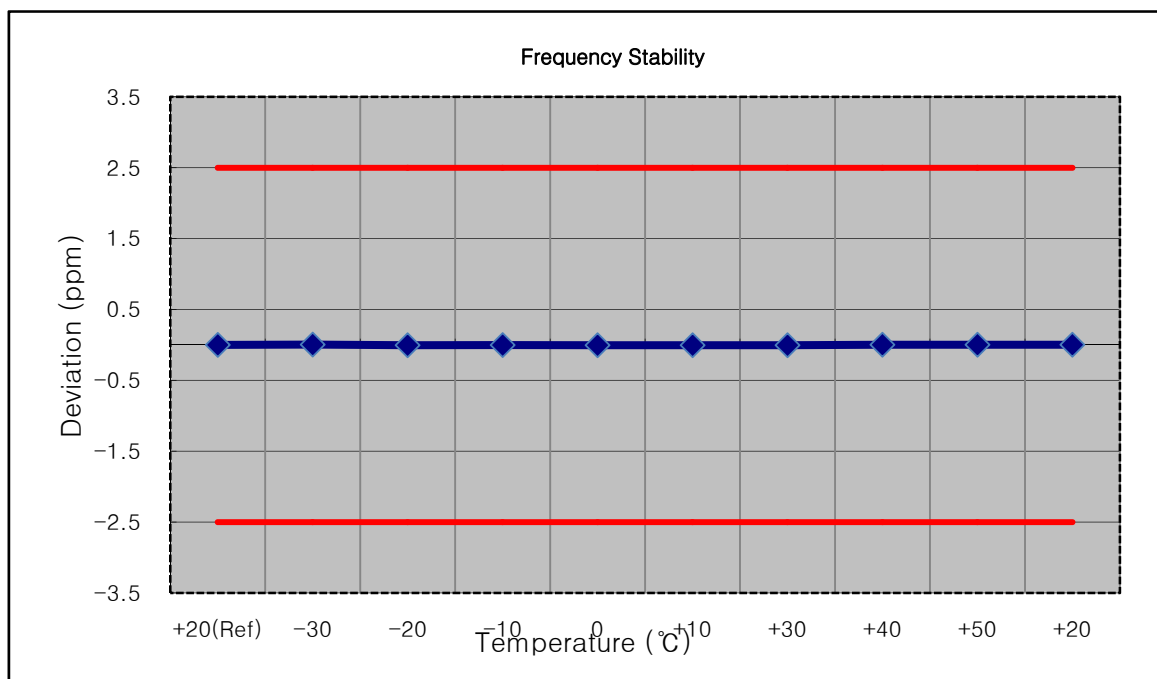
Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.85	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100%		-30	836 500 001	3.6	0.000 000	0.004
100%		-20	836 499 995	-2.3	0.000 000	-0.003
100%		-10	836 499 996	-1.6	0.000 000	-0.002
100%		0	836 499 994	-3.5	0.000 000	-0.004
100%		+10	836 499 994	-3.4	0.000 000	-0.004
100%		+30	836 499 995	-2.9	0.000 000	-0.003
100%		+40	836 500 001	3.1	0.000 000	0.004
100%		+50	836 500 001	3.0	0.000 000	0.004
Batt. Endpoint	3.27	+20	836 500 001	3.2	0.000 000	0.004



7.7.5 FREQUENCY STABILITY (15 MHz Band 26 LTE)

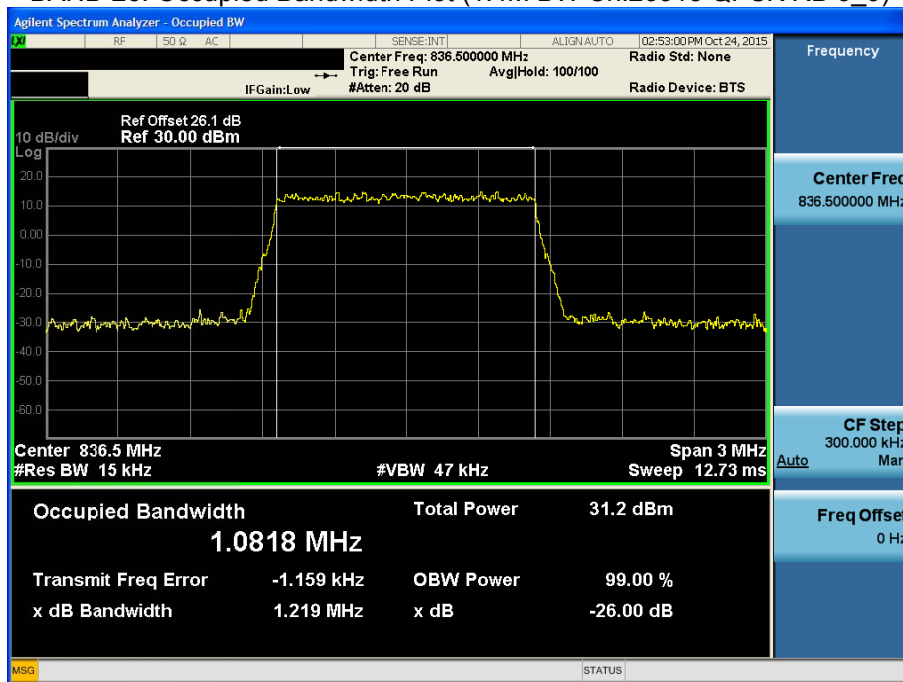
- OPERATING FREQUENCY: 836,500,000 Hz
- CHANNEL: 26915 (15 MHz)
- REFERENCE VOLTAGE: 3.85 VDC
- DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.85	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100%		-30	836 500 001	3.7	0.000 000	0.004
100%		-20	836 499 994	-3.8	0.000 000	-0.005
100%		-10	836 500 002	4.0	0.000 000	0.005
100%		0	836 499 992	-5.3	-0.000 001	-0.006
100%		+10	836 500 001	3.0	0.000 000	0.004
100%		+30	836 499 994	-3.9	0.000 000	-0.005
100%		+40	836 500 000	2.6	0.000 000	0.003
100%		+50	836 499 994	-3.9	0.000 000	-0.005
Batt. Endpoint	3.27	+20	836 500 003	5.1	0.000 001	0.006

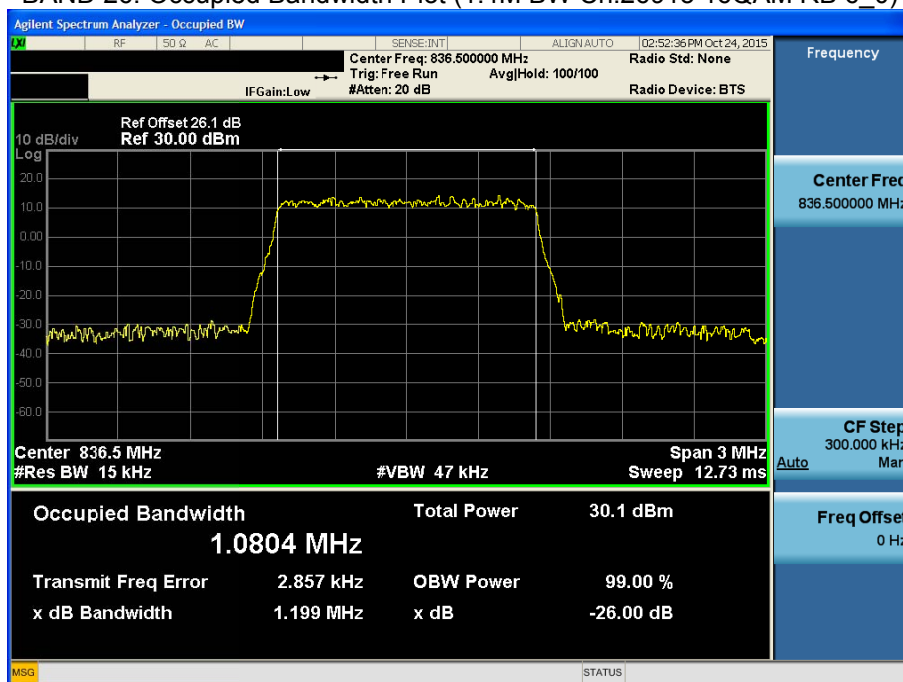


8. TEST PLOTS

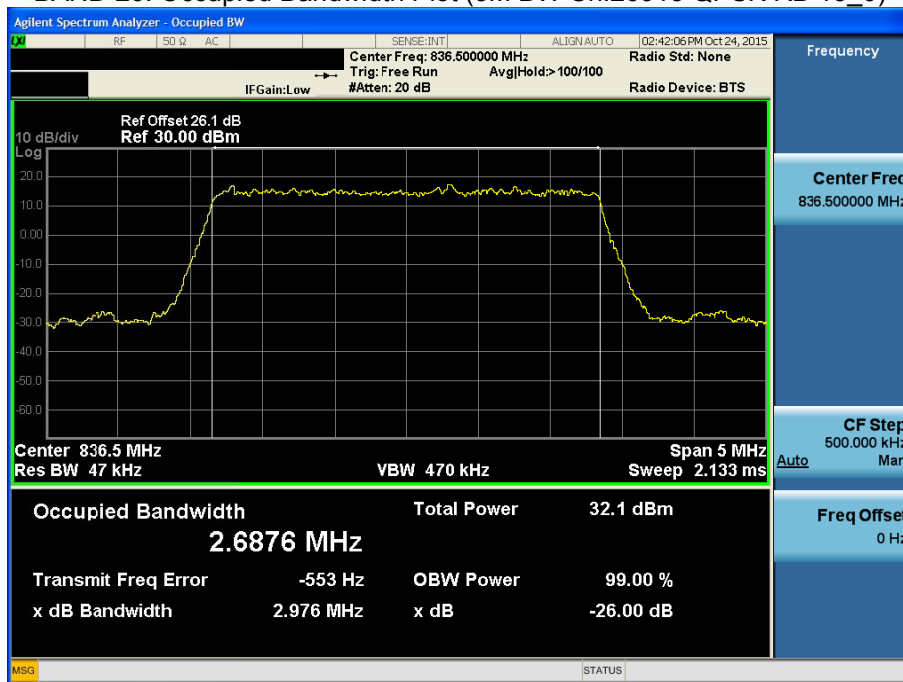
BAND 26. Occupied Bandwidth Plot (1.4M BW Ch.26915 QPSK RB 6_0)



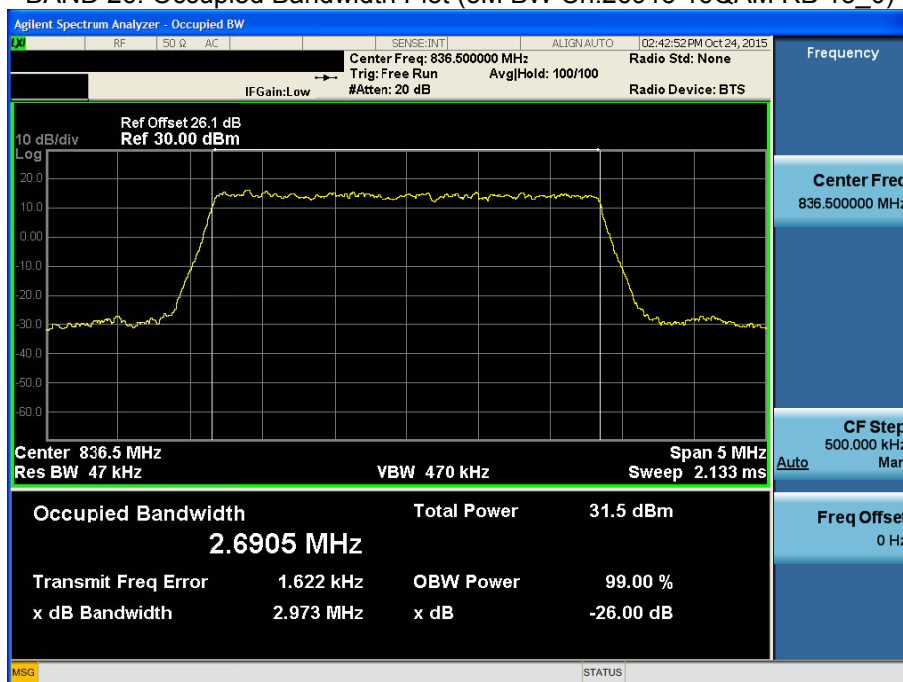
BAND 26. Occupied Bandwidth Plot (1.4M BW Ch.26915 16QAM RB 6_0)



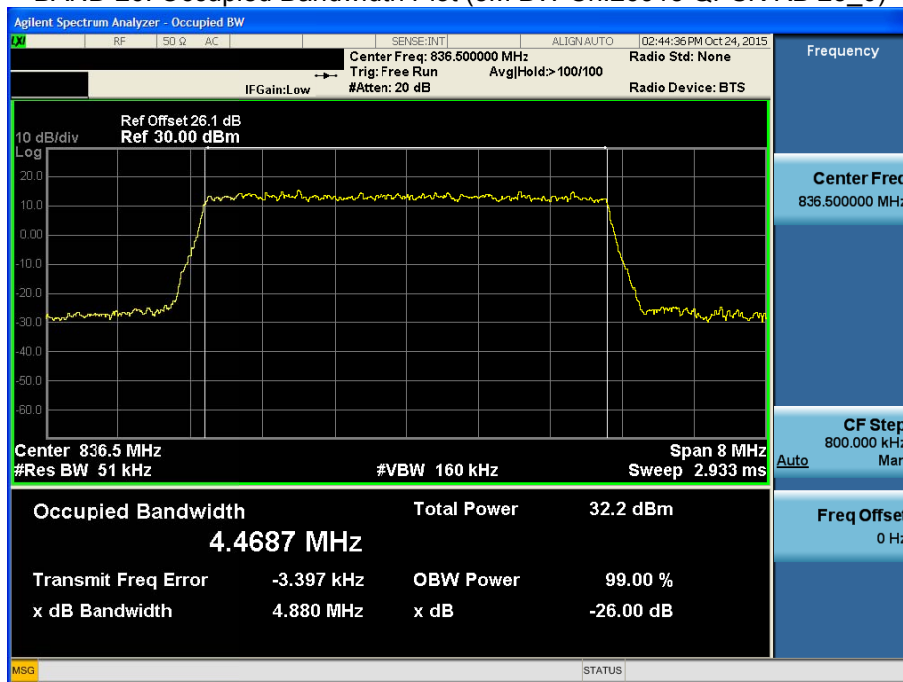
BAND 26. Occupied Bandwidth Plot (3M BW Ch.26915 QPSK RB 15_0)



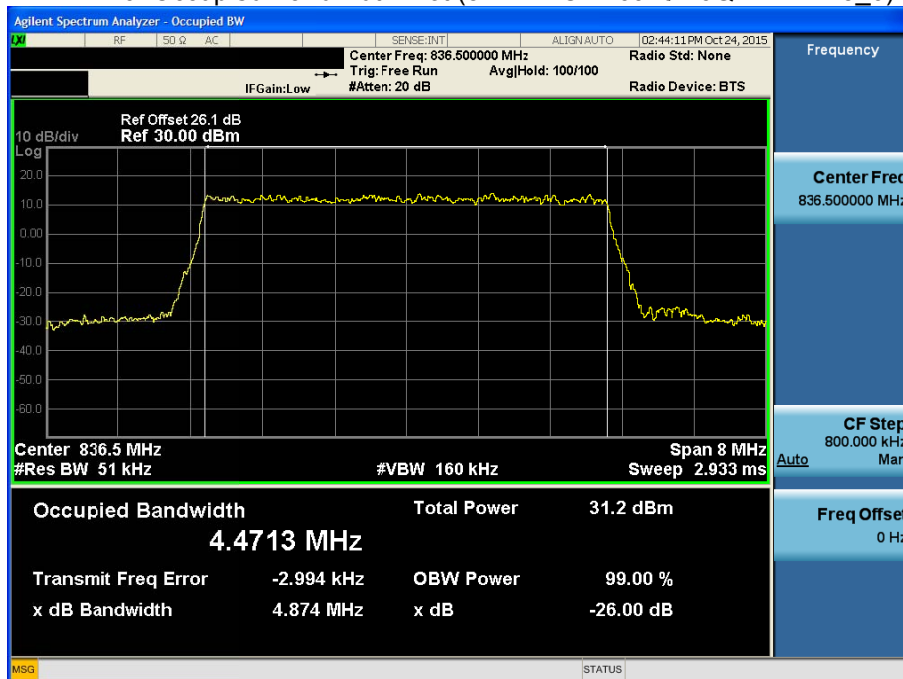
BAND 26. Occupied Bandwidth Plot (3M BW Ch.26915 16QAM RB 15_0)



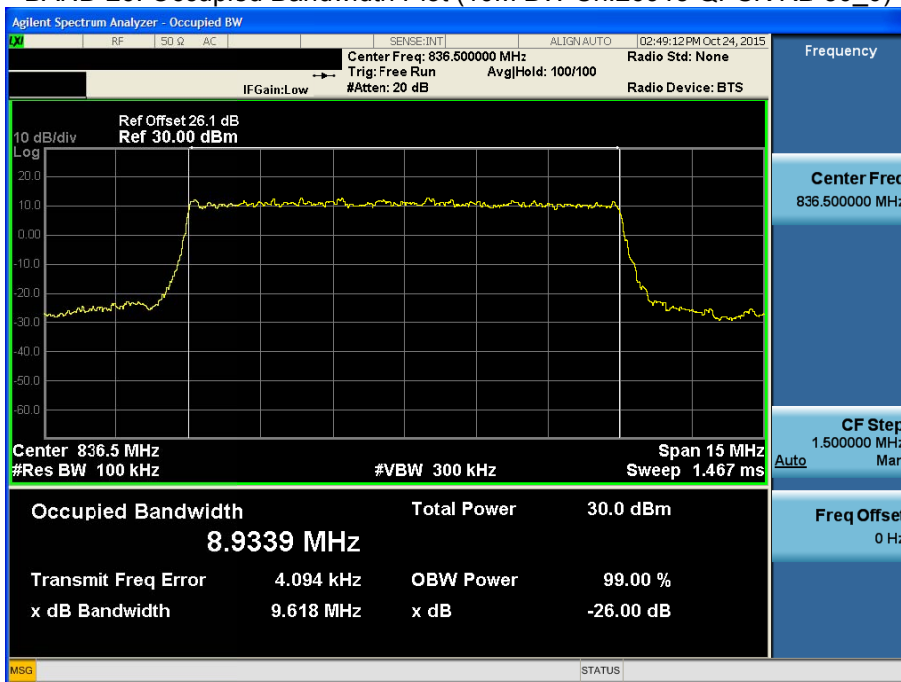
BAND 26. Occupied Bandwidth Plot (5M BW Ch.26915 QPSK RB 25_0)



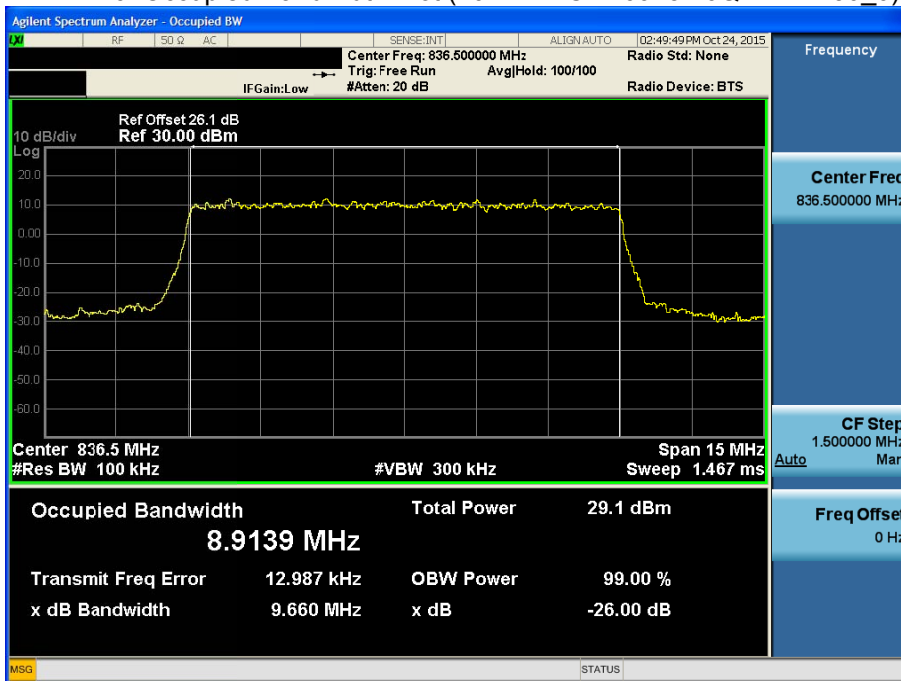
BAND 26. Occupied Bandwidth Plot (5M BW Ch.26915 16QAM RB 25_0)



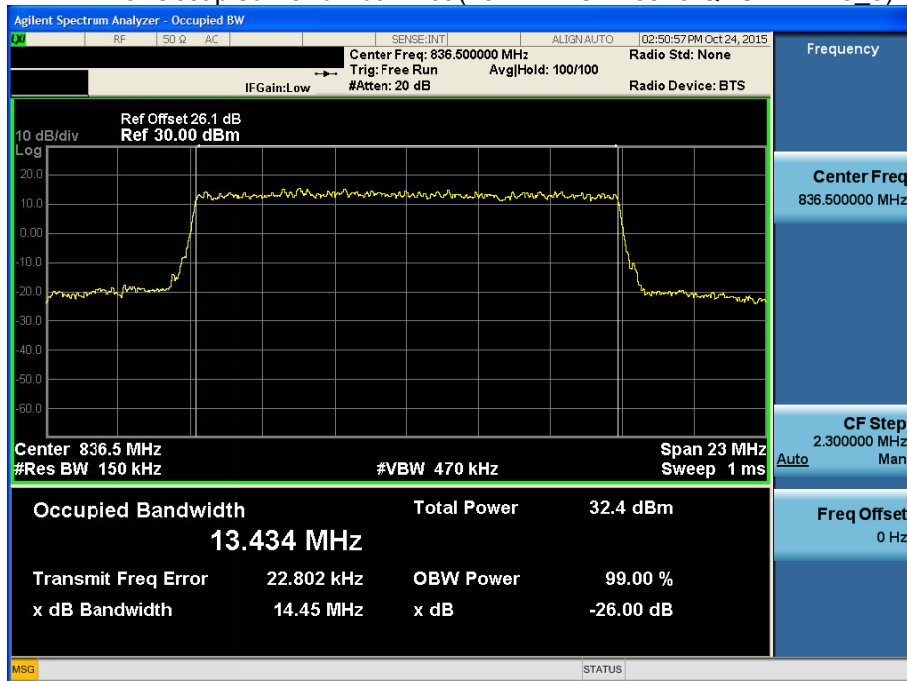
BAND 26. Occupied Bandwidth Plot (10M BW Ch.26915 QPSK RB 50_0)



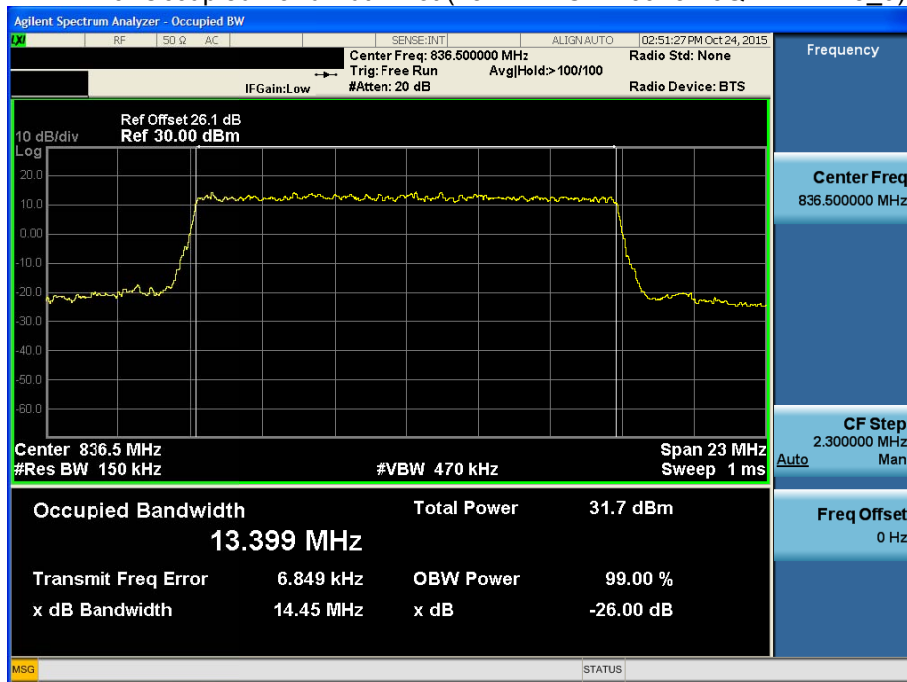
BAND 26. Occupied Bandwidth Plot (10M BW Ch.26915 16QAM RB 50_0)



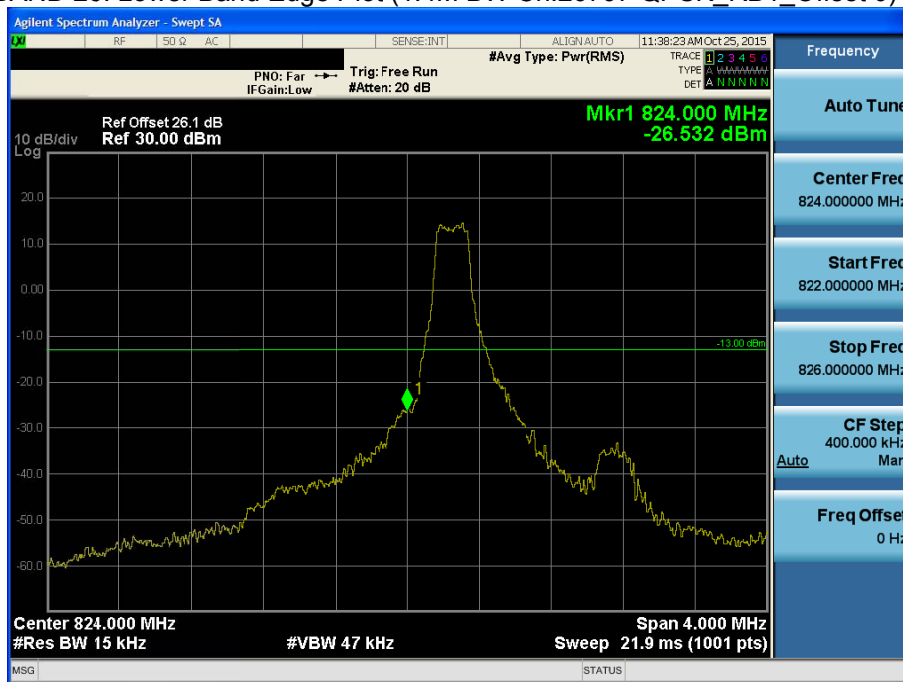
BAND 26. Occupied Bandwidth Plot (15M BW Ch.26915 QPSK RB 75_0)



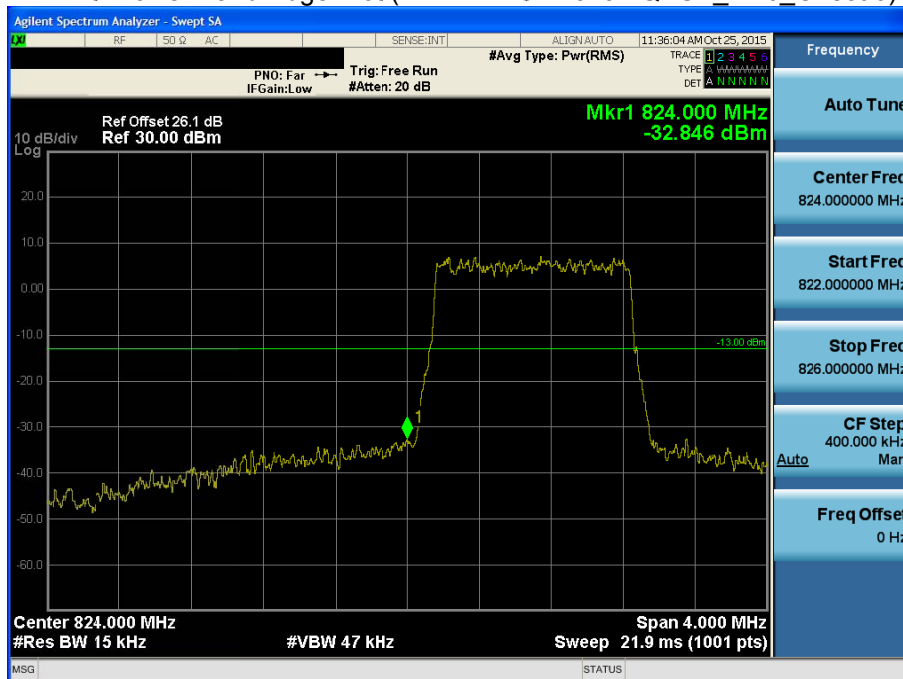
BAND 26. Occupied Bandwidth Plot (15M BW Ch. 26915 16QAM RB 75_0)

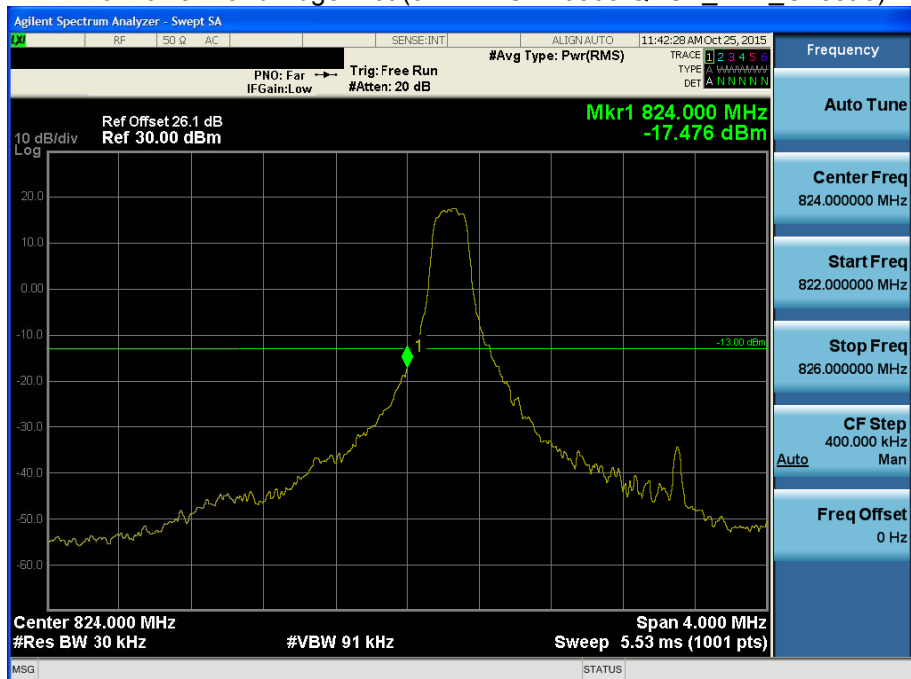


BAND 26. Lower Band Edge Plot (1.4M BW Ch.26797 QPSK_RB1_Offset 0) -1



BAND 26. Lower Band Edge Plot (1.4M BW Ch.26797 QPSK_RB6_Offset 0) -2





Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO 11:41:27 AM Oct 25, 2015

Frequency

Auto Tune

Center Freq 824.000000 MHz

Start Freq 822.000000 MHz

Stop Freq 826.000000 MHz

CF Step 400.000 kHz

Auto Man

Freq Offset 0 Hz

Ref Offset 26.1 dB
Ref 30.00 dBm

Mkr1 824.000 MHz
-27.563 dBm

10 dB/div
Log

Center 824.000 MHz
#Res BW 30 kHz
#VBW 91 kHz

Span 4.000 MHz
Sweep 5.53 ms (1001 pts)

PN0: Far
IF Gain: Low

Trig: Free Run
#Atten: 20 dB

#Avg Type: Pwr(RMS)

TRACE 1 2 3 4 5 6
TYPE A
DET A

-13.00 dBm

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

REF: Power: Attenuated Band Edge - 1st (Power: Low) - 20000 Hz

UNIT: dBm

RF 50 Ω AC SENSE:INT ALIGN: AUTO 01:39:08 PM Oct 26, 2015

#Avg Type: Pwr(RMS)

TRACE 1 2 3 4 5 6

TYPE A N N N N N

DET A N N N N N

PNO: Far → Trig: Free Run

IFGain: Low #Atten: 20 dB

Ref Offset 26.1 dB

Ref 30.00 dBm

Mkr1 822.820 MHz

-33.553 dBm

10 dB/div

Log

20.0

10.0

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

-13.00 dBm

1

Start 819.000 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 823.000 MHz

Sweep 1.00 ms (1001 pts)

Frequency

Auto Tune

Center Freq

821.000000 MHz

Start Freq

819.000000 MHz

Stop Freq

823.000000 MHz

CF Step

400.000 kHz

Auto

Man

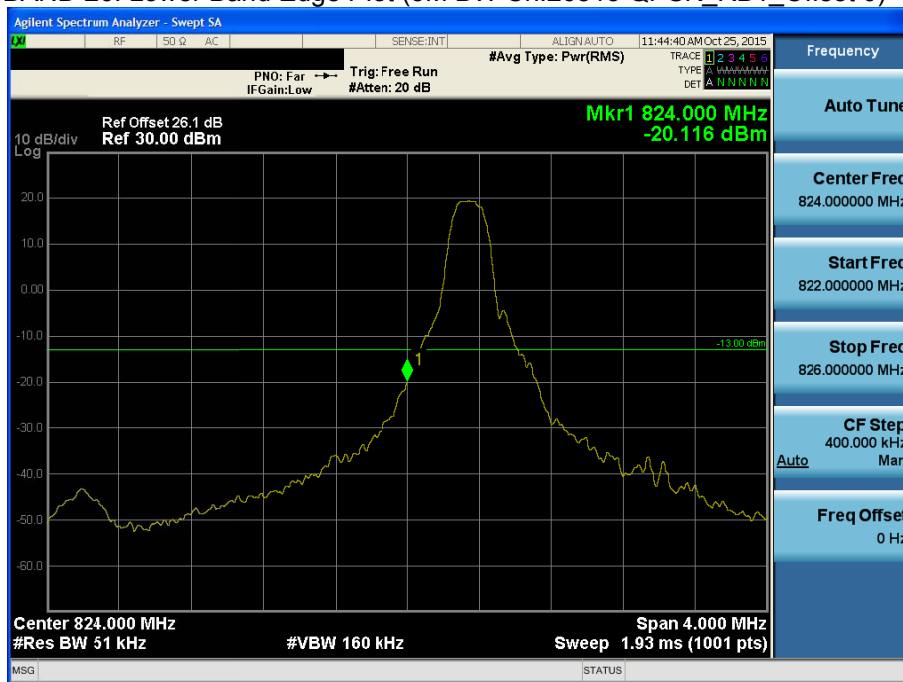
Freq Offset

0 Hz

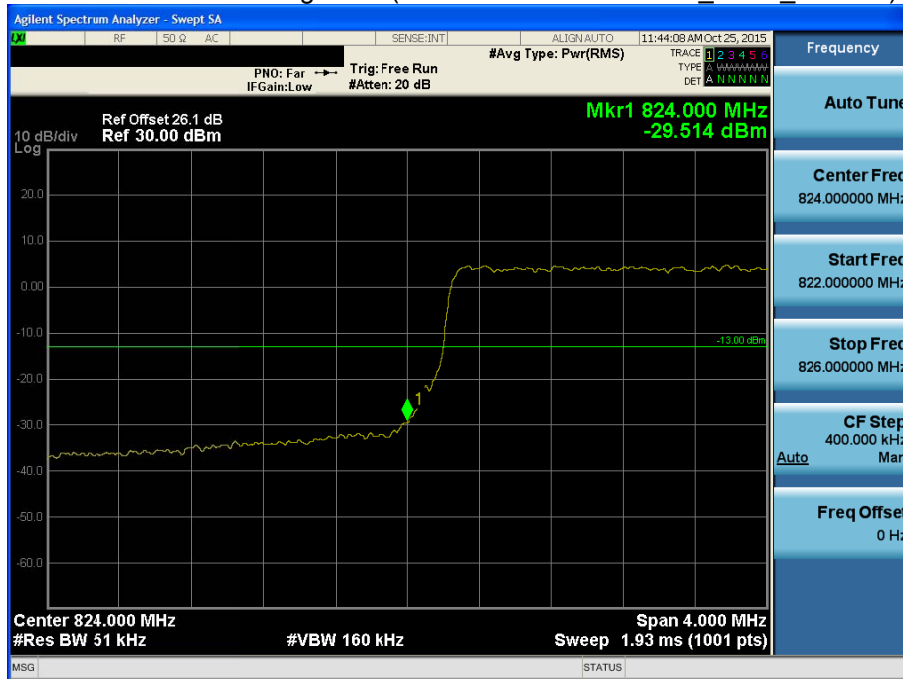
MSG

STATUS

BAND 26. Lower Band Edge Plot (5M BW Ch.26815 QPSK_RB1_Offset 0) -1



BAND 26. Lower Band Edge Plot (5M BW Ch. 26815 QPSK_RB25_Offset 0) -2



Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO 01:39:33 PM Oct 26, 2015

#Avg Type: Pwr(RMS)

TRAC 1 2 3 4 5 6
TYPE A W W W W W W
DET A H N N N N

PNO: Far → Trg: Free Run
IFGain: Low #Atten: 20 dB

Ref Offset 26.1 dB
Ref 30.00 dBm

Mkr1 822.904 MHz
-32.347 dBm

10 dB/div
Log

Start 819.000 MHz
#Res BW 100 kHz
#VBW 300 kHz

Stop 823.000 MHz
Sweep 1.00 ms (1001 pts)

Frequency

Auto Tune

Center Freq
821.000000 MHz

Start Freq
819.000000 MHz

Stop Freq
823.000000 MHz

CF Step
400.000 kHz
Man

Auto

Freq Offset
0 Hz

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO 11:47:08 AM Oct 25, 2015

#Avg Type: Pwr(RMS) TRAC 1 2 3 4 5 6
 TYPE A W W W W W W W W
 DET A N N N N N N

PNO: Far Trg: Free Run
 IFGain:Low #Atten: 20 dB

Ref Offset 26.1 dB
 Ref 30.00 dBm

Mkr1 824.000 MHz
 -29.334 dBm

10 dB/div
 Log

Center 824.000 MHz
 #Res BW 100 kHz
 #VBW 300 kHz

Span 4.000 MHz
 Sweep 1.0 ms (1001 pts)

Frequency

Auto Tune

Center Freq
 824.000000 MHz

Start Freq
 822.000000 MHz

Stop Freq
 826.000000 MHz

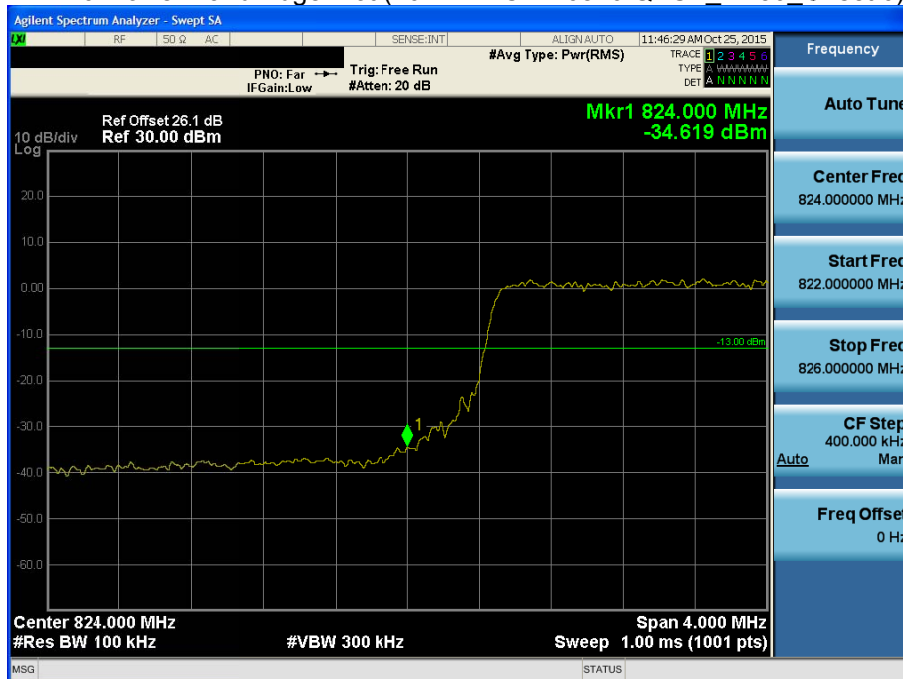
CF Step
 400.000 kHz
 Mar

Auto

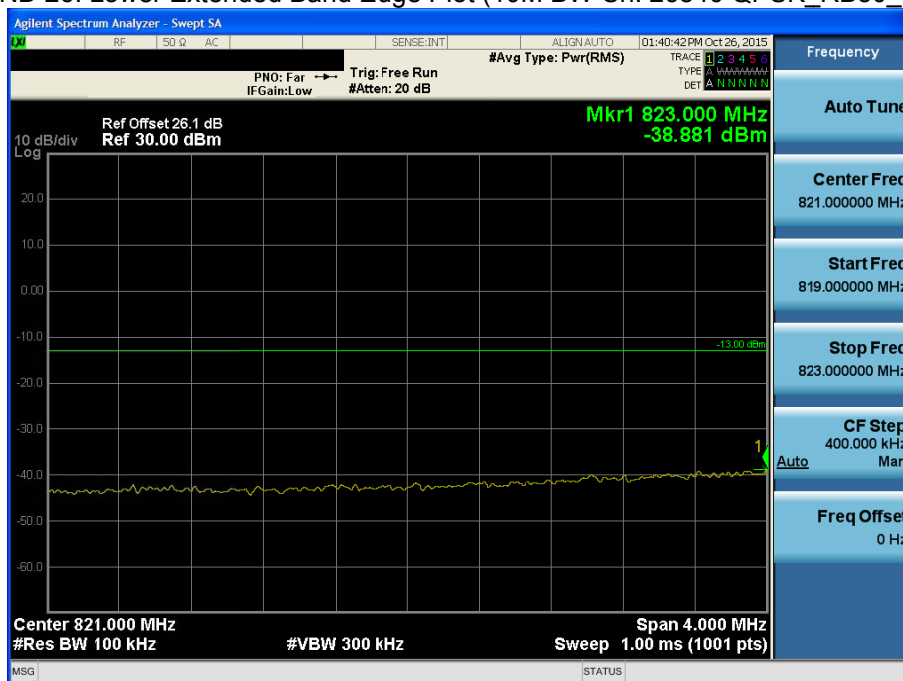
Freq Offset
 0 Hz

MSG STATUS

BAND 26. Lower Band Edge Plot (10M BW Ch. 26840 QPSK_RB50_Offset 0) -2



BAND 26. Lower Extended Band Edge Plot (10M BW Ch. 26840 QPSK_RB50_0) -3



Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO 11:49:51 AM Oct 25, 2015

#Avg Type: Pwr(RMS)

Trace 1 2 3 4 5 6
Type 0 W W W W W W W W
Det A W W W W W W W W

PNO: Far Trig: Free Run
IF Gain: Low #Atten: 20 dB

Ref Offset 26.1 dB
Ref 30.00 dBm

Mkr1 824.000 MHz
-29.270 dBm

10 dB/div
Log

Center 824.000 MHz
#Res BW 150 kHz
#VBW 470 kHz

Span 4.000 MHz
Sweep 1.00 ms (1001 pts)

MSG STATUS

Frequency
Auto Tune
Center Freq
824.000000 MHz
Start Freq
822.000000 MHz
Stop Freq
826.000000 MHz
CF Step
400.000 kHz
Mar
Auto
Freq Offset
0 Hz

Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN: AUTO 11:48:54 AM Oct 25, 2015

PNO: Far Trig: Free Run #Avg Type: Pwr(RMS) TRACE 1 2 3 4 5 6
IFGain: Low #Atten: 20 dB TYPE A W W W W W W W W
DET A W W W W W W W W

Ref Offset 26.1 dB
Ref 30.00 dBm

Mkr1 824.000 MHz
-27.811 dBm

10 dB/div
Log

Center 824.000 MHz
#Res BW 150 kHz
#VBW 470 kHz

Span 4.000 MHz
Sweep 1.00 ms (1001 pts)

Frequency

Auto Tune

Center Freq
824.000000 MHz

Start Freq
822.000000 MHz

Stop Freq
826.000000 MHz

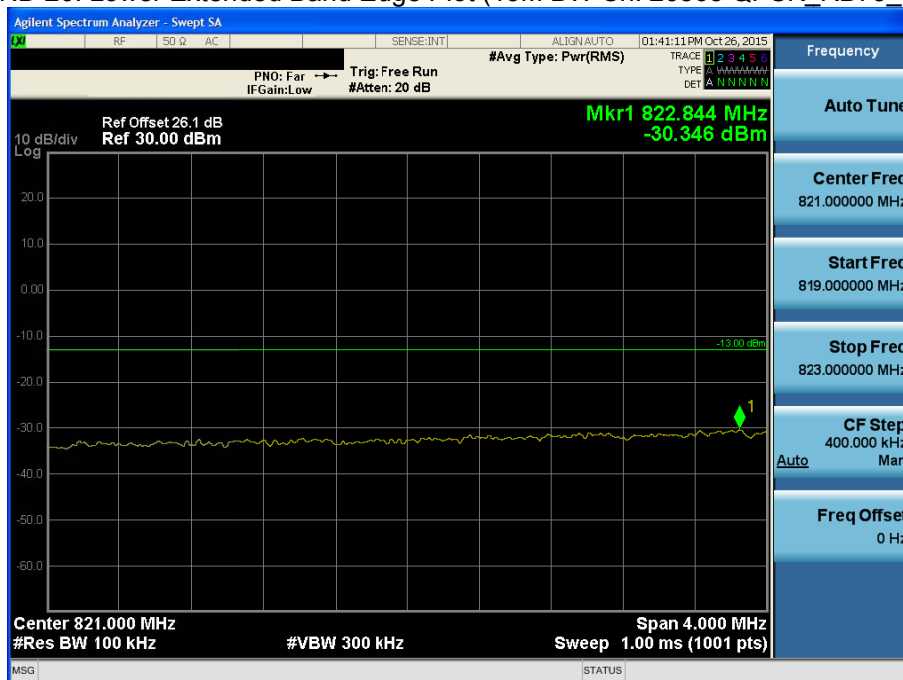
CF Step
400.000 kHz
Mar

Auto

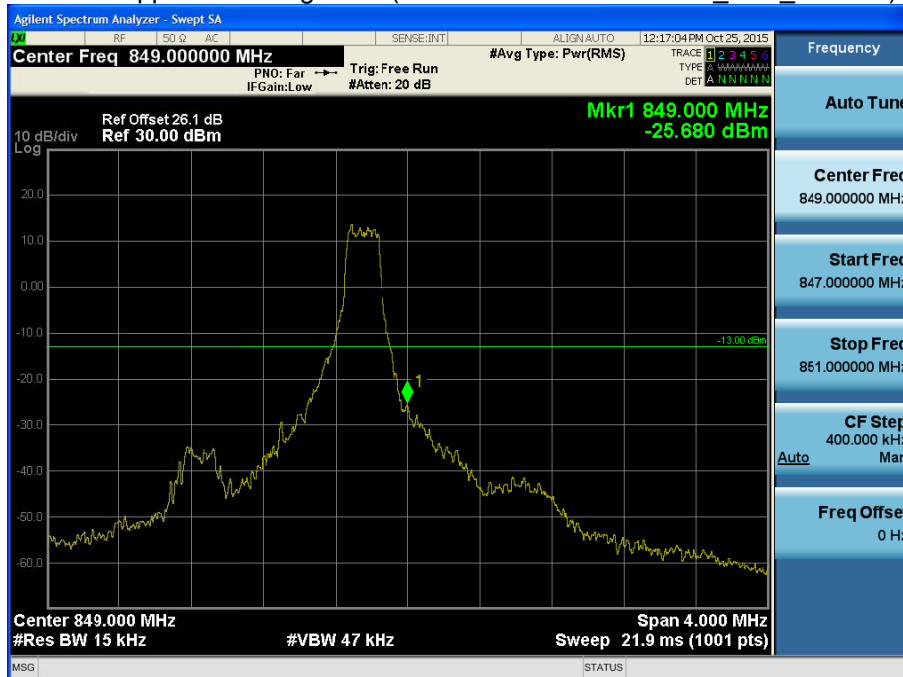
Freq Offset
0 Hz

MSG STATUS

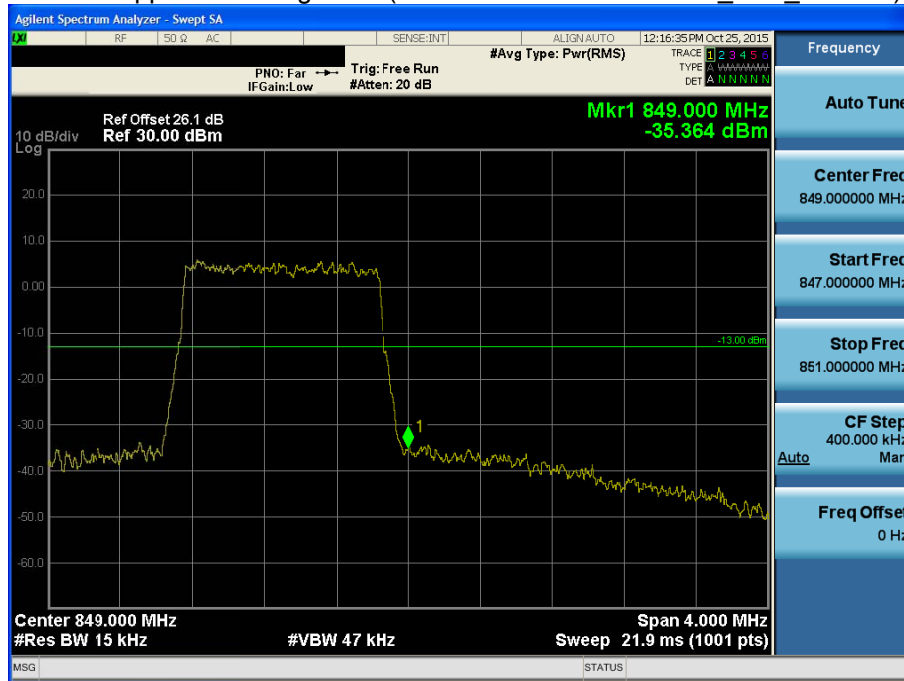
BAND 26. Lower Extended Band Edge Plot (15M BW Ch. 26865 QPSK_RB75_0) -3



BAND 26. Upper Band Edge Plot (1.4M BW Ch.27033 QPSK_RB1_Offset 5) -1



BAND 26. Upper Band Edge Plot (1.4M BW Ch. 27033 QPSK_RB6_Offset 0) -2



BAND 26. Upper Extended Band Edge Plot (1.4M BW Ch. 27033 QPSK_RB6_0) -3



Agilent Spectrum Analyzer - Swept SA

REF: 50 Ω AC SENSE: INT ALIGN: AUTO 12:14:34 PM Oct 25, 2015

Trace 1: 2 3 4 5 6 TYPE: A DET: A

PNO: Far Trg: Free Run #Avg Type: Pwr(RMS) IF Gain: Low #Att: 20 dB

Ref Offset 26.1 dB Ref 30.00 dBm

Mkr1 849.000 MHz -18.181 dBm

10 dB/div Log

Center 849.000 MHz #Res BW 30 kHz #VBW 91 kHz Span 4.000 MHz Sweep 5.53 ms (1001 pts)

Frequency

Auto Tune

Center Freq 849.000000 MHz

Start Freq 847.000000 MHz

Stop Freq 851.000000 MHz

CF Step 400.000 kHz Man

Auto

Freq Offset 0 Hz

Agilent Spectrum Analyzer - Swept SA

UX RF 50 Ω AC SENSE:INT ALIGN:AUTO 04:53:31 PM Oct 26, 2015

#Avg Type: Pwr(RMS) TRACE 1 2 3 4 5 6 TYPE A W W W W W W W W DET A N N N N N N

PNO: Far IF Gain: Low Trig: Free Run #Atten: 20 dB

Ref Offset 26.1 dB Ref 30.00 dBm

Mkr1 849.000 MHz -26.701 dBm

10 dB/div Log

Center 849.000 MHz #Res BW 30 kHz #VBW 91 kHz Span 4.000 MHz Sweep 5.53 ms (1001 pts)

Frequency

Auto Tune

Center Freq 849.000000 MHz

Start Freq 847.000000 MHz

Stop Freq 851.000000 MHz

CF Step 400.000 kHz Man

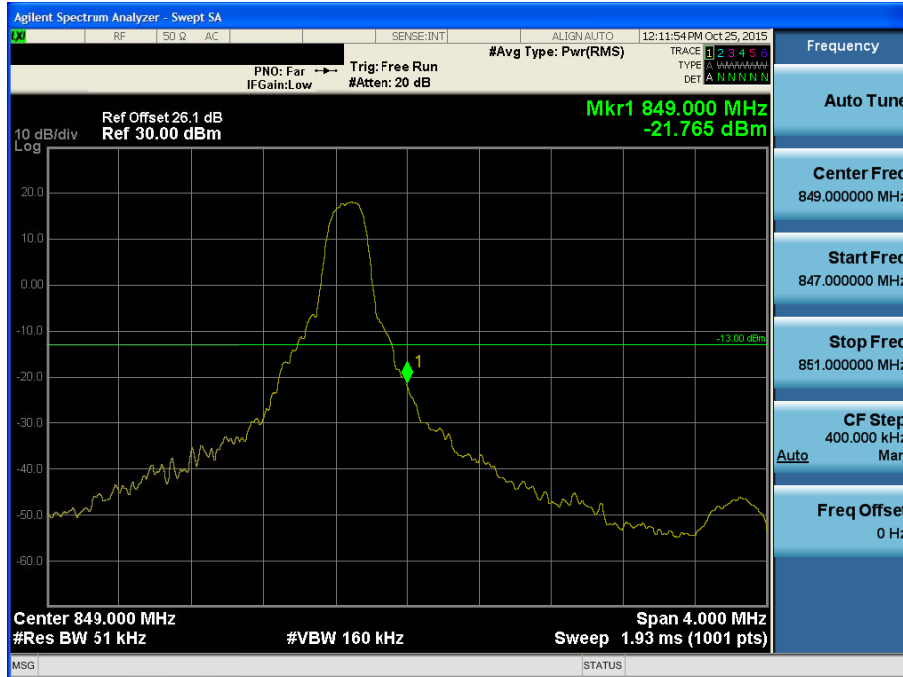
Auto

Freq Offset 0 Hz

BAND 26. Upper Extended Band Edge Plot (3M BW Ch. 27025 QPSK_RB15 0) -3



BAND 26. Upper Band Edge Plot (5M BW Ch. 27015 QPSK_RB1_Offset 24) -1



Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO 12:11:24 PM Oct 25, 2015

UX #Avg Type: Pwr(RMS) TRACE 1 2 3 4 5 6
 TYPE A W W W W W W
 DET A N N N N N

PNO: Far → Trig: Free Run
 IF Gain: Low #Atten: 20 dB

Ref Offset 26.1 dB
 Ref 30.00 dBm

Mkr1 849.000 MHz
 -30.623 dBm

10 dB/div
 Log

Center 849.000 MHz
 #Res BW 51 kHz #VBW 160 kHz Span 4.000 MHz
 Sweep 1.93 ms (1001 pts)

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN:AUTO 03:25:24 PM Oct 26, 2015

PN0: Far Trg: Free Run #Avg Type: Pwr(RMS) TRACE 1 2 3 4 5 6
 IF Gain: Low #Atten: 20 dB TYPE A W W W W W W W W
 DET A N N N N N N

Ref Offset 26.1 dB Mkr1 850.044 MHz
 Ref 30.00 dBm -37.033 dBm

10 dB/div Log

Start 850.000 MHz Stop 854.000 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 1.00 ms (1001 pts)

Frequency

Auto Tune

Center Freq
 852.000000 MHz

Start Freq
 850.000000 MHz

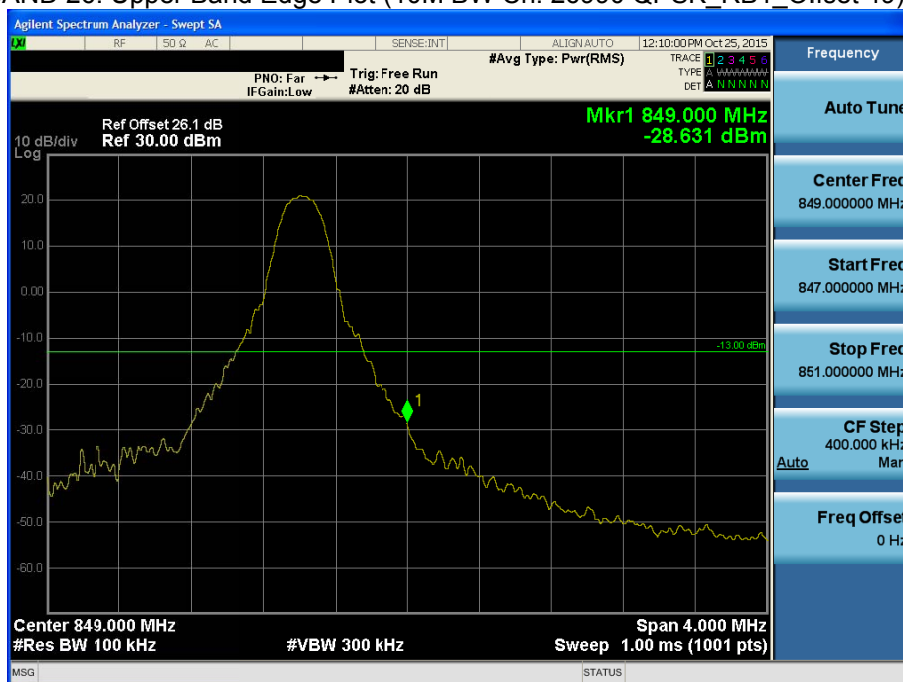
Stop Freq
 854.000000 MHz

CF Step
 400.000 kHz
 Auto Man

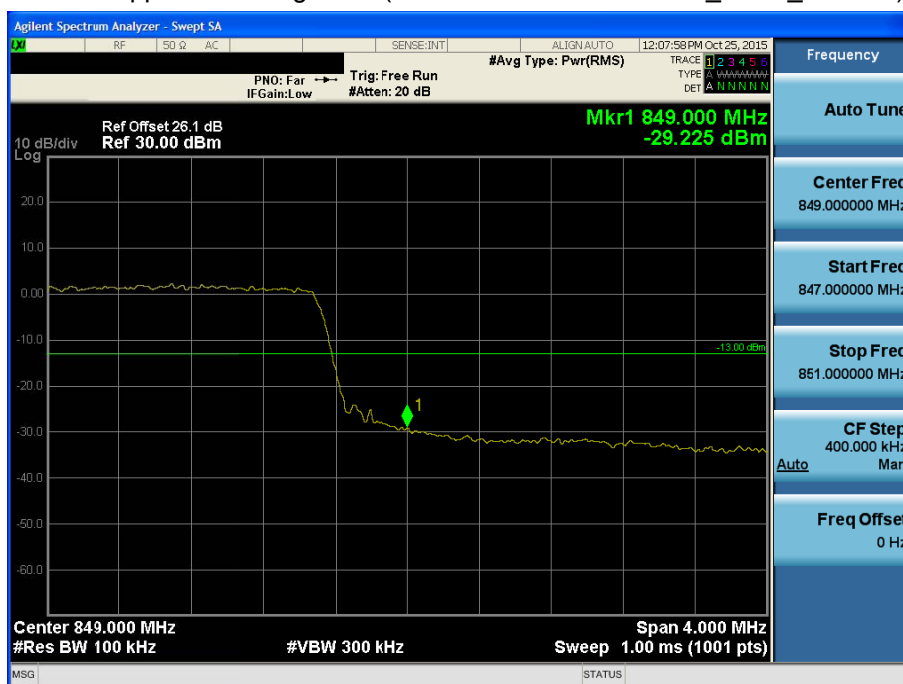
Freq Offset
 0 Hz

MSG STATUS

BAND 26. Upper Band Edge Plot (10M BW Ch. 26990 QPSK_RB1_Offset 49) -1



BAND 26. Upper Band Edge Plot (10M BW Ch. 26990 QPSK_RB50_Offset 0) -2



Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN AUTO 03:24:53 PM Oct 26, 2015

#Avg Type: Pwr(RMS)

TRAC 1 2 3 4 5 6
TYPE Δ WWWWWWW
DET Δ NNNNN

PNO: Far → Trig: Free Run
IFGain: Low #Atten: 20 dB

Ref Offset 26.1 dB
Ref 30.00 dBm

Mkr1 850.004 MHz
-31.727 dBm

10 dB/div
Log

Center Freq 852.000000 MHz

Start Freq 850.000000 MHz

Stop Freq 854.000000 MHz

CF Step 400.000 kHz
Mar

Auto

Freq Offset 0 Hz

Start 850.000 MHz
#Res BW 100 kHz

#VBW 300 kHz

Stop 854.000 MHz
Sweep 1.00 ms (1001 pts)

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

UX RF 50 Ω AC SENSE:INT ALIGN: AUTO 12:06:30 PM Oct 25, 2015

#Avg Type: Pwr(RMS) TRACE 1 2 3 4 5 6
TYPE 0 W W W W W W W W
DET A W W W W W W W W

PNO: Far Trig: Free Run
IFGain: Low #Atten: 20 dB

Ref Offset 26.1 dB
Ref 30.00 dBm

Mkr1 849.000 MHz
-31.573 dBm

10 dB/div
Log

Center 849.000 MHz
#Res BW 150 kHz

#VBW 470 kHz

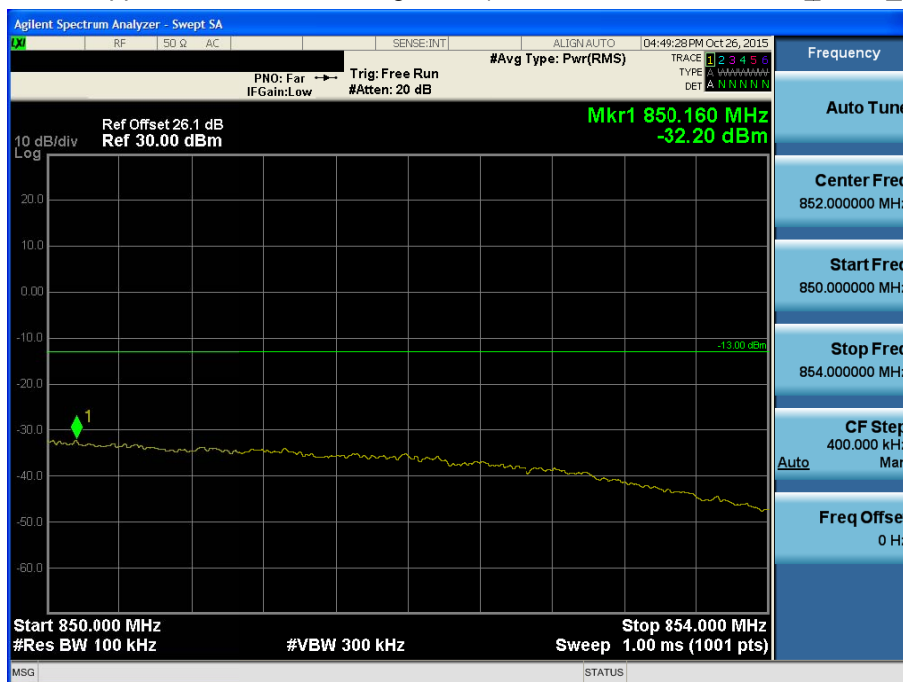
Span 4.000 MHz
Sweep 1.00 ms (1001 pts)

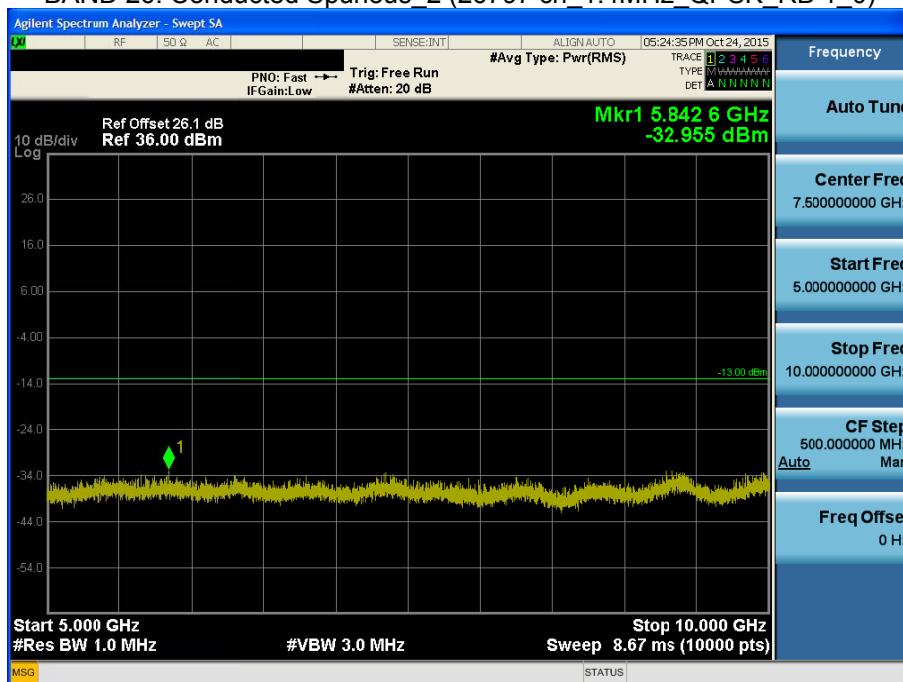
Auto Tune
Center Freq
849.000000 MHz
Start Freq
847.000000 MHz
Stop Freq
851.000000 MHz
CF Step
400.000 kHz
Auto
Freq Offset
0 Hz

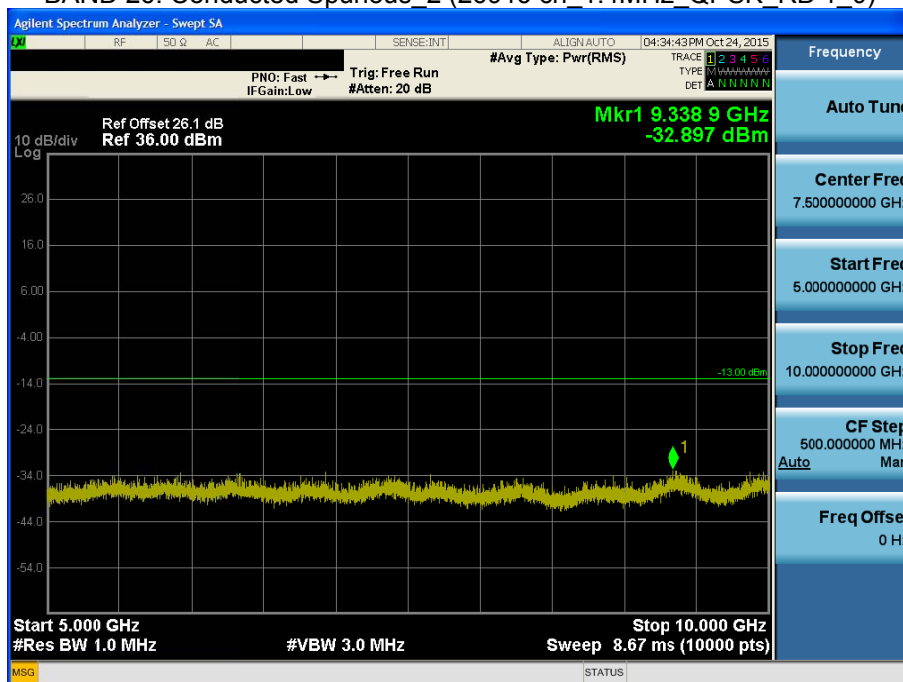
BAND 26. Upper Band Edge Plot (15M BW Ch. 26965 QPSK_RB75_Offset 0) -2



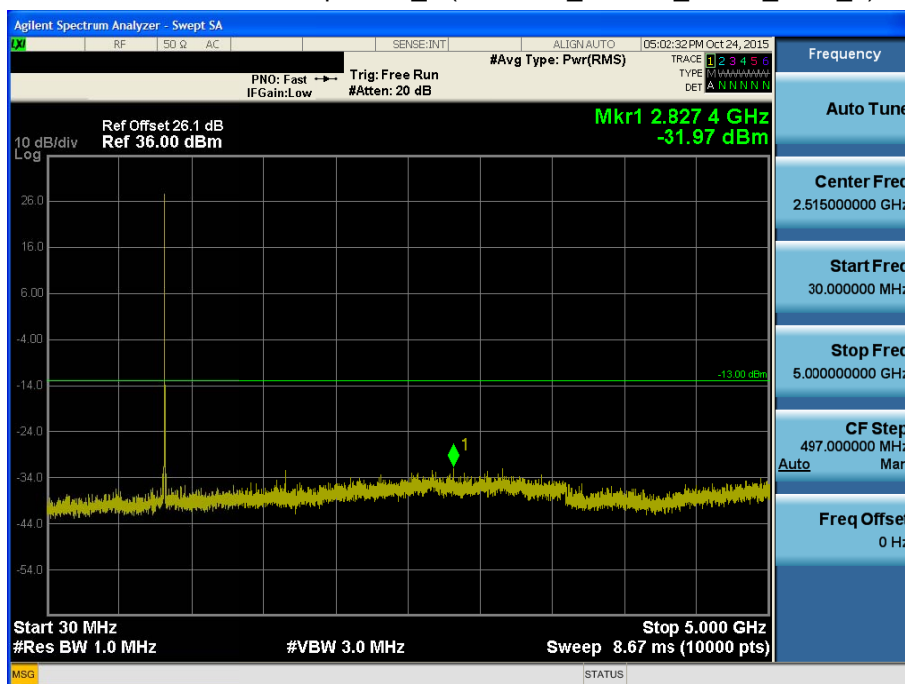
BAND 26. Upper Extended Band Edge Plot (15M BW Ch. 26965 QPSK_RB75_0) -3



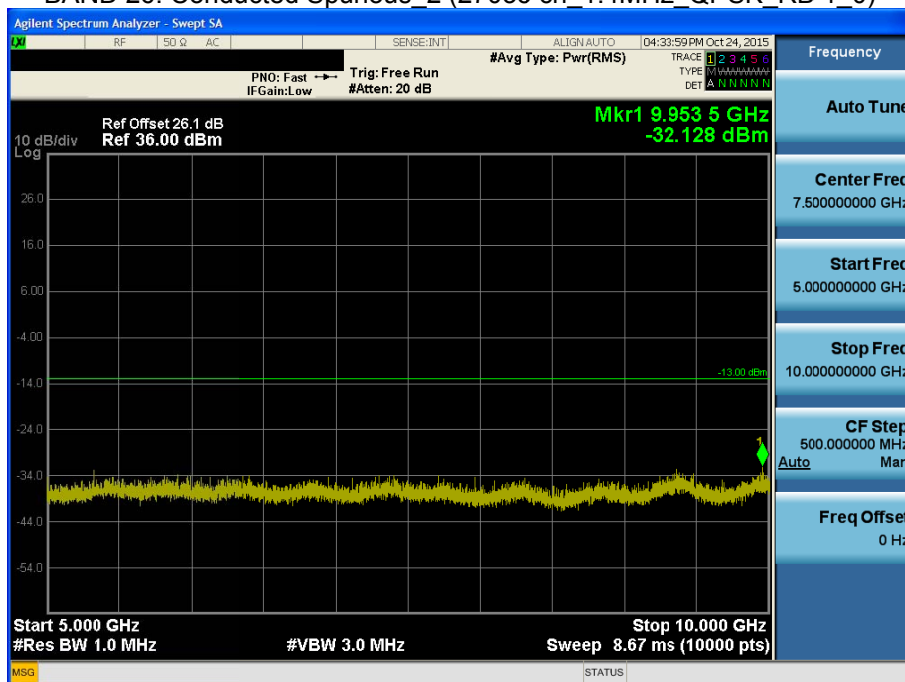




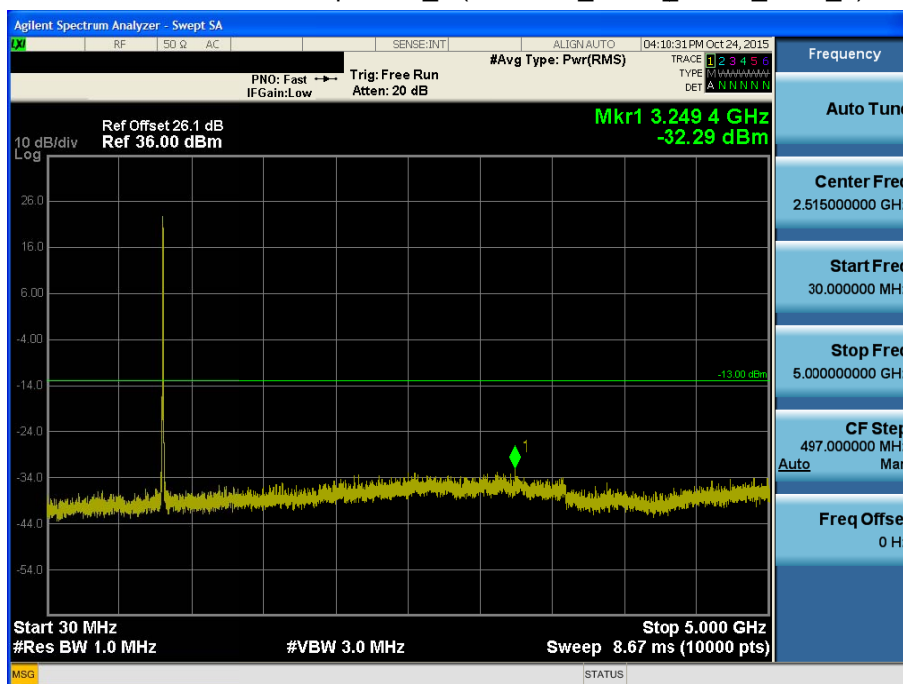
BAND 26. Conducted Spurious_1 (27033 ch_1.4MHz_QPSK_RB 1_0)



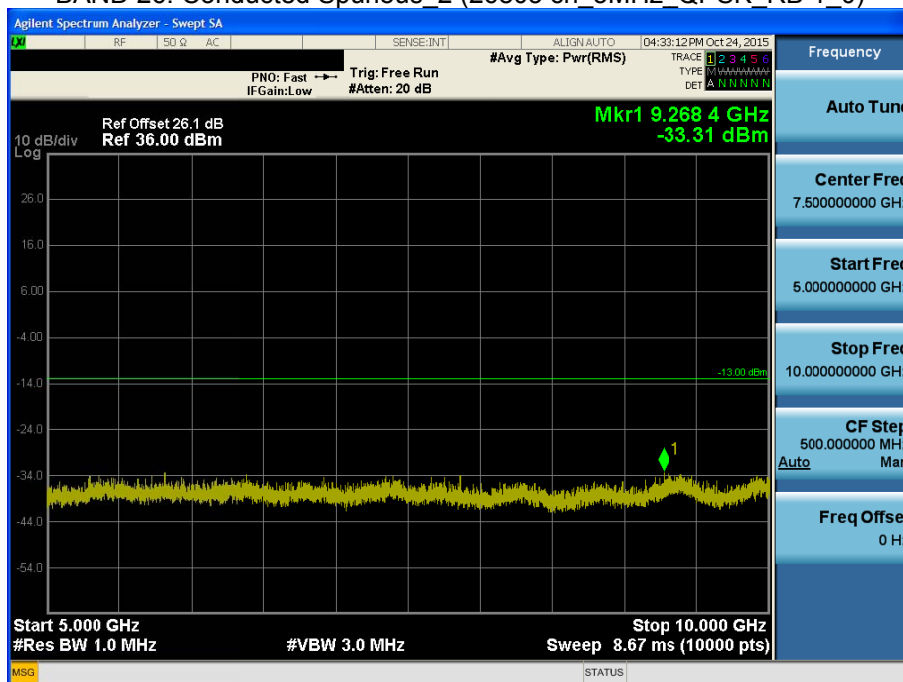
BAND 26. Conducted Spurious_2 (27033 ch_1.4MHz_QPSK_RB 1_0)

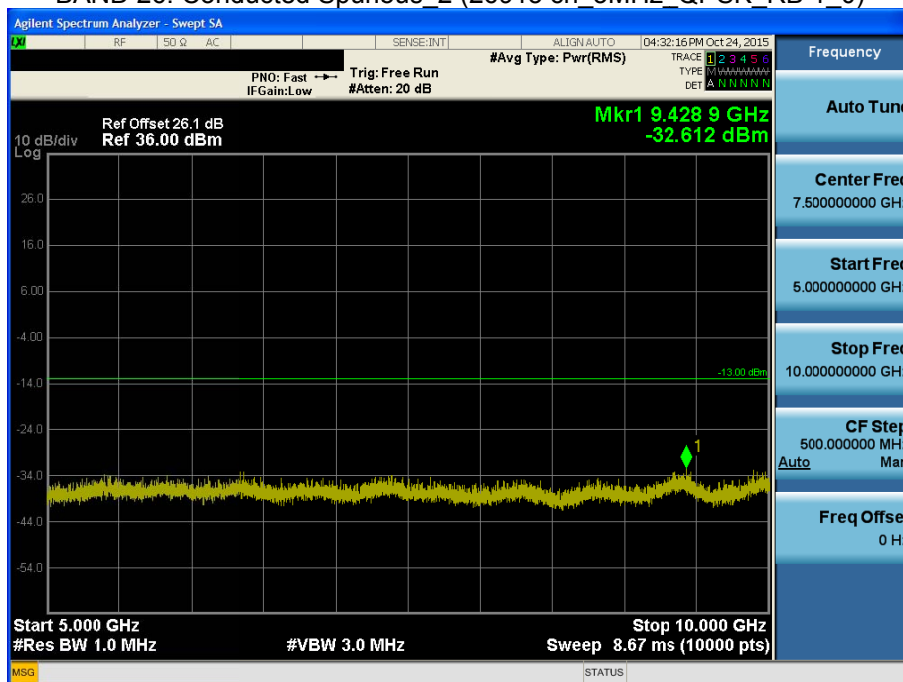


BAND 26. Conducted Spurious_1 (26805 ch_3MHz_QPSK_RB 1_0)

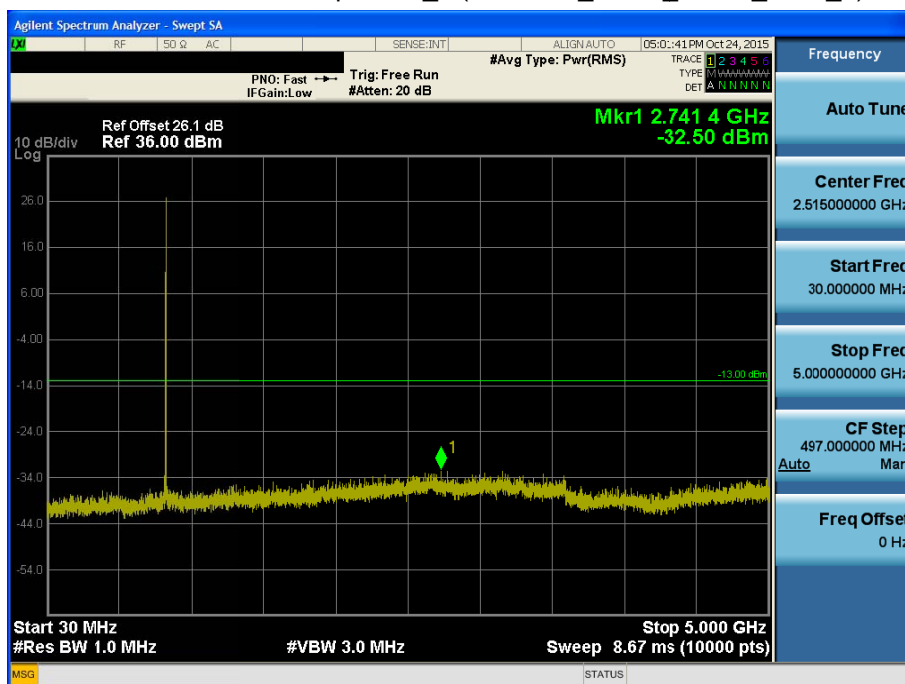


BAND 26. Conducted Spurious_2 (26805 ch_3MHz_QPSK_RB 1_0)

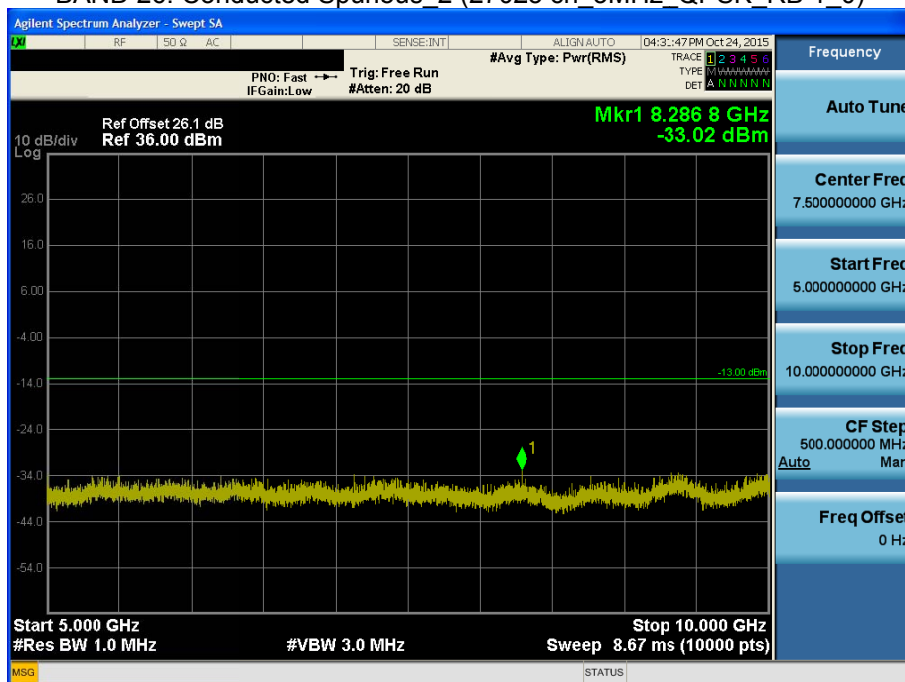


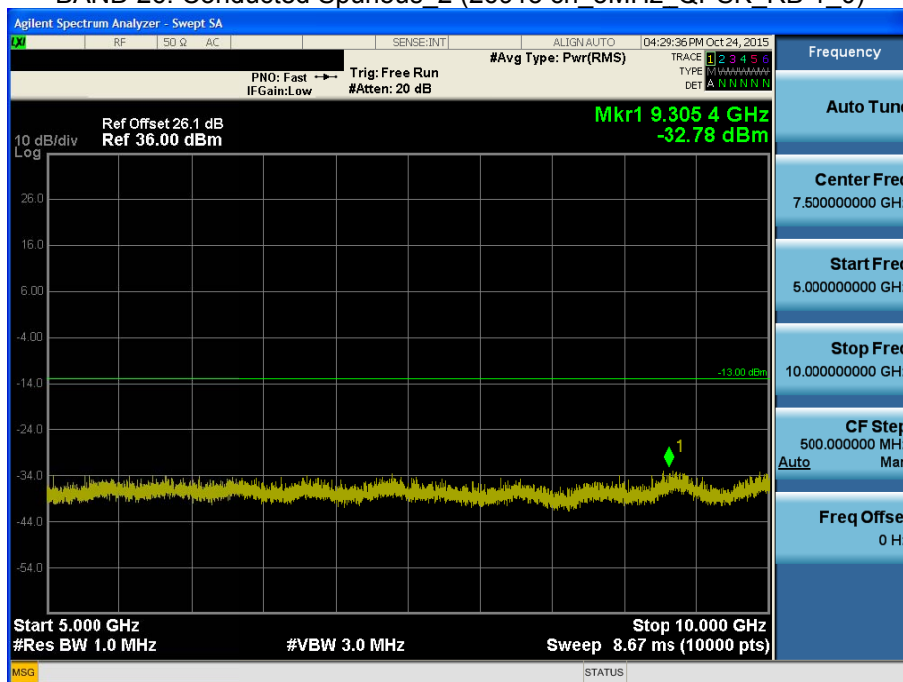


BAND 26. Conducted Spurious_1 (27025 ch_3MHz_QPSK_RB 1_0)

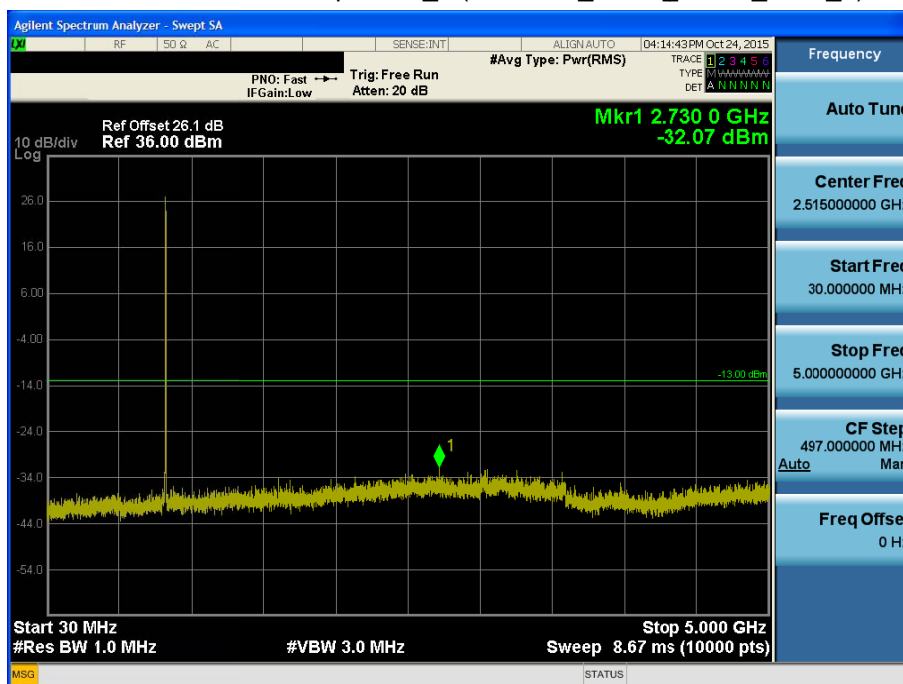


BAND 26. Conducted Spurious_2 (27025 ch_3MHz_QPSK_RB 1_0)

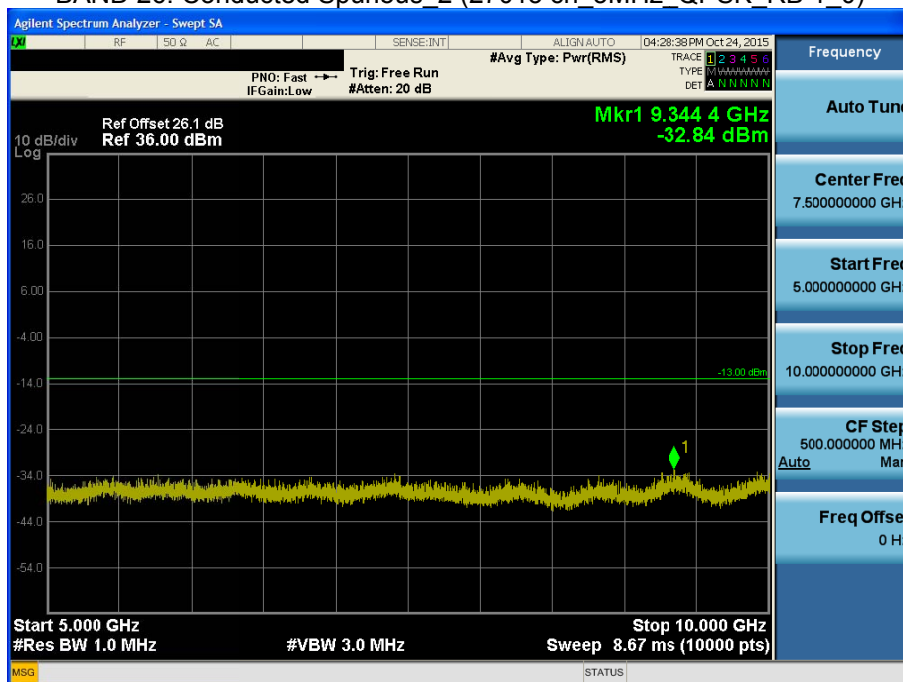


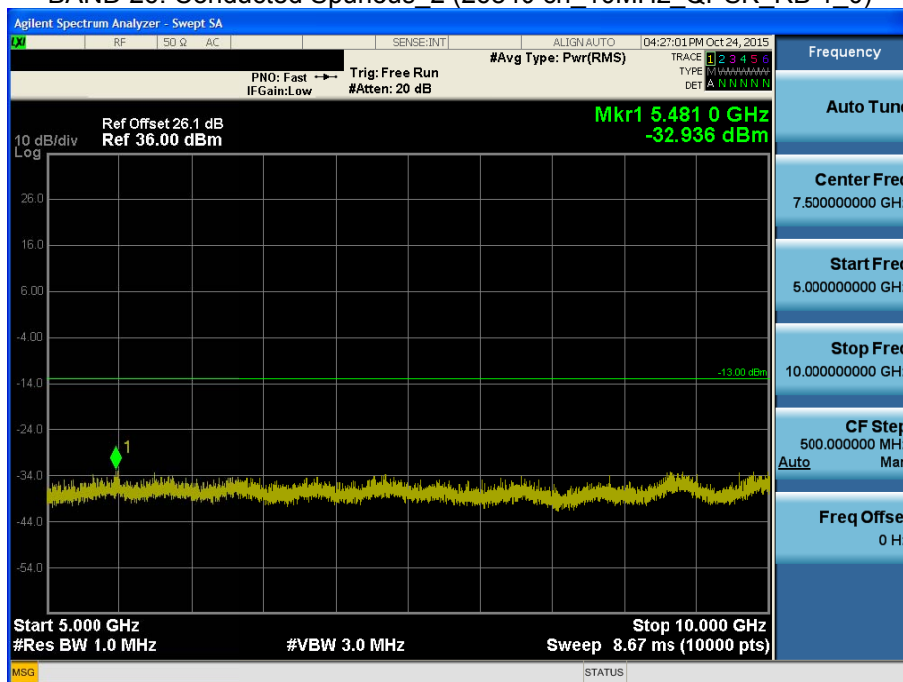


BAND 26. Conducted Spurious_1 (20715 ch_5MHz_QPSK_RB 1_0)

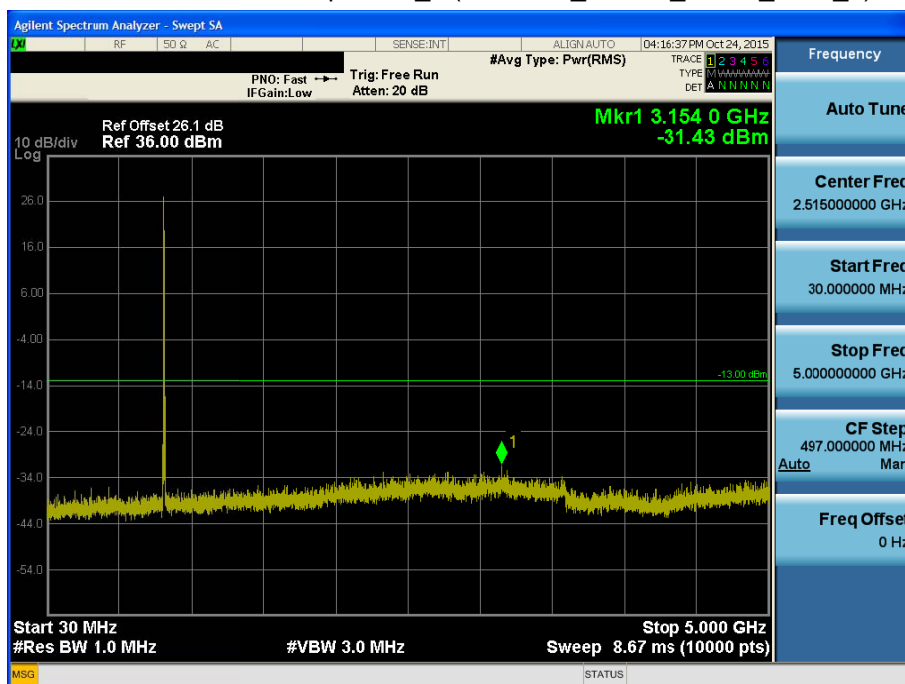


BAND 26. Conducted Spurious_2 (27015 ch_5MHz_QPSK_RB 1_0)

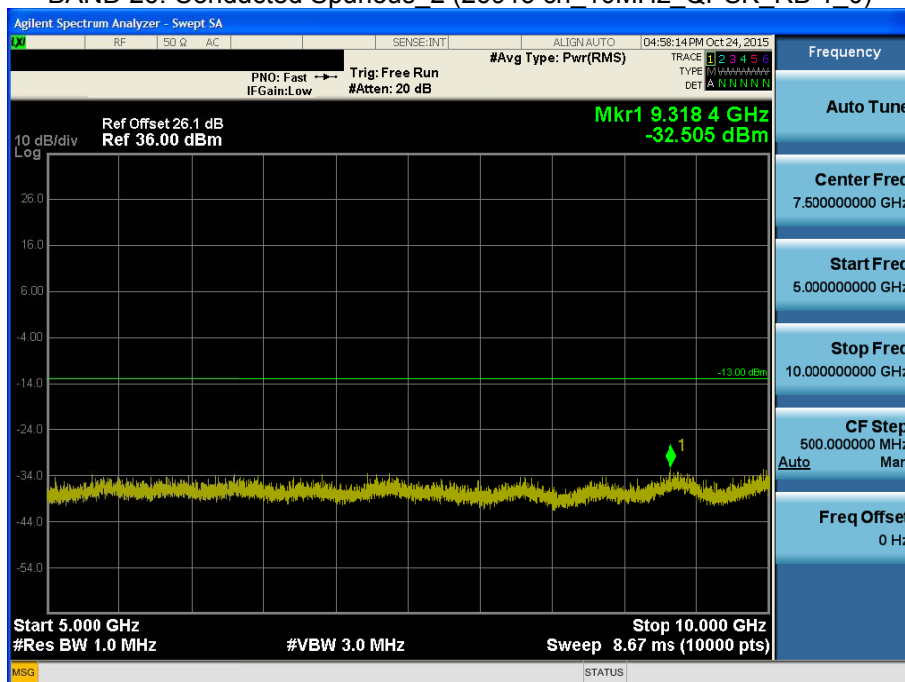




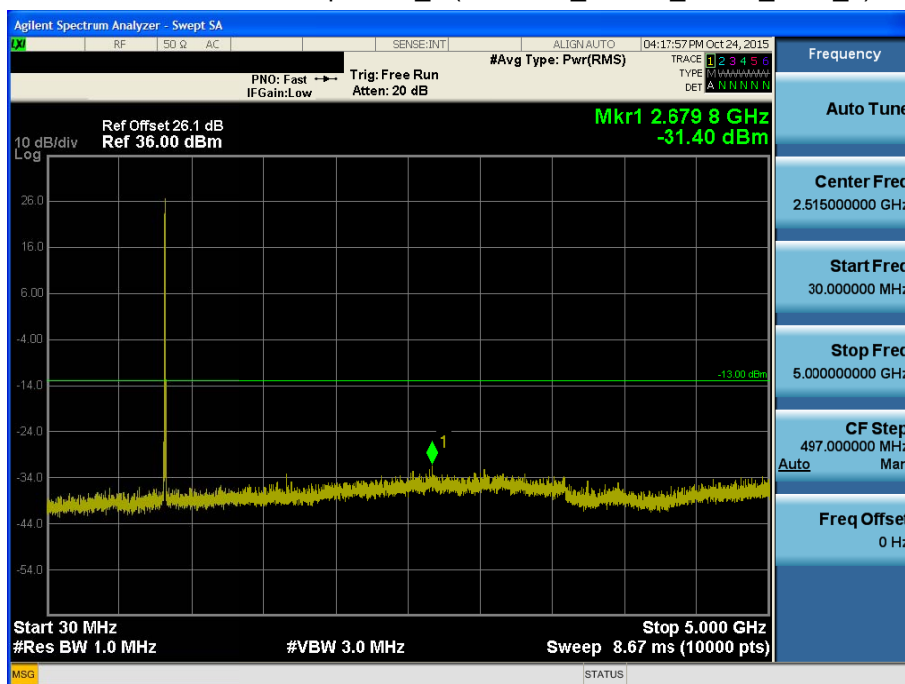
BAND 26. Conducted Spurious_1 (26915 ch_10MHz_QPSK_RB 1_0)



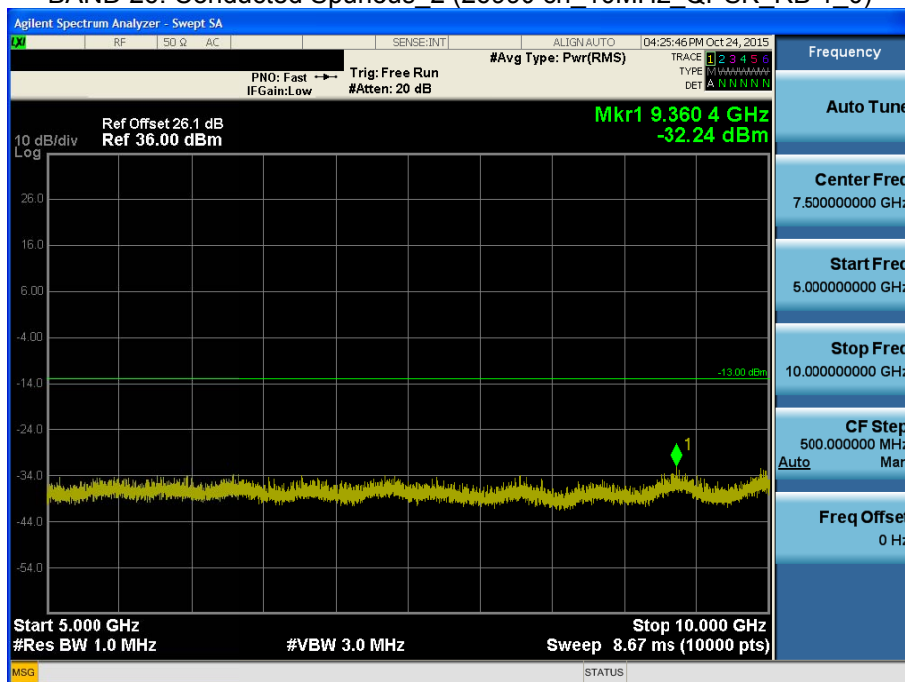
BAND 26. Conducted Spurious_2 (26915 ch_10MHz_QPSK_RB 1_0)



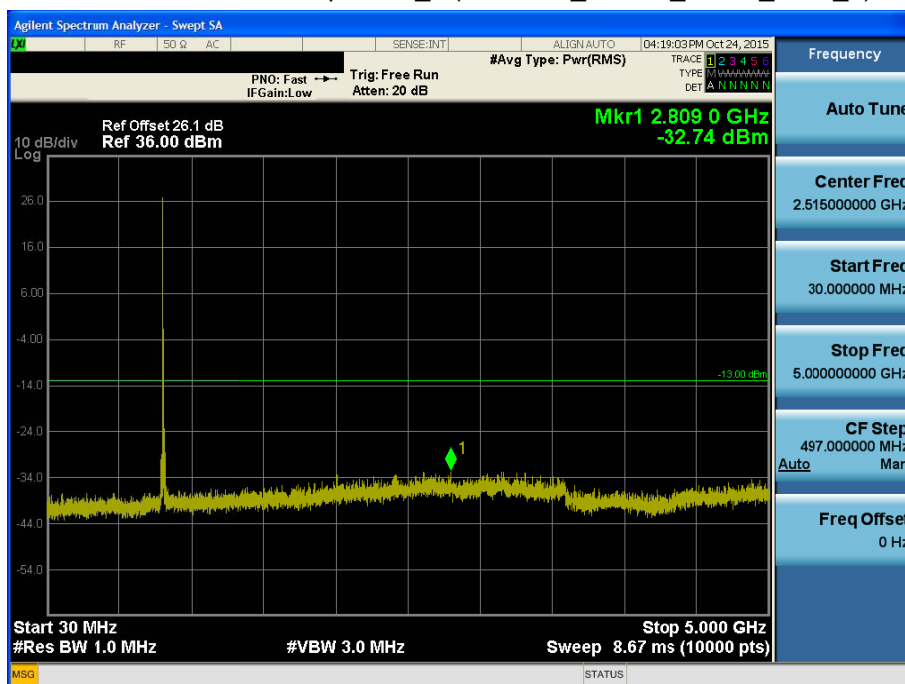
BAND 26. Conducted Spurious_1 (26990 ch_10MHz_QPSK_RB 1_0)



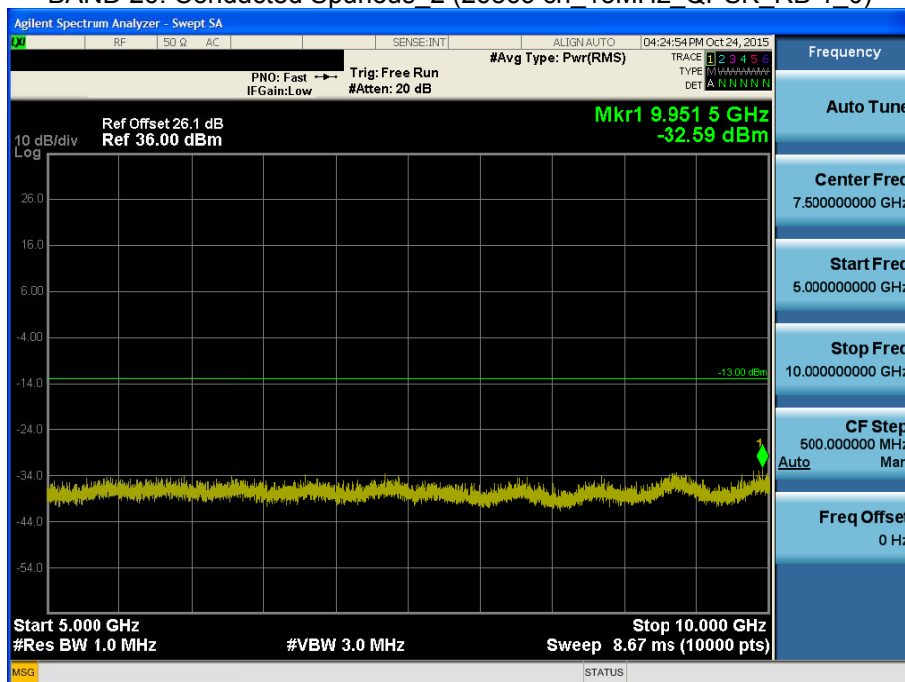
BAND 26. Conducted Spurious_2 (26990 ch_10MHz_QPSK_RB 1_0)



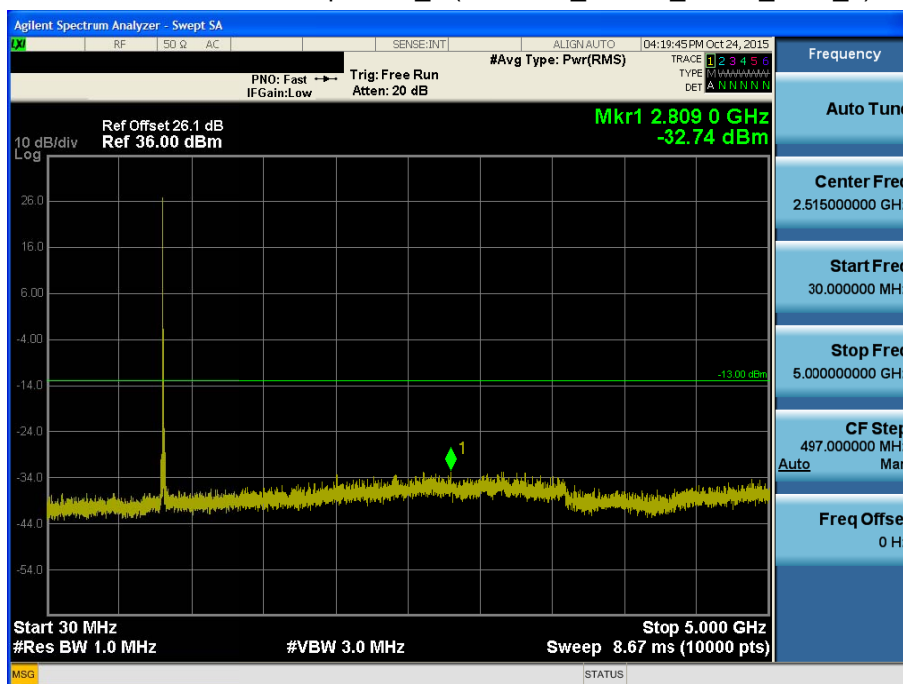
BAND 26. Conducted Spurious_1 (26865 ch_15MHz_QPSK_RB 1_0)



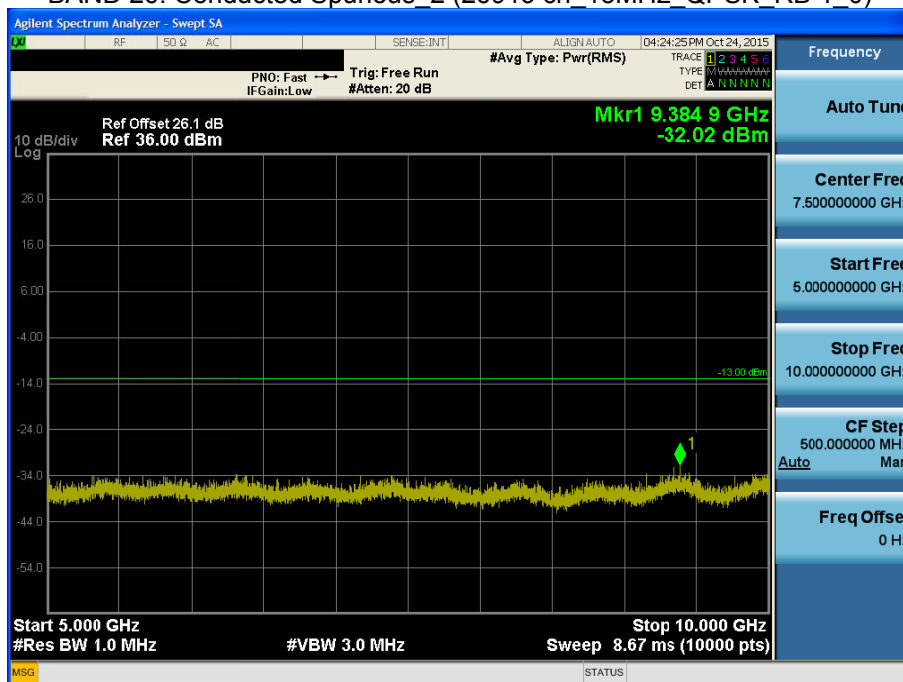
BAND 26. Conducted Spurious_2 (26865 ch_15MHz_QPSK_RB 1_0)



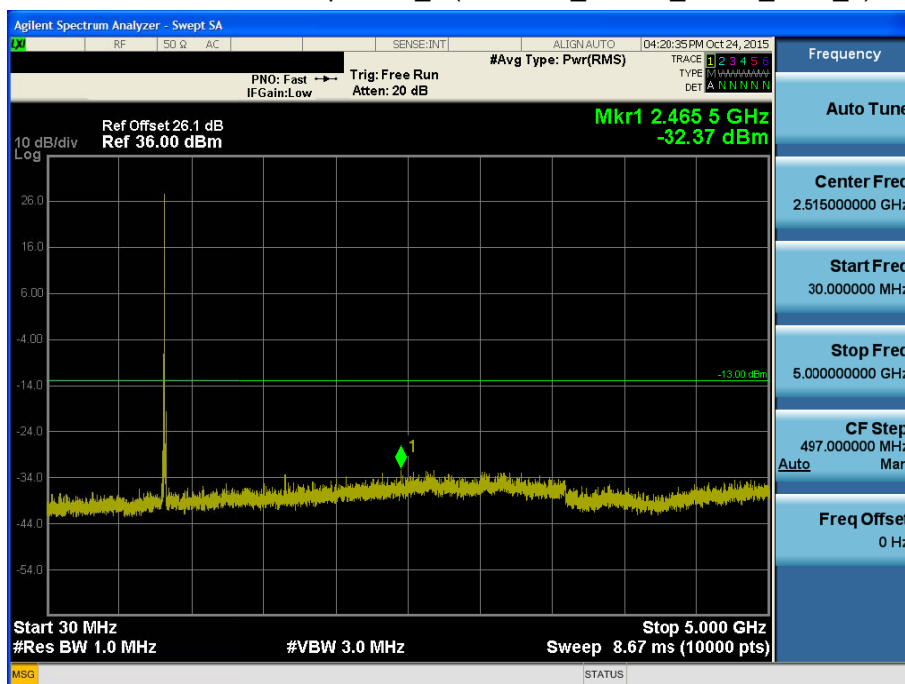
BAND 26. Conducted Spurious_1 (26915 ch_15MHz_QPSK_RB 1_0)



BAND 26. Conducted Spurious_2 (26915 ch_15MHz_QPSK_RB 1_0)



BAND 26. Conducted Spurious_1 (26965 ch_15MHz_QPSK_RB 1_0)



BAND 26. Conducted Spurious_2 (26965 ch_15MHz_QPSK_RB 1_0)

