

Carrier Aggregation Report

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
April 29, 2019

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

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
Report No.: HCT-RF-1904-FC049

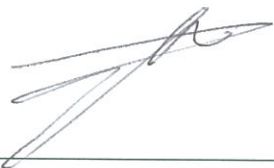
FCC ID: **A3LSMT725C**

APPLICANT: **SAMSUNG Electronics Co., Ltd.**

Model(s): SM-T725C
EUT Type: Tablet
FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part(s): §27, §2

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)



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Manager of Telecommunication Testing Center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1904-FC049	April 29, 2019	- First Approval Report

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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:	A3LSMT725C
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§27, §2
EUT Type:	Tablet
Model(s):	SM-T725C
Tx Frequency:	2557.5 – 2652.5 : 5 MHz 2560.0 – 2650.0 : 10 MHz 2562.5 – 2647.5 : 15 MHz 2565.0 – 2645.0 : 20 MHz
Date(s) of Tests:	April 22, 2019 ~ April 29, 2019
LTE CA :	CA 41C(Uplink)

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Tablet with GSM/GPRS/EGPRS/UMTS and LTE.

It also supports IEEE 802.11 a/b/g/n/ac (HT20/40/80), ANT+, Bluetooth, BT LE.

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 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Channel Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests 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-E-2016 Clause 2.2.17.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. 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;

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

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

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value.

These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration

4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

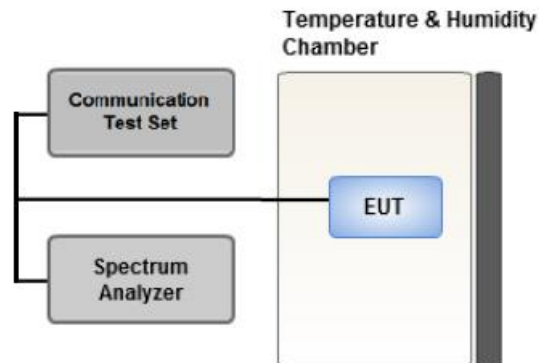
Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $> 2 \times$ span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10th harmonics from 9 kHz.

Test Note

1. Measurements value 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.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data

3.4 OCCUPIED BANDWIDTH.



Test setup

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.

The EUT makes a call to the communication simulator.

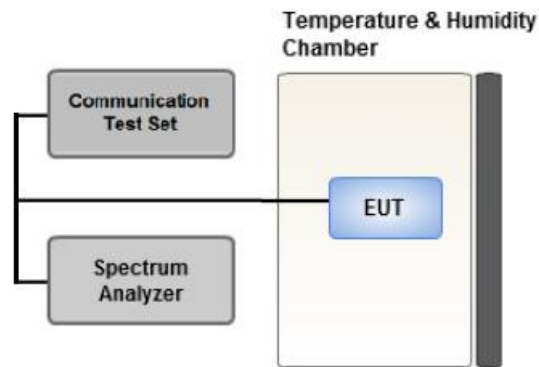
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW \geq 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

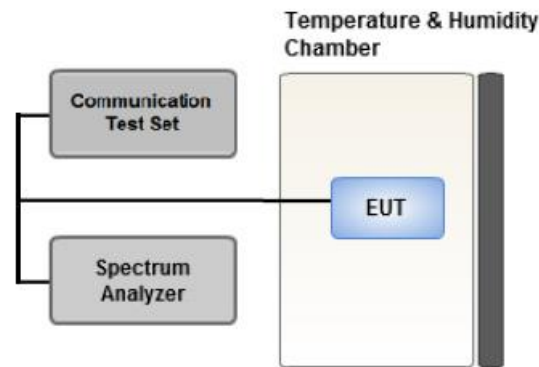
Test Overview

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.

Test Settings

1. RBW = 1 MHz
2. VBW \geq 3 MHz
3. Detector = Peak
4. Trace Mode = max hold
5. Sweep time = auto
6. Number of points in sweep \geq 2 * Span / RBW

3.6 CHANNEL EDGE



Test setup

Test Overview

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.

Test Settings

1. Start and stop frequency were set such that the channel edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 2% of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

1. The attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz.
2. All measurements were done at 3 channels.
3. The channel edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
REOHDE & SCHWARZ	SCU 18 / AMPLIFIER	10094	04/16/2019	Annual	04/16/2020
Wainwright	WHK1.2/15G-10EF/H.P.F	4	04/02/2019	Annual	04/02/2020
Wainwright	WHK3.3/18G-10EF/H.P.F	2	04/02/2019	Annual	04/02/2020
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	5001	06/07/2018	Annual	06/07/2019
Agilent	E3632A/DC Power Supply	KR75303243	05/09/2018	Annual	05/09/2019
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93000718	08/07/2018	Annual	08/07/2019
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	09/14/2018	Annual	09/14/2019
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	10/04/2018	Annual	10/04/2019
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170541	12/04/2017	Biennial	12/04/2019
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	01/28/2019	Biennial	01/28/2021
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY52090906	06/08/2018	Annual	06/08/2019
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/21/2018	Annual	06/21/2019
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/22/2018	Annual	10/22/2019
Agilent	8960 (E5515C)/ Base Station	MY48360800	09/27/2018	Annual	09/27/2019
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	08/23/2018	Biennial	08/23/2020
Schwarzbeck	VULB9160/ Bilog Antenna	9160-3368	08/09/2018	Biennial	08/09/2020
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6201502997	08/13/2018	Annual	08/13/2019
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/30/2019	Annual	01/30/2020
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/19/2018	Annual	07/19/2019
REOHDE & SCHWARZ	ESU40 / EMI TEST RECEIVER	100524	07/27/2018	Annual	07/27/2019
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (\pmdB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(m)(4)	<ul style="list-style-type: none"> ■ $< 40 + 10\log_{10} (P[\text{Watts}])$ at Channel edges ■ $< 43 + 10\log_{10} (P[\text{Watts}])$ between 5 and X MHz from Channel edges ■ $< 55 + 10\log_{10} (P[\text{Watts}])$ beyond X MHz beyond from Channel edges ■ $< 43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz 	PASS
Conducted Output Power	§2.1046	N/A	<u>See Note1</u>
Frequency stability / variation of ambient temperature	§2.1055, §27.54	Emission must remain in band	PASS

Note:

1. See SAR Report
2. The same samples were used for SAR and EMC

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§27.50(h)(2)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(m)(4)	$< 55 + 10\log_{10} (P[\text{Watts}])$	PASS

7. SAMPLE CALCULATION

7.1 ERP

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	0.483	26.84

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

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test , the turn table is rotated until the maximum signal 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.

7.2 EIRP

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
40620	2593.0	-15.75	18.45	9.90	1.76	H	0.456	26.59

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

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test , the turn table is rotated until the maximum signal 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 equivalent isotropic radiated power.

7.3 Emission Designator

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

16QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

64QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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.

Test Note

1. All tests were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth.
2. Channel bandwidth is shown in the tables below based only on the channel bandwidths that were supported in this device.

Channel Bandwidth (PCC)	Channel Bandwidth (SCC)	Maximum aggregated bandwidth (MHz)
10	20	40
15	15, 20	40
20	10, 15, 20	40
5, 10	20	40
15	15, 20	40
20	5, 10, 15, 20	40
10	15, 20	40
15	10, 15, 20	40
20	10, 15, 20	40
10	20	40
20	20	40

3. All modes of operation were investigated and the worst case configuration results are reported in this section. Please refer to the table below.

- Worst case(Conducted Spurious Emissions, Channel Edge)
: We have selected higher of the Conduction Output Power.

- Worst case(Radiated Spurious Emissions) : We have selected higher of the EIRP.

[Worst case]

Test Description	Mod	Operating frequency	PCC				SCC			
			BW (MHz)	Ch.	RB	RB Offset	BW (MHz)	Ch.	RB	RB Offset
Conducted Spurious Emissions	QPSK	Low	20	40340	1	99	20	40538	1	0
	QPSK	Mid	5	40740	1	0	20	40623	1	99
	QPSK	High	20	41140	1	0	15	40969	1	74
	QPSK	Low	20	40340	100	0	20	40538	100	0
	QPSK	Mid	5	40740	25	0	20	40623	100	0
	QPSK	High	20	41140	100	0	15	40969	75	0
Channel Edge	QPSK	Low	20	40340	1	99	20	40538	1	0
	QPSK	Mid	5	40740	1	0	20	40623	1	99
	QPSK	High	20	41140	1	0	15	40969	1	74
	QPSK	Low	20	40340	100	0	20	40538	100	0
	QPSK	Mid	5	40740	25	0	20	40623	100	0
	QPSK	High	20	41140	100	0	15	40969	75	0
Radiated Spurious Emissions	QPSK	Low	10	40290	1	49	20	40434	1	0
	QPSK	Mid	10	40740	1	0	15	40620	1	74
	QPSK	High	20	41140	1	0	10	40996	1	49

[Worst case]

Test Description	Mod	Operating frequency	PCC				SCC			
			BW (MHz)	Ch.	RB	RB Offset	BW (MHz)	Ch.	RB	RB Offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM	Mid	5	40740	25	0	20	40623	100	0
			10	40740	50	0	15	40620	75	0
			10	40740	50	0	20	40596	100	0
			15	40740	75	0	10	40620	50	0
			15	40740	75	0	15	40590	75	0
			15	40740	75	0	20	40569	100	0
			20	40740	100	0	5	40623	25	0
			20	40740	100	0	10	40596	50	0
			20	40740	100	0	15	40569	75	0
			20	40740	100	0	20	40542	100	0
Frequency stability	QPSK	Low	5	40265	1	0	20	40382	1	0
			10	40290	1	0	20	40434	1	0
			15	40315	1	0	15	40465	1	0
			20	40340	1	0	20	40538	1	0
		High	5	41215	1	24	20	41098	1	99
			10	41190	1	49	20	41046	1	99
			15	41165	1	74	20	40994	1	99
			20	41140	1	99	20	40942	1	99

8.1 Conducted Power

PCC				SCC				Conducted.
Bandwidth [MHz]	Channel	RB	RB Offset	Bandwidth [MHz]	Channel	RB	RB Offset	Power [dBm]
5	40265	1	24	20	40382	1	0	22.80
10	40290	1	49	15	40410	1	0	22.71
10	40290	1	49	20	40434	1	0	22.68
15	40315	1	74	10	40435	1	0	22.81
15	40315	1	74	15	40465	1	0	22.82
15	40315	1	74	20	40486	1	0	22.76
20	40340	1	99	5	40457	1	0	22.87
20	40340	1	99	10	40484	1	0	22.86
20	40340	1	99	15	40511	1	0	22.87
20	40340	1	99	20	40538	1	0	22.88
5	40740	1	0	20	40623	1	99	22.75
10	40740	1	0	15	40620	1	74	22.66
10	40740	1	0	20	40596	1	99	22.65
15	40740	1	0	10	40620	1	49	22.70
15	40740	1	0	15	40590	1	74	22.69
15	40740	1	0	20	40569	1	99	22.67
20	40740	1	0	5	40623	1	24	22.71
20	40740	1	0	10	40596	1	49	22.63
20	40740	1	0	15	40569	1	74	22.69
20	40740	1	0	20	40542	1	99	22.71
5	41215	1	0	20	41098	1	99	22.72
10	41190	1	0	15	41070	1	74	22.75
10	41190	1	0	20	41046	1	99	22.72
15	41165	1	0	10	41045	1	49	22.66
15	41165	1	0	15	41015	1	74	22.75
15	41165	1	0	20	40994	1	99	22.73
20	41140	1	0	5	41023	1	24	22.69
20	41140	1	0	10	40996	1	49	22.68
20	41140	1	0	15	40969	1	74	22.78
20	41140	1	0	20	40942	1	99	22.77

PCC				SCC				Conducted.
Bandwidth [MHz]	Channel	RB	RB Offset	Bandwidth [MHz]	Channel	RB	RB Offset	Power [dBm]
5	40265	25	0	20	40382	100	0	20.70
10	40290	50	0	15	40410	75	0	20.71
10	40290	50	0	20	40434	100	0	20.71
15	40315	75	0	10	40435	50	0	20.73
15	40315	75	0	15	40465	75	0	20.72
15	40315	75	0	20	40486	100	0	20.70
20	40340	100	0	5	40457	25	0	20.77
20	40340	100	0	10	40484	50	0	20.77
20	40340	100	0	15	40511	75	0	20.77
20	40340	100	0	20	40538	100	0	20.78
5	40740	25	0	20	40623	100	0	20.81
10	40740	50	0	15	40620	75	0	20.74
10	40740	50	0	20	40596	100	0	20.79
15	40740	75	0	10	40620	50	0	20.74
15	40740	75	0	15	40590	75	0	20.76
15	40740	75	0	20	40569	100	0	20.77
20	40740	100	0	5	40623	25	0	20.76
20	40740	100	0	10	40596	50	0	20.78
20	40740	100	0	15	40569	75	0	20.78
20	40740	100	0	20	40542	100	0	20.80
5	41215	25	0	20	41098	100	0	20.64
10	41190	50	0	15	41070	75	0	20.72
10	41190	50	0	20	41046	100	0	20.72
15	41165	75	0	10	41045	50	0	20.69
15	41165	75	0	15	41015	75	0	20.68
15	41165	75	0	20	40994	100	0	20.67
20	41140	100	0	5	41023	25	0	20.68
20	41140	100	0	10	40996	50	0	20.73
20	41140	100	0	15	40969	75	0	20.74
20	41140	100	0	20	40942	100	0	20.69

8.2 Equivalent Isotropic Radiated Power

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/Offset	BW [MHz]	Channel	RB/Offset						W	dBm
10	40290	1/49	20	40434	1/0	-20.97	13.86	11.02	1.63	H	0.21	23.25
15	40315	1/74	15	40465	1/0	-21.64	13.19	11.02	1.63	H	0.18	22.58
15	40315	1/74	20	40486	1/0	-21.51	13.32	11.02	1.63	H	0.19	22.71
20	40340	1/99	10	40484	1/0	-21.27	13.56	11.02	1.63	H	0.20	22.95
20	40340	1/99	15	40511	1/0	-21.59	13.24	11.02	1.63	H	0.18	22.63
20	40340	1/99	20	40538	1/0	-21.26	13.57	11.02	1.63	H	0.20	22.96
5	40265	1/24	20	40382	1/0	-21.38	13.45	11.02	1.63	H	0.19	22.84
20	40340	1/99	5	40457	1/0	-21.25	13.58	11.02	1.63	H	0.20	22.97
10	40290	1/49	15	40410	1/0	-21.21	13.62	11.02	1.63	H	0.20	23.01
15	40315	1/74	10	40435	1/0	-21.50	13.35	11.02	1.63	H	0.19	22.74
10	40740	1/0	20	40596	1/99	-21.42	13.42	11.02	1.62	H	0.19	22.82
15	40740	1/0	15	40590	1/74	-21.65	13.19	11.02	1.62	H	0.18	22.59
15	40740	1/0	20	40569	1/99	-21.73	13.11	11.02	1.62	H	0.18	22.51
20	40740	1/0	10	40596	1/49	-21.51	13.33	11.02	1.62	H	0.19	22.73
20	40740	1/0	15	40569	1/74	-21.63	13.21	11.02	1.62	H	0.18	22.61
20	40740	1/0	20	40542	1/99	-21.52	13.32	11.02	1.62	H	0.19	22.72
5	40740	1/0	20	40623	1/99	-21.32	13.52	11.02	1.62	H	0.20	22.92
20	40740	1/0	5	40623	1/24	-21.66	13.18	11.02	1.62	H	0.18	22.58
10	40740	1/0	15	40620	1/74	-21.17	13.67	11.02	1.62	H	0.20	23.07
15	40740	1/0	10	40620	1/49	-21.24	13.60	11.02	1.62	H	0.20	23.00
10	41190	1/0	20	41046	1/99	-20.79	14.15	11.13	1.65	H	0.23	23.63
15	41165	1/0	15	41015	1/74	-20.78	14.16	11.13	1.65	H	0.23	23.64
15	41165	1/0	20	40994	1/99	-20.88	14.06	11.13	1.65	H	0.23	23.54
20	41140	1/0	10	40996	1/49	-20.29	14.65	11.13	1.65	H	0.26	24.13
20	41140	1/0	15	40969	1/74	-20.48	14.46	11.13	1.65	H	0.25	23.94
20	41140	1/0	20	40942	1/99	-20.75	14.19	11.13	1.65	H	0.23	23.67
5	41215	1/0	20	41098	1/99	-20.80	14.14	11.13	1.65	H	0.23	23.62
20	41140	1/0	5	41023	1/24	-20.81	14.13	11.13	1.65	H	0.23	23.61
10	41190	1/0	15	41070	1/74	-20.83	14.11	11.13	1.65	H	0.23	23.59
15	41165	1/0	10	41045	1/49	-20.97	13.97	11.13	1.65	H	0.22	23.45

Note:

1. Modulation : QPSK
2. Limit : < 2 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/Offset	BW [MHz]	Channel	RB/Offset						W	dBm
10	40290	1/49	20	40434	1/0	-22.42	12.41	11.02	1.63	H	0.15	21.80
15	40315	1/74	15	40465	1/0	-22.45	12.38	11.02	1.63	H	0.15	21.77
15	40315	1/74	20	40486	1/0	-22.39	12.44	11.02	1.63	H	0.15	21.83
20	40340	1/99	10	40484	1/0	-22.08	12.75	11.02	1.63	H	0.16	22.14
20	40340	1/99	15	40511	1/0	-22.19	12.64	11.02	1.63	H	0.16	22.03
20	40340	1/99	20	40538	1/0	-22.22	12.61	11.02	1.63	H	0.16	22.00
5	40265	1/24	20	40382	1/0	-22.46	12.37	11.02	1.63	H	0.15	21.76
20	40340	1/99	5	40457	1/0	-22.32	12.51	11.02	1.63	H	0.15	21.90
10	40290	1/49	15	40410	1/0	-22.25	12.58	11.02	1.63	H	0.16	21.97
15	40315	1/74	10	40435	1/0	-22.40	12.45	11.02	1.63	H	0.15	21.84
10	40740	1/0	20	40596	1/99	-22.25	12.59	11.02	1.62	H	0.16	21.99
15	40740	1/0	15	40590	1/74	-22.66	12.18	11.02	1.62	H	0.14	21.58
15	40740	1/0	20	40569	1/99	-22.50	12.34	11.02	1.62	H	0.15	21.74
20	40740	1/0	10	40596	1/49	-22.78	12.06	11.02	1.62	H	0.14	21.46
20	40740	1/0	15	40569	1/74	-22.68	12.16	11.02	1.62	H	0.14	21.56
20	40740	1/0	20	40542	1/99	-22.53	12.31	11.02	1.62	H	0.15	21.71
5	40740	1/0	20	40623	1/99	-22.20	12.64	11.02	1.62	H	0.16	22.04
20	40740	1/0	5	40623	1/24	-22.58	12.26	11.02	1.62	H	0.15	21.66
10	40740	1/0	15	40620	1/74	-22.00	12.84	11.02	1.62	H	0.17	22.24
15	40740	1/0	10	40620	1/49	-22.37	12.47	11.02	1.62	H	0.15	21.87
10	41190	1/0	20	41046	1/99	-21.66	13.28	11.13	1.65	H	0.19	22.76
15	41165	1/0	15	41015	1/74	-21.74	13.20	11.13	1.65	H	0.19	22.68
15	41165	1/0	20	40994	1/99	-21.72	13.22	11.13	1.65	H	0.19	22.70
20	41140	1/0	10	40996	1/49	-21.92	13.02	11.13	1.65	H	0.18	22.50
20	41140	1/0	15	40969	1/74	-21.31	13.63	11.13	1.65	H	0.20	23.11
20	41140	1/0	20	40942	1/99	-21.83	13.11	11.13	1.65	H	0.18	22.59
5	41215	1/0	20	41098	1/99	-21.77	13.17	11.13	1.65	H	0.18	22.65
20	41140	1/0	5	41023	1/24	-21.67	13.27	11.13	1.65	H	0.19	22.75
10	41190	1/0	15	41070	1/74	-21.60	13.34	11.13	1.65	H	0.19	22.82
15	41165	1/0	10	41045	1/49	-21.71	13.23	11.13	1.65	H	0.19	22.71

Note:

1. Modulation : 16QAM
2. Limit : < 2 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/Offset	BW [MHz]	Channel	RB/Offset						W	dBm
10	40290	1/49	20	40434	1/0	-24.47	10.36	11.02	1.63	H	0.09	19.75
15	40315	1/74	15	40465	1/0	-24.61	10.22	11.02	1.63	H	0.09	19.61
15	40315	1/74	20	40486	1/0	-24.65	10.18	11.02	1.63	H	0.09	19.57
20	40340	1/99	10	40484	1/0	-24.33	10.50	11.02	1.63	H	0.10	19.89
20	40340	1/99	15	40511	1/0	-24.21	10.62	11.02	1.63	H	0.10	20.01
20	40340	1/99	20	40538	1/0	-24.45	10.38	11.02	1.63	H	0.09	19.77
5	40265	1/24	20	40382	1/0	-24.38	10.45	11.02	1.63	H	0.10	19.84
20	40340	1/99	5	40457	1/0	-24.30	10.53	11.02	1.63	H	0.10	19.92
10	40290	1/49	15	40410	1/0	-24.46	10.37	11.02	1.63	H	0.09	19.76
15	40315	1/74	10	40435	1/0	-24.58	10.27	11.02	1.63	H	0.09	19.66
10	40740	1/0	20	40596	1/99	-24.15	10.69	11.02	1.62	H	0.10	20.09
15	40740	1/0	15	40590	1/74	-24.74	10.10	11.02	1.62	H	0.09	19.50
15	40740	1/0	20	40569	1/99	-24.58	10.26	11.02	1.62	H	0.09	19.66
20	40740	1/0	10	40596	1/49	-24.77	10.07	11.02	1.62	H	0.09	19.47
20	40740	1/0	15	40569	1/74	-24.71	10.13	11.02	1.62	H	0.09	19.53
20	40740	1/0	20	40542	1/99	-24.57	10.27	11.02	1.62	H	0.09	19.67
5	40740	1/0	20	40623	1/99	-24.23	10.61	11.02	1.62	H	0.10	20.01
20	40740	1/0	5	40623	1/24	-24.75	10.09	11.02	1.62	H	0.09	19.49
10	40740	1/0	15	40620	1/74	-24.19	10.65	11.02	1.62	H	0.10	20.05
15	40740	1/0	10	40620	1/49	-24.43	10.41	11.02	1.62	H	0.10	19.81
10	41190	1/0	20	41046	1/99	-23.83	11.11	11.13	1.65	H	0.11	20.59
15	41165	1/0	15	41015	1/74	-23.76	11.18	11.13	1.65	H	0.12	20.66
15	41165	1/0	20	40994	1/99	-23.65	11.29	11.13	1.65	H	0.12	20.77
20	41140	1/0	10	40996	1/49	-23.78	11.16	11.13	1.65	H	0.12	20.64
20	41140	1/0	15	40969	1/74	-24.00	10.94	11.13	1.65	H	0.11	20.42
20	41140	1/0	20	40942	1/99	-23.76	11.18	11.13	1.65	H	0.12	20.66
5	41215	1/0	20	41098	1/99	-24.00	10.94	11.13	1.65	H	0.11	20.42
20	41140	1/0	5	41023	1/24	-23.84	11.10	11.13	1.65	H	0.11	20.58
10	41190	1/0	15	41070	1/74	-23.84	11.10	11.13	1.65	H	0.11	20.58
15	41165	1/0	10	41045	1/49	-23.97	10.97	11.13	1.65	H	0.11	20.45

Note:

1. Modulation : 64QAM
2. Limit : < 2 Watts

8.3 Conducted Spurious Emissions

PCC				SCC				Measurement Maximum Frequency (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)
BW [MHz]	Ch.	RB	RB Offset	BW [MHz]	Ch.	RB	RB Offset				
20	40340	1	99	20	40538	1	0	3.7079	27.976	-61.521	-33.545
5	40740	1	0	20	40623	1	99	3.6955	27.976	-60.855	-32.879
20	41140	1	0	15	40969	1	74	3.7154	27.976	-61.611	-33.635
20	40340	1	0	20	40538	1	99	3.6950	28.591	-61.611	-33.020
5	40740	1	24	20	40623	1	0	3.1970	27.976	-61.621	-33.645
20	41140	1	99	15	40969	1	0	3.6990	27.976	-61.166	-33.190
20	40340	100	0	20	40538	100	0	5.6541	28.591	-61.240	-32.649
5	40740	25	0	20	40623	100	0	3.7024	27.976	-61.752	-33.776
20	41140	100	0	15	40969	75	0	3.7354	27.976	-61.570	-33.594

Note:

1. Modulation : QPSK
2. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter
3. Factors for frequency :

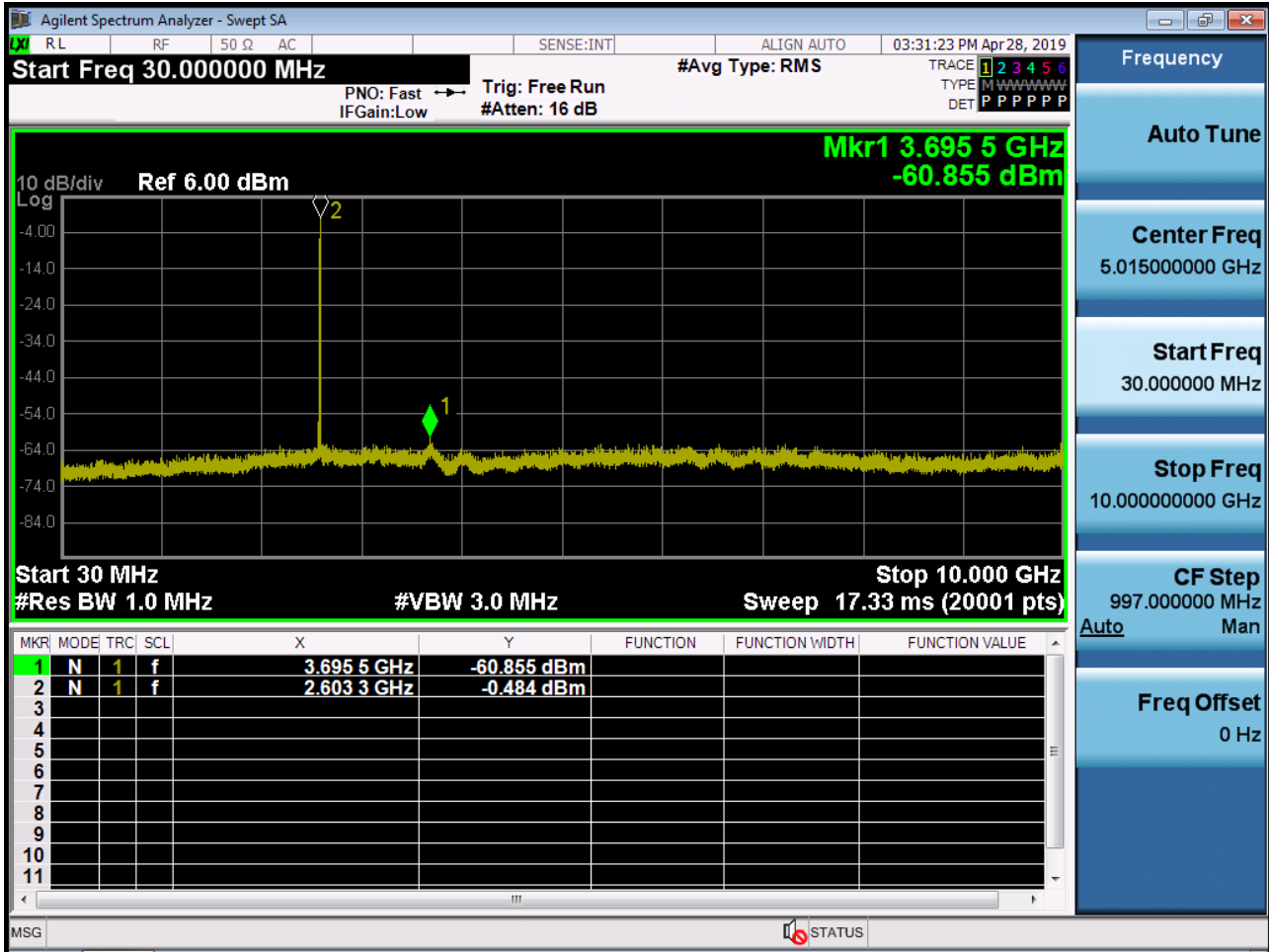
Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20(26.5)	30.131

4. Limit : -25.0 dBm

Frequency Range : 30MHz ~ 10GHz

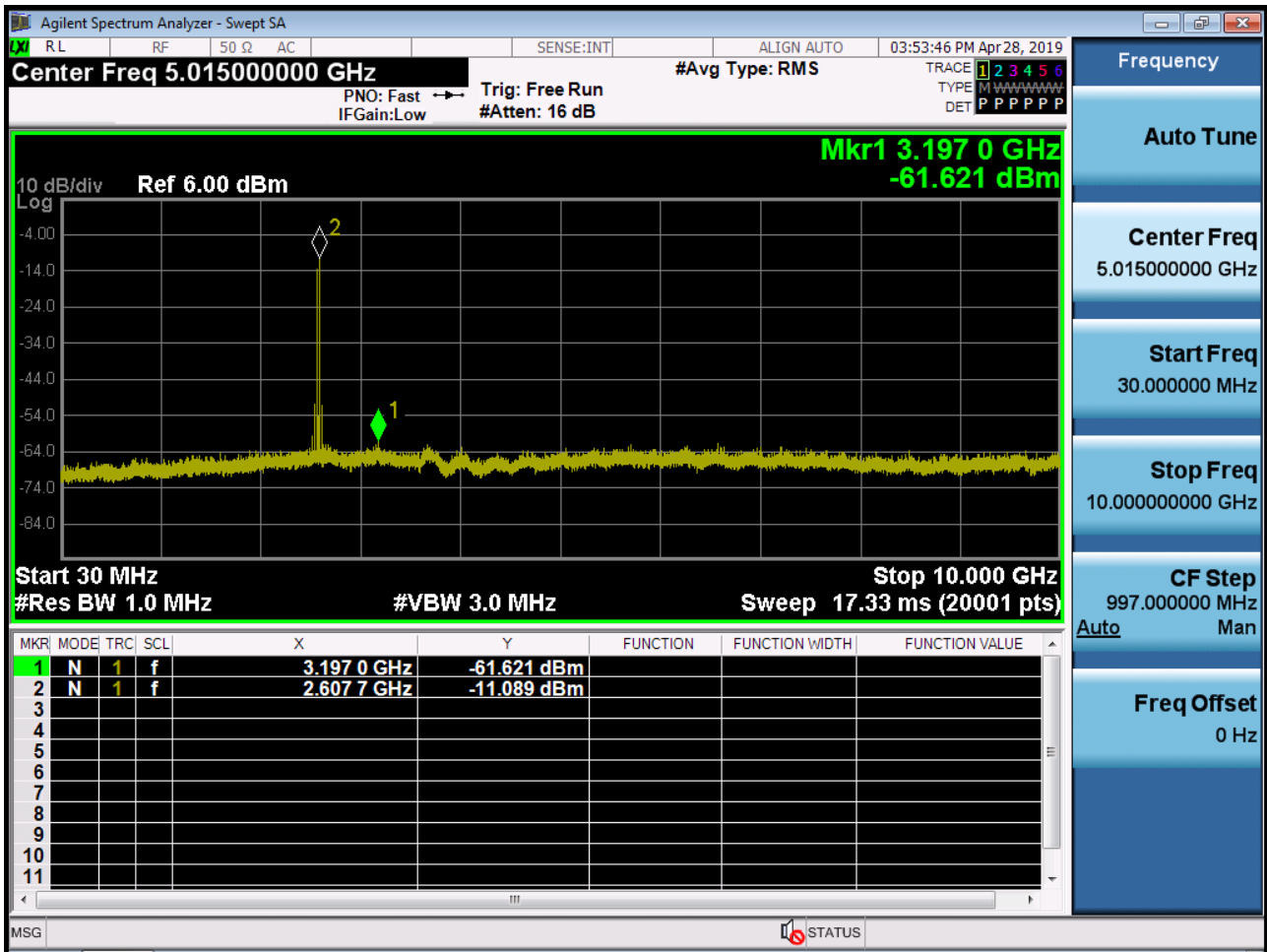
PCC 5MHz Ch40740 RB1 Offset0

SCC 20MHz Ch40623 RB1 Offset99

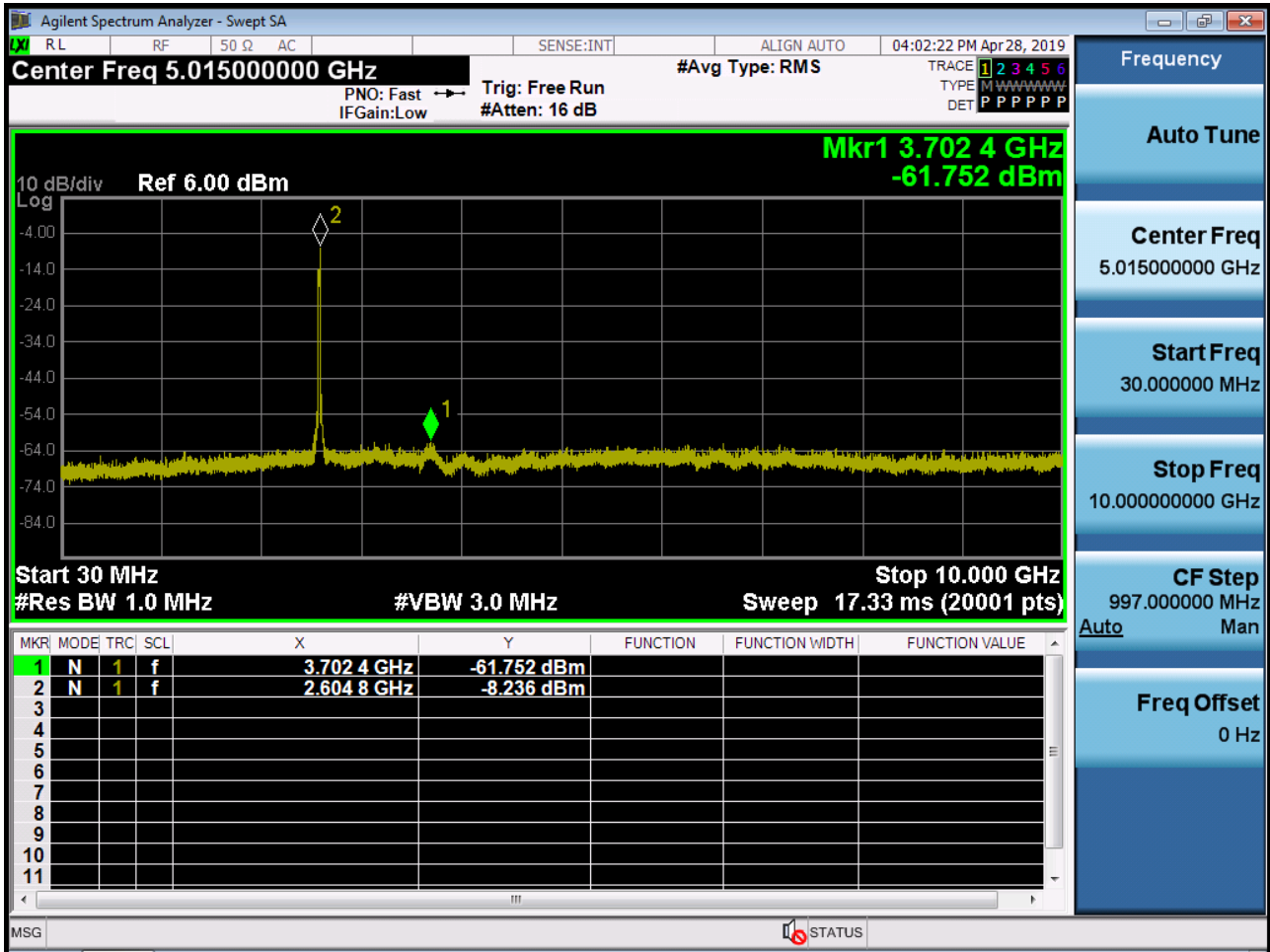


PCC 5MHz Ch40740 RB1 Offset24

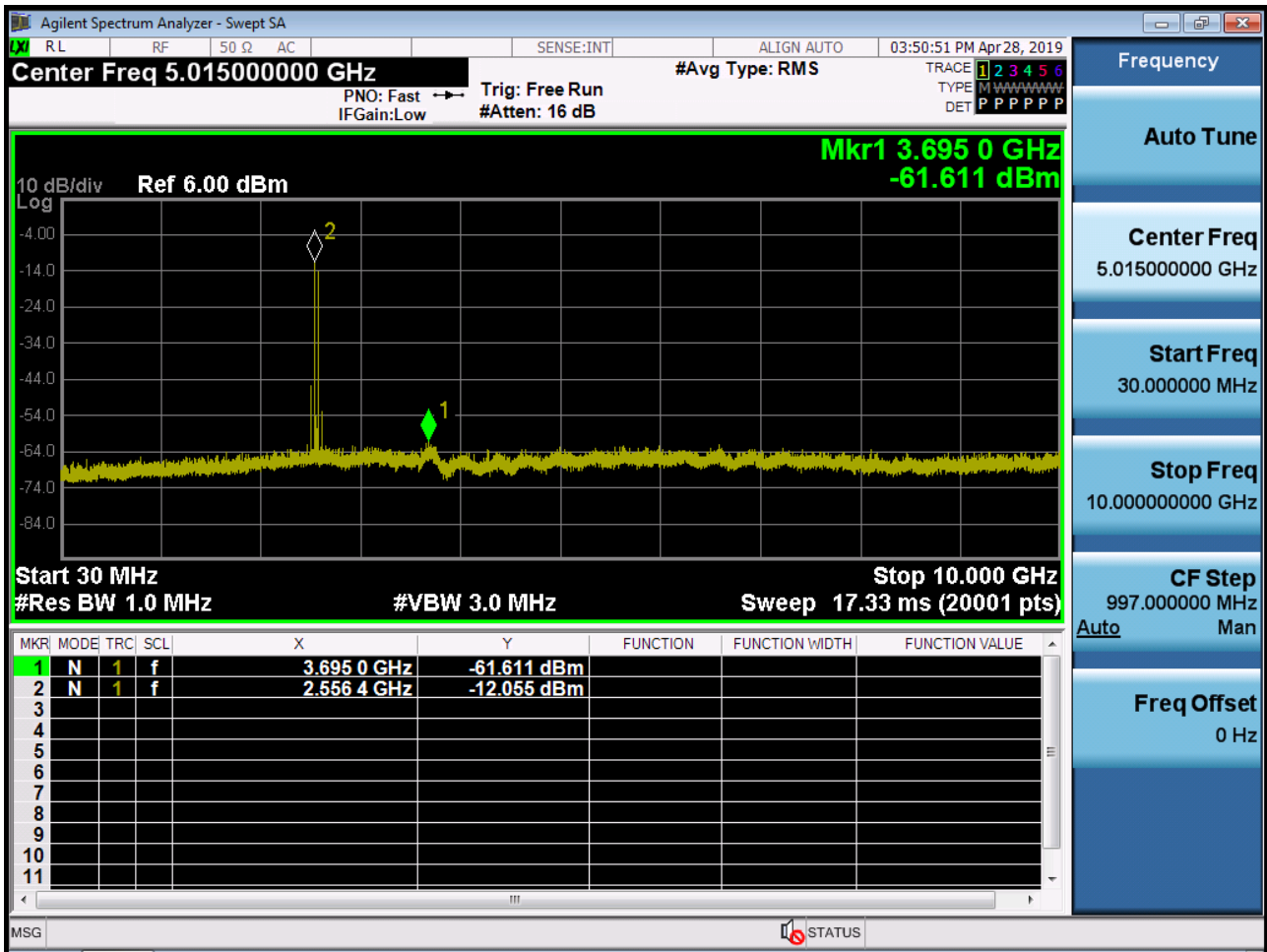
SCC 20MHz Ch40623 RB1 Offset0



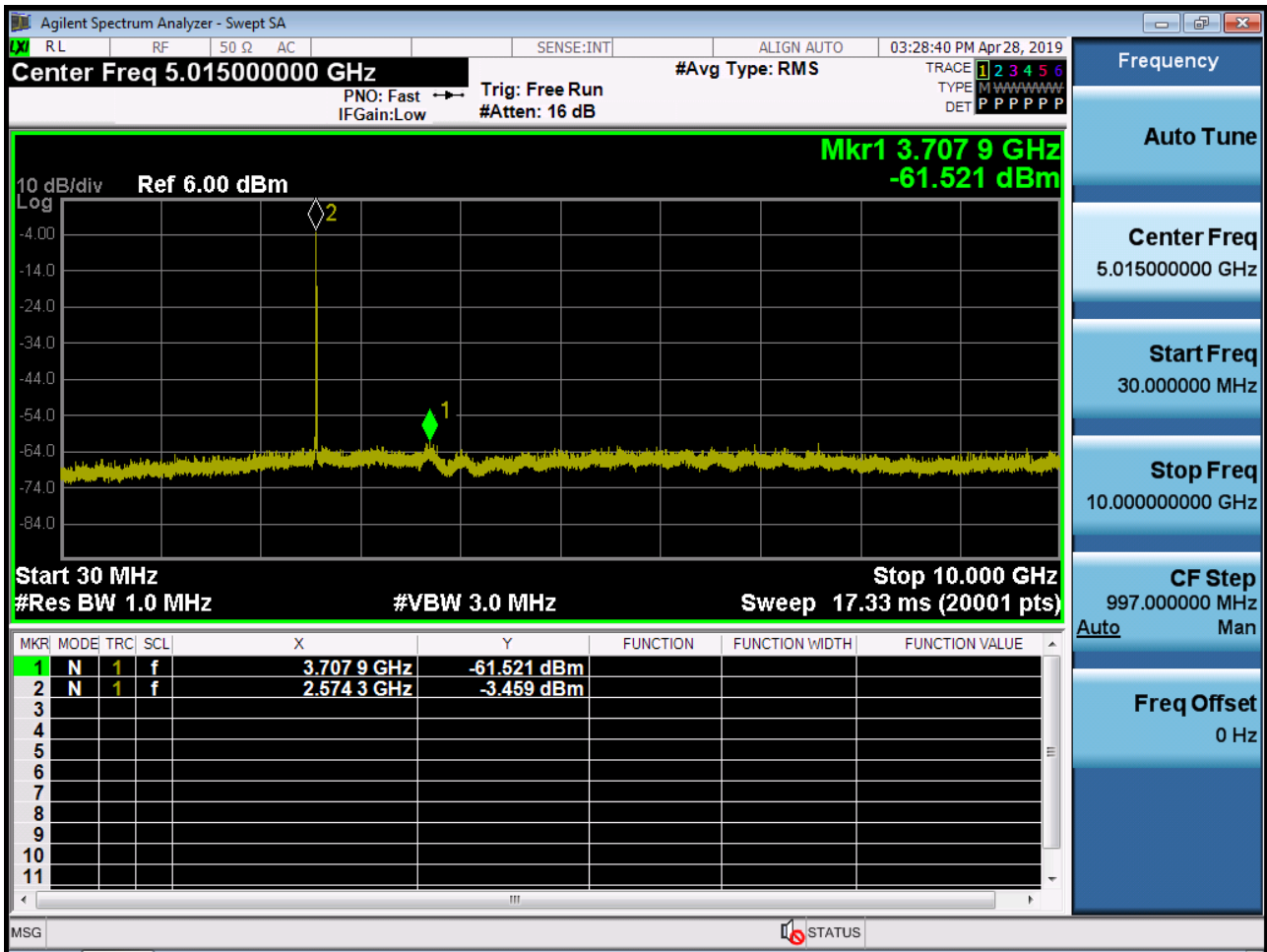
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SCC 20MHz Ch40623 RB100 Offset0



PCC 20MHz Ch40340 RB1 Offset0
SCC 20MHz Ch40538 RB1 Offset99

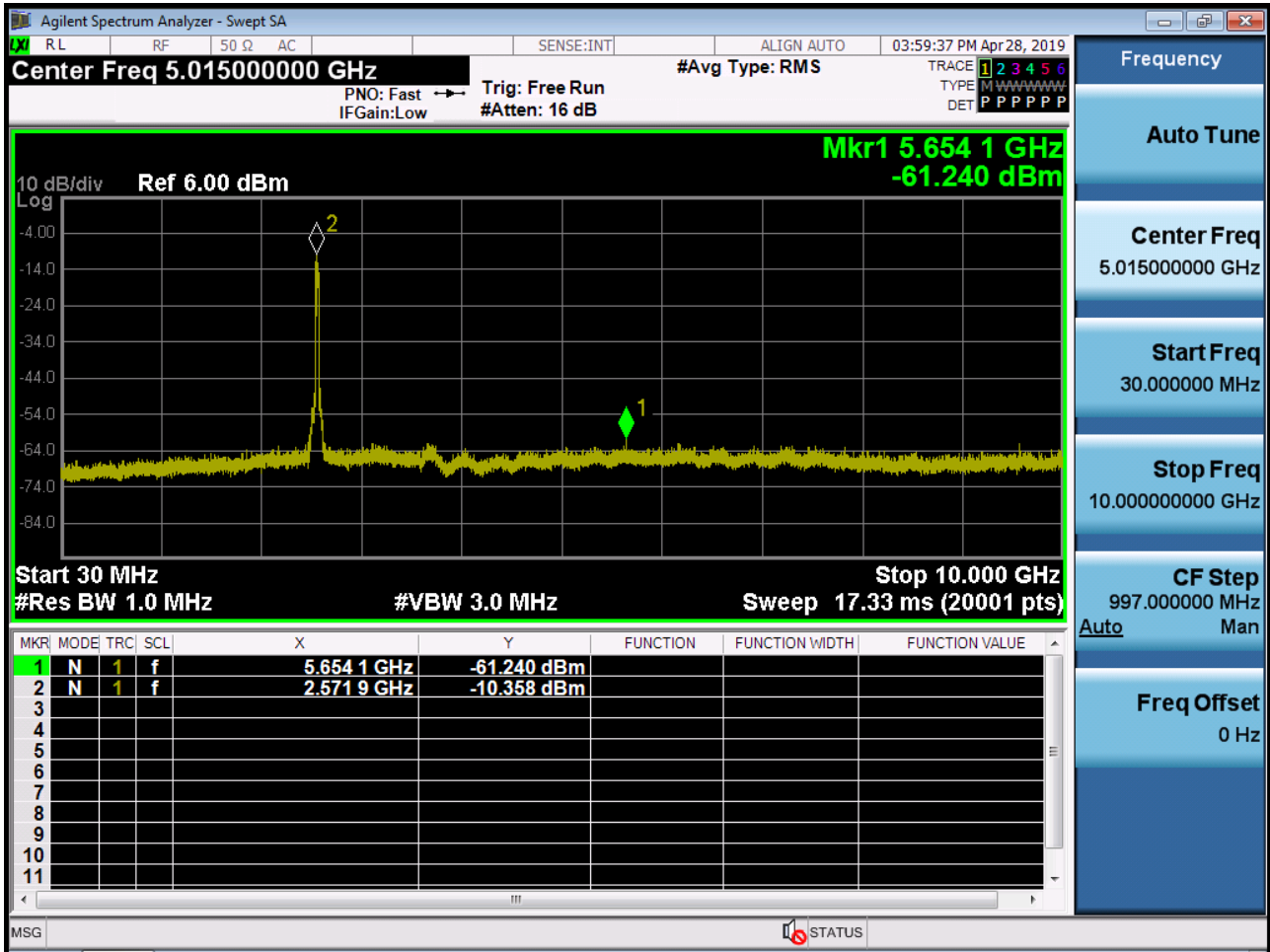


PCC 20MHz Ch40340 RB1 Offset99
SCC 20MHz Ch40538 RB1 Offset0

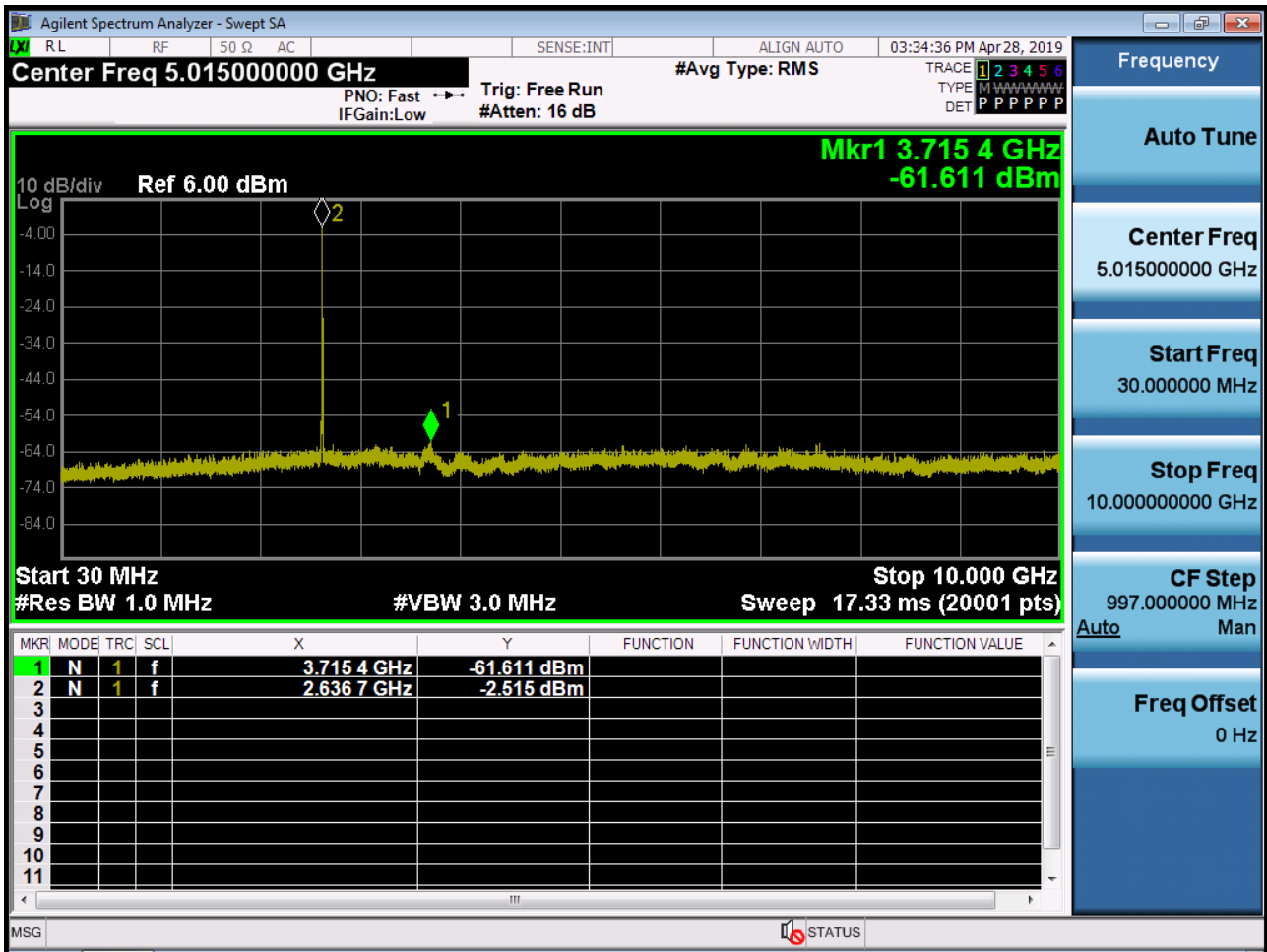


PCC 20MHz Ch40340 RB100 Offset0

SCC 20MHz Ch40538 RB100 Offset0

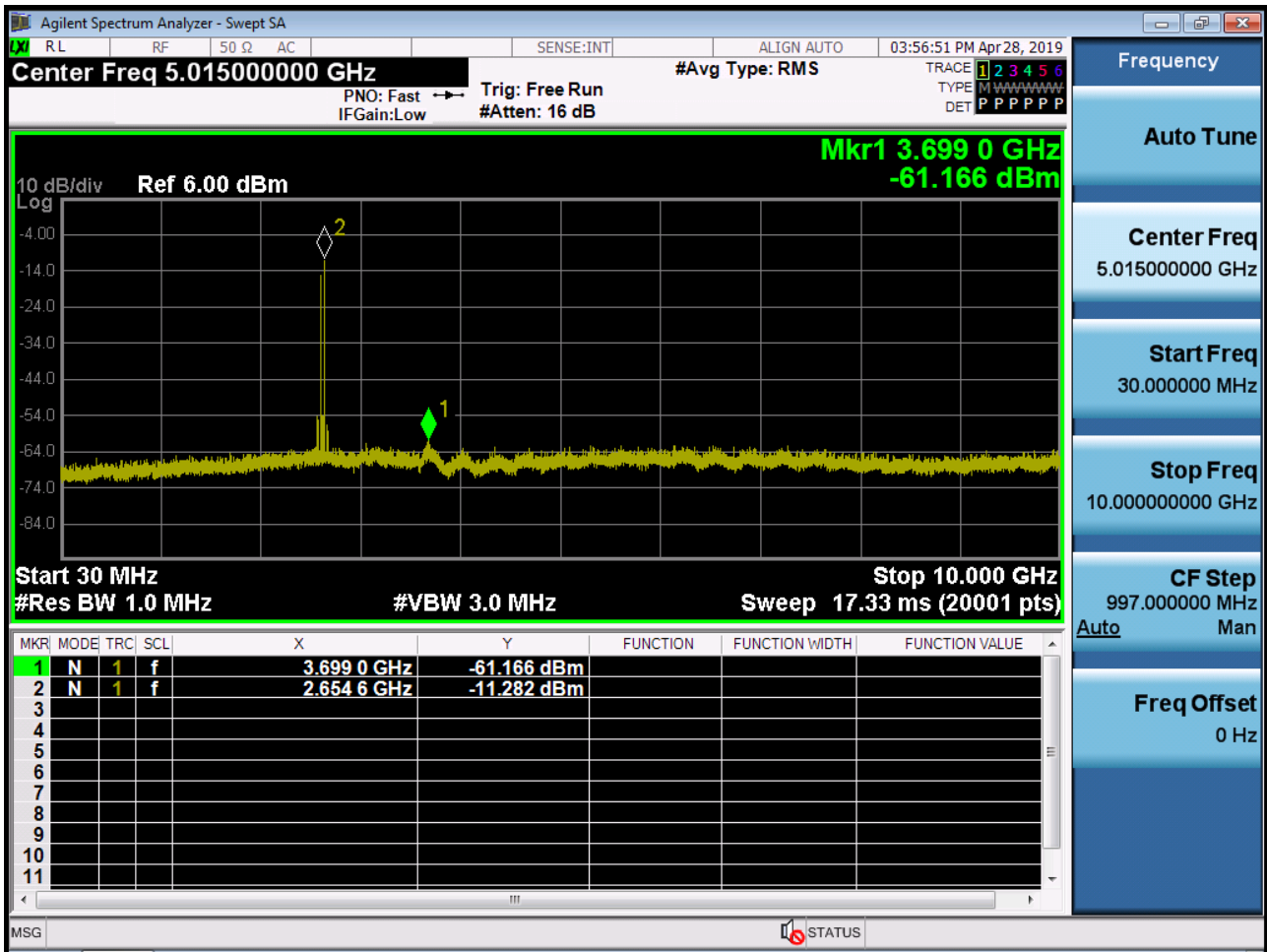


PCC 20MHz Ch41140 RB1 Offset0
SCC 15MHz Ch40969 RB1 Offset74



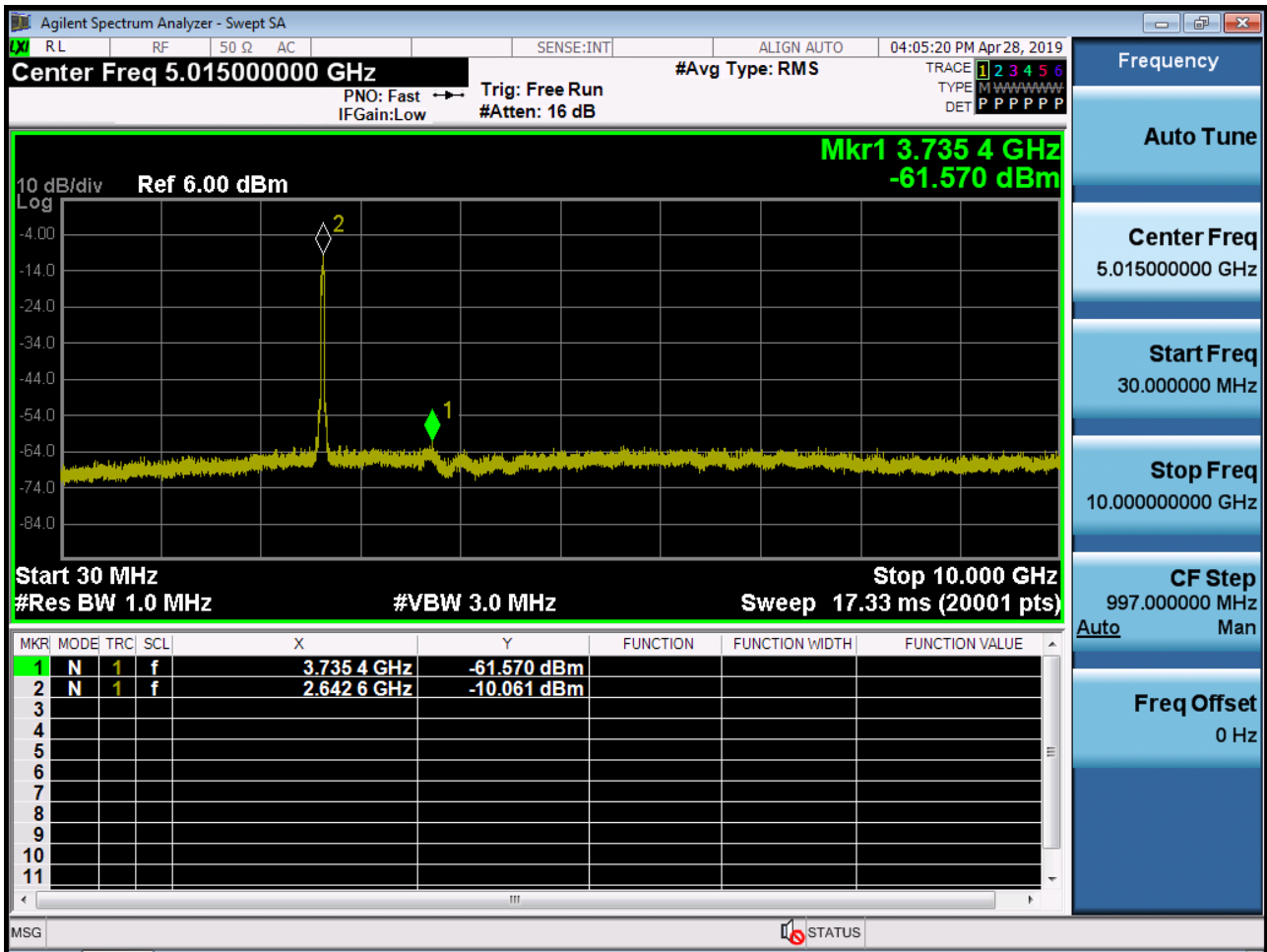
PCC 20MHz Ch41140 RB1 Offset99

SCC 15MHz Ch40969 RB1 Offset0



PCC 20MHz Ch41140 RB100 Offset0

SCC 15MHz Ch40969 RB75 Offset0



Frequency Range : 10GHz ~ 26.5GHz

PCC 5MHz Ch40740 RB1 Offset0

SCC 20MHz Ch40623 RB1 Offset99

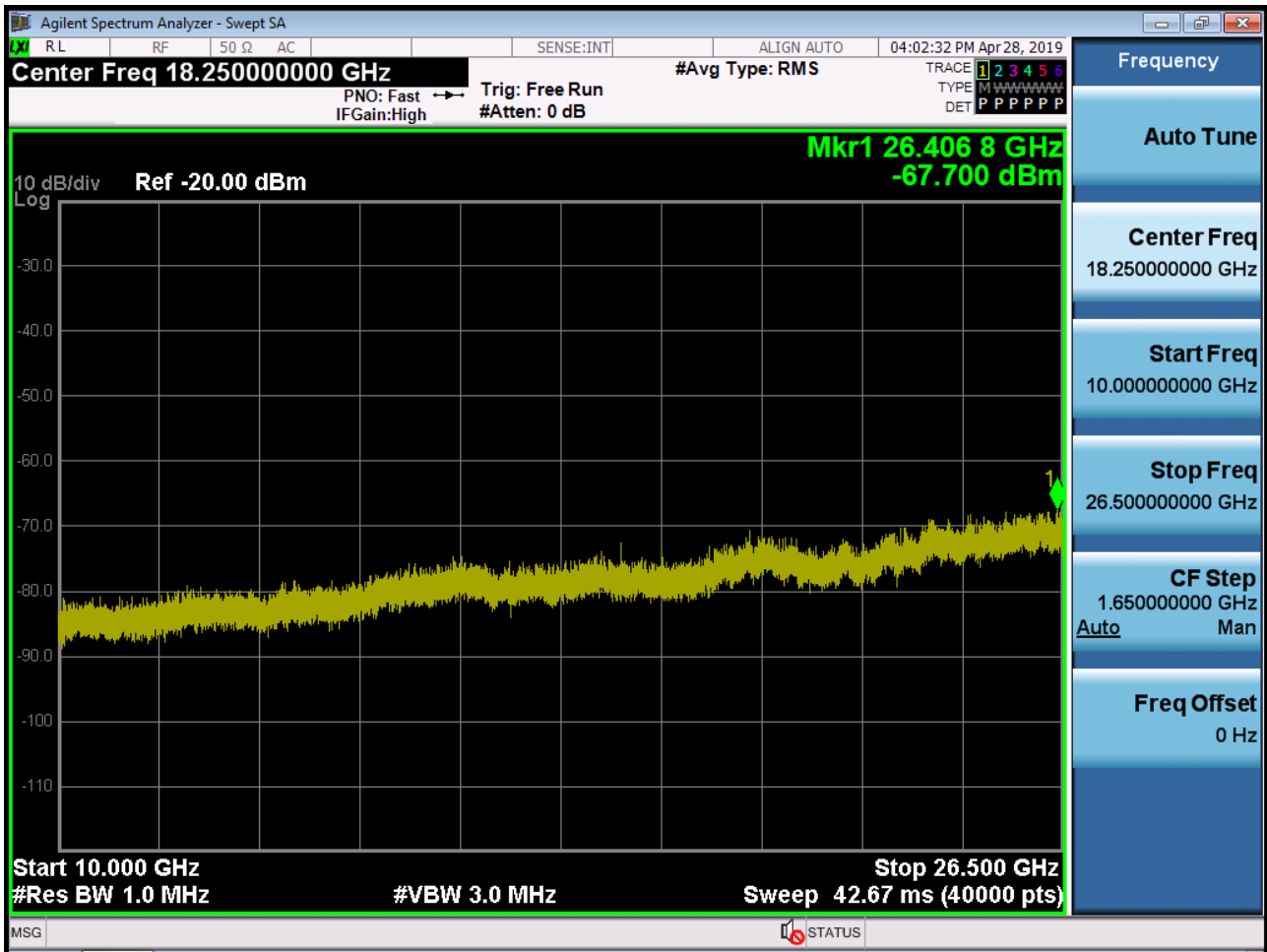


PCC 5MHz Ch40740 RB1 Offset24

SCC 20MHz Ch40623 RB1 Offset0



PCC 5MHz Ch40740 RB25 Offset0
 SCC 20MHz Ch40623 RB100 Offset0



PCC 20MHz Ch40340 RB1 Offset0
 SCC 20MHz Ch40538 RB1 Offset99



PCC 20MHz Ch40340 RB1 Offset99

SCC 20MHz Ch40538 RB1 Offset0

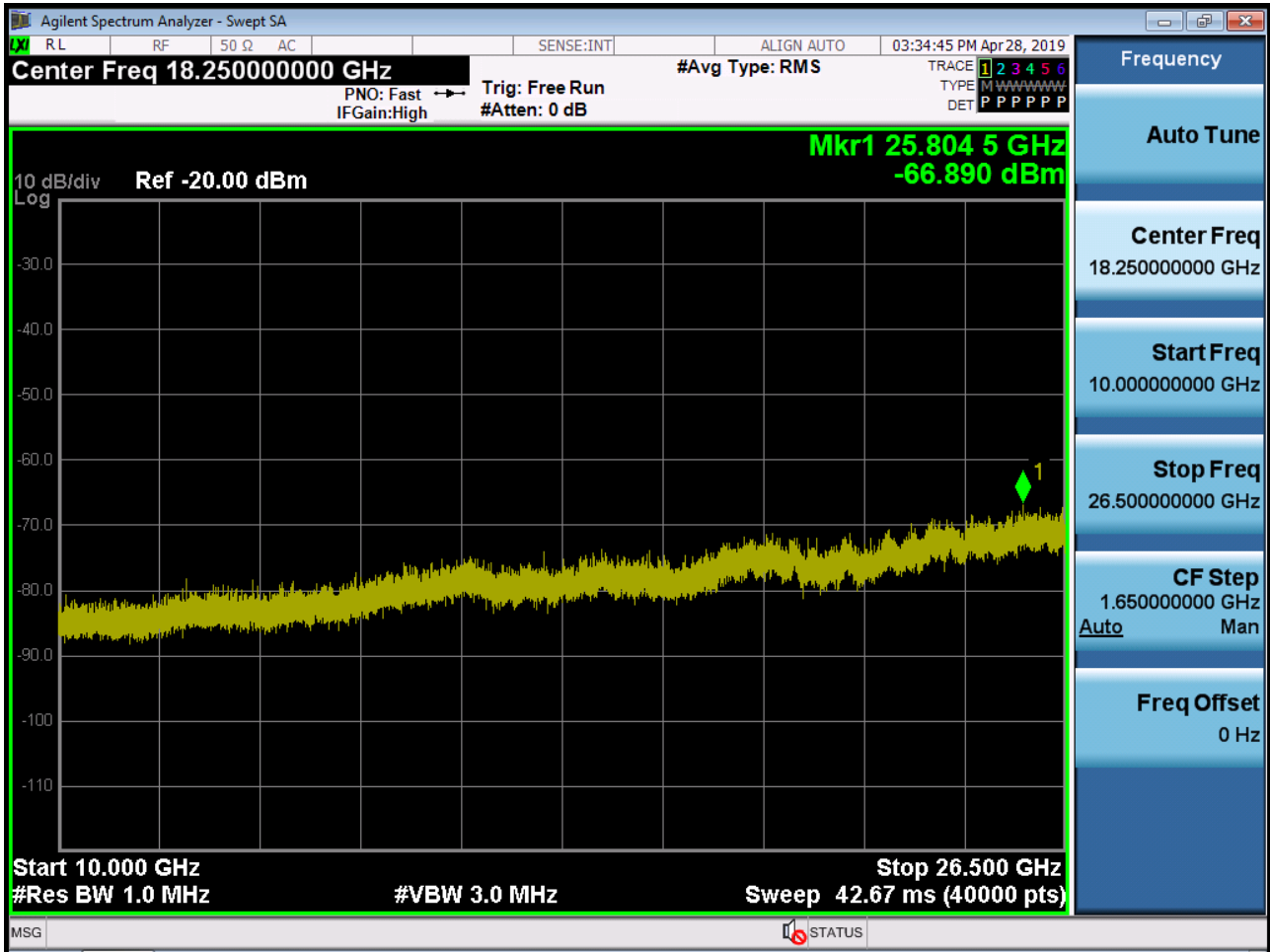


PCC 20MHz Ch40340 RB100 Offset0

SCC 20MHz Ch40538 RB100 Offset0



PCC 20MHz Ch41140 RB1 Offset0
 SCC 15MHz Ch40969 RB1 Offset74

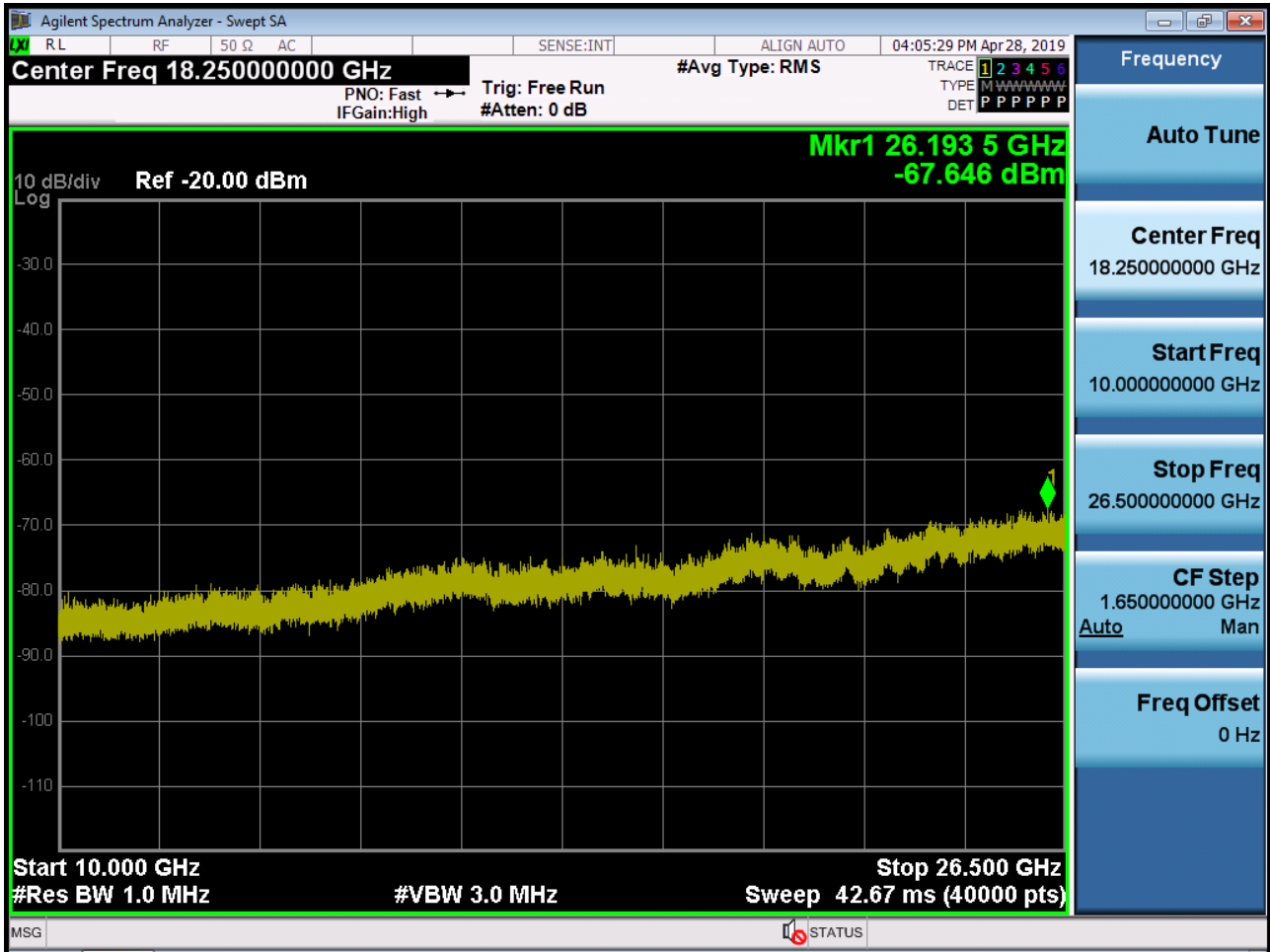


PCC 20MHz Ch41140 RB1 Offset99

SCC 15MHz Ch40969 RB1 Offset0

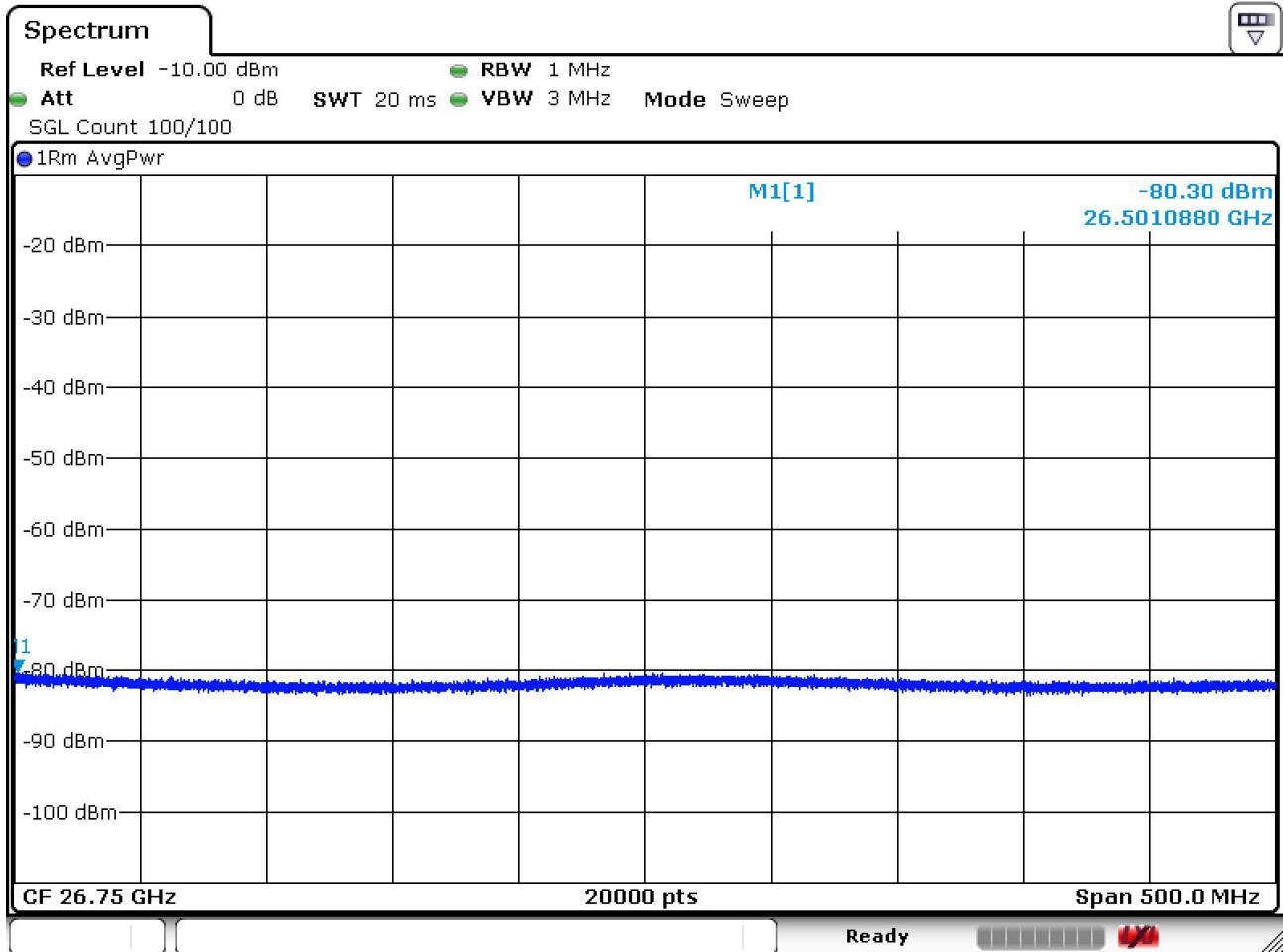


PCC 20MHz Ch41140 RB100 Offset0
SCC 15MHz Ch40969 RB75 Offset0

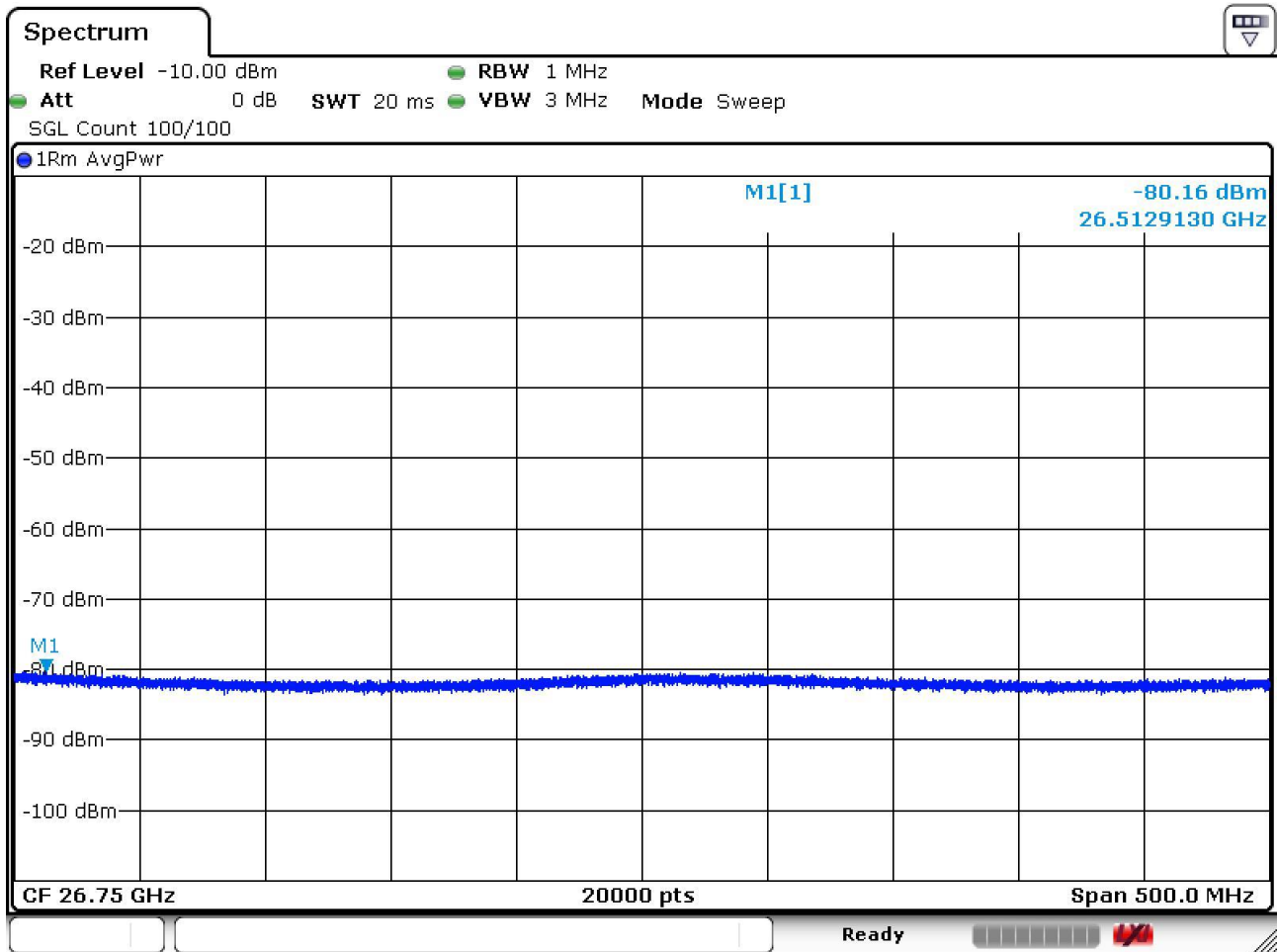


Frequency Range : 26.5GHz ~ 27.0GHz

PCC 20MHz Ch41140 RB1 Offset0
SCC 15MHz Ch40969 RB1 Offset74

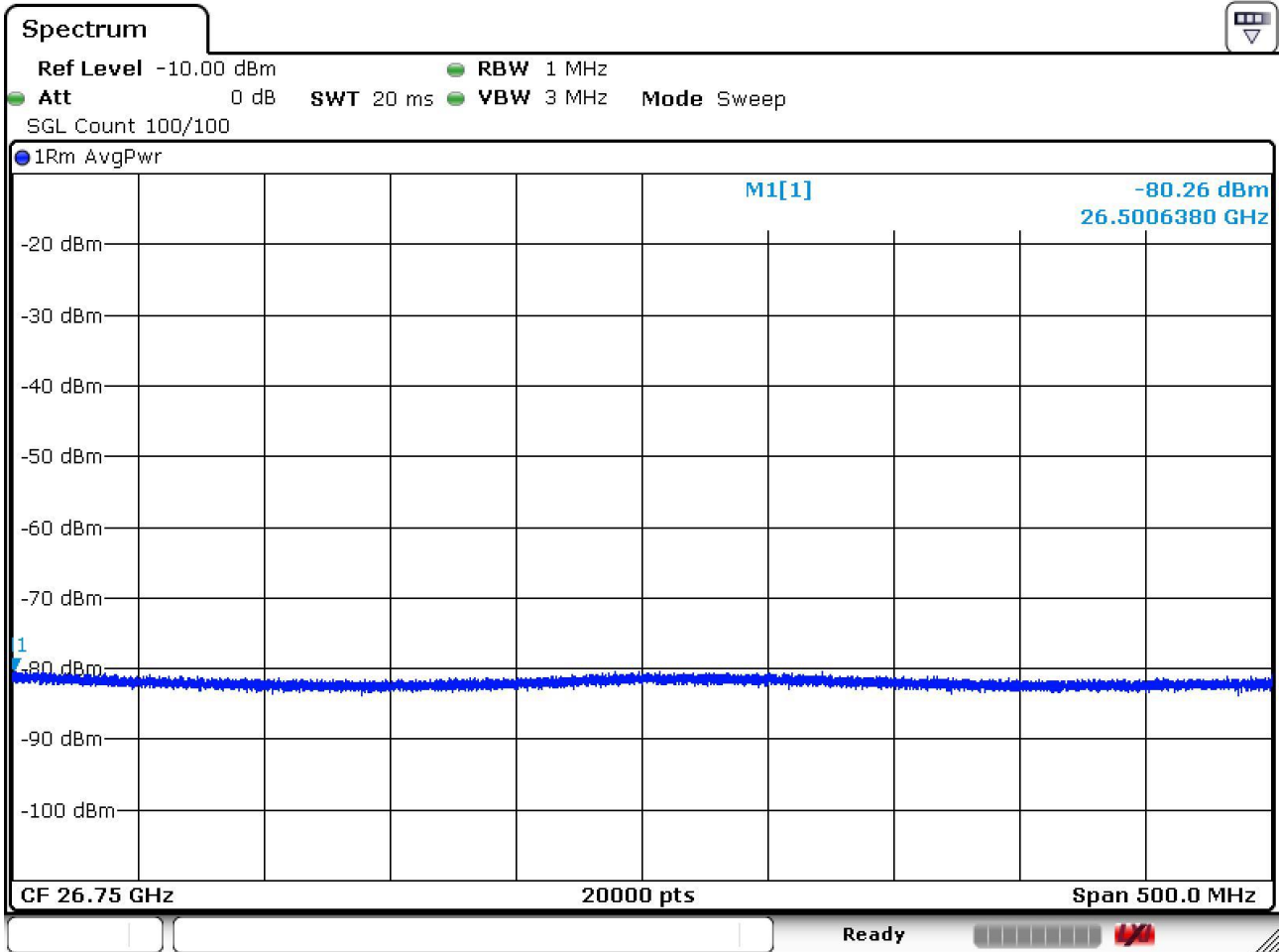


PCC 20MHz Ch41140 RB1 Offset99
SCC 15MHz Ch40969 RB1 Offset0



PCC 20MHz Ch41140 RB100 Offset0

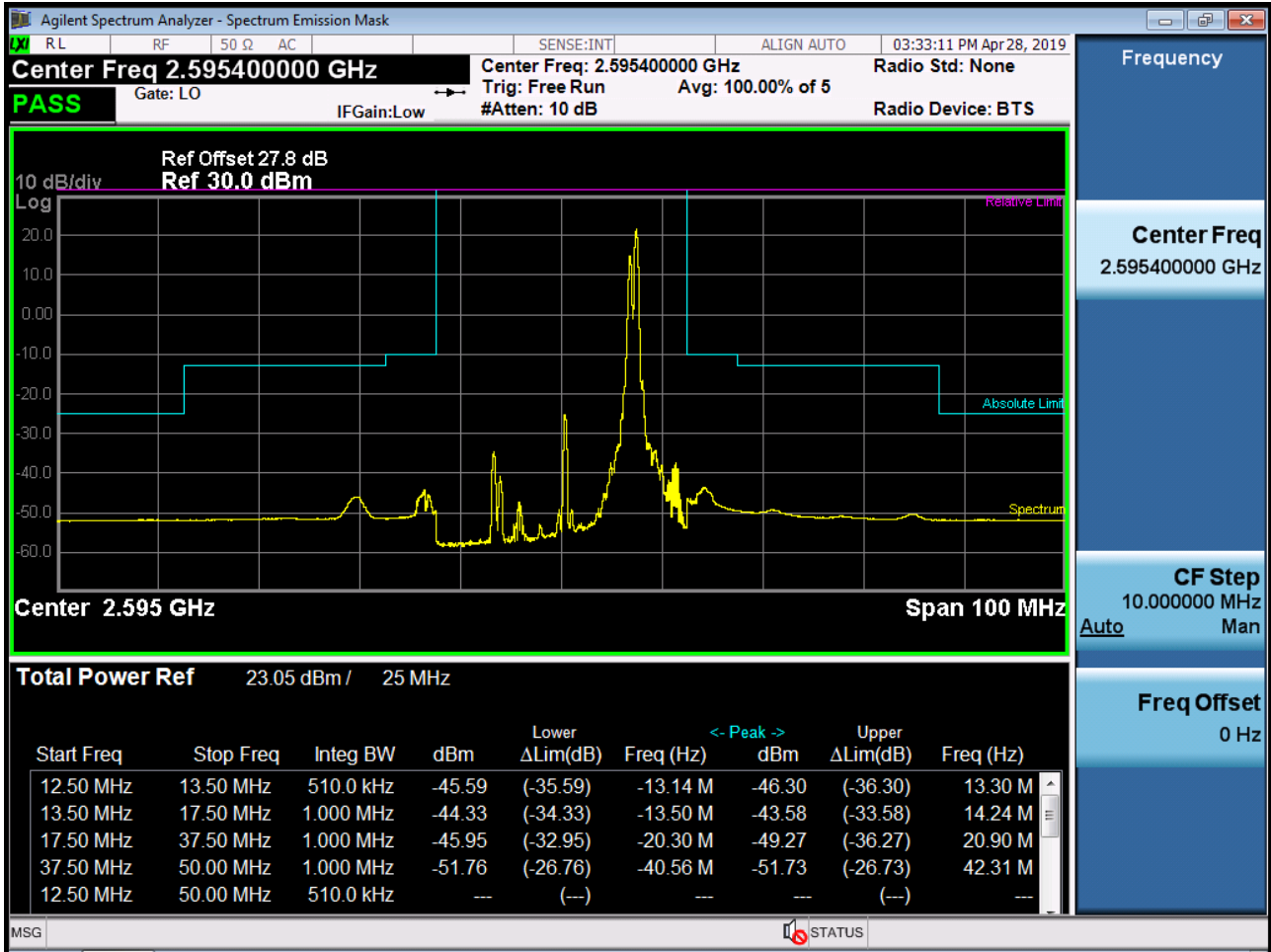
SCC 15MHz Ch40969 RB75 Offset0



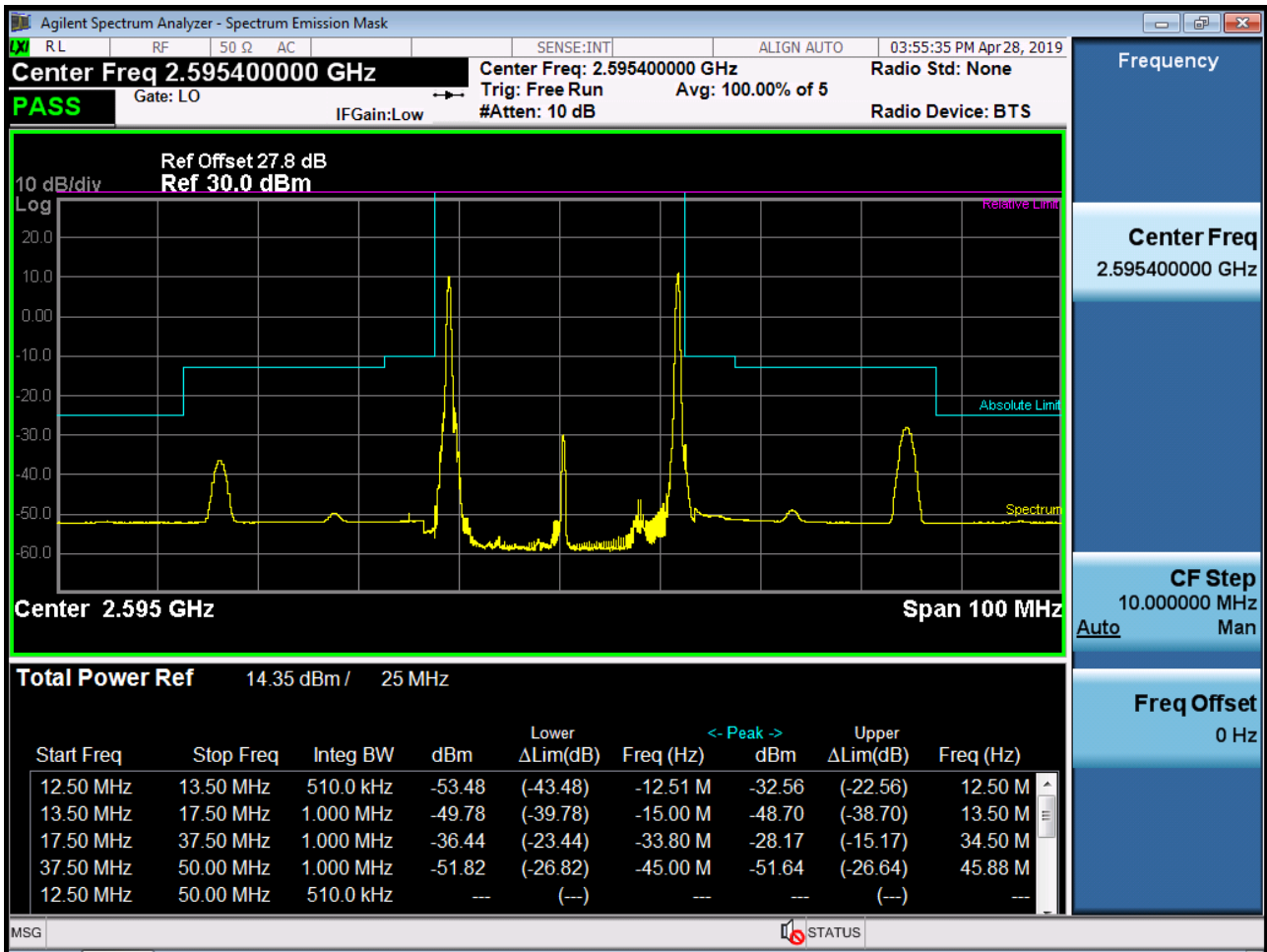
8.4 Channel Edge

PCC 5MHz Ch40740 RB1 Offset0

SCC 20MHz Ch40623 RB1 Offset99

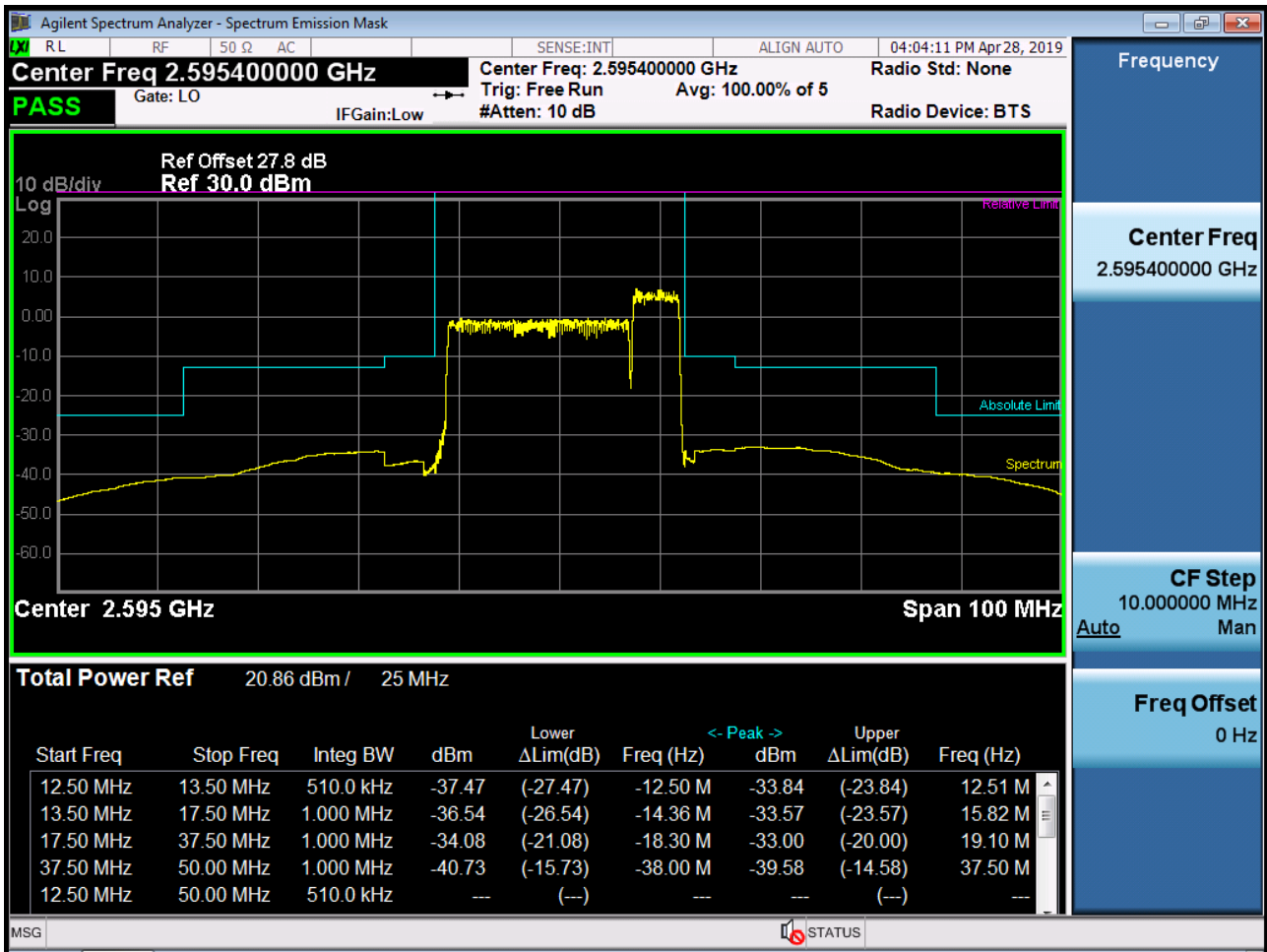


PCC 5MHz Ch40740 RB1 Offset24
SCC 20MHz Ch40623 RB1 Offset0

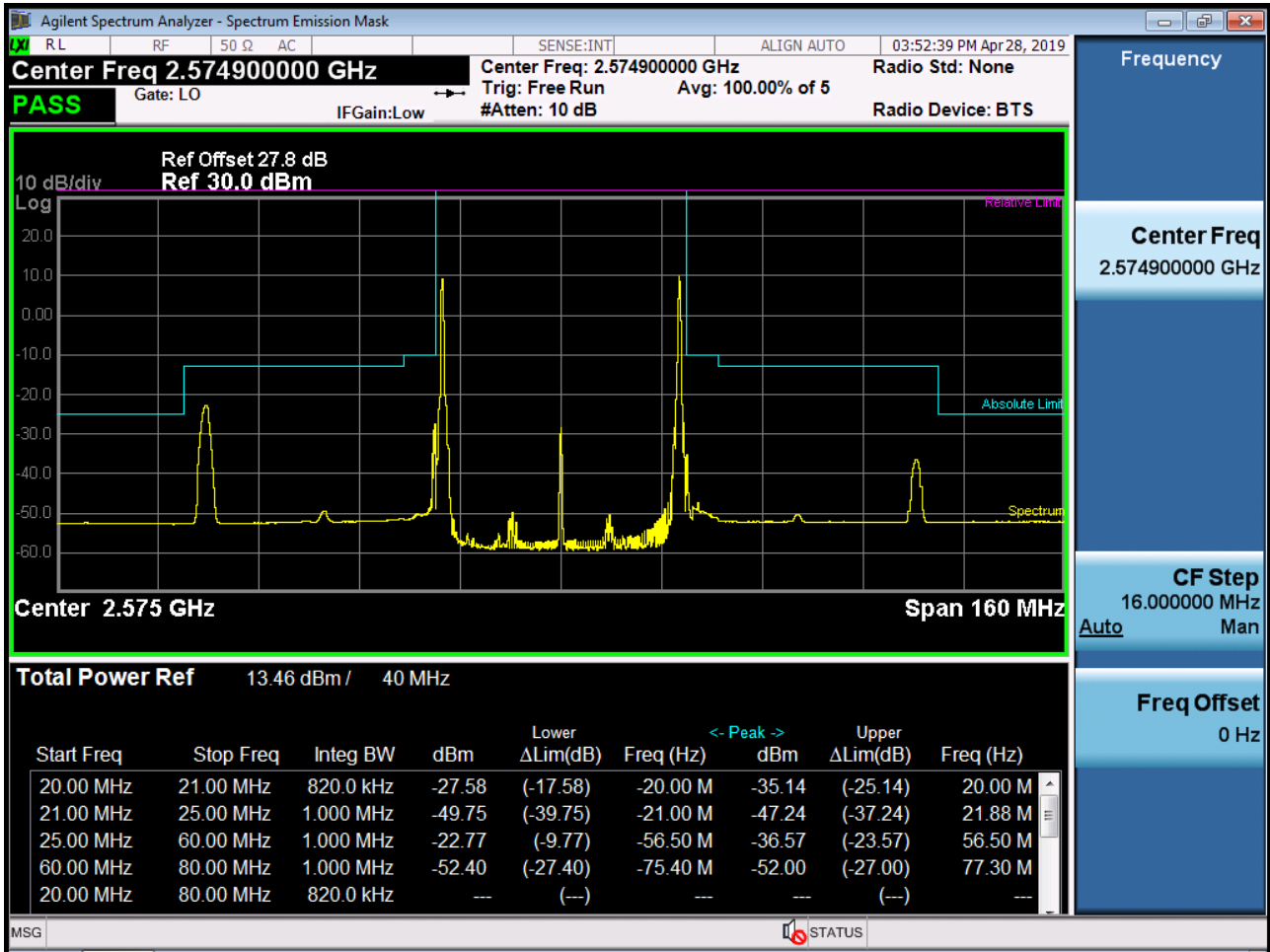


PCC 5MHz Ch40740 RB25 Offset0

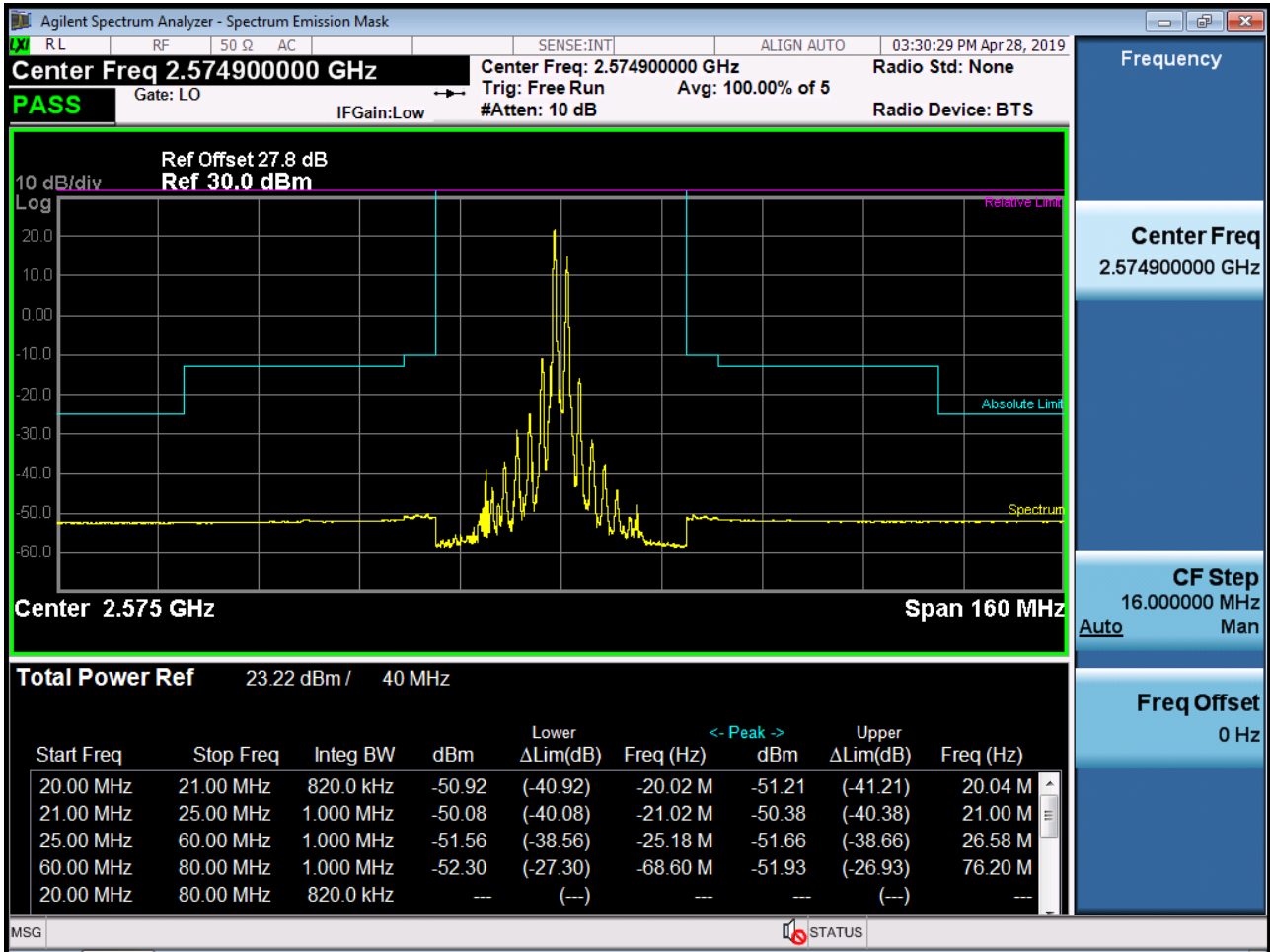
SCC 20MHz Ch40623 RB100 Offset0



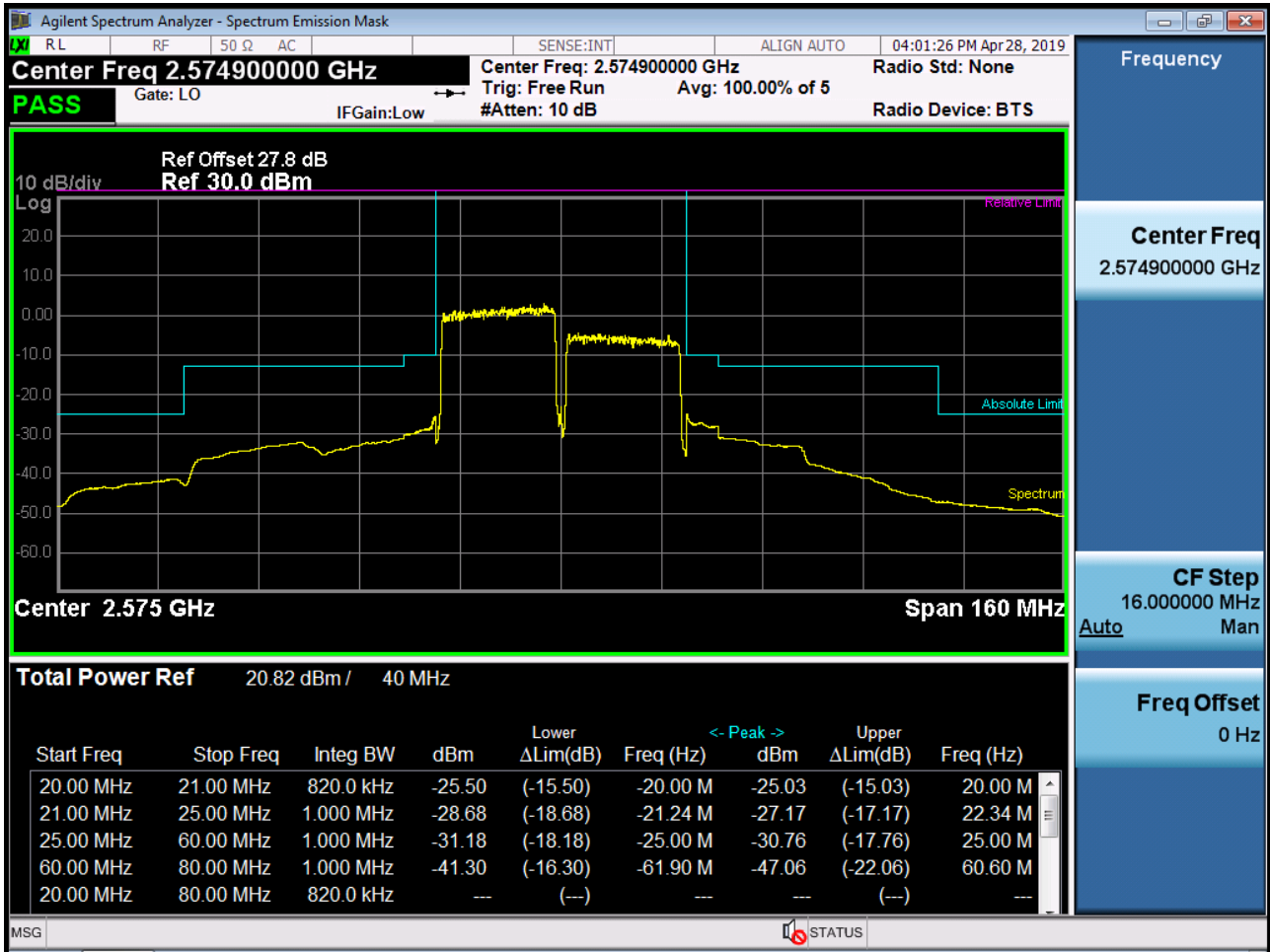
PCC 20MHz Ch40340 RB1 Offset0
SCC 20MHz Ch40538 RB1 Offset99



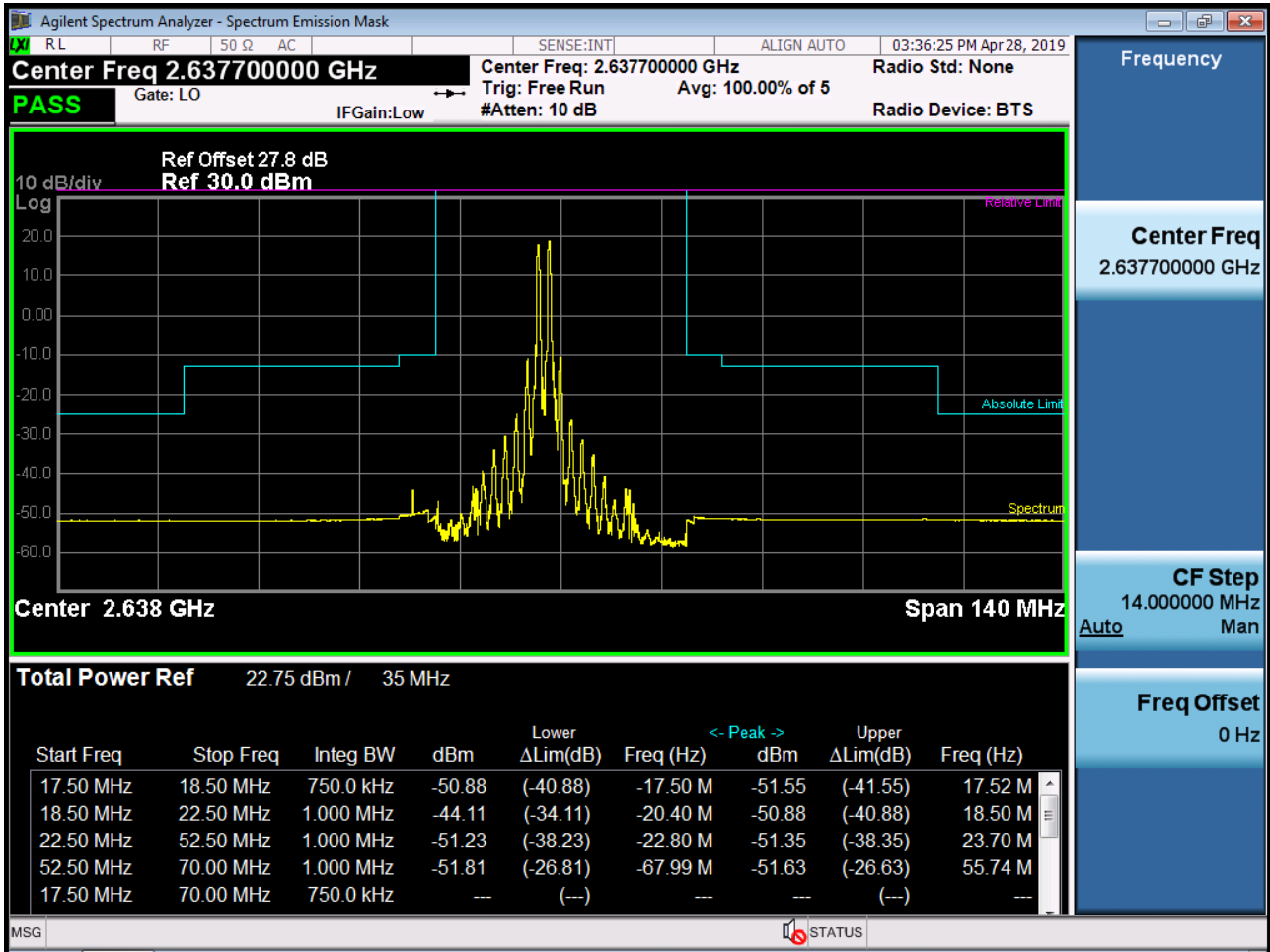
PCC 20MHz Ch40340 RB1 Offset99
SCC 20MHz Ch40538 RB1 Offset0



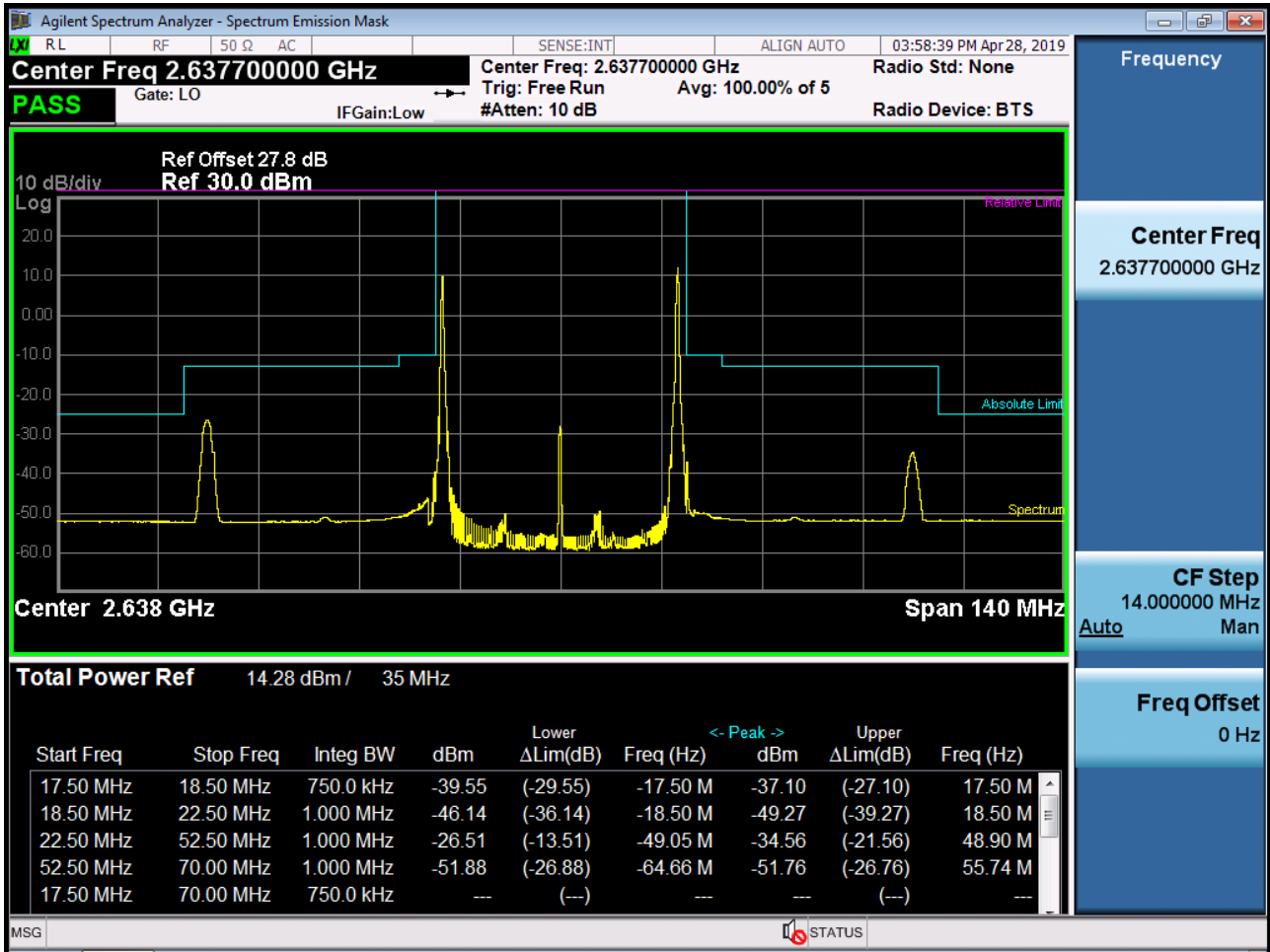
PCC 20MHz Ch40340 RB100 Offset0
 SCC 20MHz Ch40538 RB100 Offset0



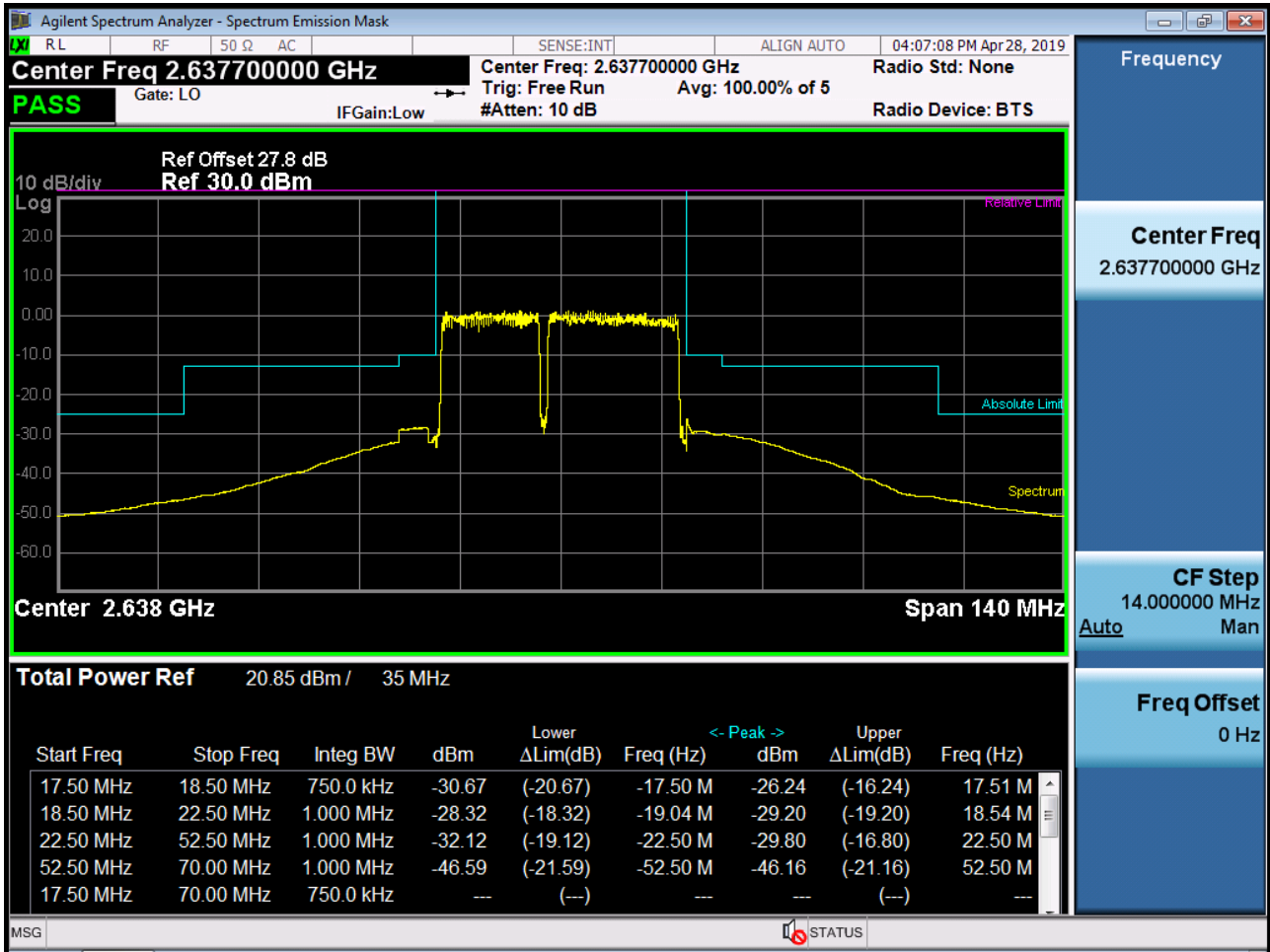
PCC 20MHz Ch41140 RB1 Offset0
SCC 15MHz Ch40969 RB1 Offset74



PCC 20MHz Ch41140 RB1 Offset99
SCC 15MHz Ch40969 RB1 Offset0



PCC 20MHz Ch41140 RB100 Offset0
SCC 15MHz Ch40969 RB75 Offset0



8.5 Frequency Stability / Variation Of Ambient Temperature

- SCC Channel: 40265
- SCC Frequency: 2557.5 Hz
- SCC BandWidth: 5 MHz
- PCC Channel: 40382
- PCC Frequency: 2569.2 Hz
- PCC BandWidth: 20 MHz
- Voltage : 3.850 VDC
- LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	-0.014	0.017	2557.49996	2569.20004
100%		-30	0.011	0.016	2557.50003	2569.20004
100%		-20	-0.022	-0.006	2557.49994	2569.19998
100%		-10	-0.020	0.012	2557.49995	2569.20003
100%		0	-0.011	0.019	2557.49997	2569.20005
100%		10	-0.012	-0.024	2557.49997	2569.19994
100%		30	0.005	0.014	2557.50001	2569.20004
100%		40	-0.007	0.007	2557.49998	2569.20002
100%		50	-0.011	-0.023	2557.49997	2569.19994
Batt. Endpoint		3.400	20	-0.006	0.016	2557.49999

- ▣ SCC Channel: 40290
- ▣ SCC Frequency: 2560.0 Hz
- ▣ SCC BandWidth: 10 MHz
- ▣ PCC Channel: 40434
- ▣ PCC Frequency: 2574.4 Hz
- ▣ PCC BandWidth: 20 MHz
- ▣ Voltage : 3.850 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	0.024	0.023	2560.00006	2574.40006
100%		-30	0.009	-0.022	2560.00002	2574.39994
100%		-20	-0.012	0.005	2559.99997	2574.40001
100%		-10	-0.015	0.008	2559.99996	2574.40002
100%		0	-0.006	0.021	2559.99998	2574.40005
100%		10	0.023	-0.011	2560.00006	2574.39997
100%		30	0.014	0.005	2560.00004	2574.40001
100%		40	0.008	0.024	2560.00002	2574.40006
100%		50	-0.011	0.018	2559.99997	2574.40005
Batt. Endpoint		3.400	20	-0.009	0.012	2559.99998

- SCC Channel: 40315
- SCC Frequency: 2562.5 Hz
- SCC BandWidth: 15 MHz
- PCC Channel: 40465
- PCC Frequency: 2577.5 Hz
- PCC BandWidth: 15 MHz
- Voltage : 3.850 VDC
- LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	-0.013	0.017	2562.49997	2577.50004
100%		-30	0.005	0.010	2562.50001	2577.50003
100%		-20	0.016	0.008	2562.50004	2577.50002
100%		-10	0.015	-0.006	2562.50004	2577.49999
100%		0	0.023	-0.017	2562.50006	2577.49996
100%		10	0.005	0.016	2562.50001	2577.50004
100%		30	-0.022	-0.018	2562.49994	2577.49995
100%		40	-0.009	0.004	2562.49998	2577.50001
100%		50	0.020	0.019	2562.50005	2577.50005
Batt. Endpoint		3.400	20	-0.013	-0.012	2562.49997

- ▣ SCC Channel: 40340
- ▣ SCC Frequency: 2565.0 Hz
- ▣ SCC BandWidth: 20 MHz
- ▣ PCC Channel: 40538
- ▣ PCC Frequency: 2584.8 Hz
- ▣ PCC BandWidth: 20 MHz
- ▣ Voltage : 3.850 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	0.004	0.011	2565.00001	2584.80003
100%		-30	-0.013	-0.014	2564.99997	2584.79996
100%		-20	-0.014	-0.016	2564.99996	2584.79996
100%		-10	0.007	-0.020	2565.00002	2584.79995
100%		0	0.012	-0.012	2565.00003	2584.79997
100%		10	0.012	0.023	2565.00003	2584.80006
100%		30	0.010	0.013	2565.00002	2584.80003
100%		40	0.008	0.011	2565.00002	2584.80003
100%		50	0.022	-0.006	2565.00006	2584.79998
Batt. Endpoint		3.400	20	0.016	0.008	2565.00004

- SCC Channel: 41215
- SCC Frequency: 2652.5 Hz
- SCC BandWidth: 5 MHz
- PCC Channel: 41098
- PCC Frequency: 2640.8 Hz
- PCC BandWidth: 20 MHz
- Voltage : 3.850 VDC
- LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	0.014	-0.005	2652.50004	2640.79999
100%		-30	0.005	0.006	2652.50001	2640.80002
100%		-20	0.008	0.020	2652.50002	2640.80005
100%		-10	0.018	0.012	2652.50005	2640.80003
100%		0	0.006	0.017	2652.50002	2640.80004
100%		10	0.017	0.016	2652.50004	2640.80004
100%		30	0.009	0.022	2652.50002	2640.80006
100%		40	-0.022	0.023	2652.49994	2640.80006
100%		50	-0.017	0.020	2652.49995	2640.80005
Batt. Endpoint		3.400	20	0.020	-0.023	2652.50005

- ▣ SCC Channel: 41190
- ▣ SCC Frequency: 2650.0 Hz
- ▣ SCC BandWidth: 10 MHz
- ▣ PCC Channel: 41046
- ▣ PCC Frequency: 2635.6 Hz
- ▣ PCC BandWidth: 20 MHz
- ▣ Voltage : 3.850 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	-0.012	0.018	2649.99997	2635.60005
100%		-30	0.009	-0.021	2650.00002	2635.59994
100%		-20	0.015	0.021	2650.00004	2635.60006
100%		-10	-0.014	0.007	2649.99996	2635.60002
100%		0	-0.024	0.024	2649.99994	2635.60006
100%		10	-0.009	0.010	2649.99998	2635.60003
100%		30	0.006	0.010	2650.00002	2635.60003
100%		40	0.020	0.017	2650.00005	2635.60004
100%		50	-0.008	-0.018	2649.99998	2635.59995
Batt. Endpoint	3.400	20	0.008	0.020	2650.00002	2635.60005

- ▣ SCC Channel: 41165
- ▣ SCC Frequency: 2647.5 Hz
- ▣ SCC BandWidth: 15 MHz
- ▣ PCC Channel: 40994
- ▣ PCC Frequency: 2630.4 Hz
- ▣ PCC BandWidth: 20 MHz
- ▣ Voltage : 3.850 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	0.005	-0.013	2647.50001	2630.39997
100%		-30	0.005	0.021	2647.50001	2630.40005
100%		-20	-0.014	-0.014	2647.49996	2630.39996
100%		-10	0.019	0.020	2647.50005	2630.40005
100%		0	0.009	-0.007	2647.50003	2630.39998
100%		10	-0.016	0.006	2647.49996	2630.40001
100%		30	-0.023	0.005	2647.49994	2630.40001
100%		40	-0.021	-0.016	2647.49995	2630.39996
100%		50	-0.010	0.015	2647.49997	2630.40004
Batt. Endpoint		3.400	20	0.007	-0.010	2647.50002

- ▣ SCC Channel: 41140
- ▣ SCC Frequency: 2645.0 Hz
- ▣ SCC BandWidth: 20 MHz
- ▣ PCC Channel: 40942
- ▣ PCC Frequency: 2625.2 Hz
- ▣ PCC BandWidth: 20 MHz
- ▣ Voltage : 3.850 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.850	+20(Ref)	0.004	-0.008	2645.00001	2625.19998
100%		-30	0.011	-0.011	2645.00003	2625.19997
100%		-20	0.015	-0.017	2645.00004	2625.19995
100%		-10	0.004	-0.022	2645.00001	2625.19994
100%		0	0.015	0.022	2645.00004	2625.20006
100%		10	0.016	0.011	2645.00004	2625.20003
100%		30	-0.017	-0.014	2644.99996	2625.19996
100%		40	-0.005	0.018	2644.99999	2625.20005
100%		50	0.013	0.012	2645.00004	2625.20003
Batt. Endpoint		3.400	20	0.007	-0.009	2645.00002

8.6 Radiated Spurious Emissions

- ▣ PCC Channel : 40290
- ▣ PCC BW(MHz) : 10
- ▣ PCC RB/ RB Offset : 1/ 49
- ▣ SCC Channel : 40434
- ▣ SCC BW(MHz) : 20
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ DISTANCE: 1 meters
- ▣ LIMIT: -25.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
5,120.00	-43.47	12.60	-57.01	2.54	H	-46.95
7,680.00	-43.56	12.04	-51.59	2.94	V	-42.49
10,240.00	-49.81	11.13	-53.01	3.59	V	-45.47

- PCC Channel : 40740
- PCC BW(MHz) : 10
- PCC RB/ RB Offset : 1/ 0
- SCC Channel : 40620
- SCC BW(MHz) : 15
- SCC RB/ RB Offset : 1/ 74
- DISTANCE: 1 meters
- LIMIT: -25.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
5,210.00	-41.17	13.21	-55.08	2.55	H	-44.42
7,815.00	-43.13	11.93	-49.00	2.99	H	-40.06
10,420.00	-49.68	10.92	-51.36	3.58	V	-44.02

- ▣ PCC Channel : 41140
- ▣ PCC BW(MHz) : 20
- ▣ PCC RB/ RB Offset : 1/ 0
- ▣ SCC Channel : 40996
- ▣ SCC BW(MHz) : 5
- ▣ SCC RB/ RB Offset : 1/ 49
- ▣ DISTANCE: 1 meters
- ▣ LIMIT: -25.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
5,290.00	-42.13	13.55	-55.73	2.60	V	-44.78
7,935.00	-44.73	11.67	-50.07	2.99	V	-41.39
10,580.00	-49.71	10.72	-52.52	3.60	H	-45.40

8.7 Occupied Bandwidth

PCC				SCC				Data (MHz)
Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	
5	40740	QPSK	25/ 0	20	40623	QPSK	100/ 0	22.883
10	40740	QPSK	50/ 0	15	40620	QPSK	75/ 0	22.782
10	40740	QPSK	50/ 0	20	40596	QPSK	100/ 0	22.889
15	40740	QPSK	75/ 0	10	40620	QPSK	50/ 0	23.100
15	40740	QPSK	75/ 0	15	40590	QPSK	75/ 0	23.041
15	40740	QPSK	75/ 0	20	40569	QPSK	100/ 0	23.106
20	40740	QPSK	100/ 0	5	40623	QPSK	25/ 0	27.715
20	40740	QPSK	100/ 0	10	40596	QPSK	50/ 0	27.676
20	40740	QPSK	100/ 0	15	40569	QPSK	75/ 0	27.745
20	40740	QPSK	100/ 0	20	40542	QPSK	100/ 0	23.096

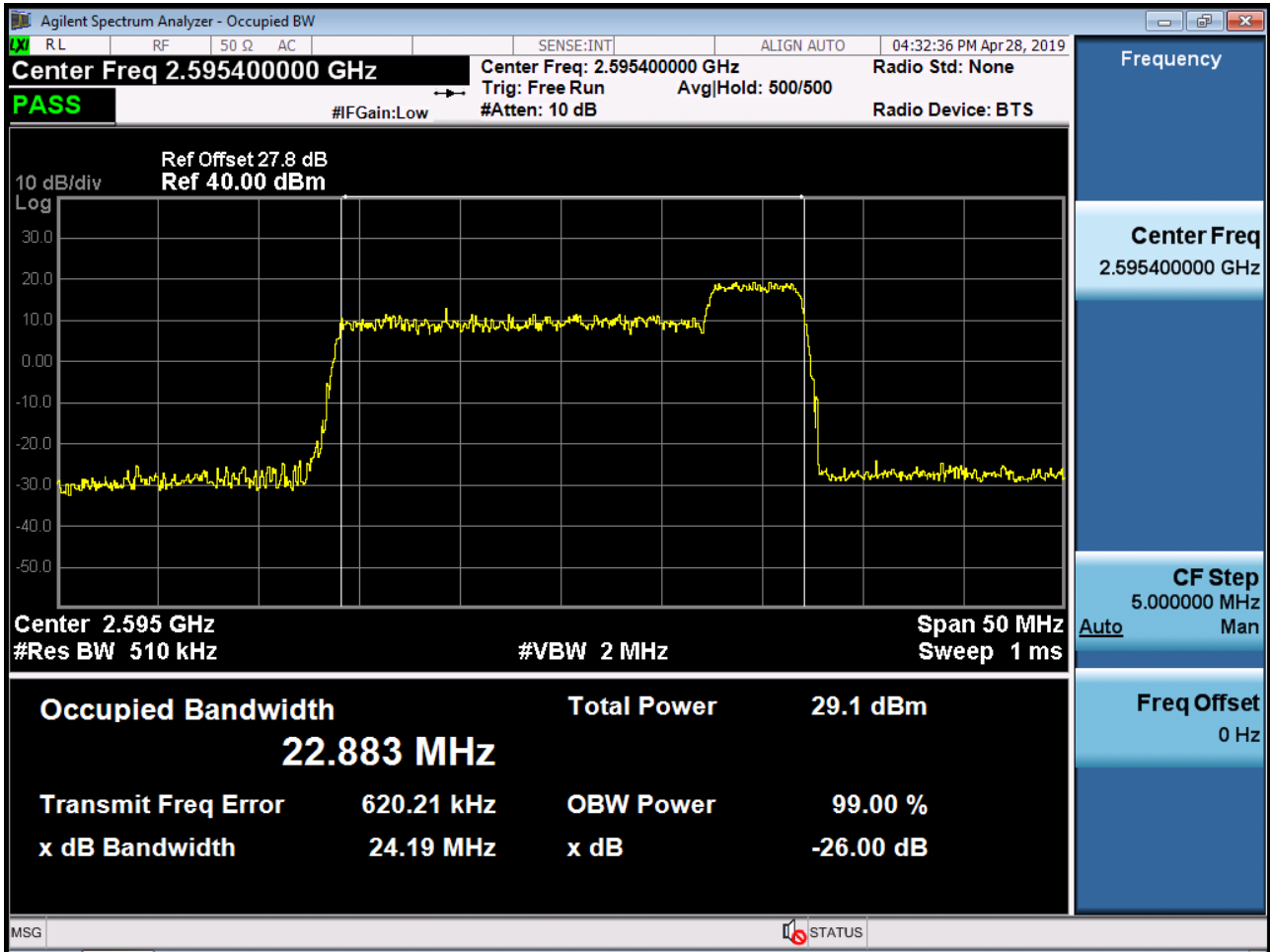
PCC				SCC				Data (MHz)
Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	
5	40740	16QAM	25/ 0	20	40623	16QAM	100/ 0	22.782
10	40740	16QAM	50/ 0	15	40620	16QAM	75/ 0	22.889
10	40740	16QAM	50/ 0	20	40596	16QAM	100/ 0	23.100
15	40740	16QAM	75/ 0	10	40620	16QAM	50/ 0	23.041
15	40740	16QAM	75/ 0	15	40590	16QAM	75/ 0	23.106
15	40740	16QAM	75/ 0	20	40569	16QAM	100/ 0	27.715
20	40740	16QAM	100/ 0	5	40623	16QAM	25/ 0	27.676
20	40740	16QAM	100/ 0	10	40596	16QAM	50/ 0	27.745
20	40740	16QAM	100/ 0	15	40569	16QAM	75/ 0	23.096
20	40740	16QAM	100/ 0	20	40542	16QAM	100/ 0	23.116

PCC				SCC				Data (MHz)
Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	
5	40740	64QAM	25/ 0	20	40623	64QAM	100/ 0	22.889
10	40740	64QAM	50/ 0	15	40620	64QAM	75/ 0	23.100
10	40740	64QAM	50/ 0	20	40596	64QAM	100/ 0	23.041
15	40740	64QAM	75/ 0	10	40620	64QAM	50/ 0	23.106
15	40740	64QAM	75/ 0	15	40590	64QAM	75/ 0	27.715
15	40740	64QAM	75/ 0	20	40569	64QAM	100/ 0	27.676
20	40740	64QAM	100/ 0	5	40623	64QAM	25/ 0	27.745
20	40740	64QAM	100/ 0	10	40596	64QAM	50/ 0	23.096
20	40740	64QAM	100/ 0	15	40569	64QAM	75/ 0	23.116
20	40740	64QAM	100/ 0	20	40542	64QAM	100/ 0	23.115

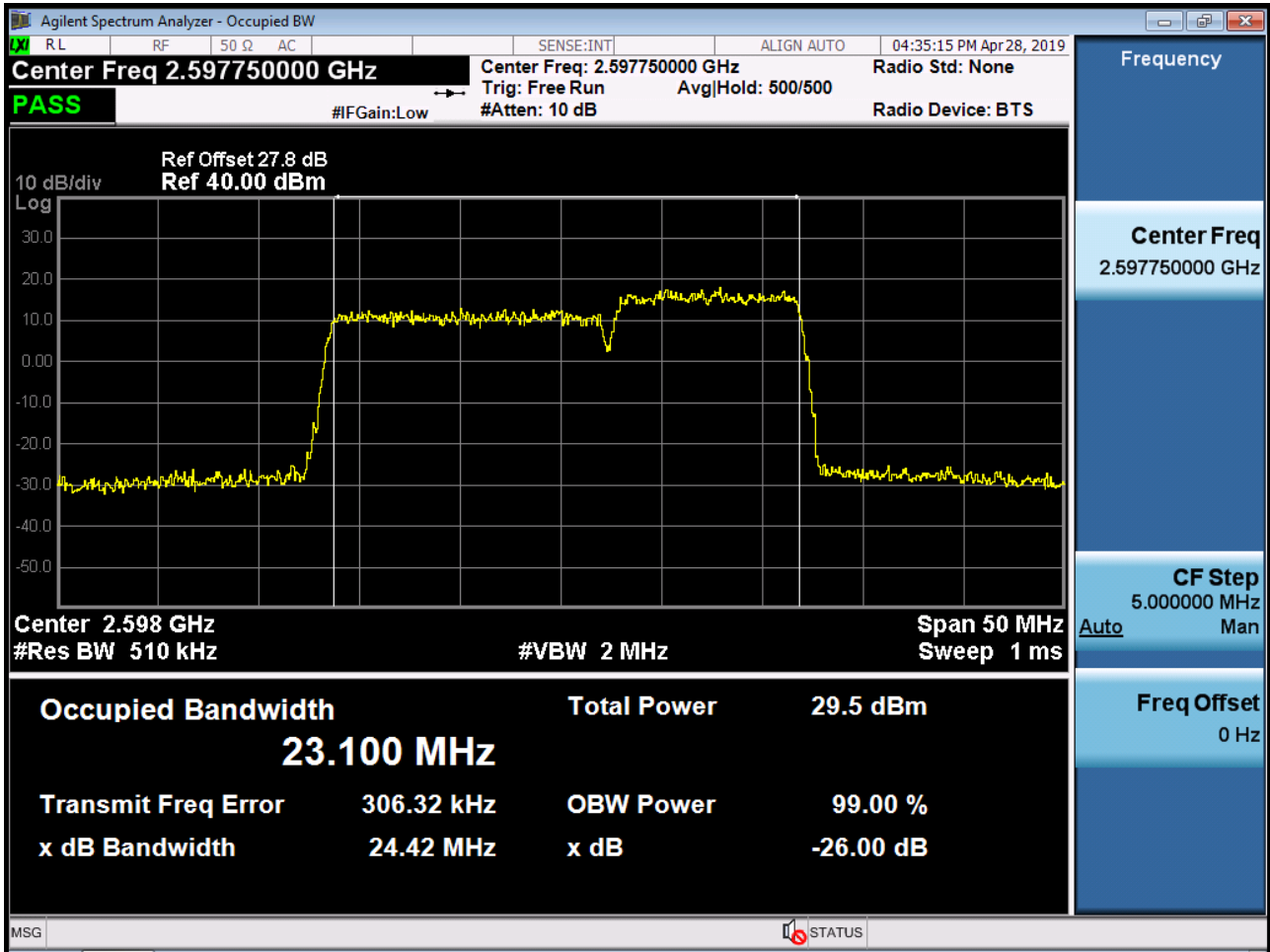
Note:

In order to simplify the report, attached plots were only QPSK modulation.

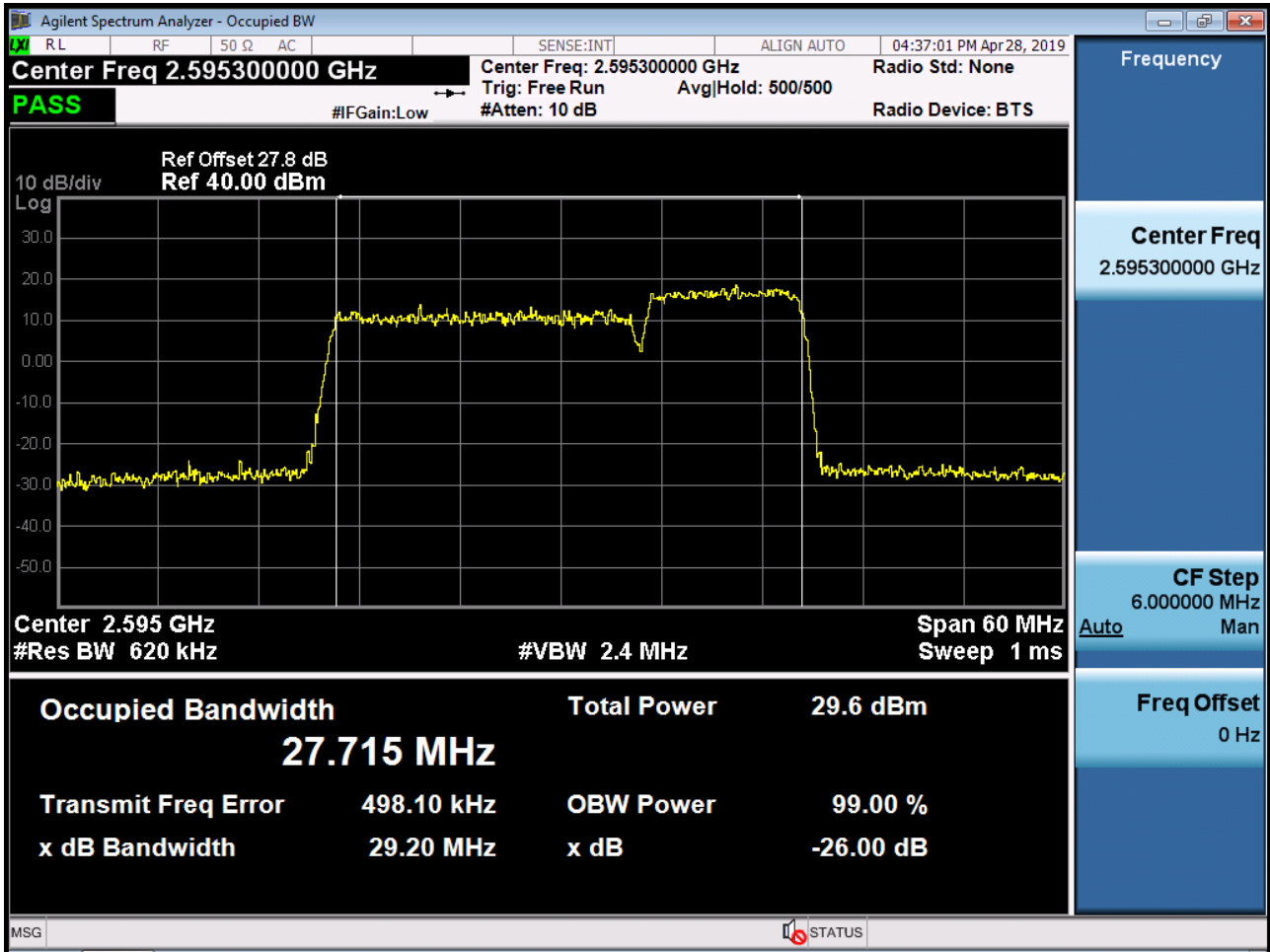
PCC 5MHz Ch40740 RB25 Offset0,
SCC 20MHz Ch40623 RB100 Offset0_(QPSK)



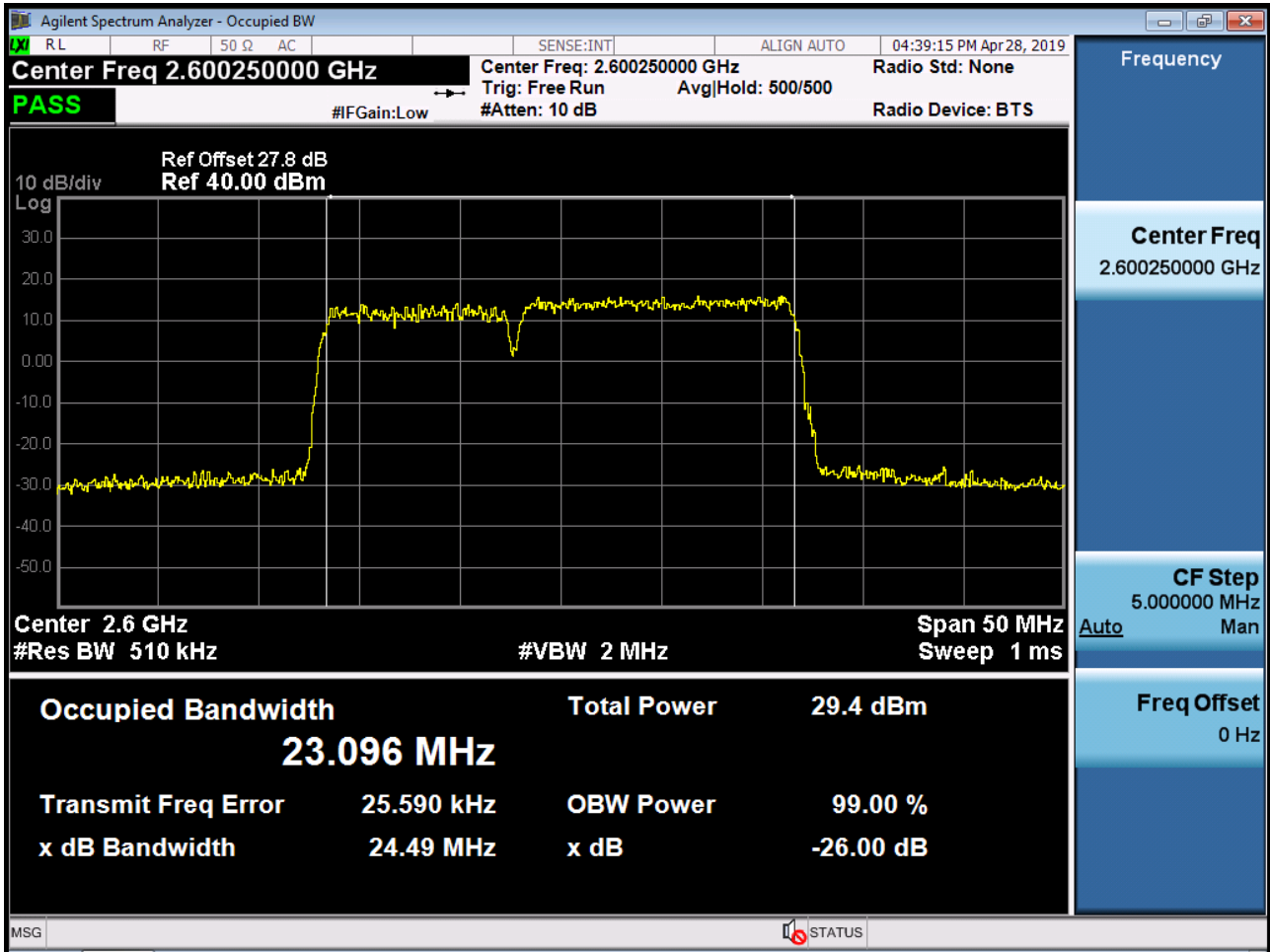
PCC 10MHz Ch40740 RB50 Offset0,
SCC 15MHz Ch40620 RB75 Offset0_(QPSK)



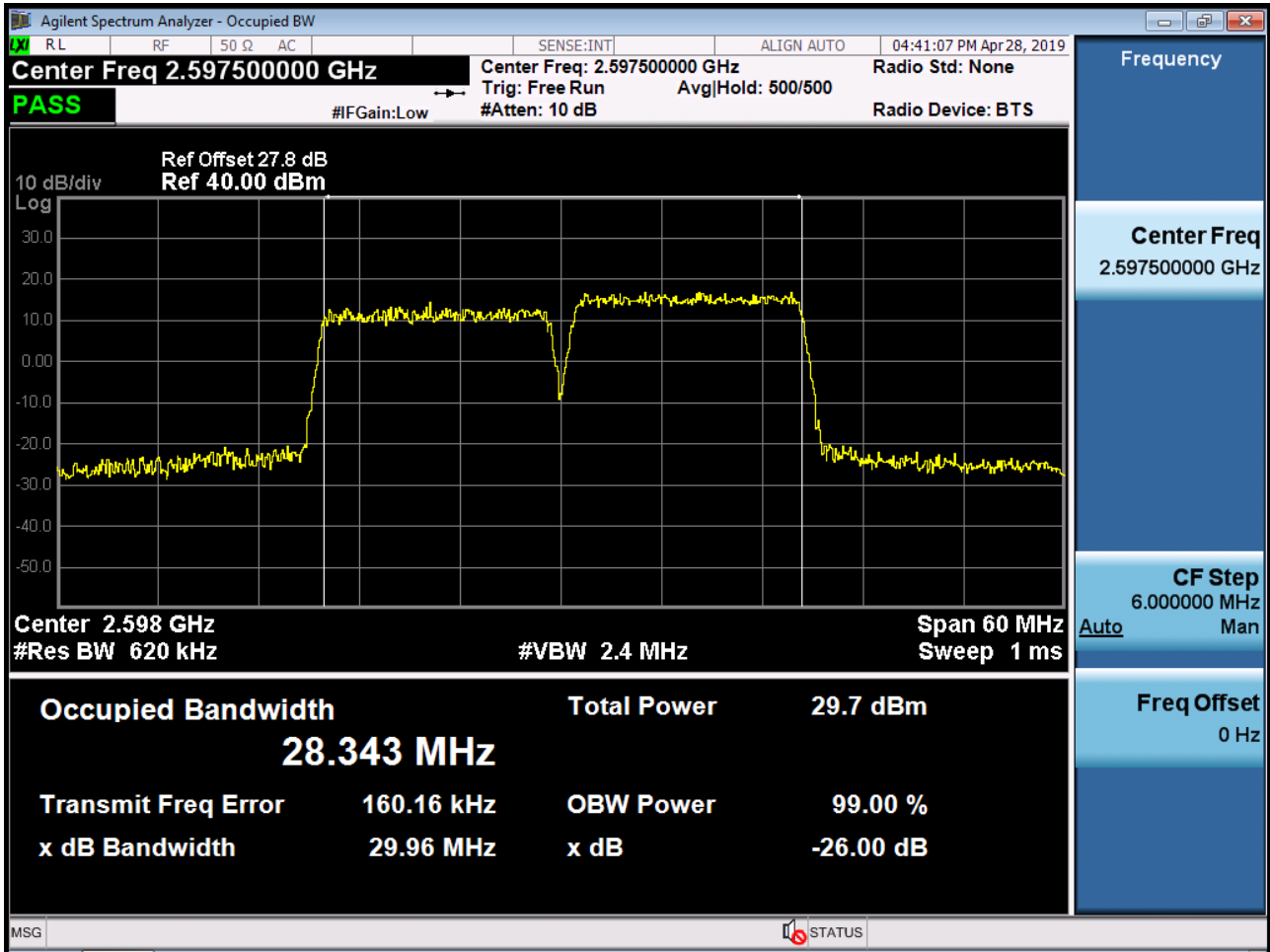
PCC 10MHz Ch40740 RB50 Offset0,
SCC 20MHz Ch40596 RB100 Offset0_(QPSK)



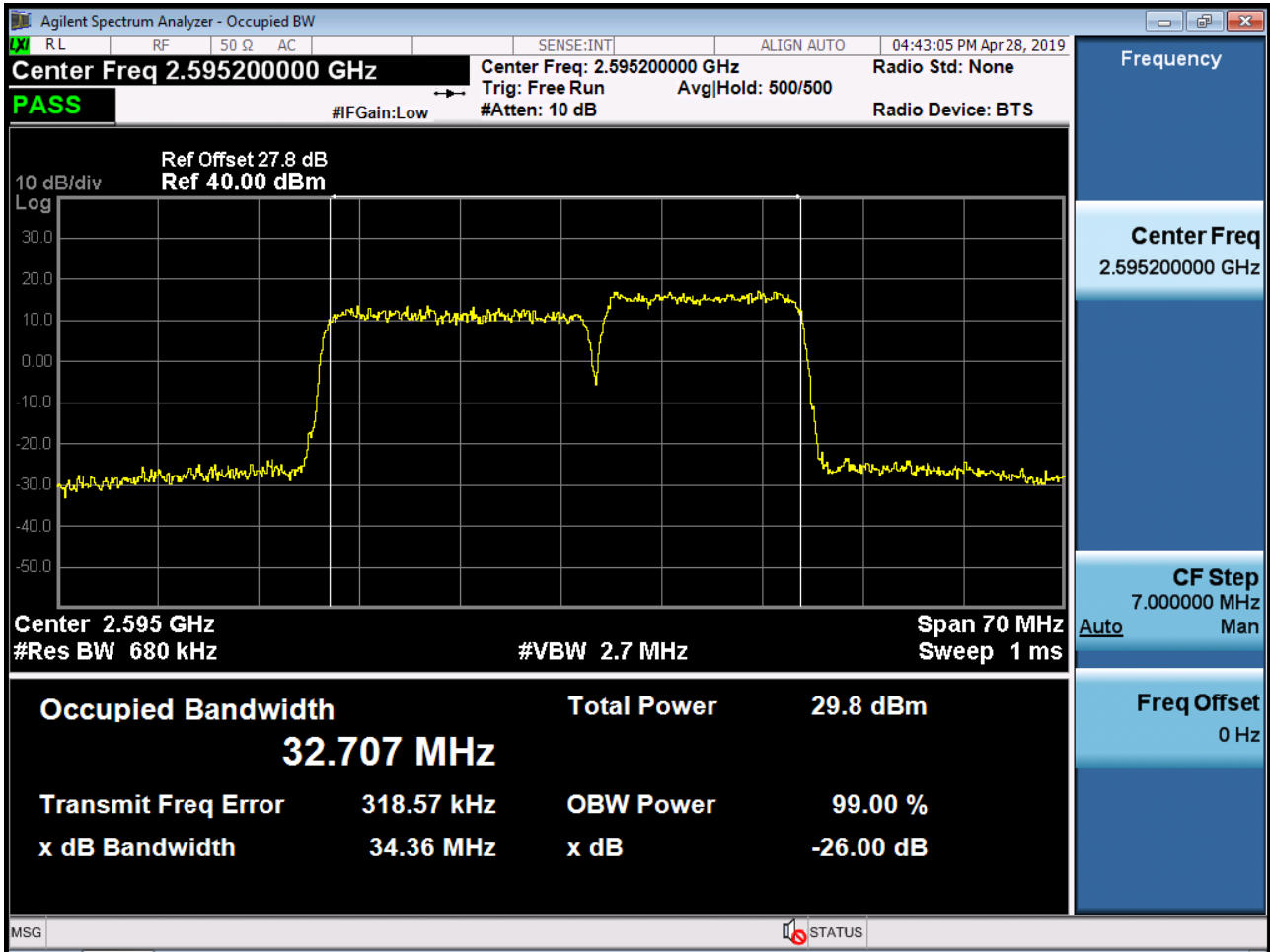
PCC 15MHz Ch40740 RB75 Offset0,
SCC 10MHz Ch40620 RB50 Offset0_(QPSK)



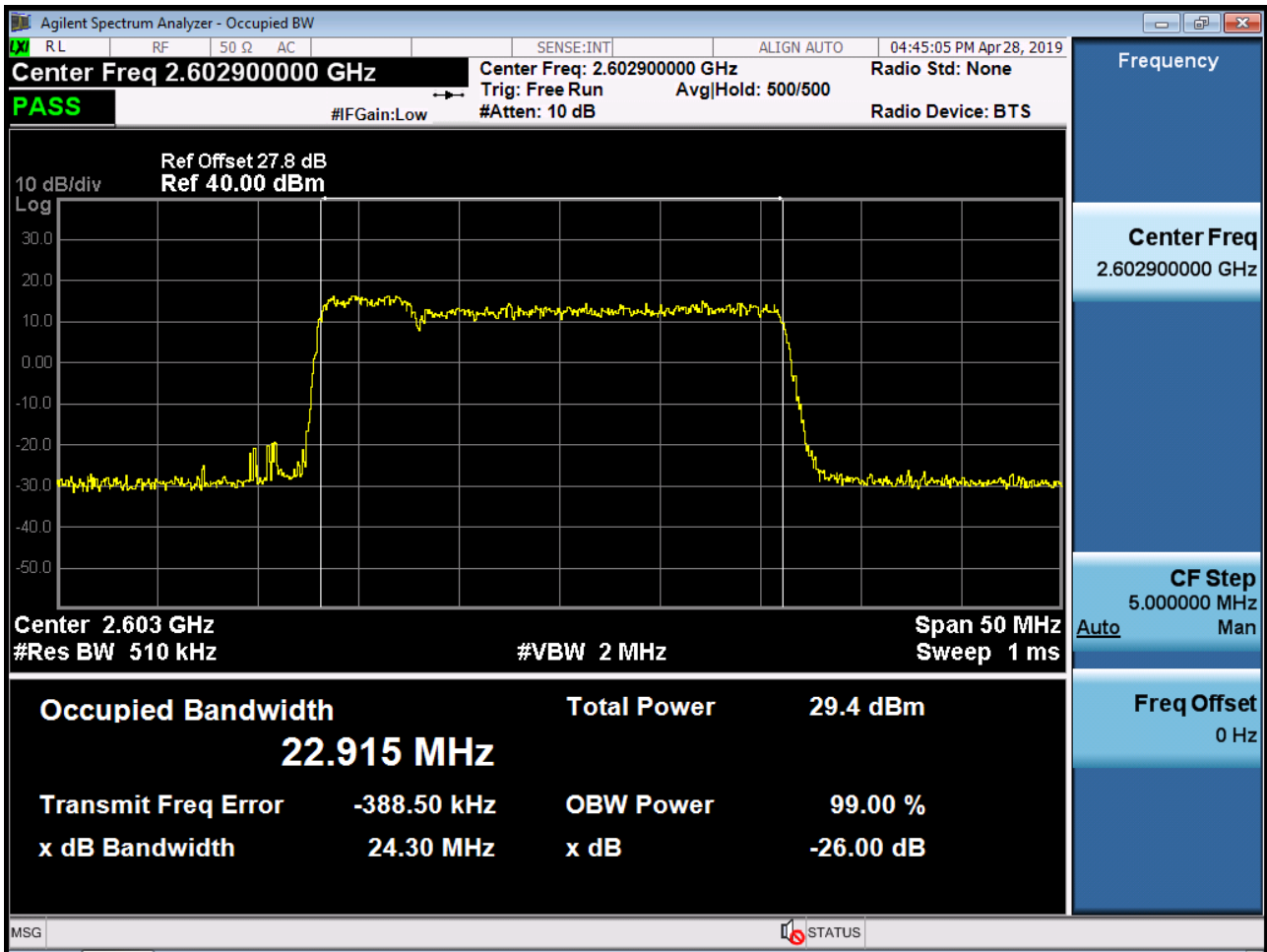
PCC 15MHz Ch40740 RB75 Offset0,
SCC 15MHz Ch40590 RB75 Offset0_(QPSK)



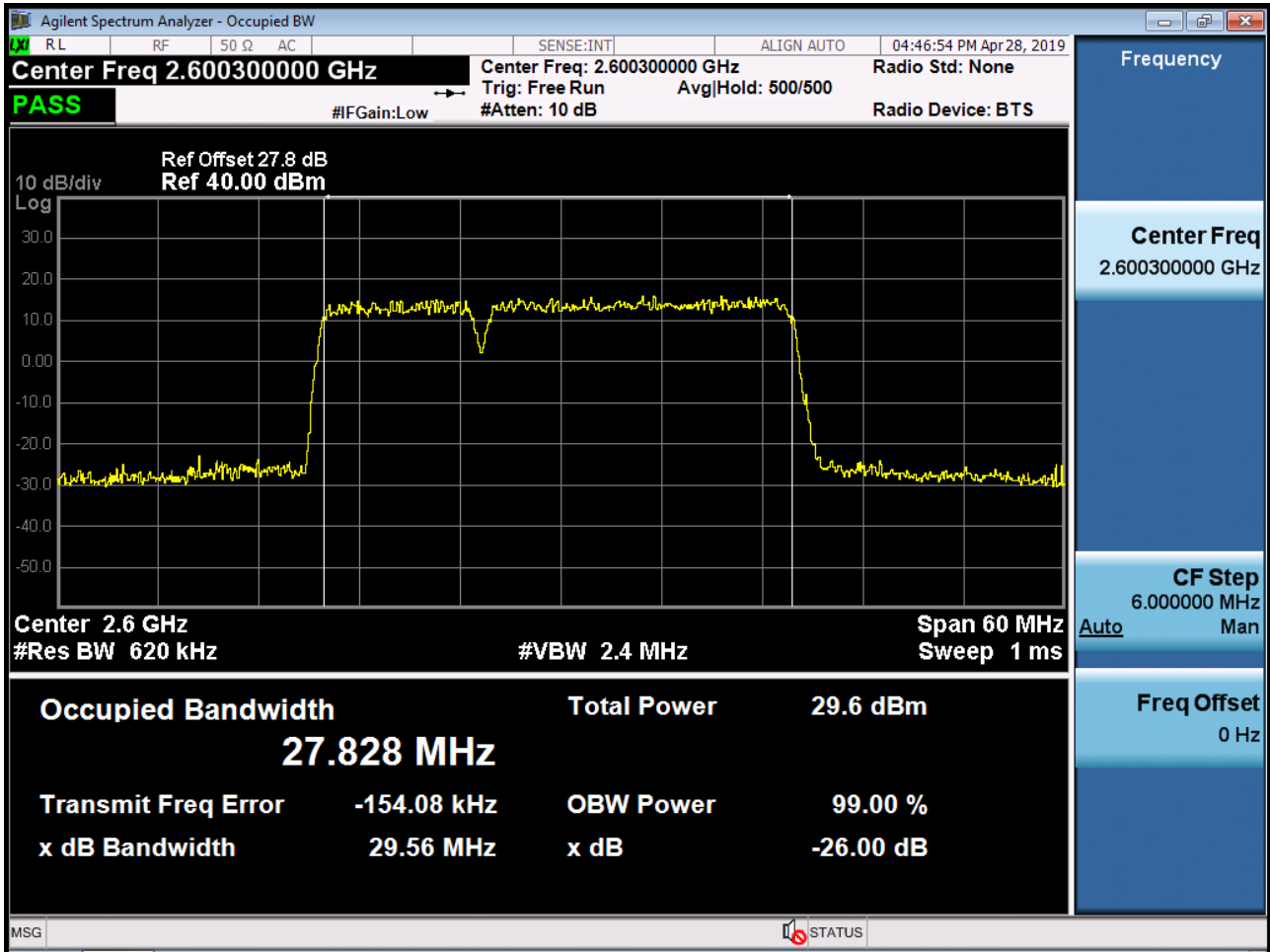
PCC 15MHz Ch40740 RB75 Offset0,
SCC 20MHz Ch40569 RB100 Offset0_(QPSK)



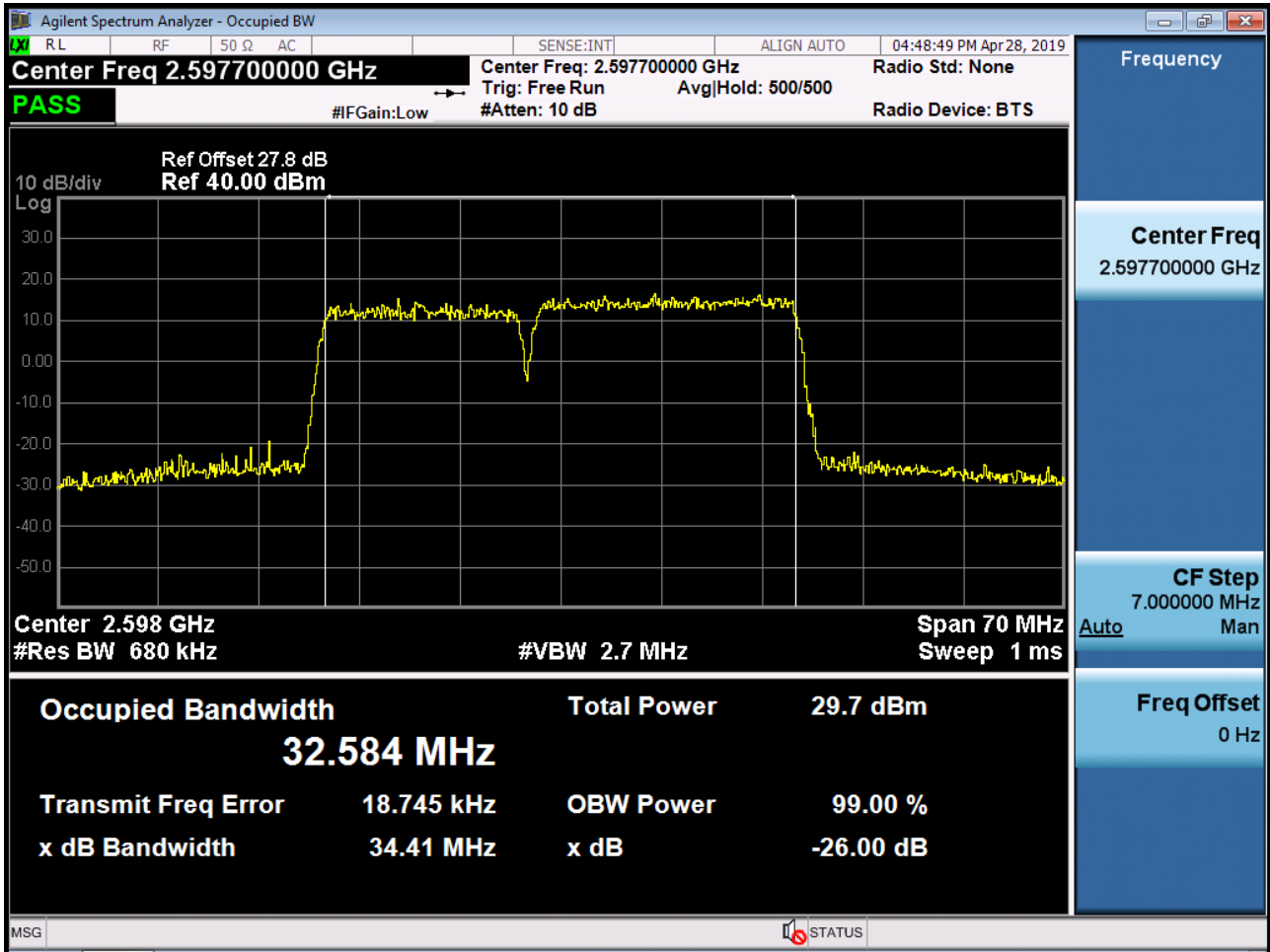
PCC 20MHz Ch40740 RB100 Offset0,
SCC 5MHz Ch40623 RB25 Offset0_(QPSK)



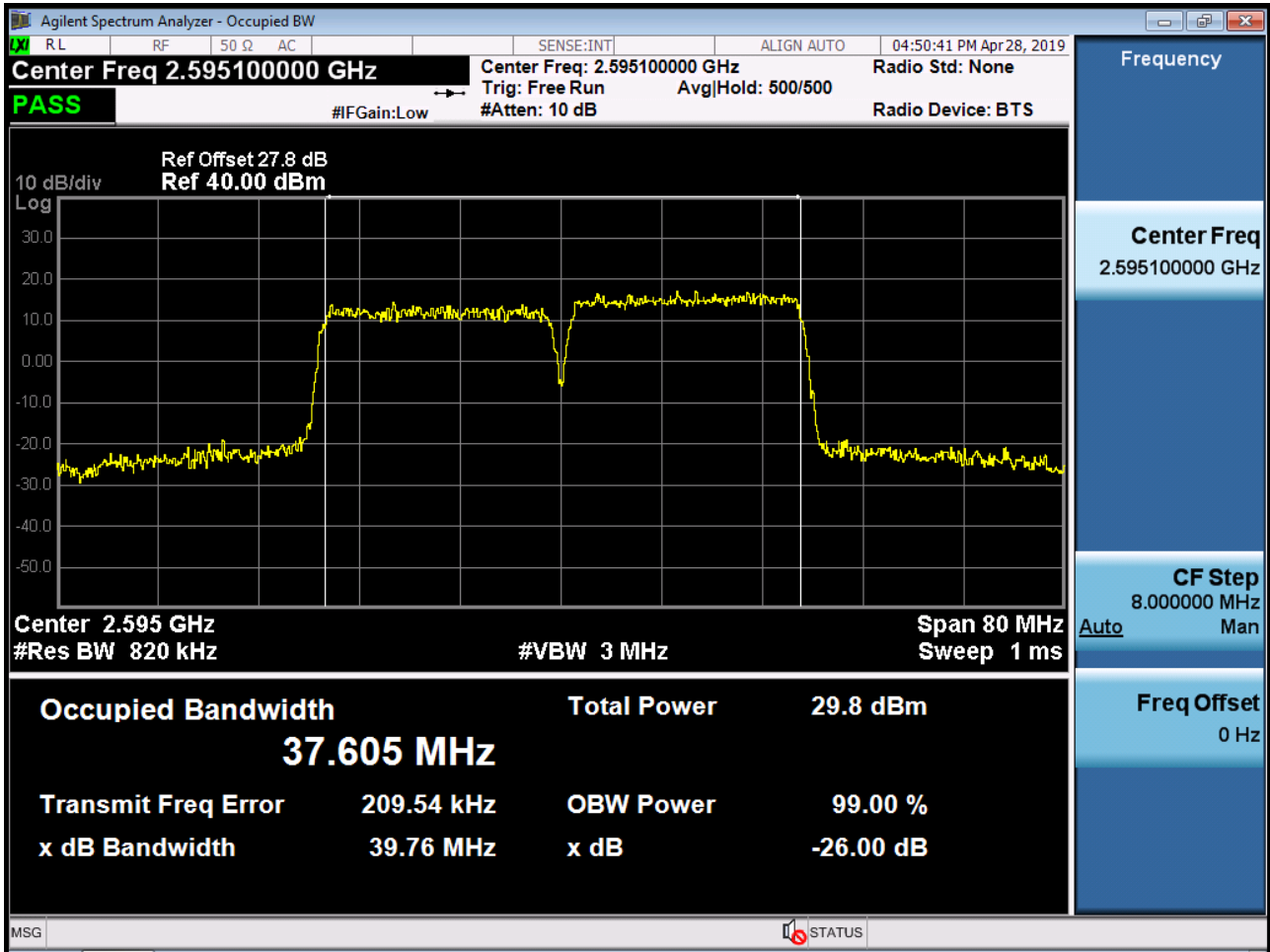
PCC 20MHz Ch40740 RB100 Offset0,
SCC 10MHz Ch40596 RB50 Offset0_(QPSK)



PCC 20MHz Ch40740 RB100 Offset0,
SCC 15MHz Ch40569 RB75 Offset0_(QPSK)



PCC 20MHz Ch40740 RB100 Offset0,
SCC 20MHz Ch40542 RB100 Offset0_(QPSK)



8.8 Peak- to- Average Ratio

PCC				SCC				Data (MHz)
Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	
5	40740	QPSK	25/ 0	20	40623	QPSK	100/ 0	5.95
10	40740	QPSK	50/ 0	15	40620	QPSK	75/ 0	5.91
10	40740	QPSK	50/ 0	20	40596	QPSK	100/ 0	5.94
15	40740	QPSK	75/ 0	10	40620	QPSK	50/ 0	5.90
15	40740	QPSK	75/ 0	15	40590	QPSK	75/ 0	5.83
15	40740	QPSK	75/ 0	20	40569	QPSK	100/ 0	5.88
20	40740	QPSK	100/ 0	5	40623	QPSK	25/ 0	5.88
20	40740	QPSK	100/ 0	10	40596	QPSK	50/ 0	5.89
20	40740	QPSK	100/ 0	15	40569	QPSK	75/ 0	5.89
20	40740	QPSK	100/ 0	20	40542	QPSK	100/ 0	5.69

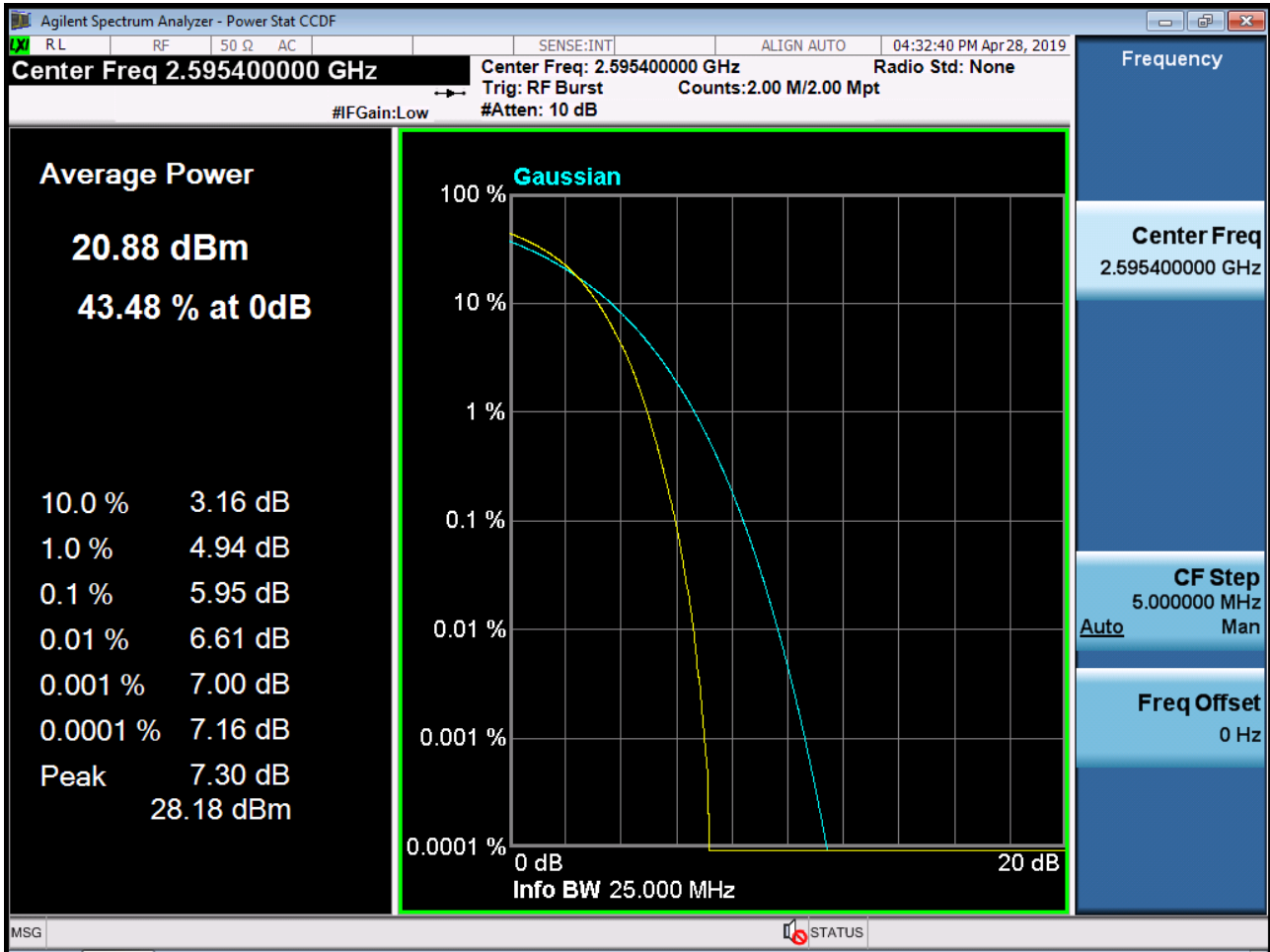
PCC				SCC				Data (MHz)
Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	
5	40740	16QAM	25/ 0	20	40623	16QAM	100/ 0	6.74
10	40740	16QAM	50/ 0	15	40620	16QAM	75/ 0	6.73
10	40740	16QAM	50/ 0	20	40596	16QAM	100/ 0	6.73
15	40740	16QAM	75/ 0	10	40620	16QAM	50/ 0	6.73
15	40740	16QAM	75/ 0	15	40590	16QAM	75/ 0	6.73
15	40740	16QAM	75/ 0	20	40569	16QAM	100/ 0	6.69
20	40740	16QAM	100/ 0	5	40623	16QAM	25/ 0	6.72
20	40740	16QAM	100/ 0	10	40596	16QAM	50/ 0	6.72
20	40740	16QAM	100/ 0	15	40569	16QAM	75/ 0	6.71
20	40740	16QAM	100/ 0	20	40542	16QAM	100/ 0	6.72

PCC				SCC				Data (MHz)
Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	Bandwidth [MHz]	Channel	Mod	RB/ RB Offset	
5	40740	64QAM	25/ 0	20	40623	64QAM	100/ 0	6.97
10	40740	64QAM	50/ 0	15	40620	64QAM	75/ 0	7.02
10	40740	64QAM	50/ 0	20	40596	64QAM	100/ 0	6.96
15	40740	64QAM	75/ 0	10	40620	64QAM	50/ 0	7.02
15	40740	64QAM	75/ 0	15	40590	64QAM	75/ 0	7.01
15	40740	64QAM	75/ 0	20	40569	64QAM	100/ 0	7.00
20	40740	64QAM	100/ 0	5	40623	64QAM	25/ 0	6.96
20	40740	64QAM	100/ 0	10	40596	64QAM	50/ 0	6.96
20	40740	64QAM	100/ 0	15	40569	64QAM	75/ 0	7.01
20	40740	64QAM	100/ 0	20	40542	64QAM	100/ 0	7.01

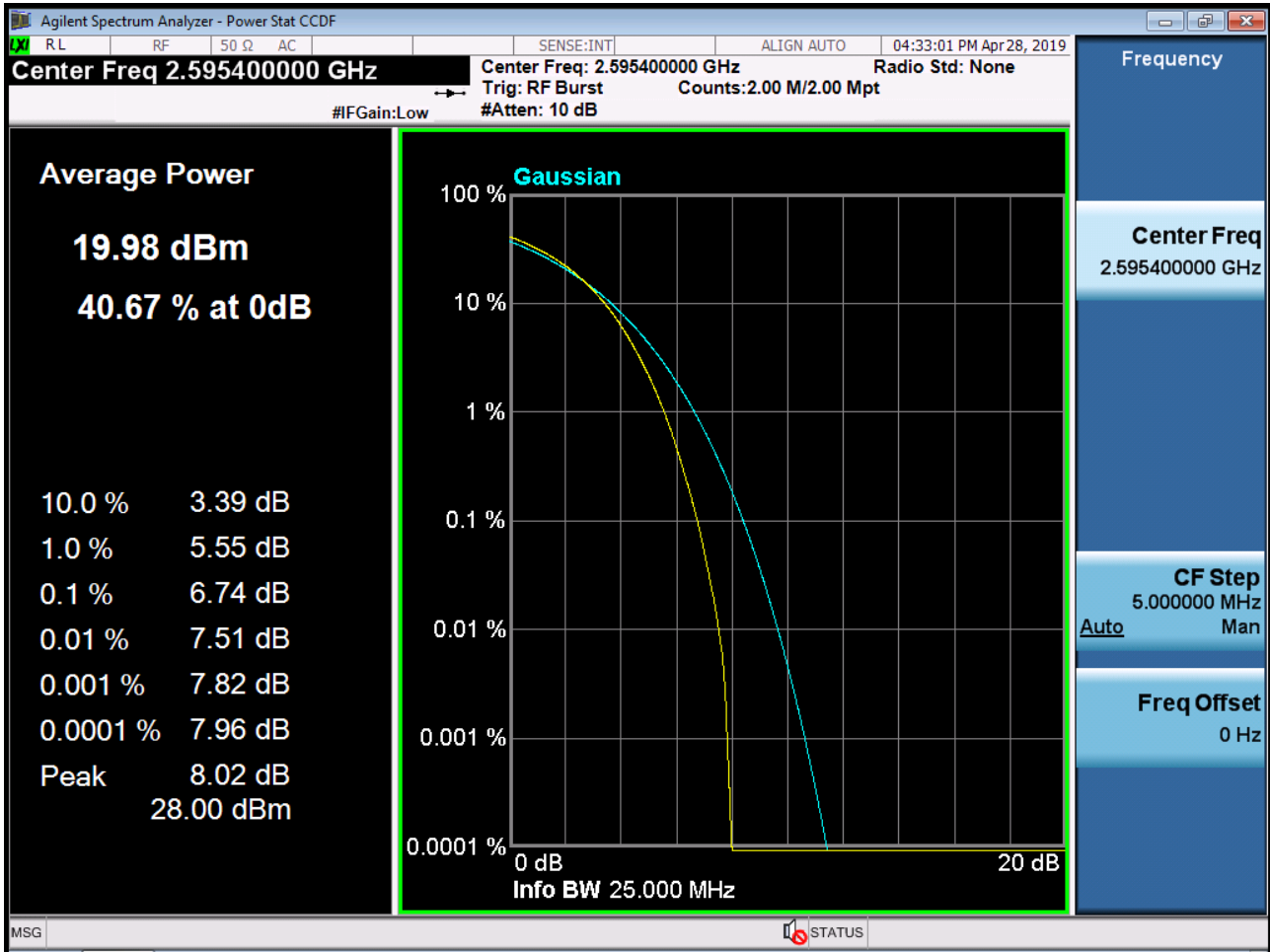
Note:

In order to simplify the report, attached plots were only worst-case.

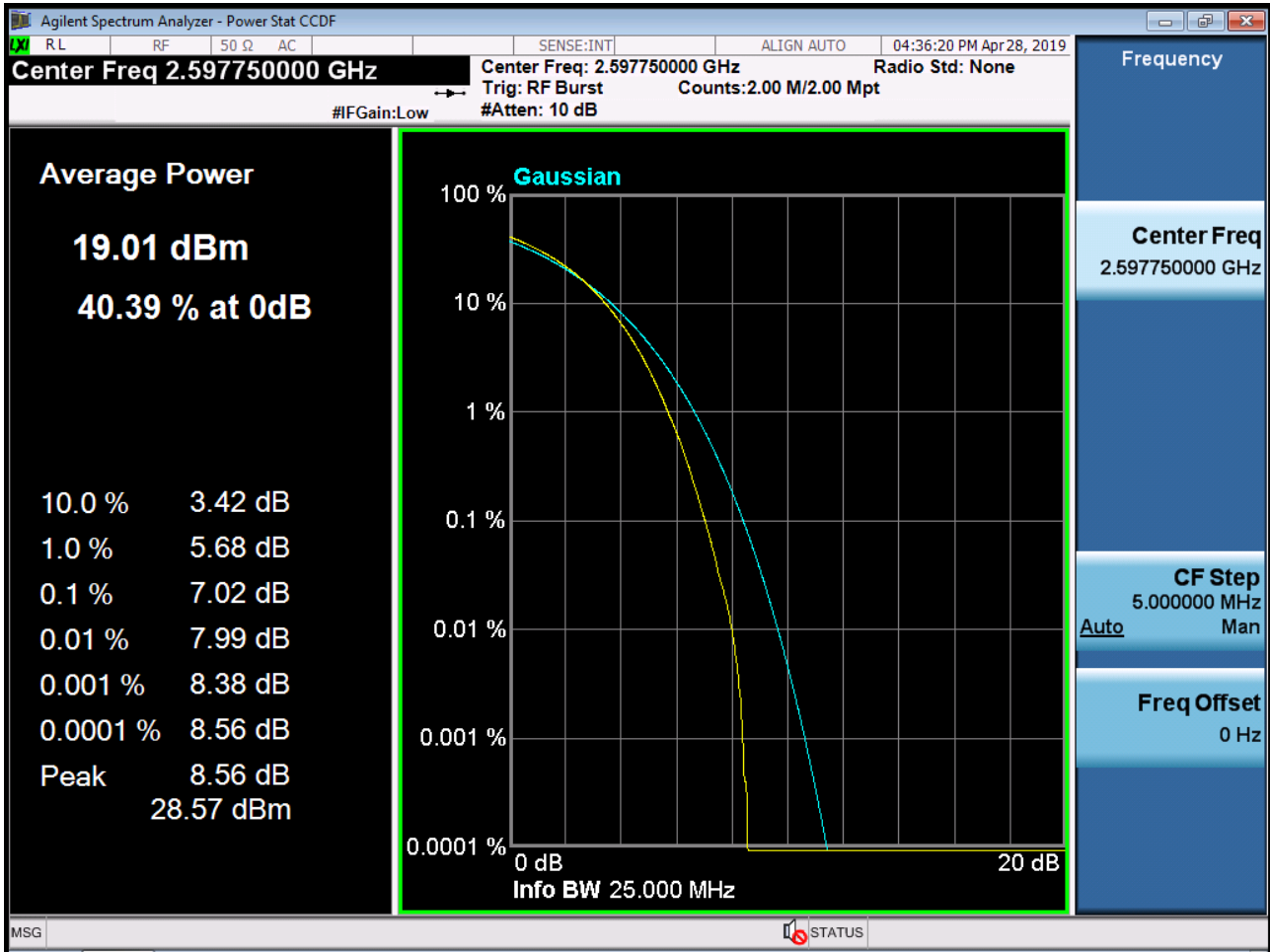
PCC 5MHz Ch40740 RB25 Offset0,
SCC 20MHz Ch40623 RB100 Offset0_(QPSK)



PCC 5MHz Ch40740 RB25 Offset0,
SCC 20MHz Ch40623 RB100 Offset0_(16QAM)



PCC 10MHz Ch40740 RB50 Offset0,
SCC 15MHz Ch40620 RB75 Offset0_(64QAM)



8.9 Emission Designator.

Mode	Modulation	Emission Designator
5MHz+20MHz	QPSK	22M9G7D
	16QAM	22M9W7D
	64QAM	22M9W7D
10MHz+15MHz	QPSK	23M1G7D
	16QAM	23M1W7D
	64QAM	23M1W7D
10MHz+20MHz	QPSK	27M8G7D
	16QAM	27M7W7D
	64QAM	27M8W7D
15MHz+15MHz	QPSK	28M3G7D
	16QAM	28M3W7D
	64QAM	28M4W7D
15MHz+20MHz	QPSK	32M7G7D
	16QAM	32M7W7D
	64QAM	32M7W7D
20MHz+20MHz	QPSK	37M6G7D
	16QAM	37M6W7D
	64QAM	37M6W7D

9. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1904-FC049-P