



REPORT No.: SZ16050107W11

FCC RF TEST REPORT

APPLICANT : Shakespeare Company,LLC

PRODUCT NAME : WebWatch

MODEL NAME : WCT-1,WC-1

TRADE NAME : WebWatch

BRAND NAME : Shakespeare

FCC ID : I4O-WW01

STANDARD(S) : 47 CFR Part 22 Subpart H
47 CFR Part 24 Subpart E
47 CFR Part 27 Subpart L

ISSUE DATE : 2016-07-20



SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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Change History		
Issue	Date	Reason for change
1.0	2016-07-20	First edition



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TEST REPORT DECLARATION

Applicant	Shakespeare Company,LLC
Applicant Address	6111 Shakespeare Rd, Columbia, SC,29223 United States
Manufacturer	Shakespeare Company,LLC
Manufacturer Address	6111 Shakespeare Rd, Columbia, SC,29223 United States
Product Name	WebWatch
Model Name	WCT-1,WC-1
Brand Name	Shakespeare
HW Version	V1.0
SW Version	V1.0
Test Standards	47 CFR Part 22 Subpart H 47 CFR Part 24 Subpart E 47 CFR Part 27 Subpart L
Test Date	2016-05-30 to 2016-06-15
Test Result	PASS

Tested by : Yuan Ling
Yuan Ling

Reviewed by : Qiu Xiaojun
Qiu Xiaojun

Approved by : Peng Huarui
Peng Huarui



1. GENERAL INFORMATION

1.1 EUT Description

EUT Type: WebWatch
Serial No.: (n.a, marked #1 by test site)
Hardware Version: V1.0
Software Version: V1.0
Applicant: Shakespeare Company,LLC
6111 Shakespeare Rd, Columbia, SC,29223 United States
Manufacturer: Shakespeare Company,LLC
6111 Shakespeare Rd, Columbia, SC,29223 United States
Frequency Range: WCDMA 850MHz
Tx: 826.4 - 846.6MHz (at intervals of 200kHz);
Rx: 871.4 - 891.6MHz (at intervals of 200kHz);
WCDMA 1700MHz
Tx: 1712.4 – 1752.6MHz (at intervals of 200kHz);
Rx: 2112.4 - 2152.6MHz (at intervals of 200kHz)
WCDMA 1900MHz
Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);
Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)
Modulation Type.....: WCDMA Mode with QPSK Modulation
HSDPA Mode with QPSK Modulation
HSUPA Mode with QPSK Modulation
HSPA+ Mode with QPSK Modulation
Antenna Type: Dedicated Antenna
Emission Designators: WCDMA 850:4M16F9W ,WCDMA1700:4M17F9W
WCDMA1900:4M17F9W

Note 1: The transmitter (Tx) frequency arrangement of the WCDMA 850MHz band used by the EUT can be represented with the formula $F(n)=826.4+0.2*(n-4132)$, $4132 \leq n \leq 4233$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 4132 (826.4MHz), 4175(835MHz) and 4233 (846.6MHz).

Note 2: The transmitter (Tx) frequency arrangement of the WCDMA 1900MHz band used by the EUT can be represented with the formula $F(n)=1852.4+0.2*(n-9262)$, $9262 \leq n \leq 9538$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 9262 (1852.4MHz), 9400 (1880MHz) and 9538 (1907.6MHz).

Note 3: The transmitter (Tx) frequency arrangement of the WCDMA 1700MHz band used by the EUT can be represented with the formula $F(n)=1712.4+0.2*(n-1312)$, $1312 \leq n \leq 1513$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report



are separately 1312 (1712.4MHz), 1412 (1732.4MHz) and 1513 (1752.6MHz).

Note 4: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 , Part 24and Part 27 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-12 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-12 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-12 Edition)	Personal Communications Services
4	47 CFR Part 27 (10-1-12 Edition)	Miscellaneous Wireless Communications Services

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	2.1046	Conducted RF Output Power	PASS
2.	24.232(d), 27.50(d)(5)	Peak to average radio	PASS
2	2.1049, 22.917, 24.238, 27.53(g)	99% Occupied Bandwidth	PASS
3	2.1055, 22.355, 24.235, 27.54	Frequency Stability	PASS
4	2.1051, 2.1057, 22.917, 24.238, 27.53(g)	Conducted Out of Band Emissions	PASS
5	2.1051, 2.1057, 22.917, 24.238, 27.53(g)(h)	Band Edge	PASS
6	22.913, 24.232, 27.50(d)(4)	Transmitter Radiated Power (EIPR/ERP)	PASS
7	2.1053, 2.1057, 22.917, 24.238, 27.53(g)	Radiated Out of Band Emissions	PASS

NOTE: Measurement method according to TIA/EIA 603.D-2010



1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District, ShenZhen, GuangDong Province,P. R. China 518101. The test site is constructed in conformance with the requirements of ANSI C63.7-2009, ANSI C63.4-2014 and CISPR Publication 22:2010; the FCC registration number is 695796.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR PART 2, PART 22H & 24E&27L REQUIREMENTS

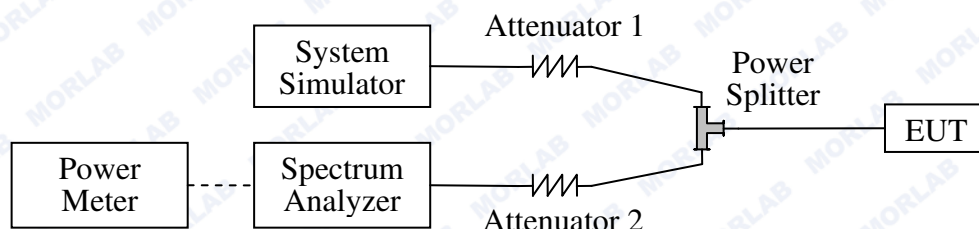
2.1 Conducted RF Output Power

2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2 Test Description

Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

The Power Meter was just used for the Conducted RF Output Power test of WCDMA Model.

Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2016.03.02	2017.03.01
Spectrum Analyzer	Agilent	E7405A	US44210471	2016.03.02	2017.03.01
Power Meter	Agilent	E4418B	GB43318055	2016.03.02	2017.03.01
Power Sensor	Agilent	8482A	MY41091706	2016.03.02	2017.03.01
Power Splitter	Weinschel	1506A	NW521	2016.03.02	2017.03.01
Attenuator 1	Resnet	20dB	(n.a.)	2016.03.02	2017.03.01
Attenuator 2	Resnet	3dB	(n.a.)	2016.03.02	2017.03.01



2.1.3 Test Results

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

WCDMA Model Test Verdict:

Item	band	WCDMA 850			WCDMA 1900		
	ARFCN	4132	4175	4233	9262	9400	9538
	subtest	dBm			dBm		
5.2(WCDMA)	non	26.66	26.76	26.51	25.52	24.73	25.32
HSDPA	1	26.88	26.82	26.73	25.68	25.04	25.49
	2	26.85	26.79	26.64	25.54	25.17	25.58
	3	26.81	26.83	26.75	25.53	25.03	25.41
	4	26.74	26.84	26.79	25.61	25.11	25.53
HSUPA	1	26.80	26.79	26.72	25.63	25.06	25.51
	2	26.84	26.74	26.78	25.52	25.11	25.53
	3	26.83	26.81	26.64	25.66	25.03	25.58
	4	25.96	26.72	26.63	25.61	25.01	25.61
	5	25.97	26.76	26.71	25.59	25.17	25.47
HSPA+	1	26.85	26.86	26.76	25.62	25.04	25.40

Note: The Conducted RF Output Power test of WCDMA /HSDPA /HSUPA /HSPA+ was tested by power meter.

Item	band	WCDMA 1700		
	ARFCN	1312	1412	1513
	subtest	dBm		
5.2(WCDMA)	non	25.58	25.63	25.50
HSDPA	1	25.53	25.55	25.59
	2	25.47	25.54	25.51
	3	25.44	25.57	25.53
	4	25.51	25.49	25.57
HSUPA	1	25.51	25.63	25.51
	2	25.55	25.66	25.55
	3	25.56	25.59	25.57
	4	25.51	25.61	25.58
	5	25.54	25.67	25.53
HSPA+	1	25.57	25.56	25.59

Note: The Conducted RF Output Power test of WCDMA /HSDPA /HSUPA was tested by power meter.



2.2 Peak to Average Ratio

2.2.1 Definition

According to FCC section 2.1049 and FCC 24.232(d) the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2 Test Description

See section 2.1.2 of this report.

2.2.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

A .For GSM/EGPRS operating mode:

- Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.
- Set EUT in maximum output power, and triggered the bust signal.
- Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

B. For UMTS operating mode:

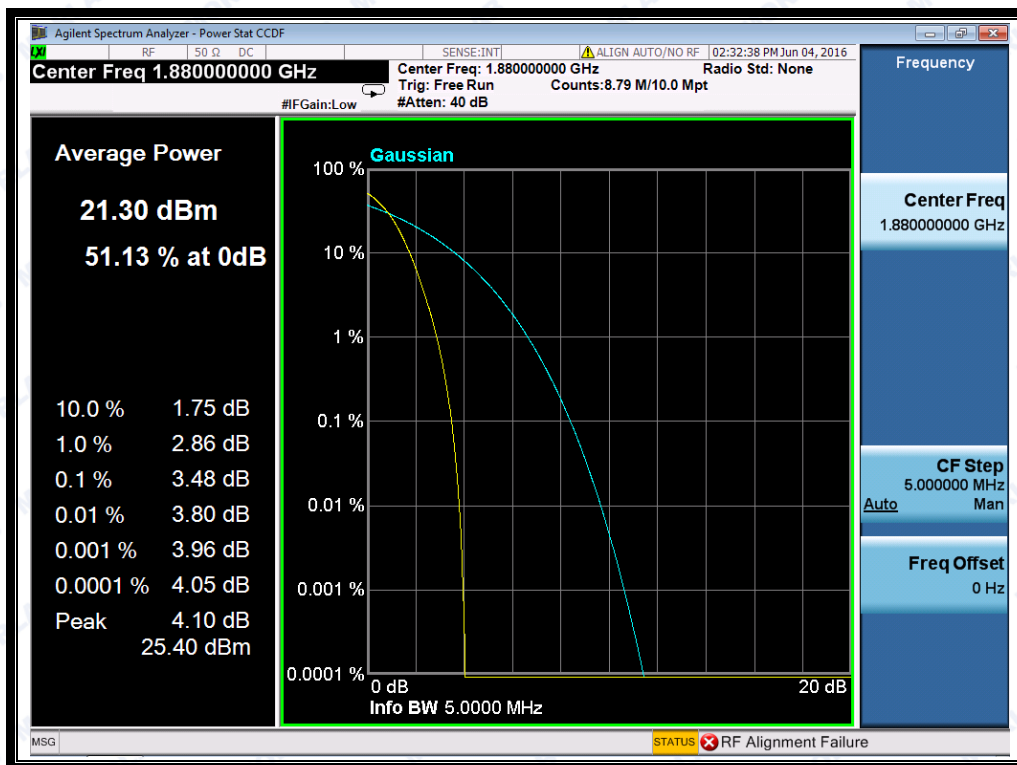
- Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
- The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

Test Verdict:

Band	Channel	Frequency (MHz)	Peak to Average ratio		Limit	Verdict
			dB	Refer to Plot	dB	
WCDMA 1900MHz	9262	1852.4	3.13	Plot C1 to C3	13	PASS
	9400	1880.0	3.48			PASS
	9538	1907.6	3.48			PASS
WCDMA 1700MHz	1312	1712.4	3.34	Plot D1 to D3	13	PASS
	1412	1732.4	3.47			PASS
	1513	1752.6	3.48			PASS



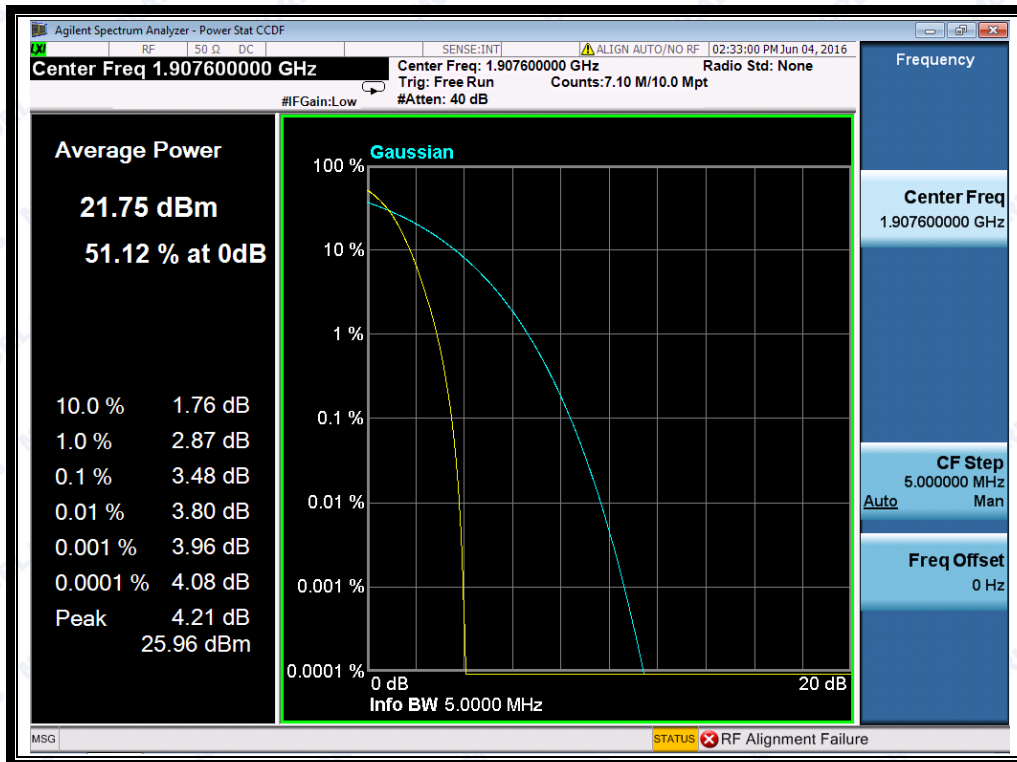
(Plot C1: WCDMA 1900MHz Channel = 9262)



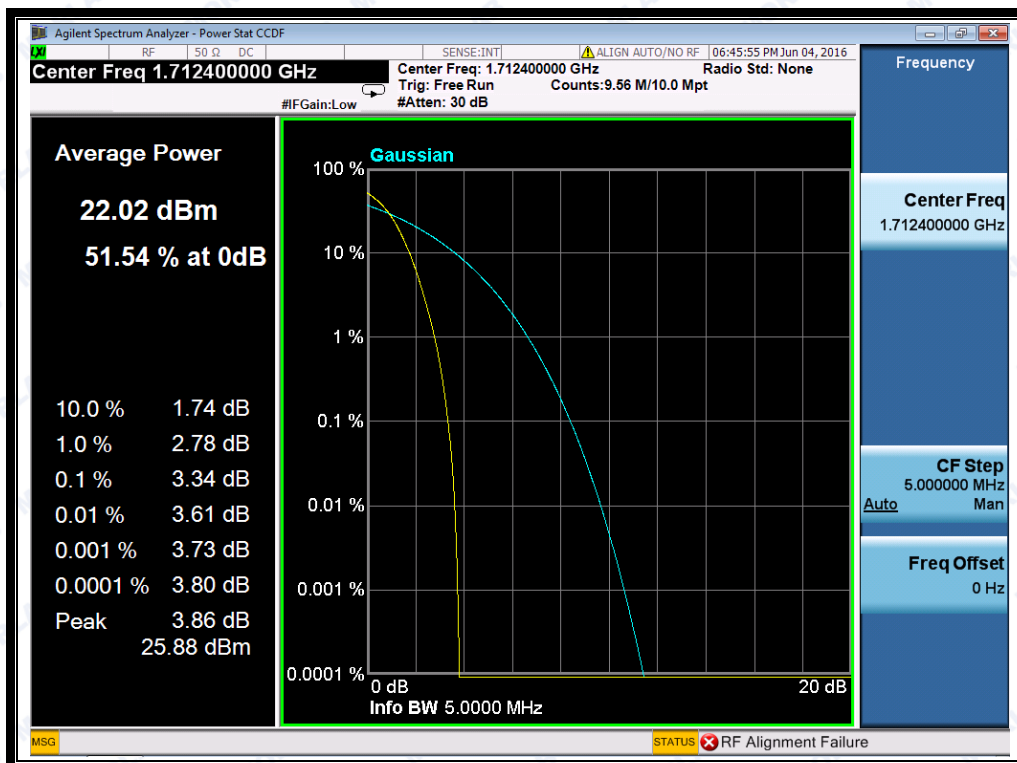
(Plot C2: WCDMA 1900MHz Channel = 9400)



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(Plot C3: WCDMA 1900MHz Channel = 9538)



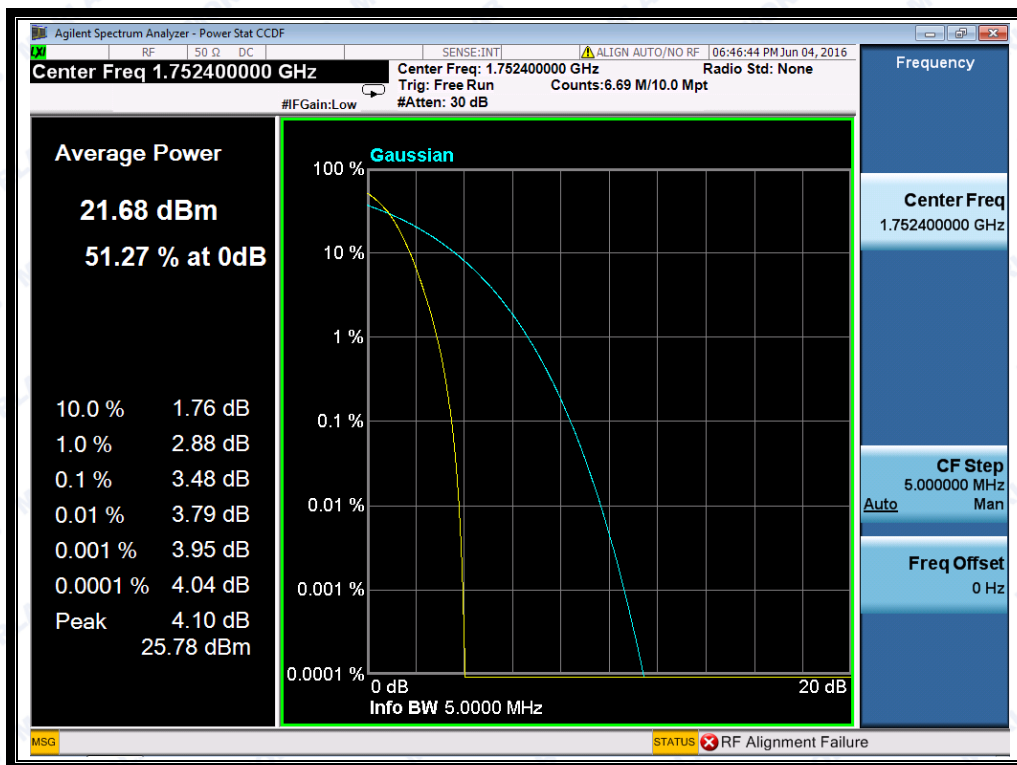
(Plot D1: WCDMA 1700MHz Channel = 1312)



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(Plot D2: WCDMA 1700MHz Channel = 1412)



(Plot D3: WCDMA 1700MHz Channel = 1513)



2.3 99% Occupied Bandwidth

2.3.1 Definition

According to FCC section 2.1049 and FCC § 22.917 & 24.238, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

2.3.2 Test Description

See section 2.1.2 of this report.

2.3.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

Test Verdict:

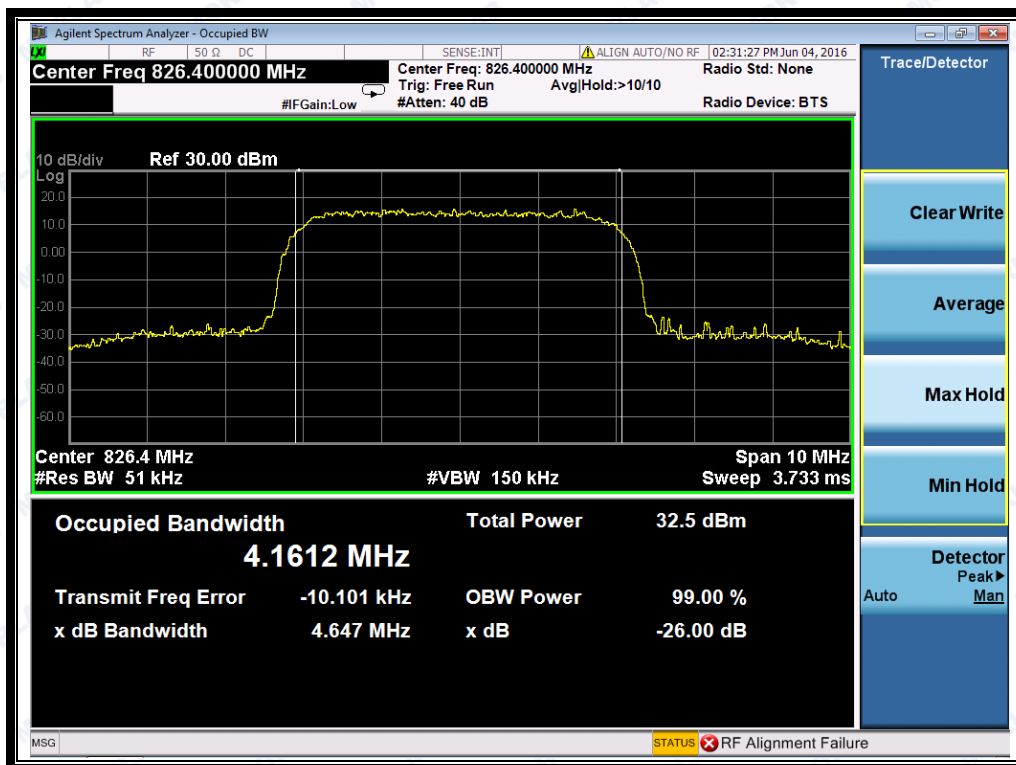
Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
WCDMA 850MHz	4132	826.4	4.647 MHz	4.1612 MHz	Plot G1 to G3
	4175	835.0	4.618 MHz	4.1491 MHz	
	4233	846.6	4.617 MHz	4.1600 MHz	
WCDMA 1700MHz	1312	1712.4	4.609 MHz	4.1524 MHz	Plot H1 to H3
	1412	1732.4	4.615 MHz	4.1564 MHz	
	1513	1752.6	4.636 MHz	4.1574 MHz	
WCDMA 1900MHz	9262	1852.4	4.628 MHz	4.1560 MHz	Plot I1 to I3
	9400	1880.0	4.608 MHz	4.1566 MHz	
	9538	1907.6	4.610 MHz	4.1525 MHz	
HSDPA 850MHz	4132	826.4	4.637 MHz	4.1624 MHz	Plot J1 to J3
	4175	835.0	4.607 MHz	4.1576 MHz	
	4233	846.6	4.627 MHz	4.1522MHz	
HSDPA 1700MHz	1312	1712.4	4.616 MHz	4.1602 MHz	Plot K1 to K3
	1412	1732.4	4.629 MHz	4.1668 MHz	
	1513	1752.6	4.623 MHz	4.1529 MHz	
HSDPA 1900MHz	9262	1852.4	4.610 MHz	4.1537 MHz	Plot L1 to L3
	9400	1880.0	4.612 MHz	4.1522 MHz	
	9538	1907.6	4.612 MHz	4.1632 MHz	
HSUPA 850MHz	4132	826.4	4.618 MHz	4.1599 MHz	Plot M1 to M3
	4175	835.0	4.638 MHz	4.1628 MHz	
	4233	846.6	4.609 MHz	4.1455 MHz	



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Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
HSUPA 1700MHz	1312	1712.4	4.633 MHz	4.1657 MHz	Plot N1 to N3
	1412	1732.4	4.599 MHz	4.1597 MHz	
	1513	1752.6	4.592 MHz	4.1464 MHz	
HSUPA 1900MHz	9262	1852.4	4.640MHz	4.1575 MHz	Plot O1 to O3
	9400	1880.0	4.604 MHz	4.1570 MHz	
	9538	1907.6	4.613 MHz	4.1596 MHz	
HSPA+ 850MHz	4132	826.4	4.641 MHz	4.1526 MHz	Plot P1 to P3
	4175	835.0	4.628 MHz	4.1543 MHz	
	4233	846.6	4.607 MHz	4.1641 MHz	
HSPA+ 1700MHz	1312	1712.4	4.625 MHz	4.1511 MHz	Plot Q1 to Q3
	1412	1732.4	4.613 MHz	4.1487 MHz	
	1513	1752.6	4.606 MHz	4.1496 MHz	
HSPA+ 1900MHz	9262	1852.4	4.622 MHz	4.1568 MHz	Plot R1 to R3
	9400	1880.0	4.614 MHz	4.1650 MHz	
	9538	1907.6	4.606 MHz	4.1637 MHz	

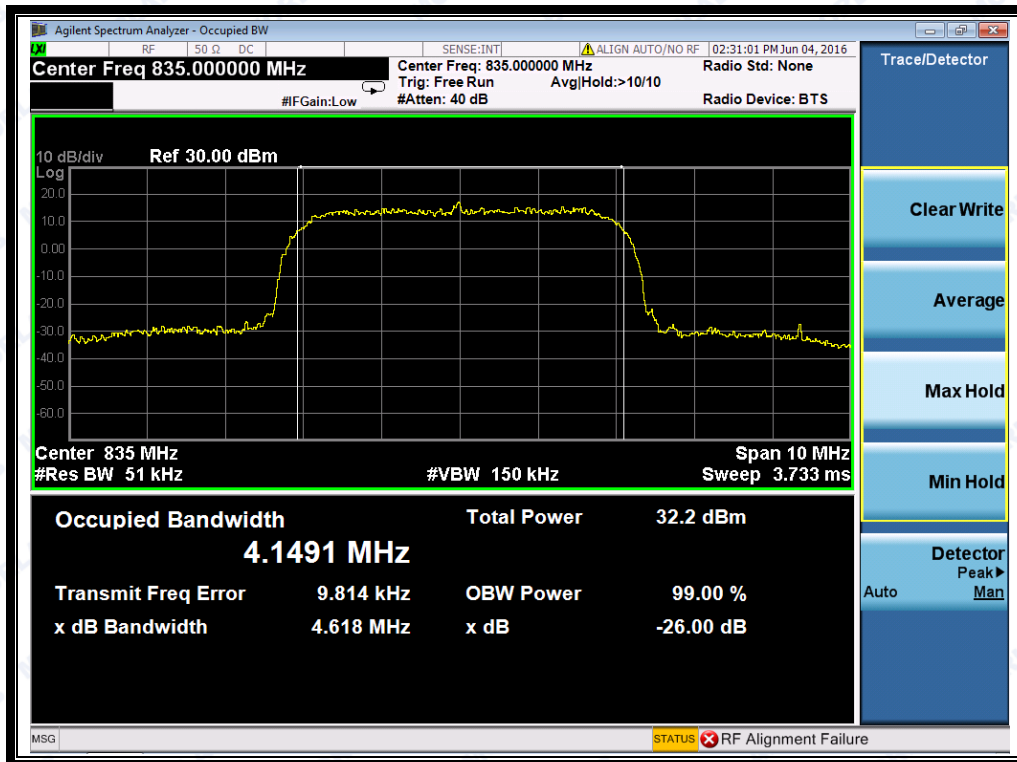
Test Plots:



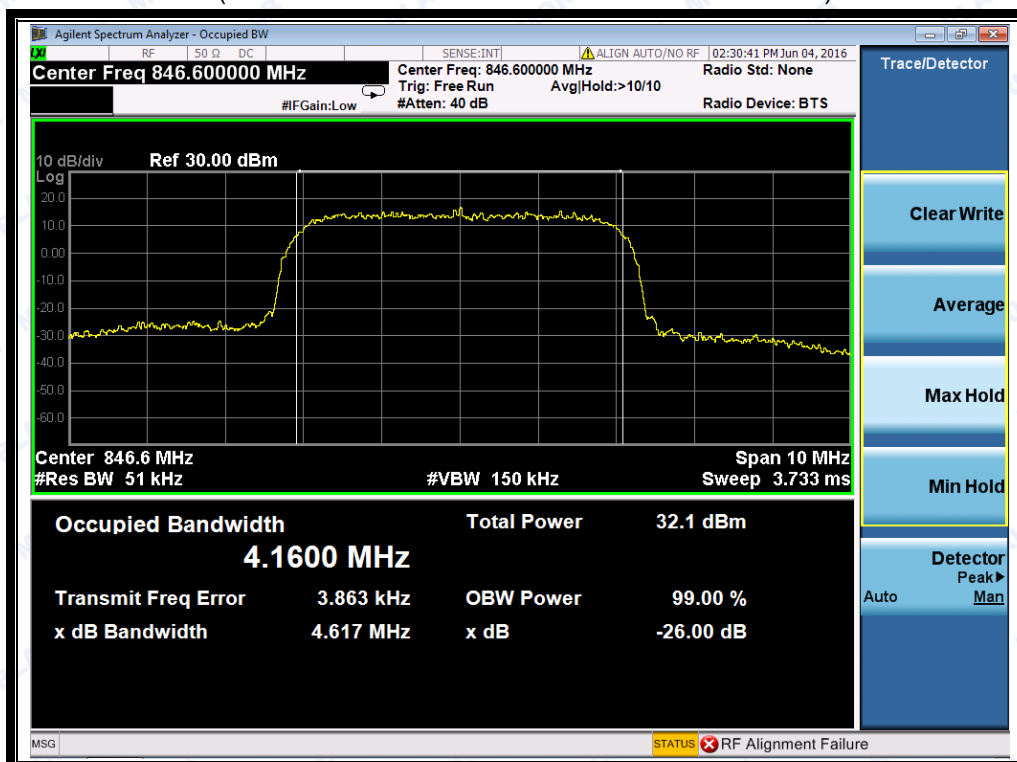
(Plot G1: WCDMA 850MHz Channel = 4132)



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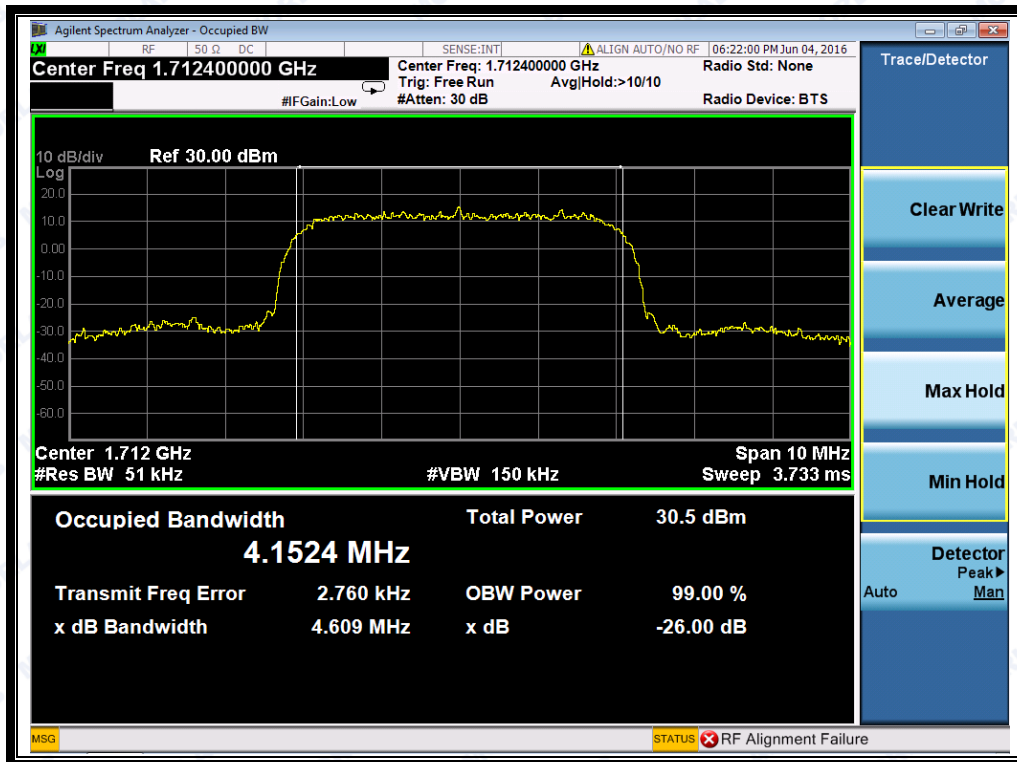
(Plot G2: WCDMA 850 MHz Channel = 4175)



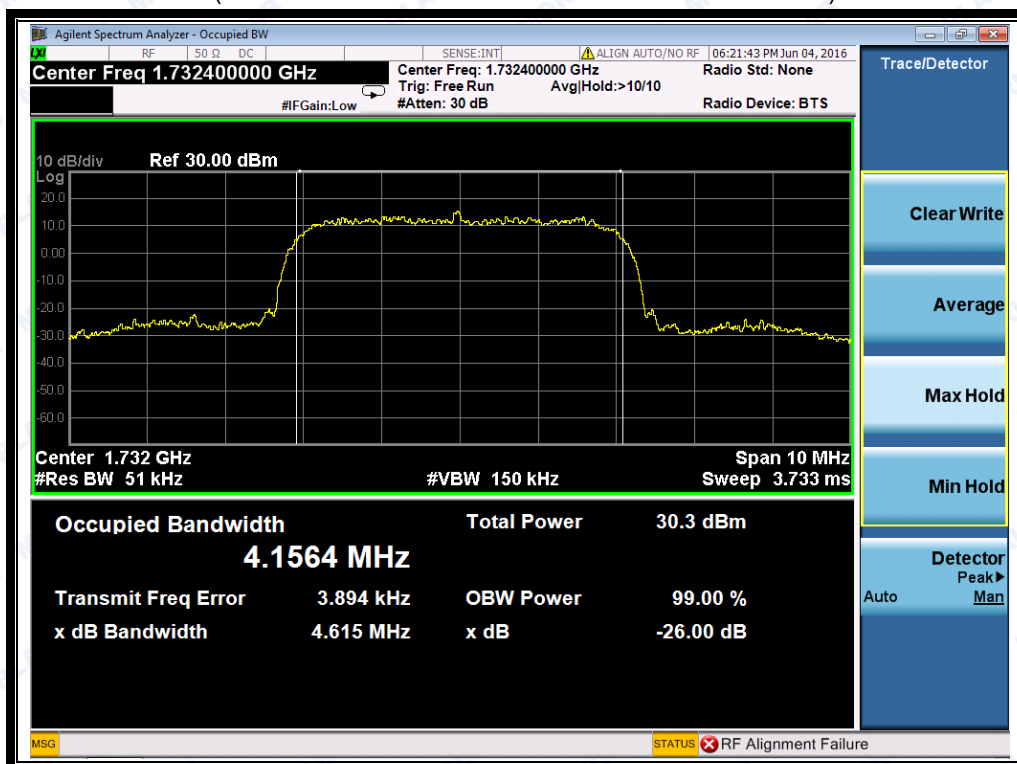
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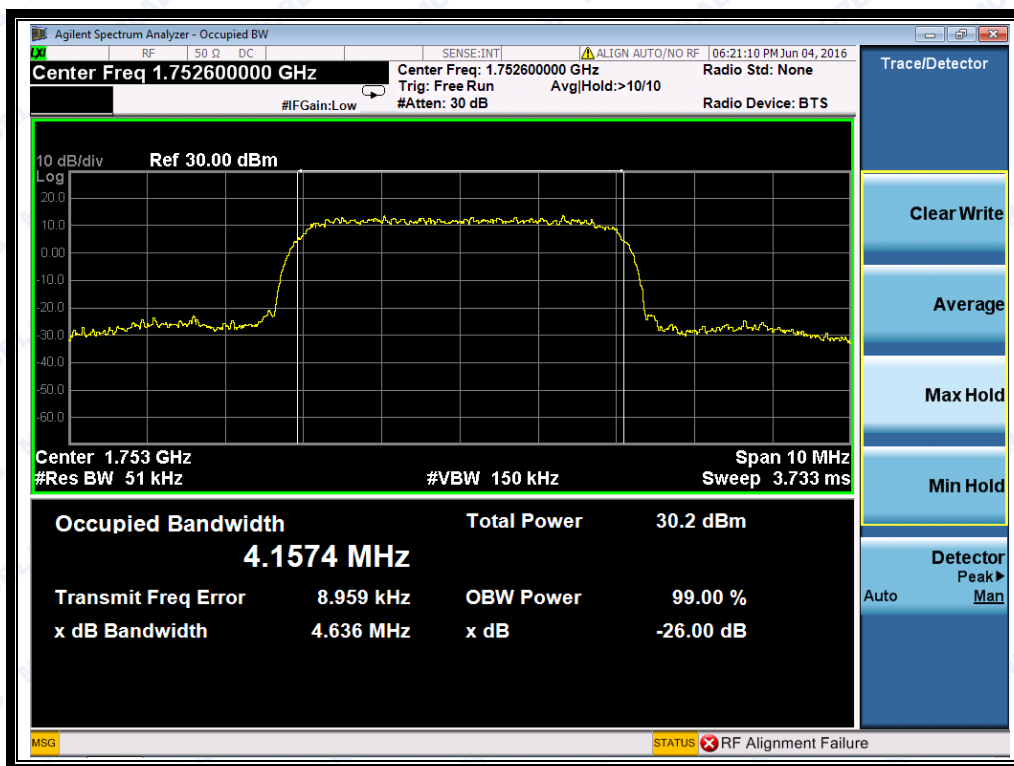
(Plot H1: WCDMA 1700MHz Channel = 1312)



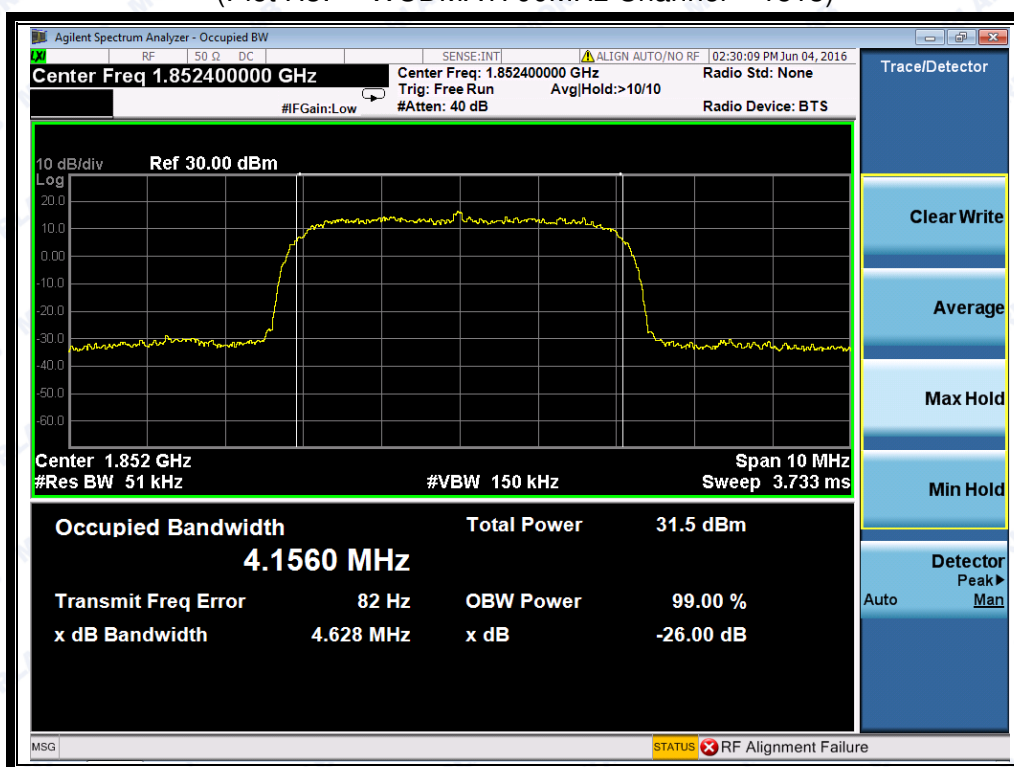
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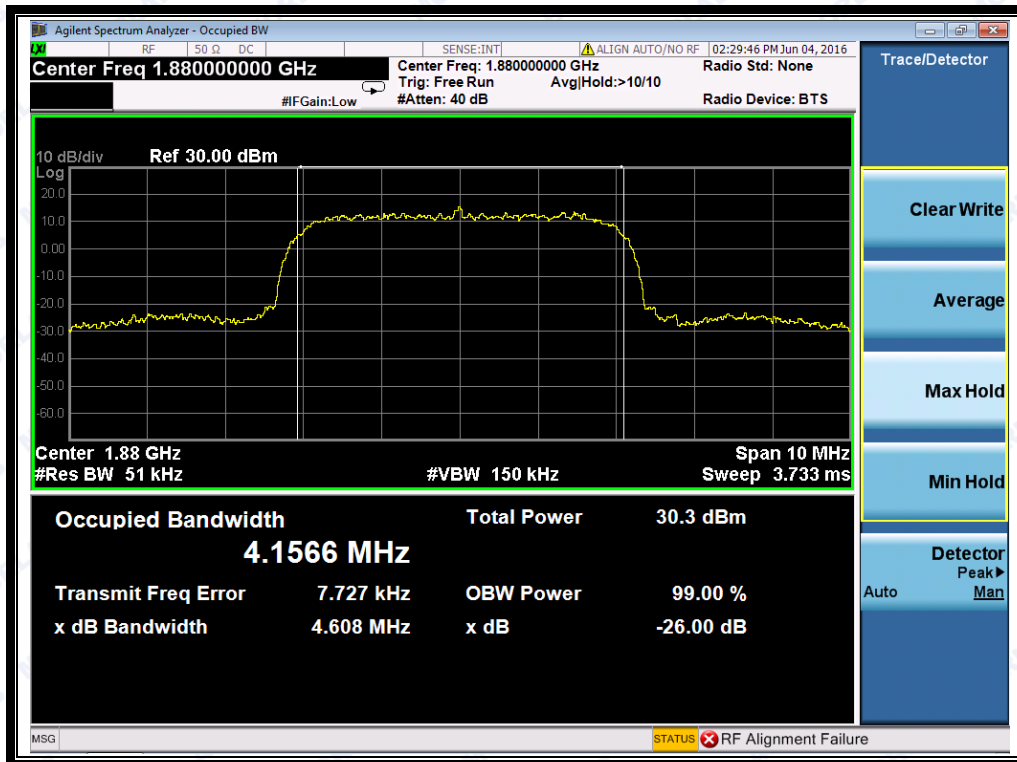
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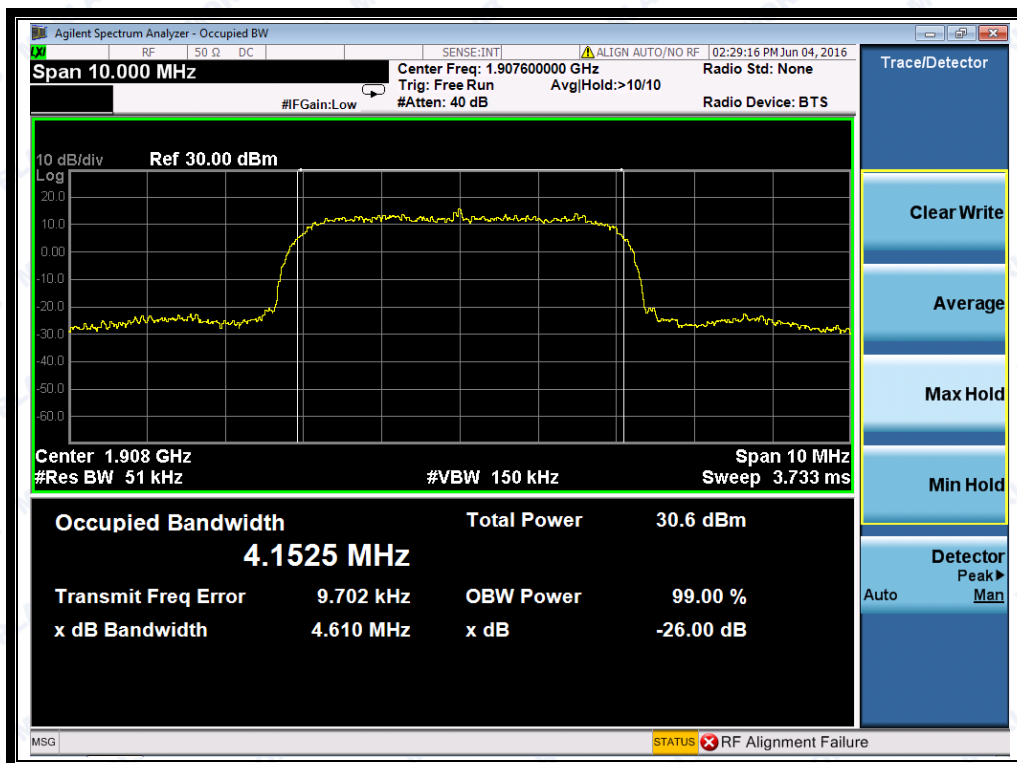
(Plot I1: WCDMA 1900MHz Channel = 9262)



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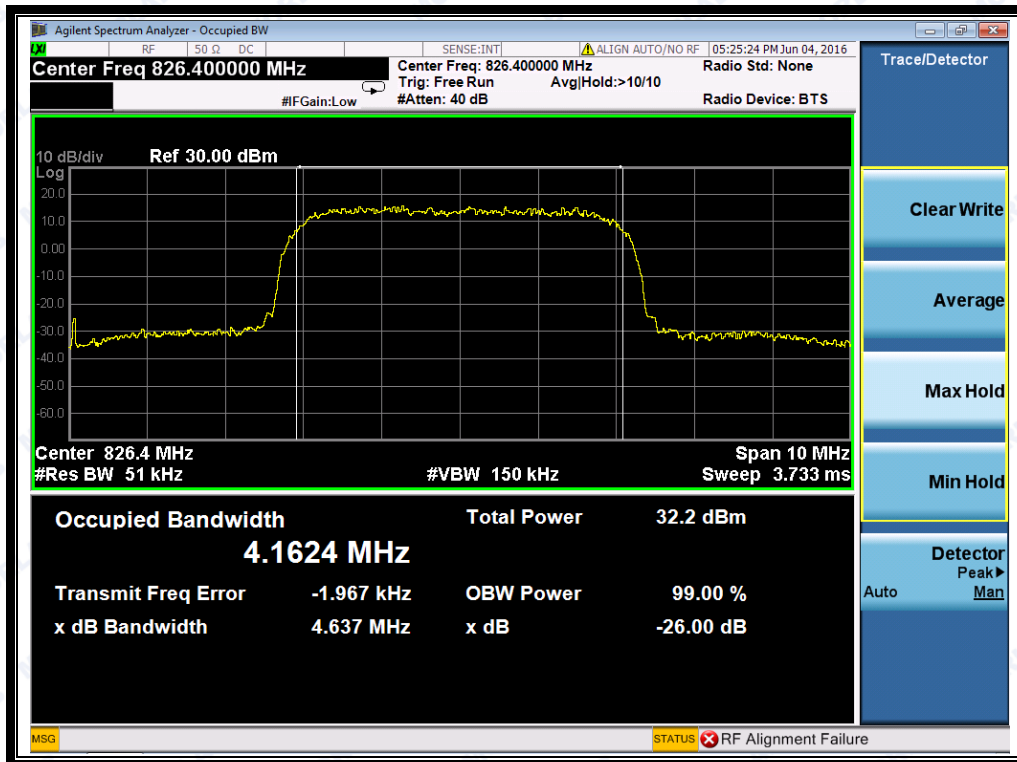
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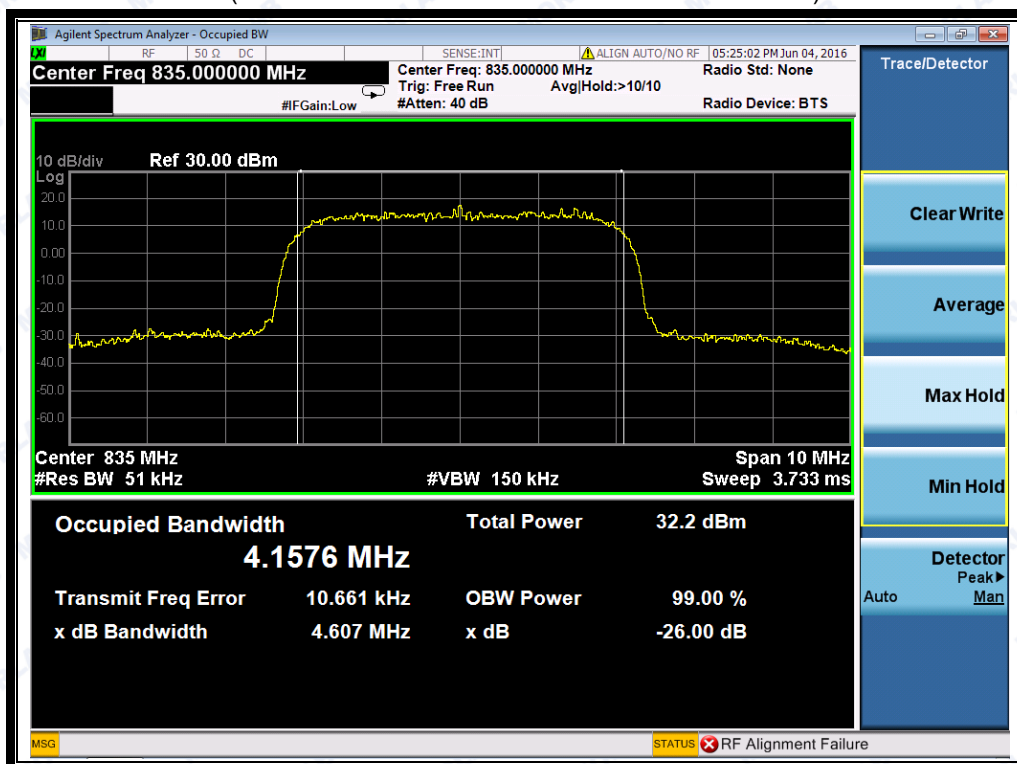
(Plot I3: WCDMA1900MHz Channel = 9538)



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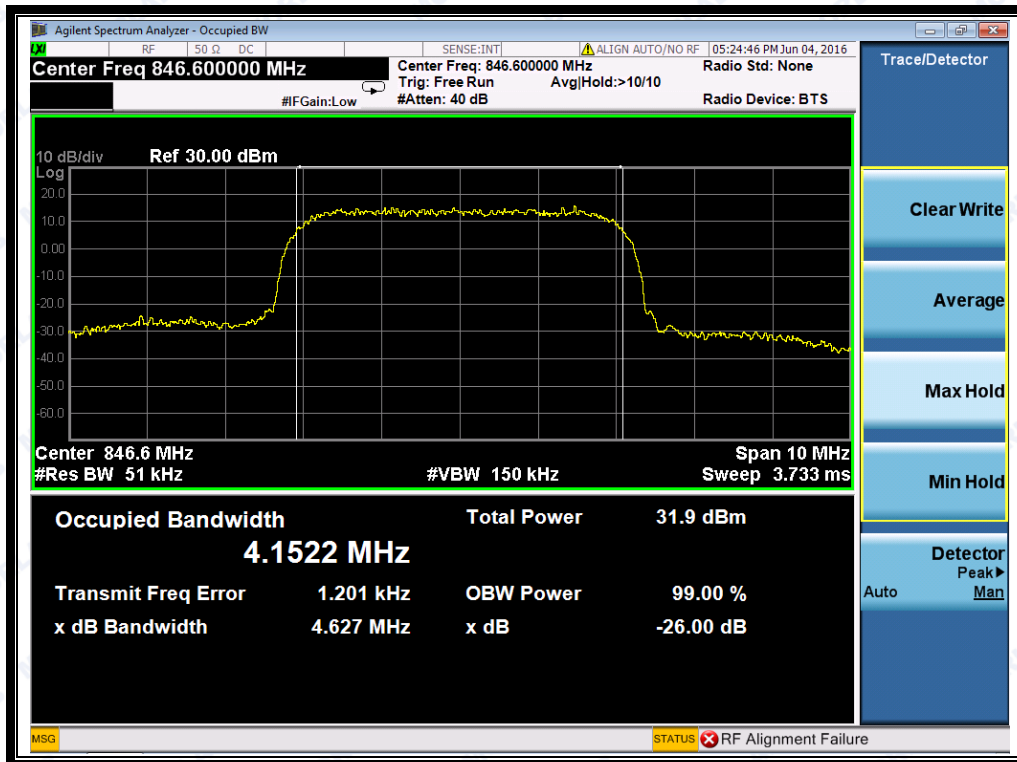
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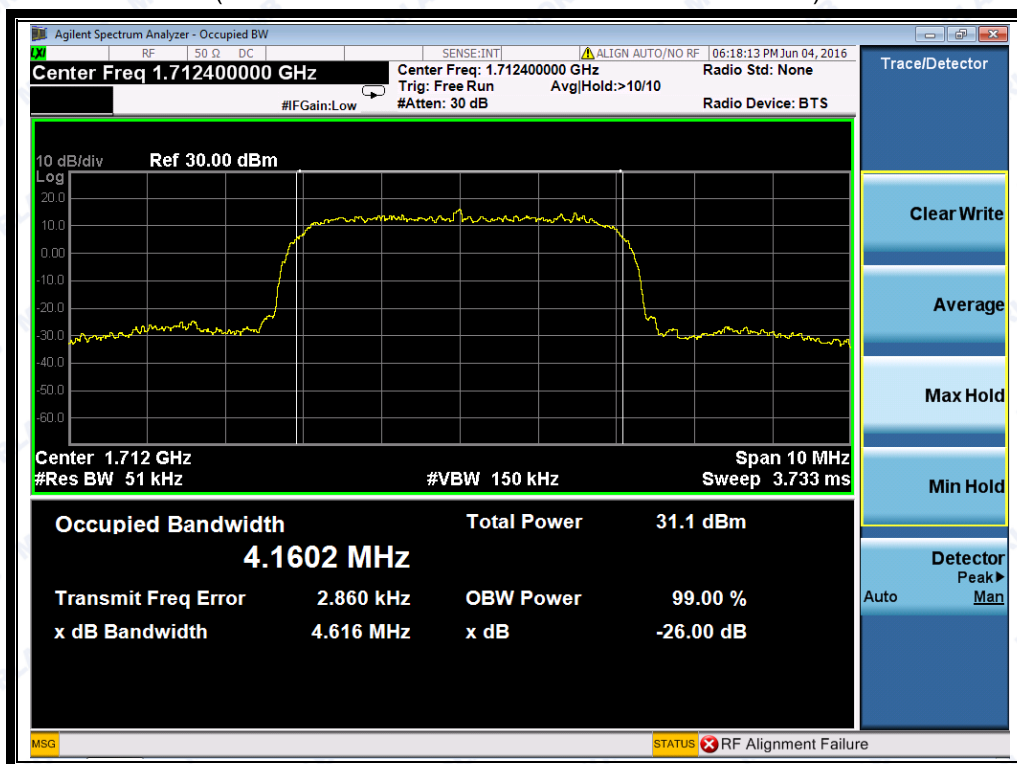
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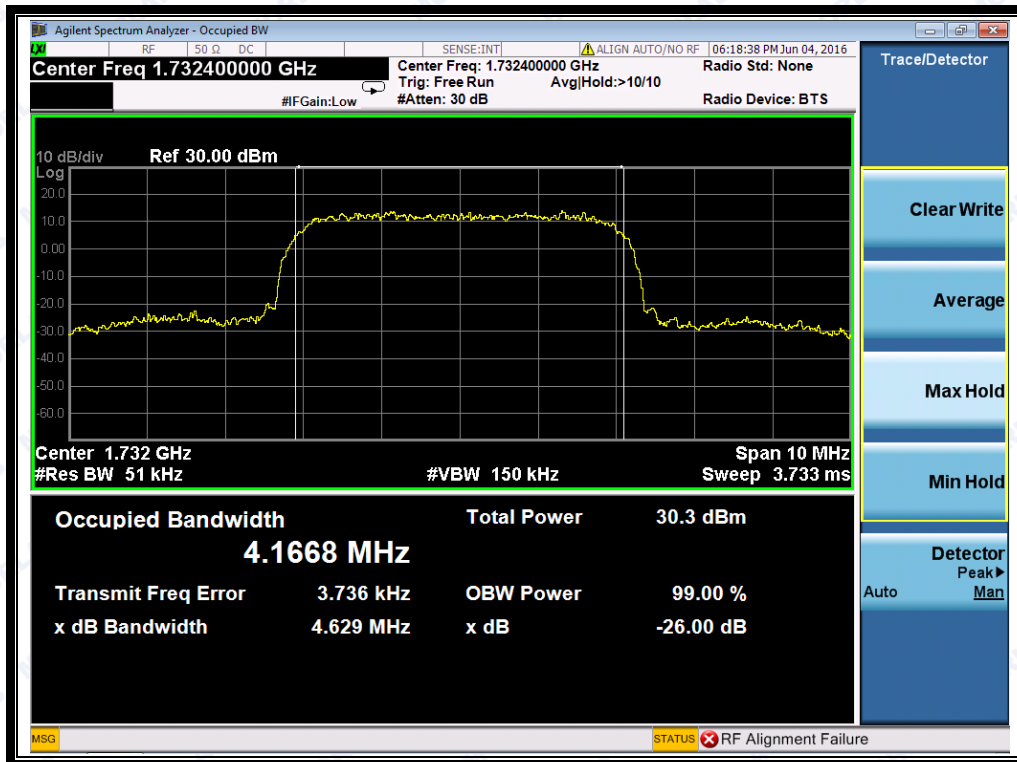
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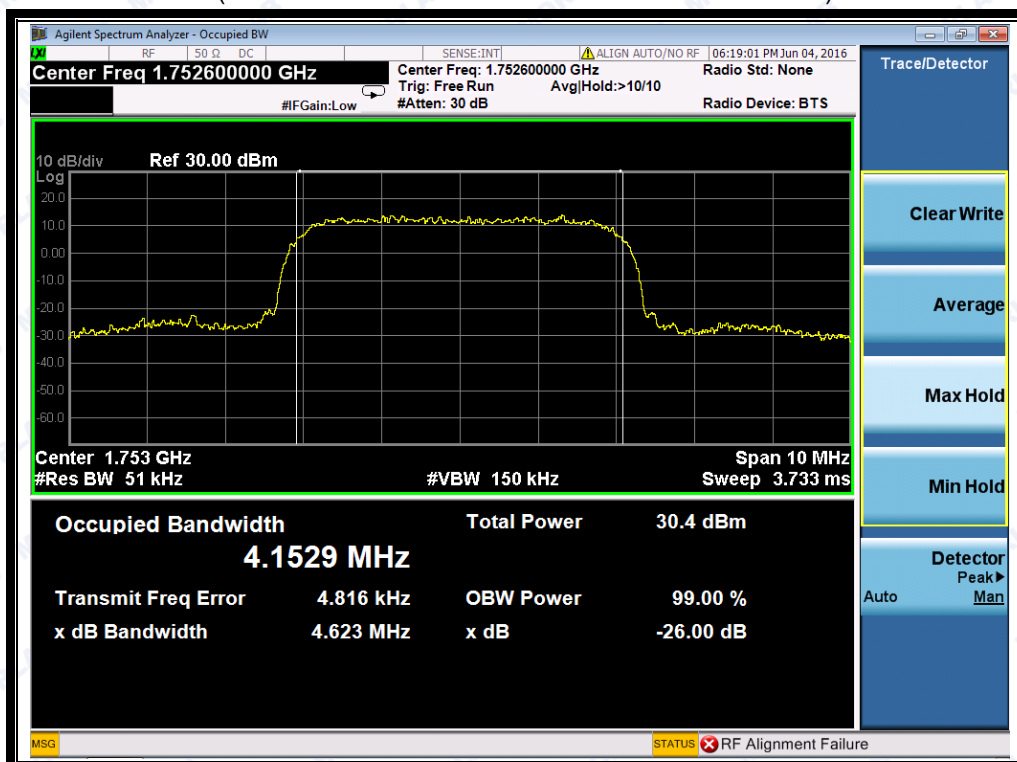
(Plot K1: HSDPA 1700MHz Channel = 1312)



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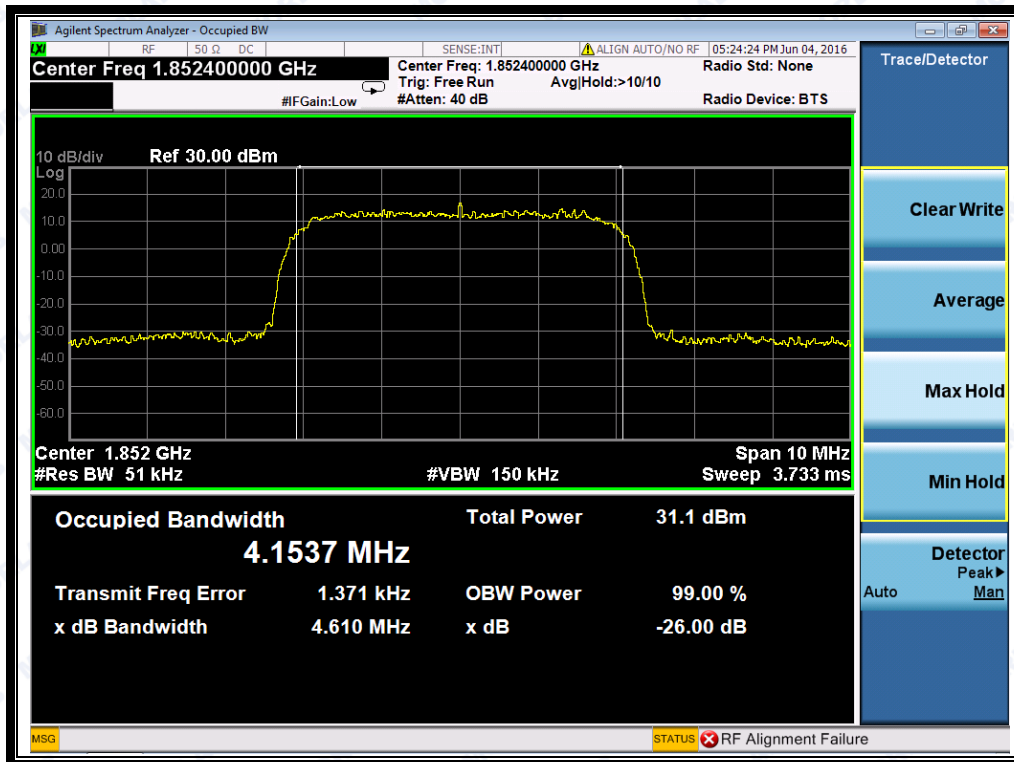
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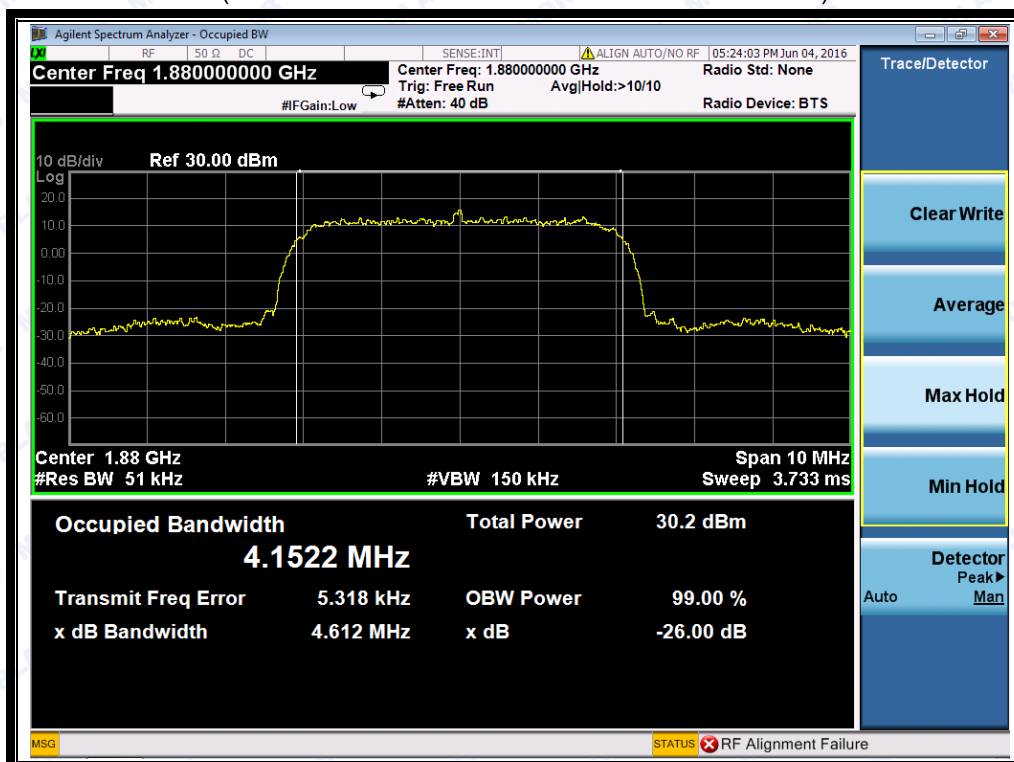
(Plot K3: HSDPA 1700MHz Channel = 1513)



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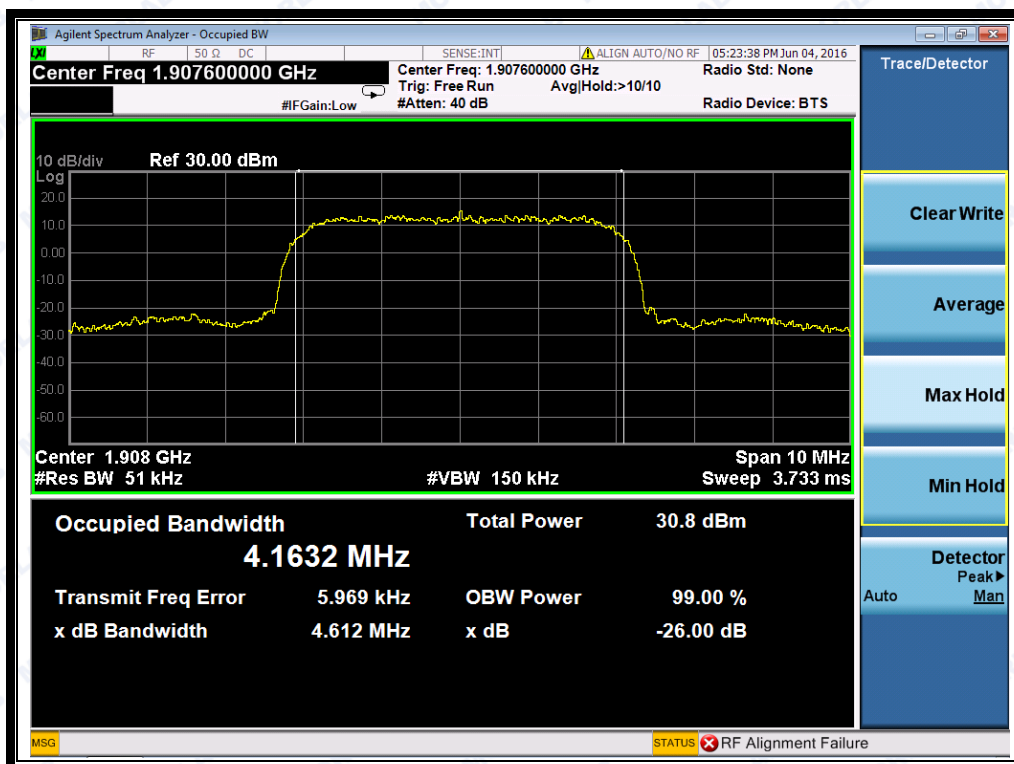
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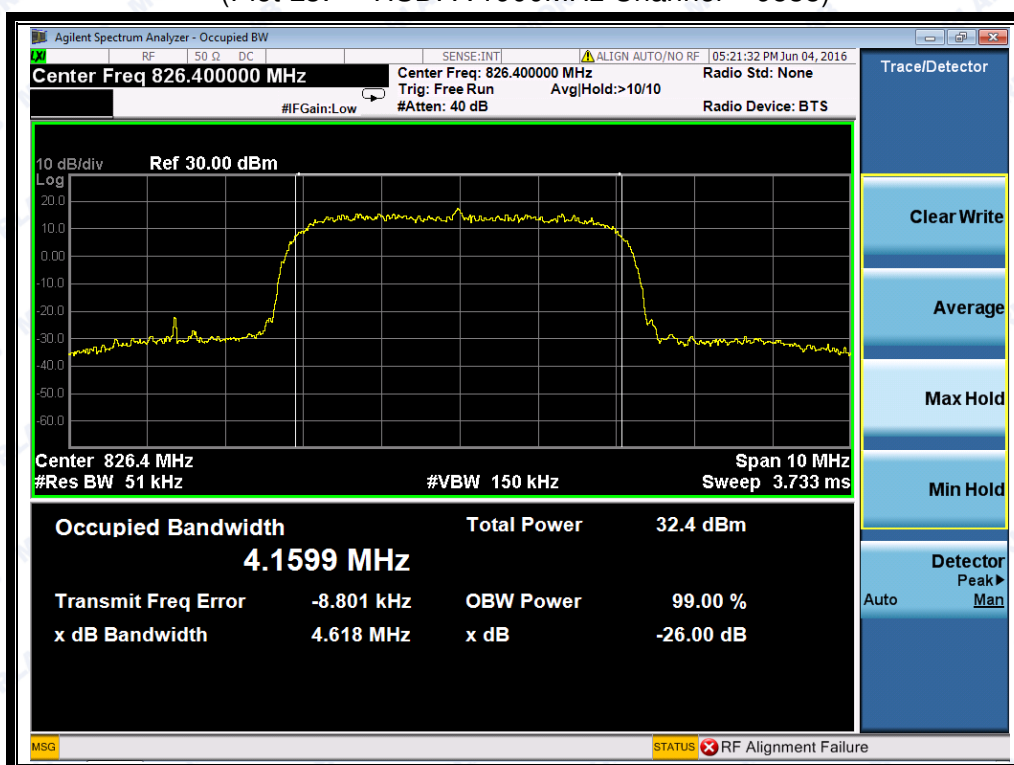
(Plot L2: HSDPA 1900 MHz Channel = 9400)



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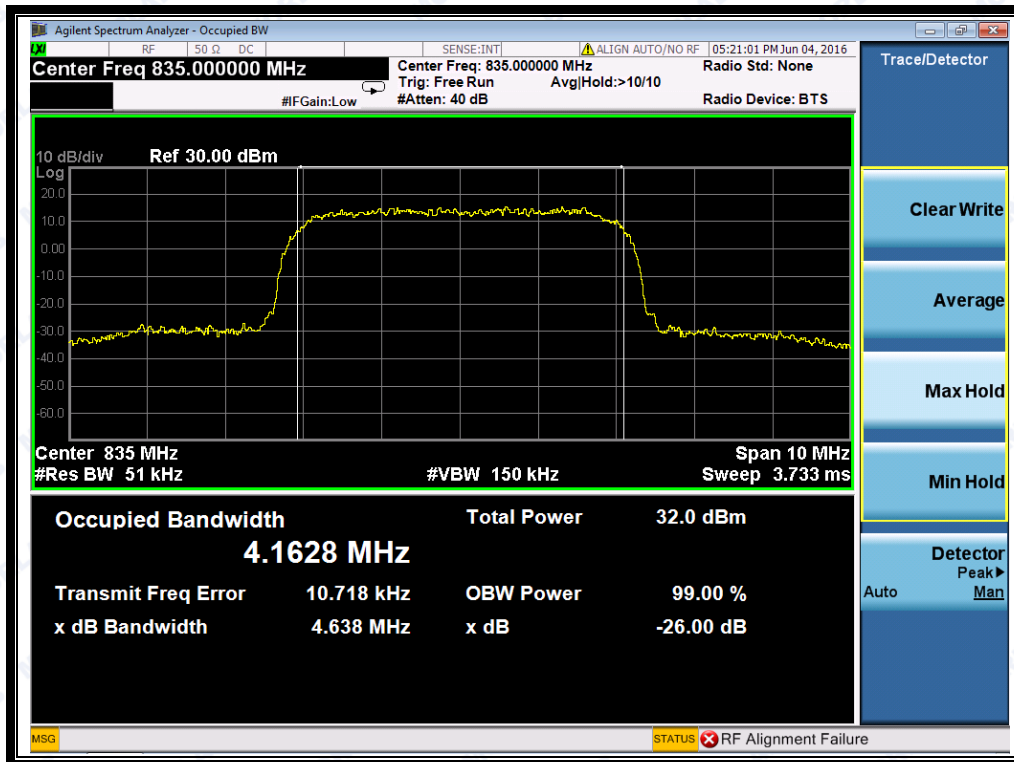
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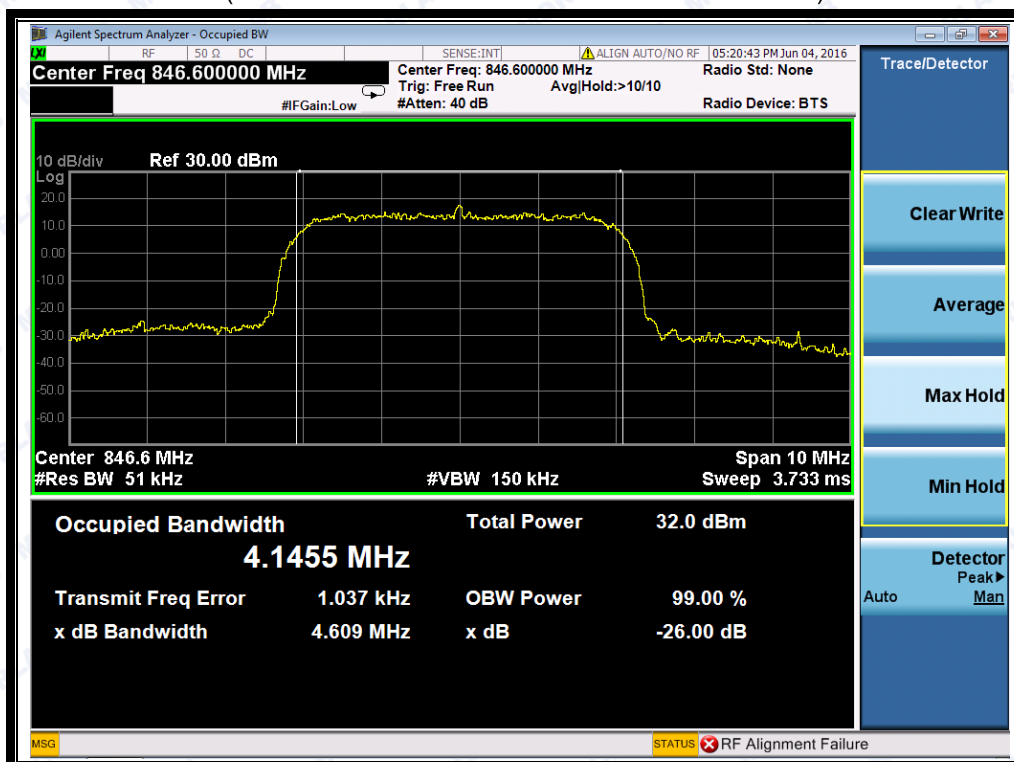
(Plot M1: HSUPA 850MHz Channel = 4132)



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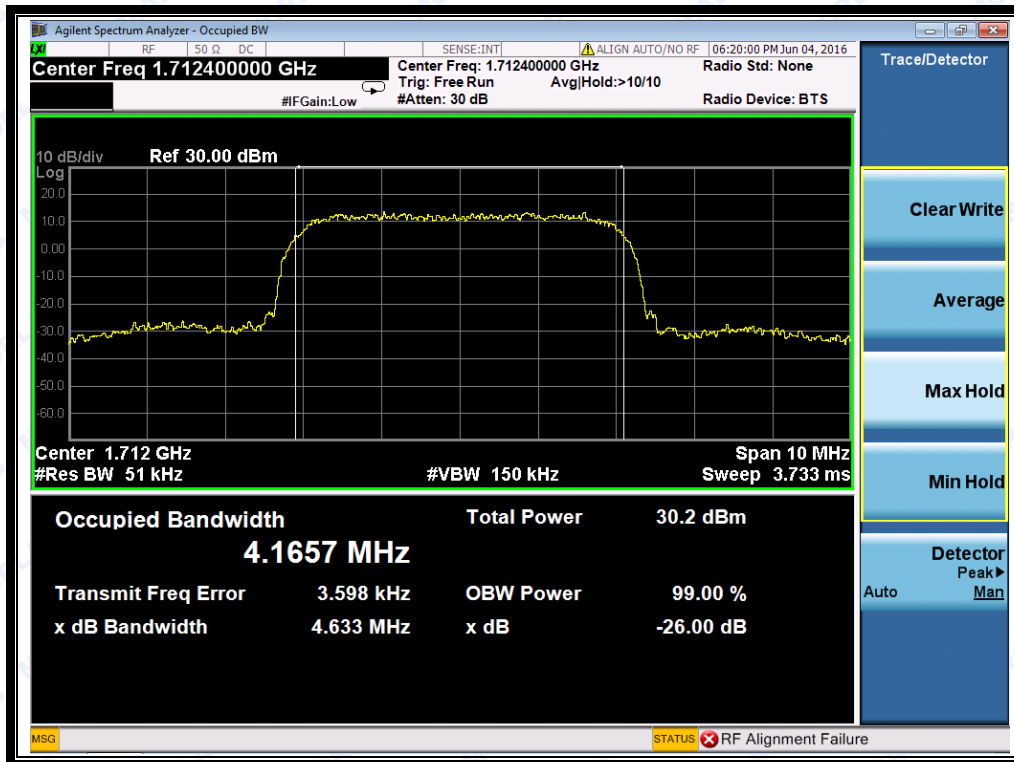
(Plot M2: HSUPA 850 MHz Channel = 4175)



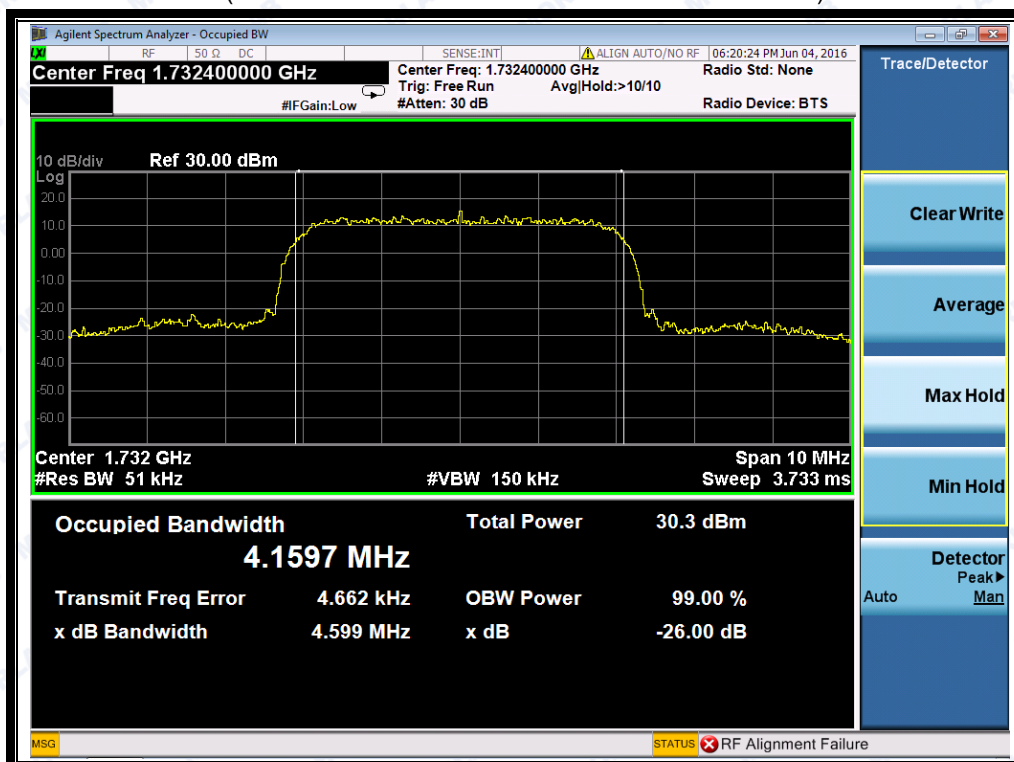
(Plot M3: HSUPA 850MHz Channel = 4233)



REPORT No.: SZ16050107W11



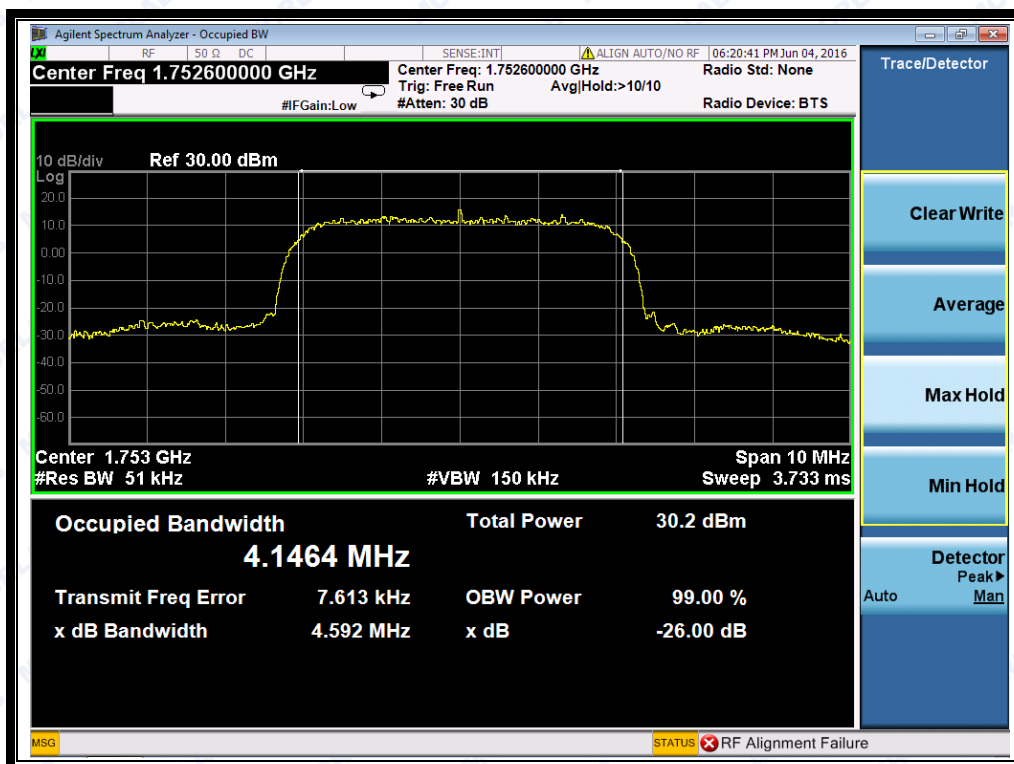
(Plot N1: HSUPA 1700MHz Channel =1312)



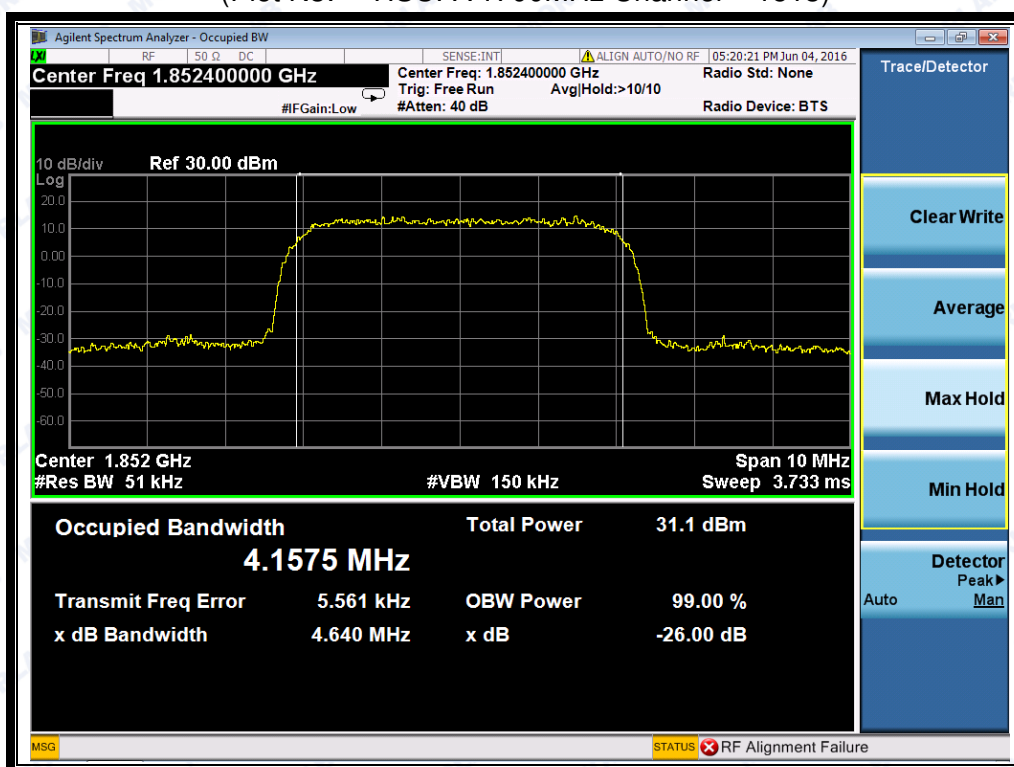
(Plot N2: HSUPA 1700 MHz Channel = 1412)



REPORT No.: SZ16050107W11



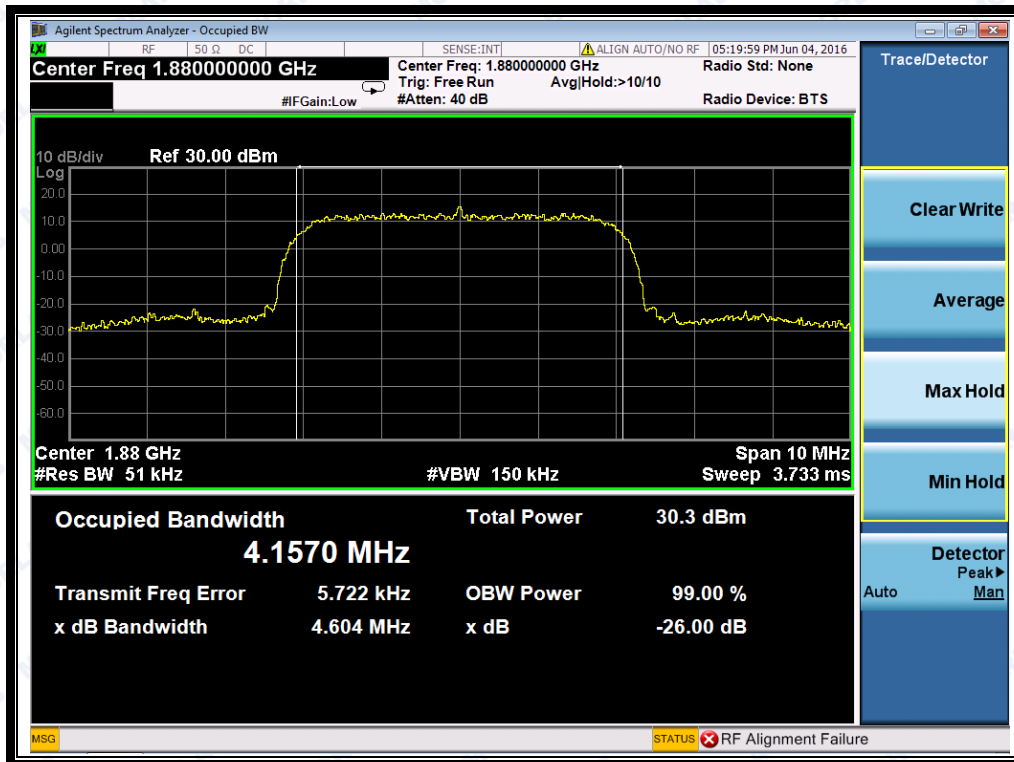
(Plot N3: HSUPA 1700MHz Channel = 1513)



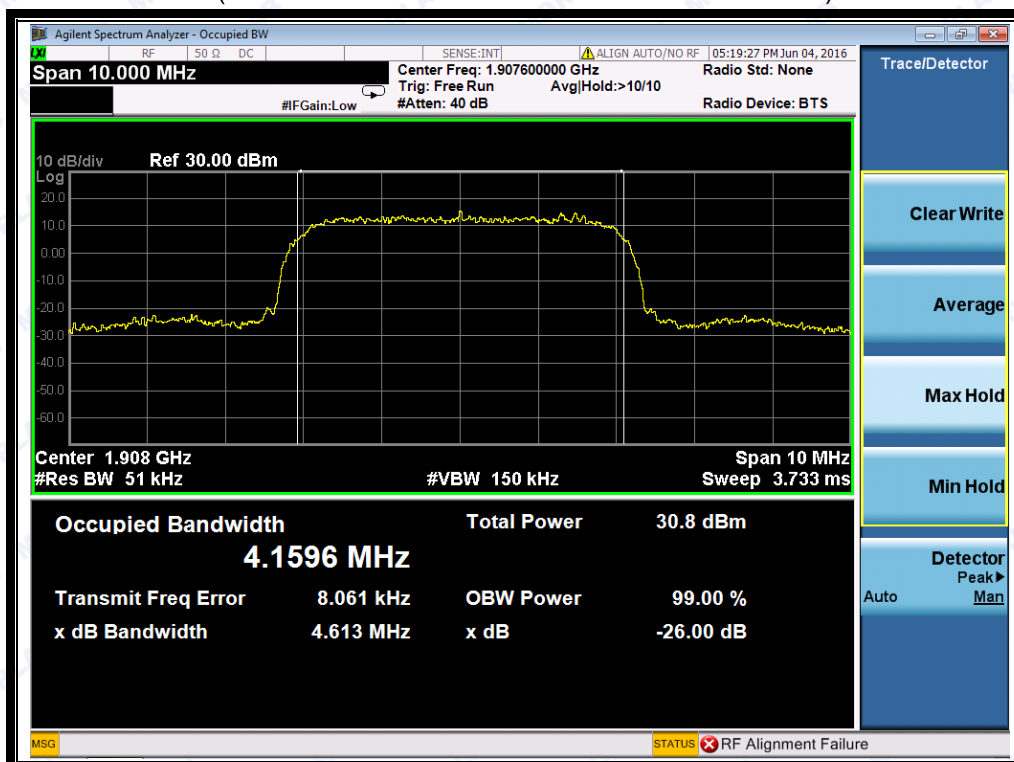
(Plot O1: HSUPA 1900MHz Channel = 9262)



REPORT No.: SZ16050107W11



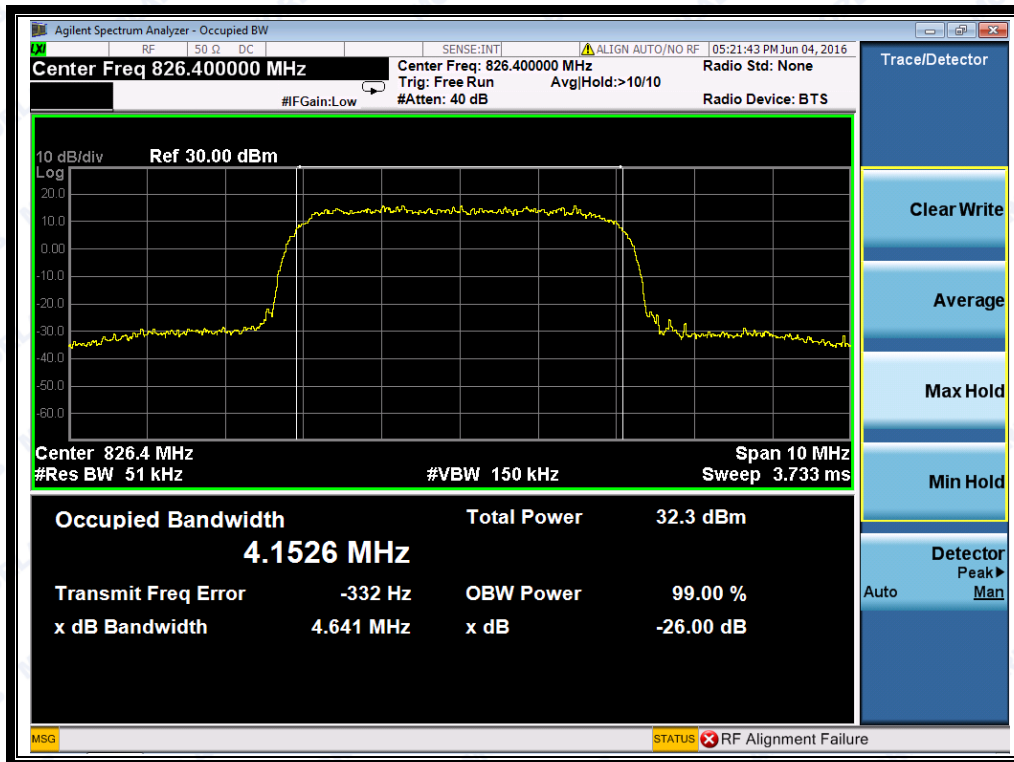
(Plot O2: HSUPA 1900 MHz Channel = 9400)



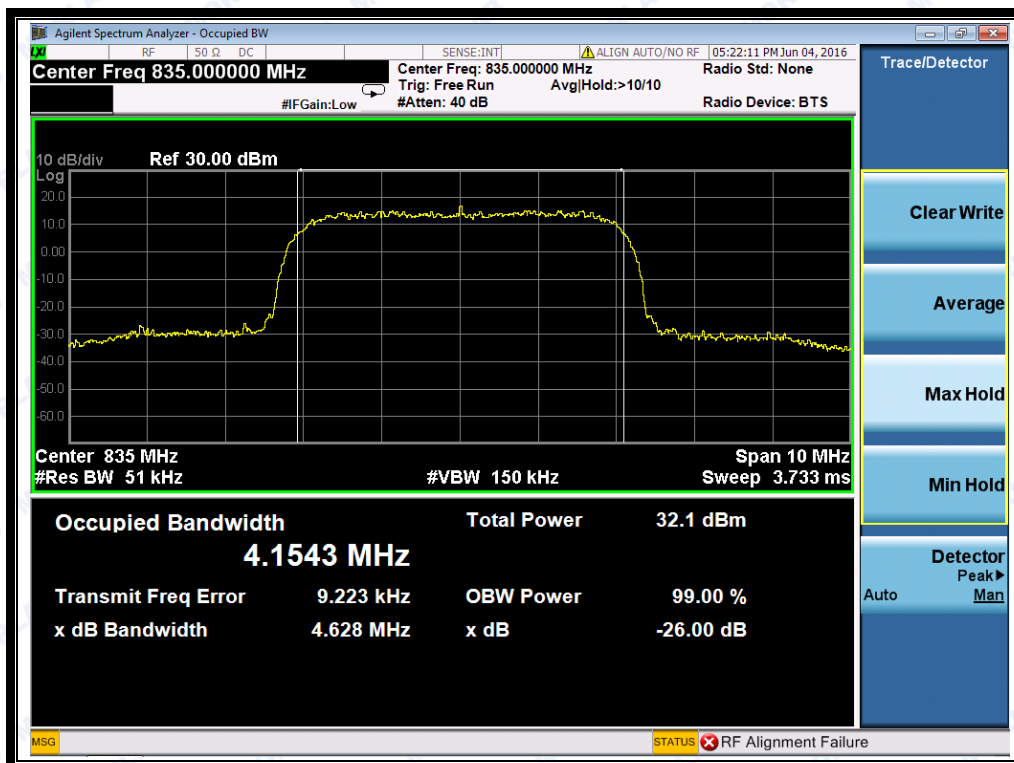
(Plot O3: HSUPA 1900MHz Channel = 9538)



REPORT No.: SZ16050107W11



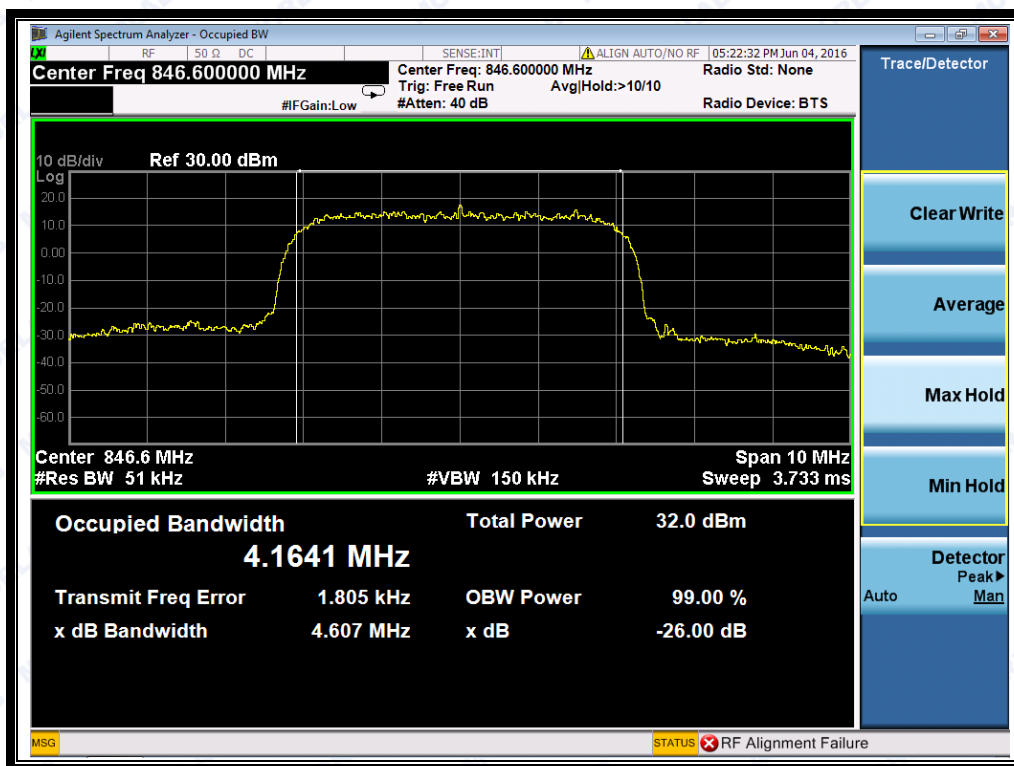
(Plot P1: HSPA+ 850MHz Channel = 4132)



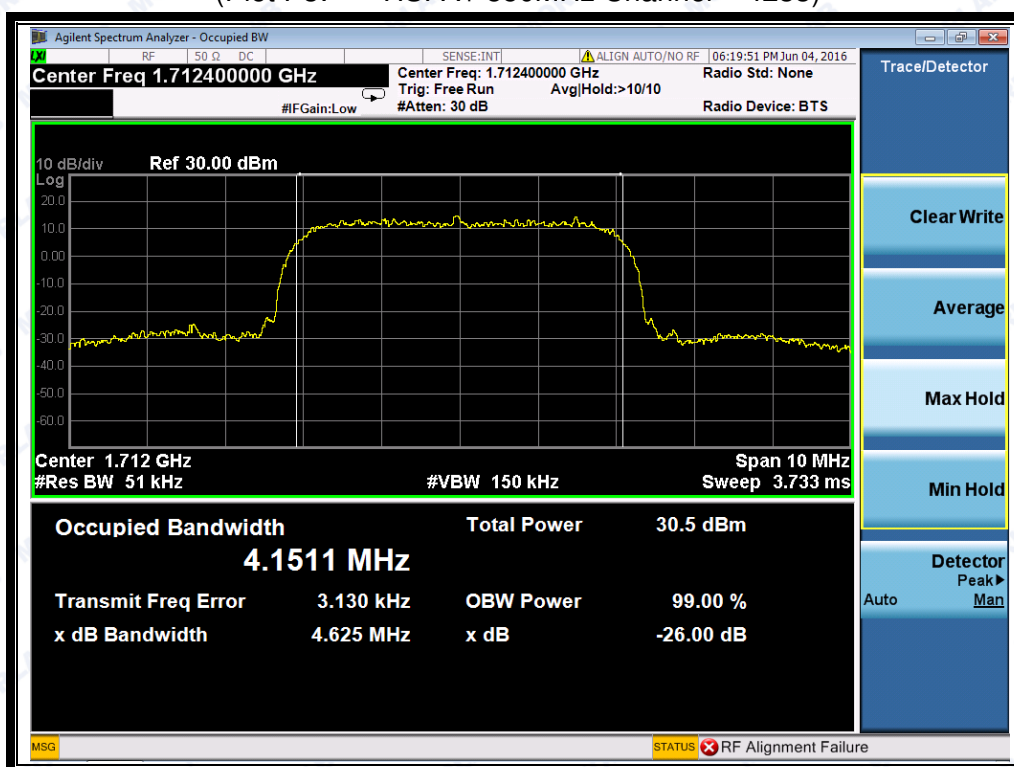
(Plot P2: HSPA+850 MHz Channel = 4175)



REPORT No.: SZ16050107W11



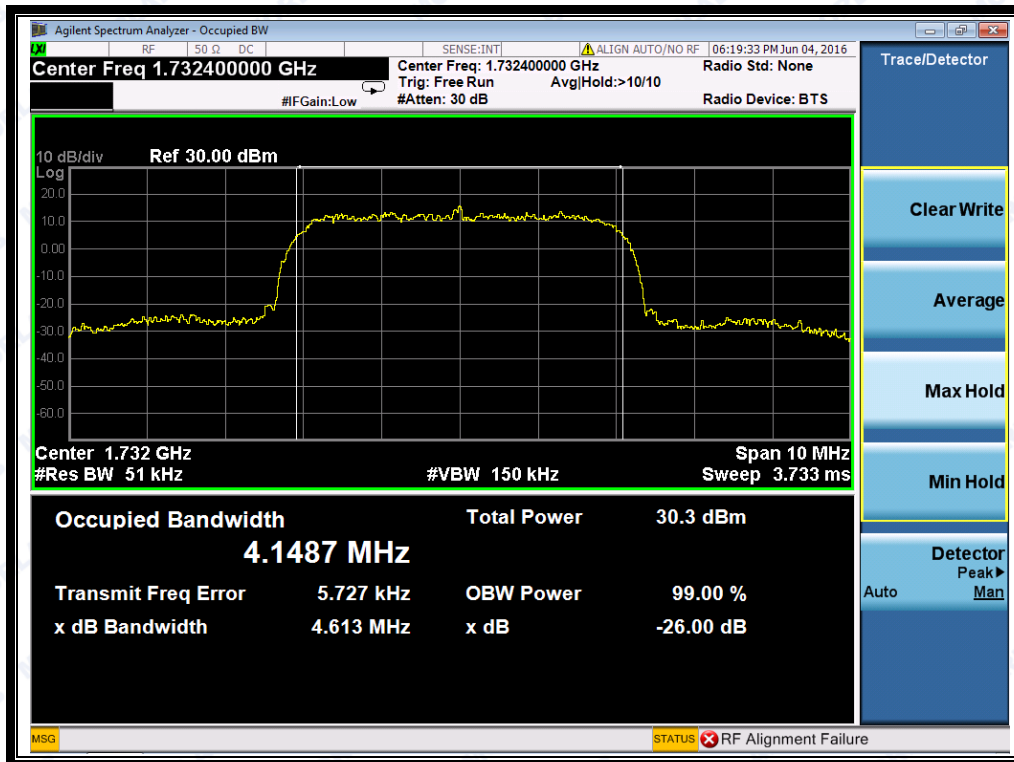
(Plot P3: HSPA+ 850MHz Channel = 4233)



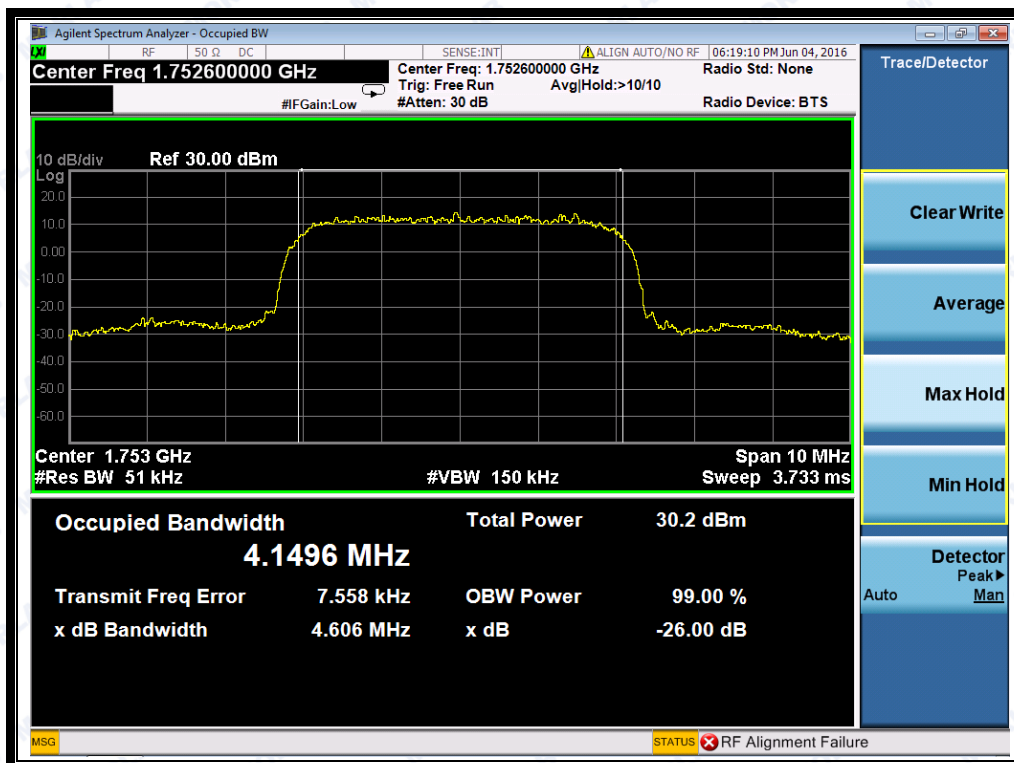
(Plot Q1: HSPA+ 1700MHz Channel = 1312)



REPORT No.: SZ16050107W11



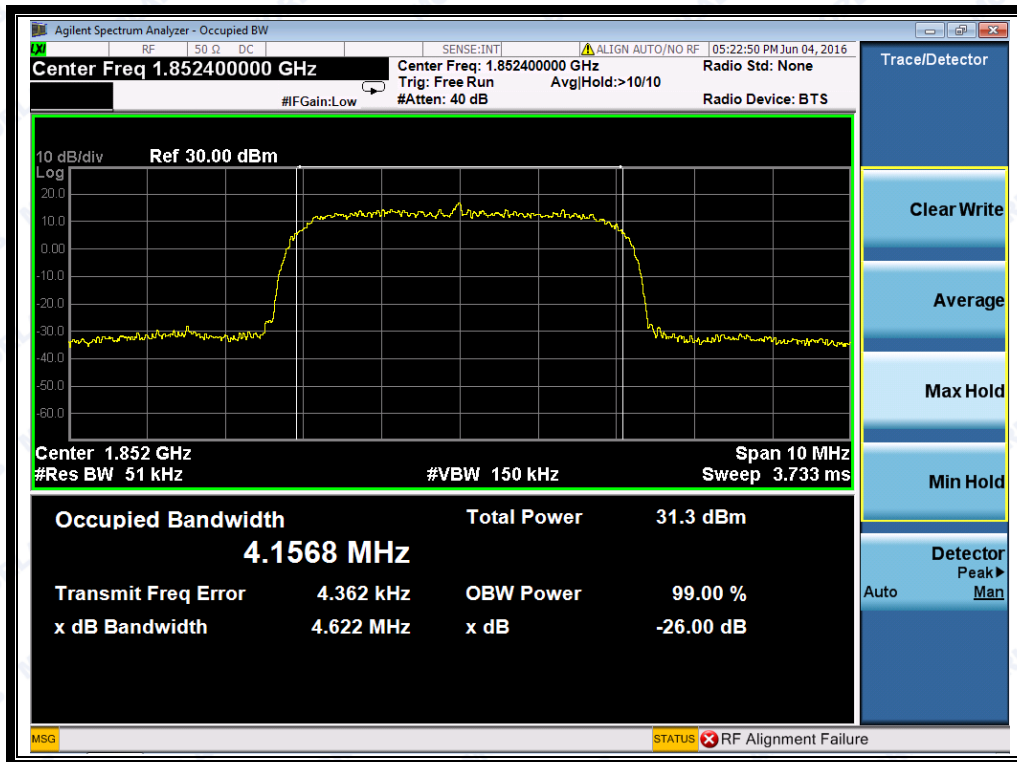
(Plot Q2: HSPA+ 1700 MHz Channel = 1412)



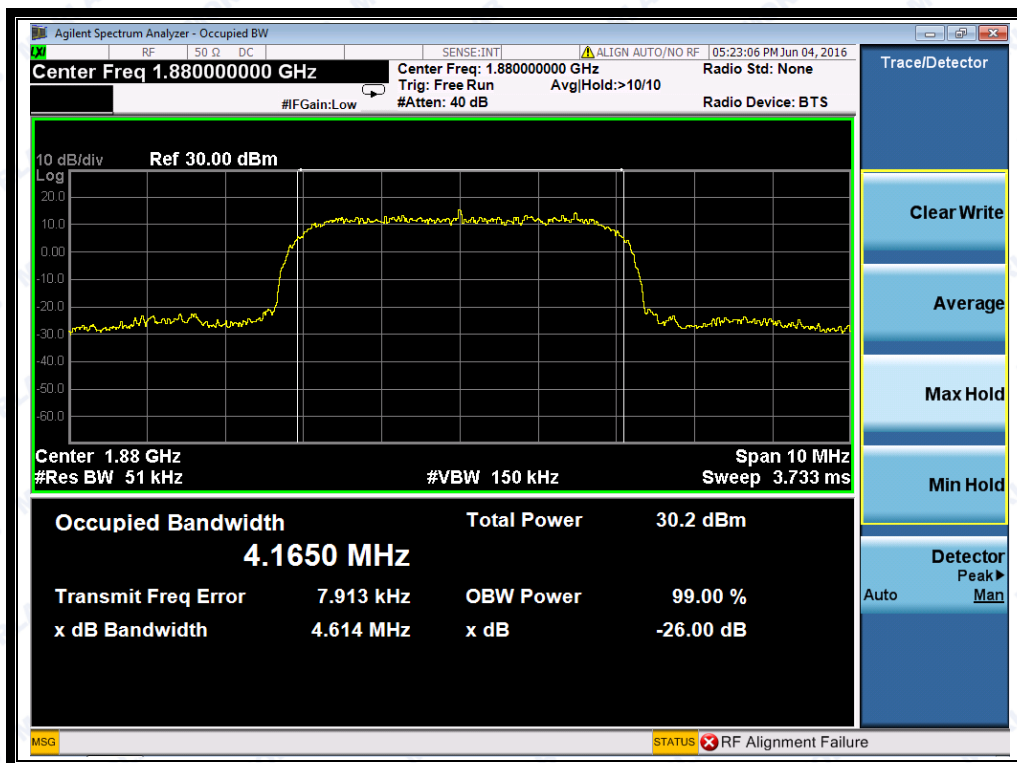
(Plot Q3: HSPA+ 1700MHz Channel = 1513)



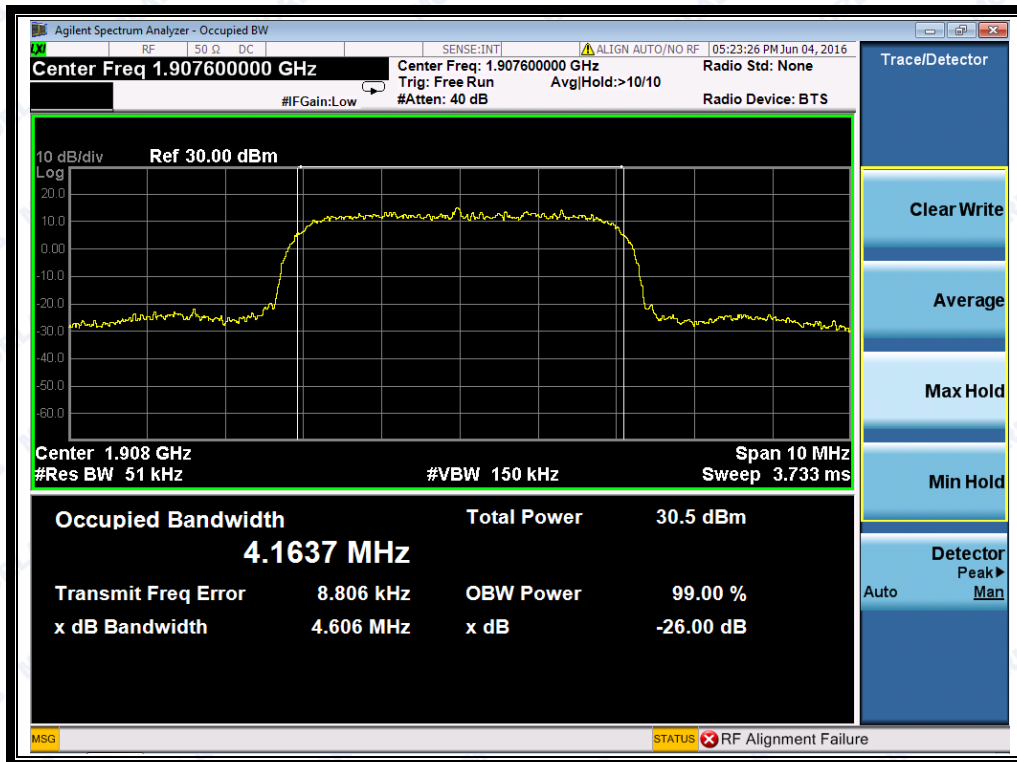
REPORT No.: SZ16050107W11



(Plot R1: HSPA+ 1900MHz Channel = 9262)



(Plot R2: HSPA+ 1900 MHz Channel = 9400)



(Plot R3: HSPA+ 1900MHz Channel = 9538)

2.4 Frequency Stability

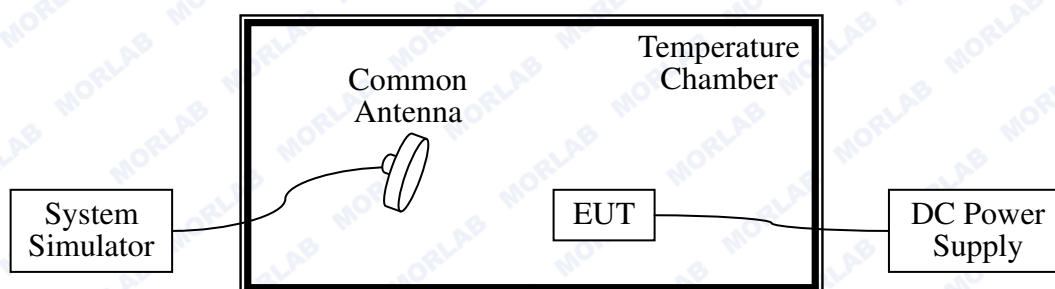
2.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
- For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.4.2 Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2016.03.02	2017.03.01
DC Power Supply	Good Will	GPS -3030DD	EF920938	2016.03.02	2017.03.01
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2016.03.02	2017.03.01



2.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.2VDC and 3.45VDC, which are specified by the applicant; the normal temperature here used is 25°C. The frequency deviation limit of 850MHz band is ± 2.5 ppm, and 1900MHz is ± 1 ppm.

1. WCDMA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.80	-20	26.62	±2066	8.7	±2087.5	-15.15	±2116.5	PASS
	-10	12.13		9.62		31.72		
	0	24.13		0.56		13.12		
	+10	-12.3		-12.67		49.3		
	+20	9.73		-4.02		65.03		
	+30	8.35		11.42		-1.53		
	+40	15.97		3.42		5.57		
	+50	10.17		3.42		3.23		
	+60	12.73		-4.47		3.29		
4.35	+25	26.02		15.69		11.53		
3.40	+25	11.1		-19.92		10.26		

2. WCDMA 1700MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 1312 (1712.4MHz)		Channel = 1412 (1732.4MHz)		Channel = 1513 (1752.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	-14.97	±4281	-17.20	±4331	11.88	±4381.5	PASS
	-20	28.55		-3.56		21.67		
	-10	-10.96		21.16		-14.67		
	0	-16.6		19.57		-13.3		
	+10	-26.96		-15.64		35.87		
	+20	10.2		22.16		-7.65		
	+30	-17.4		15.77		-13.26		
	+40	20.72		-11.82		15.07		
	+55	14.37		9.78		22.21		
4.35	+25	32.58		-3.56		-23.71		
3.0	+25	-20.72		21.18		11.68		



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3. WCDMA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.80	-20	12.21	±1852.4	-14.7	±1880	-18.08	±1907.6	PASS
	-10	3.15		38.47		35.09		
	0	-10.08		-21.74		-25.12		
	+10	-1.43		-15.79		-19.17		
	+20	14.01		18.08		14.7		
	+30	6.01		15.96		12.58		
	+40	-1.88		3.99		0.61		
	+50	11.29		14.27		10.89		
	+60	13.19		-17.23		-20.61		
4.35	+25	12.21		14.27		10.89		
3.40	+25	-17.09		16.54		13.16		

4. HSDPA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.80	-20	2.97	±2066	11.22	±2087.5	13.27	±2116.5	PASS
	-10	-6.07		20.26		-8.25		
	0	17.88		11.72		7.01		
	+10	-33.89		3.42		9.9		
	+20	2.97		-5.62		8.05		
	+30	-6.07		18.33		5.44		
	+40	18.87		-33.44		-21.83		
	+50	-31.39		27.27		-7.42		
	+60	22.02		23.9		-18.31		
4.35	+25	2.97		-36.9		-12.85		
3.40	+25	-16.42		21.69		10.75		



5. HSDPA 1700MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 1312 (1712.4MHz)		Channel = 1412 (1732.4MHz)		Channel = 1513 (1752.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	-15.55	±4281	11.32	±4331	11.1	±4381.5	PASS
	-20	-1.91		21.11		29.85		
	-10	22.81		-15.23		-9.66		
	0	21.22		-13.86		-15.3		
	+10	-13.99		35.31		-25.66		
	+20	23.81		-8.21		11.5		
	+30	17.42		-13.82		-16.1		
	+40	-10.17		14.51		22.02		
	+55	11.43		21.65		15.67		
4.35	+25	-1.91		-24.27		33.88		
3.0	+25	22.83		11.12		-19.42		

6. HSDPA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.80	-20	15.60	±1852.4	19.69	±1880	17.16	±1907.6	PASS
	-10	19.41		-22.83		-15.05		
	0	28.14		-18.24		0.22		
	+10	-20.13		-18.72		2.67		
	+20	-17.42		-6.01		-13.65		
	+30	18.44		-17.48		-9.13		
	+40	-8.85		23.94		2.22		
	+50	10.87		-17.42		2.67		
	+60	25.54		-6.07		26.42		
4.35	+25	26.20		3.08		-1.91		
3.40	+25	-10.66		6.91		18.91		



7. HSUPA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.80	-20	8.2	±2066	30.85	±2087.5	-4.42	±2116.5	PASS
	-10	3.52		26.41		8.03		
	0	-4.24		5.9		8.38		
	+10	16.89		0.59		22.19		
	+20	-1.25		-6.45		-6.88		
	+30	24.03		14.5		-3.42		
	+40	0.13		-3.27		7.93		
	+50	-11.34		21.44		9.52		
	+60	-5.4		12.07		0.43		
4.35	+25	25.99		-8.8		15.18		
3.40	+25	-16.27		19.86		5.54		

8. HSUPA 1700MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 1312 (1712.4MHz)		Channel = 1412 (1732.4MHz)		Channel = 1513 (1752.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	14.62	±4281	-12.46	±4331	-13.5	±4381.5	PASS
	-20	24.41		31.06		0.14		
	-10	-11.93		-8.45		24.86		
	0	-10.56		-14.09		23.27		
	+10	38.61		-24.45		-11.94		
	+20	-4.91		12.71		25.86		
	+30	-10.52		-14.89		19.47		
	+40	17.81		23.23		-8.12		
	+55	24.95		16.88		13.48		
4.35	+25	-20.97		35.09		0.14		
3.0	+25	14.42		-18.21		24.88		



9. HSUPA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.80	-20	10.93	±1852.4	7.77	±1880	25.24	±1907.6	PASS
	-10	-21.2		21.64		20.8		
	0	-15.66		30.23		0.29		
	+10	-4.31		-14.1		-5.02		
	+20	-3.86		-11.69		-12.06		
	+30	-10.51		14.57		8.89		
	+40	20.38		-12.72		-8.88		
	+50	5.76		7.00		15.83		
	+60	19.89		21.67		6.46		
4.35	+25	-8.44		22.33		-14.41		
3.40	+25	1.18		-14.58		14.25		

10. HSPA+ 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.80	-20	-9.33	±2066	4.36	±2087.5	4.04	±2116.5	PASS
	-10	16.39		-23.06		-8.15		
	0	9.05		13.61		-12.59		
	+10	-16.53		-9.52		-8.08		
	+20	5.28		15.2		6.07		
	+30	-10.13		13.61		-3.42		
	+40	28.99		-21.52		10		
	+50	3.04		16.2		27.97		
	+60	-31.2		9.81		-12.09		
4.35	+25	24.21		-16.79		-2.4		
3.40	+25	-7.69		4.12		16.85		



11. HSPA+ 1700MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 1312 (1712.4MHz)		Channel = 1412 (1732.4MHz)		Channel = 1513 (1752.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	11.07	±4281	-16.87	±4331	-16.69	±4381.5	PASS
	-20	20.86		26.65		-3.05		
	-10	-15.48		-12.86		21.67		
	0	-14.11		-18.5		20.08		
	+10	35.06		-28.86		-15.13		
	+20	-8.46		8.3		22.67		
	+30	-14.07		-19.3		16.28		
	+40	14.26		18.82		-11.31		
	+55	21.4		12.47		10.29		
4.35	+25	-24.52		30.68		-3.05		
3.0	+25	10.87		-22.62		21.69		

12. HSPA+ 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.80	-20	24.31	±1852.4	6.22	±1880	-19.7	±1907.6	PASS
	-10	-11.71		6.82		-9.29		
	0	18.5		12.98		40.9		
	+10	10.73		-32.96		-2.64		
	+20	-16.9		-22.55		-8.28		
	+30	6.63		26.64		-18.7		
	+40	-3.64		-16.9		18.55		
	+50	14.99		-22.54		-9.08		
	+60	-25.76		17.78		29.04		
4.35	+25	27.88		-0.67		13.6		
3.40	+25	16.36		-5.81		-26.54		



2.5 Conducted Out of Band Emissions

2.5.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a) the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10*\log(P)$ dB. This calculated to be -13dBm.

2.5.2 Test Description

See section 2.1.2 of this report.

2.5.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2016.03.02	2017.03.01
Spectrum Analyzer	Agilent	E7405A	US44210471	2016.03.02	2017.03.01
Power Meter	Agilent	E4418B	GB43318055	2016.03.02	2017.03.01
Power Sensor	Agilent	8482A	MY41091706	2016.03.02	2017.03.01
Power Splitter	Weinschel	1506A	NW521	2016.03.02	2017.03.01
Attenuator 1	Resnet	20dB	(n.a.)	2016.03.02	2017.03.01
Attenuator 2	Resnet	3dB	(n.a.)	2016.03.02	2017.03.01

2. Test Verdict:

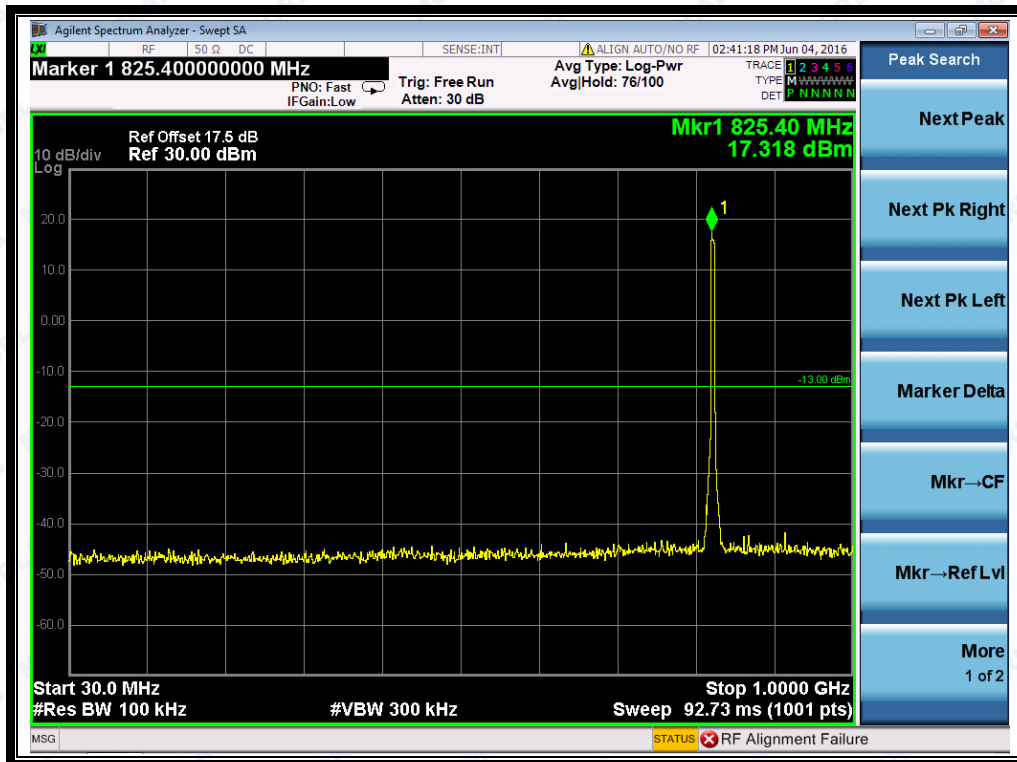
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
WCDMA 850MHz	4132	826.4	< -25	Plot G1 to G1.1	-13	PASS
	4175	835.0	< -25	Plot G2 to G2.1		PASS
	4233	846.6	< -25	Plot G3 to G3.1		PASS
WCDMA 1700MHz	1312	1712.4	< -25	Plot H1 to H1.1	-13	PASS
	1412	1732.4	< -25	Plot H2 to H2.1		PASS
	1513	1752.6	< -25	Plot H3 to H3.1		PASS
WCDMA 1900MHz	9262	1852.4	< -25	Plot I1 to I1.1	-13	PASS
	9400	1880.0	< -25	Plot I2 to I2.1		PASS
	9538	1907.6	< -25	Plot I3 to I3.1		PASS
HSDPA 850MHz	4132	826.4	< -25	Plot J1 to J1.1	-13	PASS
	4175	835.0	< -25	Plot J2 to J2.1		PASS
	4233	846.6	< -25	Plot J3 to J3.1		PASS



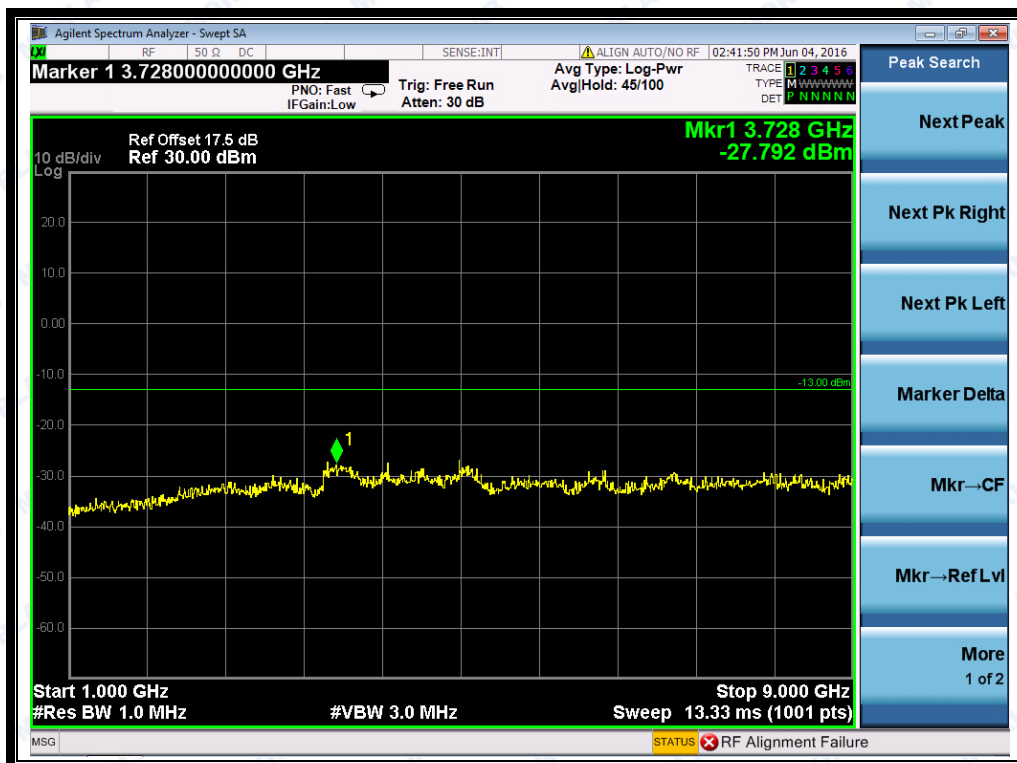
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
HSDPA 1700MHz	1312	1712.4	< -25	Plot K1 to K1.1	-13	PASS
	1412	1732.4	< -25	Plot K2 to K2.1		PASS
	1513	1752.6	< -25	Plot K3 to K3.1		PASS
HSDPA 1900MHz	9262	1852.4	< -25	Plot L1 to L1.1	-13	PASS
	9400	1880.0	< -25	Plot L2 to L2.1		PASS
	9538	1907.6	< -25	Plot L3 to L3.1		PASS
HSUPA 850MHz	4132	826.4	< -25	Plot M1 to M1.1	-13	PASS
	4175	835.0	< -25	Plot M2 to M2.1		PASS
	4233	846.6	< -25	Plot M3 to M3.1		PASS
HSUPA 1700MHz	1312	1712.4	< -25	Plot N1 to N1.1	-13	PASS
	1412	1732.4	< -25	Plot N2 to N2.1		PASS
	1513	1752.6	< -25	Plot N3 to N3.1		PASS
HSUPA 1900MHz	9262	1852.4	< -25	Plot O1 to M1.1		PASS
	9400	1880.0	< -25	Plot O2 to M2.1		PASS
	9538	1907.6	< -25	Plot O3 to M3.1		PASS
HSPA+ 850 MHz	9262	1852.4	< -25	Plot P1 to N1.1		PASS
	9400	1880.0	< -25	Plot P2 to N2.1		PASS
	9538	1907.6	< -25	Plot P3 to N3.1		PASS
HSPA+ 1700MHz	9262	1852.4	< -25	Plot Q1 to M1.1		PASS
	9400	1880.0	< -25	Plot Q2 to M2.1		PASS
	9538	1907.6	< -25	Plot Q3 to M3.1		PASS
HSPA+ 1900MHz	9262	1852.4	< -25	Plot R1 to N1.1		PASS
	9400	1880.0	< -25	Plot R2 to N2.1		PASS
	9538	1907.6	< -25	Plot R3 to N3.1		PASS

Test Plots for the Whole Measurement Frequency Range:

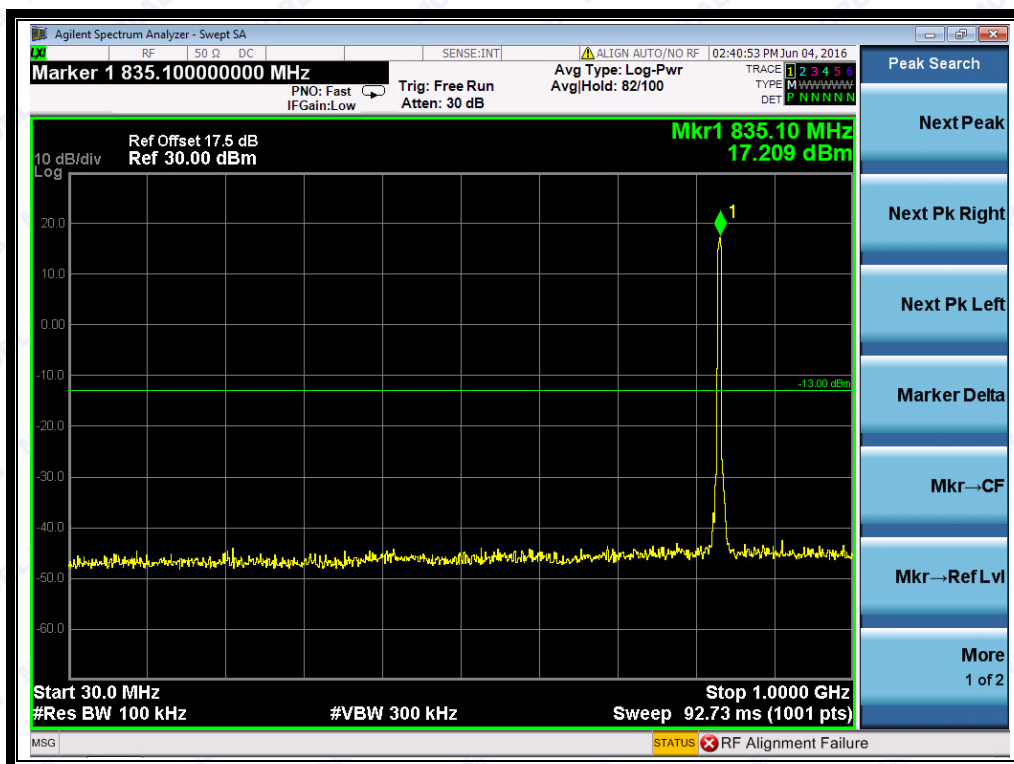
Note: the power of the EUT transmitting frequency should be ignored.



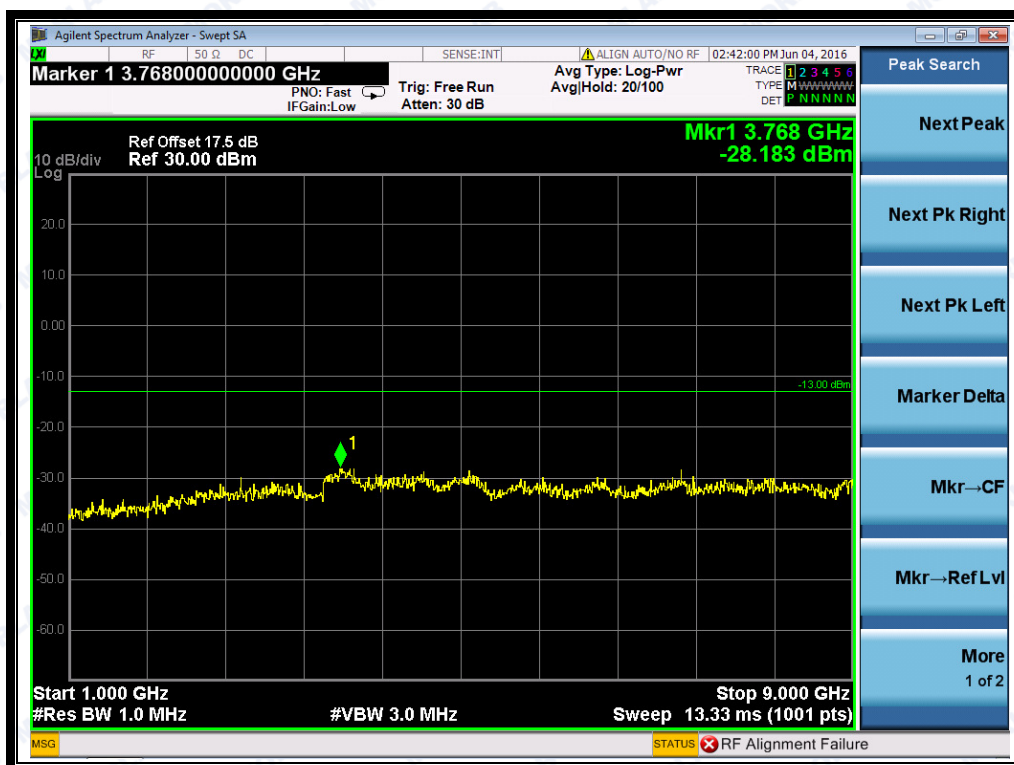
(Plot G1: WCDMA850MHz Channel = 4132, 30MHz to 1GHz)



(Plot G1.1: WCDMA850MHz Channel = 4132, 1GHz to 9GHz)



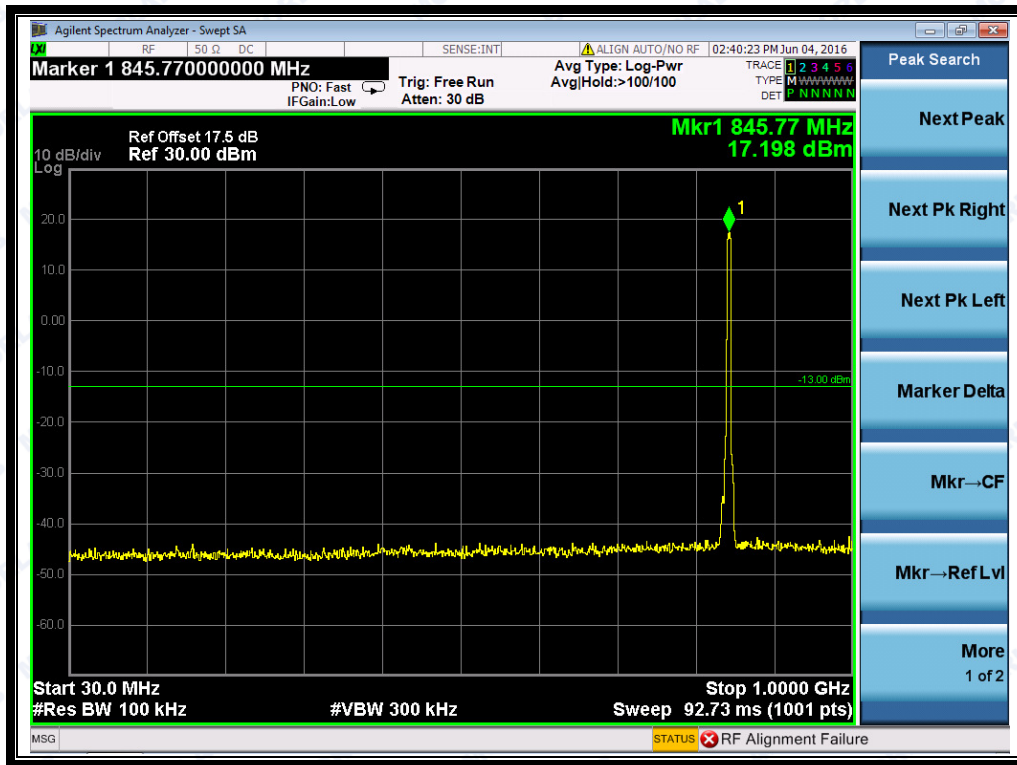
(Plot G2: WCDMA850MHz Channel = 4175, 30MHz to 1GHz)



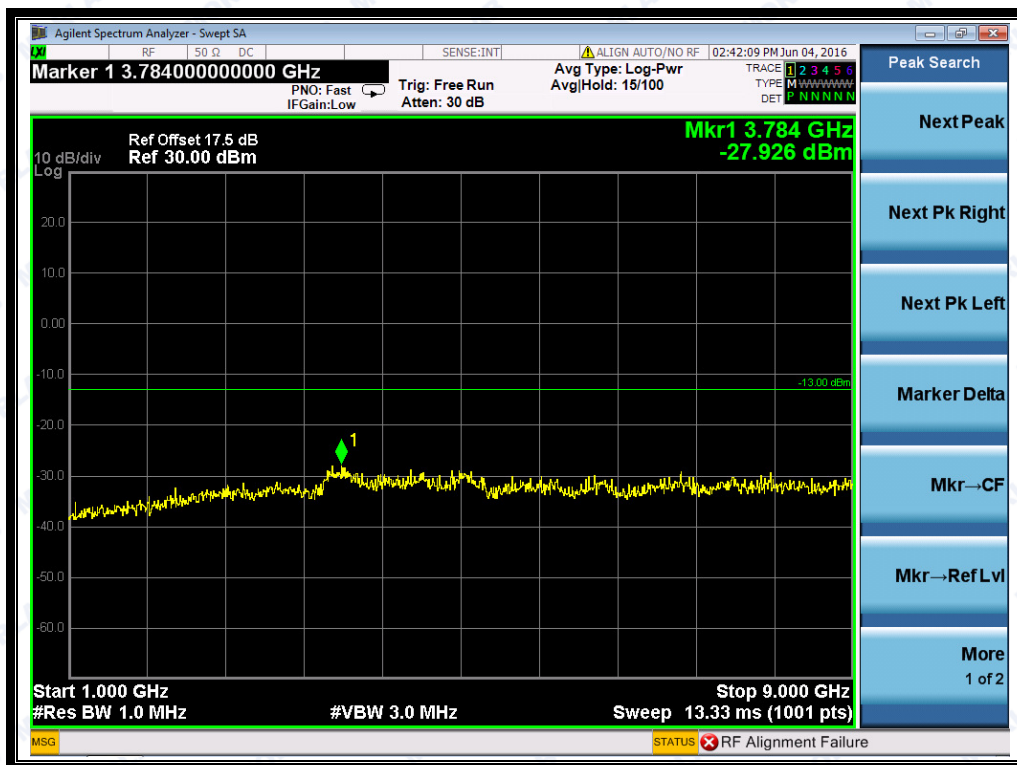
(Plot G2.1: WCDMA850MHz Channel = 4175, 1GHz to 9GHz)



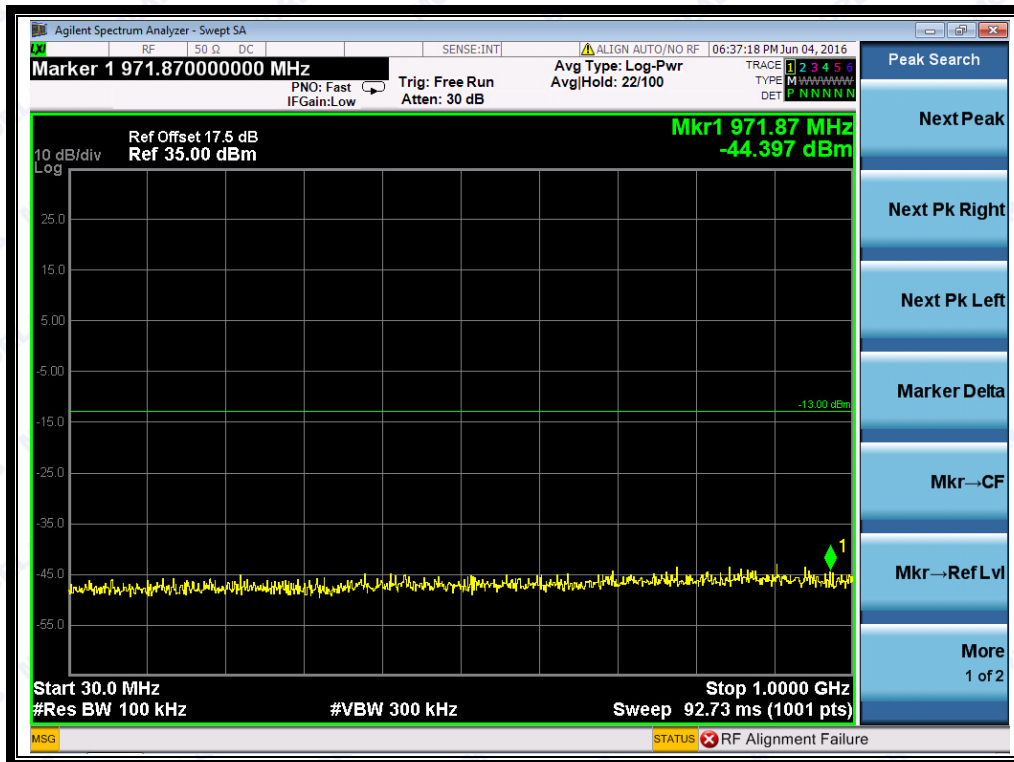
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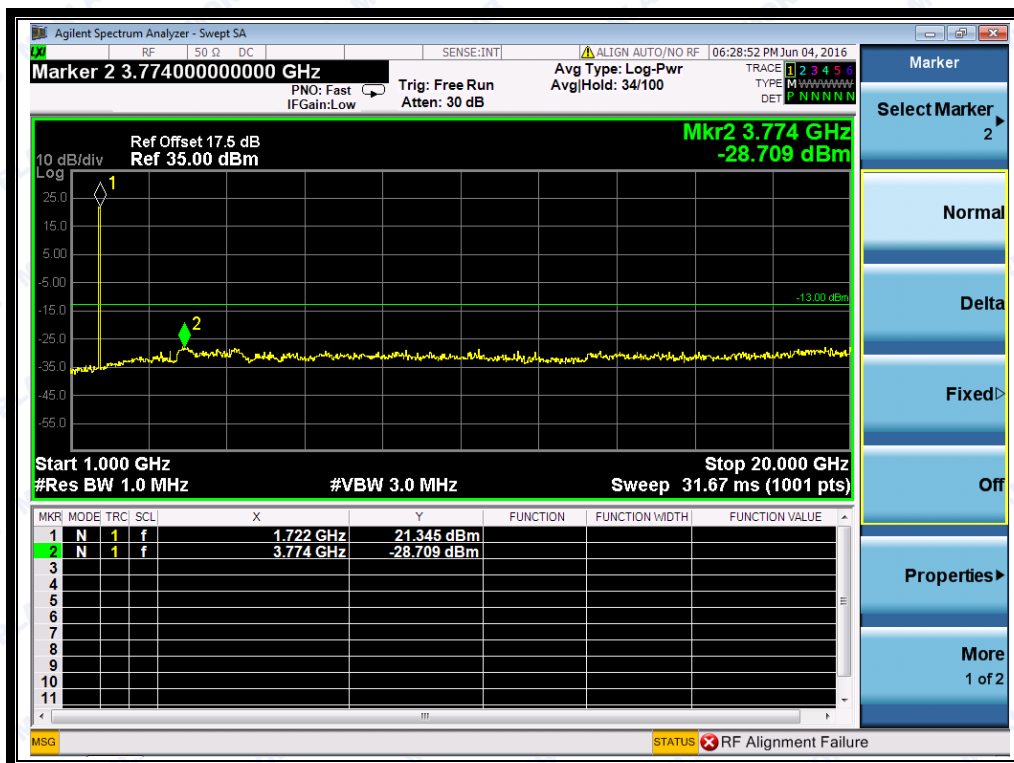
(Plot G3: WCDMA850MHz Channel = 4233, 30MHz to 1GHz)



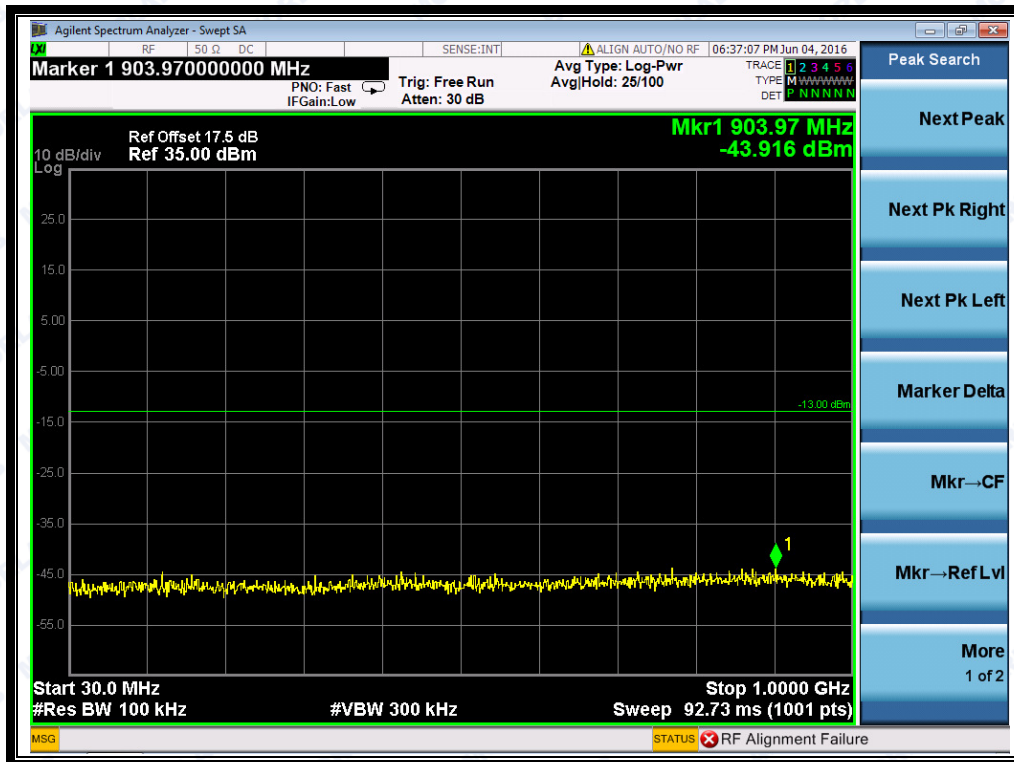
(Plot G3.1: WCDMA850MHz Channel = 4233, 1GHz to 9GHz)



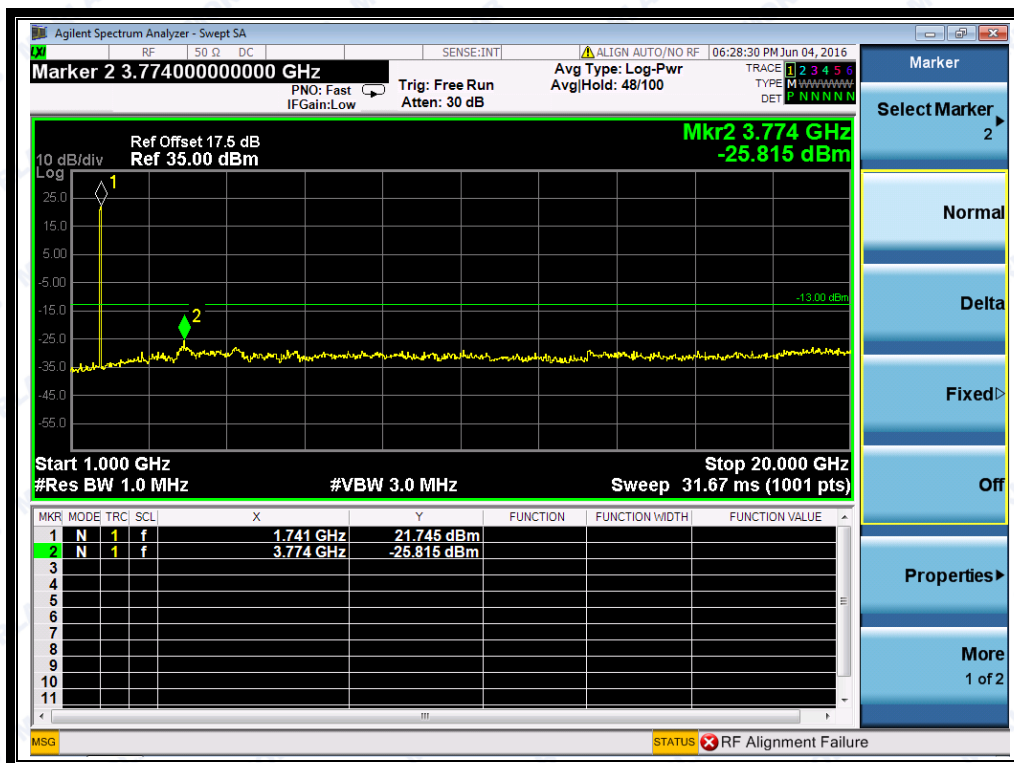
(Plot H1: WCDMA1700MHz Channel = 1312, 30MHz to 1GHz)



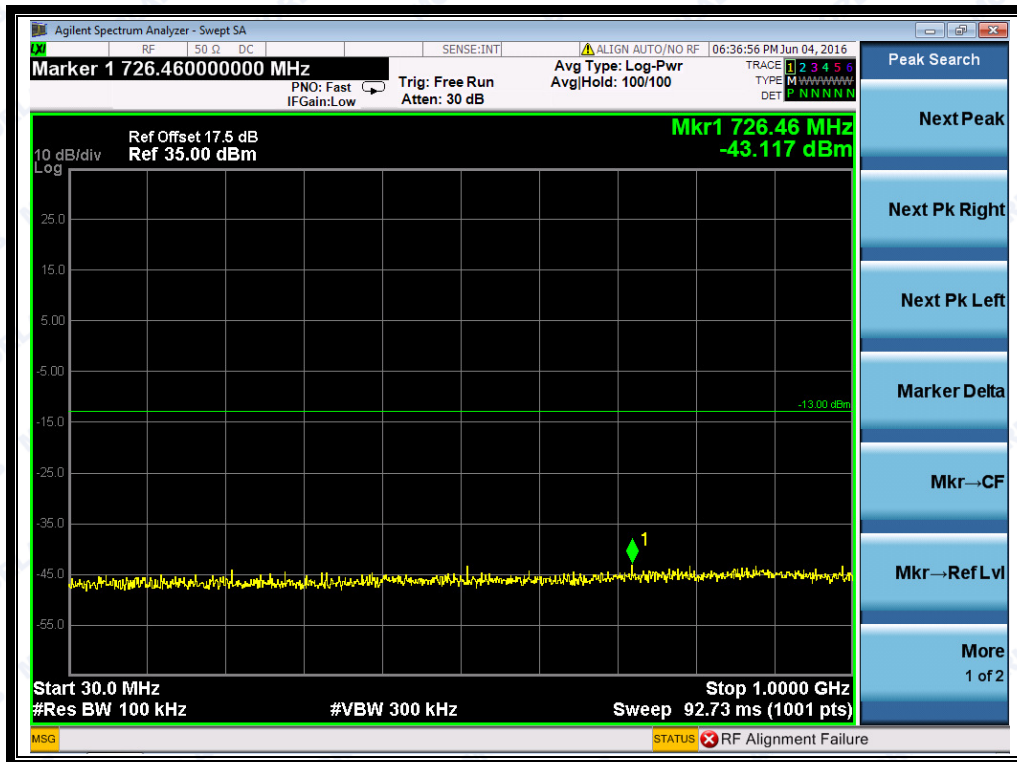
(Plot H1.1: WCDMA1700MHz Channel = 1312, 1GHz to 20GHz)



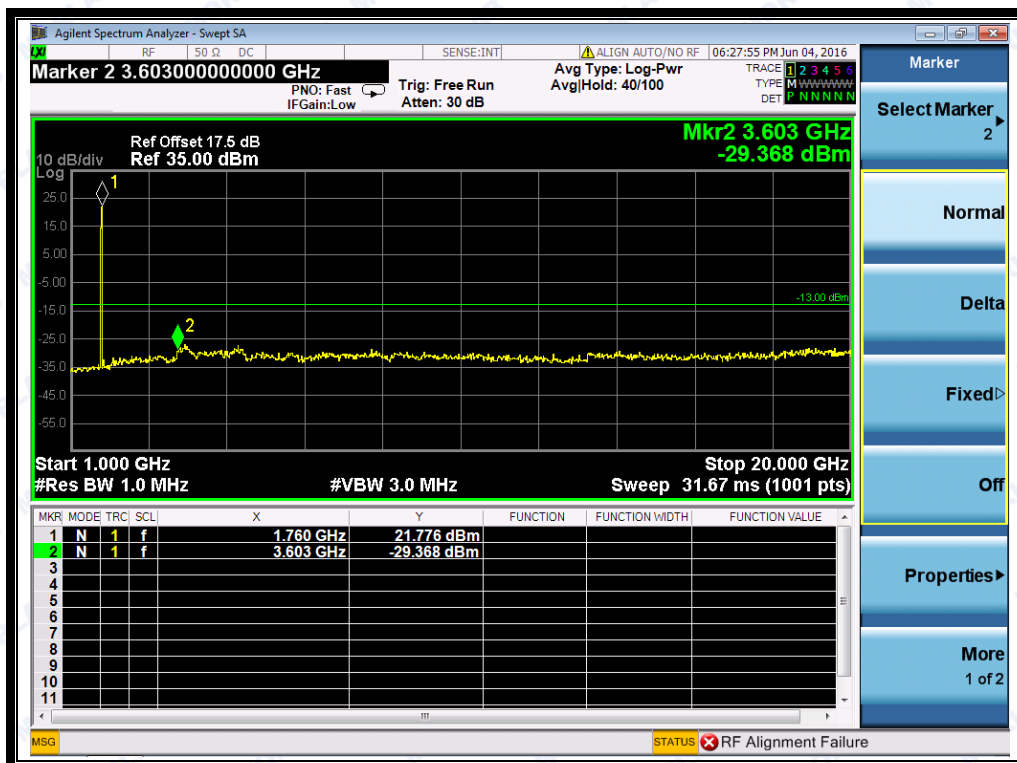
(Plot H2: WCDMA1700MHz Channel = 1412, 30MHz to 1GHz)



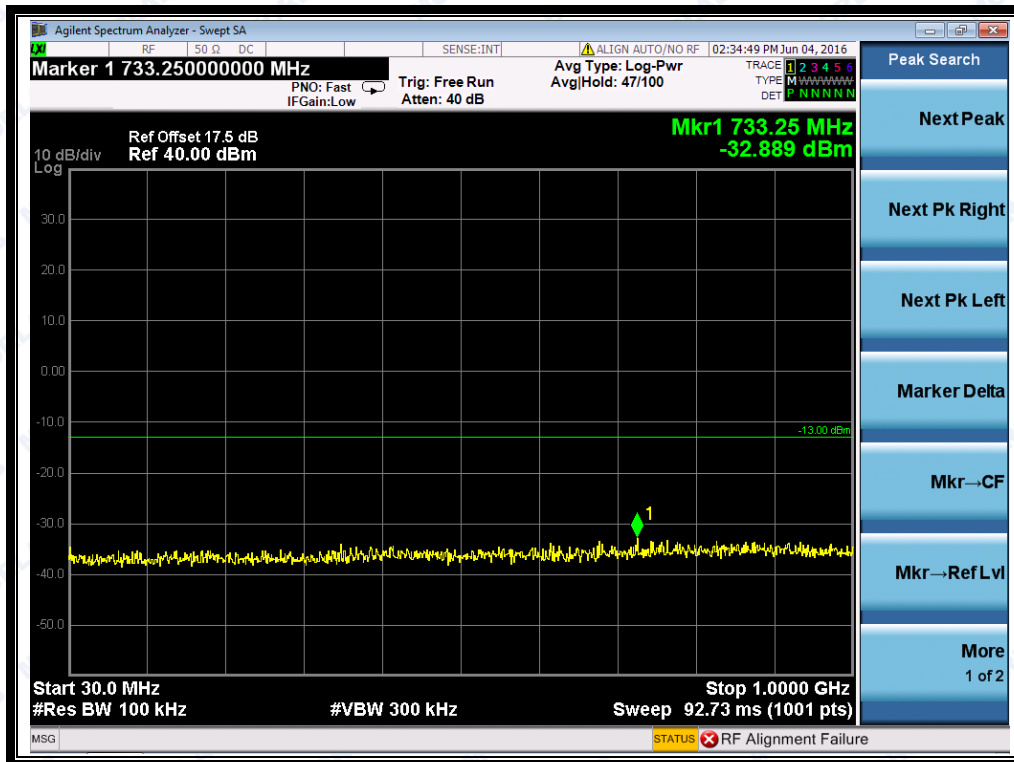
(Plot H2.1: WCDMA1700MHz Channel = 1412, 1GHz to 20GHz)



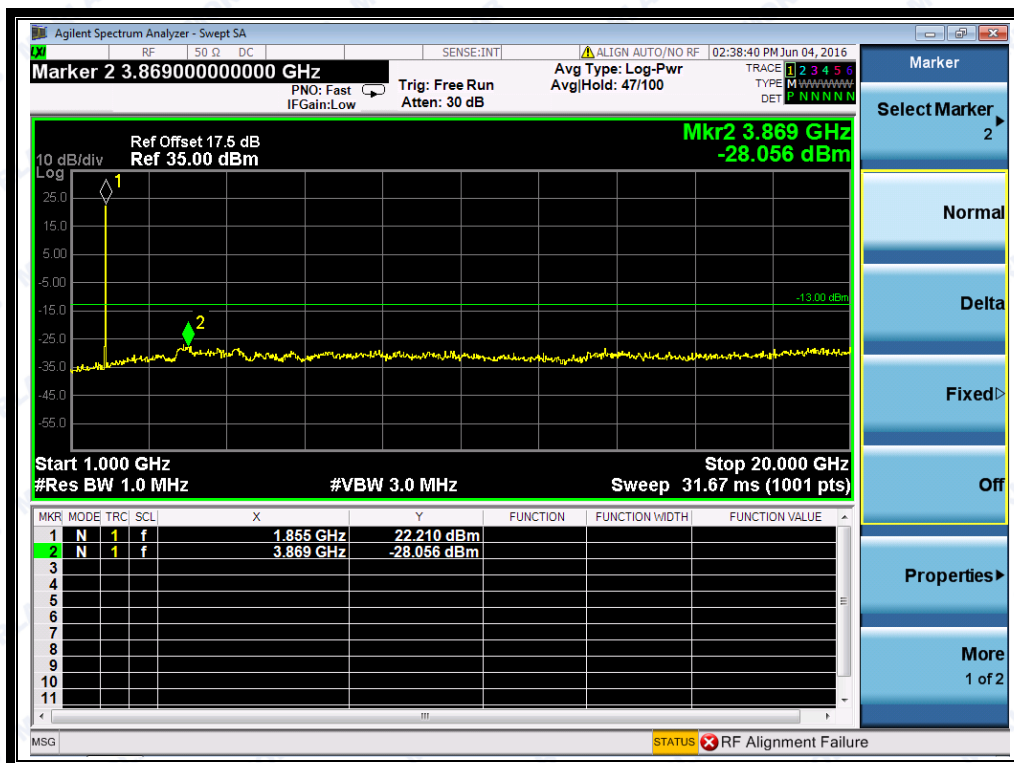
(Plot H3: WCDMA1700MHz Channel = 1513, 30MHz to 1GHz)



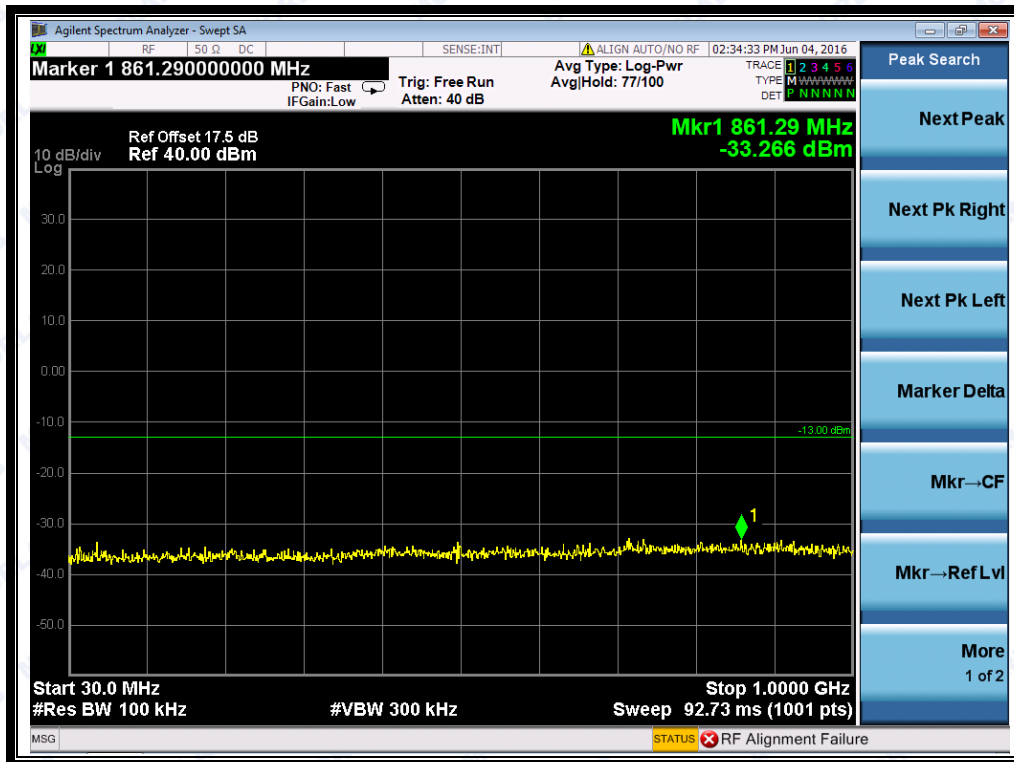
(Plot H3.1: WCDMA1700MHz Channel = 1513, 1GHz to 20GHz)



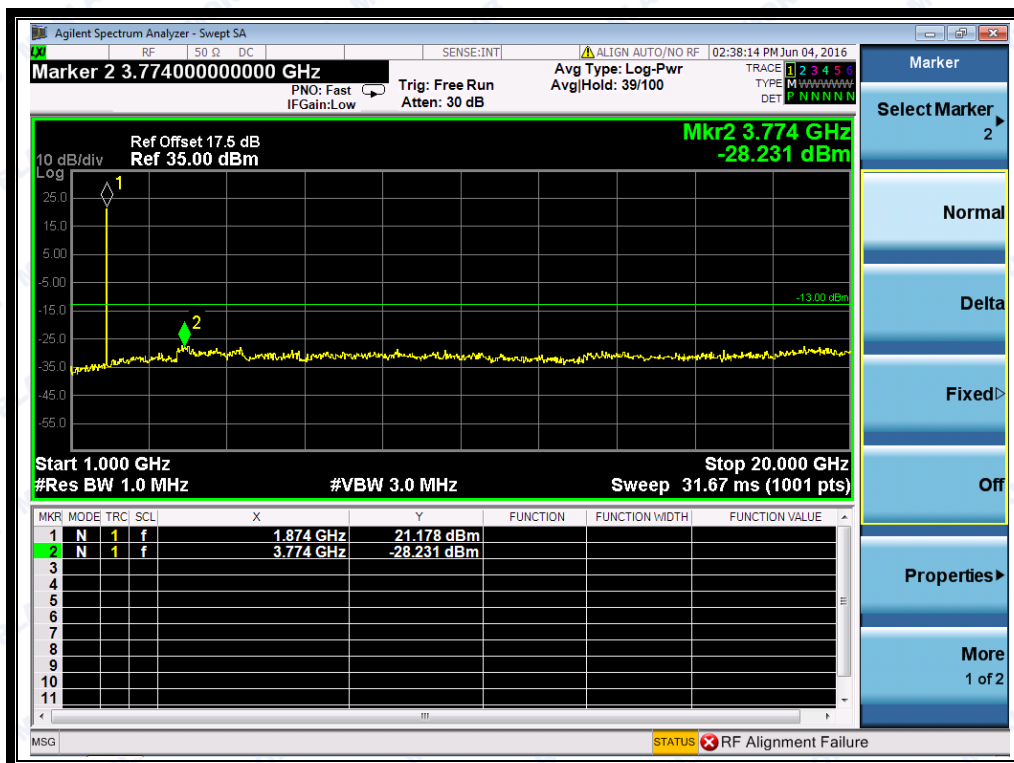
(Plot I1: WCDMA1900MHz Channel = 9262, 30MHz to 1GHz)



(Plot I1.1: WCDMA1900MHz Channel = 9262, 1GHz to 20GHz)

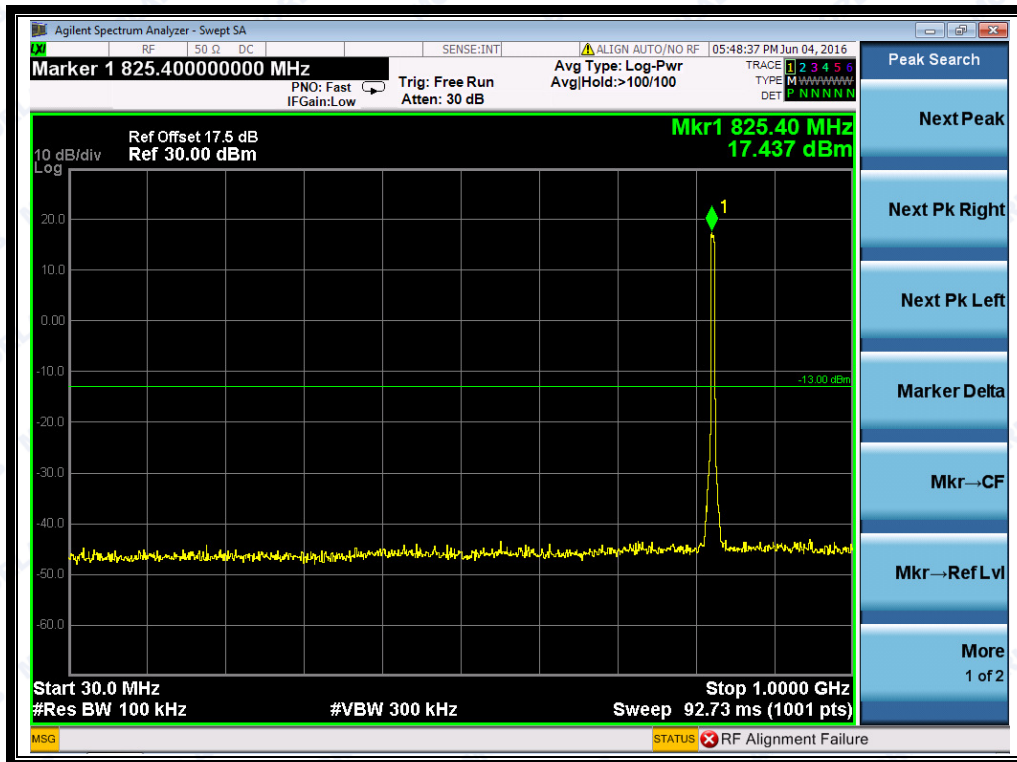


(Plot I2: WCDMA1900MHz Channel = 9400, 30MHz to 1GHz)

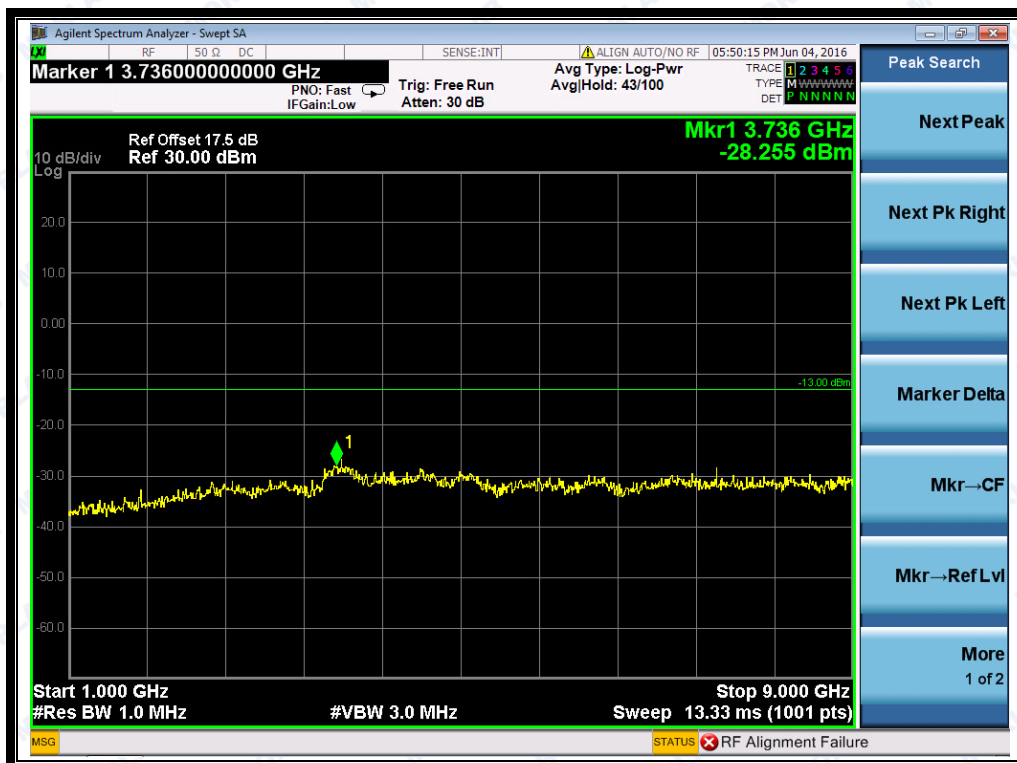


(Plot I2.1: WCDMA1900MHz Channel = 9400, 1GHz to 20GHz)

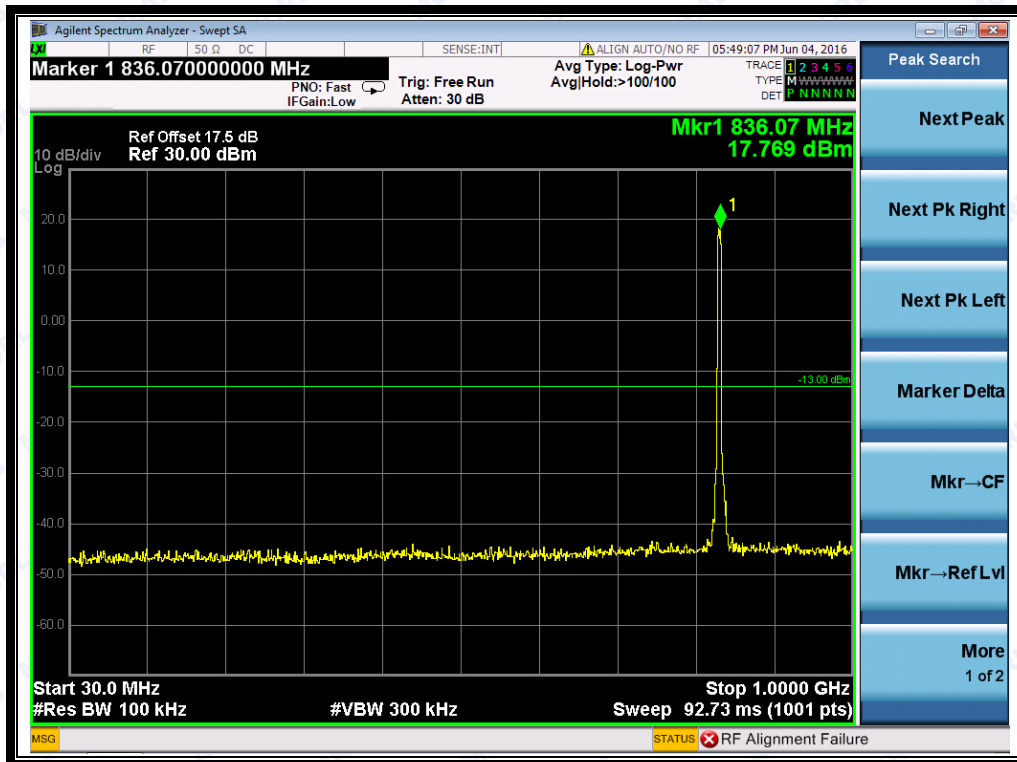




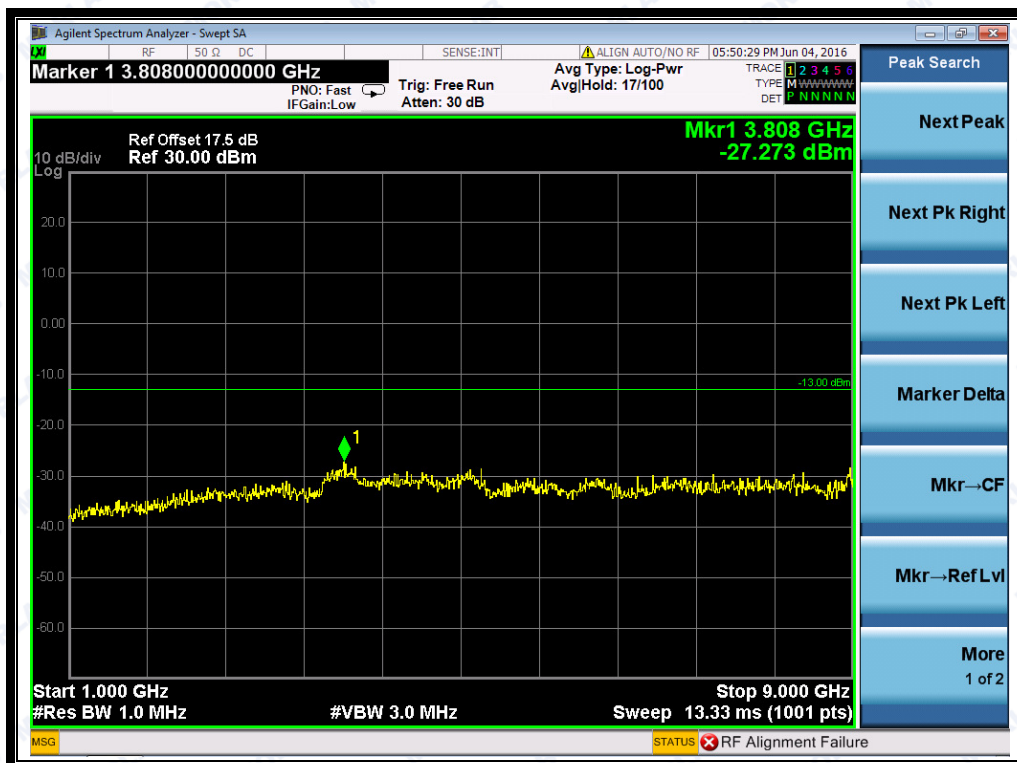
(Plot J1: HSDPA 850MHz Channel = 4132, 30MHz to 1GHz)



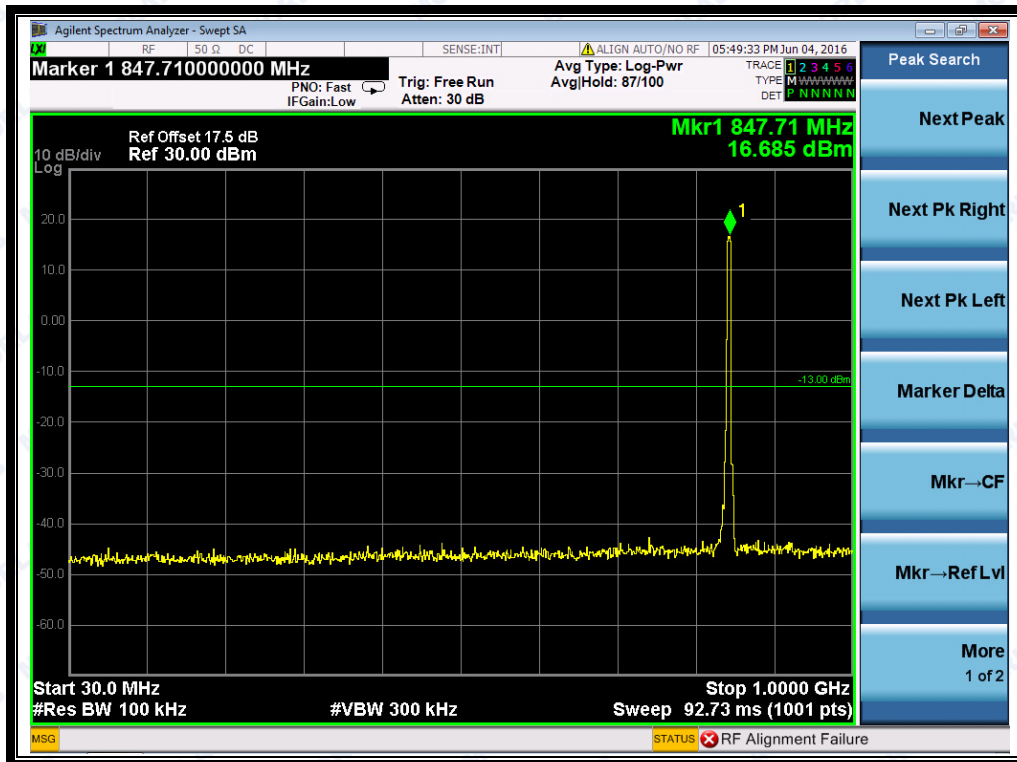
(Plot J1.1: HSDPA 850MHz Channel = 4132, 1GHz to 9GHz)



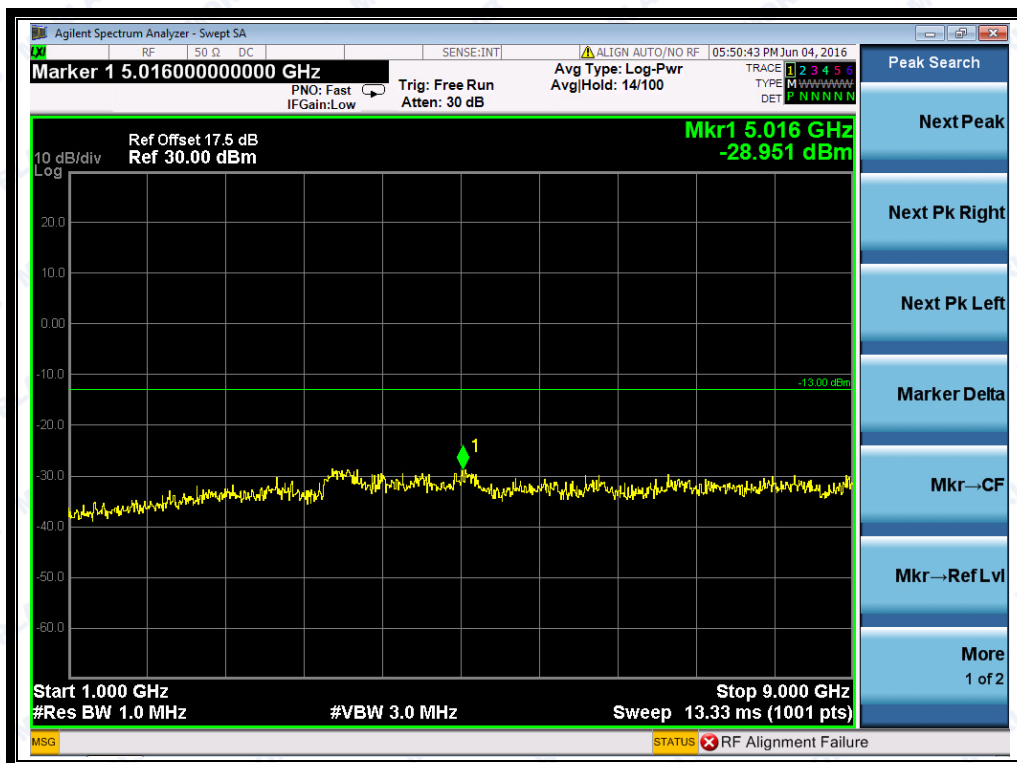
(Plot J2: HSDPA 850MHz Channel = 4175, 30MHz to 1GHz)



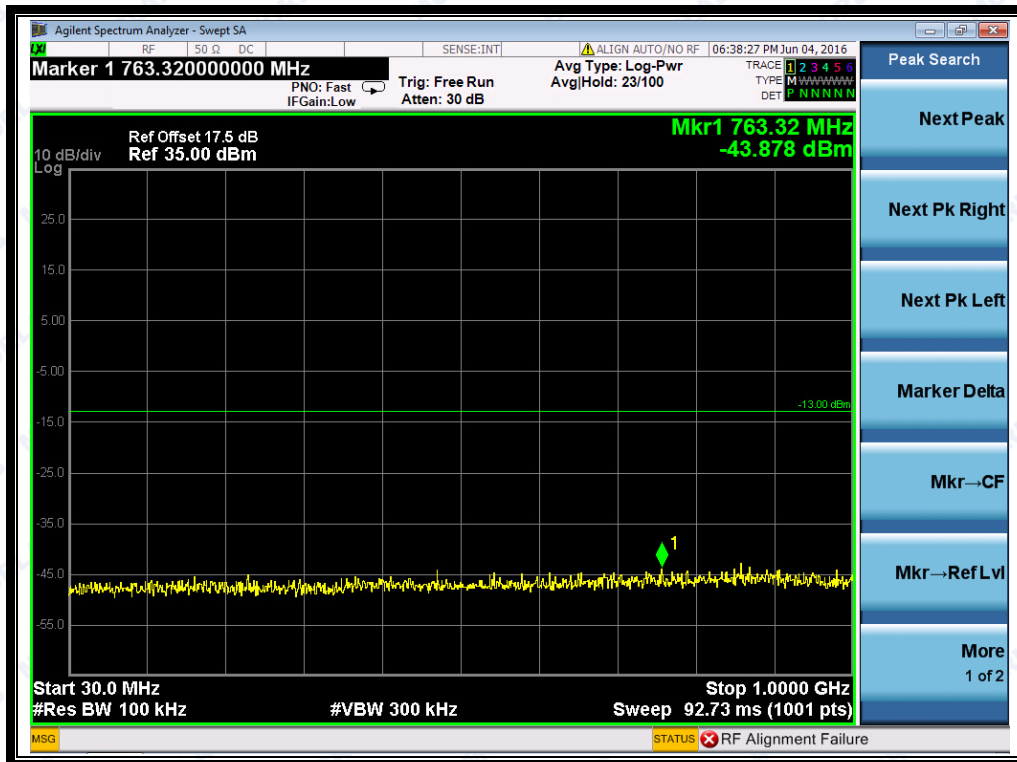
(Plot J2.1: HSDPA 850MHz Channel = 4175, 1GHz to 9GHz)



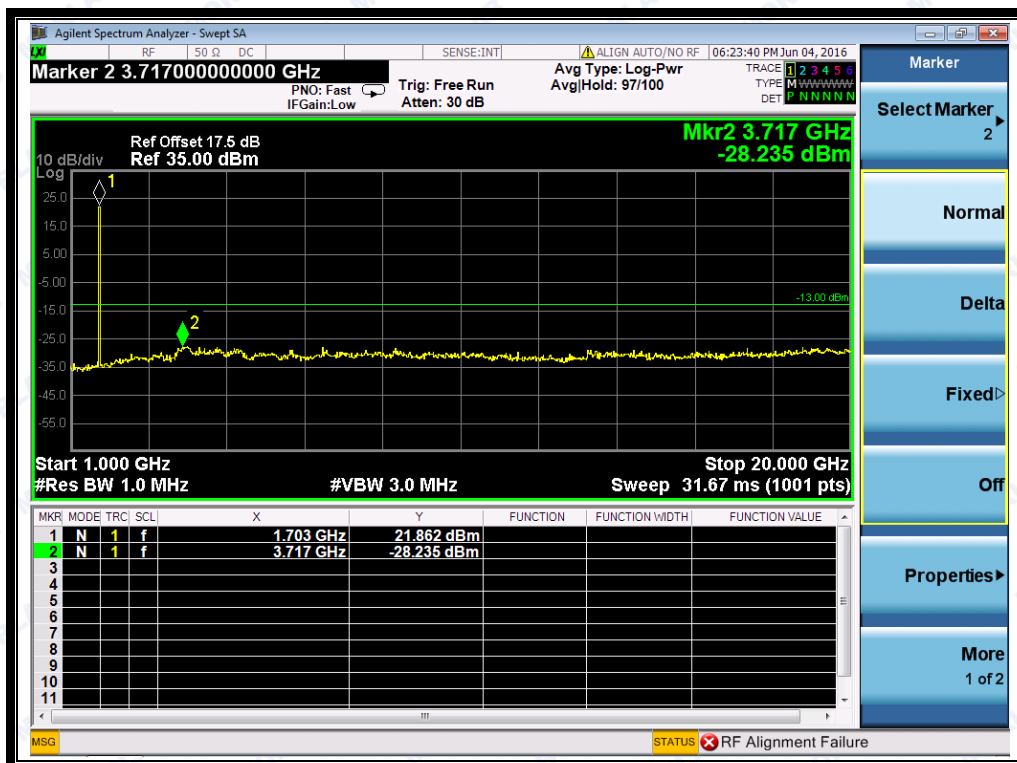
(Plot J3: HSDPA 850MHz Channel = 4233, 30MHz to 1GHz)



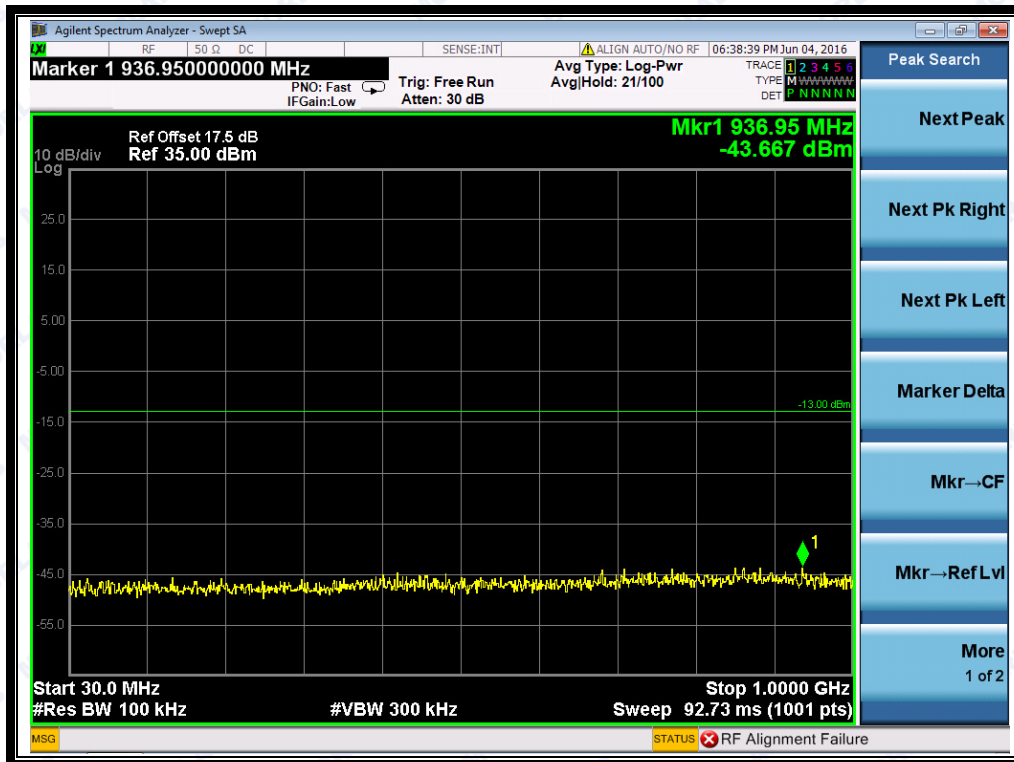
(Plot J3.1: HSDPA 850MHz Channel = 4233, 1GHz to 9GHz)



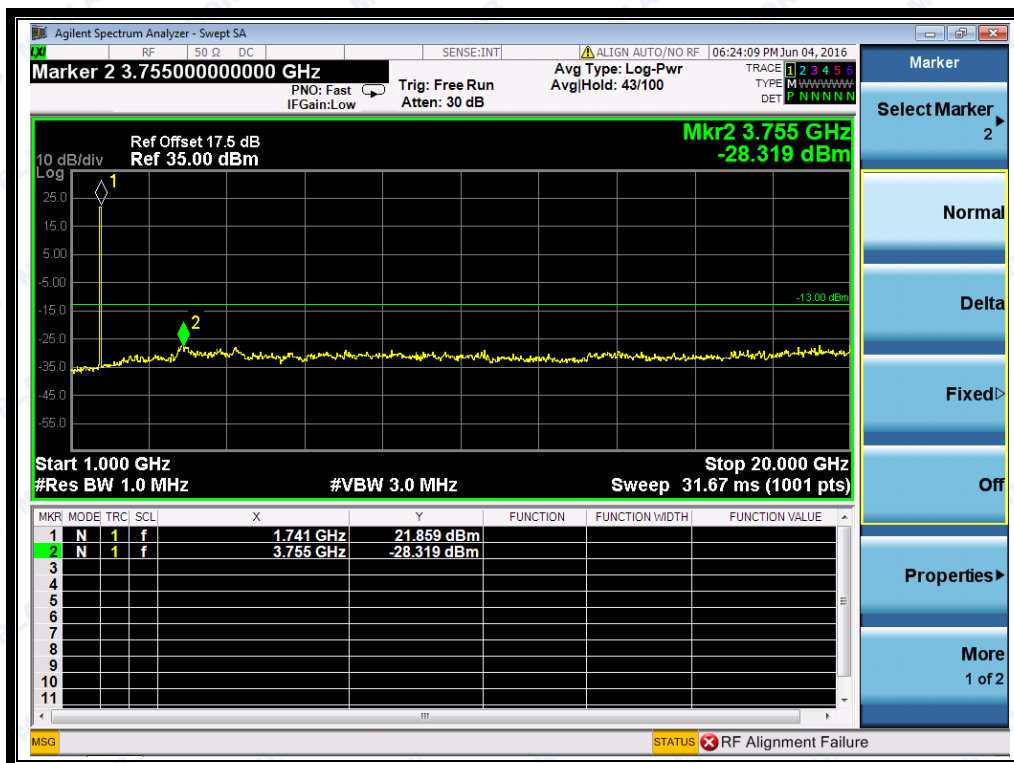
(Plot K1: HSDPA 1700MHz Channel = 1312, 30MHz to 1GHz)



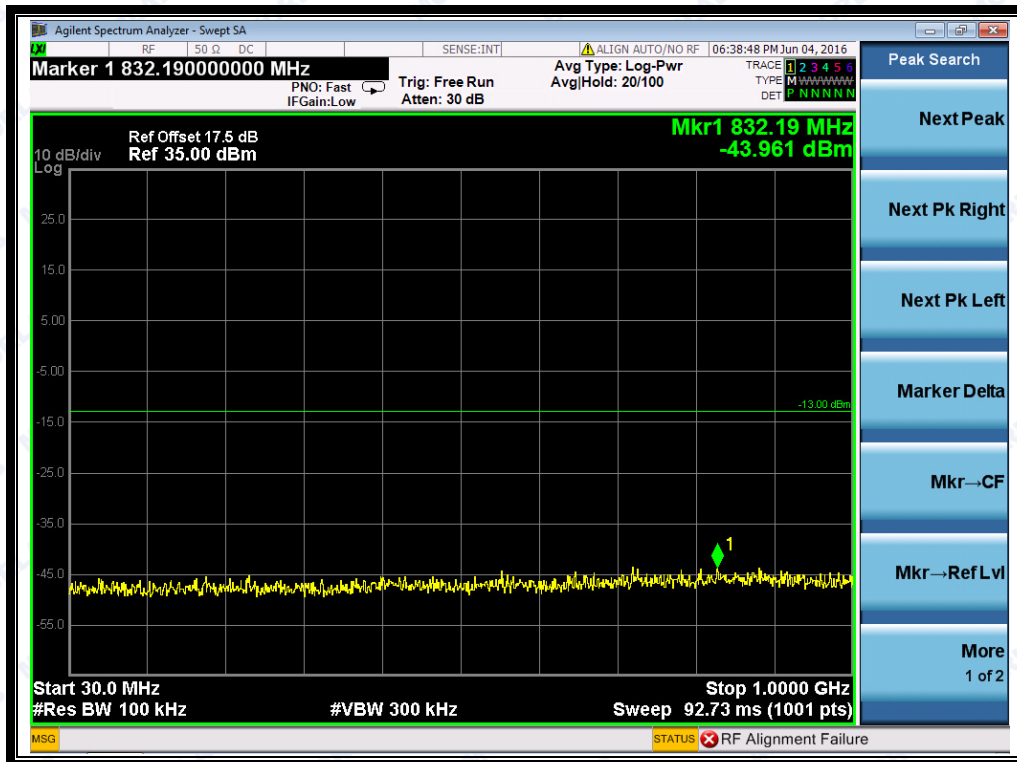
(Plot K1.1: HSDPA 1700MHz Channel = 1312, 1GHz to 20GHz)



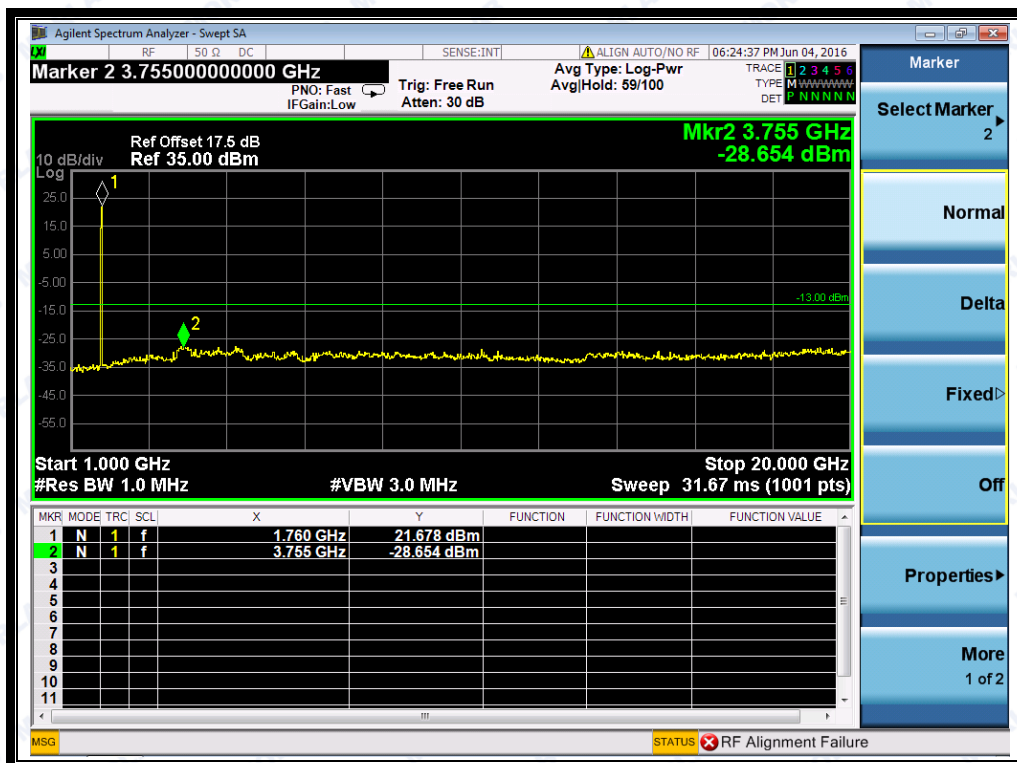
(Plot K2: HSDPA 1700MHz Channel = 1412, 30MHz to 1GHz)



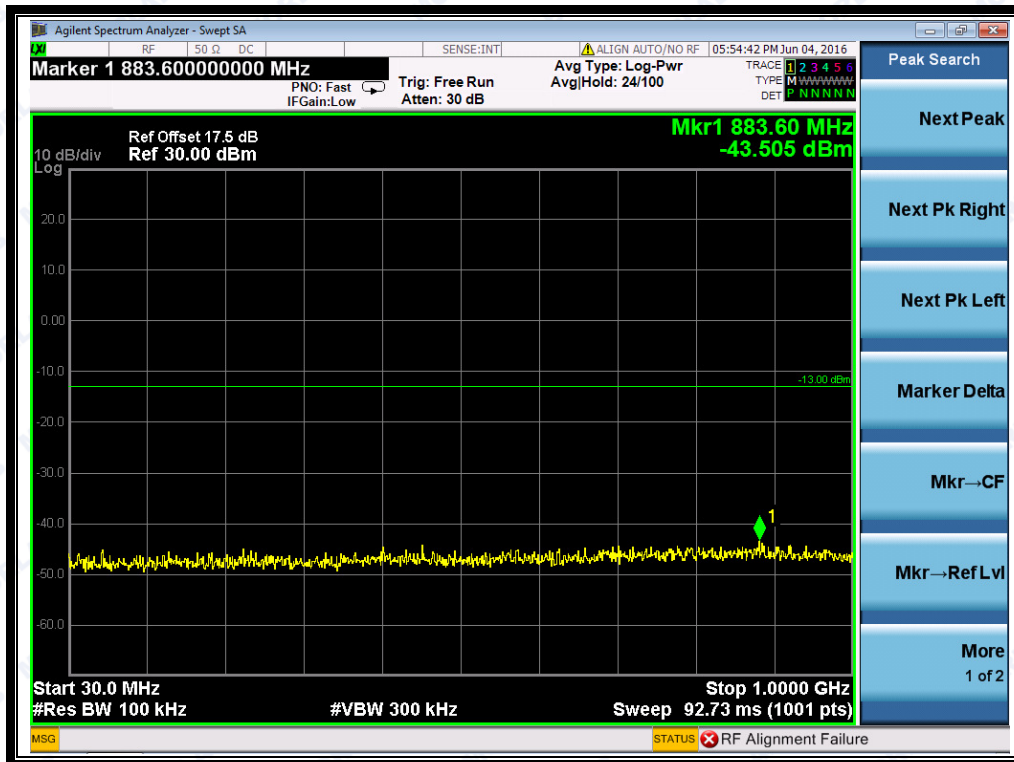
(Plot K2.1: HSDPA1700MHz Channel = 1412, 1GHz to 20GHz)



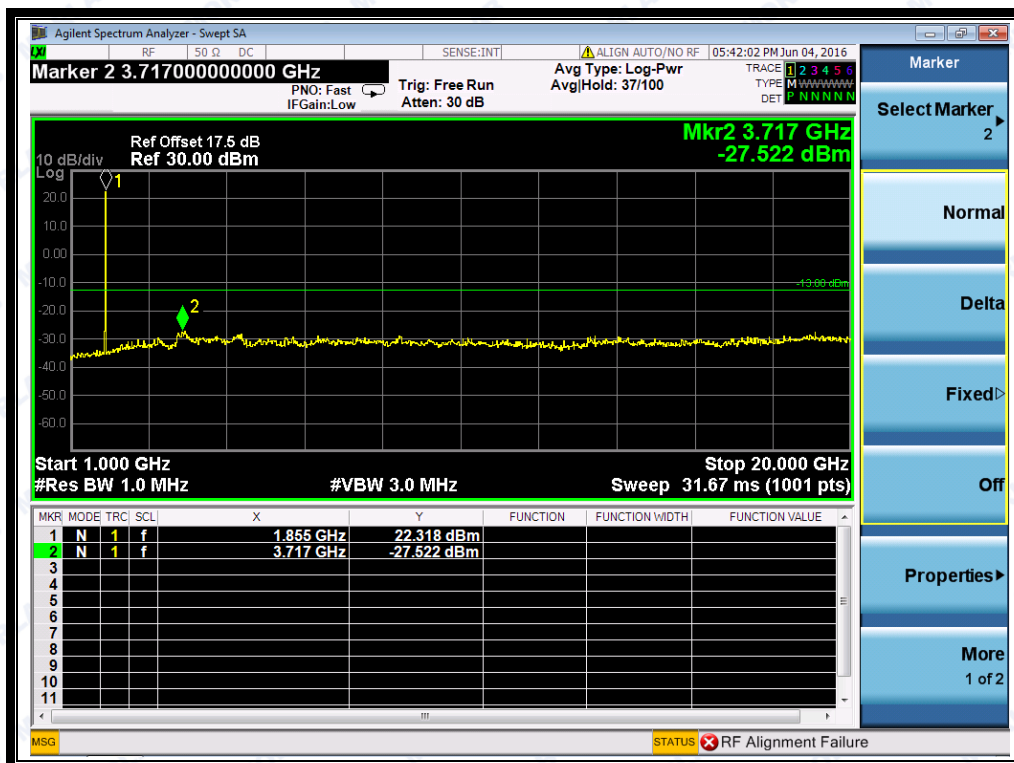
(Plot K3: HSDPA1700MHz Channel = 1513, 30MHz to 1GHz)



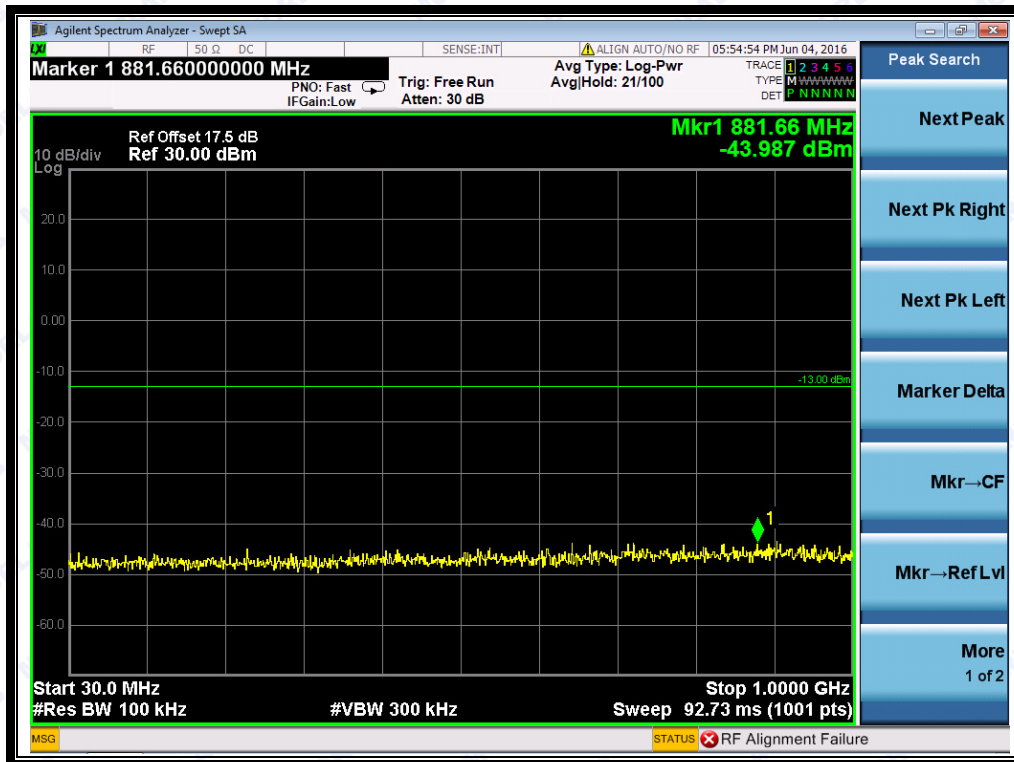
(Plot K3.1: HSDPA1700MHz Channel = 1513 1GHz to 20GHz)



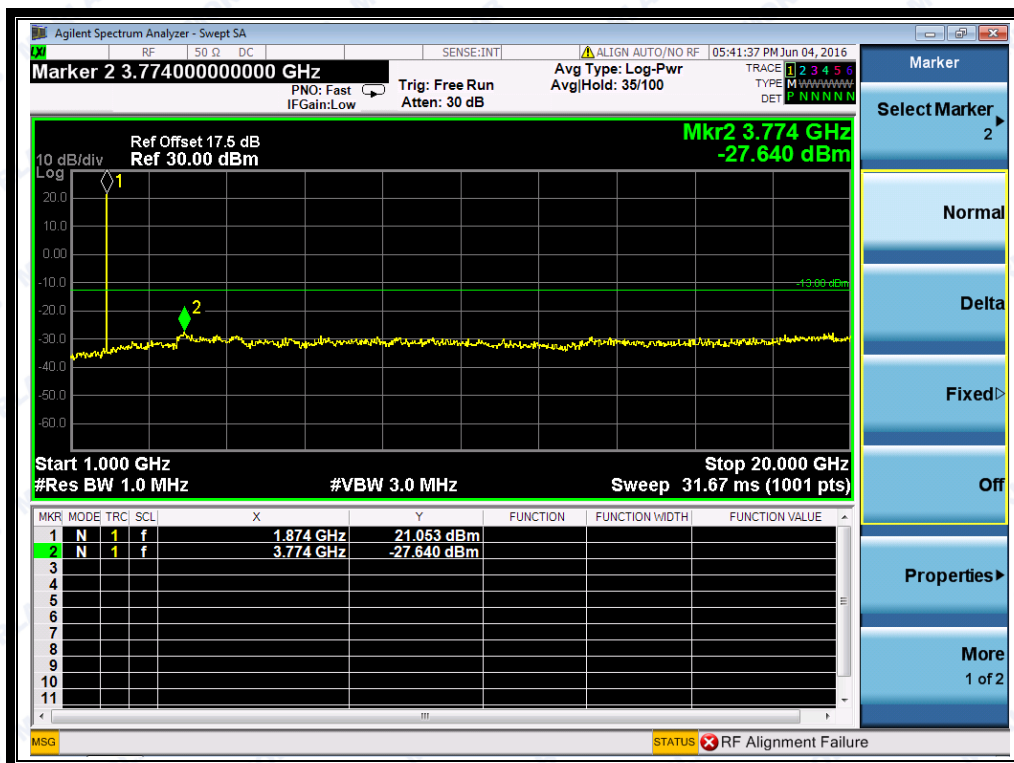
(Plot L1: HSDPA 1900MHz Channel = 9262, 30MHz to 1GHz)



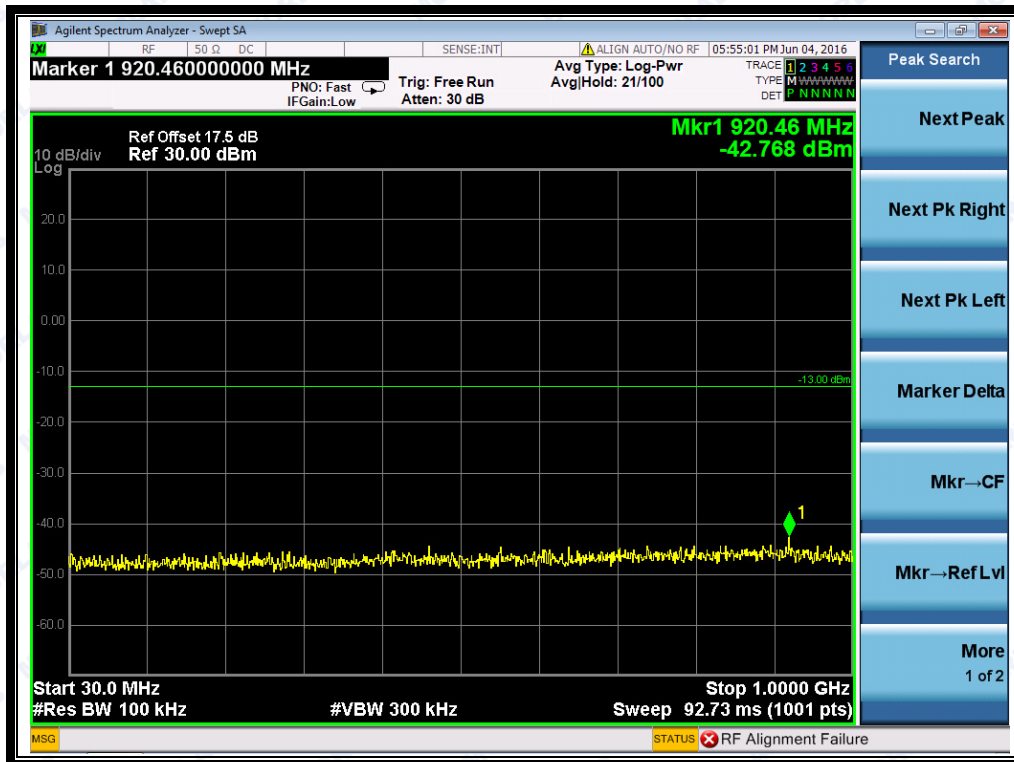
(Plot L1.1: HSDPA 1900MHz Channel = 9262, 1GHz to 20GHz)



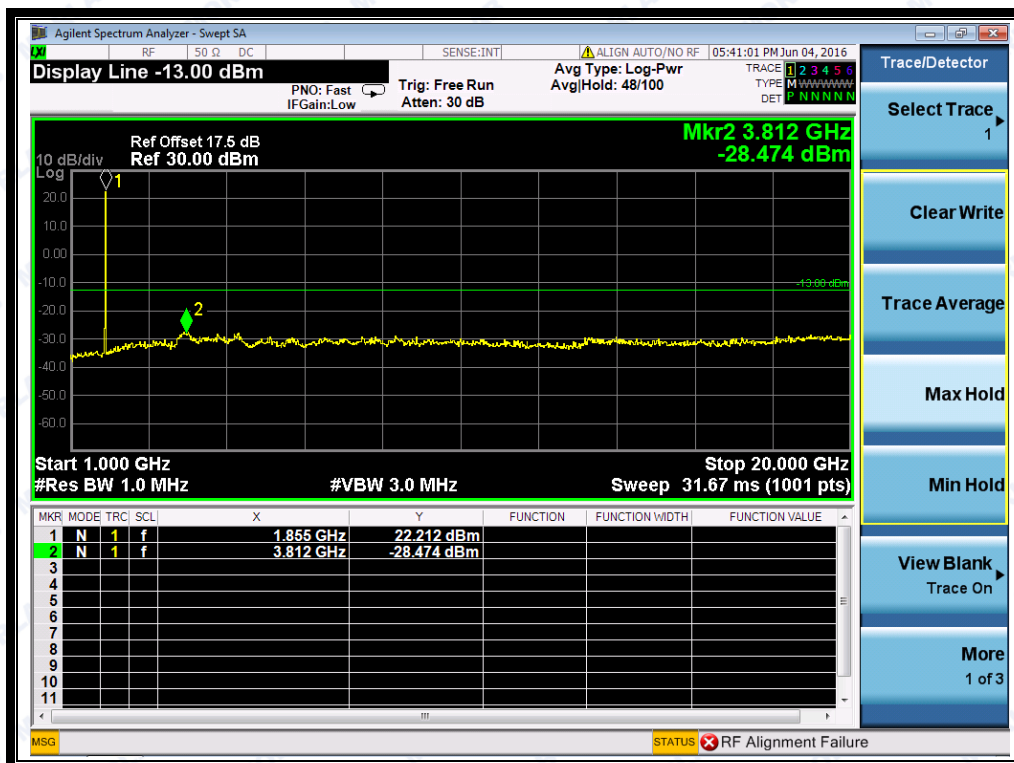
(Plot L2: HSDPA 1900MHz Channel = 9400, 30MHz to 1GHz)



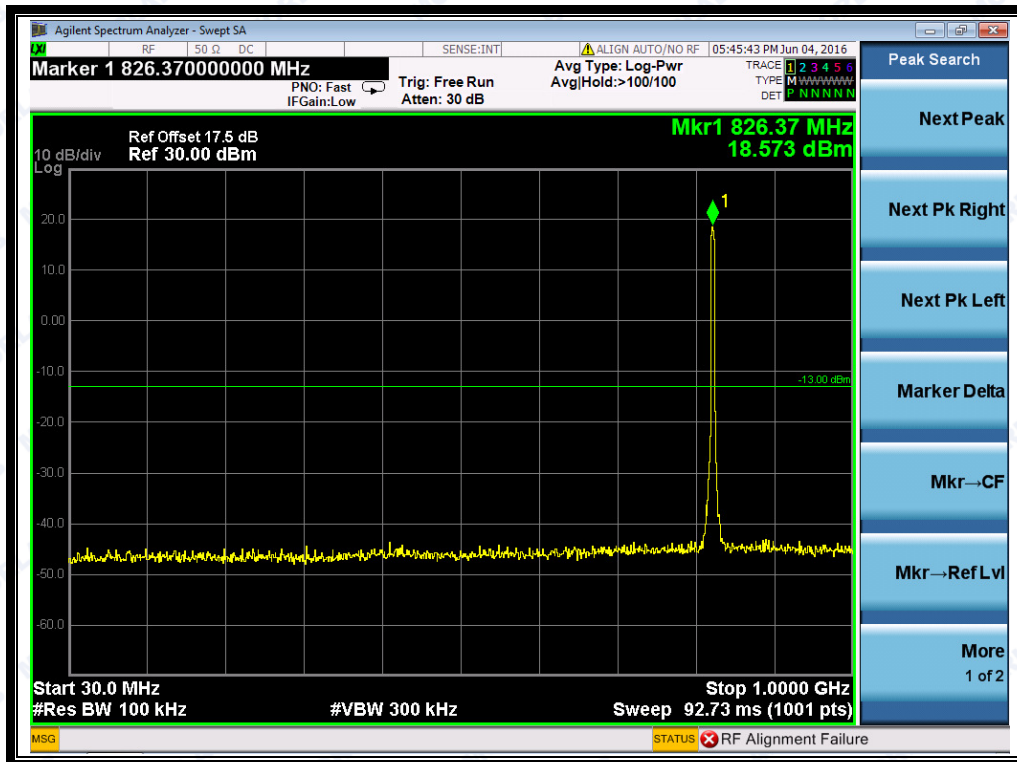
(Plot L2.1: HSDPA1900MHz Channel = 9400, 1GHz to 20GHz)



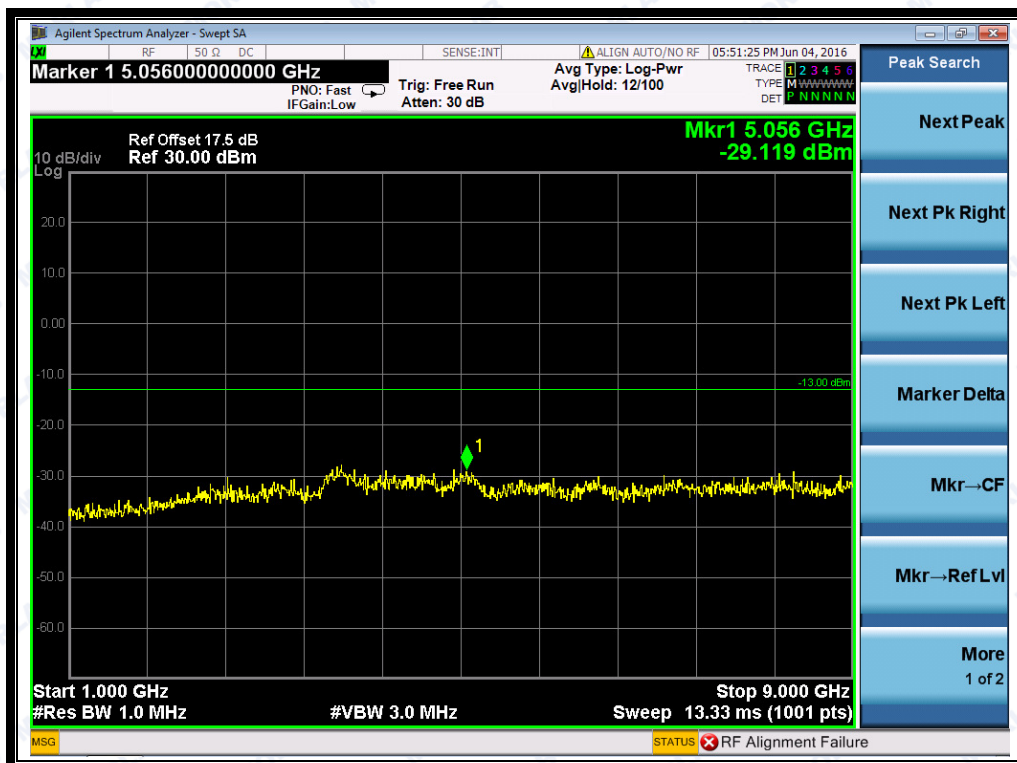
(Plot L3: HSDPA1900MHz Channel = 9538, 30MHz to 1GHz)



(Plot L3.1: HSDPA1900MHz Channel = 9538 1GHz to 20GHz)



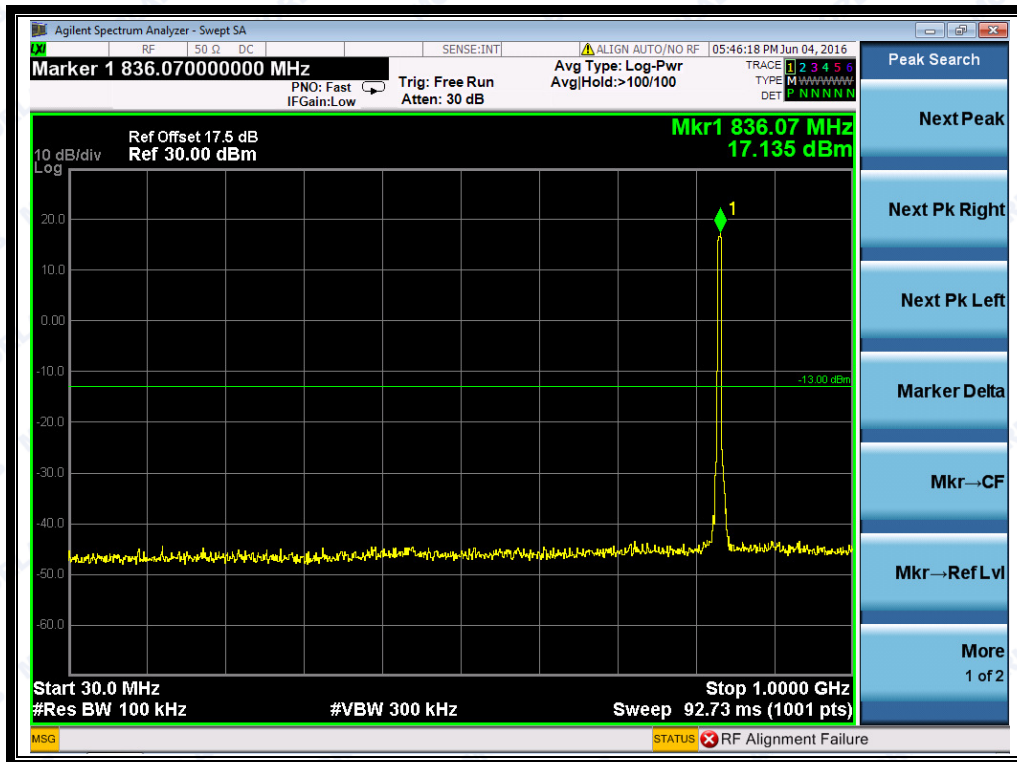
(Plot M1: HSUPA 850MHz Channel = 4132, 30MHz to 1GHz)



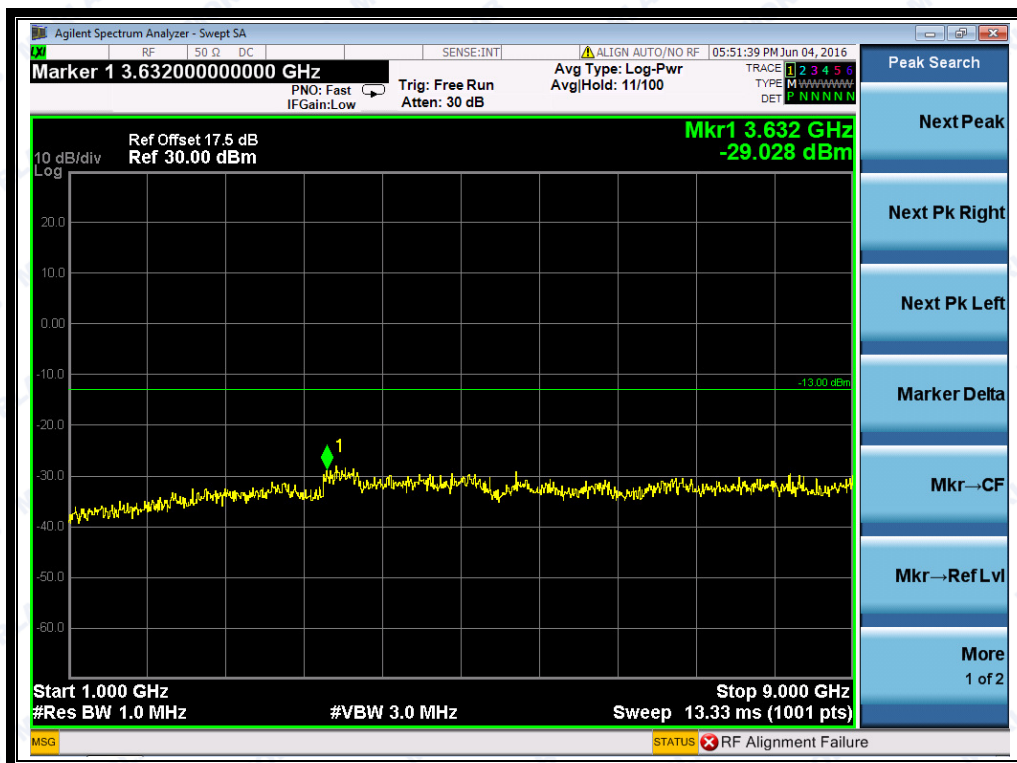
(Plot M1.1: HSUPA 850MHz Channel = 4132, 1GHz to 9GHz)



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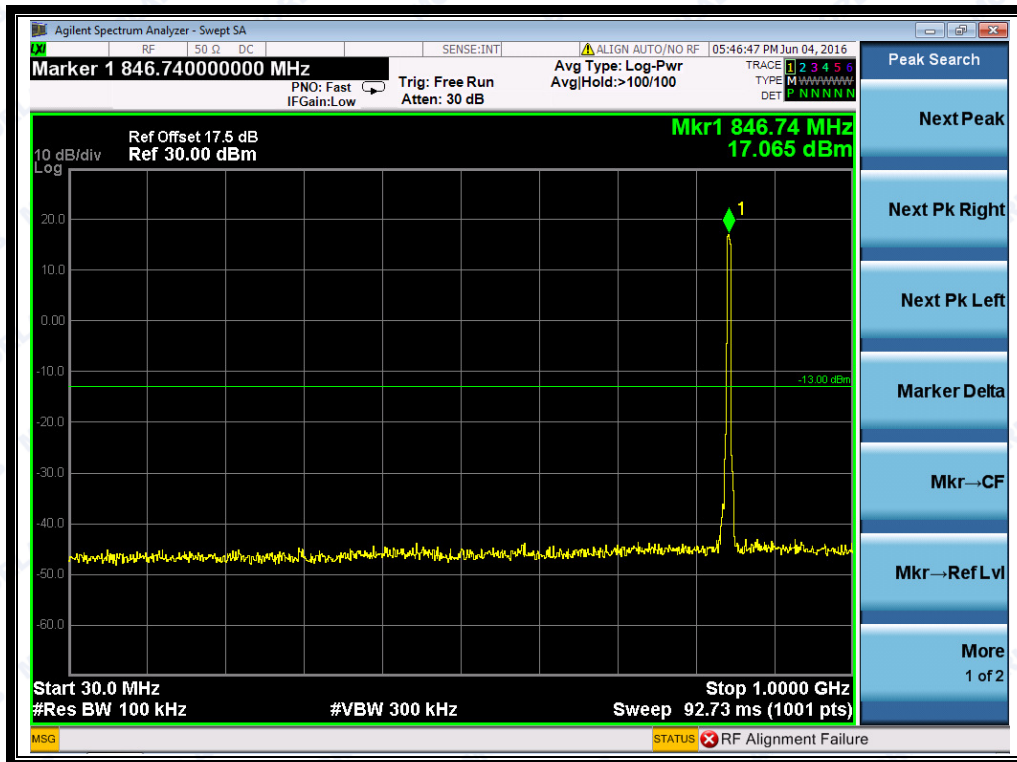
(Plot M2: HSUPA 850MHz Channel = 4175, 30MHz to 1GHz)



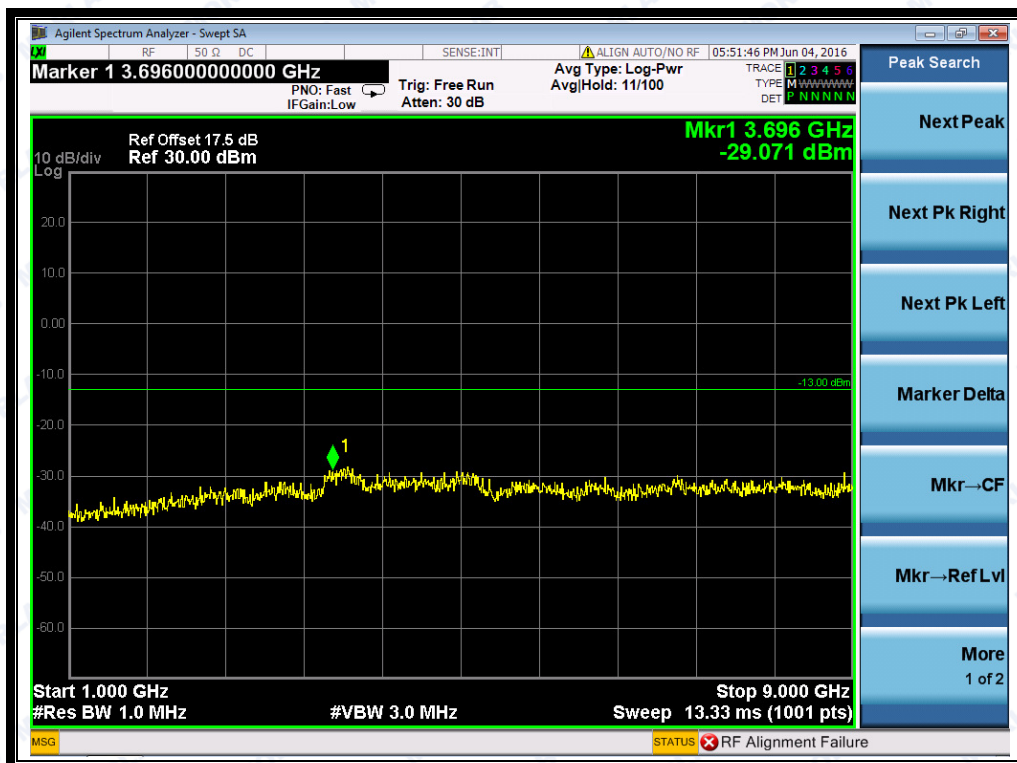
(Plot M2.1: HSUPA 850MHz Channel = 4175, 1GHz to 9GHz)



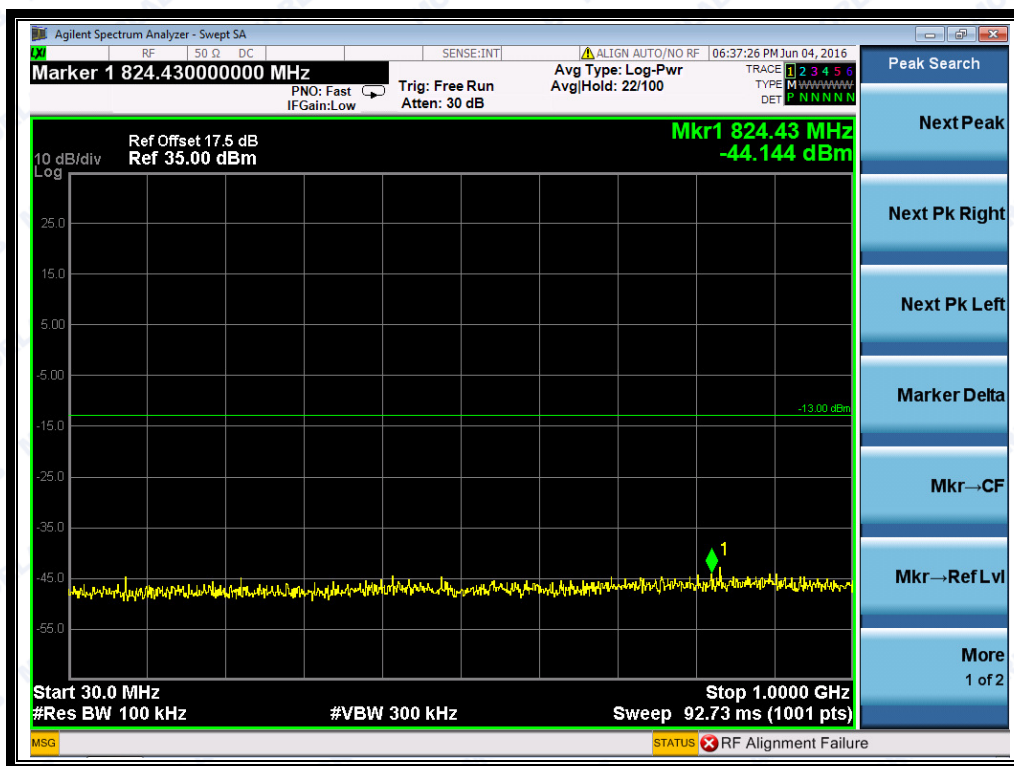
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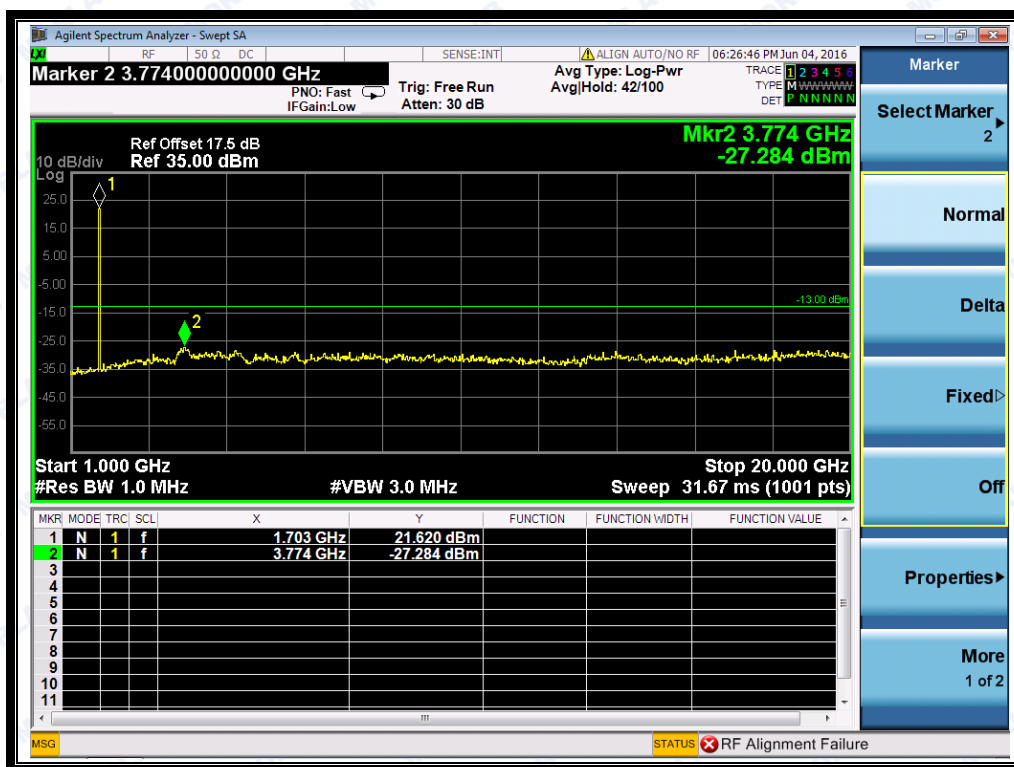
(Plot M3: HSUPA 850MHz Channel = 4233, 30MHz to 1GHz)



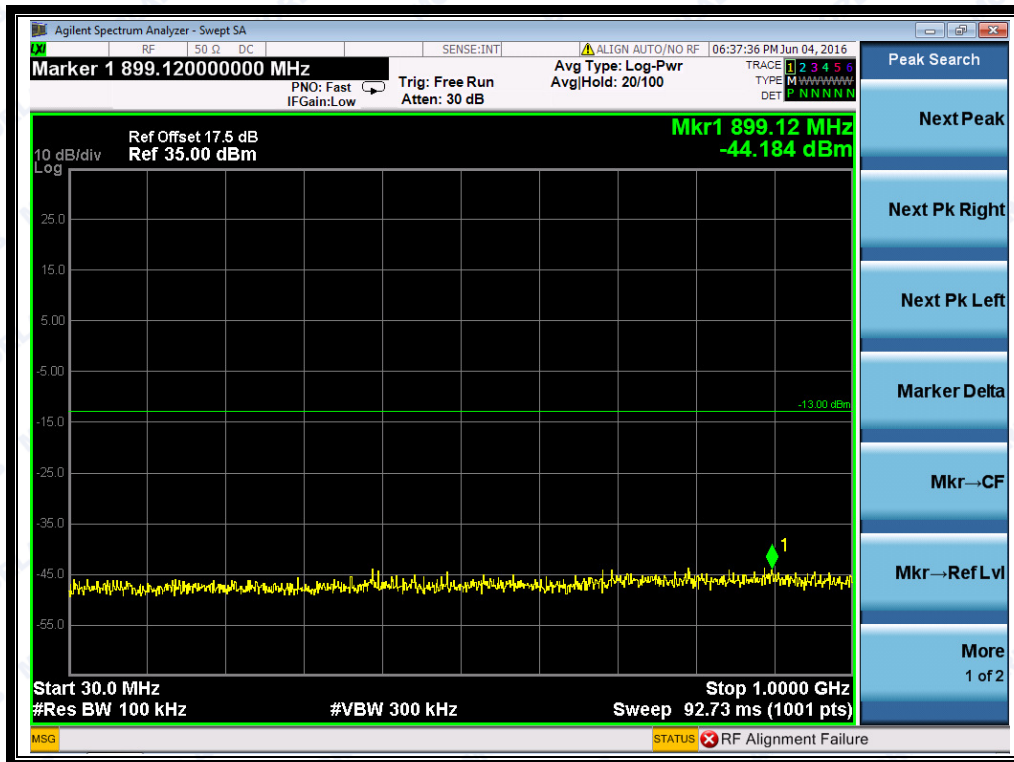
(Plot M3.1: HSUPA 850MHz Channel = 4233, 1GHz to 9GHz)



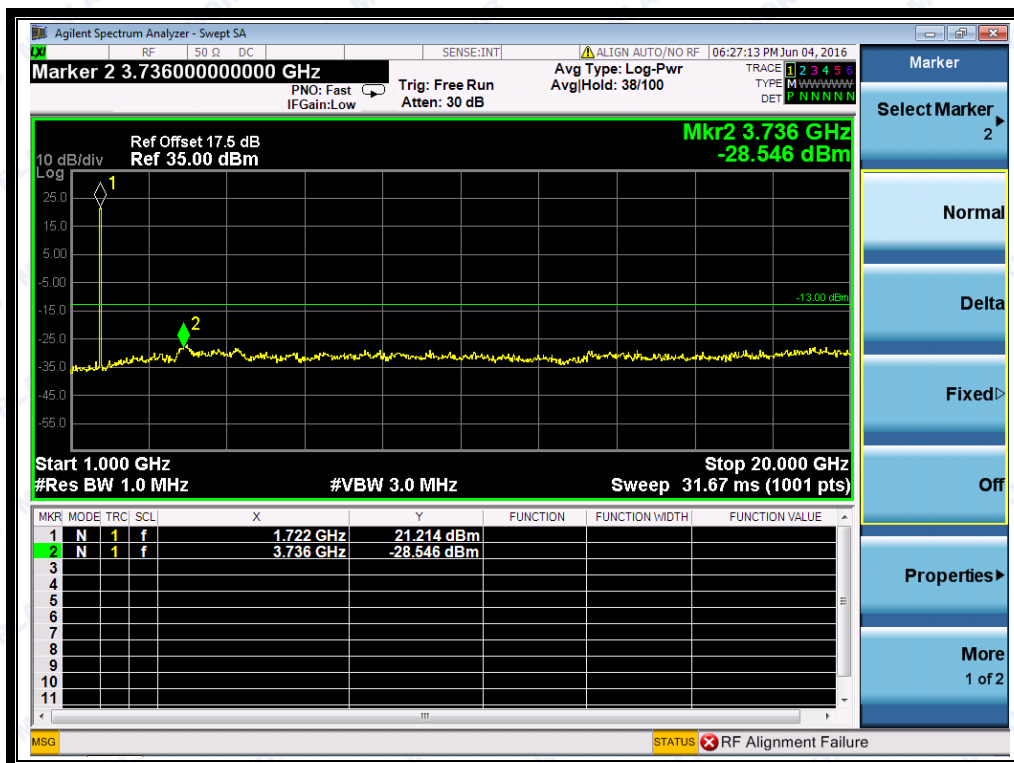
(Plot N1: HSUPA 1700MHz Channel = 1312, 30MHz to 1GHz)



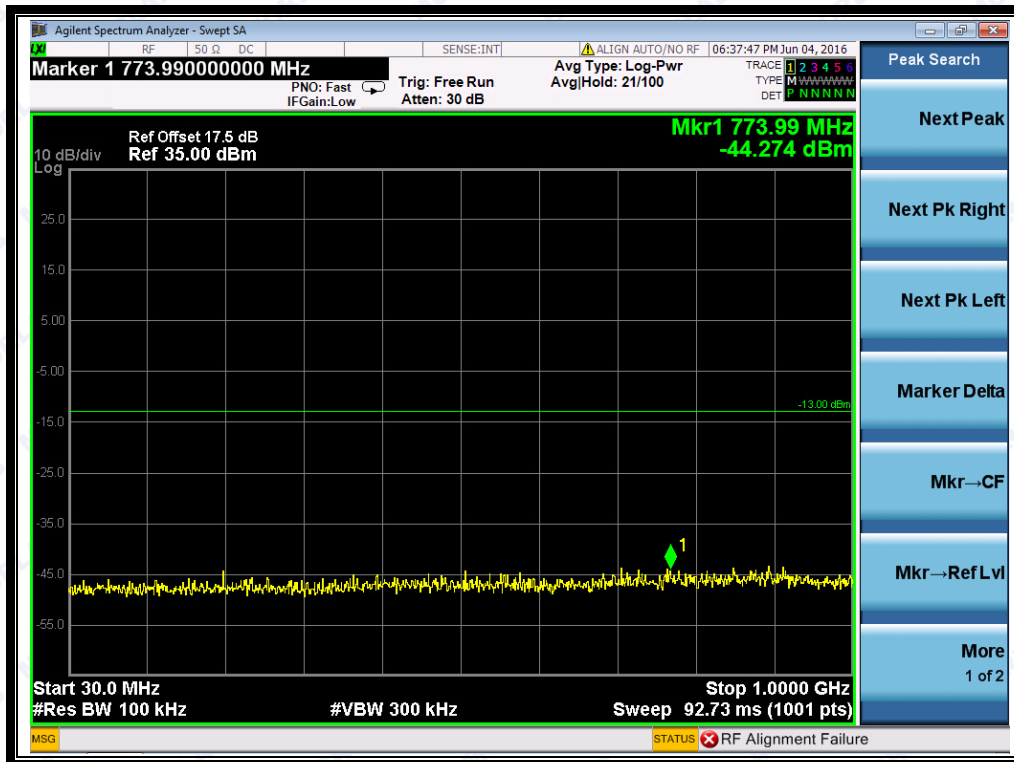
(Plot N1.1: HSUPA 1700MHz Channel = 1312, 1GHz to 20GHz)



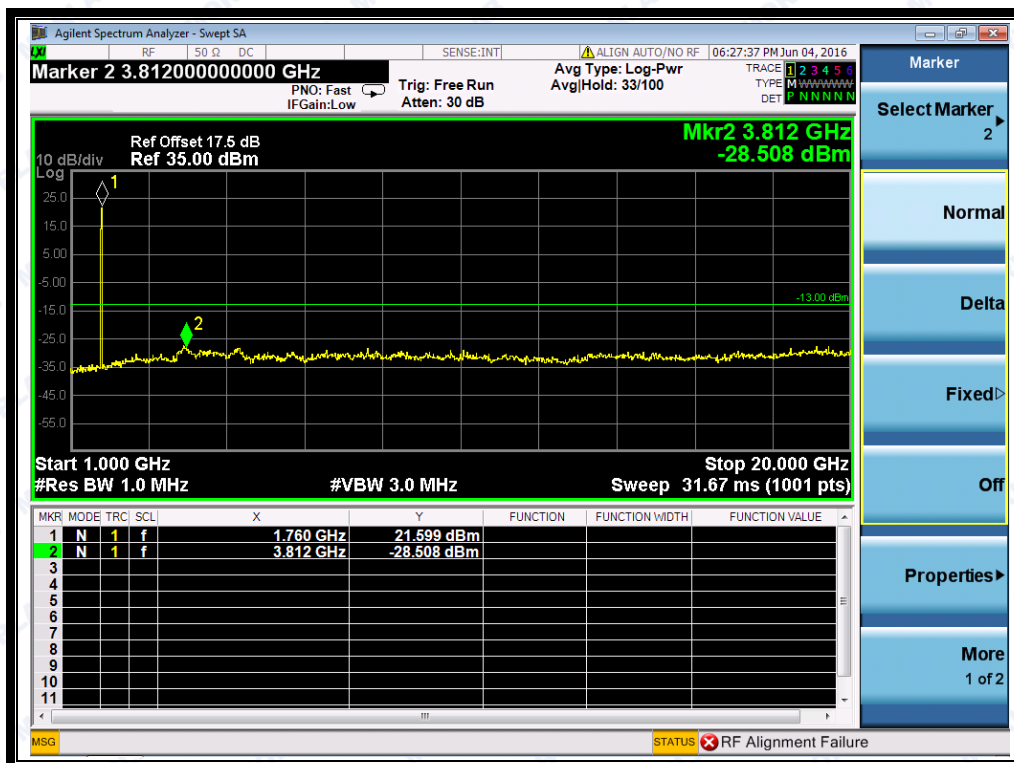
(Plot N2: HSUPA 1700MHz Channel = 1412, 30MHz to 1GHz)



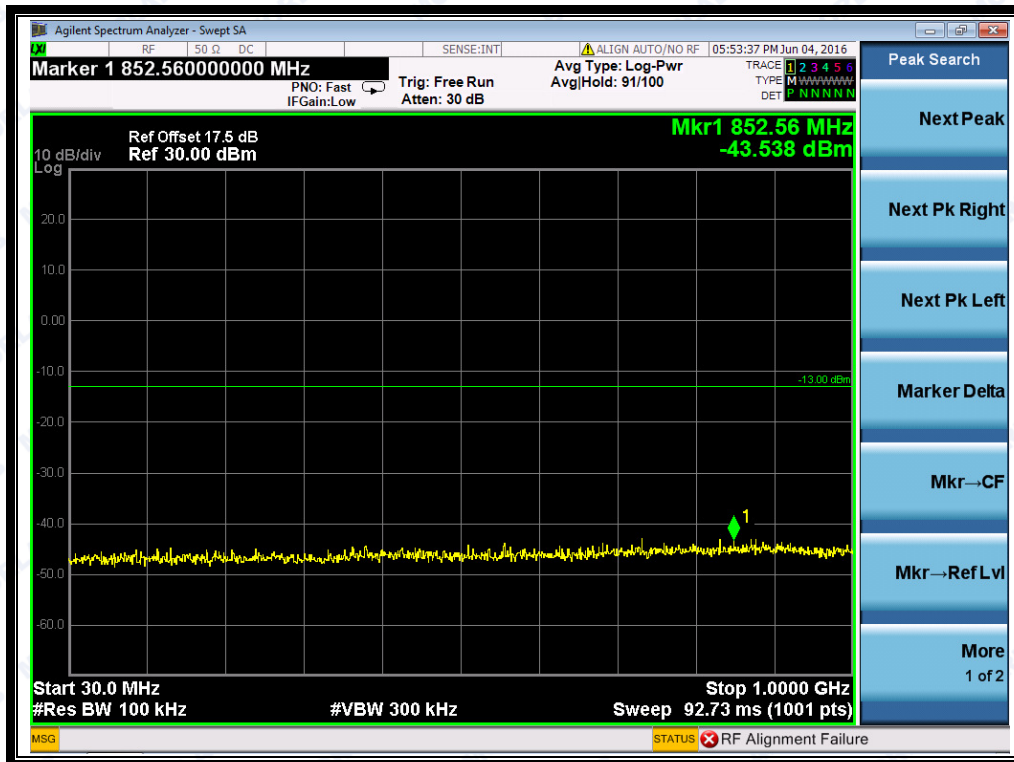
(Plot N2.1: HSUPA1700MHz Channel = 1412, 1GHz to 20GHz)



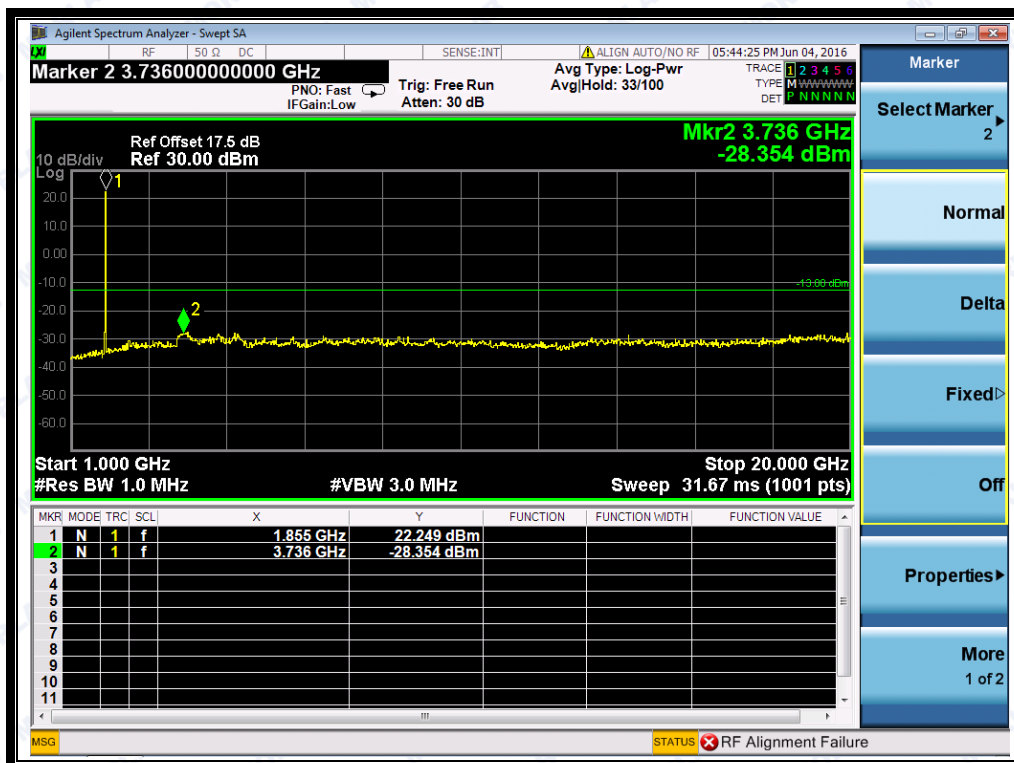
(Plot N3: HSUPA1700MHz Channel = 1513, 30MHz to 1GHz)



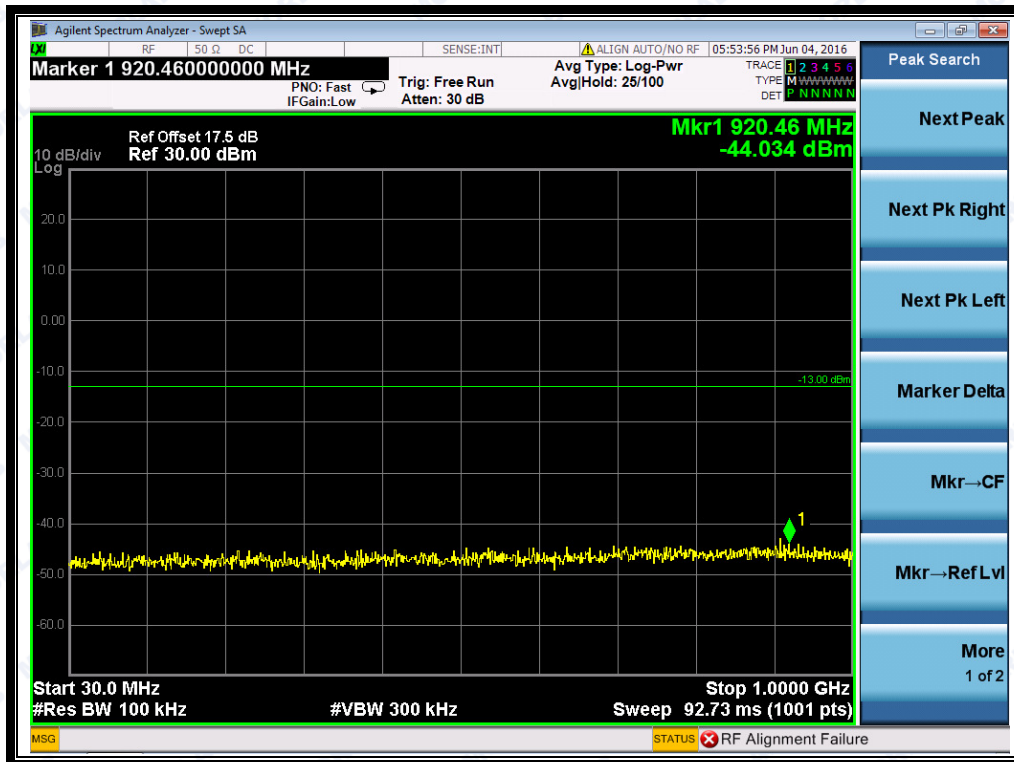
(Plot N3.1: HSUPA1700MHz Channel = 1513, 1GHz to 20GHz)



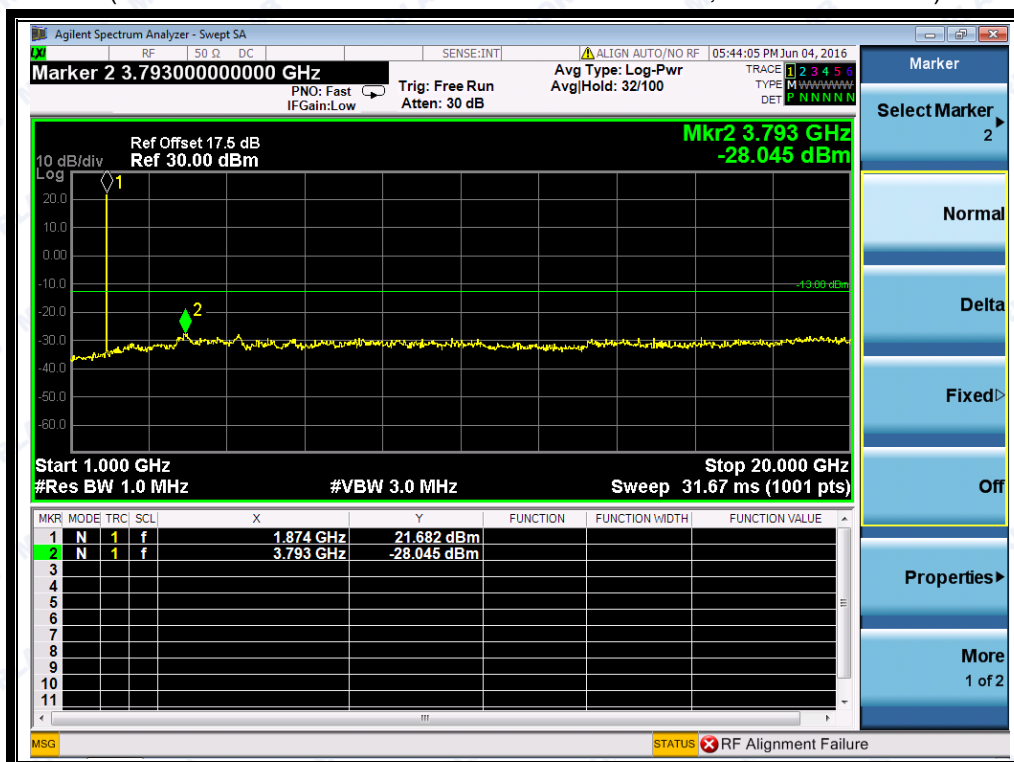
(Plot O1: HSUPA 1900MHz Channel = 9262, 30MHz to 1GHz)



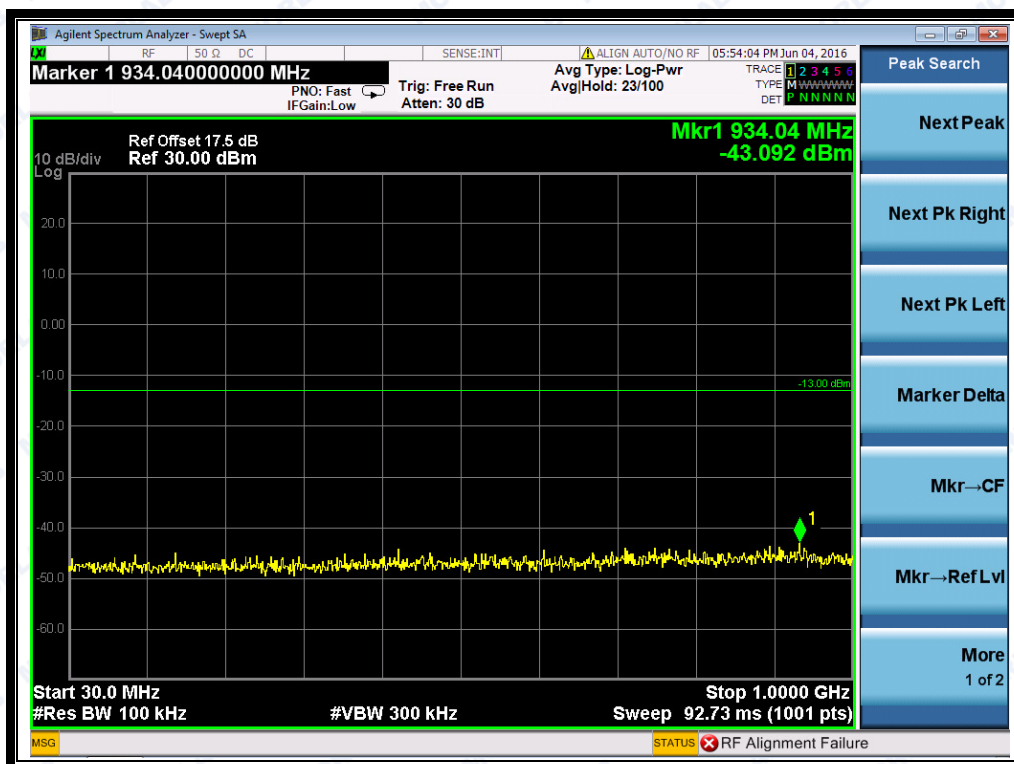
(Plot O1.1: HSUPA 1900MHz Channel = 9262, 1GHz to 20GHz)



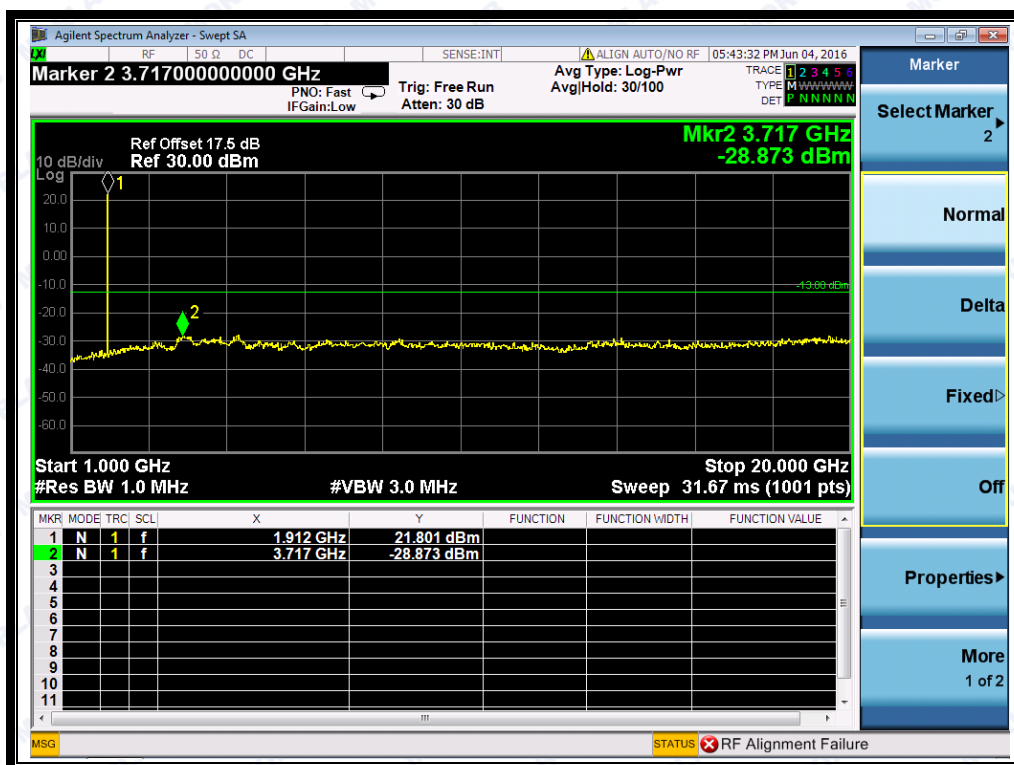
(Plot O2: HSUPA 1900MHz Channel = 9400, 30MHz to 1GHz)



(Plot O2.1: HSUPA1900MHz Channel = 9400, 1GHz to 20GHz)



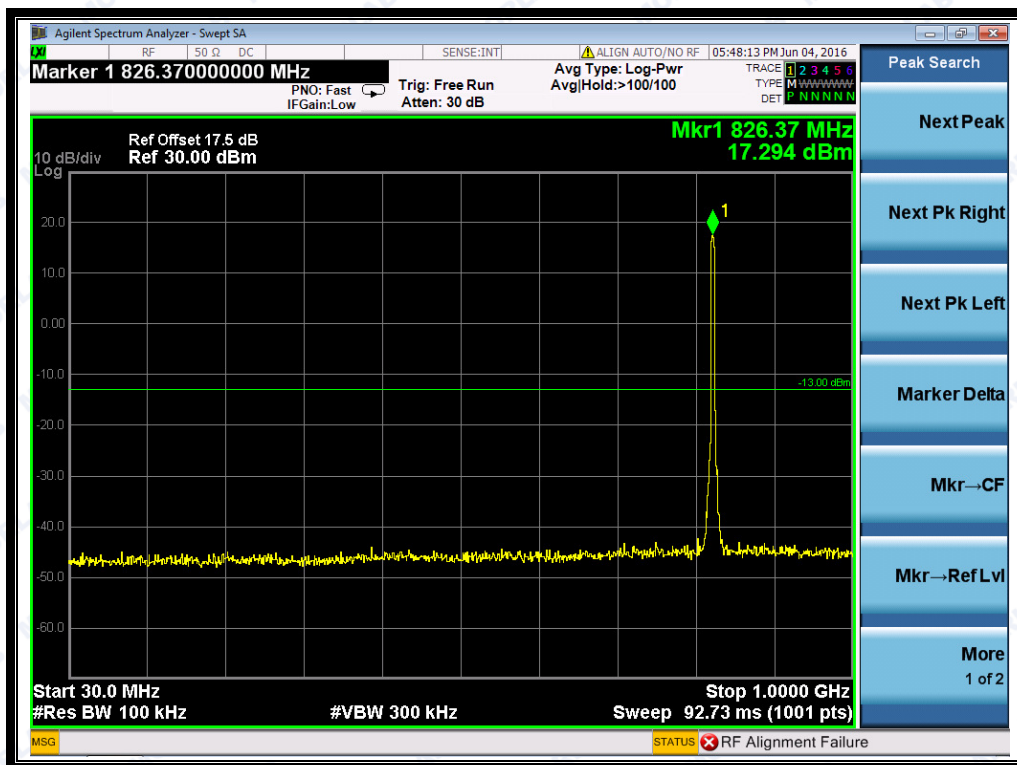
(Plot O3: HSUPA1900MHz Channel = 9538, 30MHz to 1GHz)



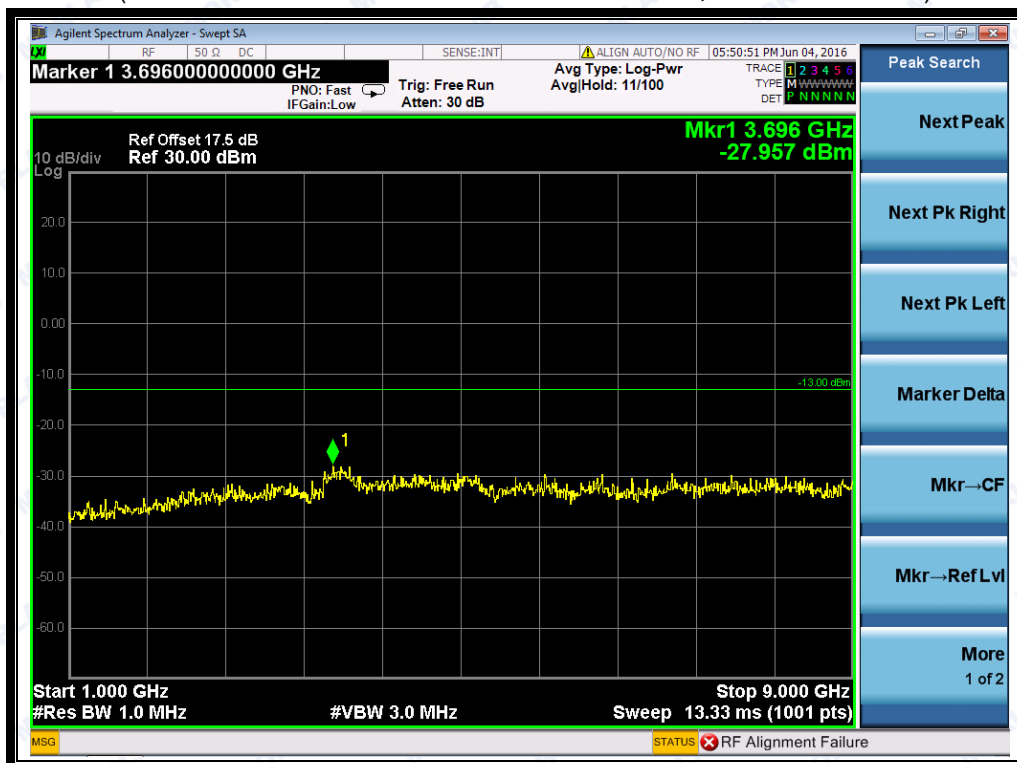
(Plot O3.1: HSUPA1900MHz Channel = 9538 1GHz to 20GHz)



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(Plot P1: HSPA+ 850MHz Channel = 4132, 30MHz to 1GHz)



(Plot P1.1: HSPA+ 850MHz Channel = 4132, 1GHz to 9GHz)