

TEST REPORT

Reference No..... : WTX21X04033440W-1
FCC ID : 2AMDJ-TC50
Applicant : Tersus GNSS Inc
Address : Room 305, Building 1, No.1228 Jinhu Road, China (Shanghai) Pilot Free Trade Zone
Product Name : TD-LTE Wireless Data Terminal
Test Model. : TC50
Standards : FCC Part 22H, FCC Part 24E, FCC Part 27
Date of Receipt sample : Apr.15, 2021
Date of Test..... : Apr.15, 2021 to May.12, 2021
Date of Issue : May.12, 2021
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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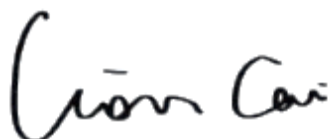
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Report version

Version No.	Date of issue	Description
Rev.00	May.12, 2021	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Tersus GNSS Inc
Address of applicant: Room 305, Building 1, No.1228 Jinhu Road, China (Shanghai)
Pilot Free Trade Zone

Manufacturer: Tersus GNSS Inc
Address of manufacturer: Room 305, Building 1, No.1228 Jinhu Road, China (Shanghai)
Pilot Free Trade Zone

General Description of EUT:	
Product Name:	TD-LTE Wireless Data Terminal
Trade Name:	Tersus
Model No.:	TC50
Adding Model(s):	/
Rated Voltage:	DC3.8V
Battery Capacity:	7000mAh
Adapter Model:	GQ24-090200-AX INPUT:AC100-240V, 50/60Hz, 1.0A Output:DC9V, 2.0A
Software Version:	V.SN50.2.1.26.2021041411
Hardware Version:	SD55-D3_Main board_Rev.A1
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.68dBm, GSM1900: 31.07dBm EDGE850: 27.15Bm, EDGE1900: 25.76Bm
Type of Emission:	GSM850: 256KGXW, GSM1900: 253KGXW EDGE850: 248KG7W, EDGE1900: 254KG7W
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -0.84dBi; GSM1900: -0.28dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 23.14dBm, WCDMA Band 5: 23.94dBm
Type of Emission:	WCDMA Band 2: 4M22F9W WCDMA Band 5: 4M21F9W
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: -0.28dBi, , WCDMA Band 5: -0.84dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS.

FCC Rules Part 22: PRIVATE LAND MOBILE RADIO SERVICES.

FCC Rules Part 24: PUBLIC MOBILE SERVICES.

FCC Rules Part 27: MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES.

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

KDB 971168 D01 Power Meas License Digital Systems v03r01: MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band 5	Low, Middle, High Channels
TM8	HSDPA Band 5	Low, Middle, High Channels
TM9	HSUPA Band 5	Low, Middle, High Channels
TM10	WCDMA Band 2	Low, Middle, High Channels
TM11	HSDPA Band 2	Low, Middle, High Channels
TM12	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2	128
		836.6	190
		848.8	251
PCS 1900	GSM/GPRS/EDGE	1850.2	512
		1880.0	661
		1909.8	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4	4132
		836.6	4183
		846.6	4233
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4	9262
		1880.0	9400
		1907.6	9538
Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case.			

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.0	Shielded	Without Ferrite
DC Cable	1.0	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	TianYi310-14ISK	/
Router	LINKSYS	WRT32X	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	$\pm 0.42\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2021-03-27	2022-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2021-03-27	2022-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2021-03-27	2022-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2021-03-27	2022-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2021-03-27	2022-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2021-03-27	2022-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2021-03-27	2022-03-26
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2021-03-27	2022-03-26
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2021-04-12	2022-04-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2021-04-12	2022-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-19	2023-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-19	2023-03-18
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2021-04-27	2022-04-26
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2021-03-27	2022-03-26
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2021-03-27	2022-03-26
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2021-03-19	2023-03-18
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§22.913(a), §24.232(c), §27.50(d)	RF Output Power	Compliant
§24.51, §27.50	Peak-to-average Ratio (PAR) of Transmitter	Compliant
§22.917(b), §24.238(b), §27.53	Emission Bandwidth	Compliant
§22.917(a), §24.238(a), §27.53(h)	Spurious Emissions at Antenna Terminal	Compliant
§22.917(a), §24.238(a), §27.53(h)	Spurious Radiation Emissions	Compliant
§22.917(a), §24.238(a), §27.53(h)	Out of Band Emissions	Compliant
§22.355, §24.235, §27.54	Frequency Stability	Compliant

3. RF Output Power

3.1 Standard Applicable

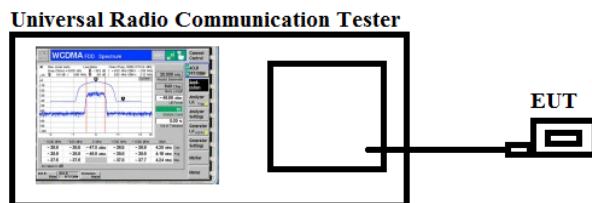
According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

3.2 Test Procedure

- Conducted output power test method:



- Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

3.3 Summary of Test Results/Plots

➤ **Max. Radiated Power**

Mode	Channel	Antenna Polar	ERP (dBm)	Limit (dBm)	Result
GSM850	128	V	30.48	<38.45	Pass
		H	25.65		
	190	V	30.04		
		H	24.13		
	251	V	30.34		
		H	24.97		
GPRS850	128	V	29.74	<38.45	Pass
		H	24.56		
	190	V	29.45		
		H	24.06		
	251	V	29.39		
		H	24.13		
EGPRS850	128	V	24.39	<38.45	Pass
		H	19.46		
	190	V	24.98		
		H	20.25		
	251	V	24.14		
		H	20.43		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	512	V	28.02	<33.00	Pass
		H	23.54		
	661	V	27.42		
		H	23.69		
	810	V	27.31		
		H	23.55		
GPRS1900	512	V	27.35	<33.00	Pass
		H	23.58		
	661	V	27.02		
		H	23.39		
	810	V	26.98		
		H	22.69		
EGPRS1900	512	V	22.61	<33.00	Pass
		H	17.02		
	661	V	22.32		
		H	17.43		
	810	V	22.69		
		H	17.36		

Mode	Channel	Antenna Polar	ERP	Limit (dBm)	Result
WCDMA Band V	4132	V	20.78	<38.45	Pass
		H	15.36		
	4183	V	20.69		
		H	15.17		
	4233	V	20.42		
		H	15.98		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band II	9262	V	20.73	<33.00	Pass
		H	15.39		
	9400	V	20.43		
		H	15.36		
	9538	V	20.47		
		H	15.91		

➤ **Max. Conducted Power (Average power)**

Please refer to Appendix A

4. Peak-to-average Ratio (PAR) of Transmitter

4.1 Standard Applicable

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

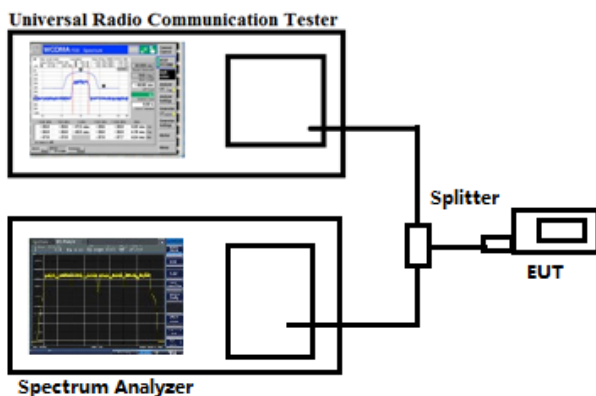
According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

4.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Configuration for the emission bandwidth testing:



4.3 Summary of Test Results

Please refer to Appendix B.

Waltek Testing Group (Shenzhen) Co., Ltd.

[Http://www.waltek.com.cn](http://www.waltek.com.cn)

5. Emission Bandwidth

5.1 Standard Applicable

According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

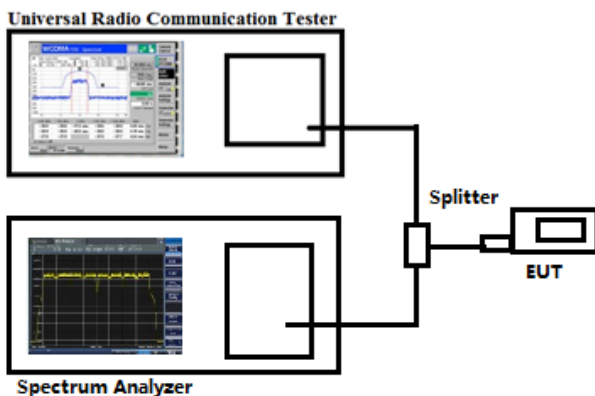
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



5.3 Summary of Test Results/Plots

Please refer to Appendix C.

6. Out of Band Emissions at Antenna Terminal

6.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

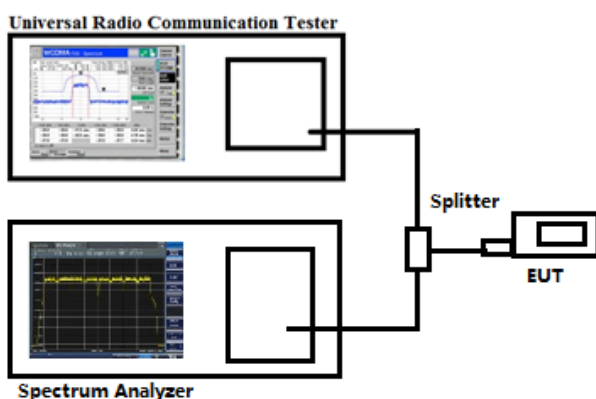
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



6.3 Summary of Test Results/Plots

Please refer to Appendix D.

7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

7.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

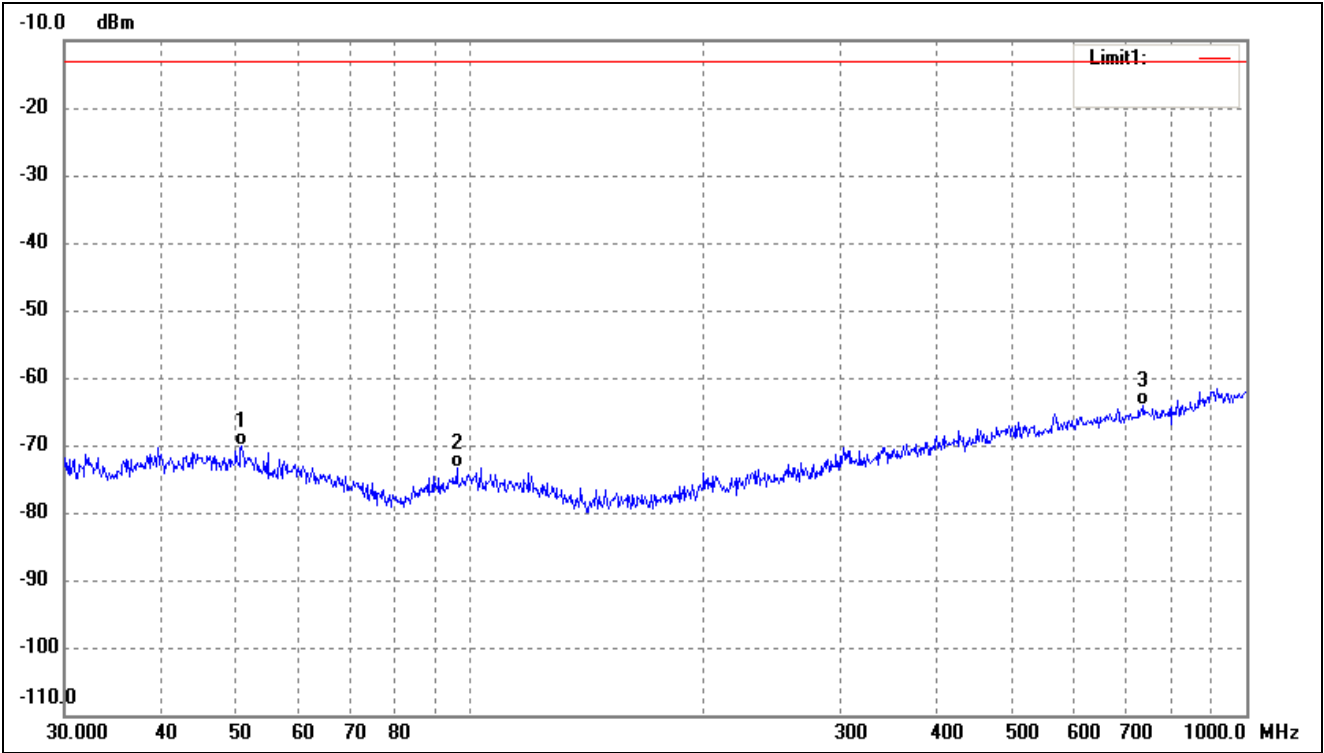
Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

7.3 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

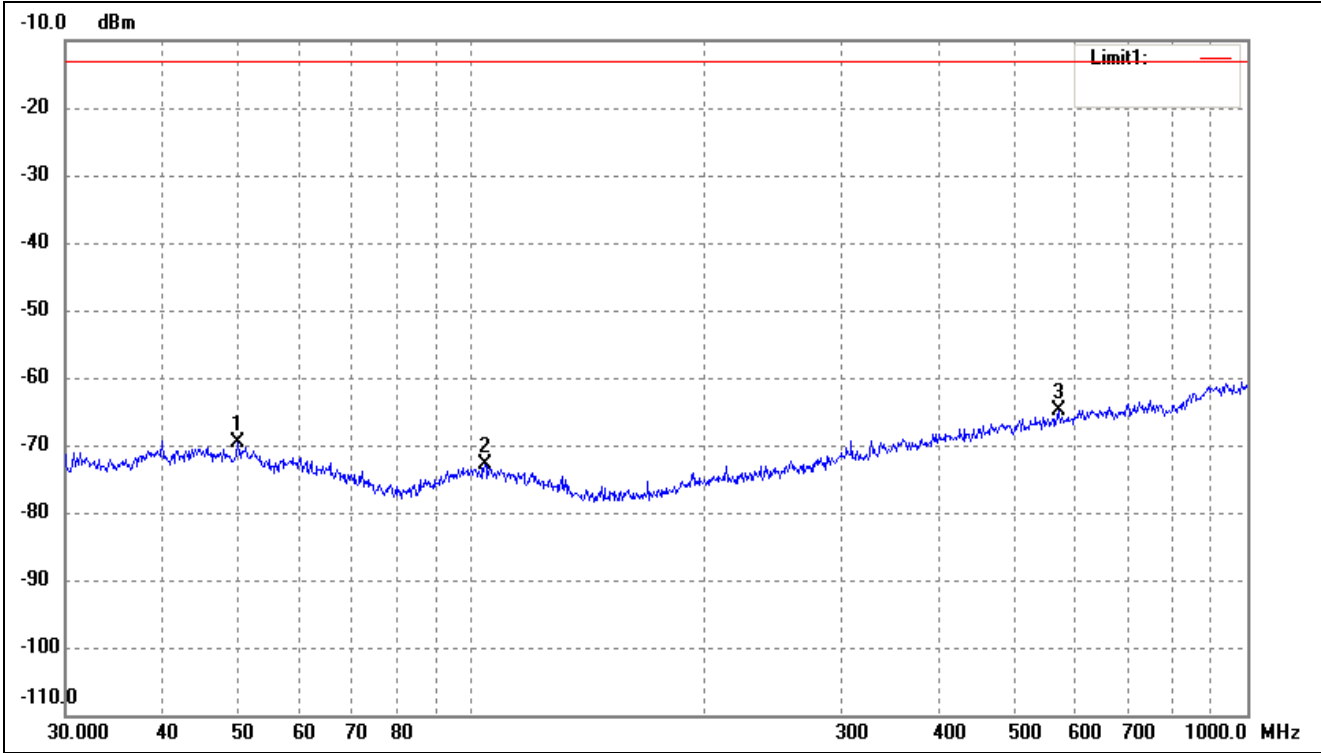
➤ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



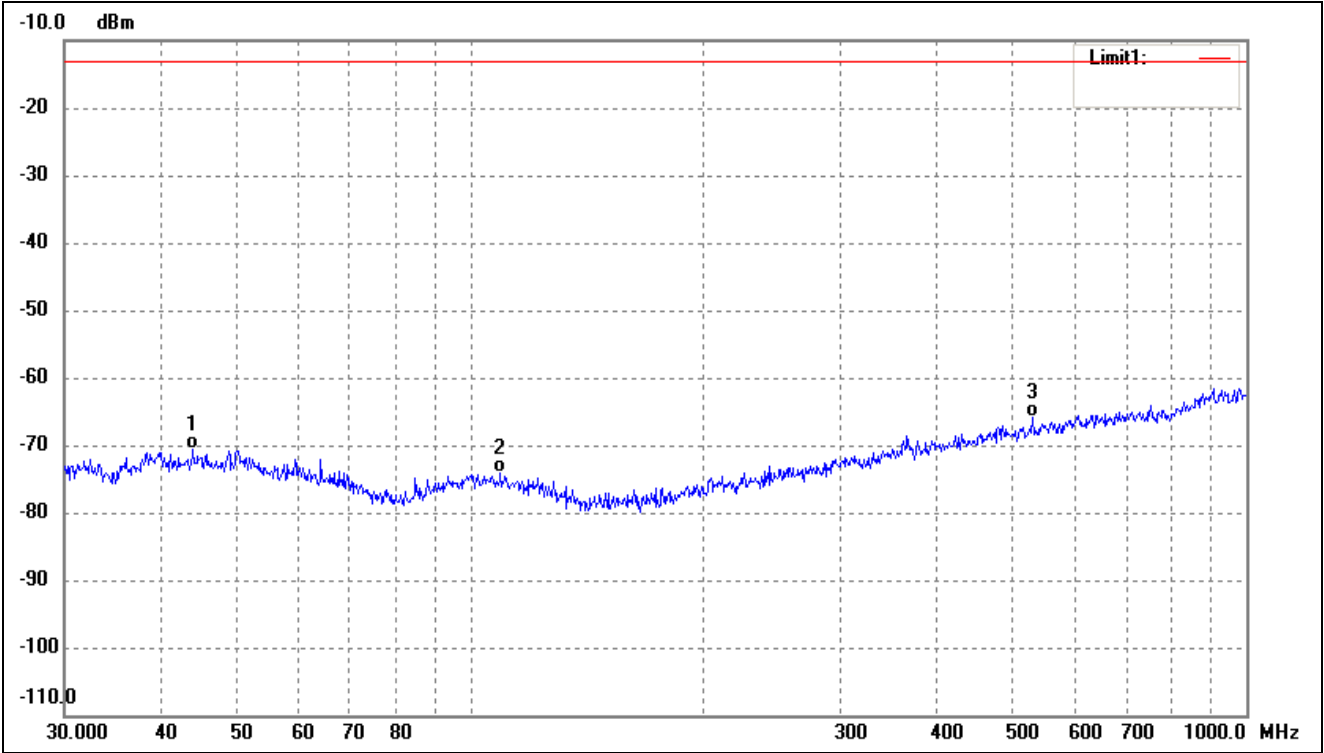
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	50.7637	-70.11	0.05	-70.06	-13.00	-57.06	ERP
2	96.0986	-71.23	-2.16	-73.39	-13.00	-60.39	ERP
3	737.0714	-74.88	10.67	-64.21	-13.00	-51.21	ERP

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



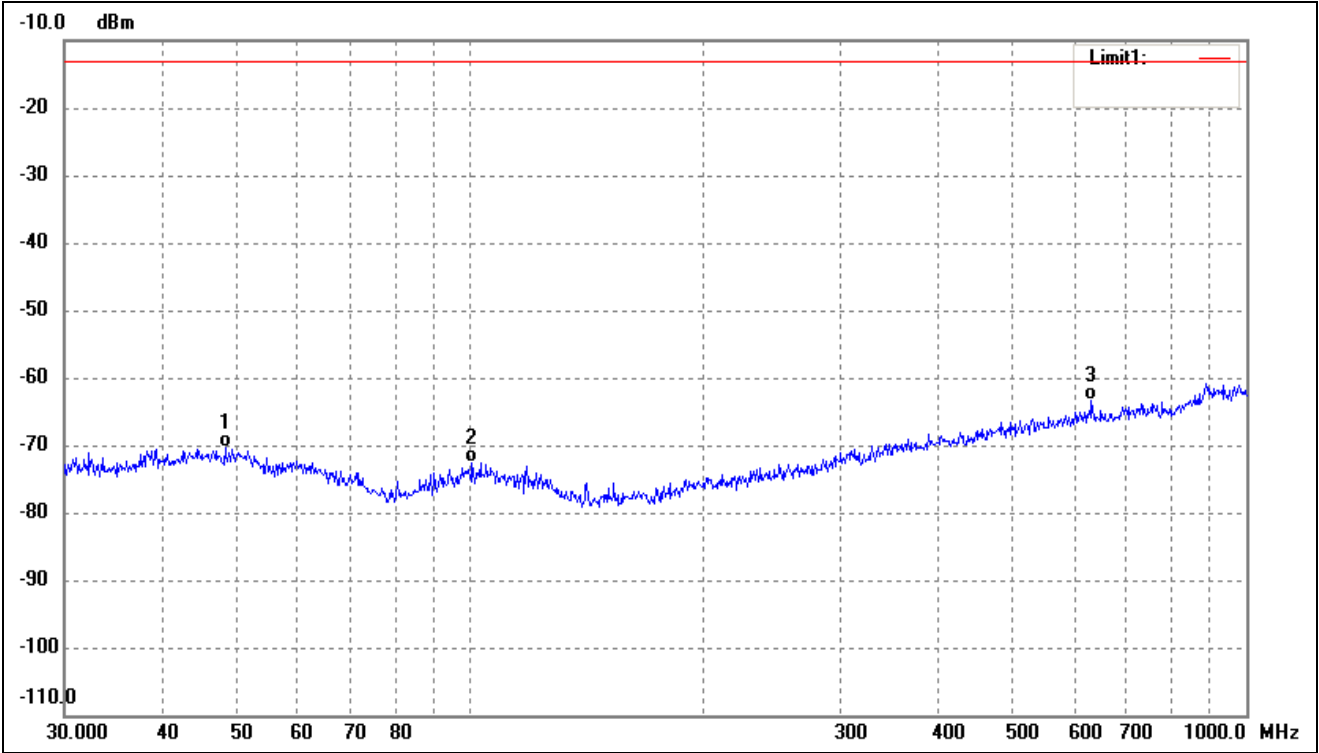
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	50.0566	-69.89	0.25	-69.64	-13.00	-56.64	ERP
2	104.1701	-71.46	-1.51	-72.97	-13.00	-59.97	ERP
3	570.6100	-74.00	9.02	-64.98	-13.00	-51.98	ERP

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.9658	-70.66	-0.03	-70.69	-13.00	-57.69	ERP
2	109.4116	-72.68	-1.51	-74.19	-13.00	-61.19	ERP
3	530.1014	-73.60	7.70	-65.90	-13.00	-52.90	ERP

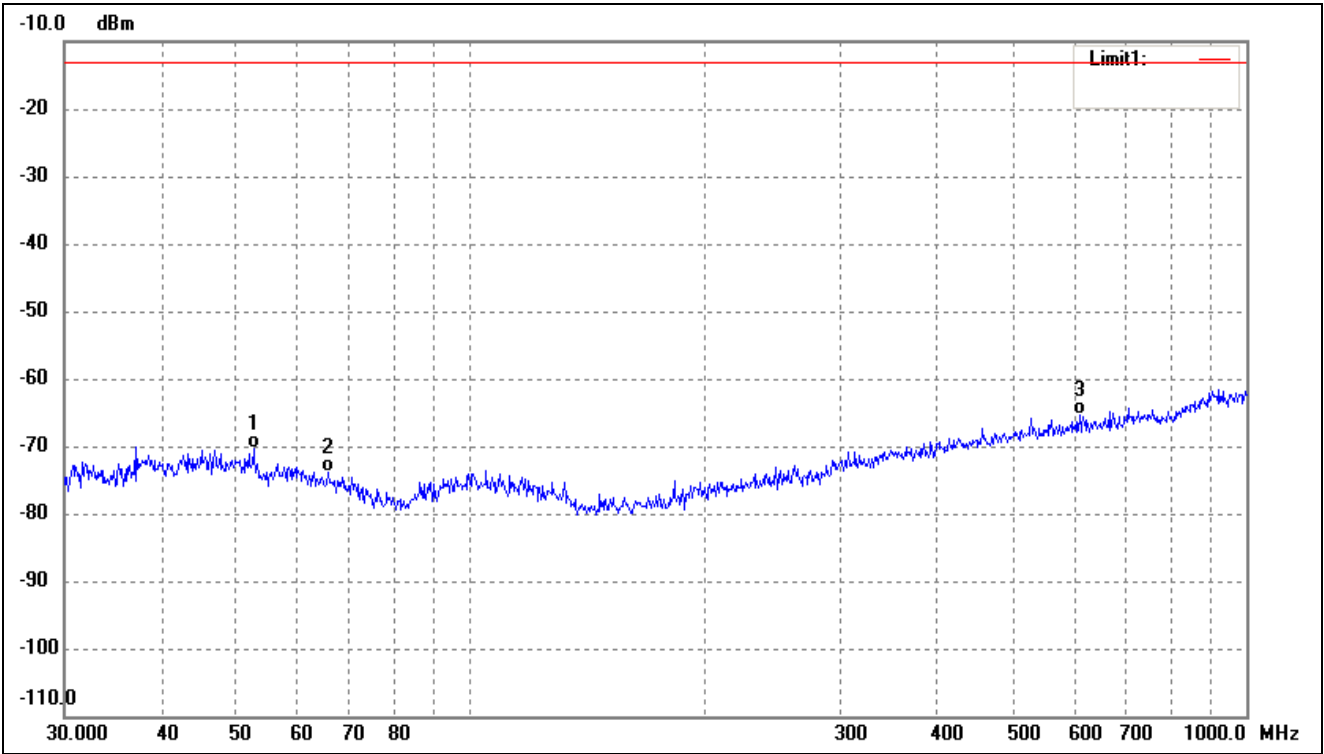
For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	48.3318	-70.53	0.18	-70.35	-13.00	-57.35	ERP
2	100.5806	-71.07	-1.53	-72.60	-13.00	-59.60	ERP
3	631.6884	-72.85	9.59	-63.26	-13.00	-50.26	ERP

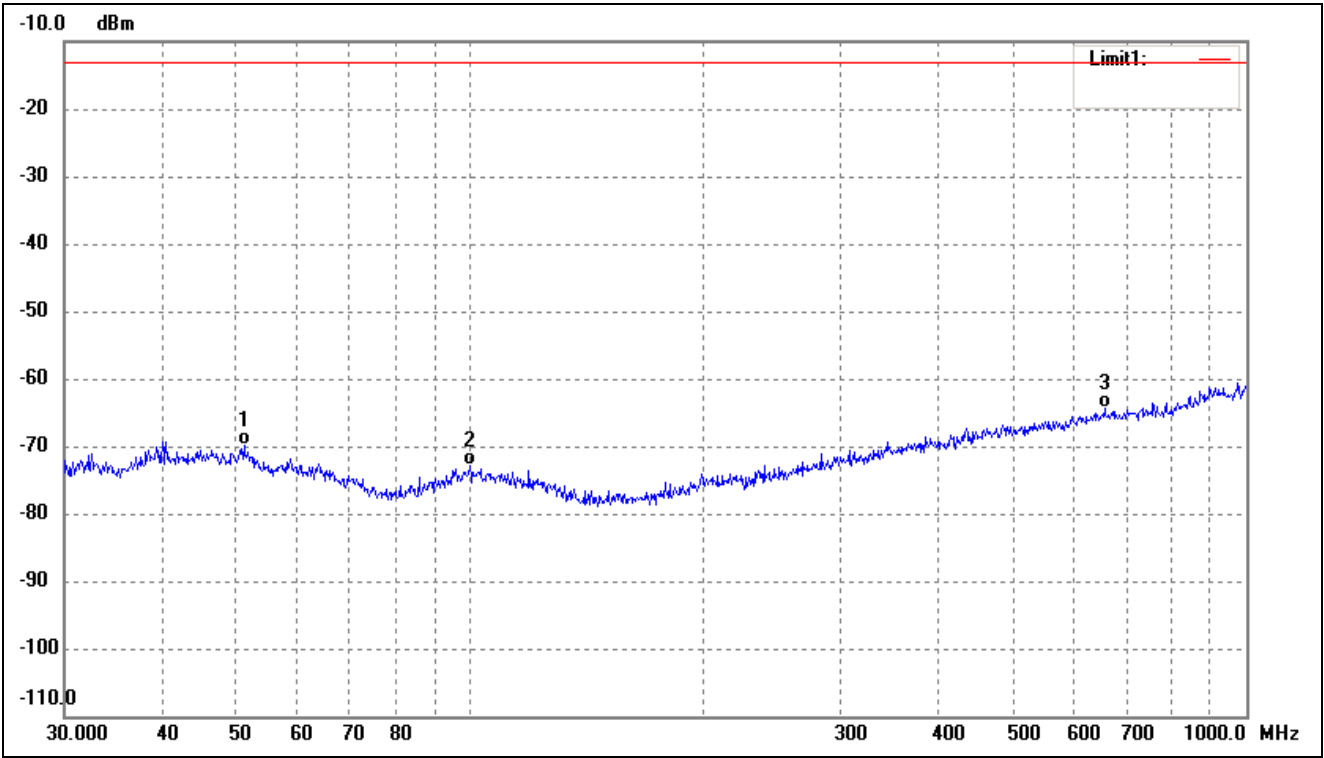
Note: Margin= (Reading+ Correct)- Limit

Test Channel	WCDMA Band V	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	52.5753	-69.94	-0.45	-70.39	-13.00	-57.39	ERP
2	65.5727	-71.68	-2.21	-73.89	-13.00	-60.89	ERP
3	609.9217	-75.15	9.78	-65.37	-13.00	-52.37	ERP

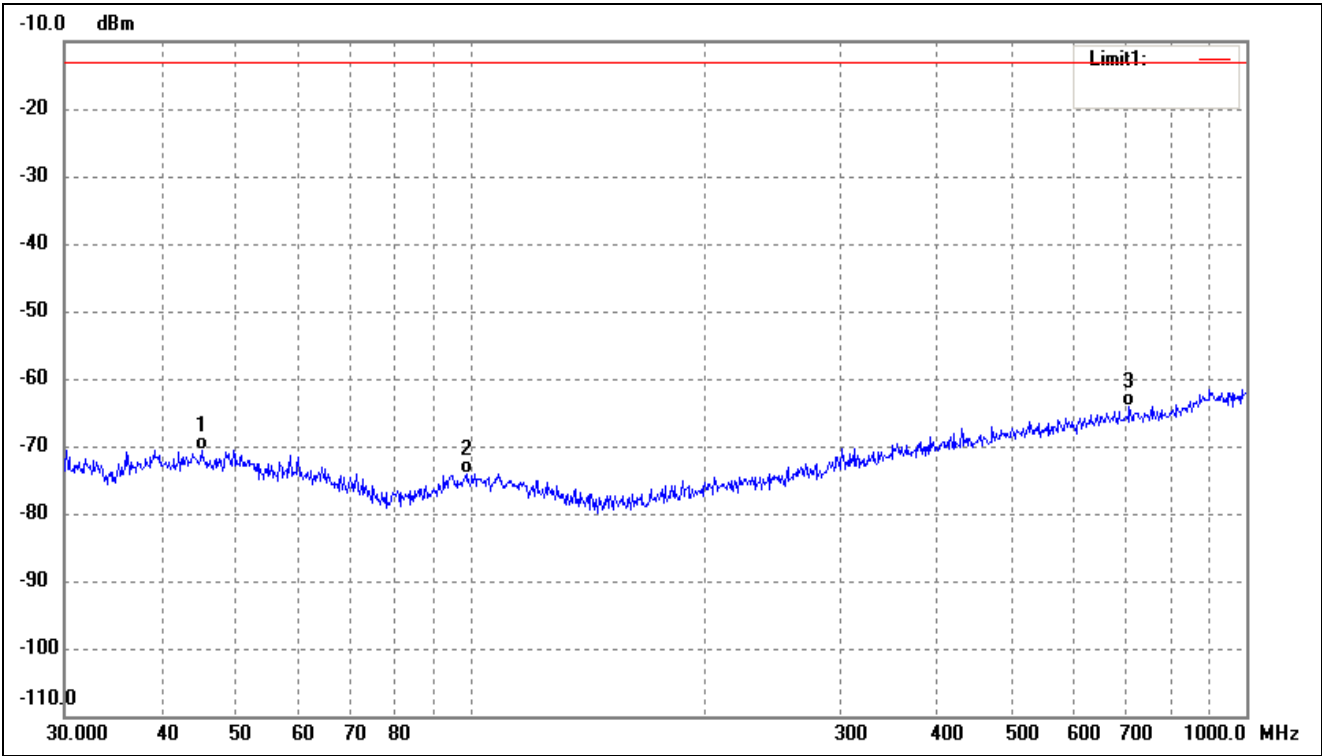
Test Channel	WCDMA Band V	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	51.1209	-69.77	-0.05	-69.82	-13.00	-56.82	ERP
2	99.8777	-71.40	-1.54	-72.94	-13.00	-59.94	ERP
3	656.5300	-74.05	9.56	-64.49	-13.00	-51.49	ERP

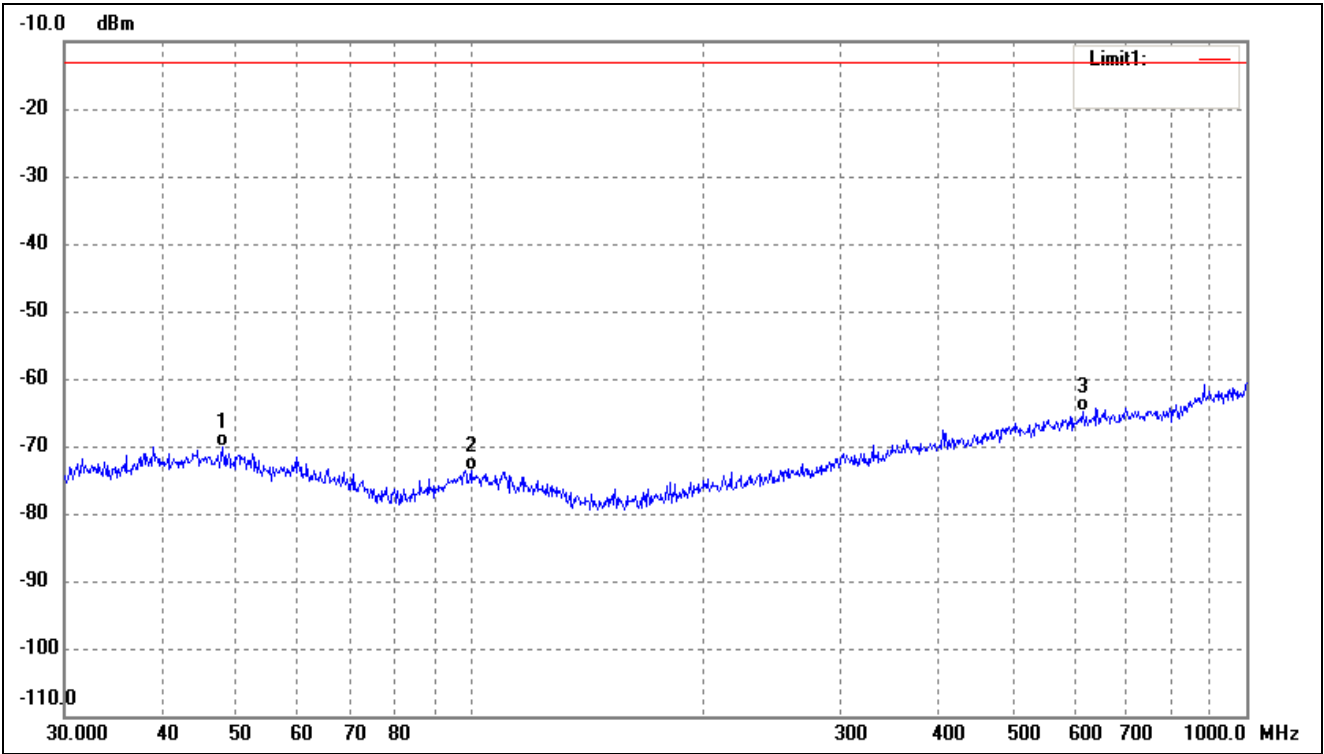
Note: $\text{Margin} = (\text{Reading} + \text{Correct}) - \text{Limit}$

Test Channel	WCDMA Band II	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.0583	-70.61	0.00	-70.61	-13.00	-57.61	ERP
2	98.8326	-72.38	-1.72	-74.10	-13.00	-61.10	ERP
3	706.6999	-74.20	10.17	-64.03	-13.00	-51.03	ERP

Test Channel	WCDMA Band II	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	47.9940	-70.37	0.17	-70.20	-13.00	-57.20	ERP
2	100.2286	-72.04	-1.52	-73.56	-13.00	-60.56	ERP
3	616.3718	-74.70	9.73	-64.97	-13.00	-51.97	ERP

Note: $Margin = (Reading + Correct) - Limit$

- Spurious Emissions Above 1GHz
- For Cellular Band_GSM850 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (824.2MHz)						
1648.4	-37.06	4.94	-32.12	-13	-19.12	H
2472.6	-42.2	8.46	-33.74	-13	-20.74	H
1648.4	-35.56	4.94	-30.62	-13	-17.62	V
2472.6	-44.81	8.46	-36.35	-13	-23.35	V
Middle Channel (836.6MHz)						
1673.2	-37.49	5.11	-32.38	-13	-19.38	H
2509.8	-41.82	8.54	-33.28	-13	-20.28	H
1673.2	-35.83	5.11	-30.72	-13	-17.72	V
2509.8	-44.33	8.54	-35.79	-13	-22.79	V
High Channel (848.8MHz)						
1697.6	-35.38	5.25	-30.13	-13	-17.13	H
2546.4	-43.4	8.57	-34.83	-13	-21.83	H
1697.6	-36.21	5.25	-30.96	-13	-17.96	V
2546.4	-44.42	8.57	-35.85	-13	-22.85	V

- For PCS Band_GSM1900 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
3700.4	-41.6	10.54	-31.06	-13	-18.06	H
5550.6	-47.34	13.37	-33.97	-13	-20.97	H
3700.4	-42.43	10.54	-31.89	-13	-18.89	V
5550.6	-48.38	13.37	-35.01	-13	-22.01	V
Middle Channel (1880MHz)						
3760.0	-39.57	10.64	-28.93	-13	-15.93	H
5640.0	-47.26	13.54	-33.72	-13	-20.72	H
3760.0	-40.6	10.64	-29.96	-13	-16.96	V
5640.0	-46.86	13.54	-33.32	-13	-20.32	V
High Channel (1909.8MHz)						
3819.6	-41.33	10.74	-30.59	-13	-17.59	H
5729.4	-47.86	13.71	-34.15	-13	-21.15	H
3819.6	-40.95	10.74	-30.21	-13	-17.21	V
5729.4	-49.48	13.71	-35.77	-13	-22.77	V

➤ For WCDMA Band V Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (826.4MHz)						
1652.8	-34.23	4.94	-29.29	-13	-16.29	H
2479.2	-41.33	8.46	-32.87	-13	-19.87	H
1652.8	-35.69	4.94	-30.75	-13	-17.75	V
2479.2	-43.82	8.46	-35.36	-13	-22.36	V
Middle Channel (836.6MHz)						
1672.8	-36.74	5.11	-31.63	-13	-18.63	H
2509.2	-42.5	8.54	-33.96	-13	-20.96	H
1672.8	-34.74	5.11	-29.63	-13	-16.63	V
2509.2	-42.79	8.54	-34.25	-13	-21.25	V
High Channel (846.6MHz)						
1693.2	-34.40	5.25	-29.15	-13	-16.15	H
2539.8	-42.60	8.57	-34.03	-13	-21.03	H
1693.2	-35.55	5.25	-30.3	-13	-17.30	V
2539.8	-41.64	8.57	-33.07	-13	-20.07	V

➤ For WCDMA Band II Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1852.4MHz)						
3704.8	-40.51	10.54	-29.97	-13	-16.97	H
5557.2	-46.22	13.37	-32.85	-13	-19.85	H
3704.8	-42.09	10.54	-31.55	-13	-18.55	V
5557.2	-49.05	13.37	-35.68	-13	-22.68	V
Middle Channel (1880MHz)						
3760.0	-41.95	10.64	-31.31	-13	-18.31	H
5640.0	-48.86	13.54	-35.32	-13	-22.32	H
3760.0	-41.17	10.64	-30.53	-13	-17.53	V
5640.0	-49.2	13.54	-35.66	-13	-22.66	V
High Channel (1907.6MHz)						
3815.2	-40.57	10.74	-29.83	-13	-16.83	H
5722.8	-48.53	13.71	-34.82	-13	-21.82	H
3815.2	-42.27	10.74	-31.53	-13	-18.53	V
5722.8	-47.85	13.71	-34.14	-13	-21.14	H

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. Frequency Stability

8.1 Standard Applicable

According to §22.355, §24.235, §27.54 the limit is 2.5ppm.

8.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

8.3 Summary of Test Results/Plots

Please refer to Appendix E

9. Modulation characteristics

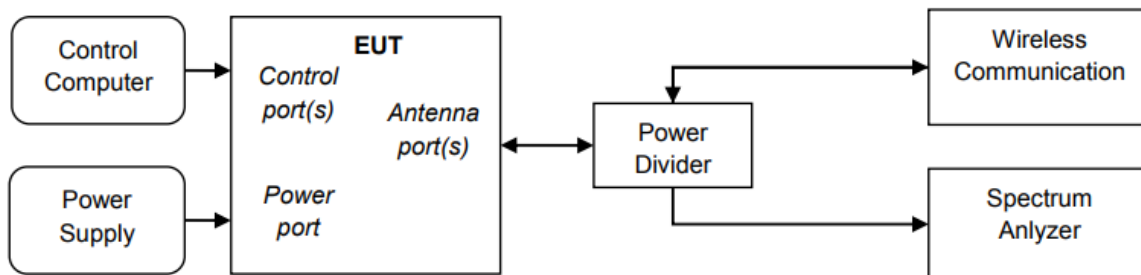
9.1 Standard Applicable

According to §2.1047, measurements required: Modulation characteristics is given below:

- (a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
- (b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.
- (c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.
- (d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

9.2 Test Procedure

According to ANSI C63.26-2015 section 5.3.2, the following test setup was performed.



9.3 Summary of Test Results/Plots

Please refer to Appendix F

APPENDIX SUMMARY

Project No.	WTX21X04033440W	Test Engineer	Combat
Start date	2021/04/28	Finish date	2021/04/30
Temperature	23℃	Humidity	52%
RF specifications	GSM/WCDMA		

APPENDIX	Description of Test Item	Result
A	RF Output Power	Compliant
B	Peak-to-average Ratio (PAR) of Transmitter	Compliant
C	Emission Bandwidth	Compliant
D	Out of Band Emissions at Antenna Terminal	Compliant
E	Frequency Stability	Compliant
F	Modulation characteristics	Compliant

APPENDIX A

Conducted Average power

Conducted Average power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.20	836.60	848.80	1850.20	1880.00	1909.80
GSM	32.58	32.68	32.55	30.76	31.00	31.00
GPRS(1Slot)	32.59	32.72	32.58	30.79	31.05	31.07
EGPRS(1Slot)	27.11	27.15	27.15	25.64	25.76	25.66

Conducted Average power (dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4183	4233	9262	9400	9538
Frequency(MHz)	826.4	836.6	846.6	1852.4	1880.0	1907.6
RMC 12.2k	23.94	23.82	23.93	22.95	23.06	23.14
HSDPA Subtest-1	22.85	22.96	22.96	21.72	21.82	21.89
HSDPA Subtest-2	22.83	22.95	22.94	21.68	21.78	21.86
HSDPA Subtest-3	22.81	22.91	22.93	21.68	21.76	21.84
HSDPA Subtest-4	22.83	22.93	22.94	21.69	21.76	21.85
HSUPA Subtest-1	22.86	22.85	23.00	21.65	21.70	21.80
HSUPA Subtest-2	22.83	22.81	22.96	21.61	21.67	21.76
HSUPA Subtest-3	22.84	22.83	22.97	21.63	21.68	21.78
HSUPA Subtest-4	22.85	22.83	22.98	21.62	21.69	21.76
HSUPA Subtest-5	22.86	22.83	22.96	21.62	21.67	21.77

APPENDIX B

Peak-to-average Ratio (PAR) of Transmitter

PCS1900				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	661	1850.2	5.69	13
GPRS(1 Slot)	661	1850.2	4.65	13
EDGE(1 Slot)	661	1850.2	4.87	13

WCDMA Band II				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	9262	1852.4	5.39	13
	9400	1880.0	5.14	13
	9538	1907.6	5.57	13

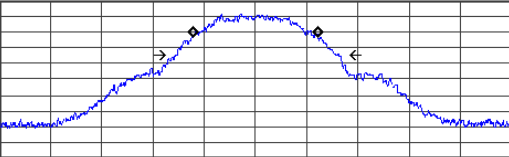
Note: Only the worst case was selected to record.

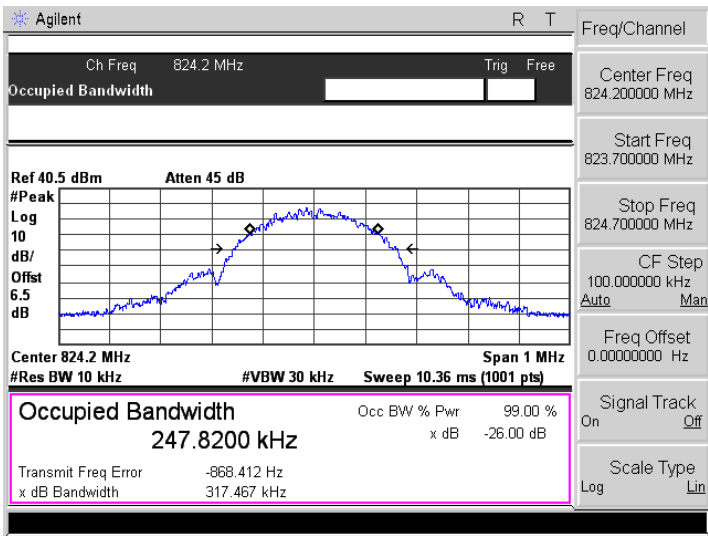
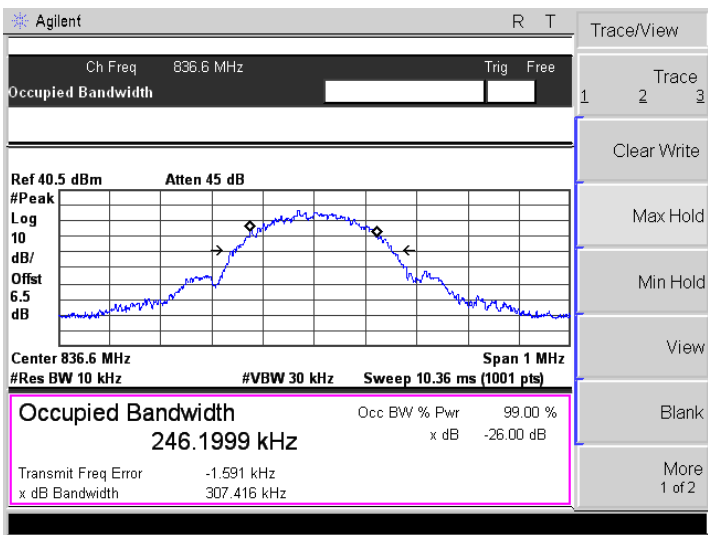
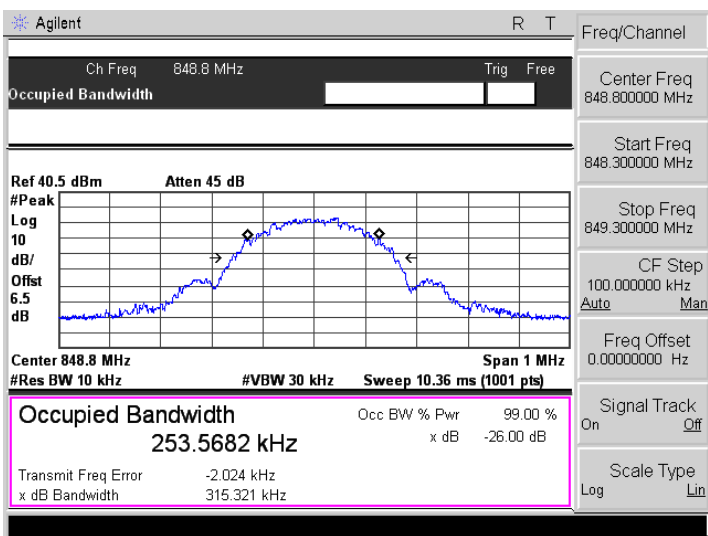
APPENDIX C

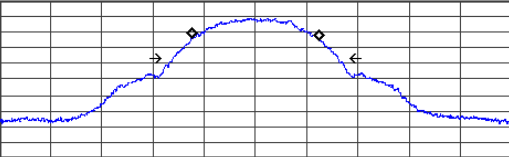
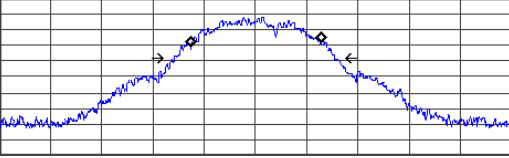
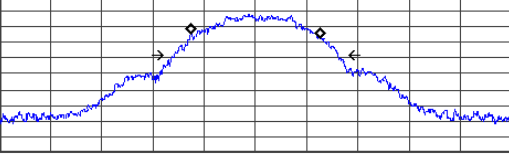
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
GSM 850 (GMSK)	128	824.20	241.9430	304.771
	190	836.60	242.5498	297.770
	251	848.80	256.5120	317.312
GPRS850 (GMSK,1Slot)	128	824.20	243.3670	314.937
	190	836.60	243.5368	325.049
	251	848.80	244.7740	321.484
EGPRS850 (8PSK,1Slot)	128	824.20	247.8200	317.467
	190	836.60	246.1999	307.416
	251	848.80	253.5682	315.321
PCS1900 (GMSK)	512	1850.20	247.6086	323.746
	661	1880.00	253.6196	310.410
	810	1909.80	251.0040	319.083
GPRS1900 (GMSK,1Slot)	512	1850.20	248.8781	317.544
	661	1880.00	245.0853	304.616
	810	1909.80	248.8494	313.307
EGPRS1900 (8PSK,1Slot)	512	1850.20	252.4133	321.225
	661	1880.00	253.7479	318.681
	810	1909.80	253.3467	320.467

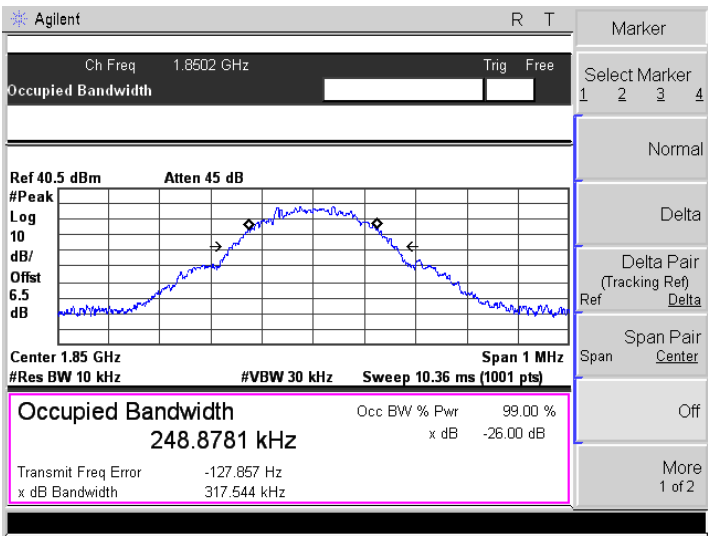
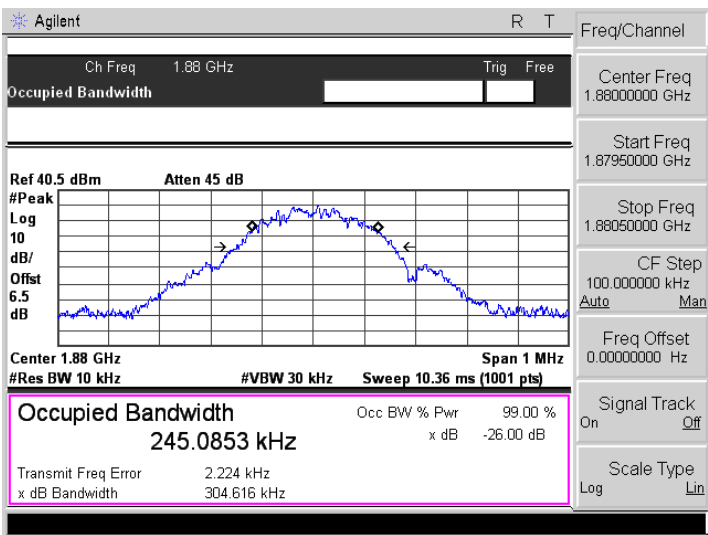
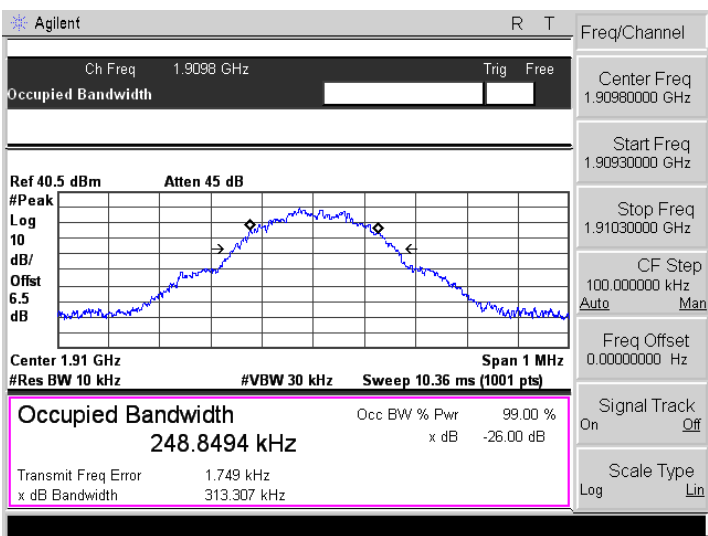
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
WCDMA Band V	4132	826.40	4181.5	4734
	4183	836.60	4181.9	4740
	4233	846.60	4229.7	4822
HSDPA	4132	826.40	4178.6	4751
	4183	836.60	4196.1	4735
	4233	846.60	4205.2	4848
HSUPA	4132	826.40	4186.1	4757
	4183	836.60	4189.5	4712
	4233	846.60	4211.6	4781
WCDMA Band II	9262	1852.40	4170.8	4715
	9400	1880.00	4176.4	4672
	9538	1907.60	4160.3	4712
HSDPA	9262	1852.40	4188.5	4689
	9400	1880.00	4190.7	4721
	9538	1907.60	4210.5	4724
HSUPA	9262	1852.40	4182.8	4699
	9400	1880.00	4183.1	4750
	9538	1907.60	4206.3	4692

GSM 850 (GMSK)-Low	Agilent Ch Freq 824.2 MHz Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB Center 824.2 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 241.9430 kHz Transmit Freq Error -3.032 kHz x dB Bandwidth 304.771 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 824.200000 MHz Start Freq 823.700000 MHz Stop Freq 824.700000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
GSM 850 (GMSK)-Middle	Agilent Ch Freq 836.6 MHz Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB Center 836.6 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 242.5498 kHz Transmit Freq Error 2.575 kHz x dB Bandwidth 297.770 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 836.600000 MHz Start Freq 836.100000 MHz Stop Freq 837.100000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
GSM 850 (GMSK)-High	Agilent Ch Freq 848.8 MHz Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB Center 848.8 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 256.5120 kHz Transmit Freq Error -779.106 Hz x dB Bandwidth 317.312 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 848.800000 MHz Start Freq 848.300000 MHz Stop Freq 849.300000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

GPRS850 (GMSK,1Slot)-Low	Agilent R T Ch Freq 824.2 MHz Trig Free Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB  Center 824.2 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Span 1 MHz Occupied Bandwidth 243.3670 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -779.423 Hz x dB Bandwidth 314.937 kHz Freq/Channel Center Freq 824.200000 MHz Start Freq 823.700000 MHz Stop Freq 824.700000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
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EGPRS850 (8PSK,1Slot)-Low	
EGPRS850 (8PSK,1Slot)-Middle	
EGPRS850 (8PSK,1Slot)-High	

PCS1900 (GMSK)-Low	Agilent R T Ch Freq 1.8502 GHz Trig Free Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB  Center 1.85 GHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 247.6086 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -42.437 Hz x dB Bandwidth 323.746 kHz Freq/Channel Center Freq 1.85020000 GHz Start Freq 1.84970000 GHz Stop Freq 1.85070000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
PCS1900 (GMSK)-Middle	Agilent R T Ch Freq 1.88 GHz Trig Free Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB  Center 1.88 GHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 253.6196 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 1.183 kHz x dB Bandwidth 310.410 kHz Freq/Channel Center Freq 1.88000000 GHz Start Freq 1.87950000 GHz Stop Freq 1.88050000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
PCS1900 (GMSK)-High	Agilent R T Ch Freq 1.9098 GHz Trig Free Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB  Center 1.91 GHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 251.0040 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 884.042 Hz x dB Bandwidth 319.083 kHz Freq/Channel Center Freq 1.90980000 GHz Start Freq 1.90930000 GHz Stop Freq 1.91030000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

GPRS1900 (GMSK,1Slot)-Low	
GPRS1900 (GMSK,1Slot)-Middle	
GPRS1900 (GMSK,1Slot)-High	

EGPRS1900 (8PSK,1Slot)-Low	Agilent Ch Freq 1.8502 GHz Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.85 GHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 252.4133 kHz Transmit Freq Error -1.237 kHz x dB Bandwidth 321.225 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 1.85020000 GHz Start Freq 1.84970000 GHz Stop Freq 1.85070000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
EGPRS1900 (8PSK,1Slot)-Middle	Agilent Ch Freq 1.88 GHz Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.88 GHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 253.7479 kHz Transmit Freq Error -649.872 Hz x dB Bandwidth 318.681 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 1.88000000 GHz Start Freq 1.87950000 GHz Stop Freq 1.88050000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
EGPRS1900 (8PSK,1Slot)-High	Agilent Ch Freq 1.9098 GHz Occupied Bandwidth Ref 40.5 dBm Atten 45 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.91 GHz #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (1001 pts) Occupied Bandwidth 253.3467 kHz Transmit Freq Error 613.747 Hz x dB Bandwidth 320.467 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 1.90980000 GHz Start Freq 1.90930000 GHz Stop Freq 1.91030000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

WCDMA Band V-Low	Agilent R T Ch Freq 826.4 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 826.4 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1815 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -4.123 kHz x dB Bandwidth 4.734 MHz Freq/Channel Center Freq 826.400000 MHz Start Freq 821.400000 MHz Stop Freq 831.400000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
WCDMA Band V-Middle	Agilent R T Ch Freq 836.6 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 836.6 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1819 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -216.568 Hz x dB Bandwidth 4.740 MHz Freq/Channel Center Freq 836.600000 MHz Start Freq 831.600000 MHz Stop Freq 841.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
WCDMA Band V-High	Agilent R T Ch Freq 846.6 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 846.6 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.2297 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -23.495 kHz x dB Bandwidth 4.822 MHz Freq/Channel Center Freq 846.600000 MHz Start Freq 841.600000 MHz Stop Freq 851.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

HSDPA-Low	Agilent R T Ch Freq 826.4 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 826.4 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1786 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -6.776 kHz x dB Bandwidth 4.751 MHz Freq/Channel Center Freq 826.400000 MHz Start Freq 821.400000 MHz Stop Freq 831.400000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
HSDPA-Middle	Agilent R T Ch Freq 836.6 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 836.6 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1961 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -1.839 kHz x dB Bandwidth 4.735 MHz Freq/Channel Center Freq 836.600000 MHz Start Freq 831.600000 MHz Stop Freq 841.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
HSDPA-High	Agilent R T Ch Freq 846.6 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 846.6 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.2052 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -16.745 kHz x dB Bandwidth 4.848 MHz Freq/Channel Center Freq 846.600000 MHz Start Freq 841.600000 MHz Stop Freq 851.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

HSUPA-Low	Agilent R T Ch Freq 826.4 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 826.4 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1861 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 300.614 Hz x dB Bandwidth 4.757 MHz Freq/Channel Center Freq 826.400000 MHz Start Freq 821.400000 MHz Stop Freq 831.400000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
HSUPA-Middle	Agilent R T Ch Freq 836.6 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 836.6 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1895 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -6.486 kHz x dB Bandwidth 4.712 MHz Freq/Channel Center Freq 836.600000 MHz Start Freq 831.600000 MHz Stop Freq 841.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
HSUPA-High	Agilent R T Ch Freq 846.6 MHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 846.6 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.2116 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -12.078 kHz x dB Bandwidth 4.781 MHz Freq/Channel Center Freq 846.600000 MHz Start Freq 841.600000 MHz Stop Freq 851.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

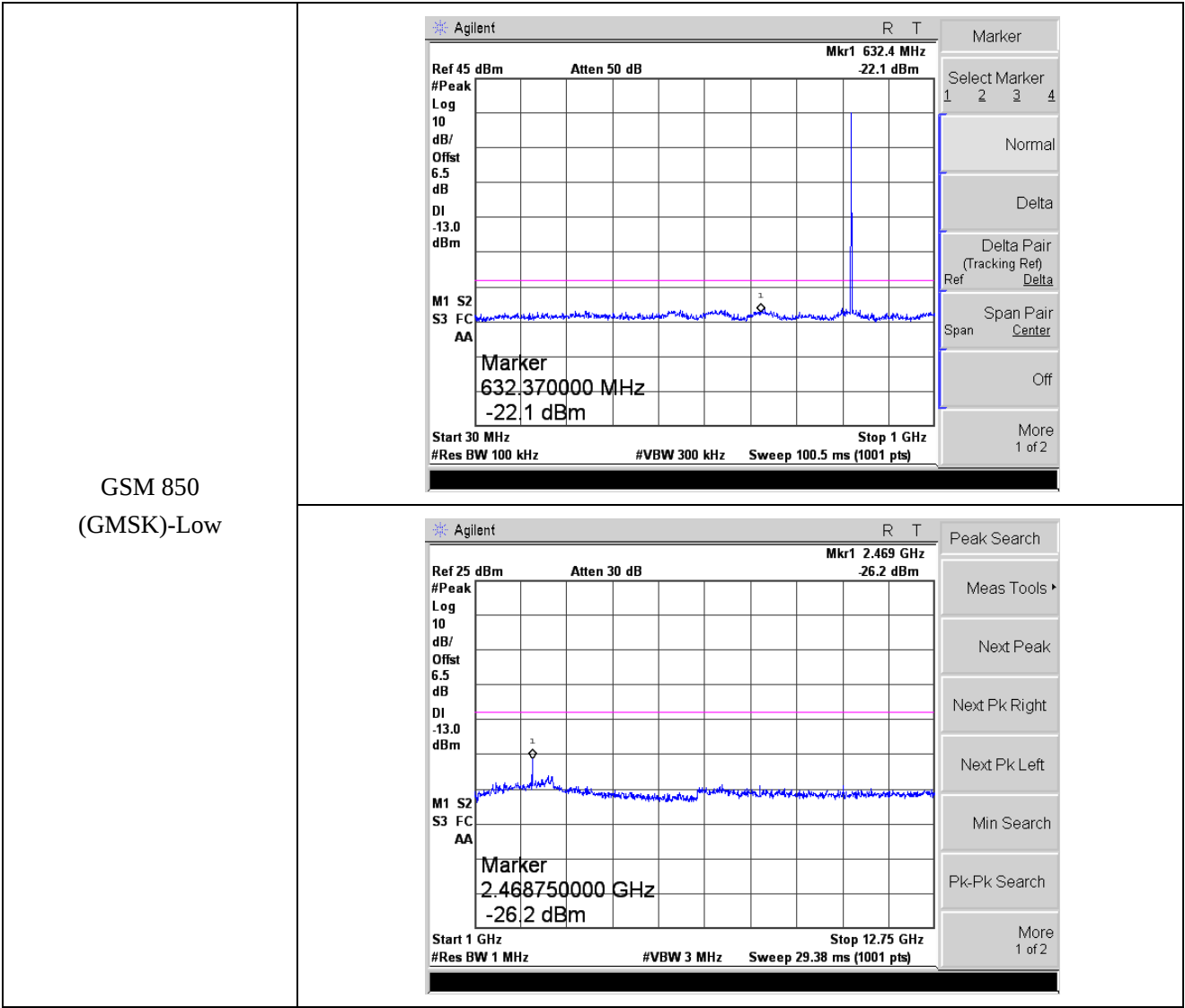
WCDMA Band II-Low	Agilent Ch Freq 1.8524 GHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.852 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Span 10 MHz Occupied Bandwidth 4.1708 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -1.007 kHz x dB Bandwidth 4.715 MHz Trace/View Trace 1 2 3 Clear Write Max Hold Min Hold View Blank More 1 of 2
WCDMA Band II-Middle	Agilent Ch Freq 1.88 GHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.88 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Span 10 MHz Occupied Bandwidth 4.1764 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -3.781 kHz x dB Bandwidth 4.672 MHz Freq/Channel Center Freq 1.88000000 GHz Start Freq 1.87500000 GHz Stop Freq 1.88500000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
WCDMA Band II-High	Agilent Ch Freq 1.9076 GHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.908 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Span 10 MHz Occupied Bandwidth 4.1603 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -2.912 kHz x dB Bandwidth 4.712 MHz Freq/Channel Center Freq 1.90760000 GHz Start Freq 1.90260000 GHz Stop Freq 1.91260000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

HSDPA-Low	Agilent Ch Freq 1.8524 GHz Occupied Bandwidth Ref 30 dBm Atten 35 dB Center 1.852 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1885 MHz Transmit Freq Error 8.138 kHz x dB Bandwidth 4.689 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 1.85240000 GHz Start Freq 1.84740000 GHz Stop Freq 1.85740000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
HSDPA-Middle	Agilent Ch Freq 1.88 GHz Occupied Bandwidth Ref 30 dBm Atten 35 dB Center 1.88 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1907 MHz Transmit Freq Error 4.318 kHz x dB Bandwidth 4.721 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 1.88000000 GHz Start Freq 1.87500000 GHz Stop Freq 1.88500000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
HSDPA-High	Agilent Ch Freq 1.9076 GHz Occupied Bandwidth Ref 30 dBm Atten 35 dB Center 1.908 GHz #Res BW 100 kHz #VBW 1 MHz Sweep 4 ms (401 pts) Occupied Bandwidth 4.2105 MHz Transmit Freq Error -4.025 kHz x dB Bandwidth 4.724 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Freq/Channel Center Freq 1.90760000 GHz Start Freq 1.90260000 GHz Stop Freq 1.91260000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin

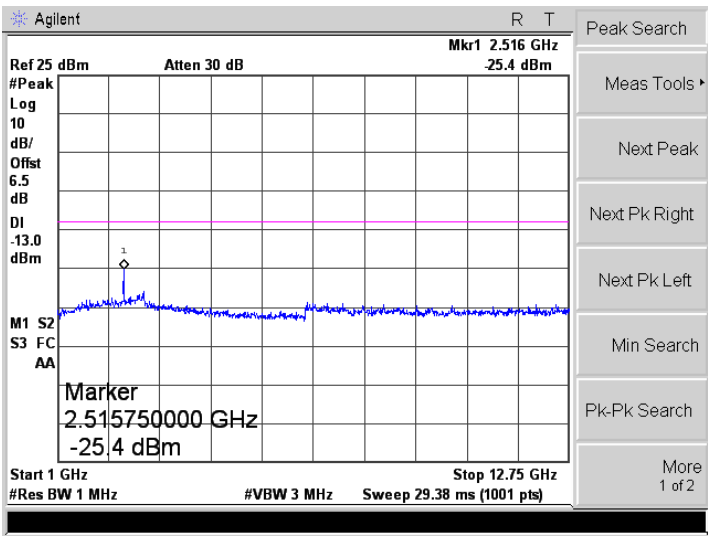
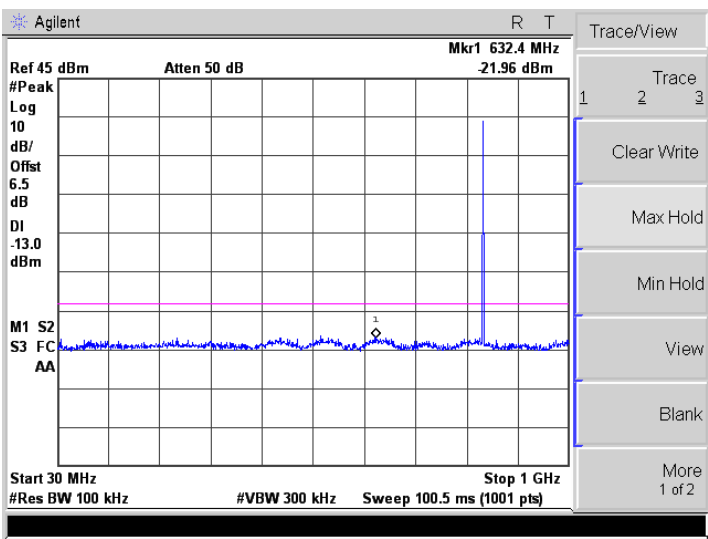
HSUPA-Low	Agilent R T Ch Freq 1.8524 GHz Trig Free Occupied Bandwidth Ref 30 dBm Atten 35 dB #Peak Log 10 dB/ Offset 6.5 dB Center 1.852 GHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 4.1828 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -975.124 Hz x dB Bandwidth 4.699 MHz Freq/Channel Center Freq 1.85240000 GHz Start Freq 1.84740000 GHz Stop Freq 1.85740000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Scale Type Log Lin
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APPENDIX D

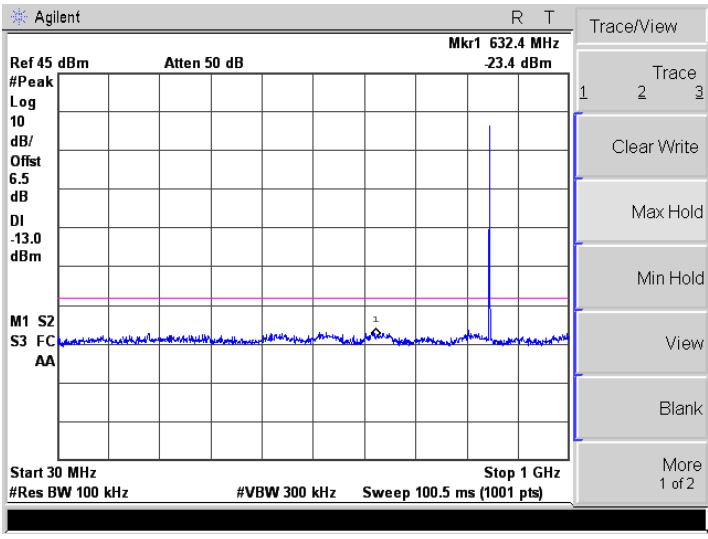
Out of Band Emissions at Antenna Terminal

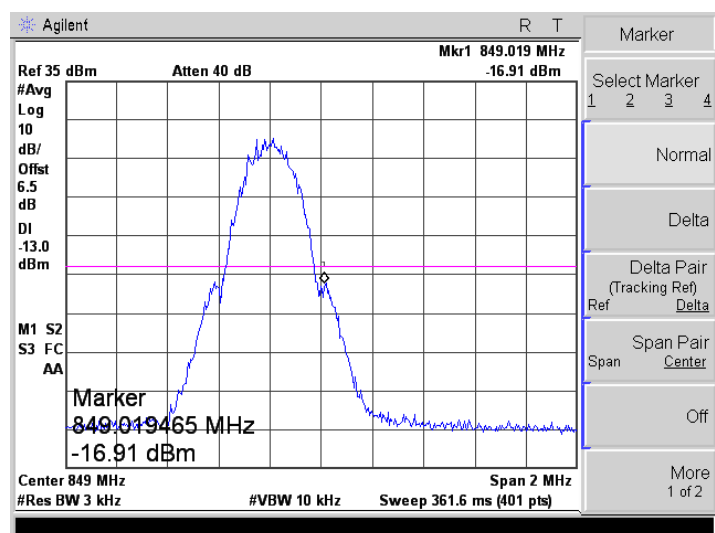
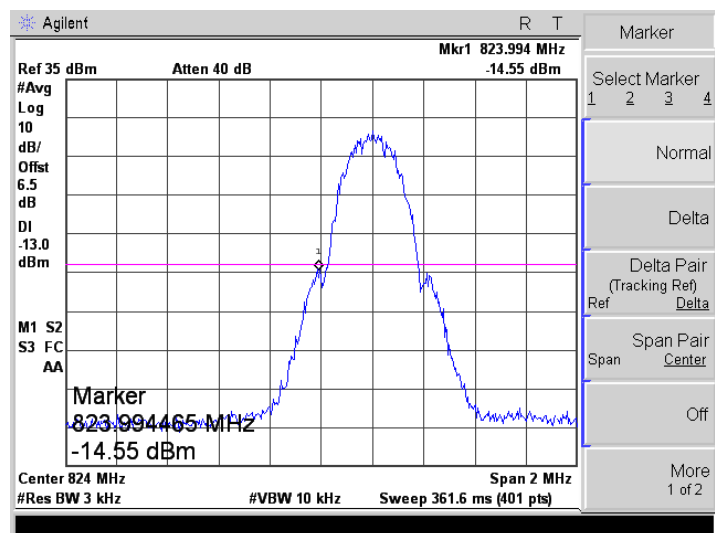
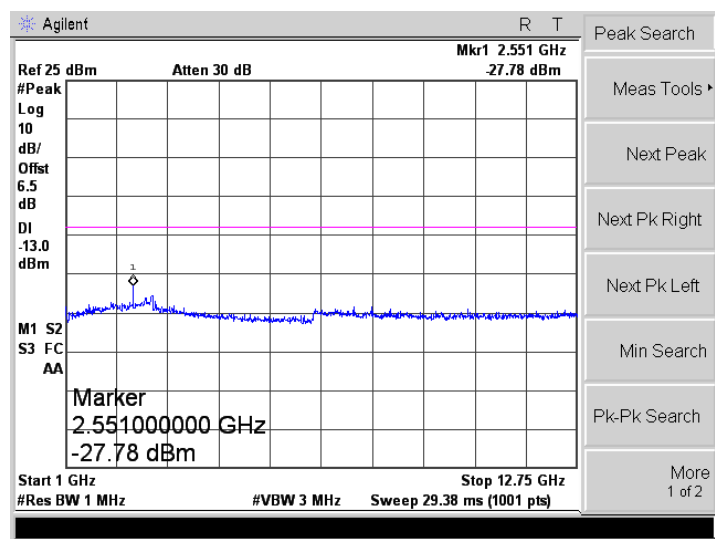


GSM 850
(GMSK)-Middle



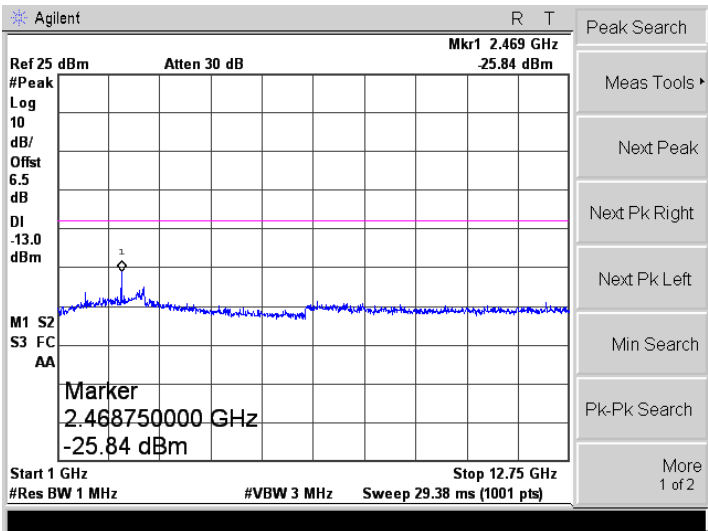
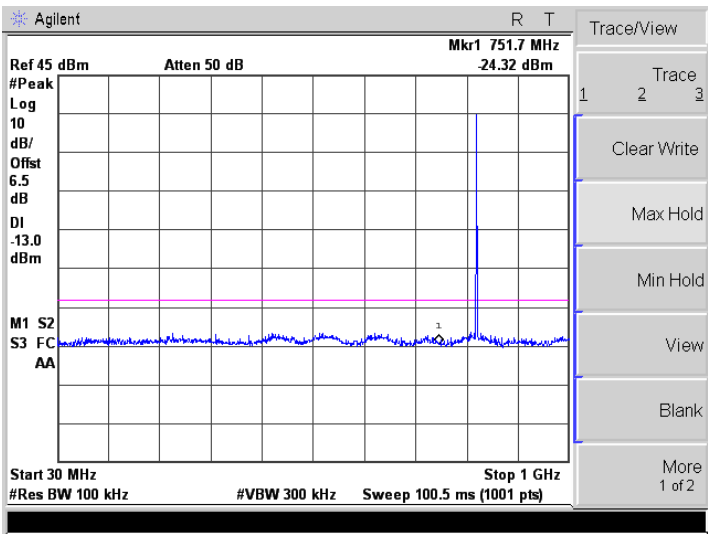
GSM 850
(GMSK)-High



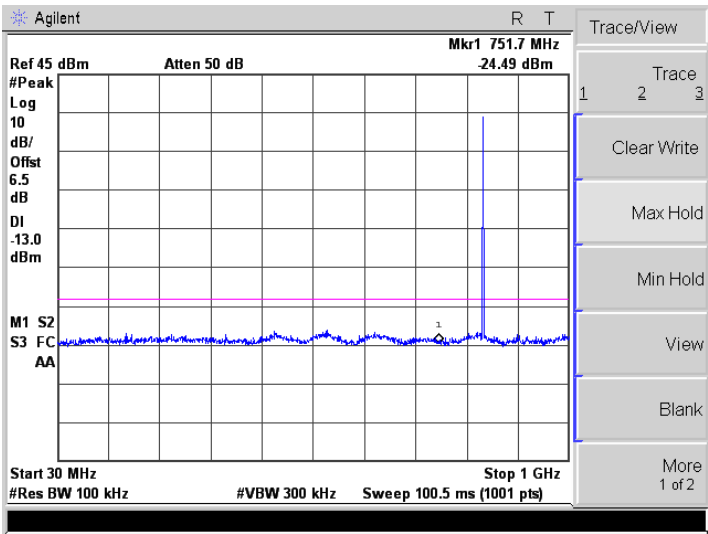


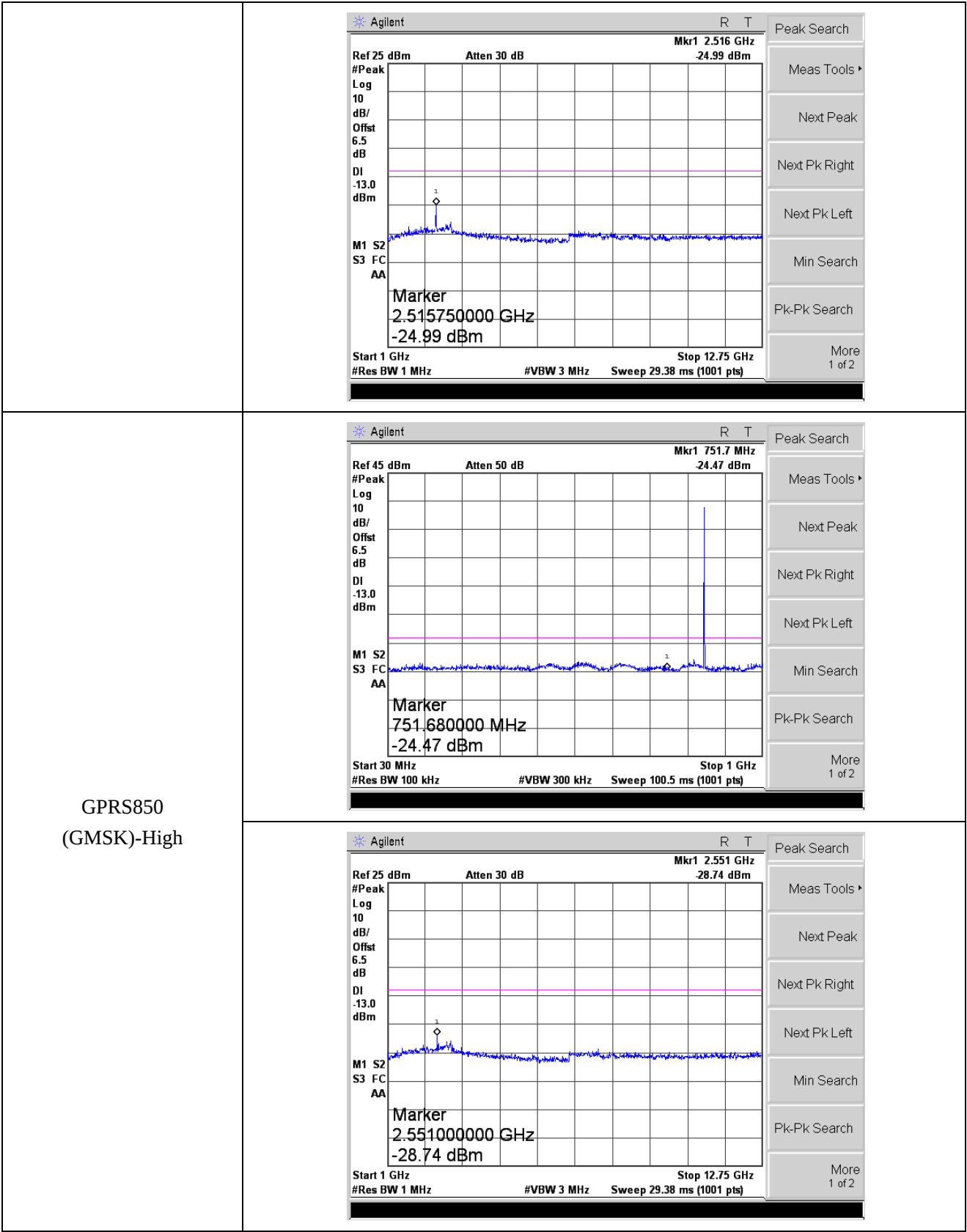
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GPRS850
(GMSK,1Slot)-Low

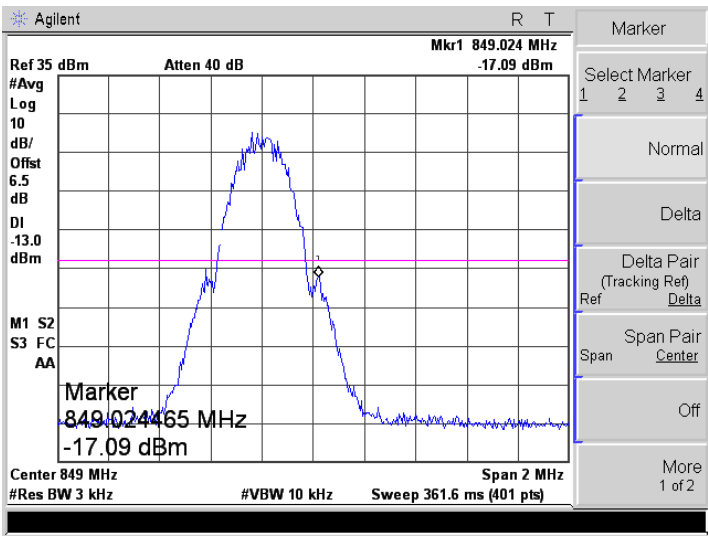
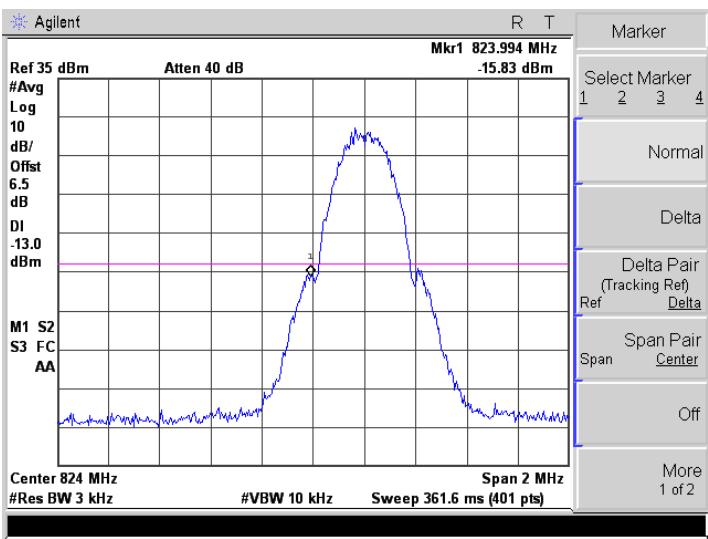


GPRS850
(GMSK,1Slot)-Middle

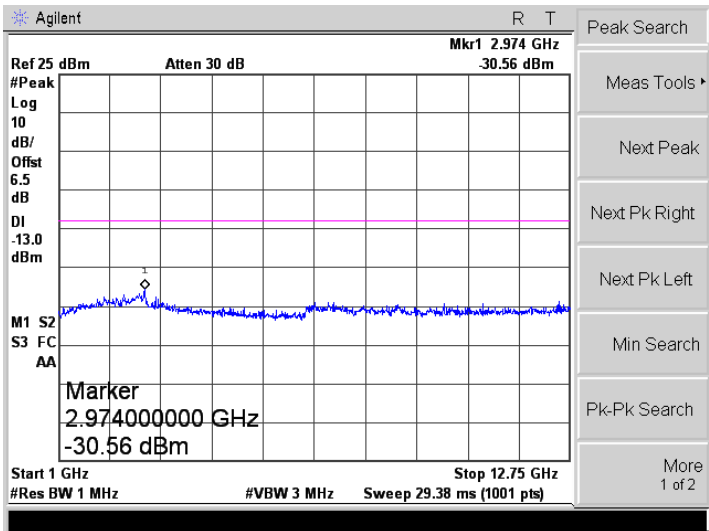
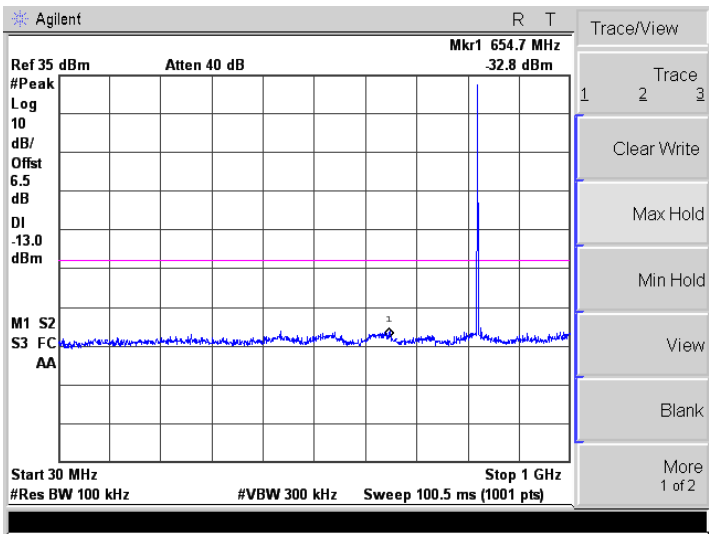




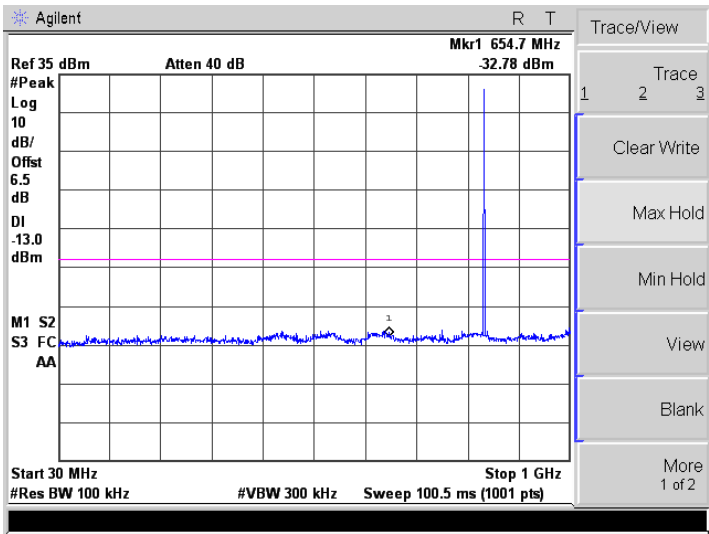
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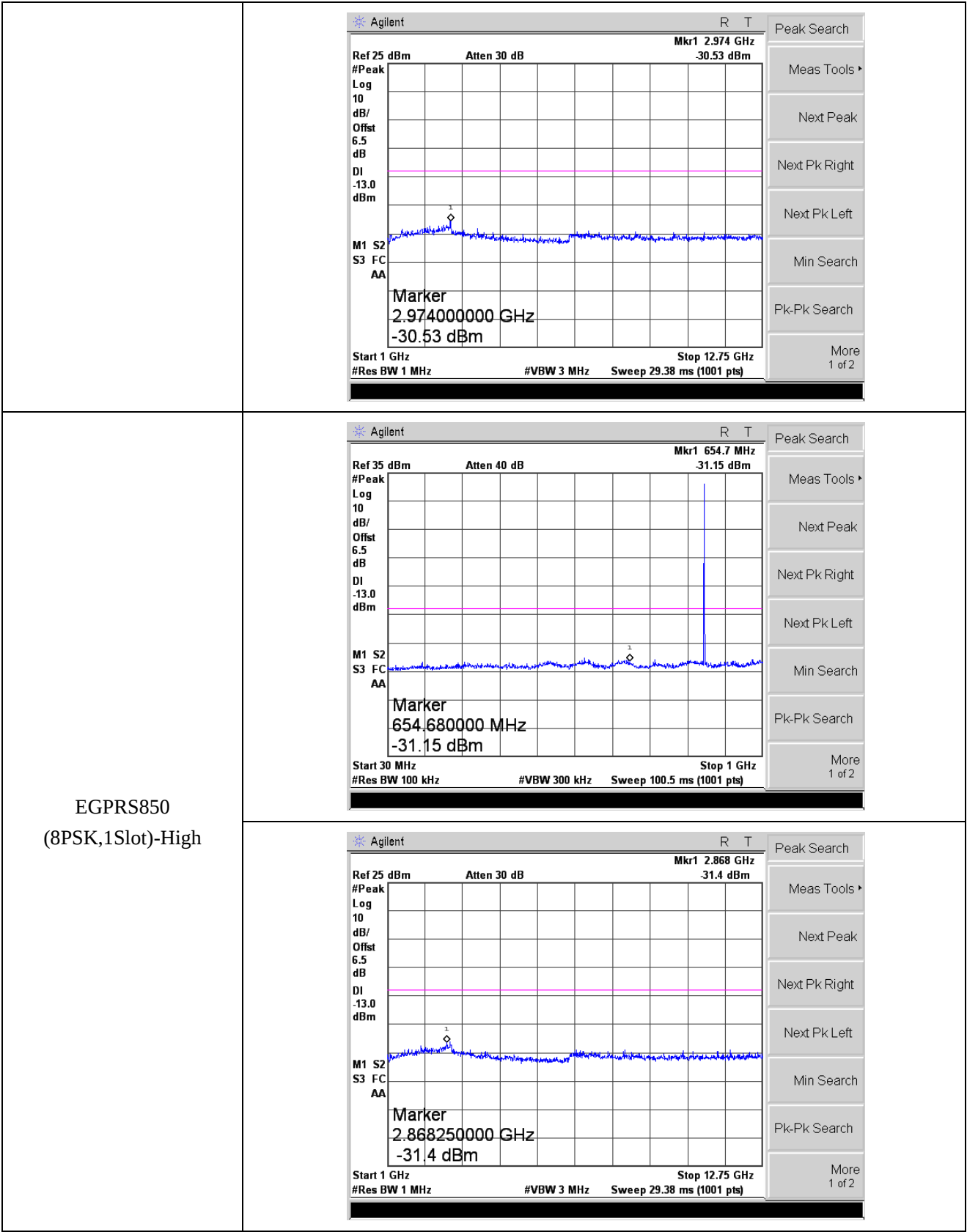


EGPRS850
(8PSK,1Slot)-Low

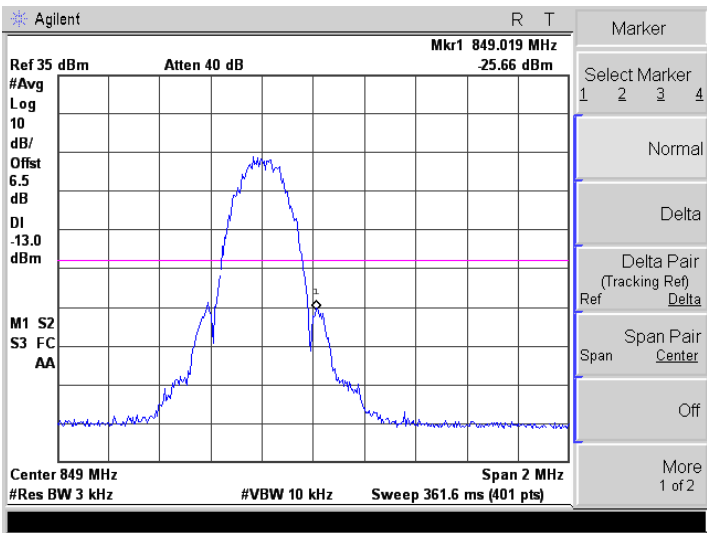
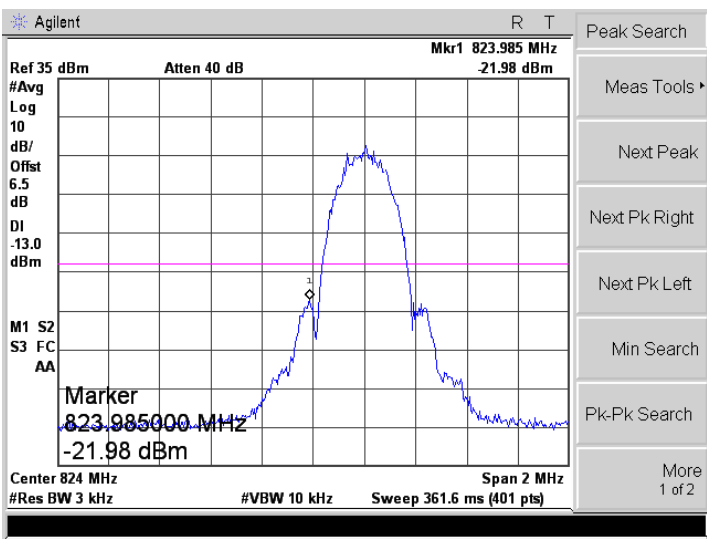


EGPRS850
(8PSK,1Slot)-Middle

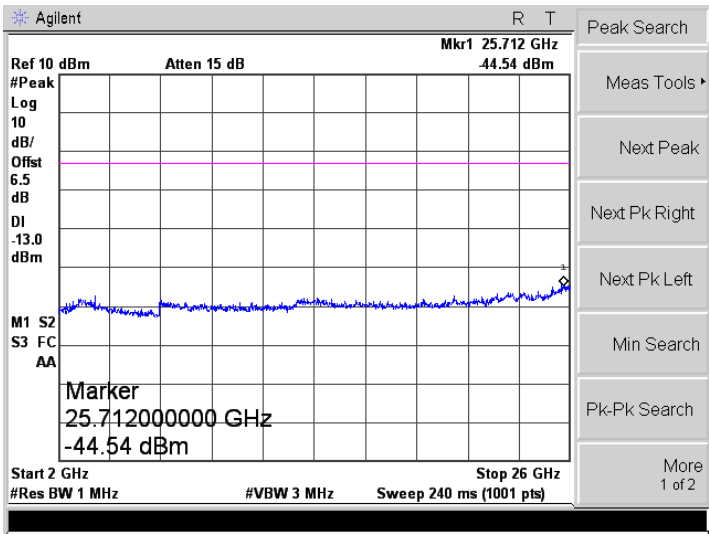
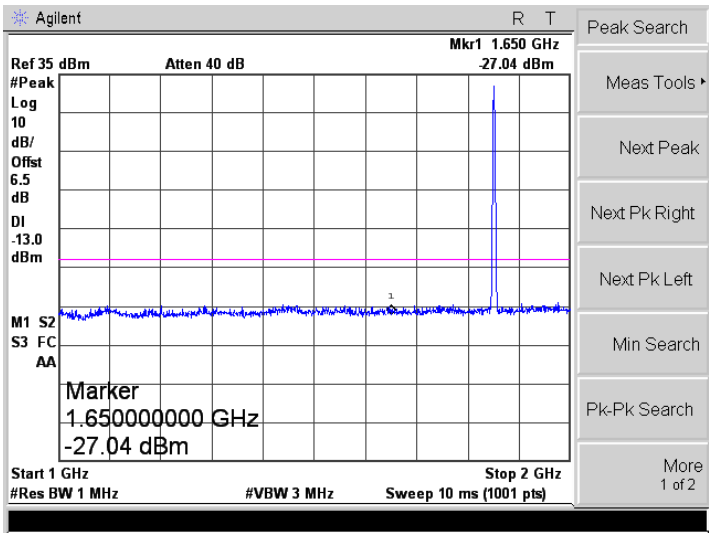
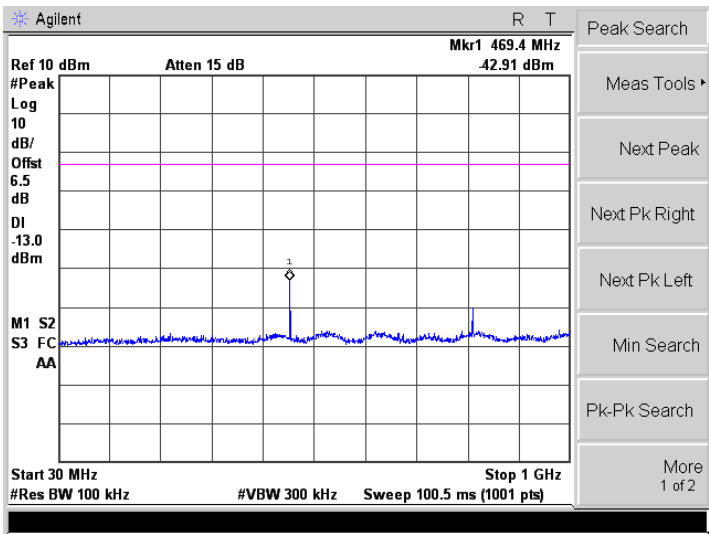




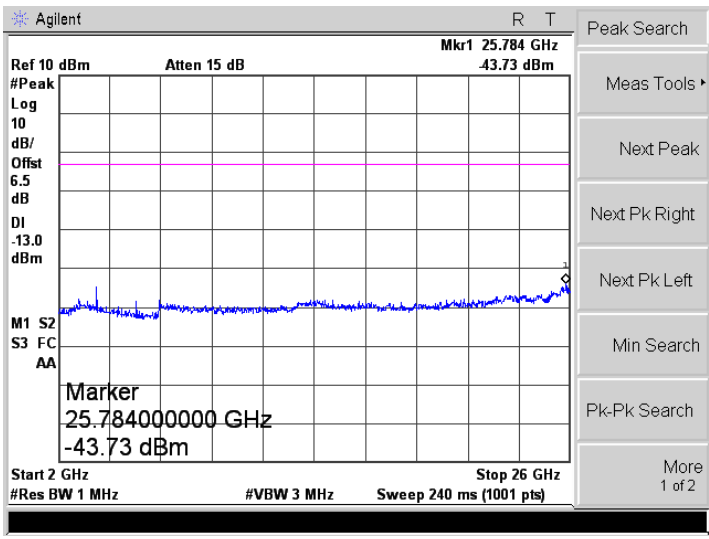
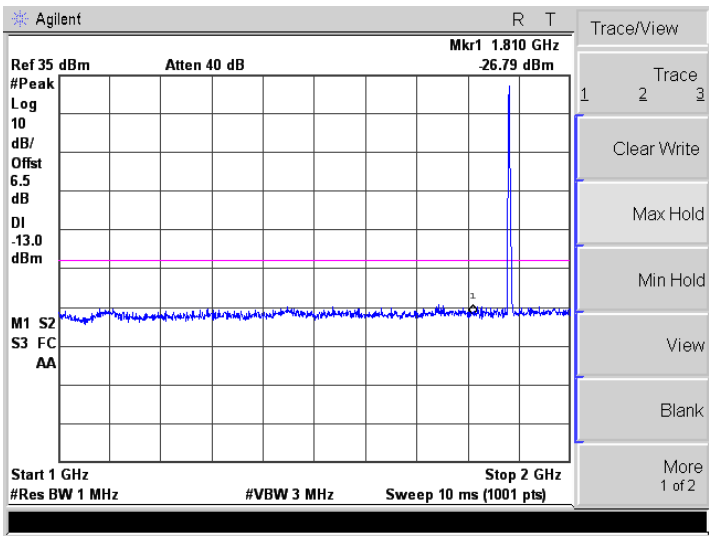
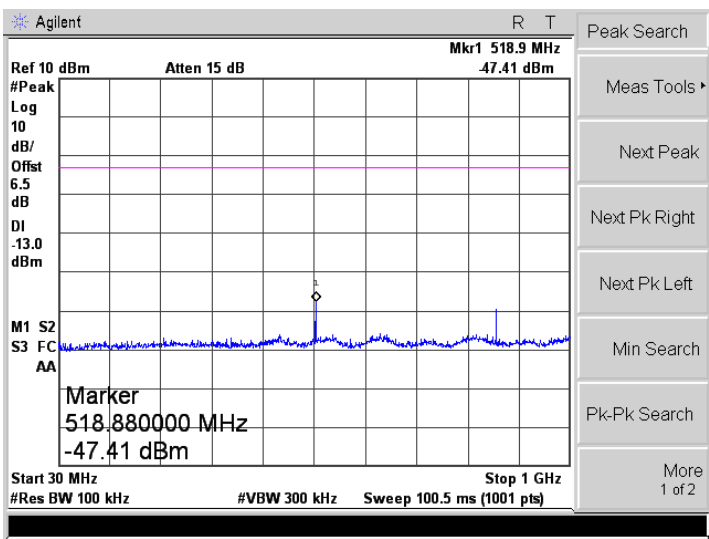
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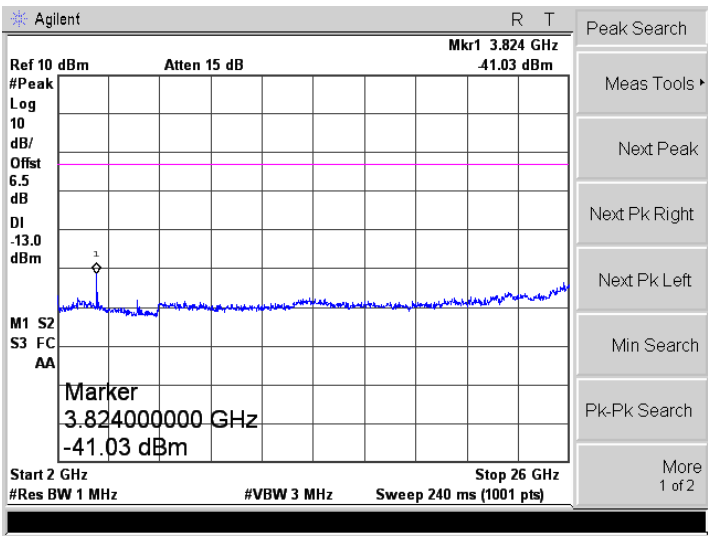
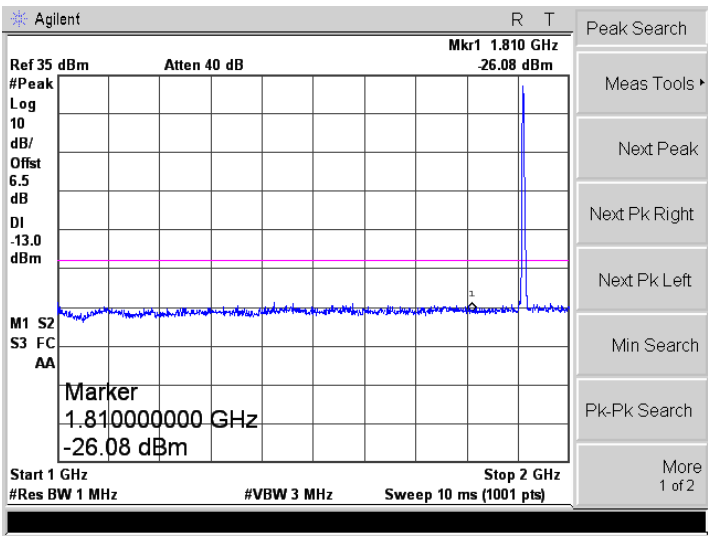
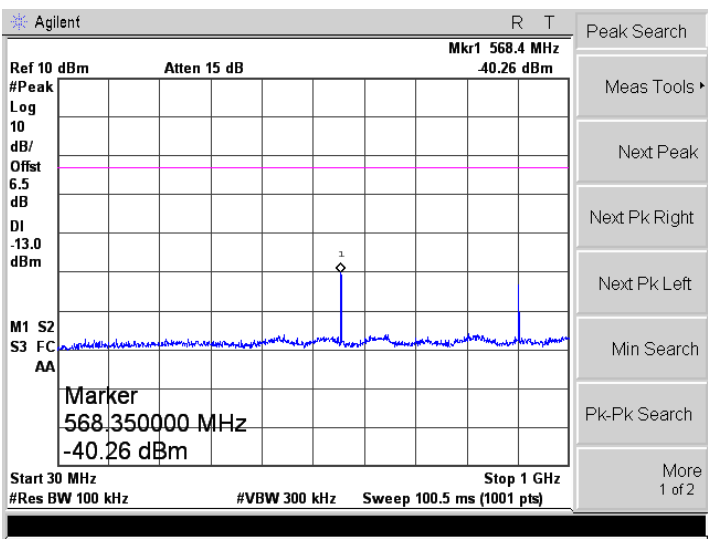
PCS1900
(GMSK)-Low



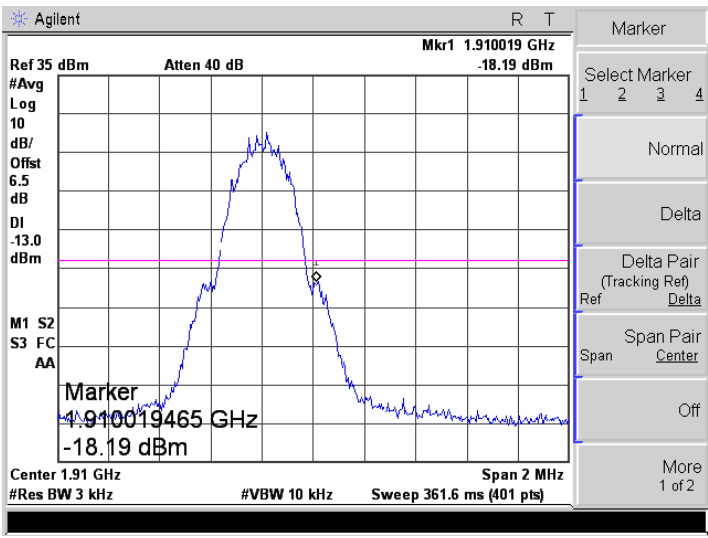
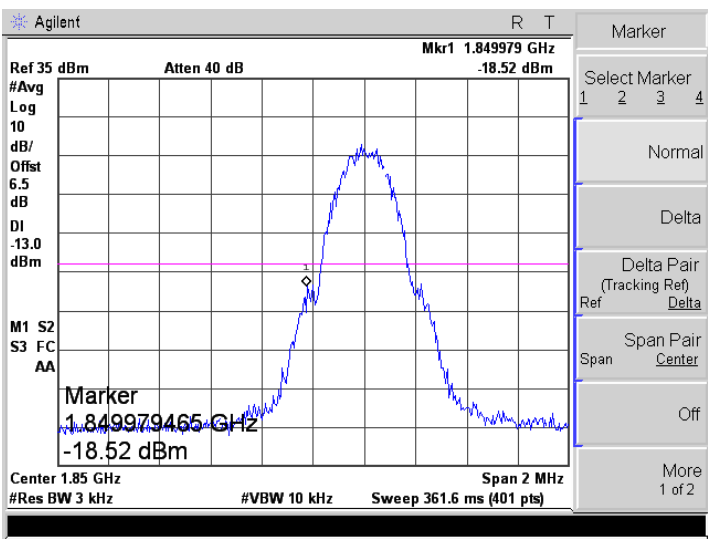
PCS1900
(GMSK)-Middle



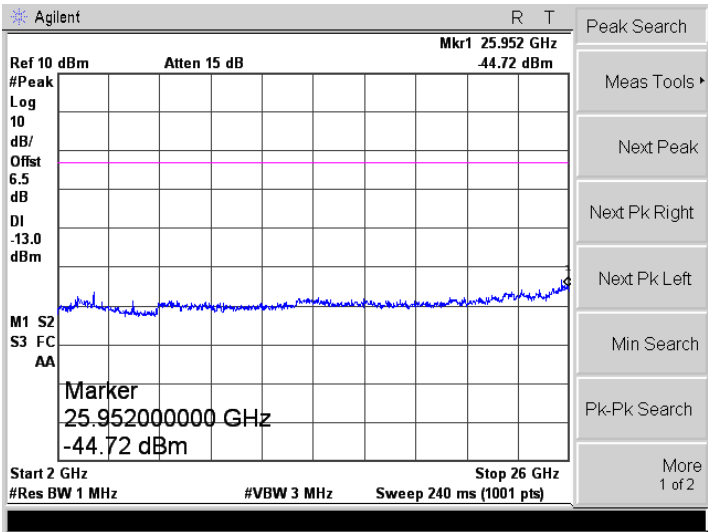
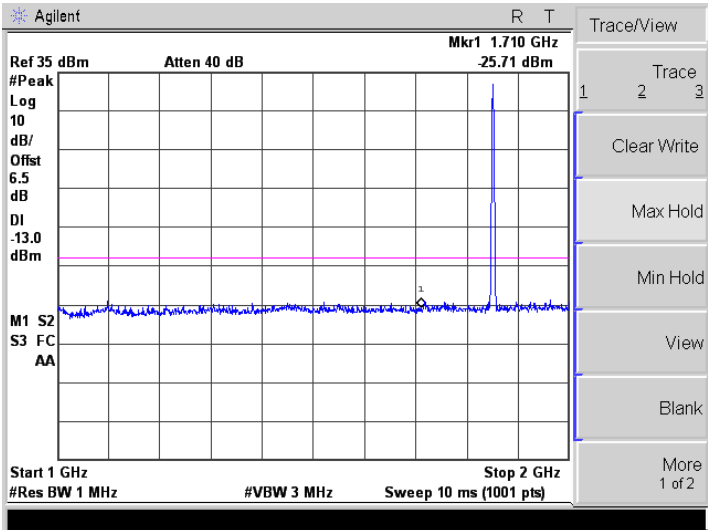
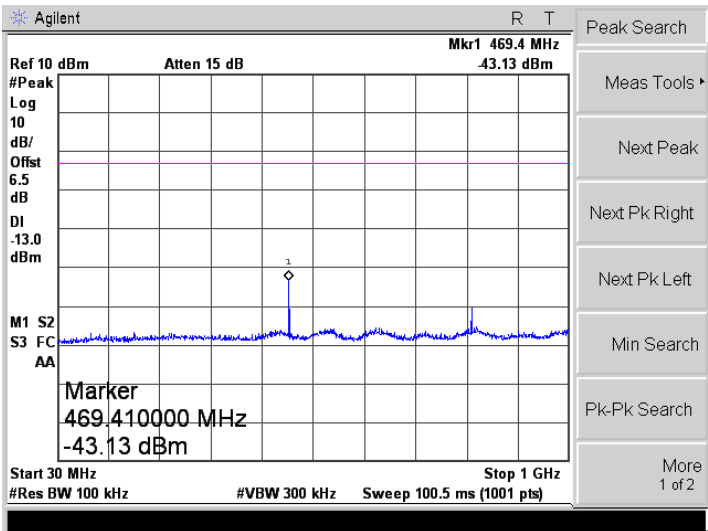
PCS1900
(GMSK)-High



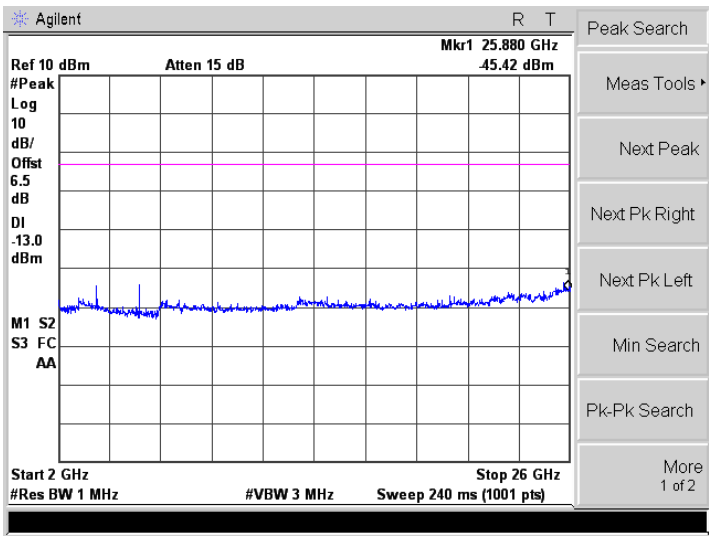
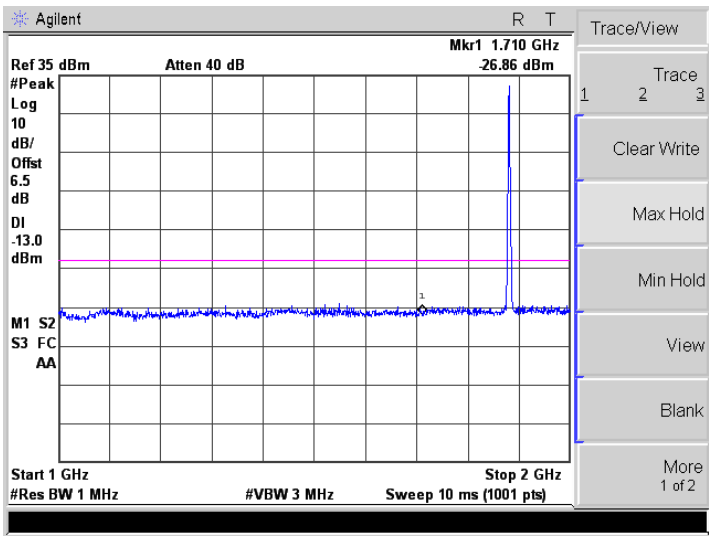
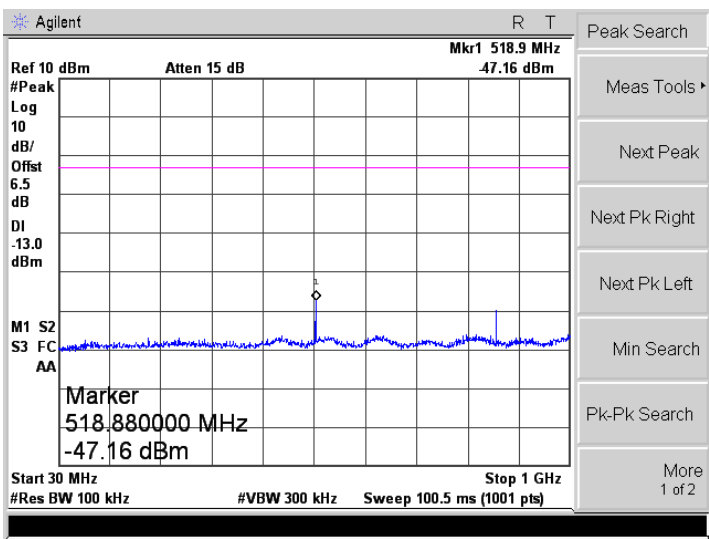
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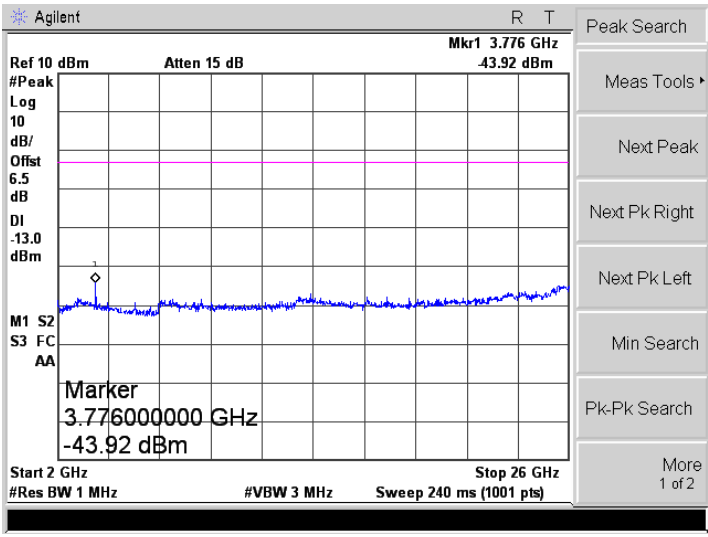
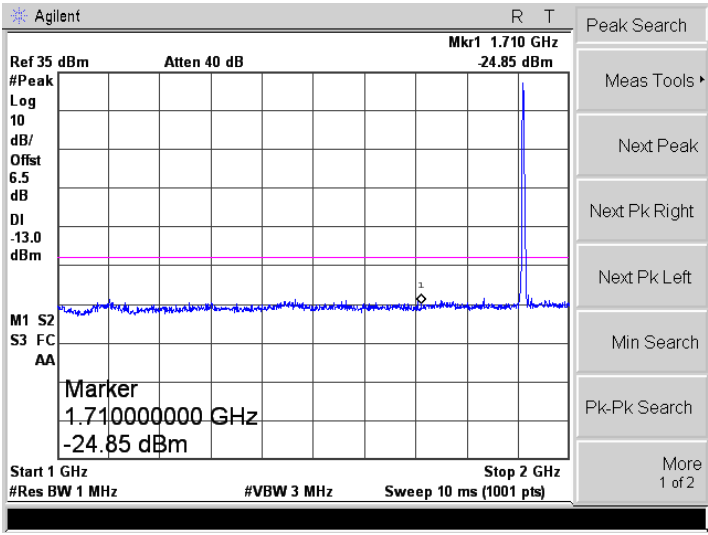
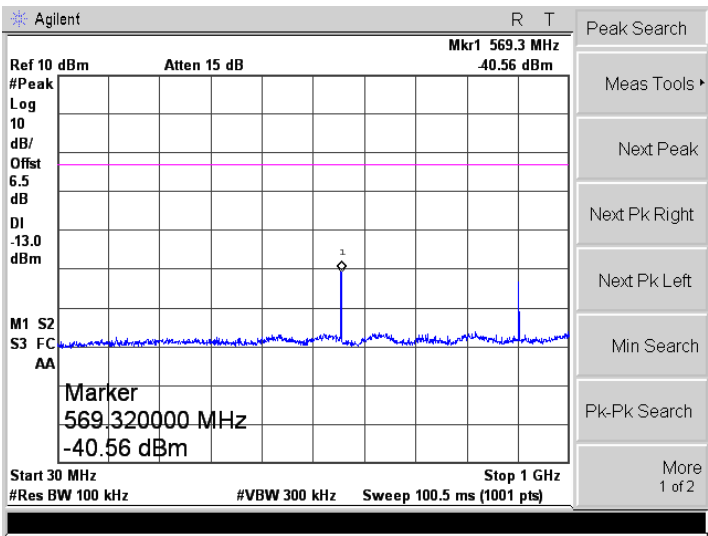
GPRS1900
(GMSK,1Slot)-Low



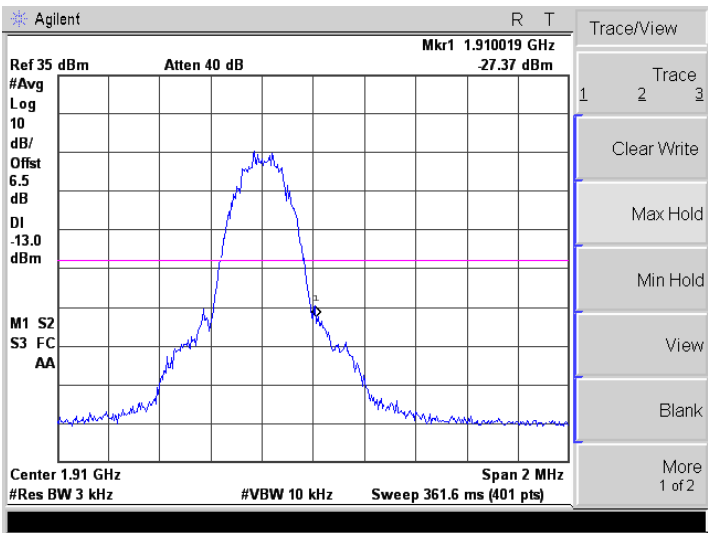
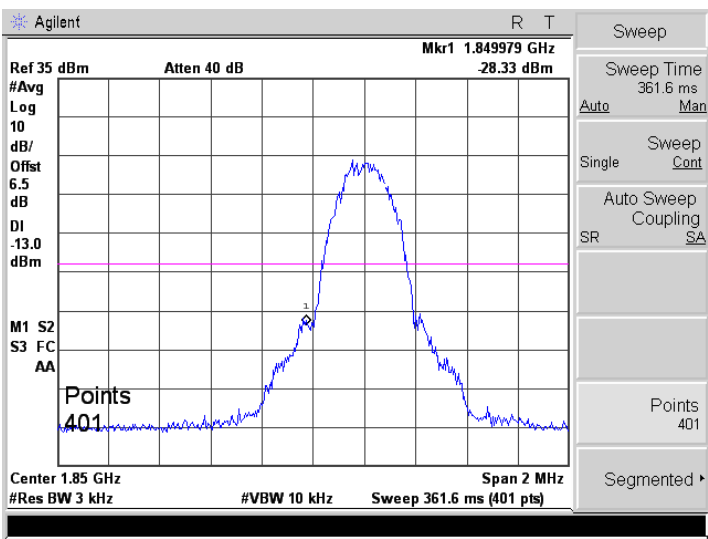
GPRS1900
(GMSK,1Slot)-Middle



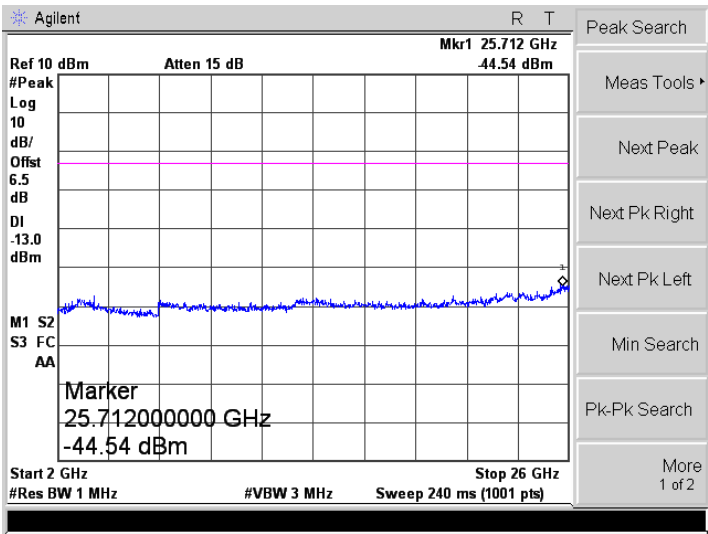
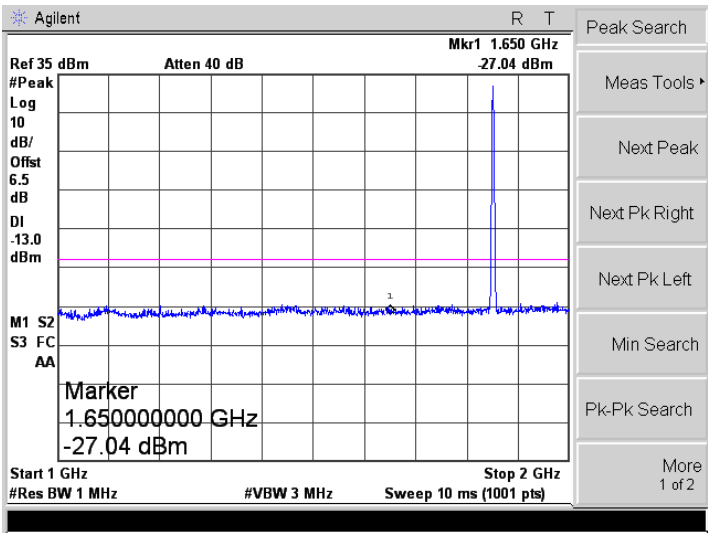
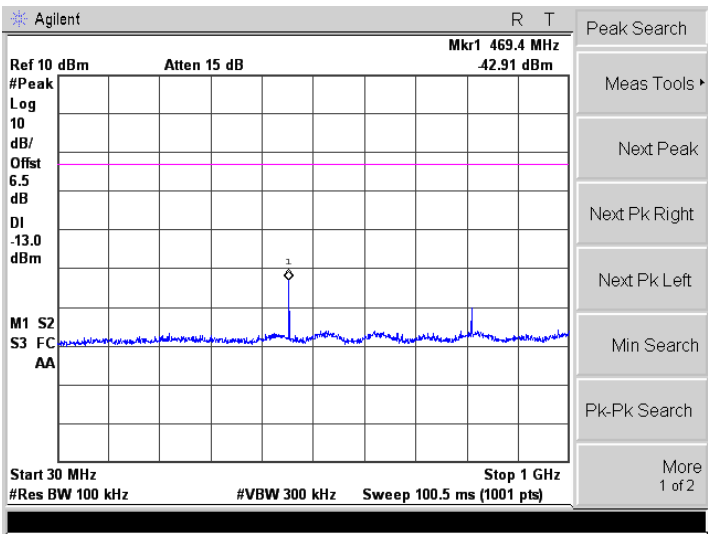
GPRS1900
(GMSK,1Slot)-High



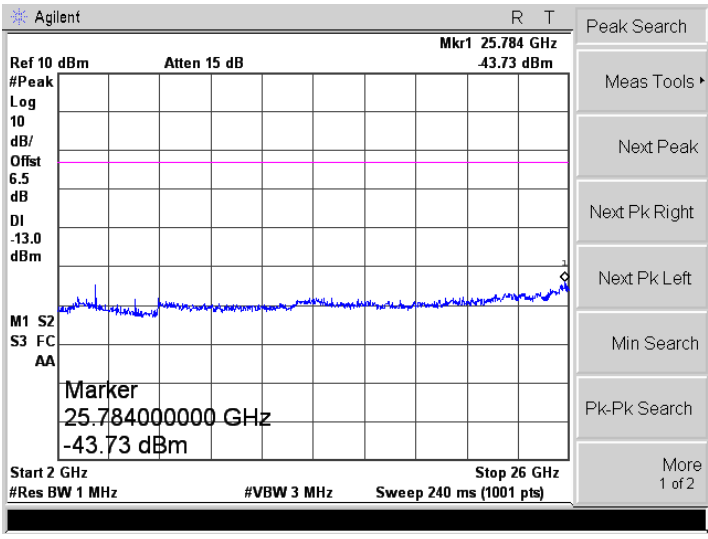
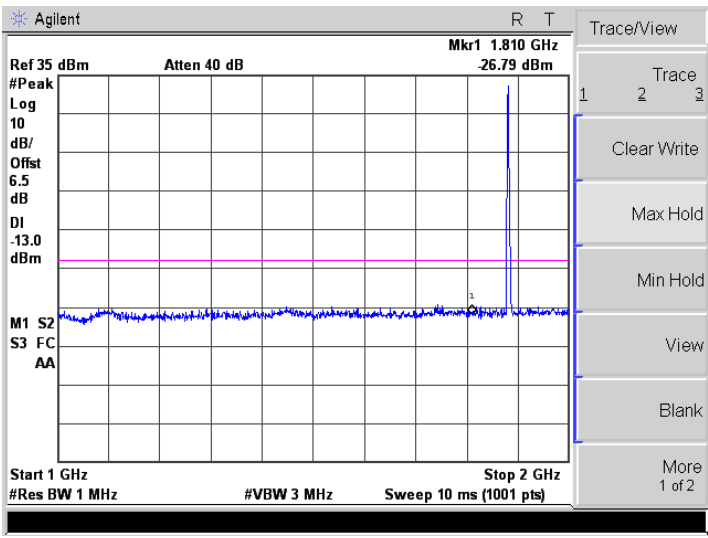
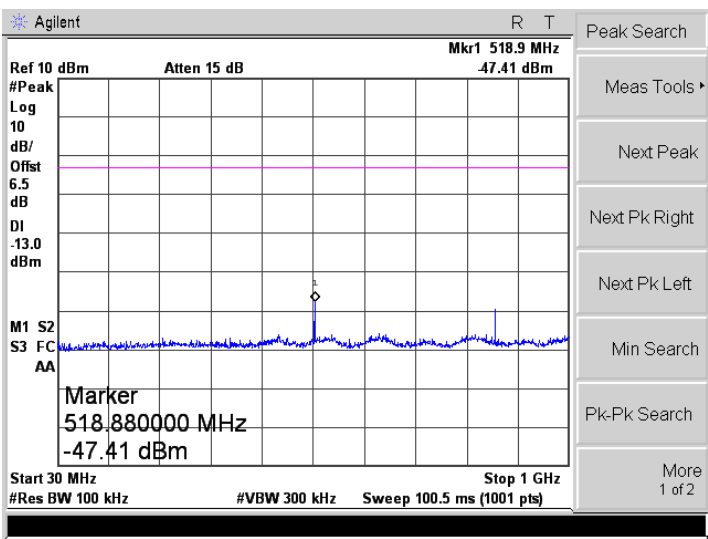
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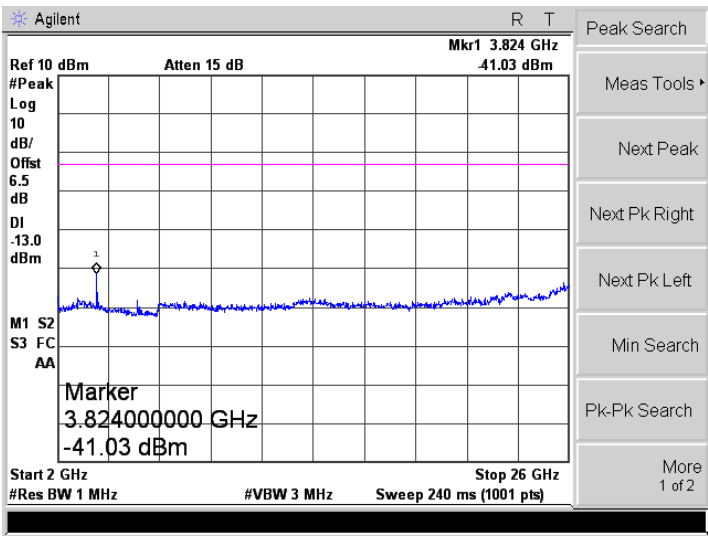
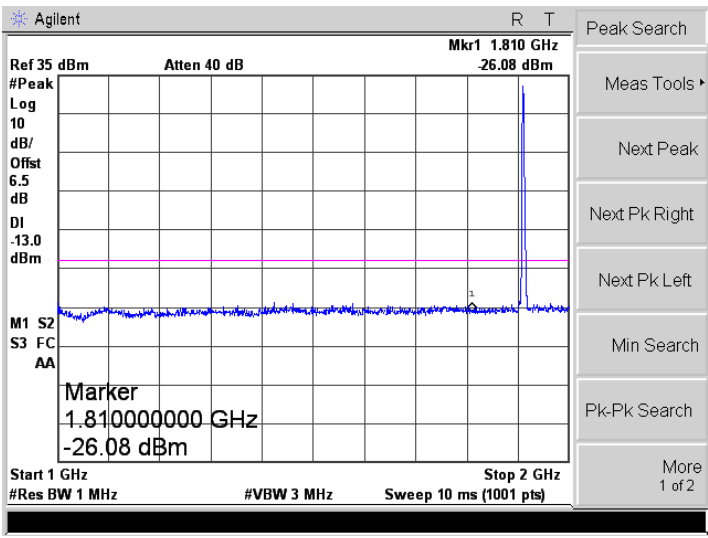
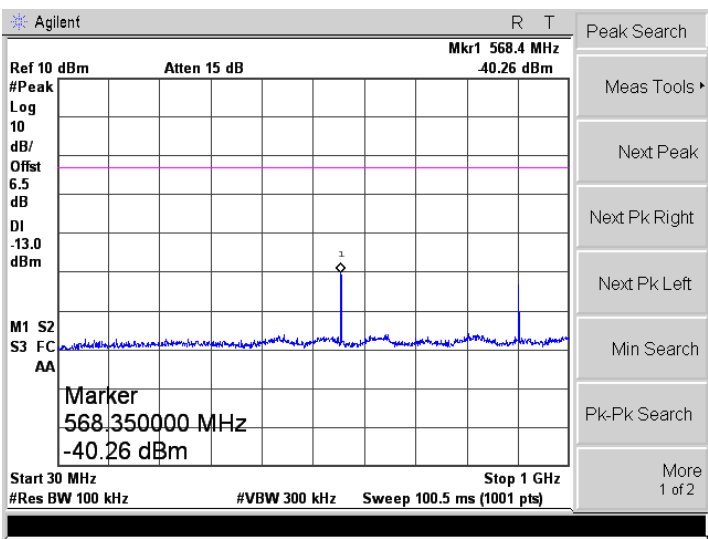
EGPRS1900
(8PSK,1Slot)-Low



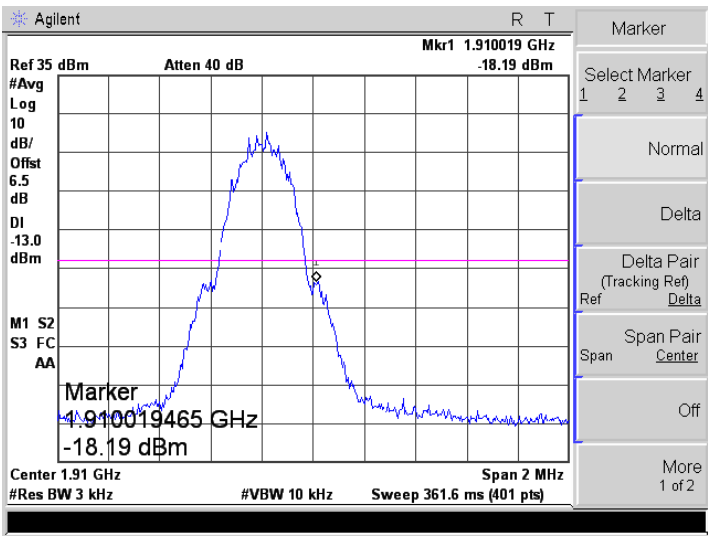
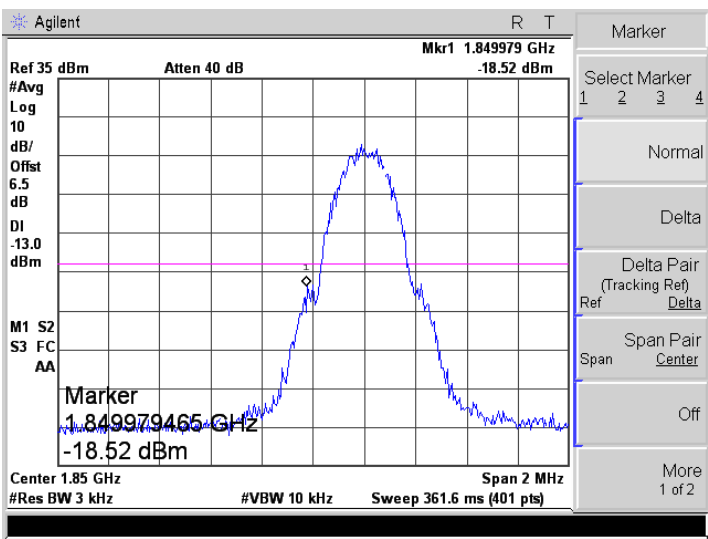
EGPRS1900
(8PSK,1Slot)-Middle



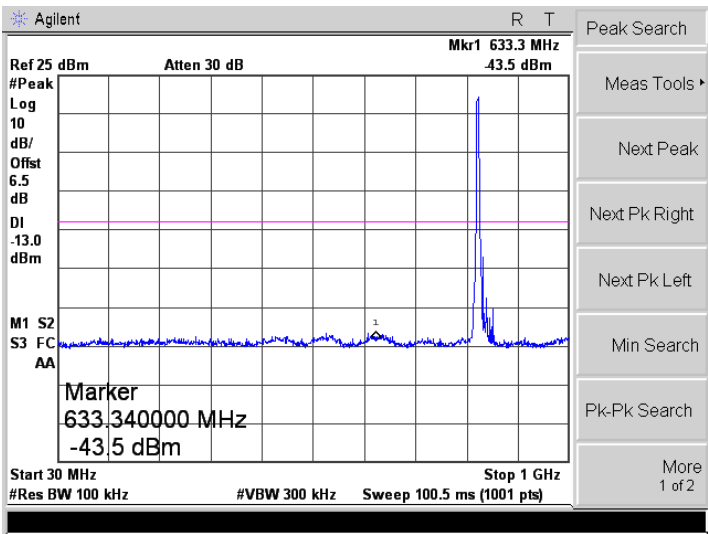
EGPRS1900
(8PSK,1Slot)-High



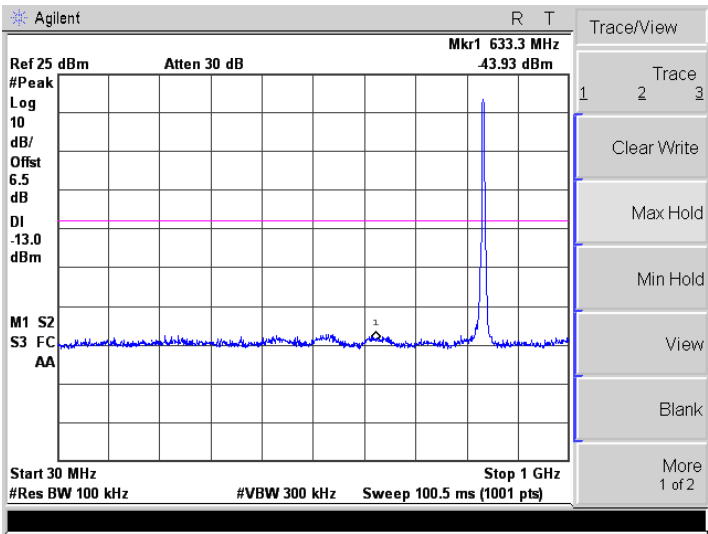
Bandedge



WCDMA Band V-Low



WCDMA Band V-Middle



Agilent

R T

Ref 10 dBm

Atten 15 dB

Mkr1 2.516 GHz

-26.56 dBm

#Peak

Log

10

dB/

Offst

6.5

dB

DI

-13.0

dBm

M1 S2

S3 FC

AA

Marker

2.515750000 GHz

-26.56 dBm

Start 1 GHz

Stop 12.75 GHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 29.38 ms (1001 pts)

Peak Search

Meas Tools

Next Peak

Next Pk Right

Next Pk Left

Min Search

Pk-Pk Search

More 1 of 2

Agilent

R T

Ref 25 dBm

Atten 30 dB

Mkr1 633.3 MHz

-43.68 dBm

#Peak

Log

10

dB/

Offst

6.5

dB

DI

-13.0

dBm

M1 S2

S3 FC

AA

Start 30 MHz

Stop 1 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 100.5 ms (1001 pts)

Trace/View

1 2 3

Clear Write

Max Hold

Min Hold

View

Blank

More 1 of 2

Agilent

R T

Ref 10 dBm

Atten 15 dB

Mkr1 2.539 GHz

-28.26 dBm

#Peak

Log

10

dB/

Offst

6.5

dB

DI

-13.0

dBm

M1 S2

S3 FC

AA

Marker

2.539250000 GHz

-28.26 dBm

Start 1 GHz

Stop 12.75 GHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 29.38 ms (1001 pts)

Peak Search

Meas Tools

Next Peak

Next Pk Right

Next Pk Left

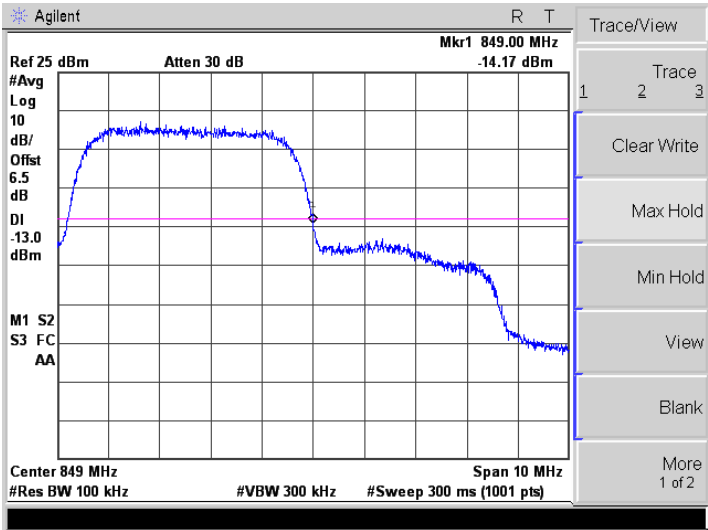
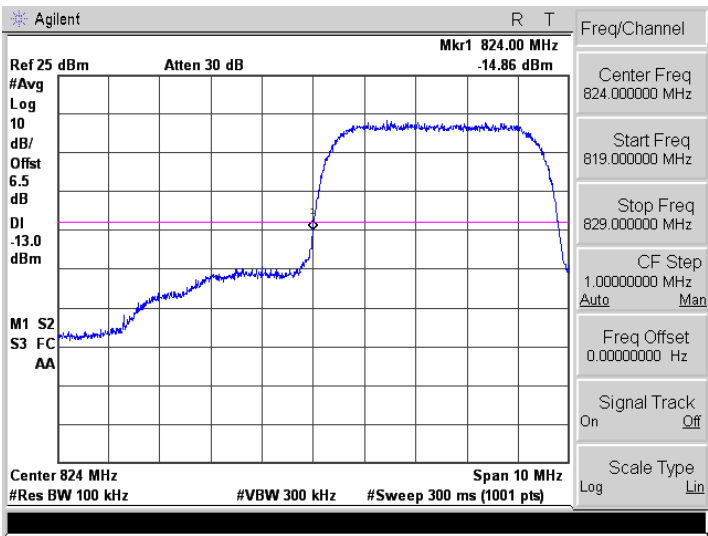
Min Search

Pk-Pk Search

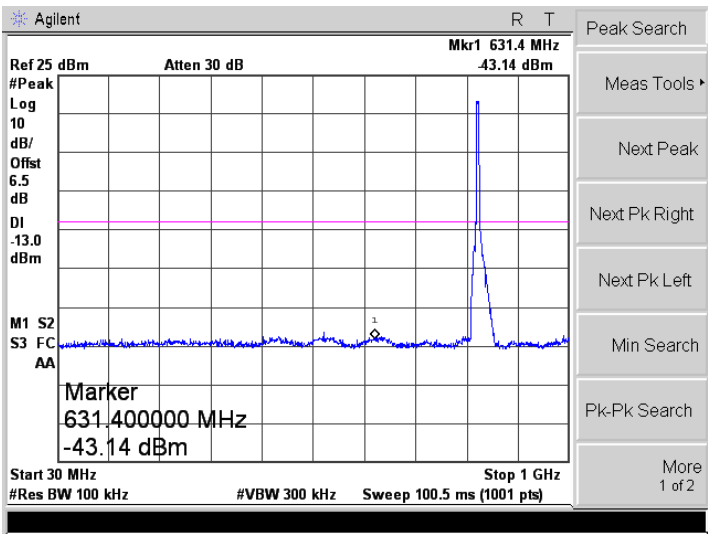
More 1 of 2

WCDMA Band V-High

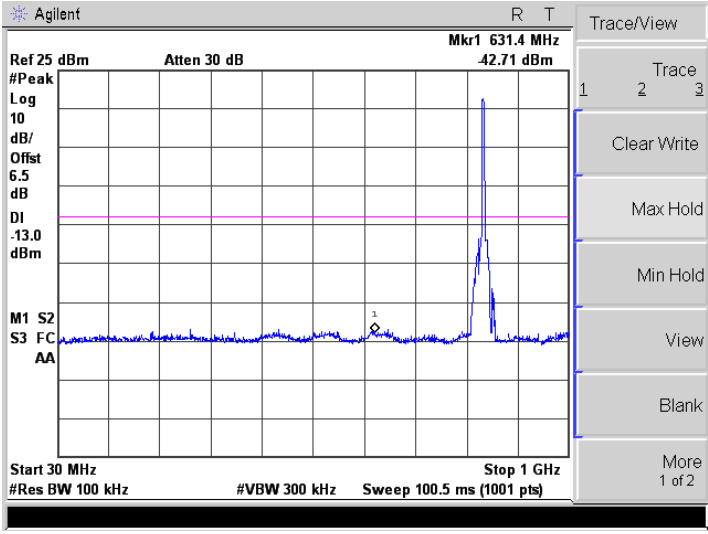
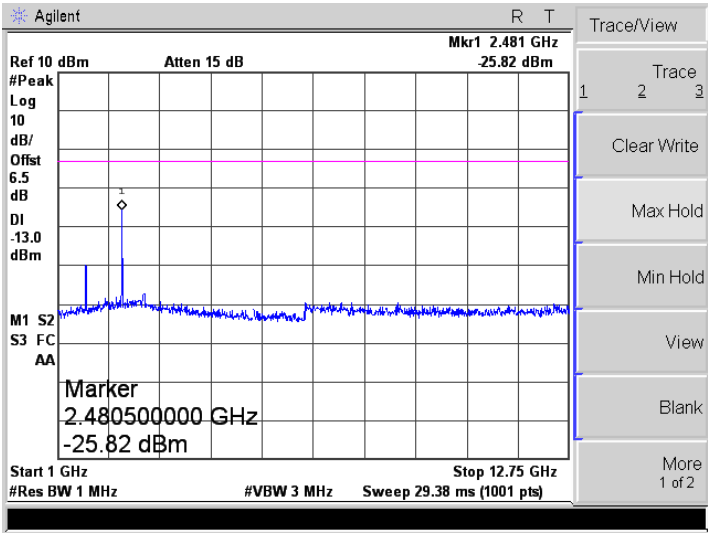
Bandedge

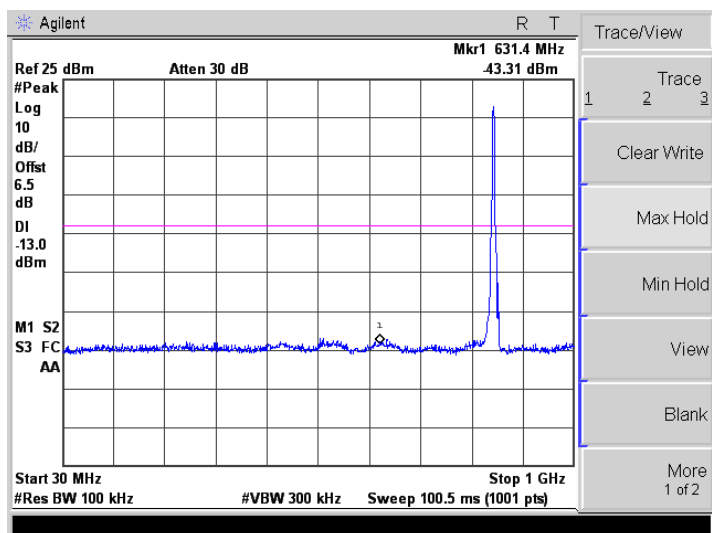
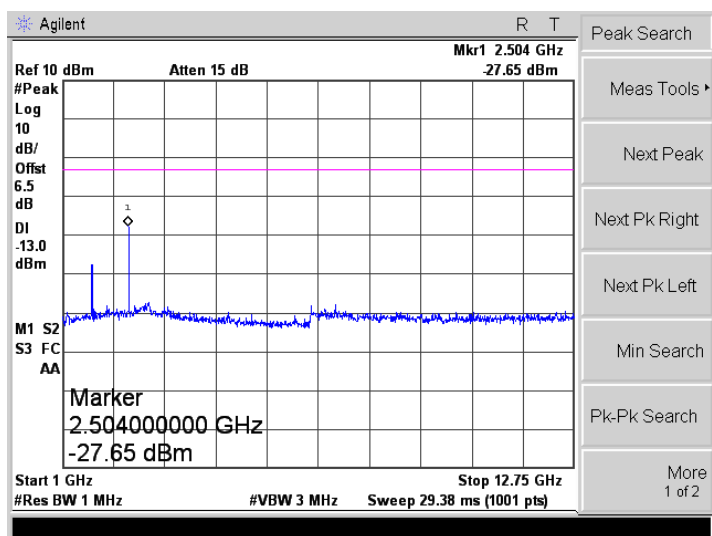


HSDPA Band V-Low

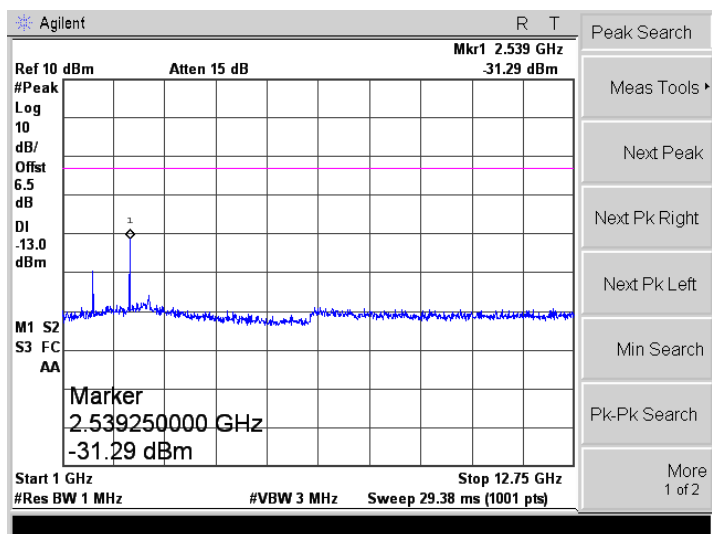


HSDPA Band V-Middle

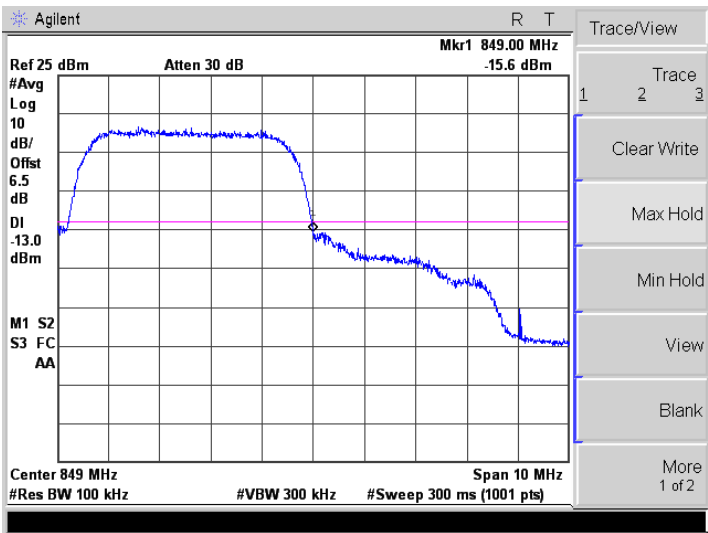
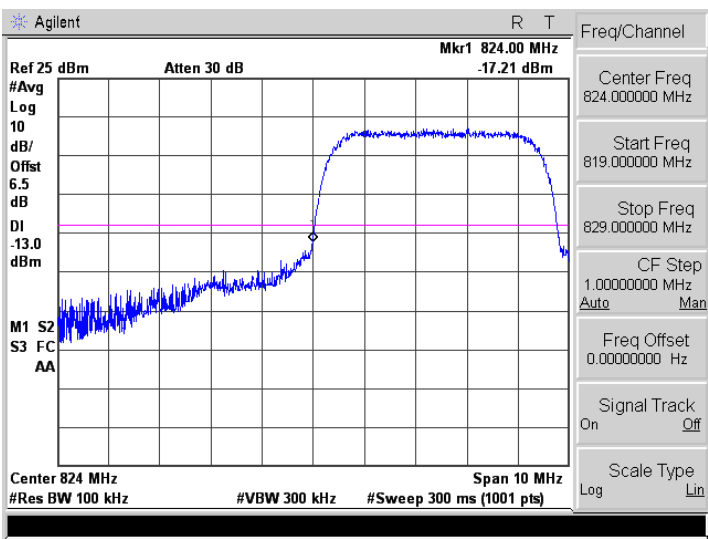




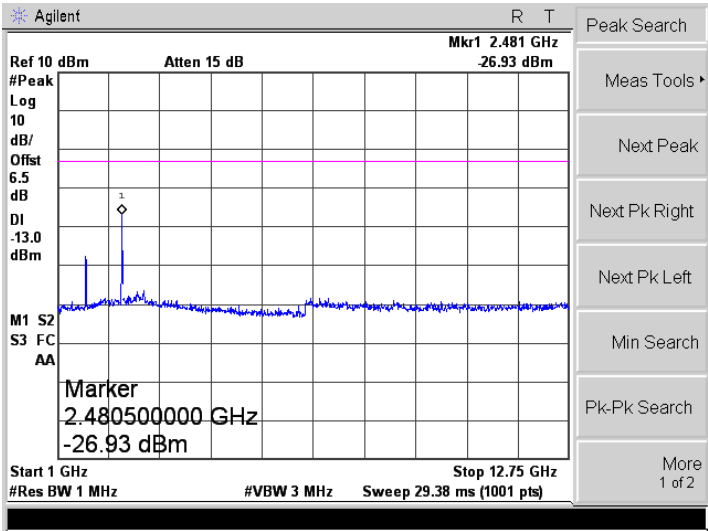
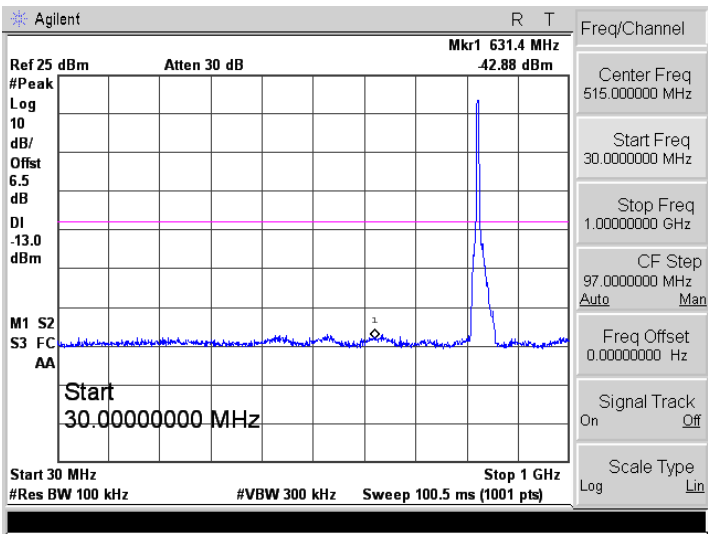
HSDPA Band V-High



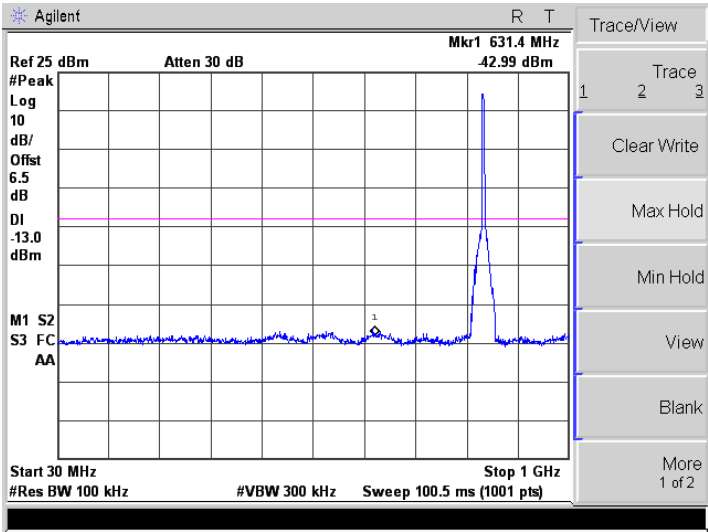
Bandedge

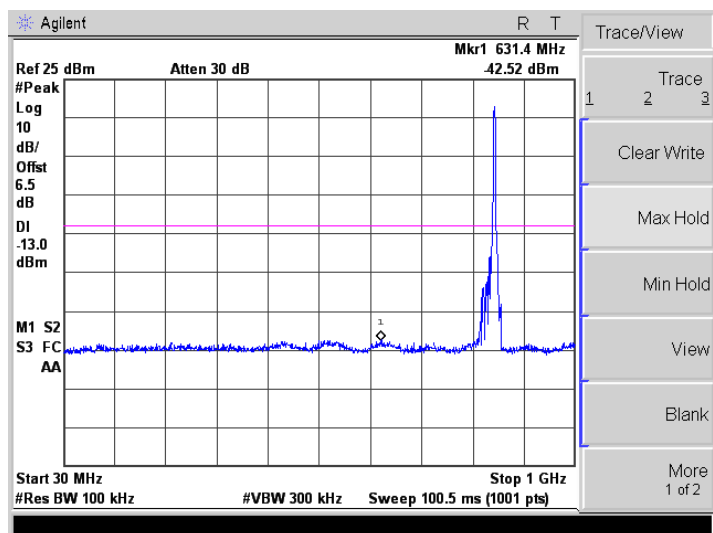
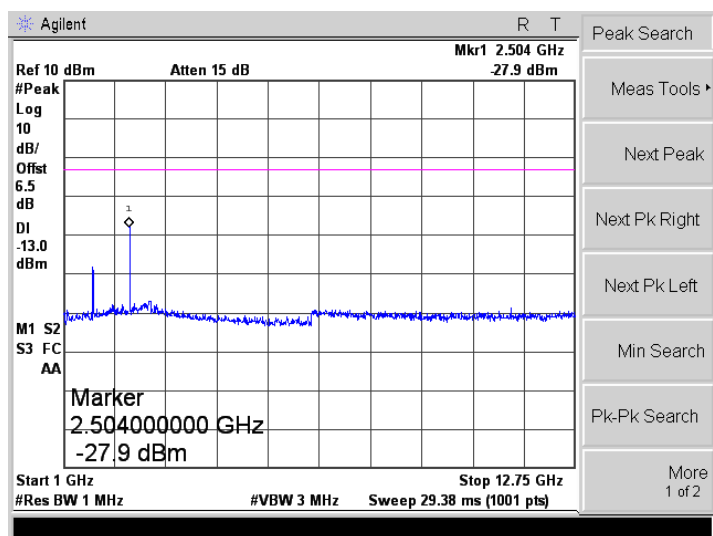


HSUPA Band V-Low

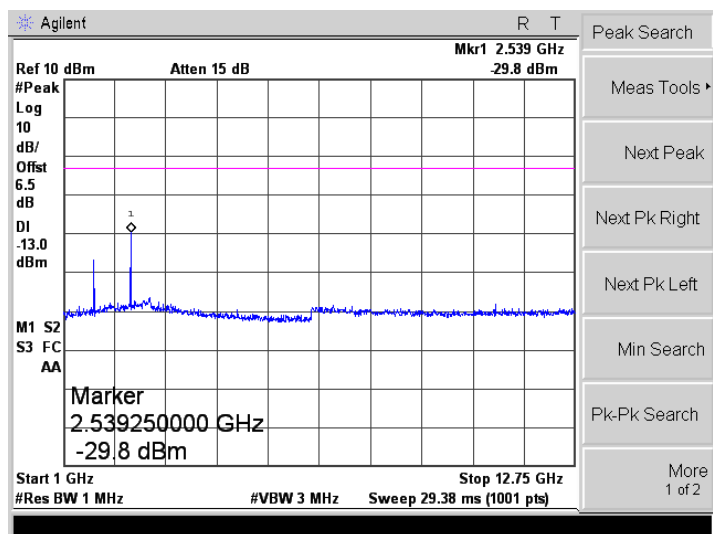


HSUPA Band V-Middle

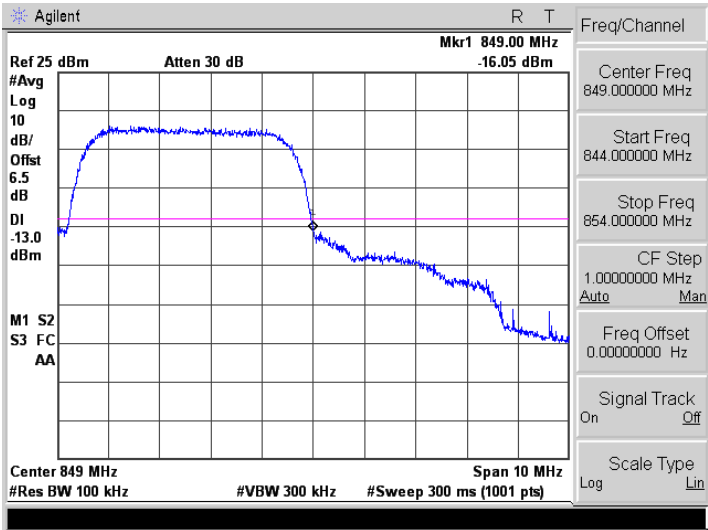
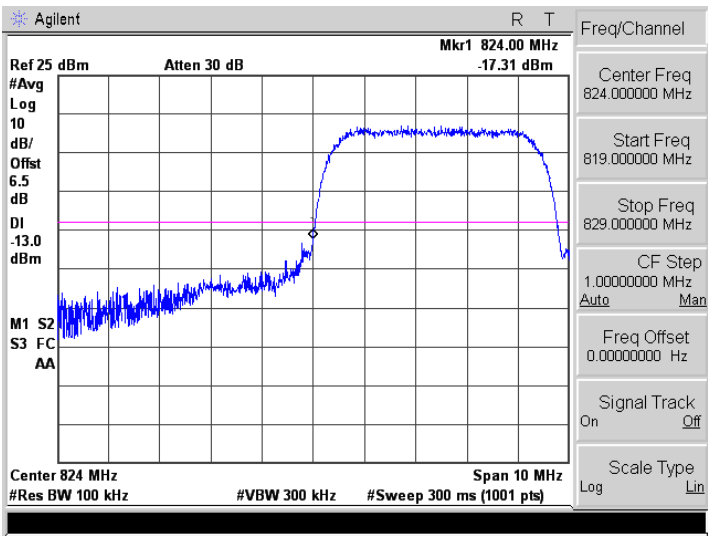




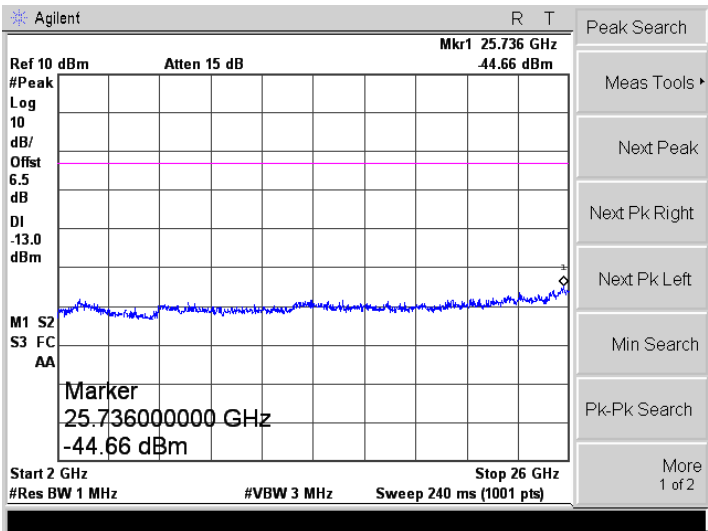
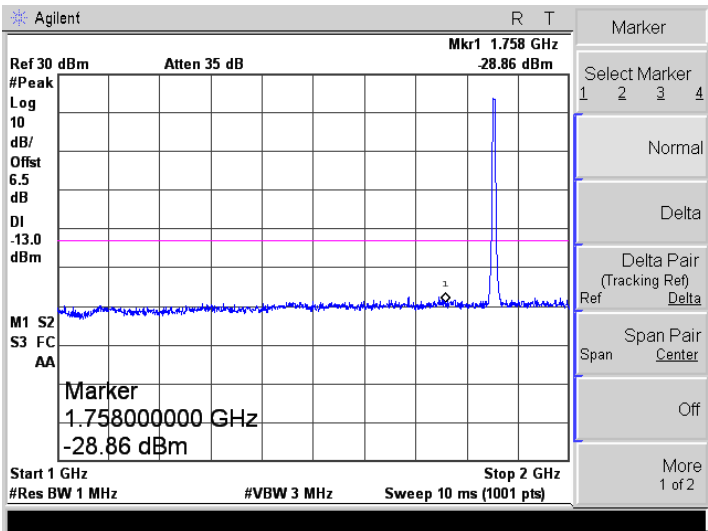
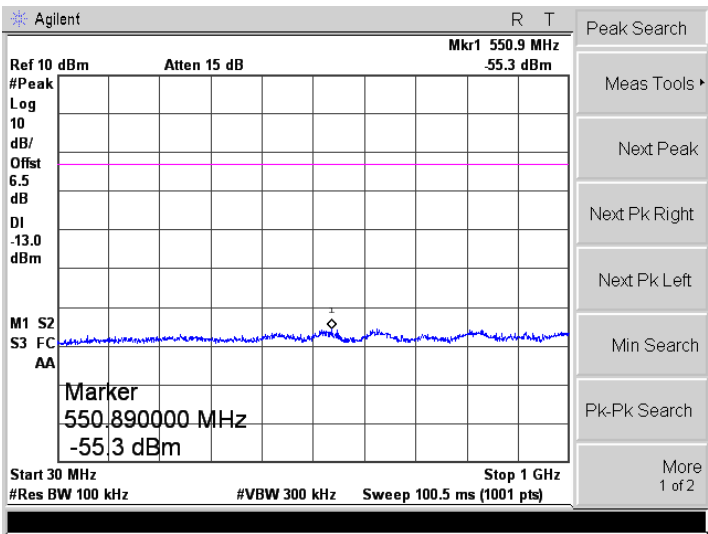
HSUPA Band V-High



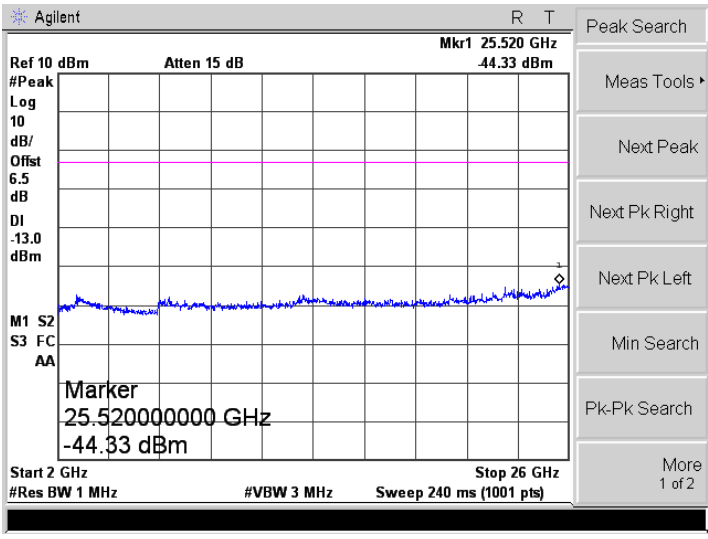
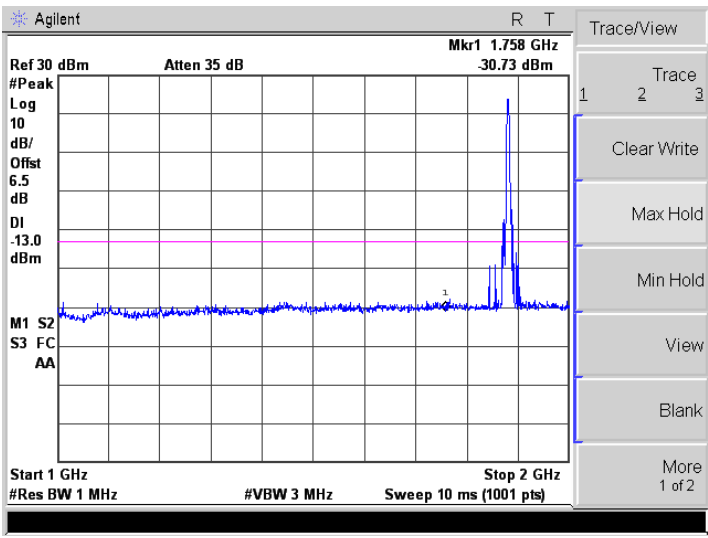
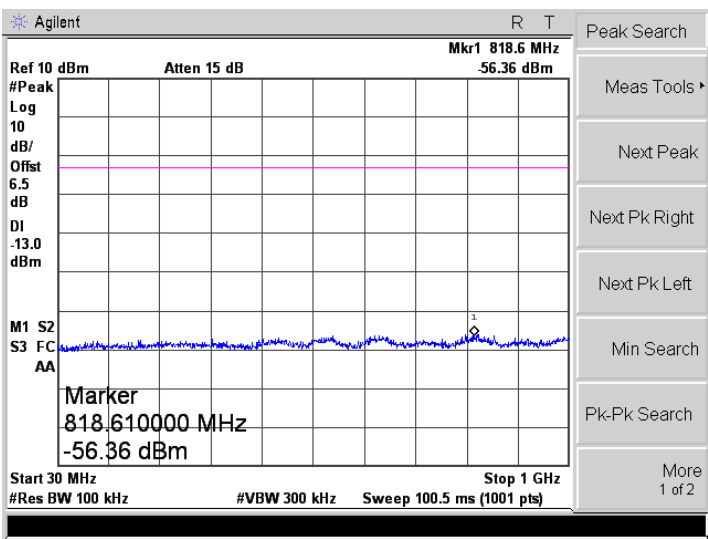
Bandedge



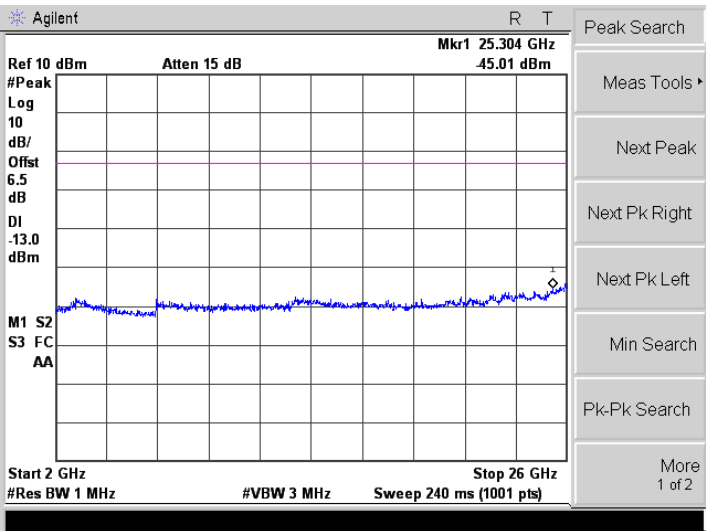
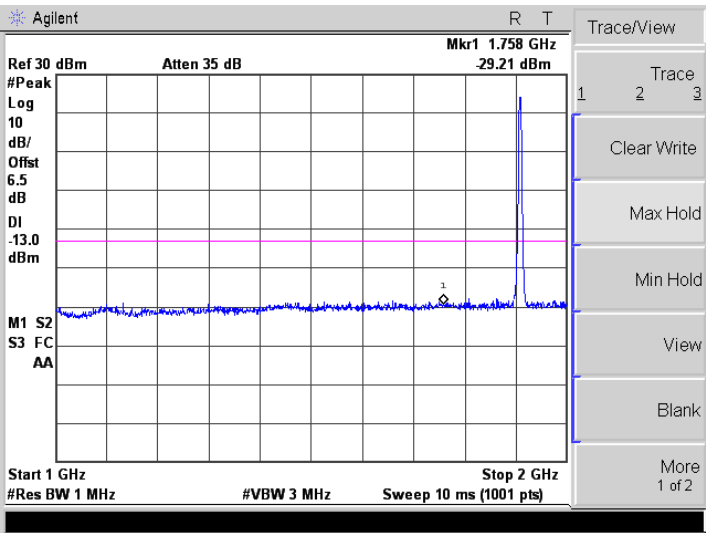
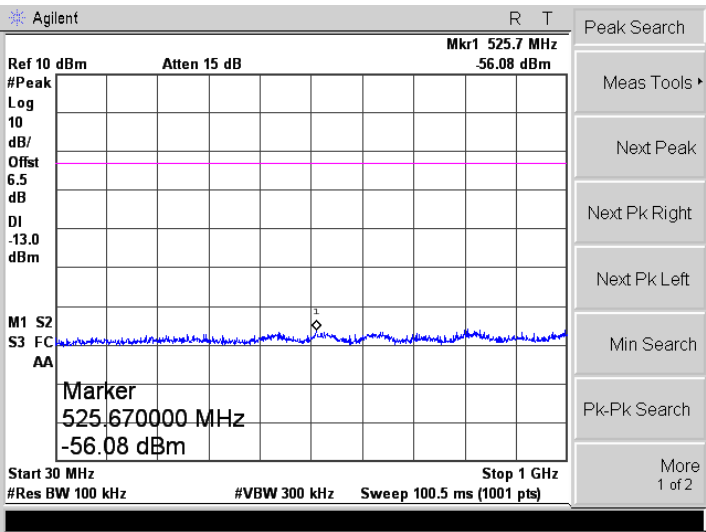
WCDMA Band II-Low



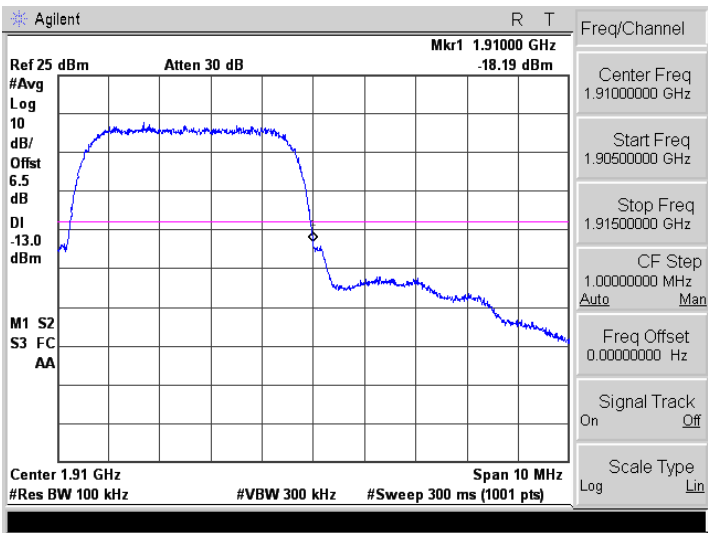
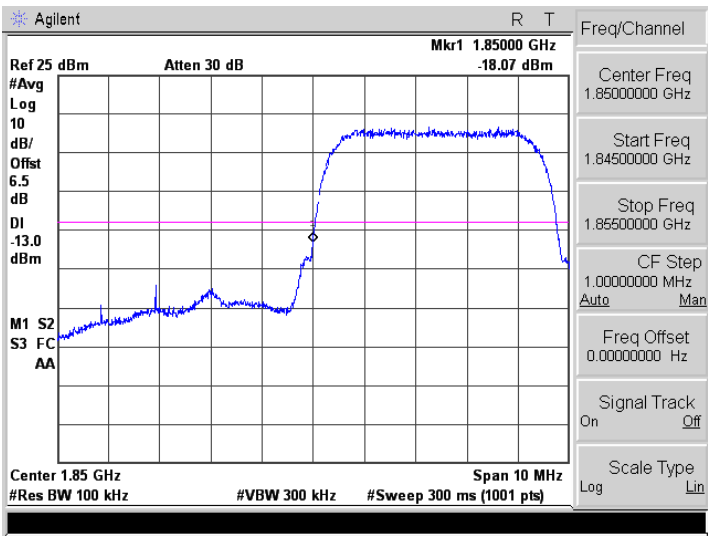
WCDMA Band II-Low



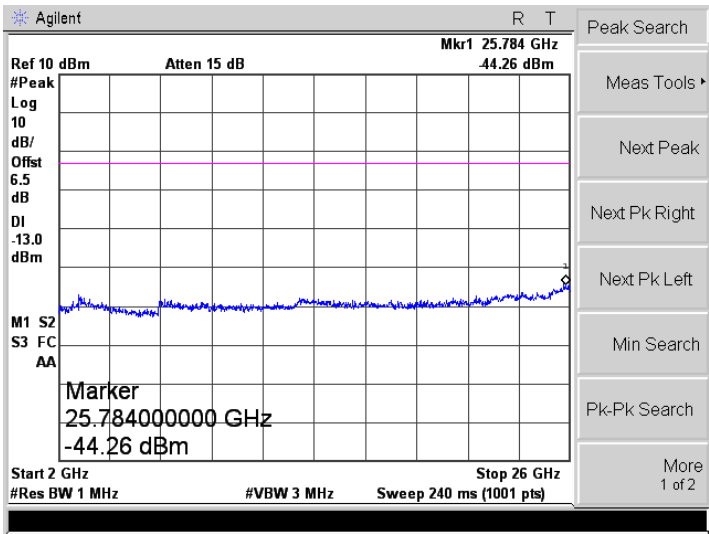
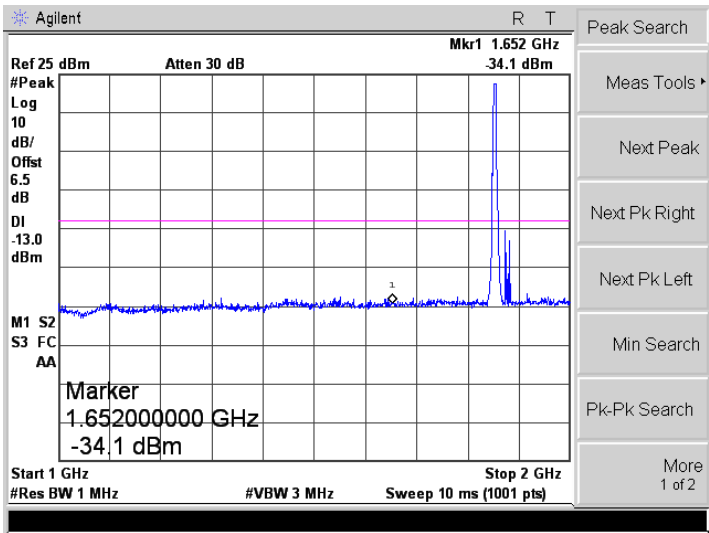
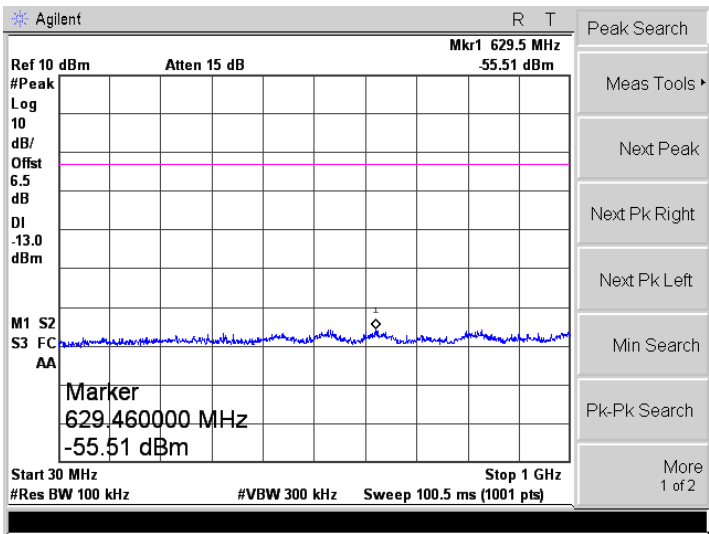
WCDMA Band II-Low



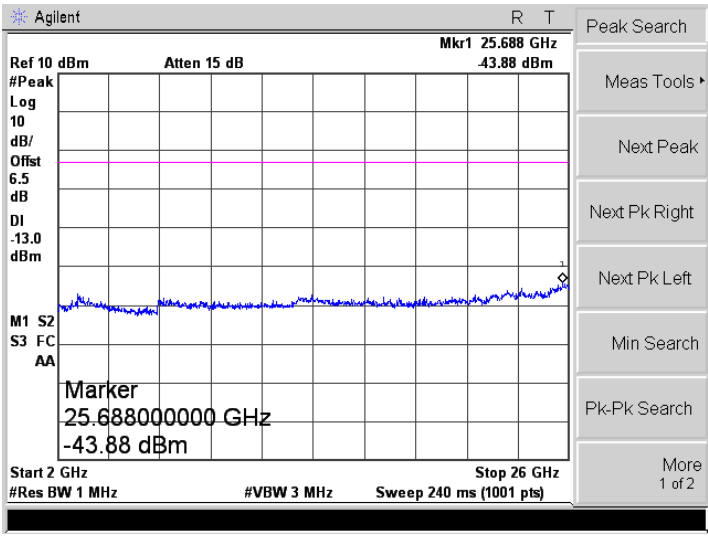
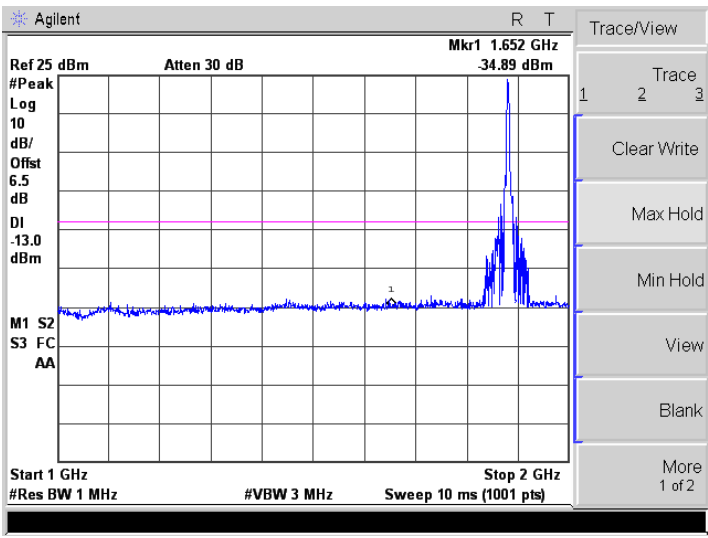
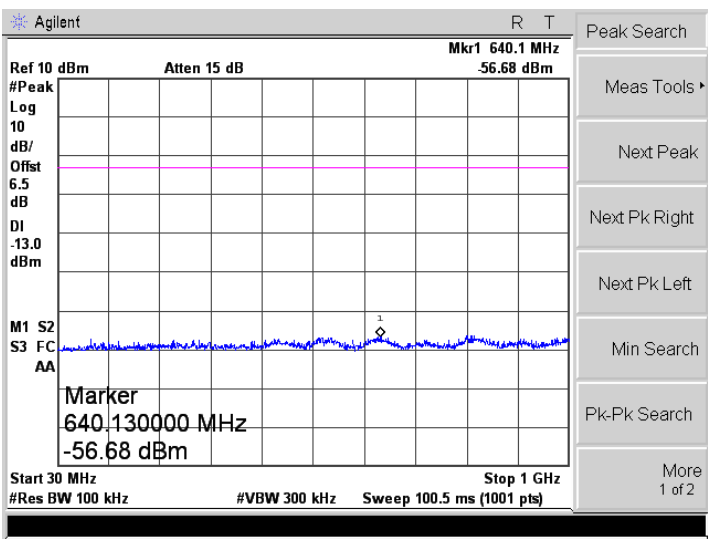
Bandedge



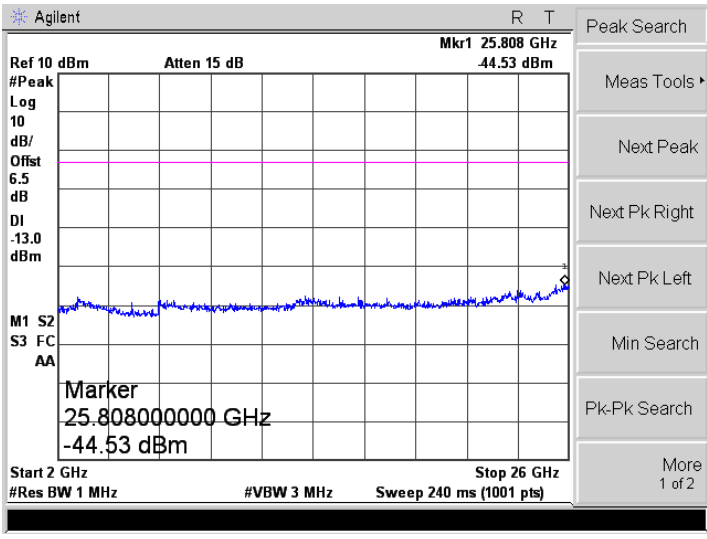
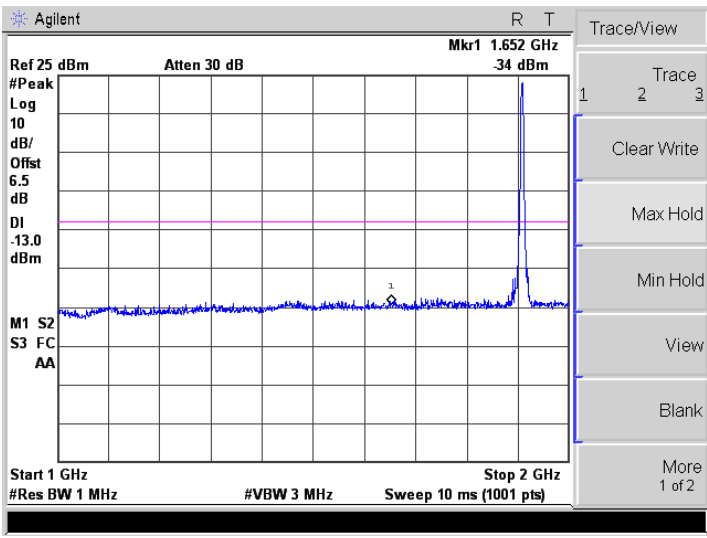
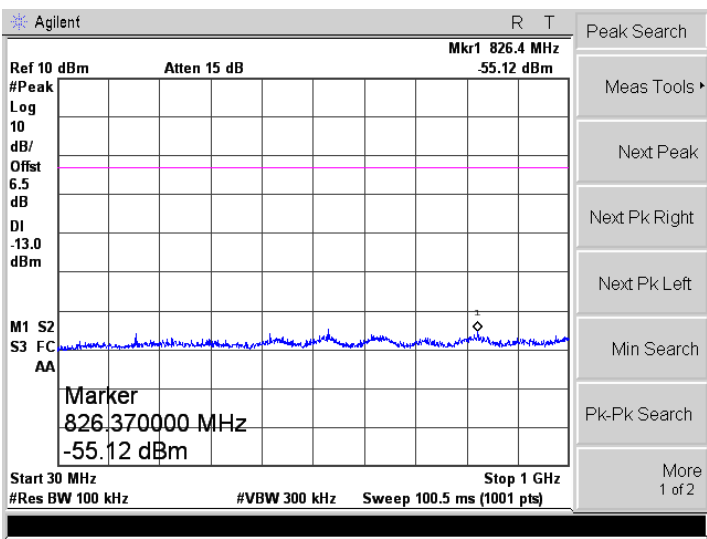
HSDPA Band II-Low



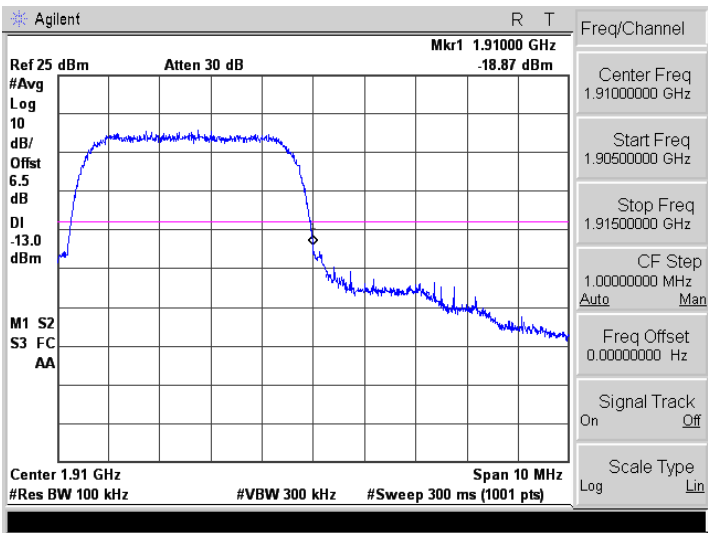
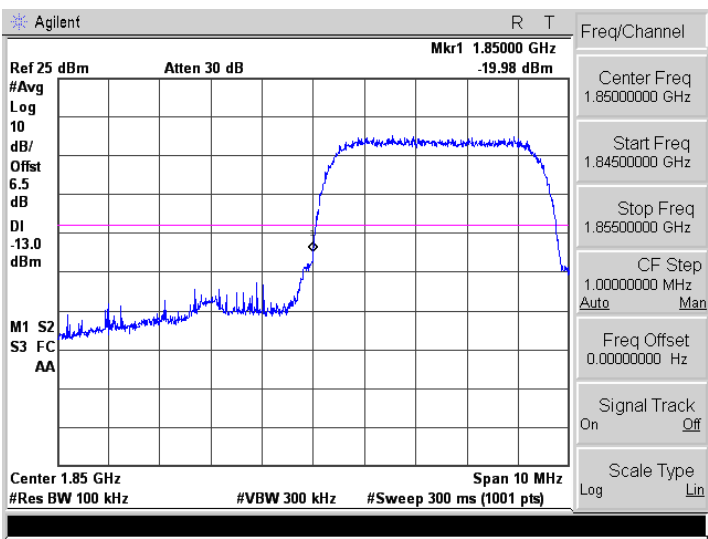
HSDPA Band II-Low



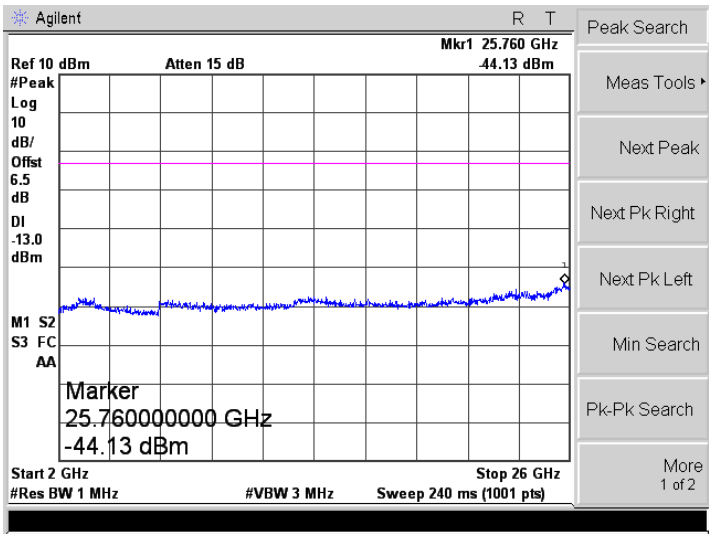
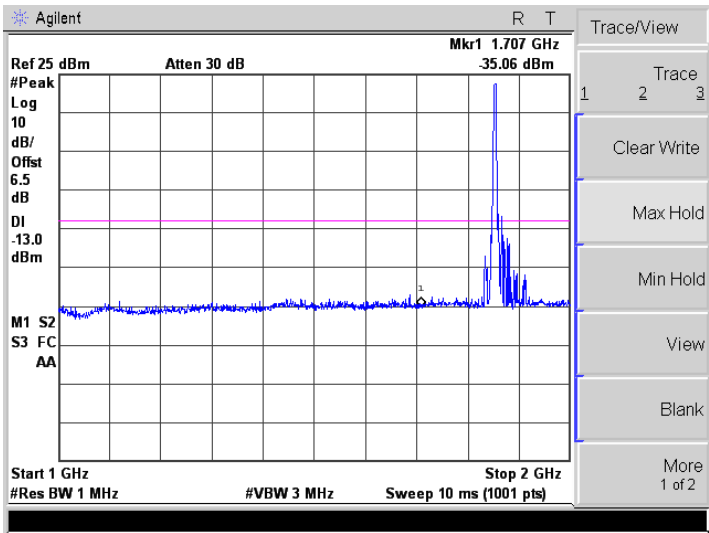
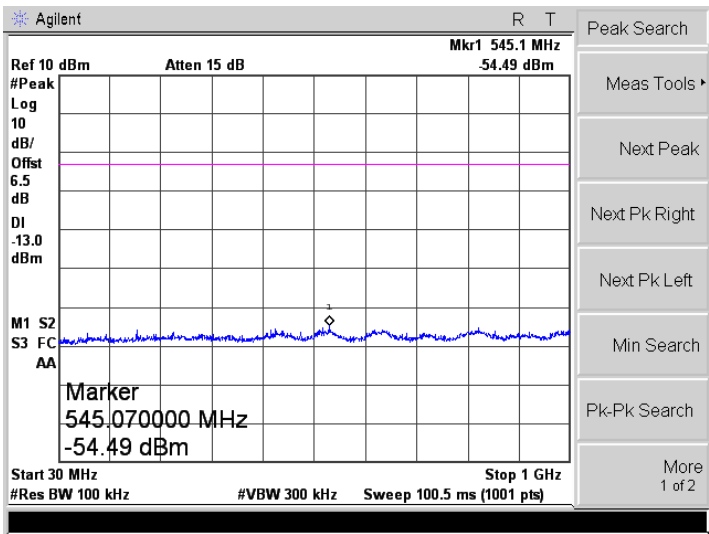
HSDPA Band II-Low



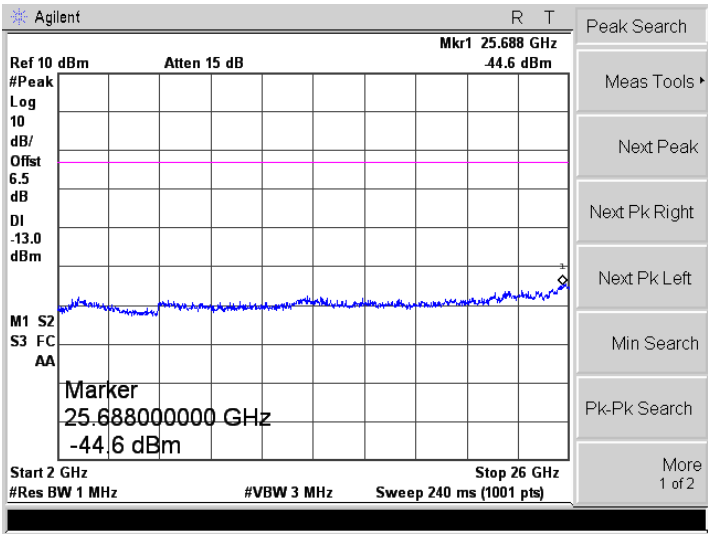
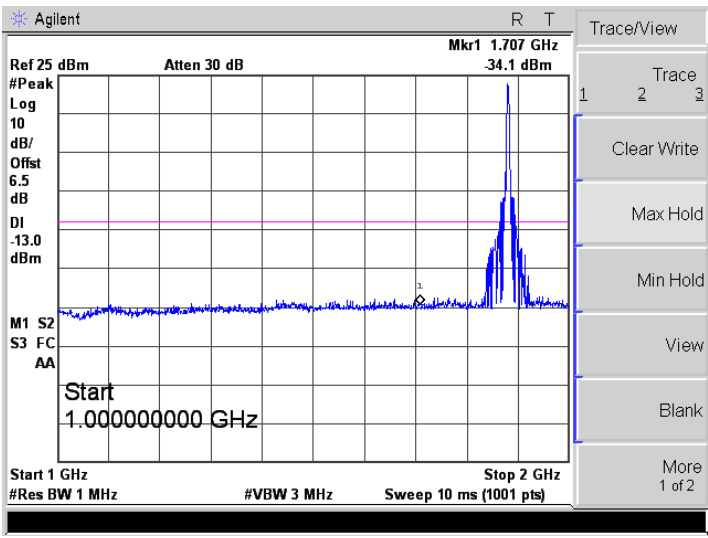
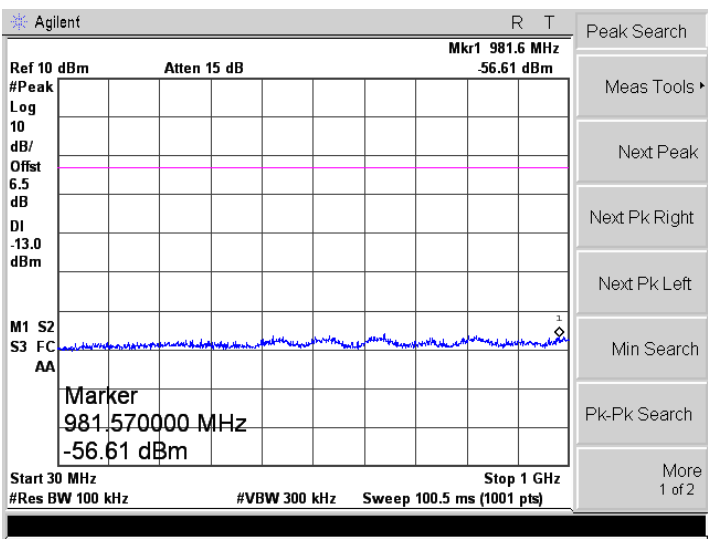
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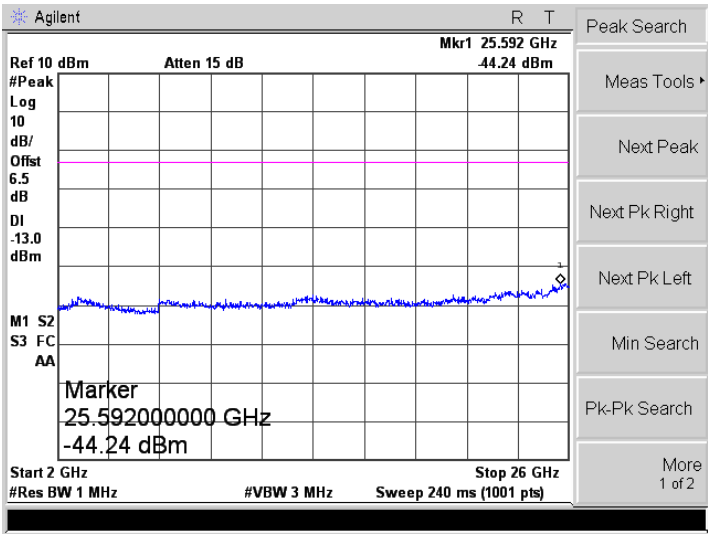
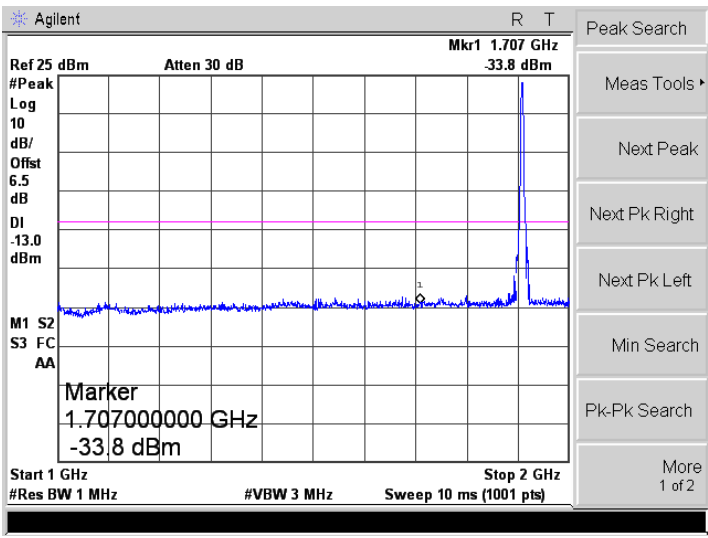
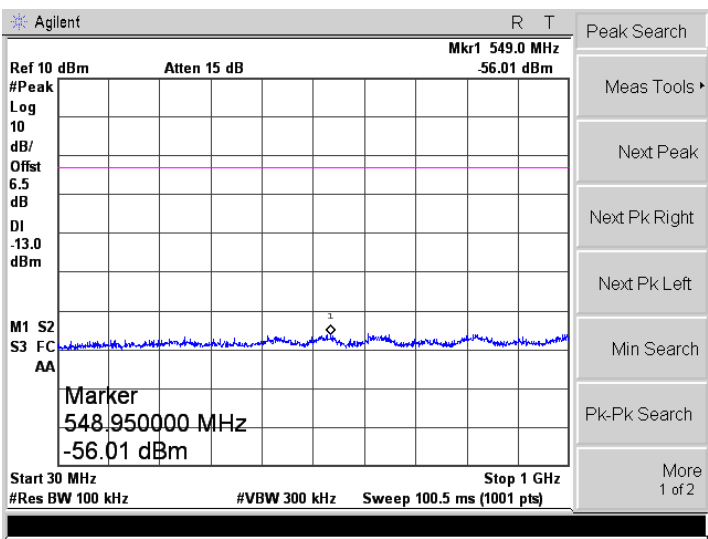
HSUPA Band II-Low



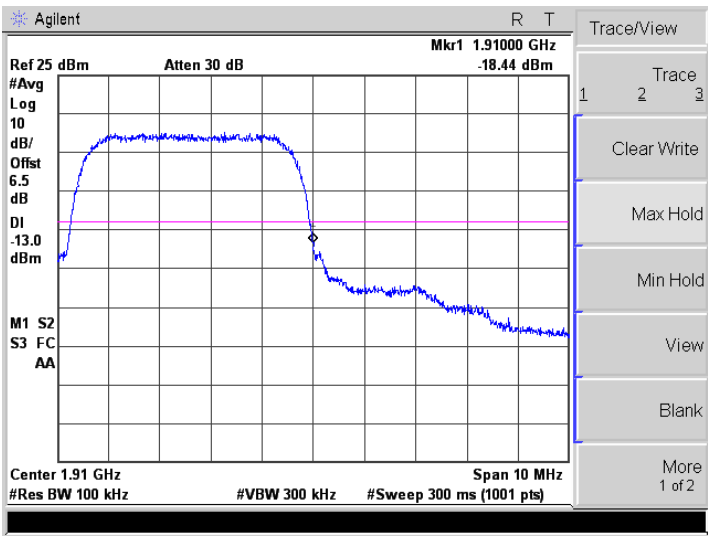
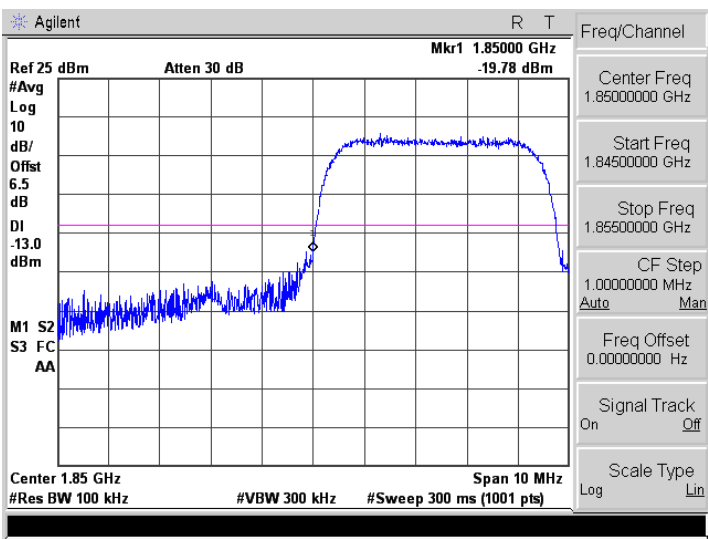
HSUPA Band II-Low



HSUPA Band II-Low



Bandedge



APPENDIX E

Frequency Stability

Note: 1. Worst case at GSM850/PCS1900/WCDMA B2/B5 middle channel

2. Normal Voltage NV=DC3.8V; Low Voltage LV=DC3.5V; High Voltage HV=DC4.35V

➤ Frequency stability V.S. Temperature measurement

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	50	0.0598	2.50	Pass
	-20	44	0.0524		
	-10	39	0.0469		
	0	35	0.0414		
	10	27	0.0322		
	20	22	0.0267		
	30	29	0.0349		
	40	34	0.0405		
	50	38	0.0451		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	62	0.0327	2.50	Pass
	-20	52	0.0278		
	-10	41	0.0217		
	0	37	0.0196		
	10	32	0.0172		
	20	25	0.0135		
	30	32	0.0168		
	40	36	0.0192		
	50	42	0.0225		

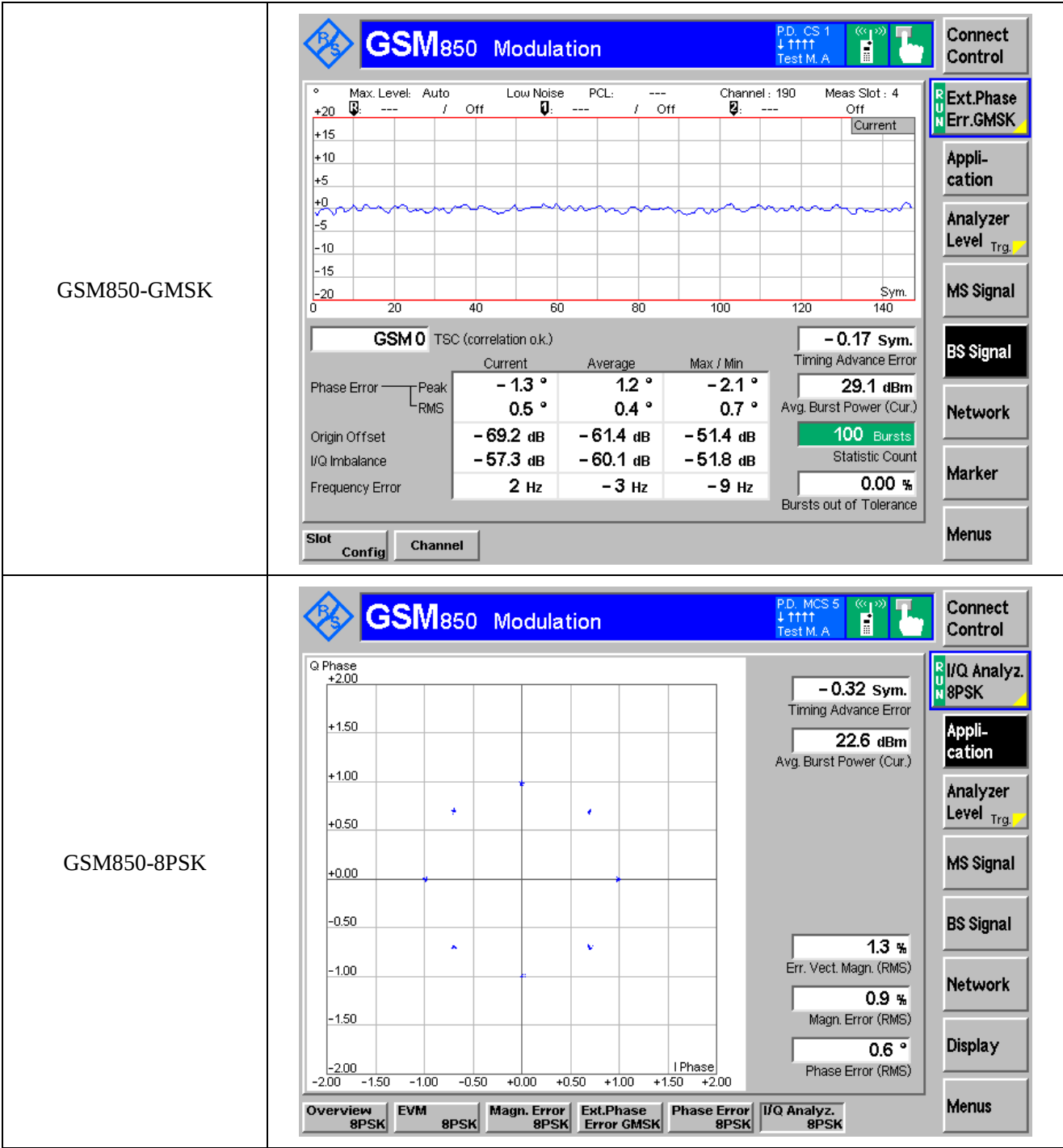
Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	63	0.0754	2.50	Pass
	-20	56	0.0671		
	-10	52	0.0625		
	0	48	0.0570		
	10	41	0.0487		
	20	37	0.0441		
	30	43	0.0515		
	40	50	0.0598		
	50	54	0.0644		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	75	0.0397	2.50	Pass
	-20	62	0.0331		
	-10	55	0.0291		
	0	49	0.0262		
	10	44	0.0233		
	20	36	0.0192		
	30	41	0.0217		
	40	48	0.0258		
	50	53	0.0282		

➤ Frequency stability V.S. Voltage measurement

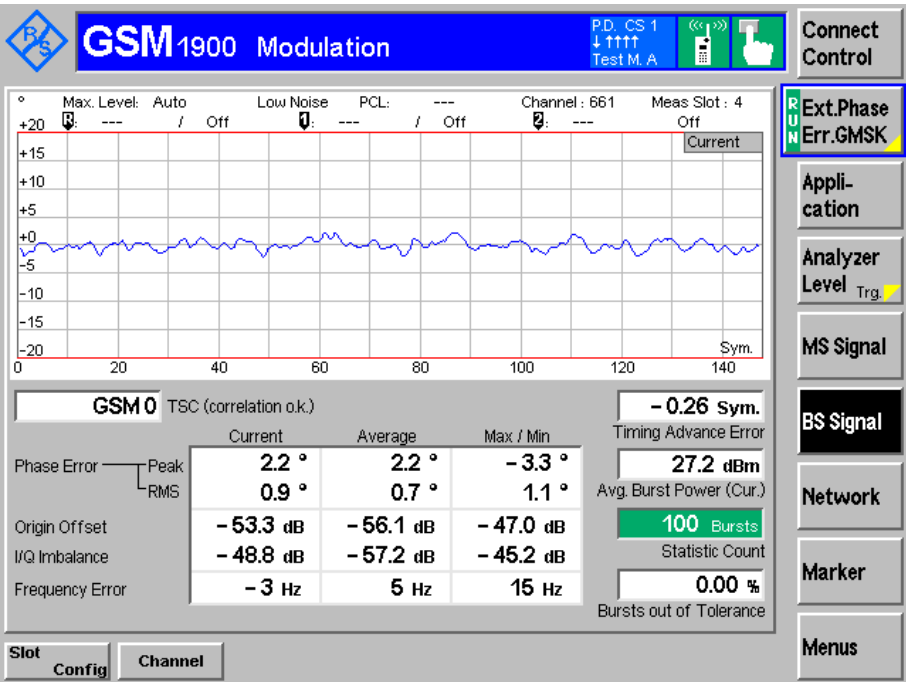
Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	48	0.0570	2.50	Pass
	NV	44	0.0524		
	LV	35	0.0423		
Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	62	0.0331	2.50	Pass
	NV	52	0.0274		
	LV	42	0.0221		
Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	
		Hz	ppm	Result	
25	HV	21	0.0248	2.50	Pass
	NV	25	0.0303		
	LV	32	0.0377		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	34	0.0180	2.50	Pass
	NV	40	0.0213		
	LV	48	0.0254		

APPENDIX F

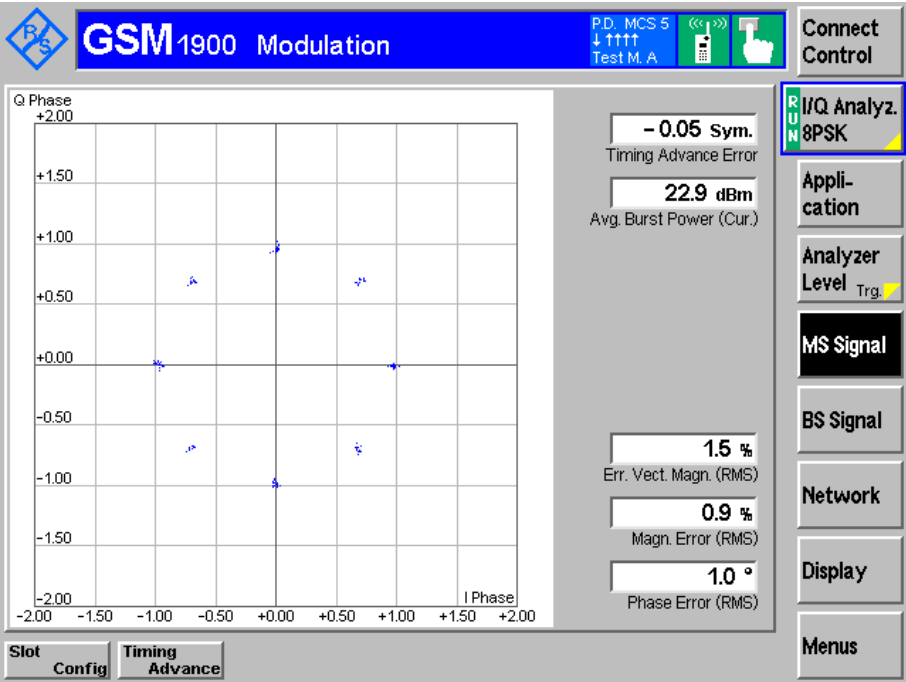
Modulation characteristics



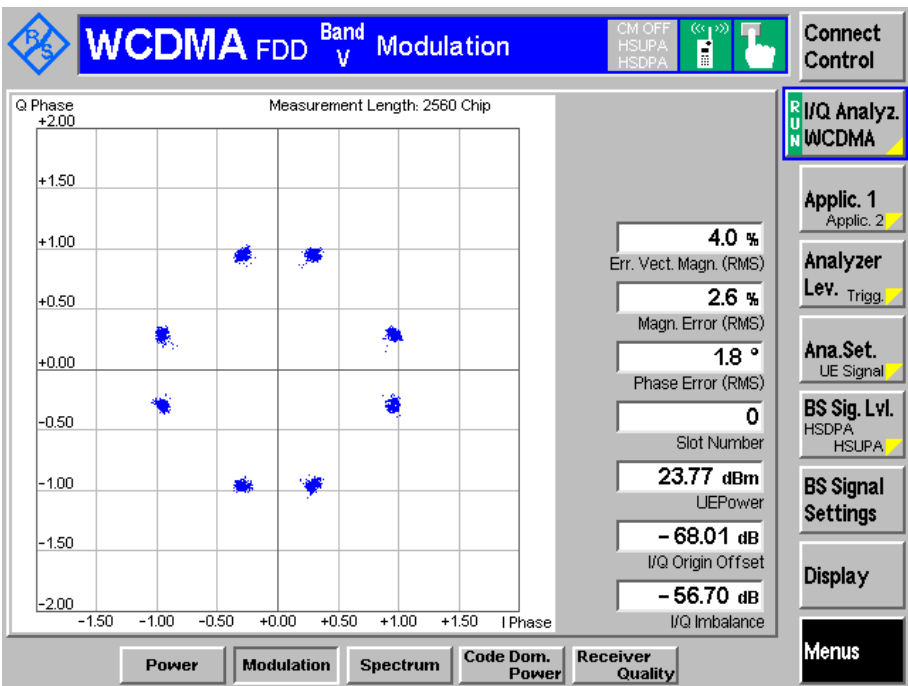
GSM1900-GMSK



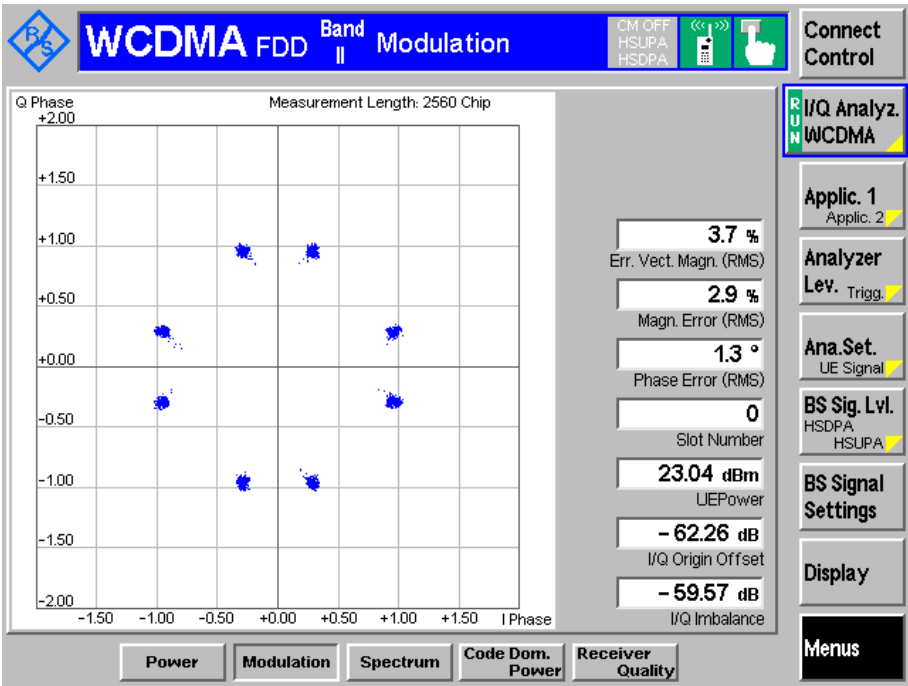
GSM1900-8PSK



WCDMA B5



WCDMA B2



APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

******* END OF REPORT *******