

FCC Part 22H & 24E & 27 Measurement and Test Report

For

Skyring Smart Technologies(Shenzhen) Co., Ltd.

6F GDC Building, 9Gaoxin Central Avenue 3rd, Nanshan District,

Shenzhen, P.R. China

FCC ID: 2AWG8-LIFERINGS5

FCC Rules: FCC Part 22H, FCC Part 24E, FCC Part 27

Product Description: Smart Watch

Tested Model: Life Ring S5

Report No.: WTX20X04018262W-1

Sample Receipt Date: Apr.13, 2020

Tested Date: Apr.13, 2020 to May.18, 2020

Issued Date: May.18, 2020

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Waltek Testing Group (Shenzhen) Co., Ltd.

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**Report version**

Version No.	Date of issue	Description
Rev.00	May.18, 2020	Original
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Skyring Smart Technologies(Shenzhen) Co., Ltd.
Address of applicant: 6F GDC Building, 9Gaoxin Central Avenue 3rd, Nanshan District, Shenzhen, P.R. China

Manufacturer: Skyring Smart Technologies(Shenzhen) Co., Ltd.
Address of manufacturer: 6F GDC Building, 9Gaoxin Central Avenue 3rd, Nanshan District, Shenzhen, P.R. China

General Description of EUT:	
Product Name:	Smart Watch
Brand Name:	SKYRING TECH
Model No.:	Life Ring S5
Adding Model(s):	/
Rated Voltage:	DC3.8V
Battery:	/
Adapter Model:	/
Software Version:	A863_V1.2_200403
Hardware Version:	A863C_MB_V1.1
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: 32.14dBm, GSM1900: 29.42dBm EDGE850: 29.25dBm, EDGE1900: 25.42dBm
Type of Emission:	GSM850: 255KGXW, GSM1900: 259KGXW EDGE850: 248KG7W, EDGE1900: 251KG7W
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -7.49dBi; GSM1900: -1.21dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 4, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 4: 1710~1755MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 4: 2110~2155MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 23.14dBm, WCDMA Band 4: 23.06dBm WCDMA Band 5: 22.59dBm
Type of Emission:	WCDMA Band 2: 4M25F9W WCDMA Band 4: 4M22F9W WCDMA Band 5: 4M23F9W
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: -1.21dBi, WCDMA Band 4: -1.4dBi, WCDMA Band 5: -7.49dBi

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 4	Low, Middle, High Channels
TM11	HSDPA Band 4	Low, Middle, High Channels
TM12	HSUPA Band 4	Low, Middle, High Channels
TM13	WCDMA Band 2	Low, Middle, High Channels
TM14	HSDPA Band 2	Low, Middle, High Channels
TM15	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
WCDMA Band 4	WCDMA/HSDPA/HSUPA	1712.4 MHz	1312
		1732.4 MHz	1412
		1752.6 MHz	1513
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4 MHz	9262
		1880.0 MHz	9400
		1907.6 MHz	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	0.6	Shielded	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	E40	/
Adapter	Philco	WK0501000	/

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	2020-04-28	2021-04-27
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2020-04-28	2021-04-27
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2020-04-28	2021-04-27
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2020-04-28	2021-04-27
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2020-04-28	2021-04-27
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2020-04-28	2021-04-27
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2020-04-28	2021-04-27
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2020-04-28	2021-04-27
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2020-04-28	2021-04-27
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2020-04-28	2021-04-27
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2020-04-28	2021-04-27
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2020-04-28	2021-04-27
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-05-05	2021-05-04
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
SEMT-1042	Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2019-05-05	2021-05-04
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2020-04-28	2021-04-27
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2020-04-28	2021-04-27
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2020-04-28	2021-04-27
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2019-05-05	2021-05-04
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2020-04-28	2021-04-27
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2020-04-28	2021-04-27
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2020-04-28	2021-04-27
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2020-03-17	2021-03-16
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2020-03-17	2021-03-16
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2020-03-17	2021-03-16
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2020-03-17	2021-03-16
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2020-03-17	2021-03-16

SEMT-C006	Cable	Zheng DI	1M0RFC	/	2020-03-17	2021-03-16
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No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2019-04-30	2020-04-29
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2019-04-30	2020-04-29
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2019-04-30	2020-04-29
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2019-04-30	2020-04-29
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2019-04-30	2020-04-29
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2019-04-30	2020-04-29
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2019-04-30	2020-04-29
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2019-04-30	2020-04-29
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2019-04-30	2020-04-29
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2019-04-30	2020-04-29
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2019-04-30	2020-04-29
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2019-04-30	2020-04-29
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2019-04-30	2020-04-29
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2019-04-30	2020-04-29
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2019-04-30	2020-04-29
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2019-04-30	2020-04-29
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2019-04-30	2020-04-29
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2019-04-30	2020-04-29

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
§1.1307, §2.1093	RF Exposure	Compliant
§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 Exposure

3.1 Standard Applicable

According to §1.1307 and §2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR report.

4. RF Output Power

4.1 Standard Applicable

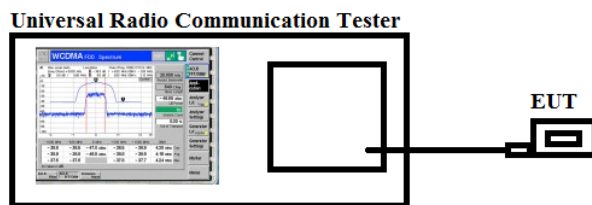
According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

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.

4.2 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.

4.3 Summary of Test Results/Plots

➤ **Max. Radiated Power**

Mode	Channel	Antenna Polar	ERP (dBm)	Limit (dBm)	Result
GSM850	128	V	30.15	<38.45	Pass
		H	24.18		
	190	V	29.46		
		H	23.57		
	251	V	29.13		
		H	23.36		
GPRS850	128	V	30.15	<38.45	Pass
		H	24.36		
	190	V	30.42		
		H	24.17		
	251	V	30.39		
		H	24.25		
EGPRS850	128	V	27.13	<38.45	Pass
		H	22.17		
	190	V	26.64		
		H	21.61		
	251	V	26.75		
		H	21.36		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	512	V	27.46	<33.00	Pass
		H	23.54		
	661	V	27.69		
		H	23.97		
	810	V	27.46		
		H	23.35		
GPRS1900	512	V	27.13	<33.00	Pass
		H	24.11		
	661	V	27.06		
		H	23.98		
	810	V	27.16		
		H	24.03		
EGPRS1900	512	V	22.36	<33.00	Pass
		H	18.65		
	661	V	22.62		
		H	18.37		
	810	V	22.02		
		H	18.39		

Mode	Channel	Antenna Polar	ERP	Limit (dBm)	Result
WCDMA Band V	4132	V	20.05	<38.45	Pass
		H	16.36		
	4183	V	20.54		
		H	16.49		
	4233	V	20.07		
		H	16.39		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band IV	1312	V	21.78	<30.00	Pass
		H	16.43		
	1412	V	21.39		
		H	16.97		
	1513	V	21.47		
		H	16.54		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band II	9262	V	21.17	<33.00	Pass
		H	17.35		
	9400	V	21.03		
		H	17.36		
	9538	V	21.16		
		H	17.46		

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

➤ **Max. Conducted Power (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	32.04	31.97	31.76	29.42	29.28	29.11
GPRS(1Slot)	32.11	32.14	32.07	29.38	29.26	29.09
EGPRS(1Slot)	29.25	28.19	28.93	25.42	25.06	24.57

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	22.59	22.58	22.23	23.14	22.96	22.80
HSDPA Subtest-1	22.00	21.94	21.72	22.05	21.90	21.92
HSDPA Subtest-2	21.96	21.92	21.70	22.03	21.89	21.87
HSDPA Subtest-3	21.97	21.93	21.69	22.01	21.87	21.89
HSDPA Subtest-4	21.96	21.94	21.67	22.02	21.86	21.87
HSUPA Subtest-1	21.62	21.70	21.35	22.20	22.03	21.83
HSUPA Subtest-2	21.6	21.68	21.32	22.16	22.01	21.81
HSUPA Subtest-3	21.59	21.67	21.32	22.18	22.01	21.82
HSUPA Subtest-4	21.57	21.68	21.33	22.19	22.02	21.81
HSUPA Subtest-5	21.58	21.69	21.34	22.19	22.01	21.81



Conducted Average power (dBm)						
Band	WCDMA Band IV					
Channel	1312	1412	1513			
Frequency(MHz)	1712.4	1733.4	1752.6			
RMC 12.2k	23.01	23.06	22.98			
HSDPA Subtest-1	21.78	21.91	21.8			
HSDPA Subtest-2	21.76	21.87	21.76			
HSDPA Subtest-3	21.76	21.89	21.75			
HSDPA Subtest-4	21.75	21.87	21.77			
HSUPA Subtest-1	22.02	22.19	21.88			
HSUPA Subtest-2	22.01	22.16	22.85			
HSUPA Subtest-3	22	22.16	22.86			
HSUPA Subtest-4	22	22.17	22.87			
HSUPA Subtest-5	22.01	22.17	22.87			

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

5.1 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.

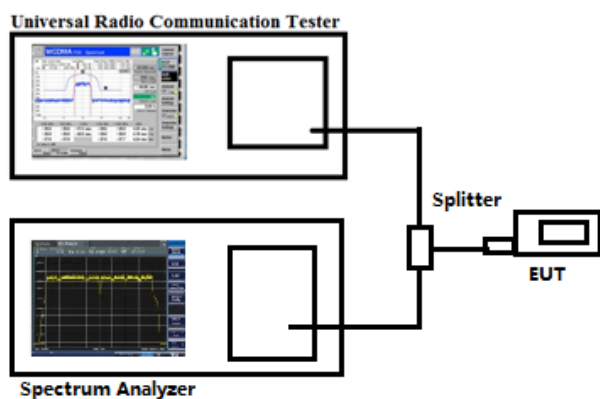
According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for 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.

5.2 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:



5.3 Summary of Test Results

PCS1900				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	661	1850.2	6.47	13
GPRS(1 Slot)	661	1850.2	6.21	13
EDGE(1 Slot)	661	1850.2	6.57	13

WCDMA Band IV				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	1312	1712.4	5.16	13
	1412	1733.4	5.69	13
	1513	1752.6	5.04	13

WCDMA Band II				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	9262	1852.4	6.21	13
	9400	1880.0	5.95	13
	9538	1907.6	5.78	13

Note: Only the worst case was selected to record.

6. Emission Bandwidth

6.1 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.

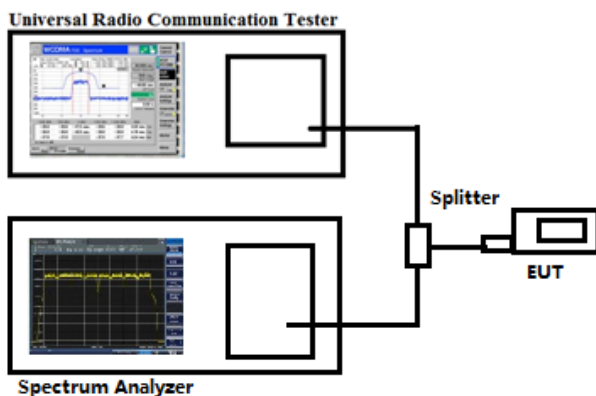
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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.

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 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:



6.3 Summary of Test Results/Plots

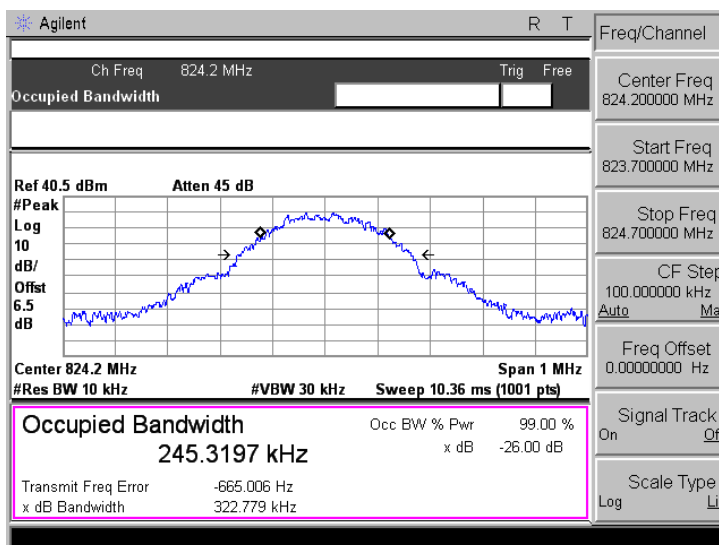
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
GSM 850 (GMSK)	128	824.20	245.3197	322.779
	190	836.60	249.0214	324.056
	251	848.80	247.3674	316.400
GPRS850 (GMSK,1Slot)	128	824.20	253.1890	325.414
	190	836.60	255.1573	320.006
	251	848.80	243.7841	319.472
EGPRS850 (8PSK,1Slot)	128	824.20	246.7499	326.993
	190	836.60	247.0755	323.689
	251	848.80	247.9899	324.495
PCS1900 (GMSK)	512	1850.20	238.8218	308.177
	661	1880.00	247.7272	315.201
	810	1909.80	242.8918	317.887
GPRS1900 (GMSK,1Slot)	512	1850.20	250.1874	319.790
	661	1880.00	244.0706	301.714
	810	1909.80	258.8756	319.774
EGPRS1900 (8PSK,1Slot)	512	1850.20	245.9128	310.454
	661	1880.00	251.1806	311.282
	810	1909.80	249.5030	317.546



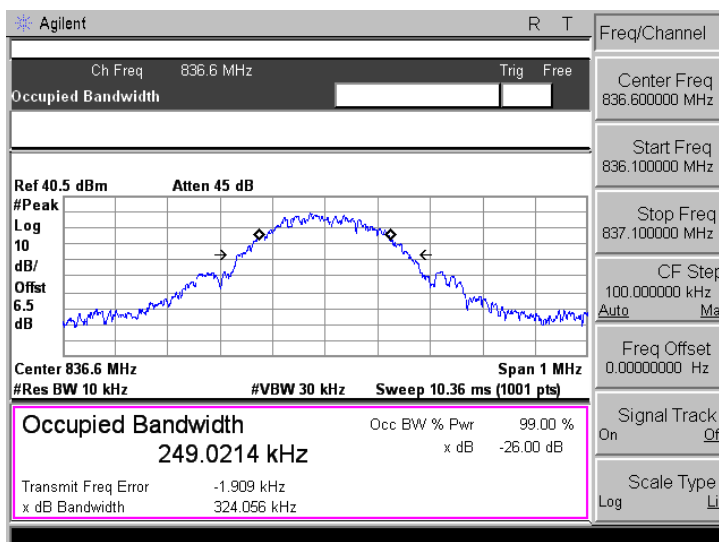
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
WCDMA Band V	4132	826.40	4210.9	4856
	4183	836.60	4229.2	4875
	4233	846.60	4203.5	4857
HSDPA	4132	826.40	4210.5	4853
	4183	836.60	4233.8	4886
	4233	846.60	4199.7	4847
HSUPA	4132	826.40	4203.9	4866
	4183	836.60	4227.9	4875
	4233	846.60	4225.0	4831
WCDMA Band II	9262	1852.40	4210.6	4908
	9400	1880.00	4232.3	4892
	9538	1907.60	4224.3	4893
HSDPA	9262	1852.40	4223.4	4853
	9400	1880.00	4220.8	4901
	9538	1907.60	4226.1	4876
HSUPA	9262	1852.40	4212.2	4866
	9400	1880.00	4245.5	4883
	9538	1907.60	4222.3	4874
WCDMA Band IV	1312	1712.4	4213.7	4887
	1412	1733.4	4218.5	4873
	1513	1752.6	4216.9	4836
HSDPA	1312	1712.4	4206.4	4844
	1412	1733.4	4213.3	4843
	1513	1752.6	4217.9	4875
HSUPA	1312	1712.4	4201.0	4862
	1412	1733.4	4211.1	4878
	1513	1752.6	4212.9	4874

GSM900

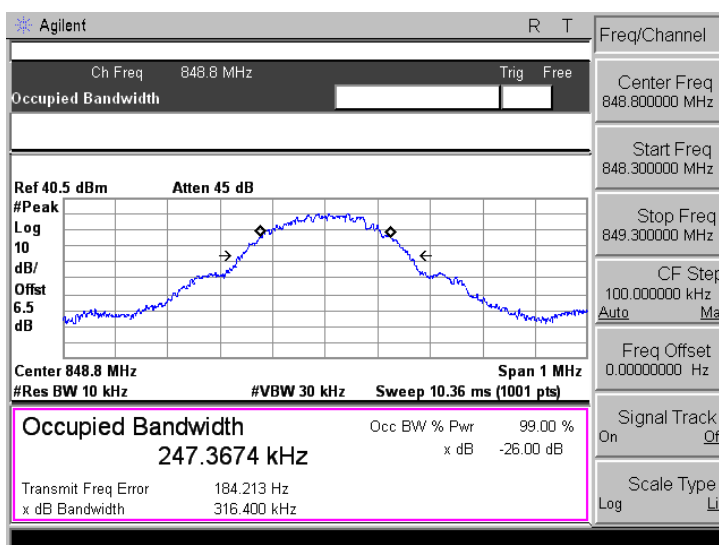
Low Channel



Middle Channel

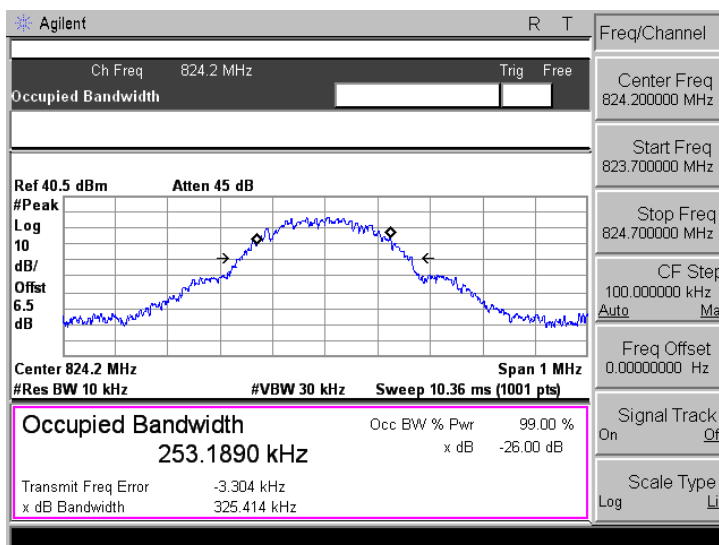


High Channel

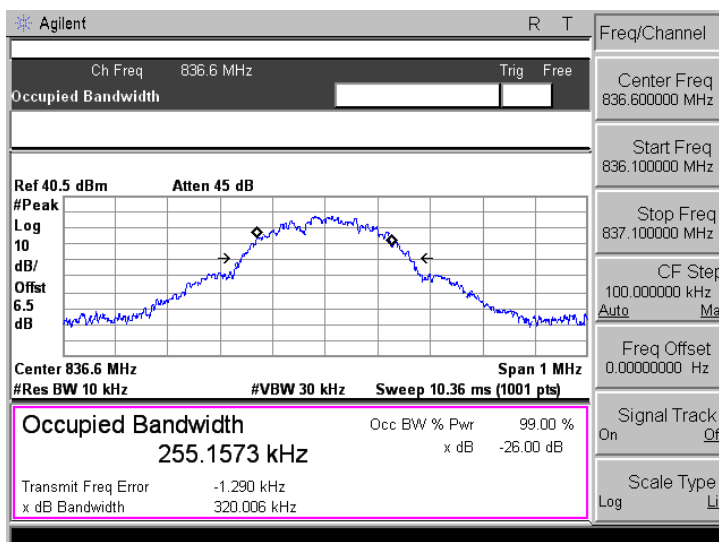


GPRS900

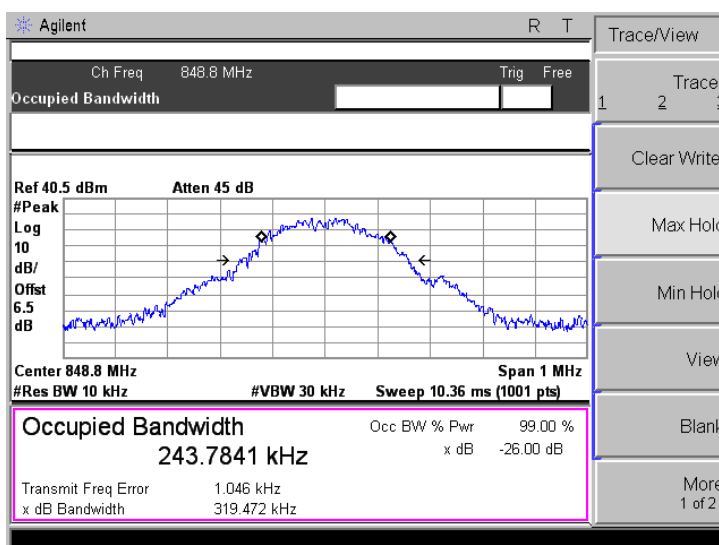
Low Channel



Middle Channel

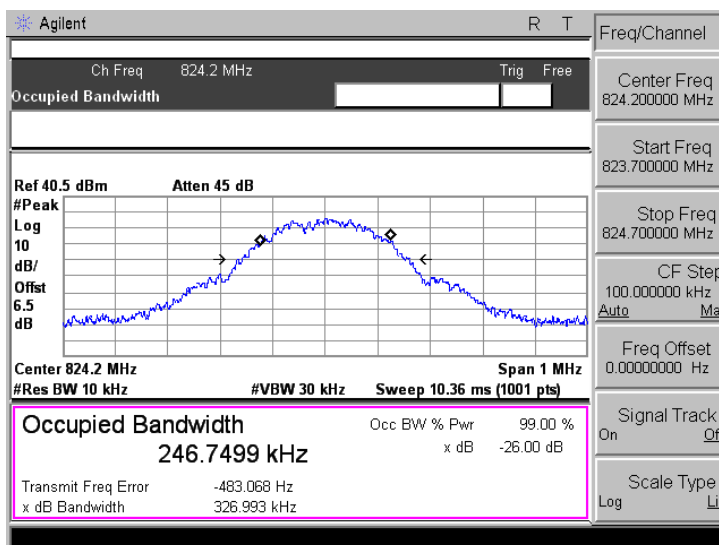


High Channel

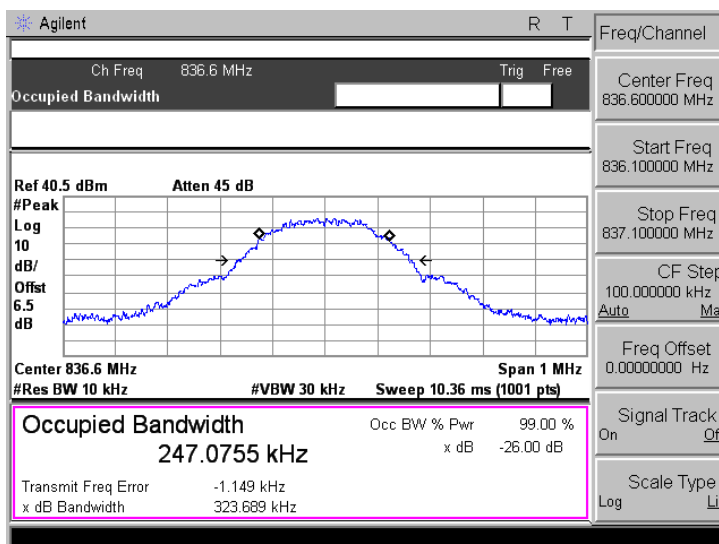


EGPRS900

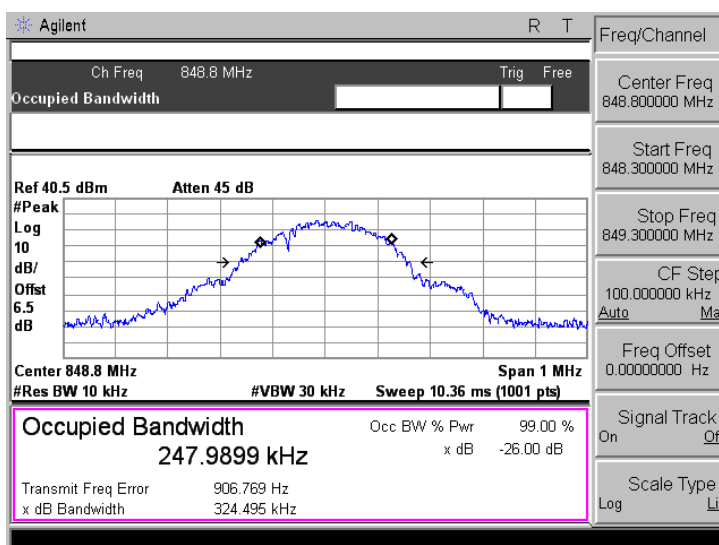
Low Channel



Middle Channel

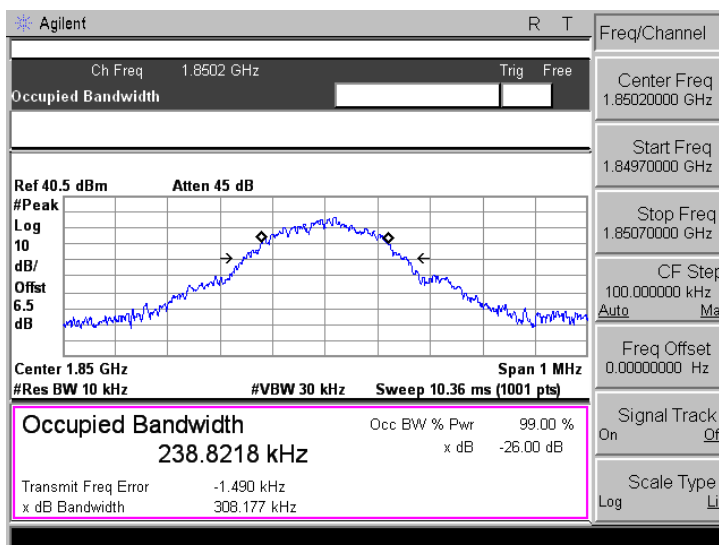


High Channel

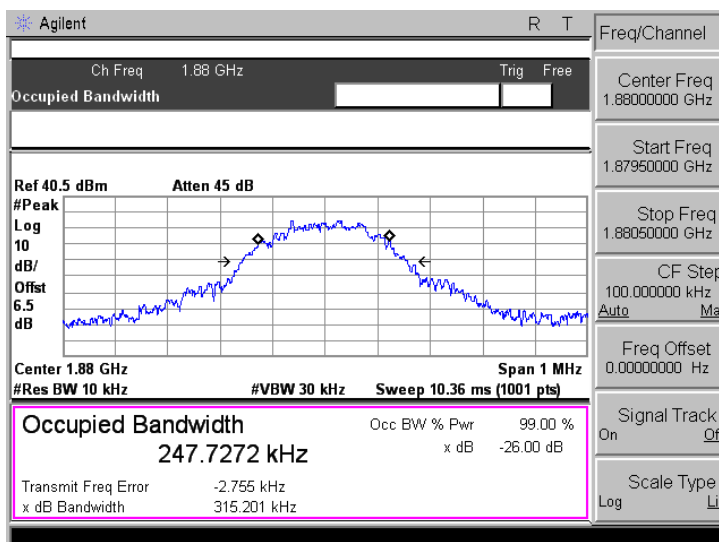


PCS1900

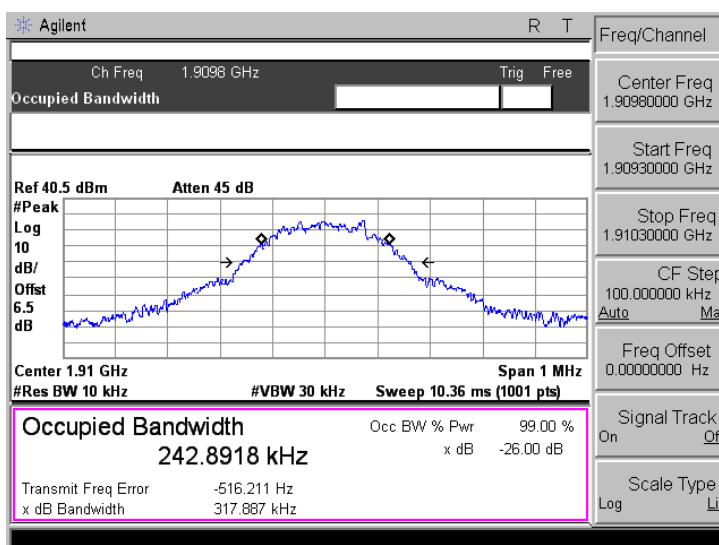
Low Channel



Middle Channel

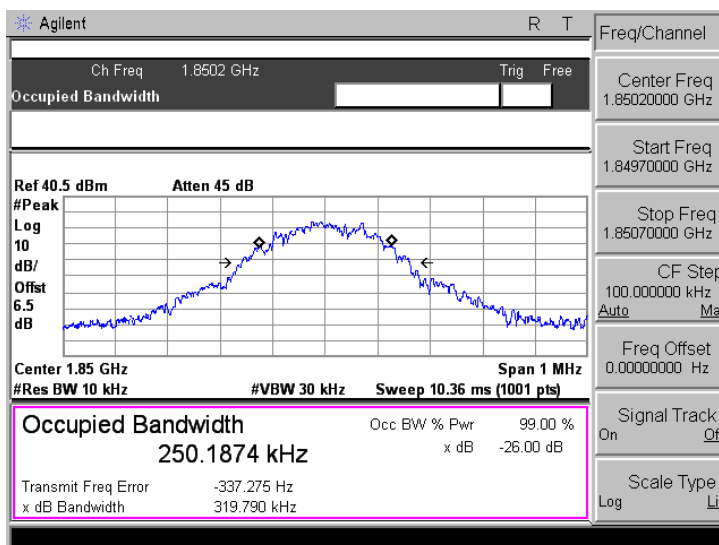


High Channel

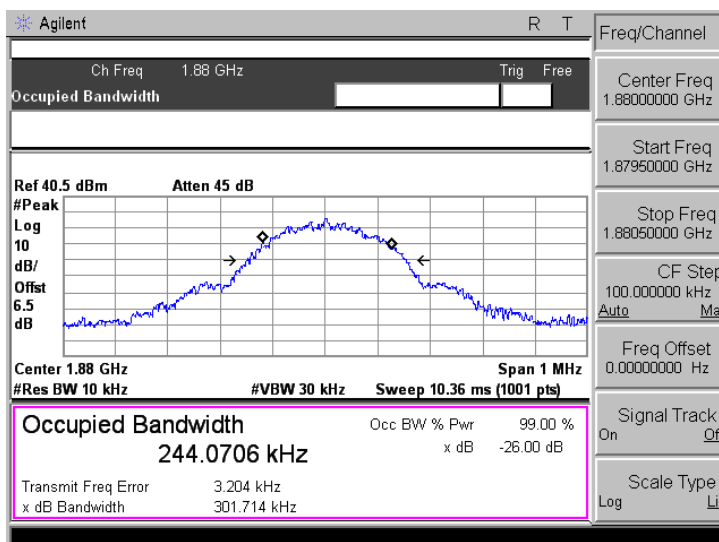


GPRS1900

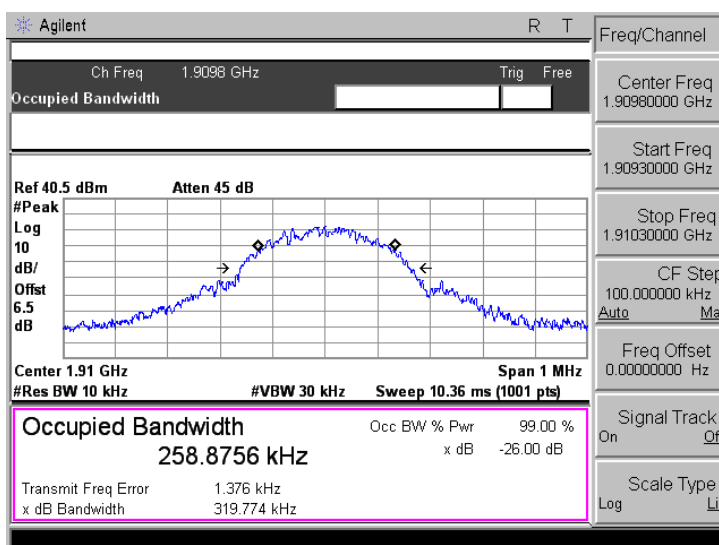
Low Channel



Middle Channel

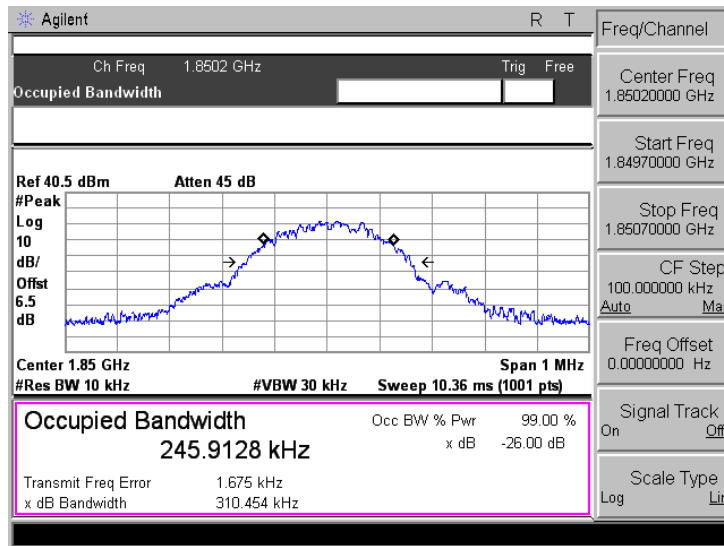


High Channel

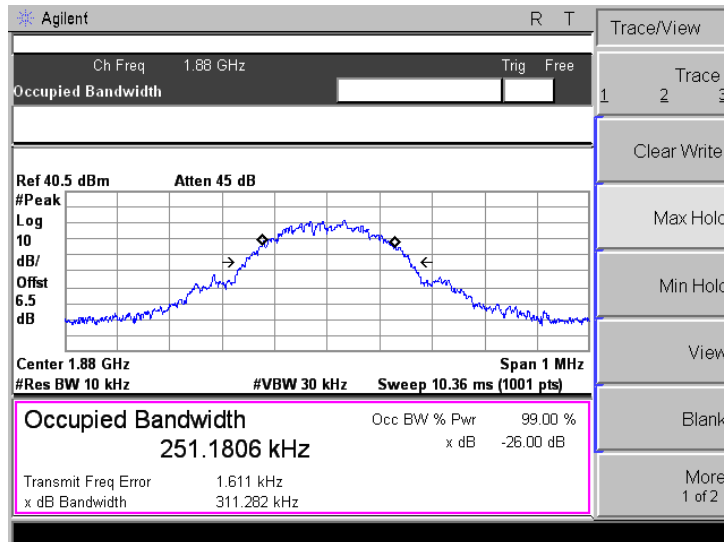


EGPRS1900

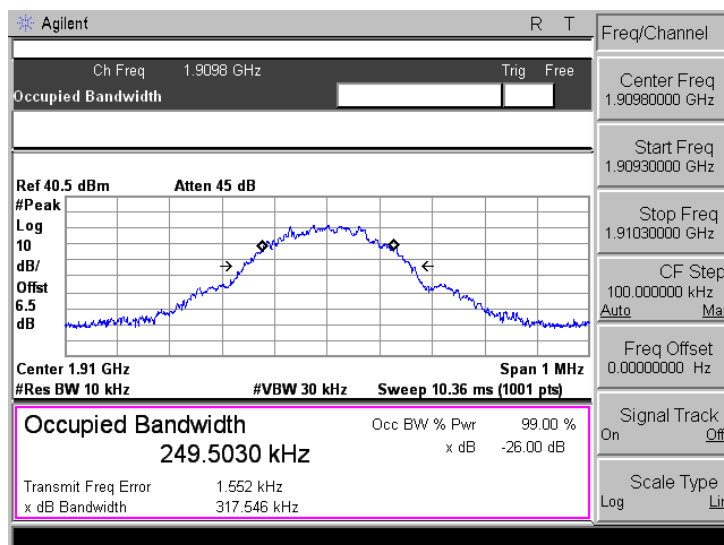
Low Channel



Middle Channel

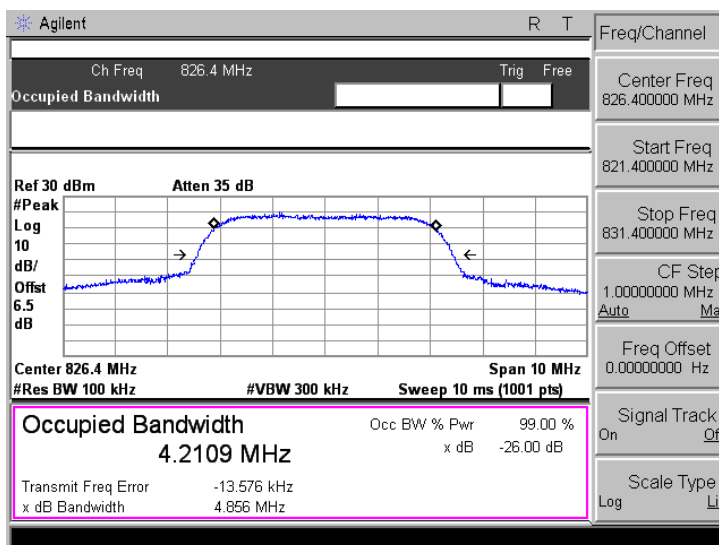


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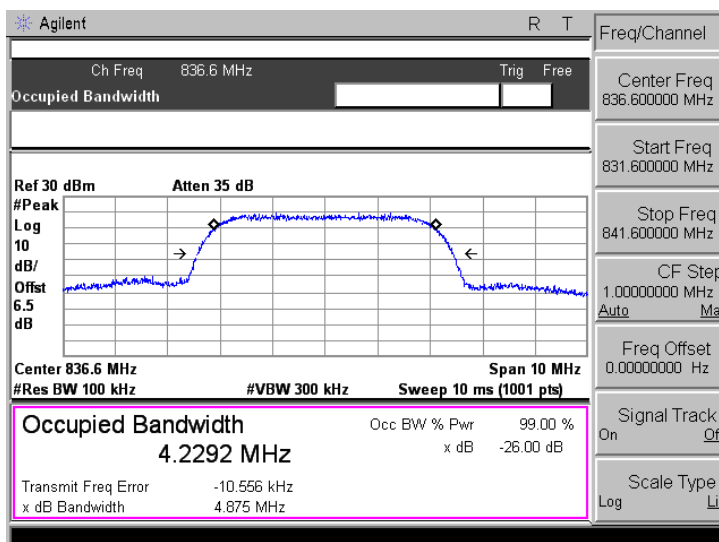


WCDMA Band V

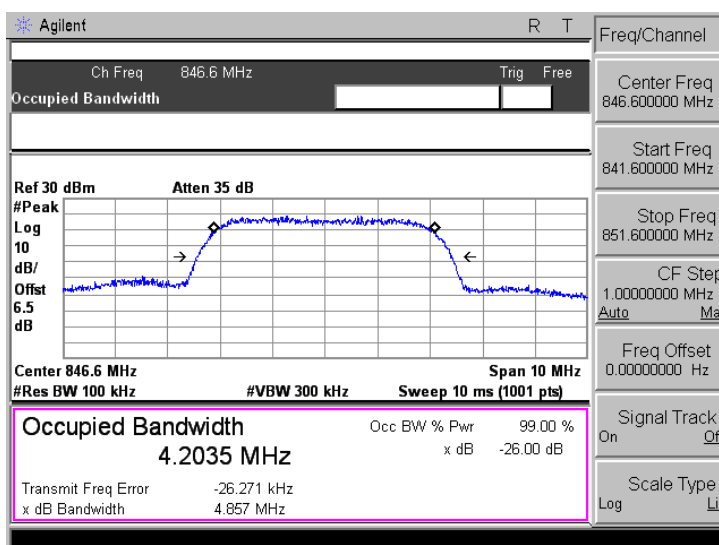
Low Channel



Middle Channel

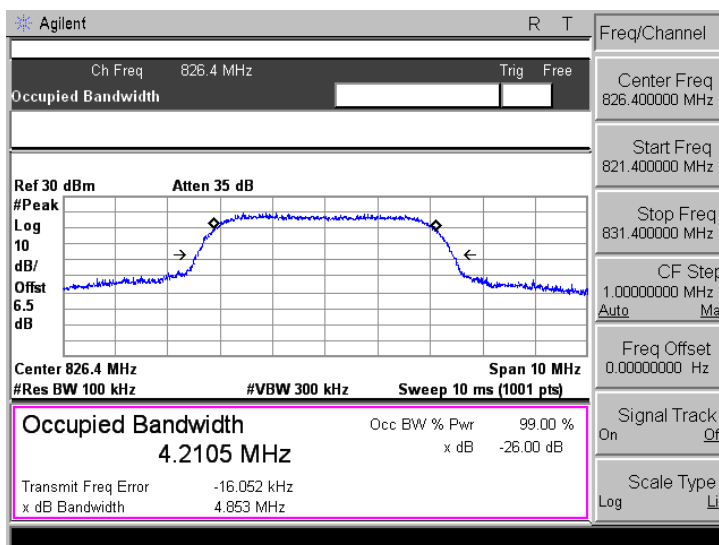


High Channel

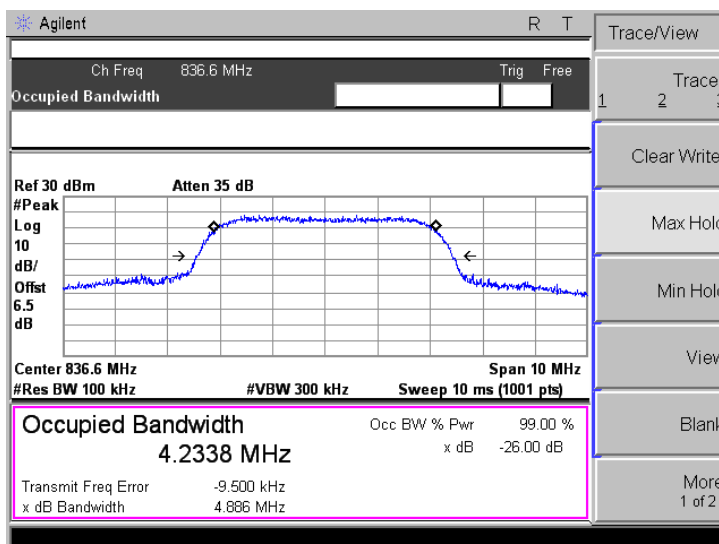


WCDMA Band V- HSDPA

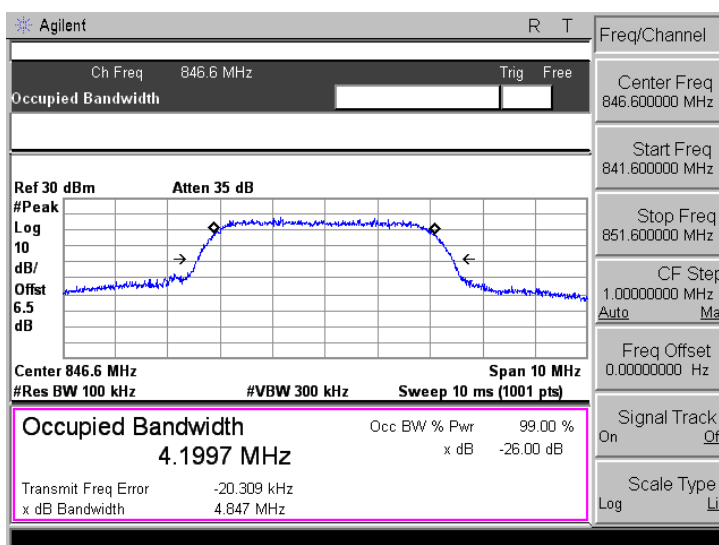
Low Channel



Middle Channel

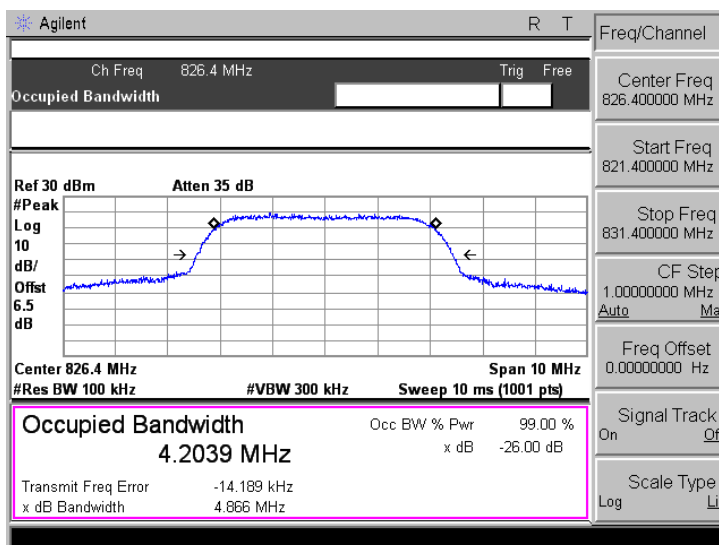


High Channel

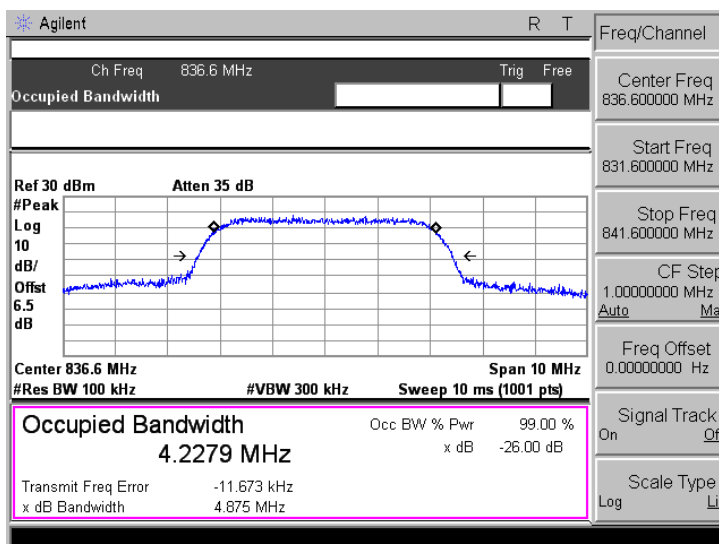


WCDMA Band V- HSUPA

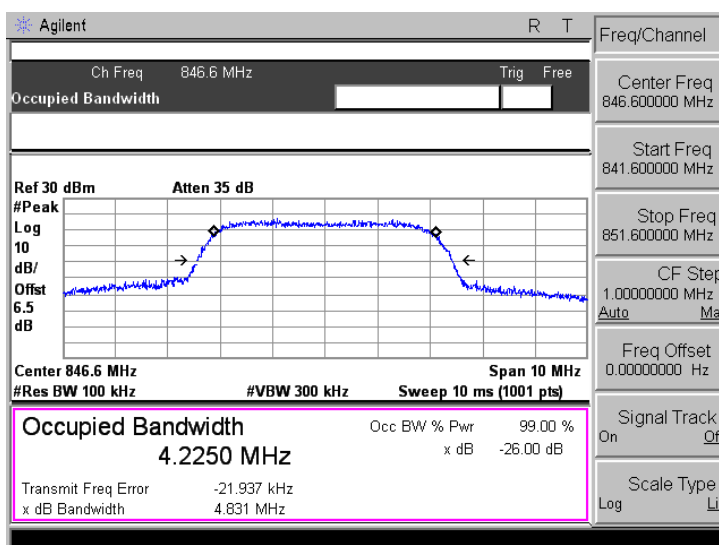
Low Channel



Middle Channel

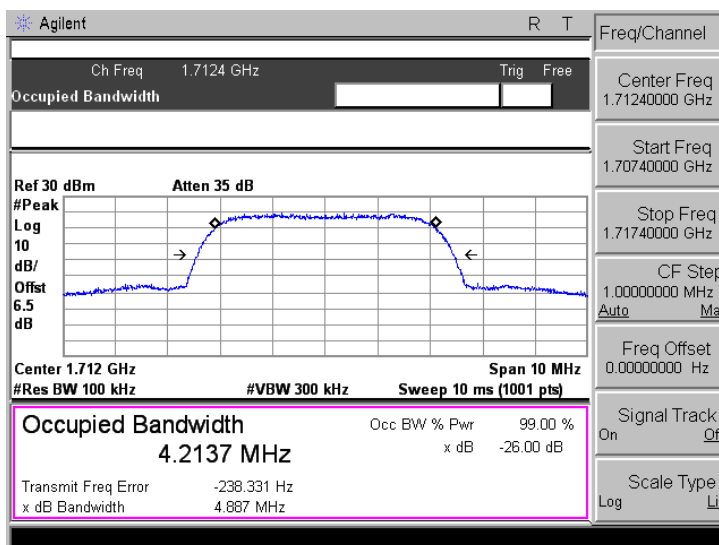


High Channel

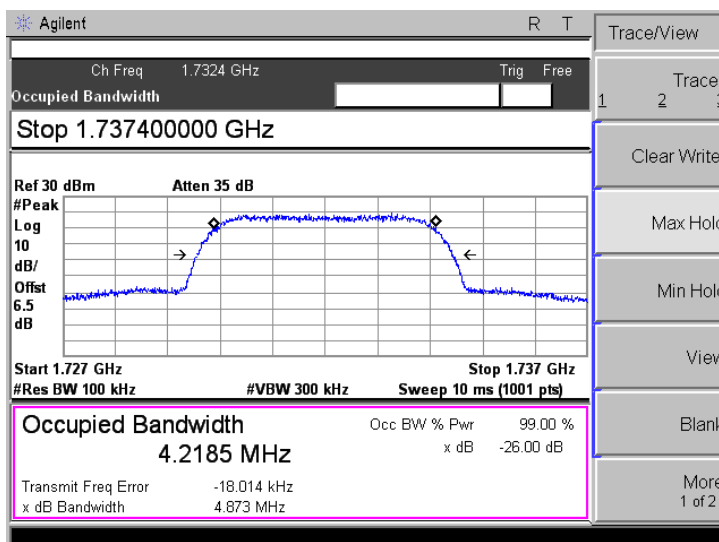


WCDMA Band IV

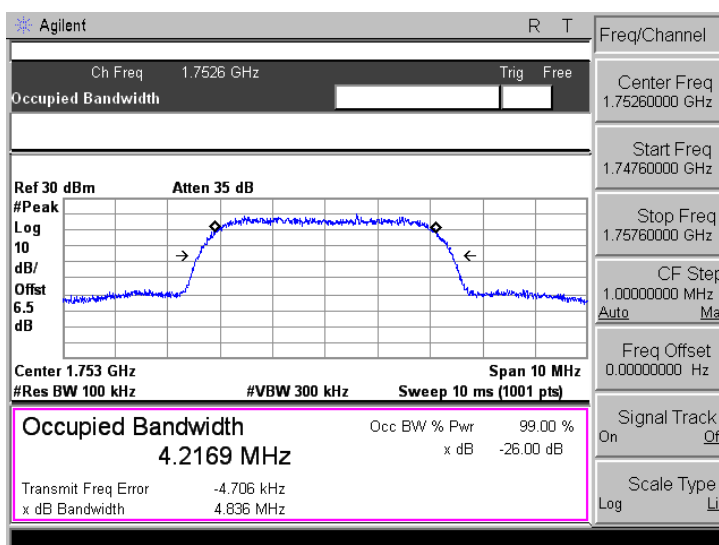
Low Channel



Middle Channel

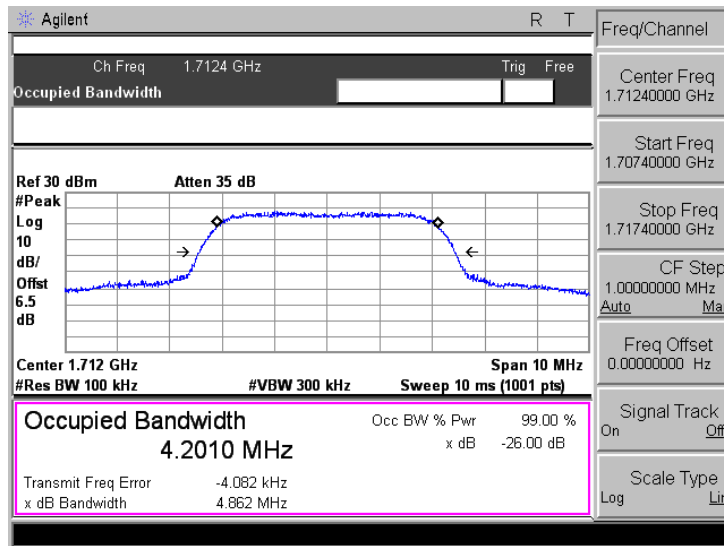


High Channel

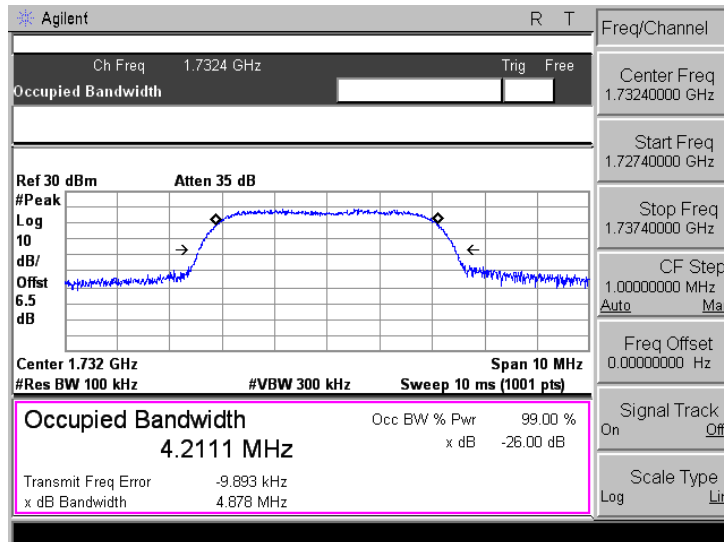


WCDMA Band IV- HSDPA

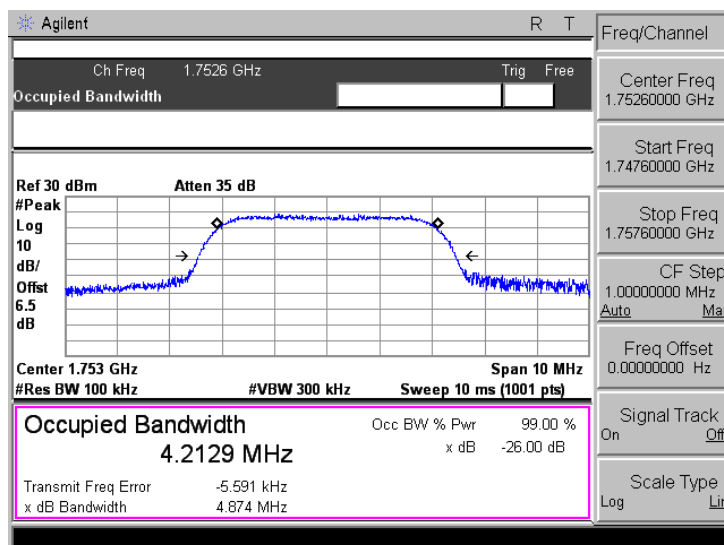
Low Channel



Middle Channel

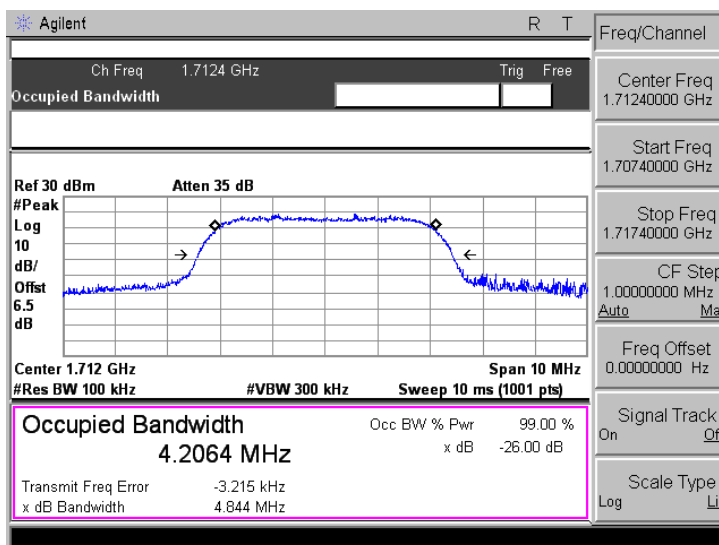


High Channel

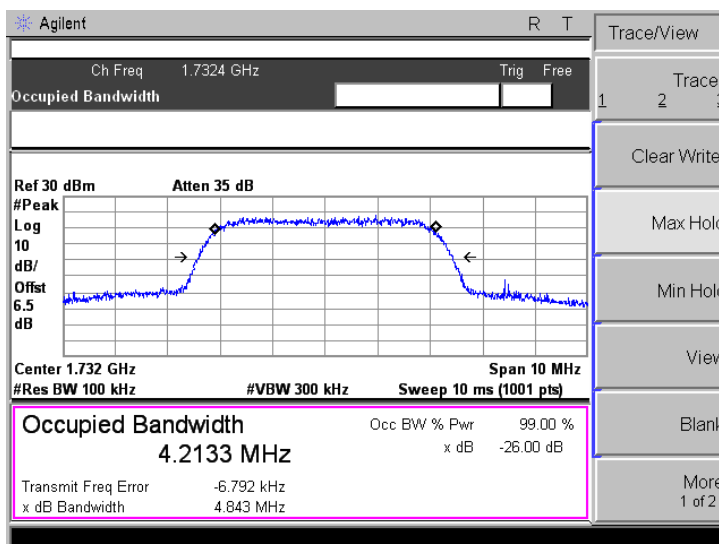


WCDMA Band IV- HSUPA

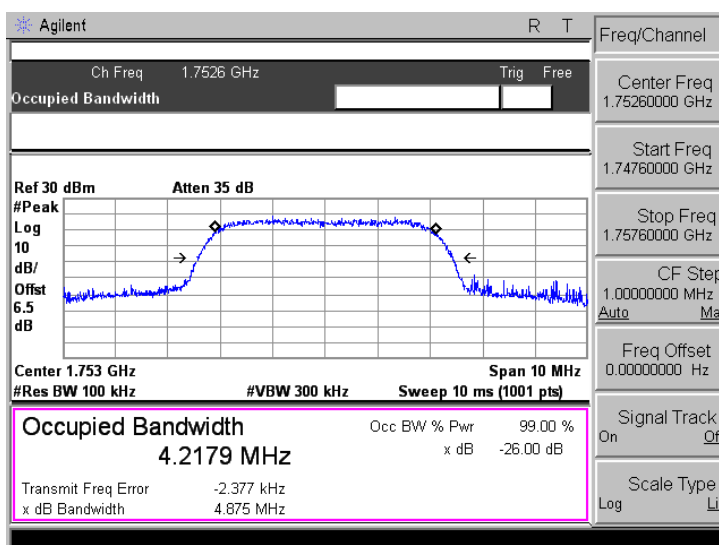
Low Channel



Middle Channel

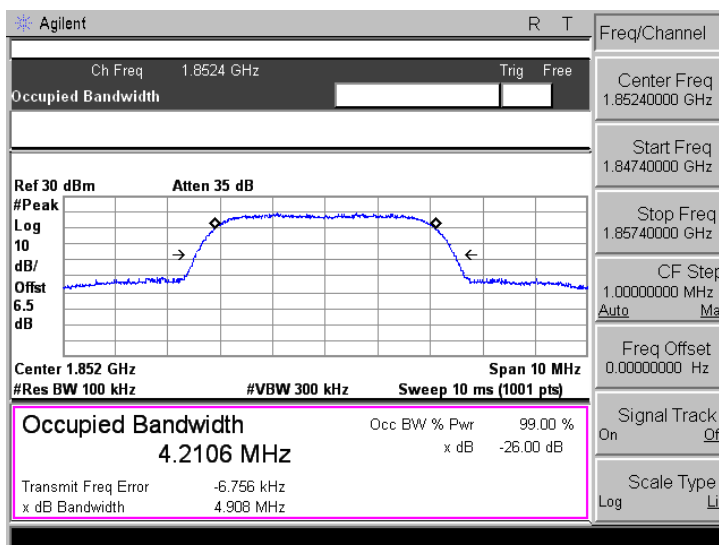


High Channel

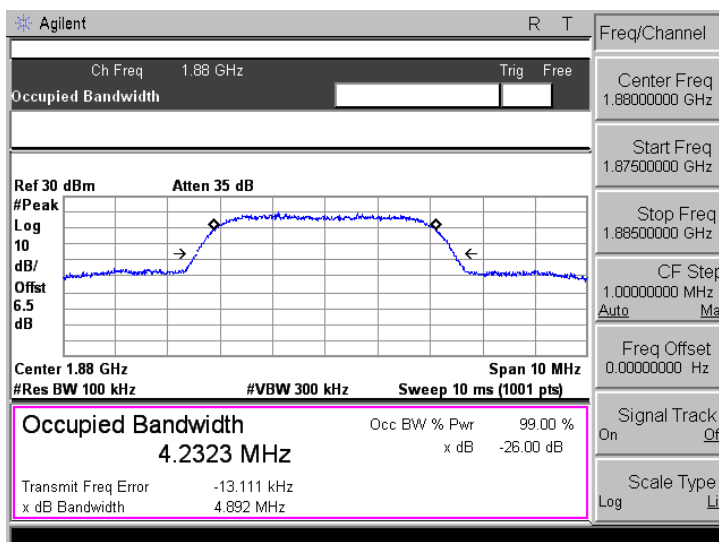


WCDMA Band II

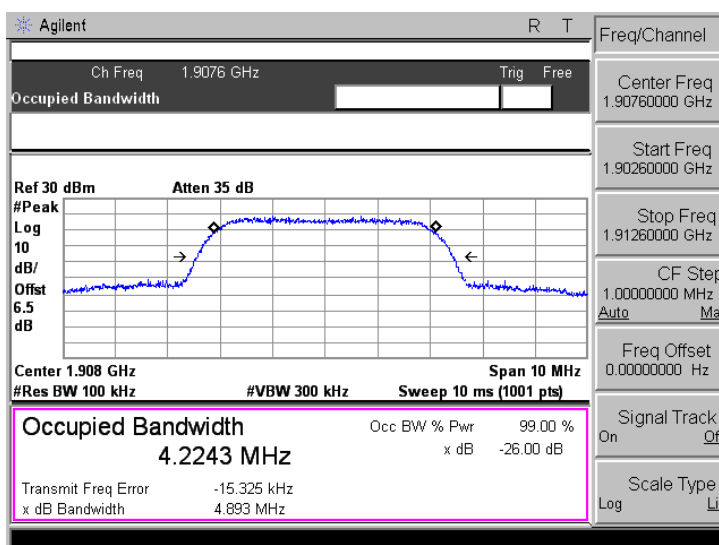
Low Channel



Middle Channel

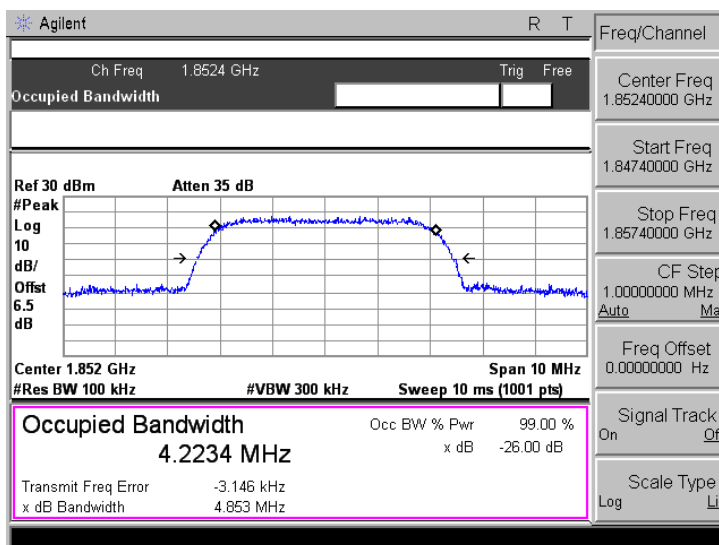


High Channel

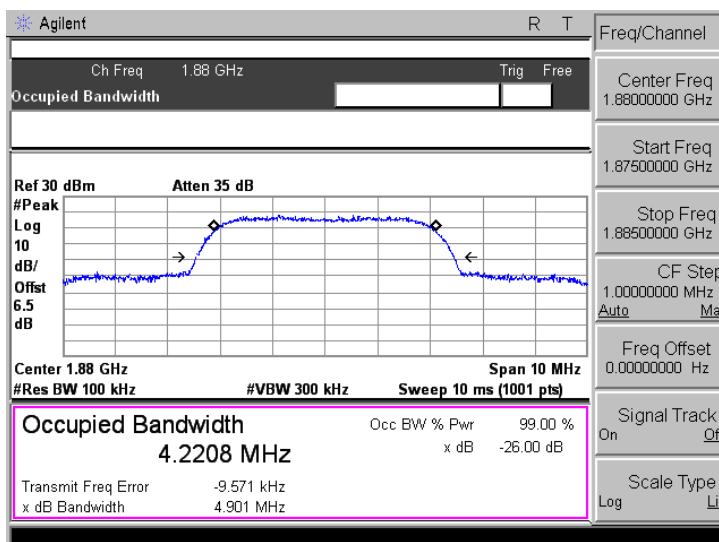


WCDMA Band II- HSDPA

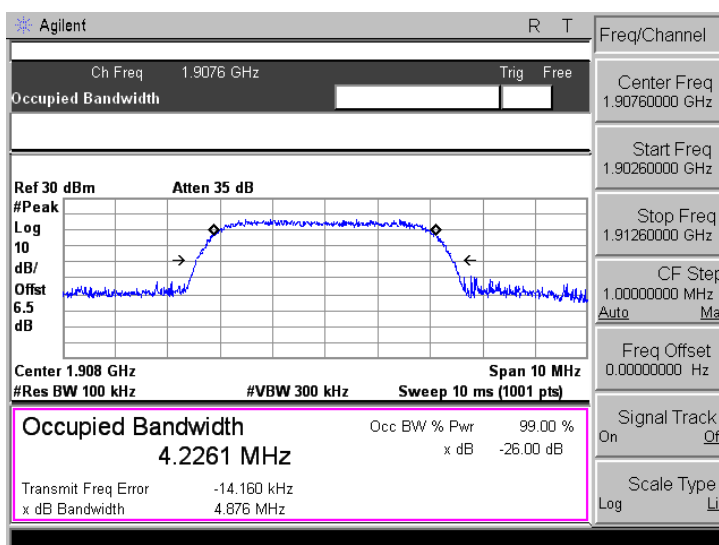
Low Channel



Middle Channel

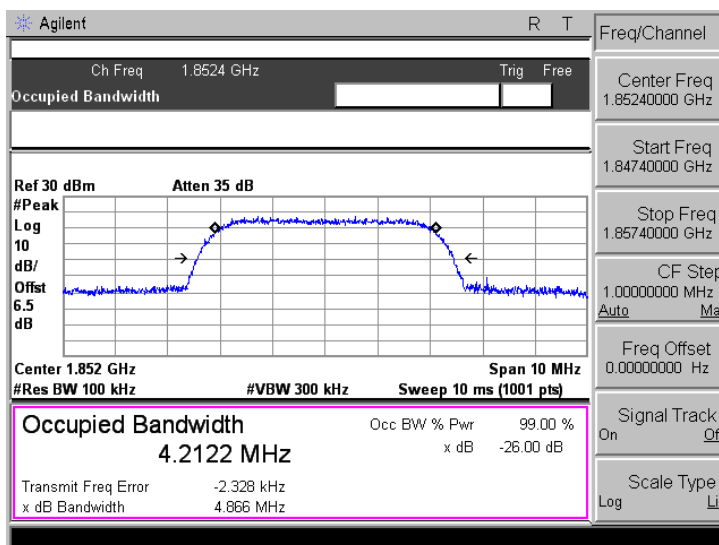


High Channel

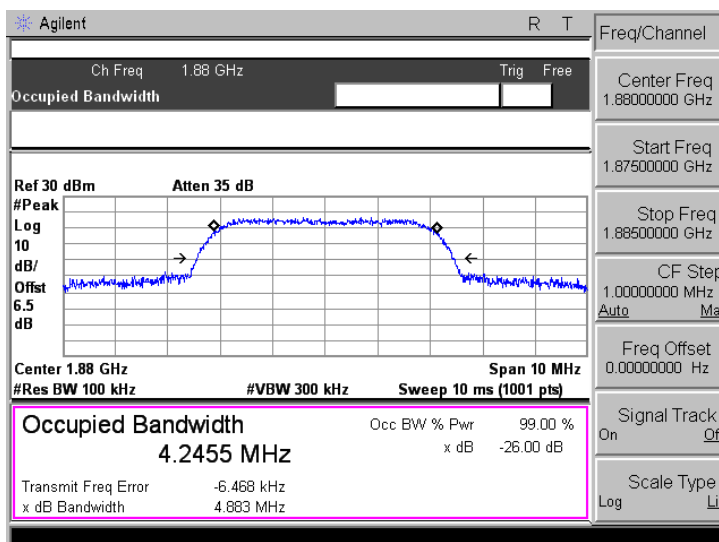


WCDMA Band II- HSUPA

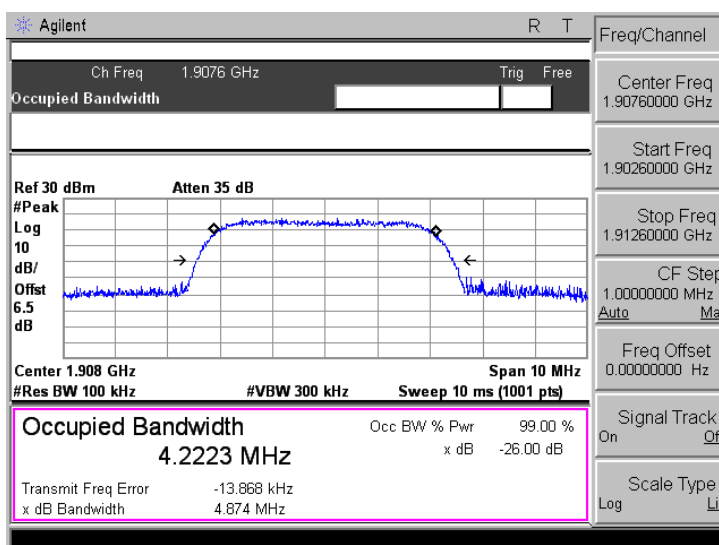
Low Channel



Middle Channel



High Channel



7. Out of Band Emissions at Antenna Terminal

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.

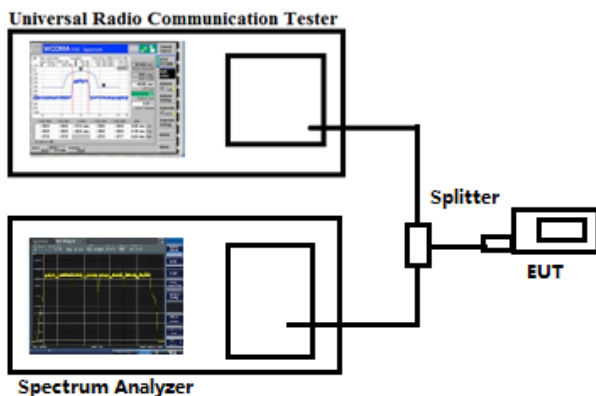
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

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:



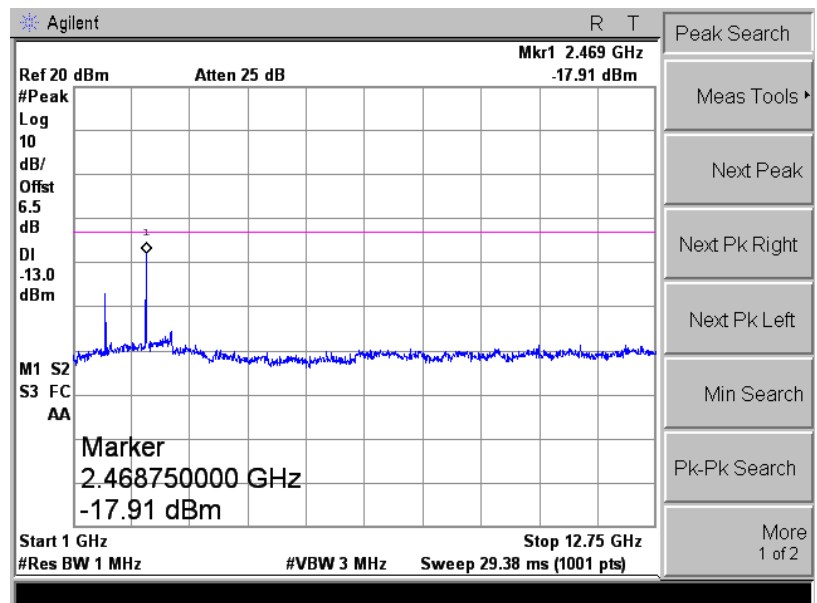
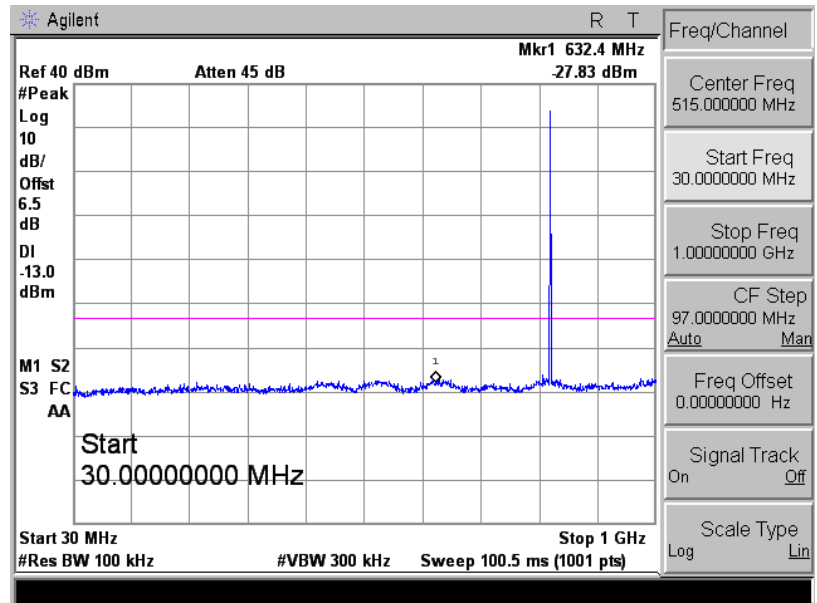
7.3 Summary of Test Results/Plots

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

Please refer to the following test plots

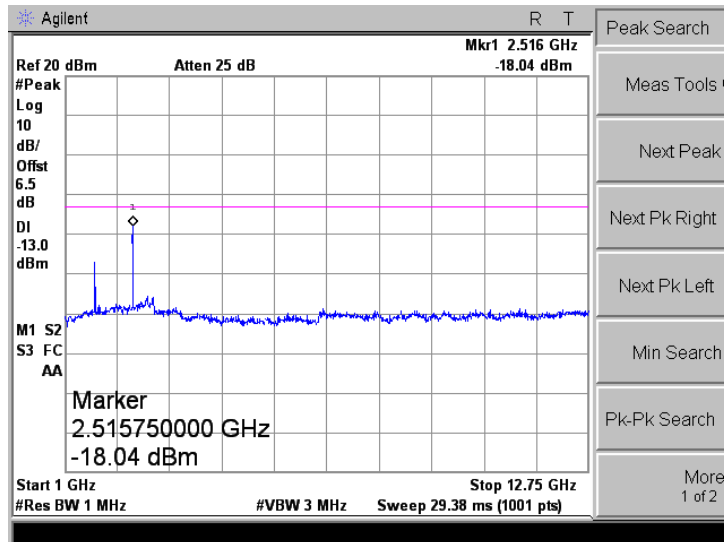
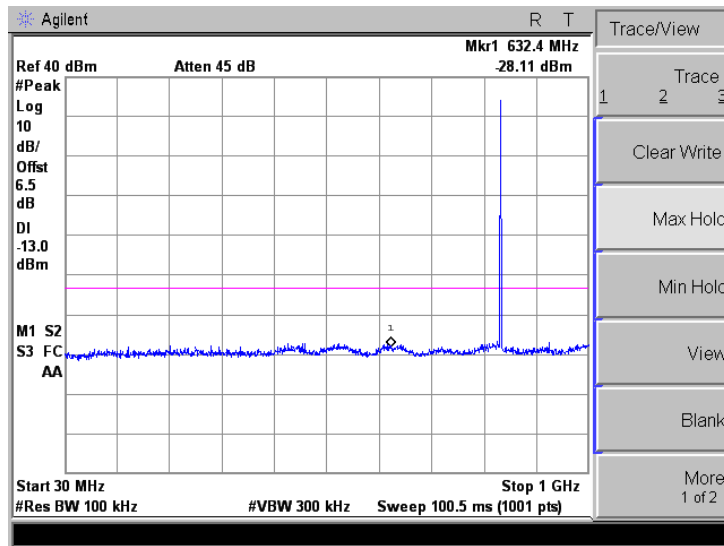
GSM850

Low Channel



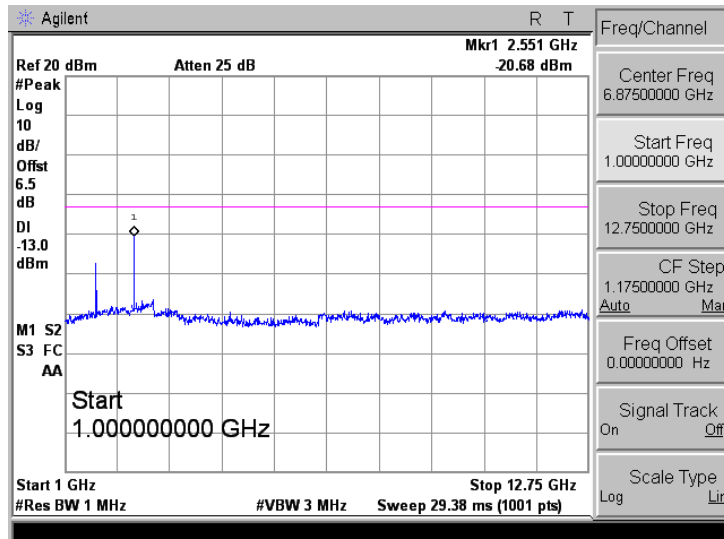
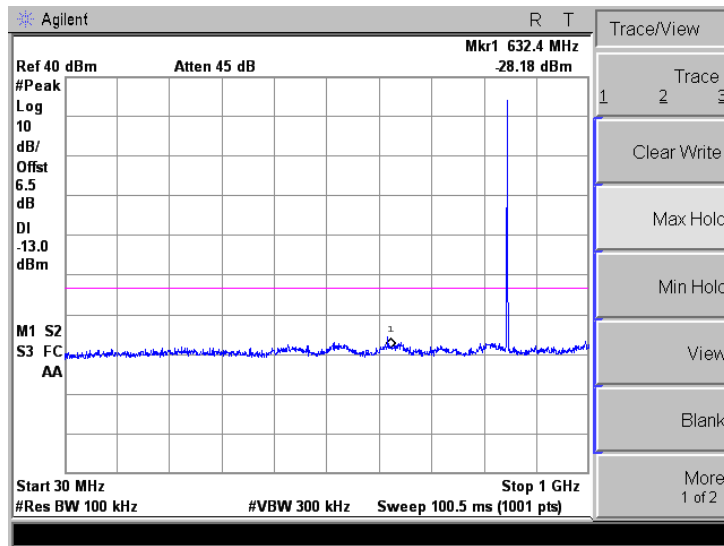
GSM850

Middle Channel



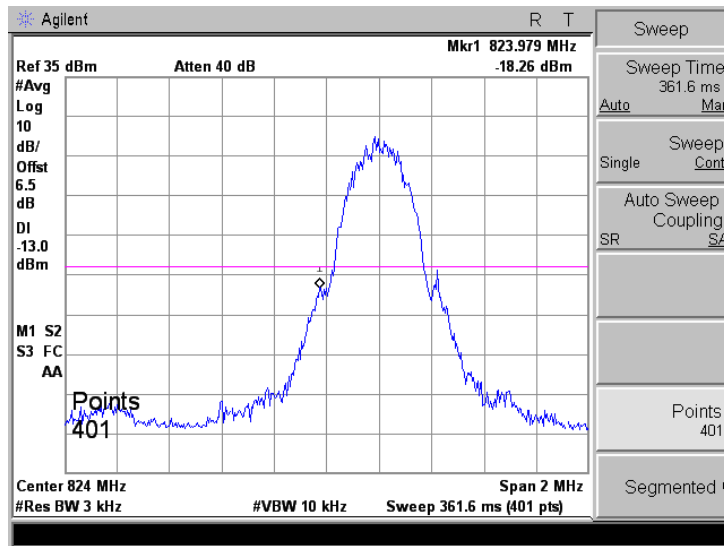
GSM850

High Channel

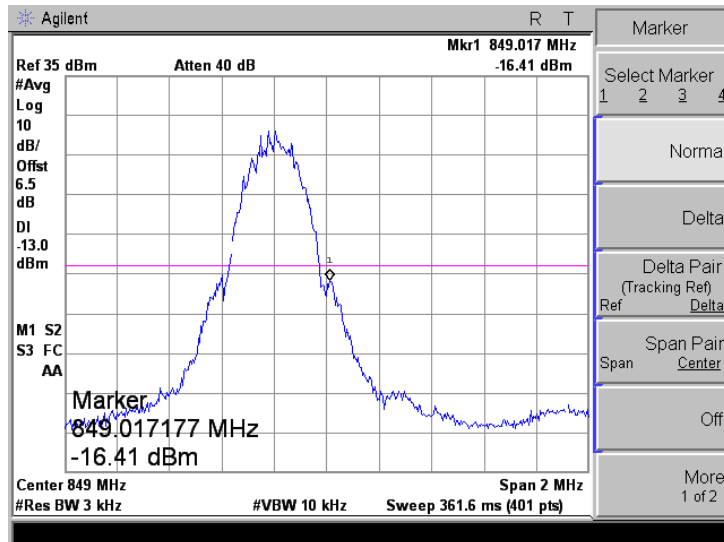


GSM850

Low Band Emission

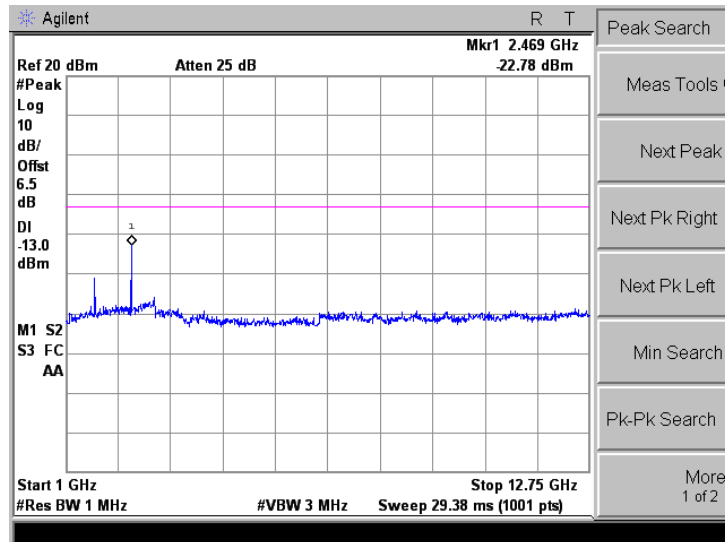
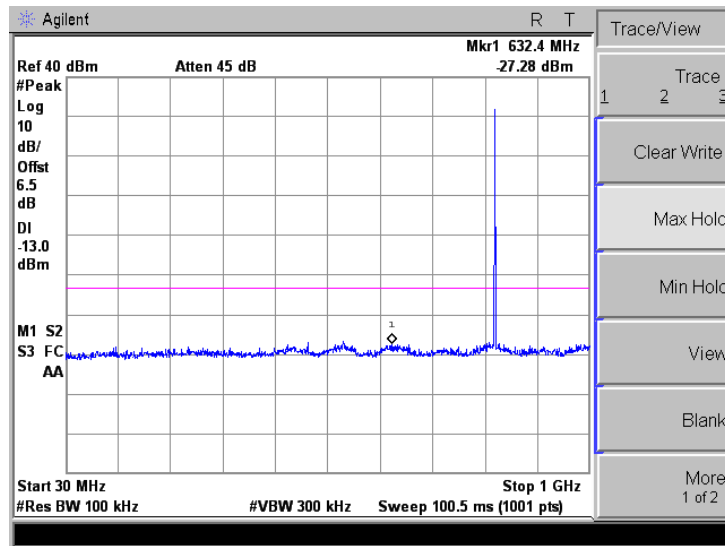


High Band Emission



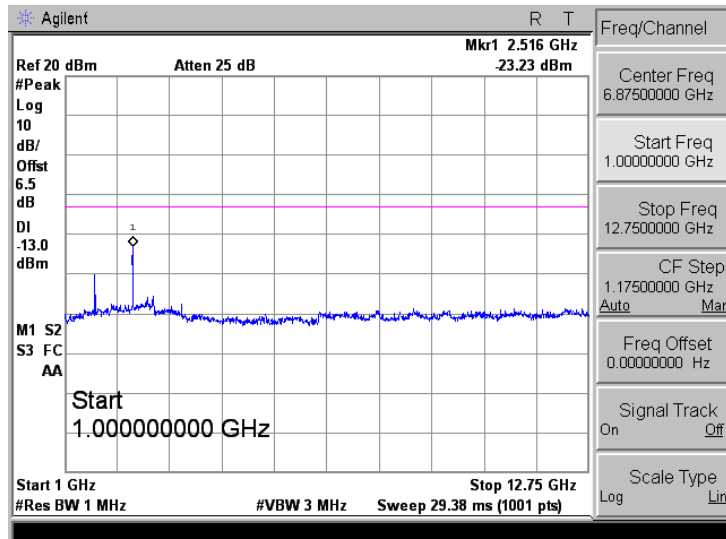
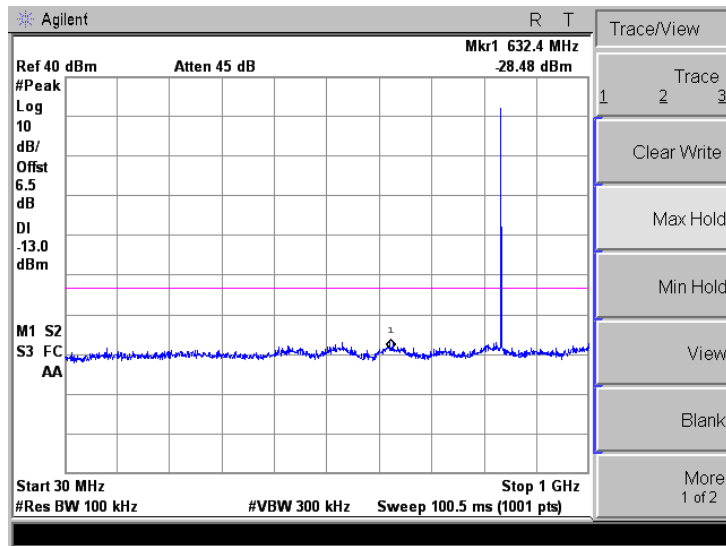
For Cellular Band

GPRS Low Channel



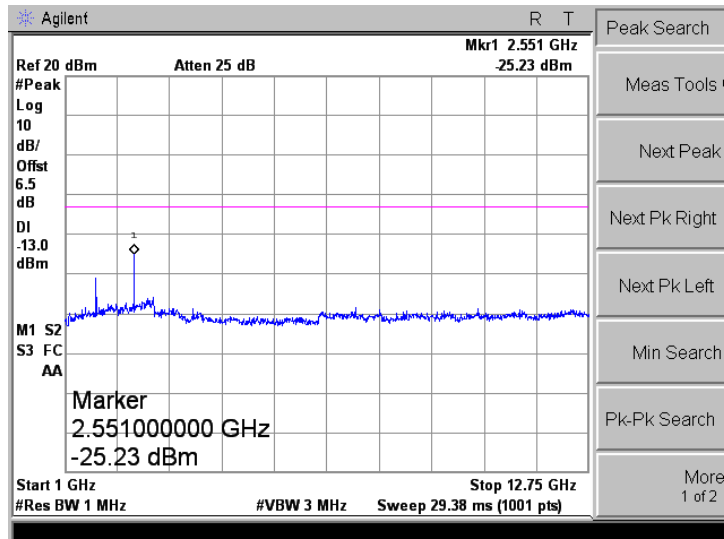
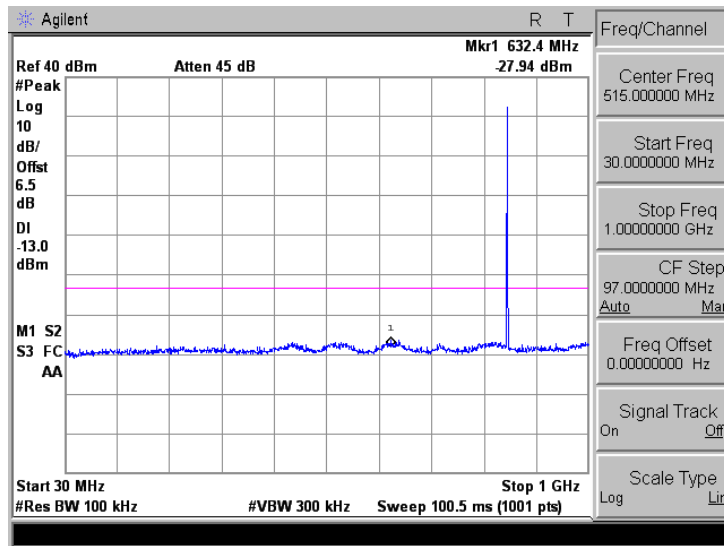
GPRS850

Middle Channel



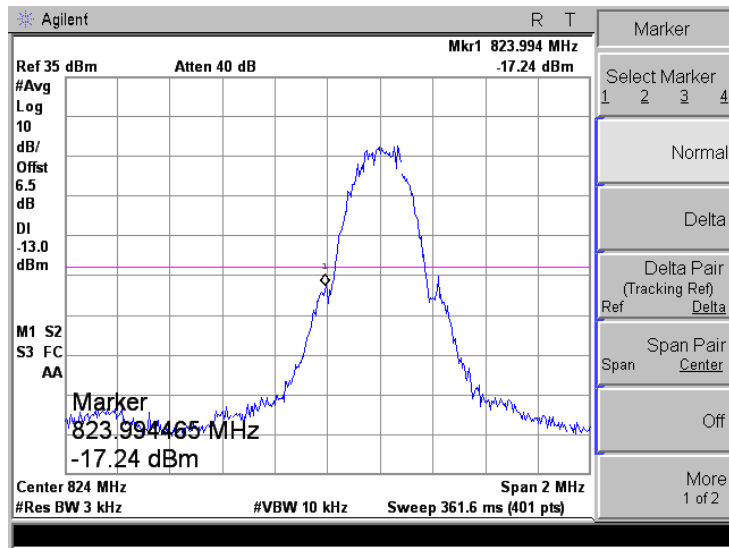
GPRS850

High Channel

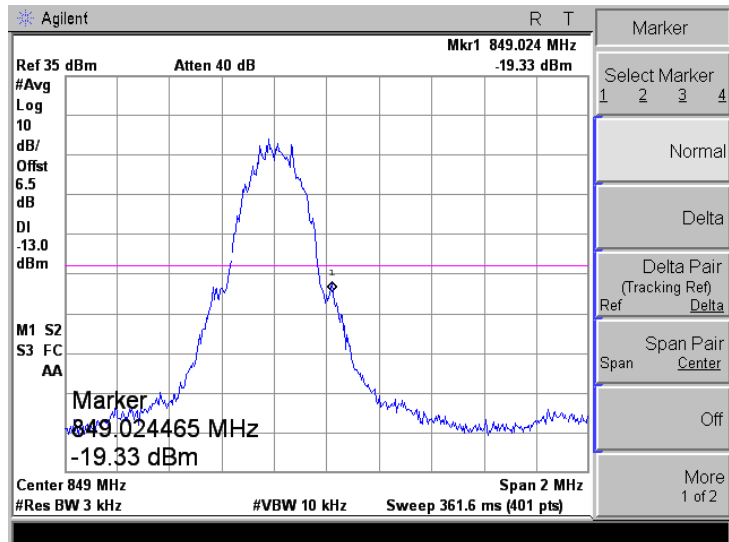


GPRS850

Low Band Emission

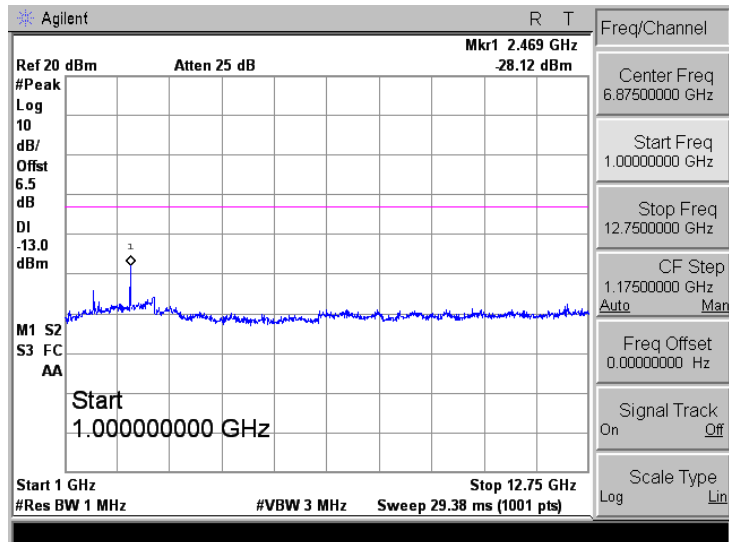
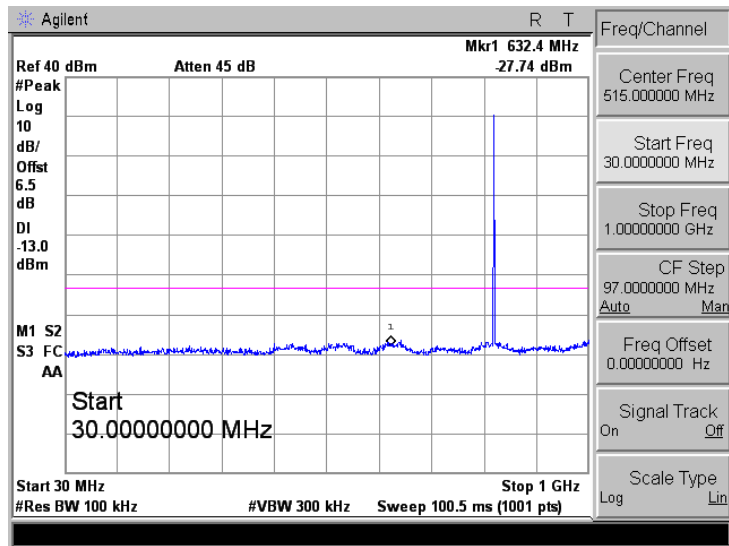


High Band Emission



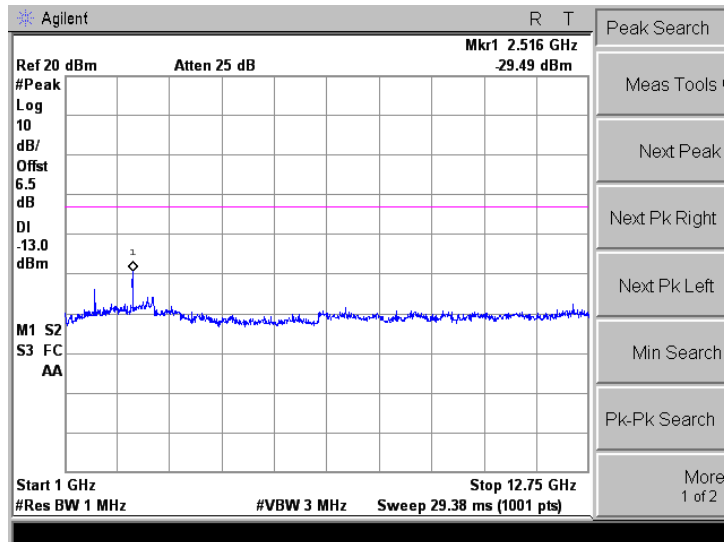
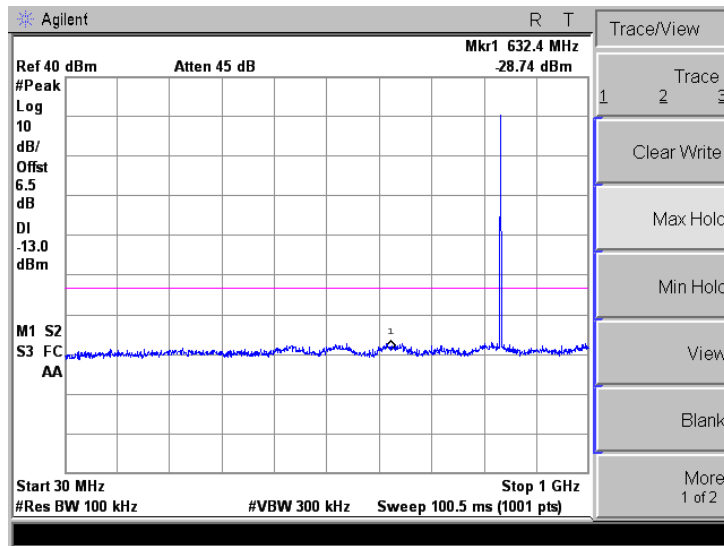
EGPRS850

Low Channel



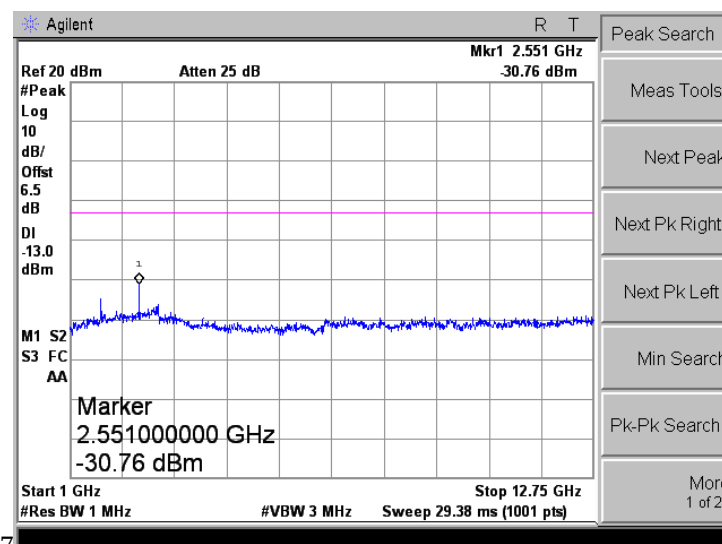
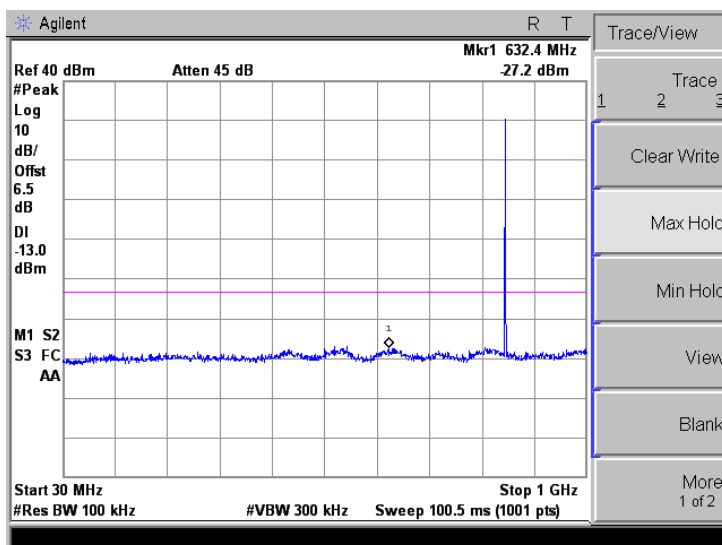
EGPRS850

Middle Channel



EGPRS850

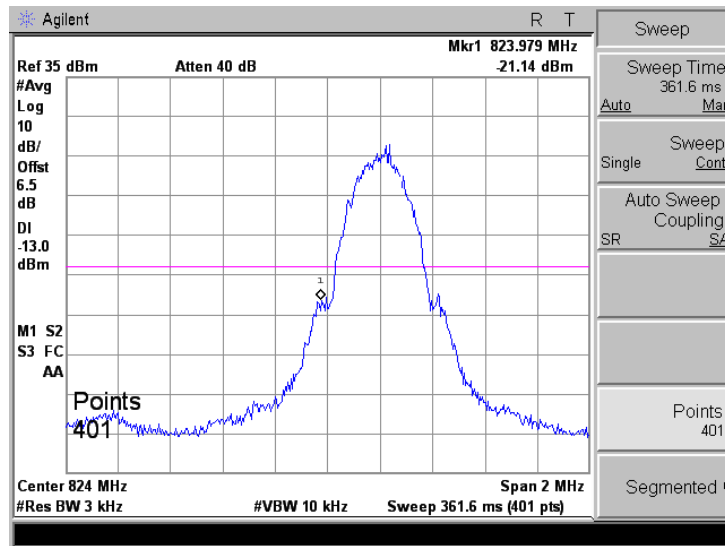
High Channel



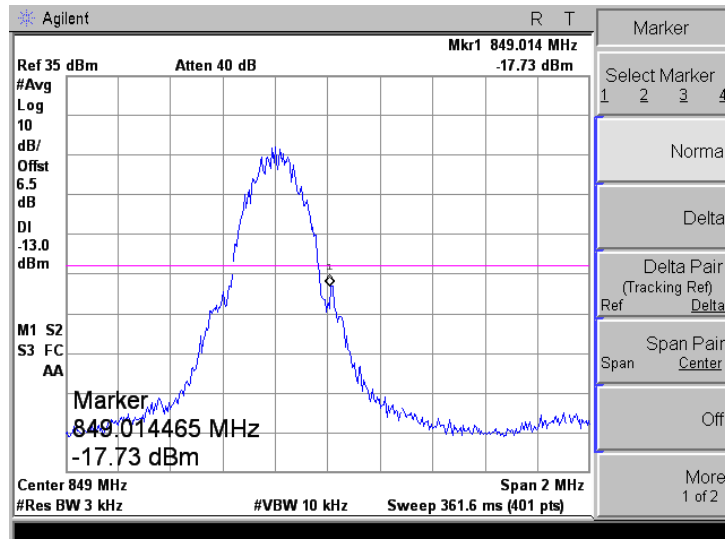
7

EGPRS850

Low Band Emission

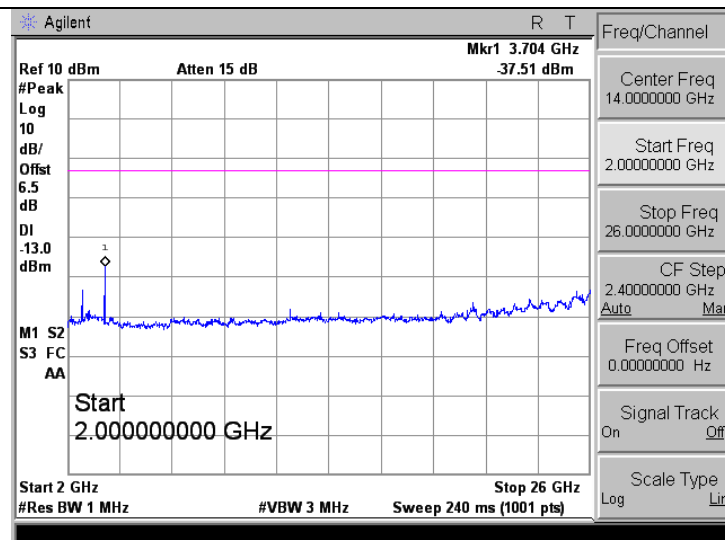
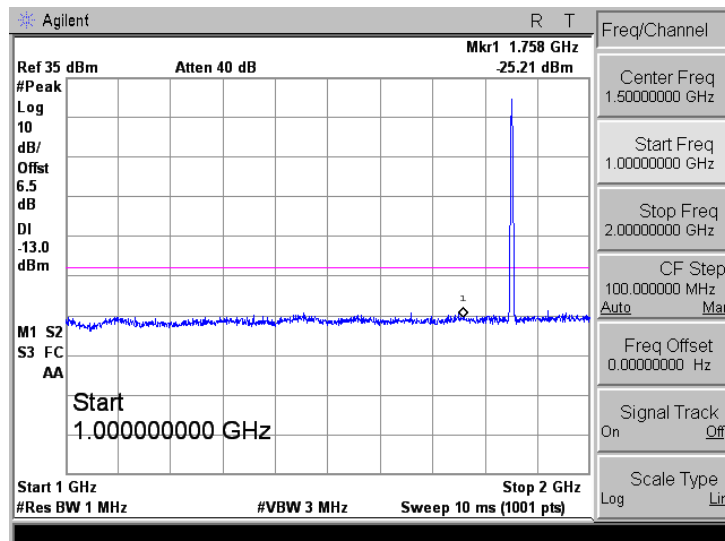
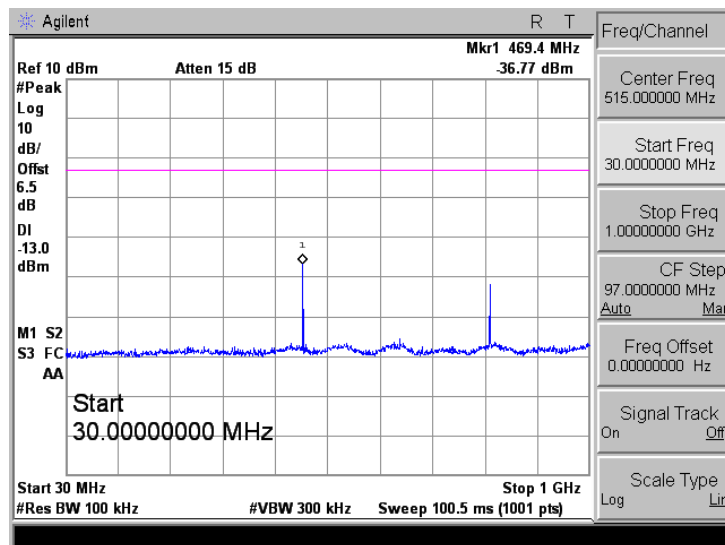


High Band Emission



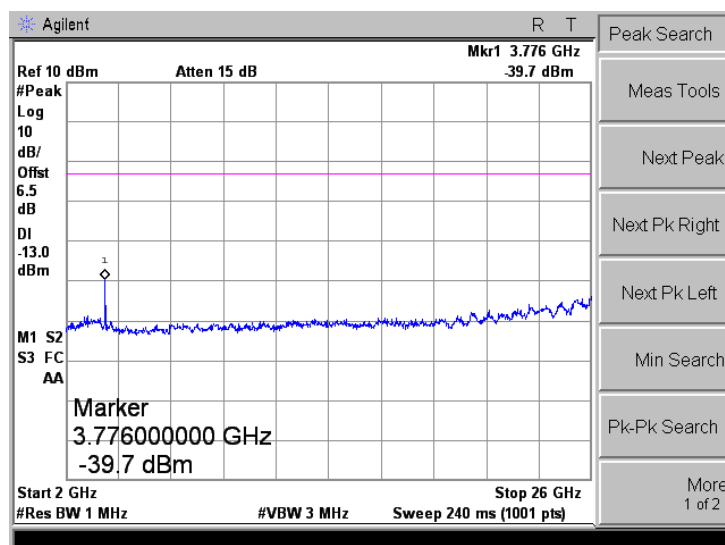
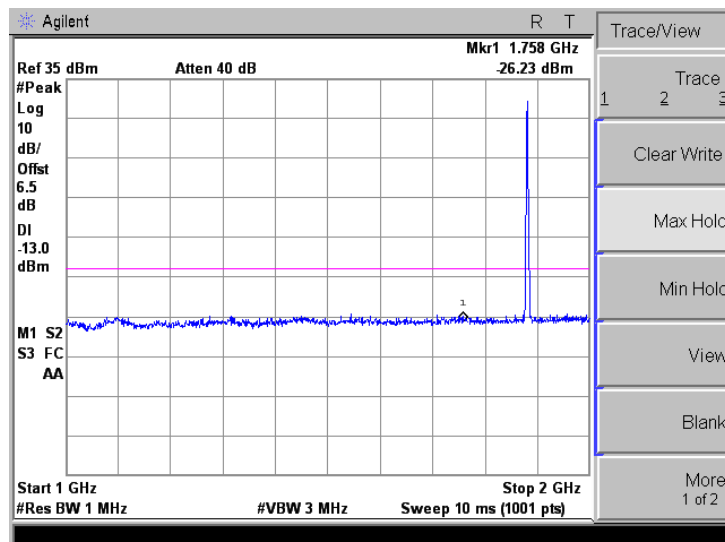
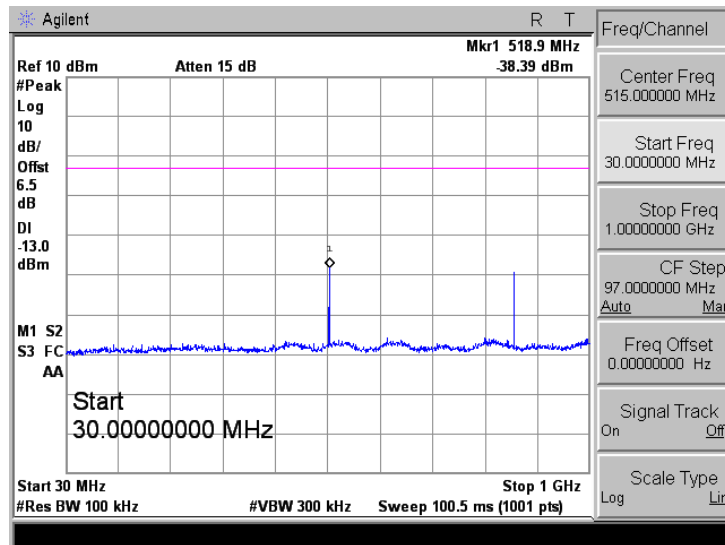
PCS1900

Low Channel



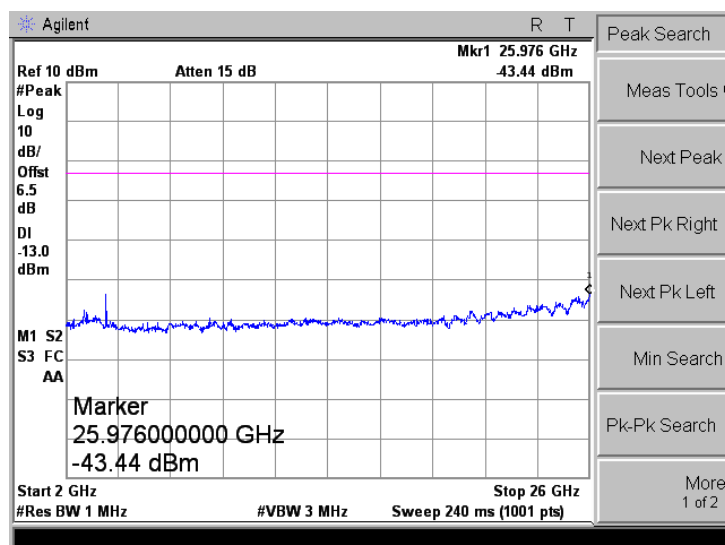
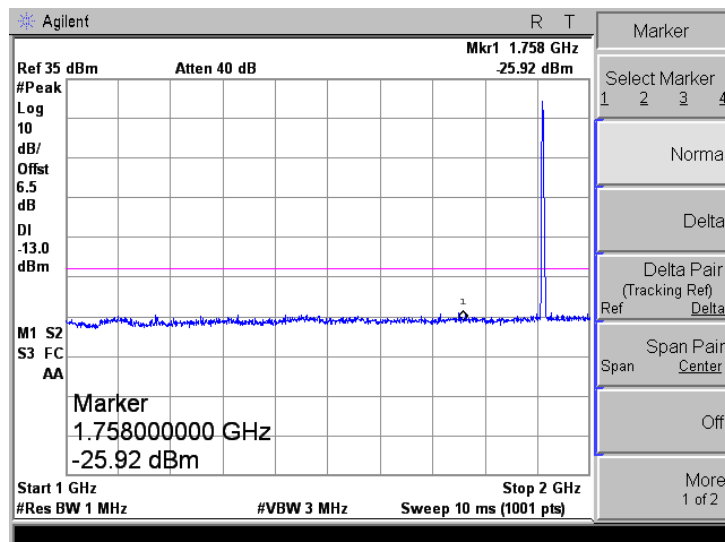
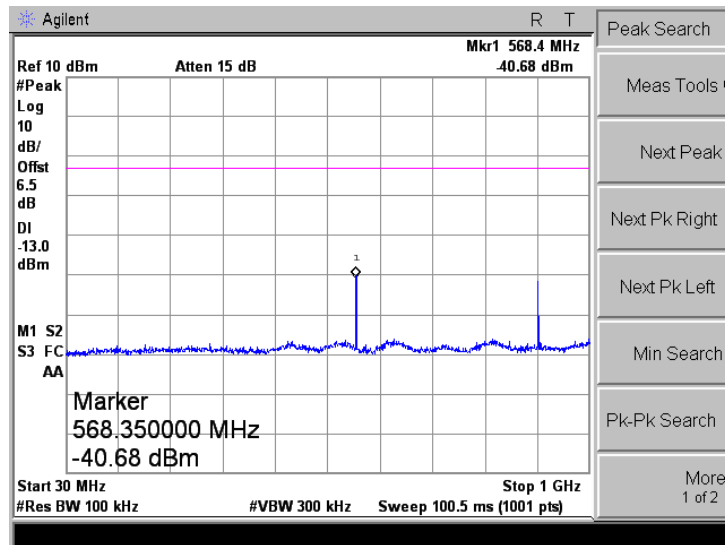
PCS1900

Middle Channel



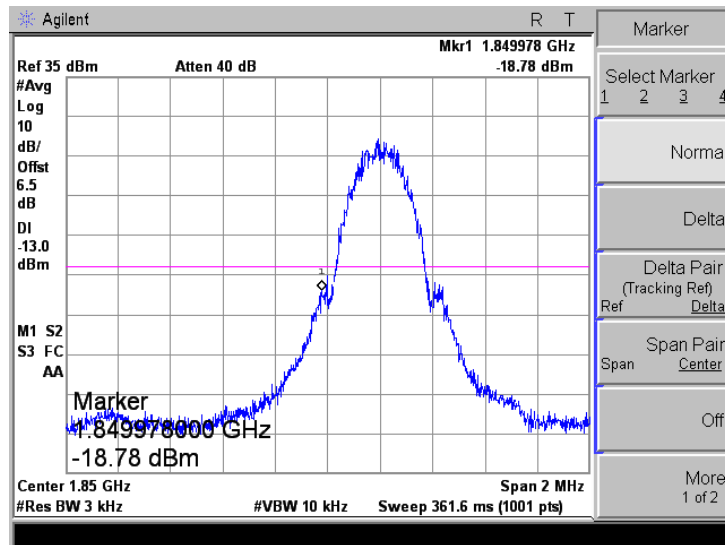
PCS1900

High Channel

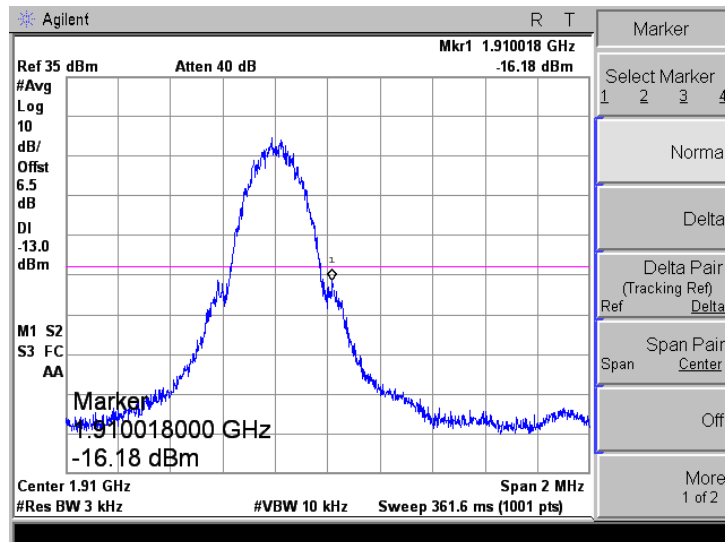


PCS1900

Low Band Emission

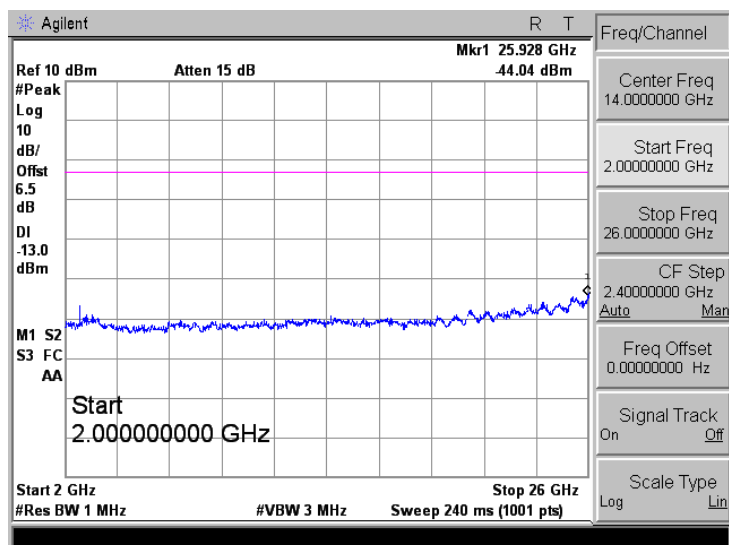
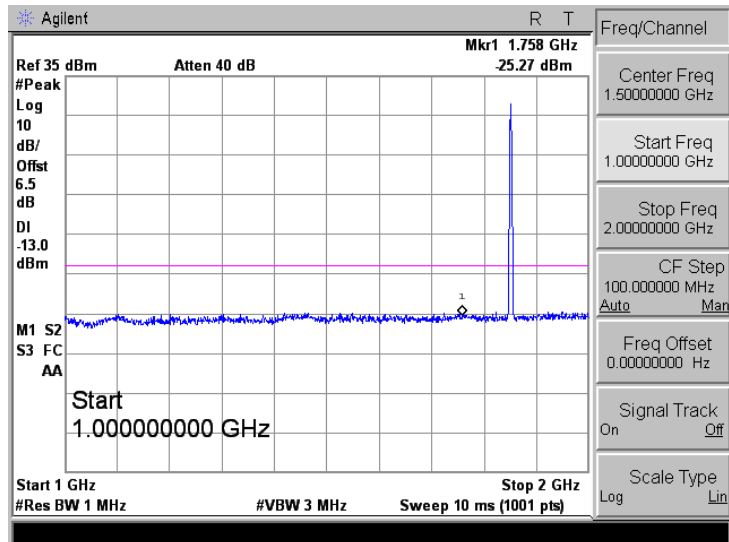
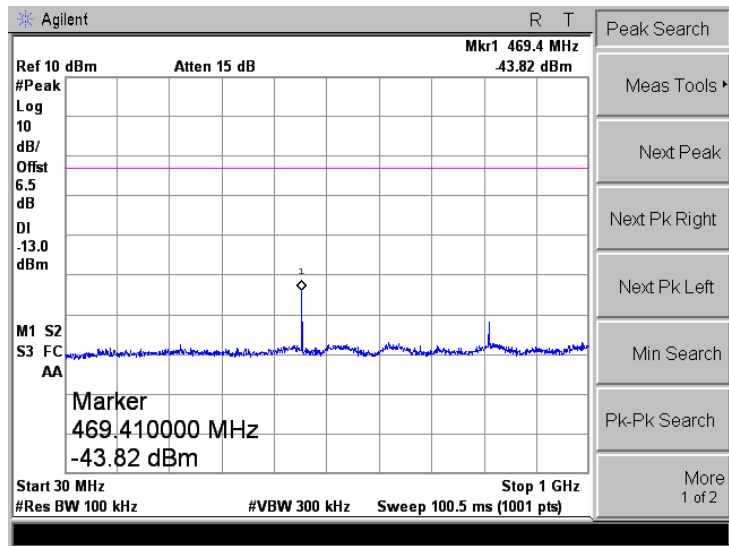


High Band Emission



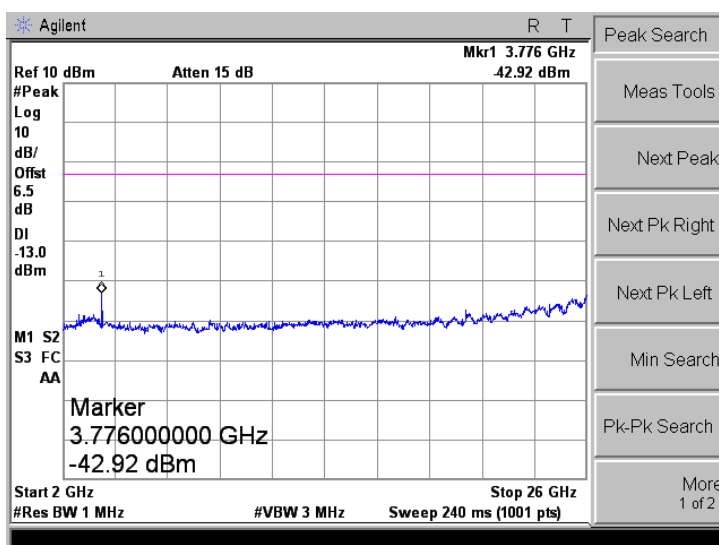
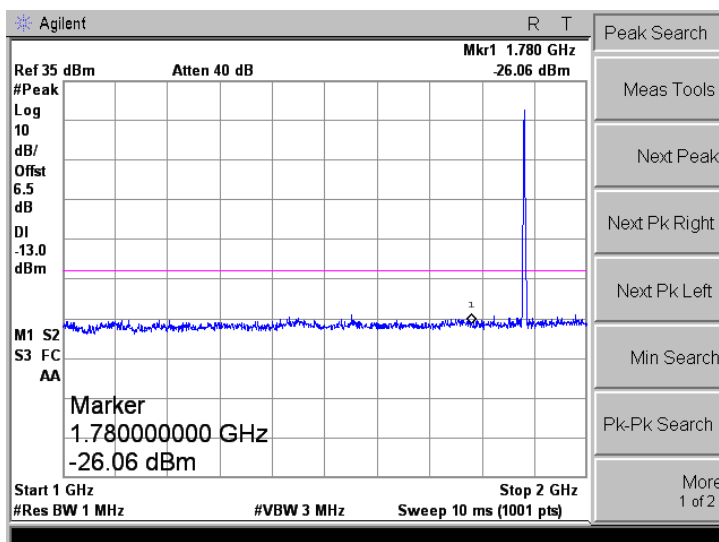
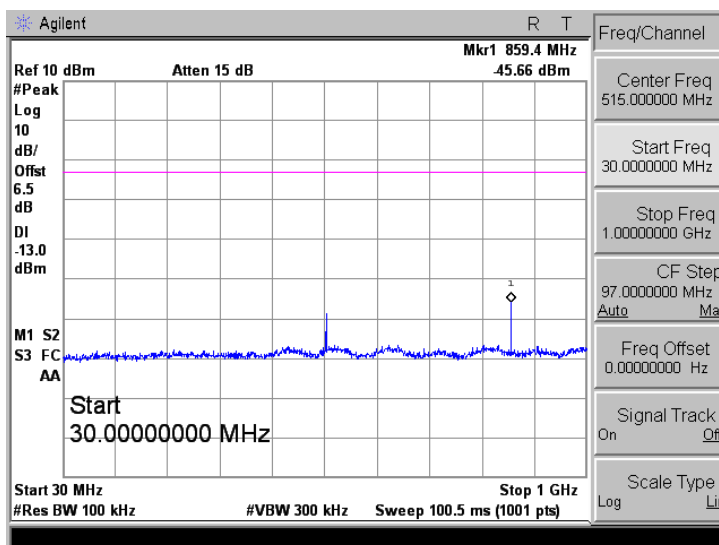
GPRS1900

Low Channel



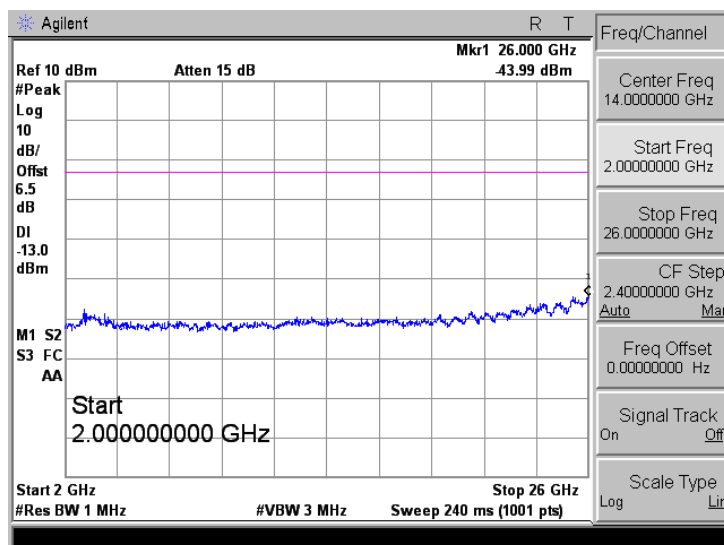
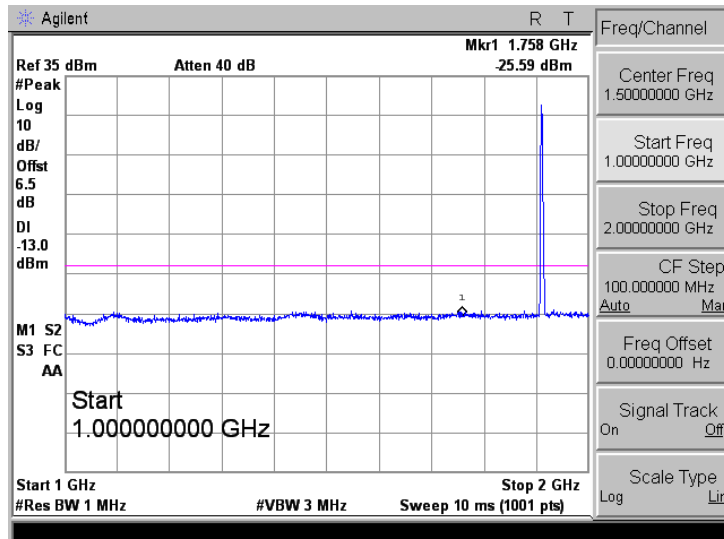
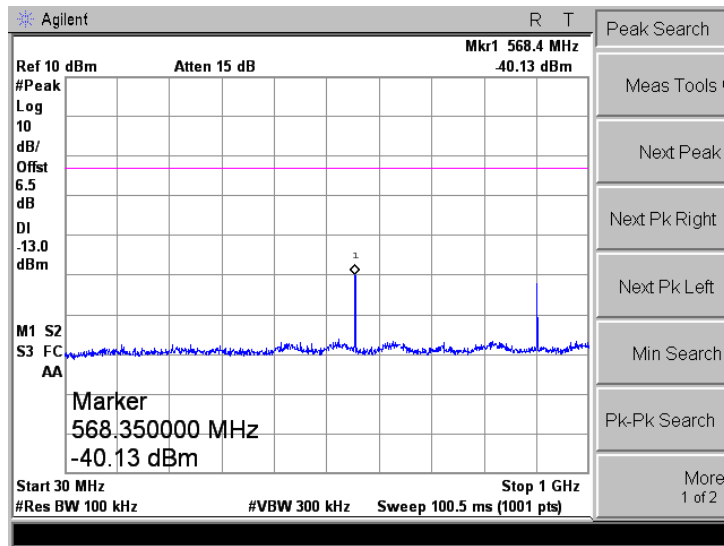
GPRS1900

Middle Channel



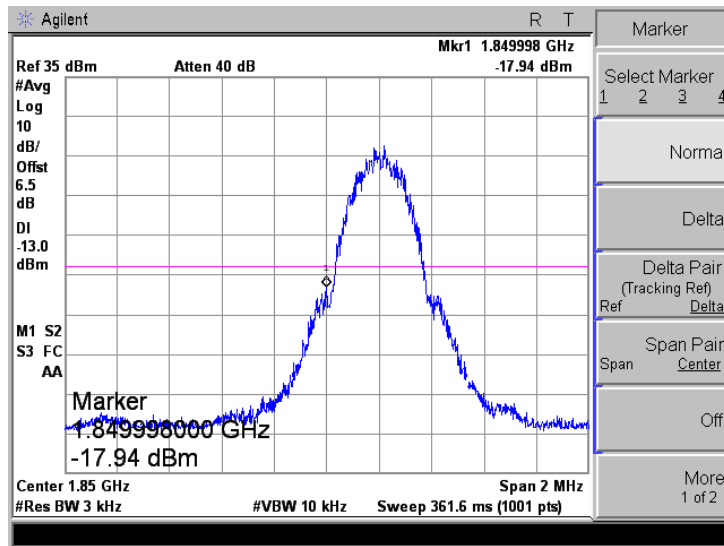
GPRS1900

High Channel

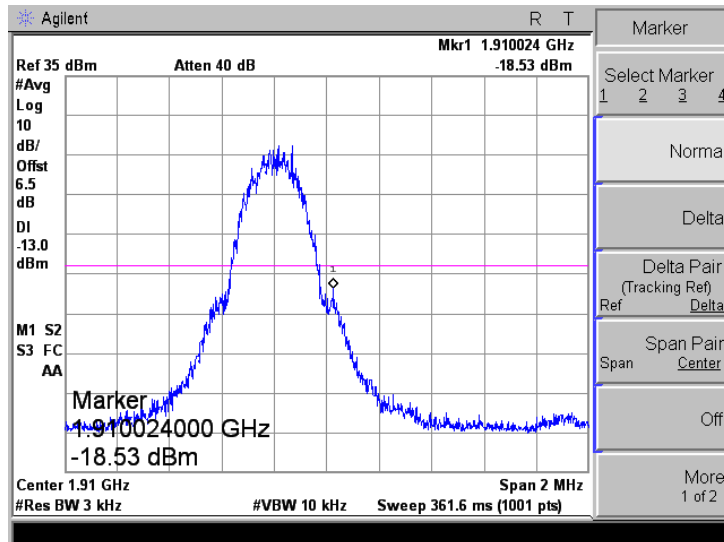


GPRS1900

Low Band Emission

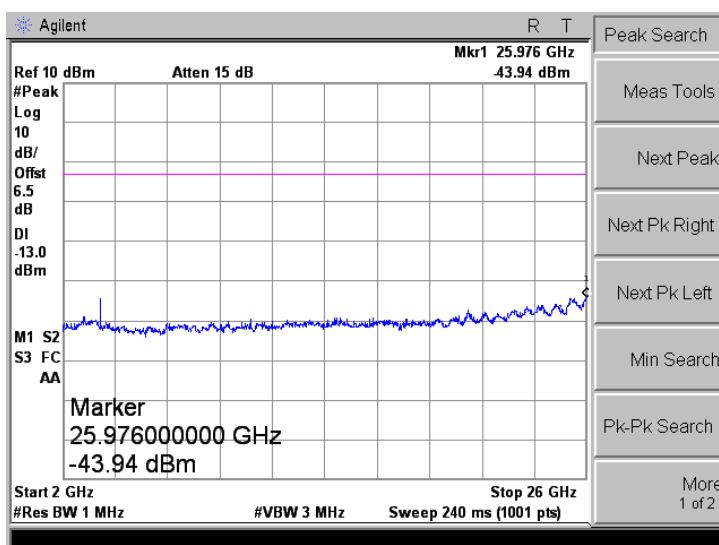
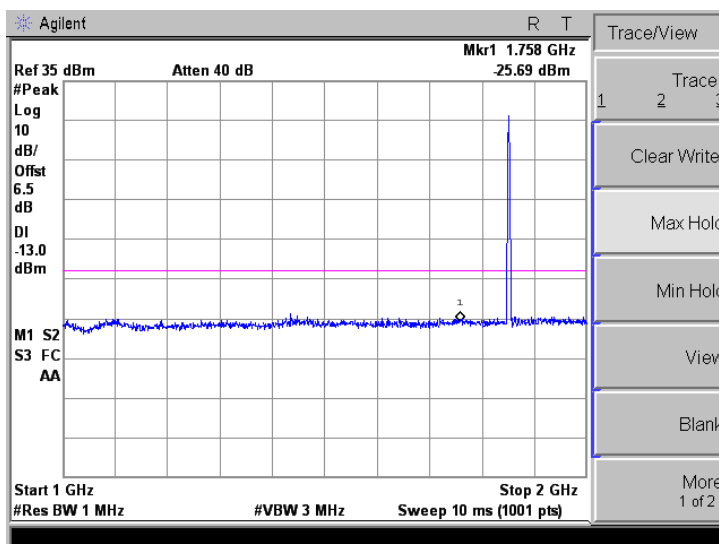
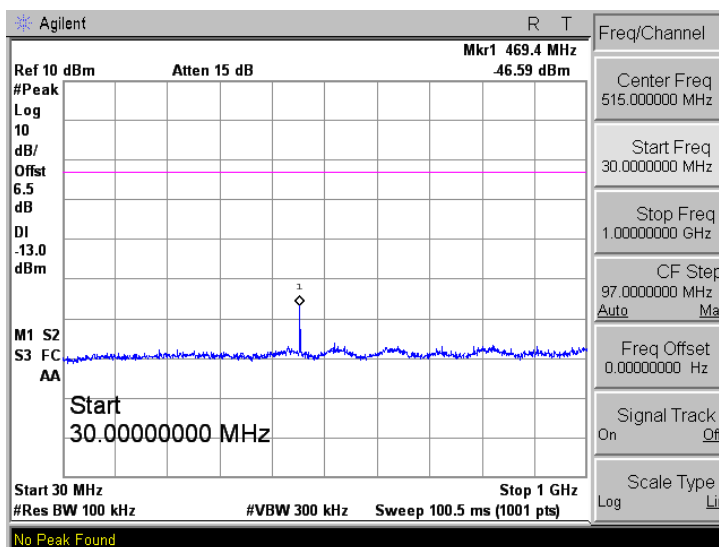


High Band Emission



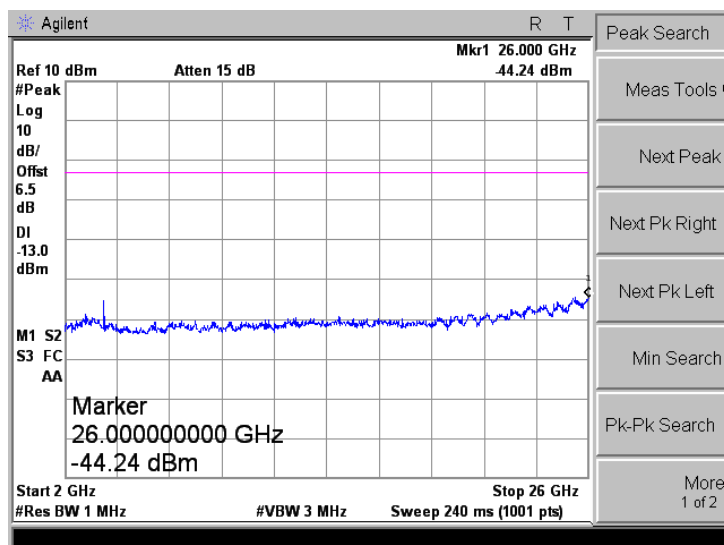
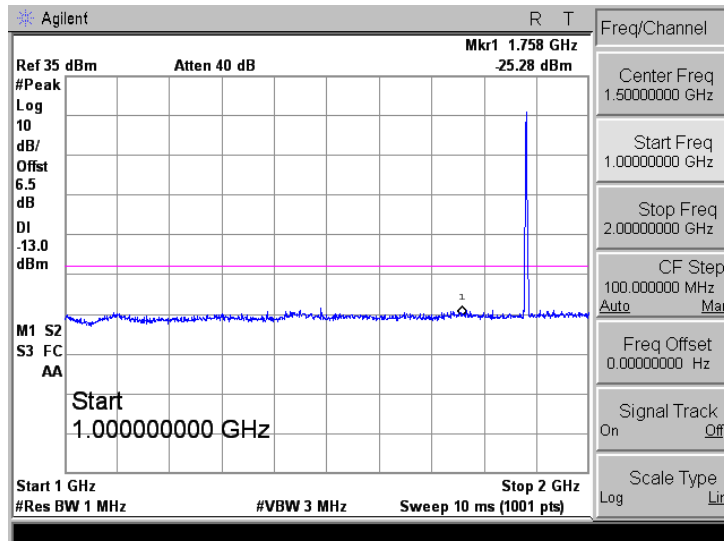
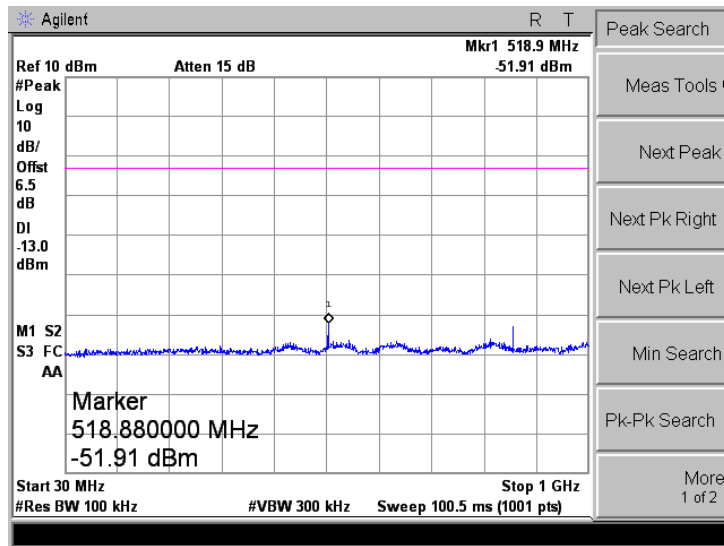
EGPRS1900

Low Channel



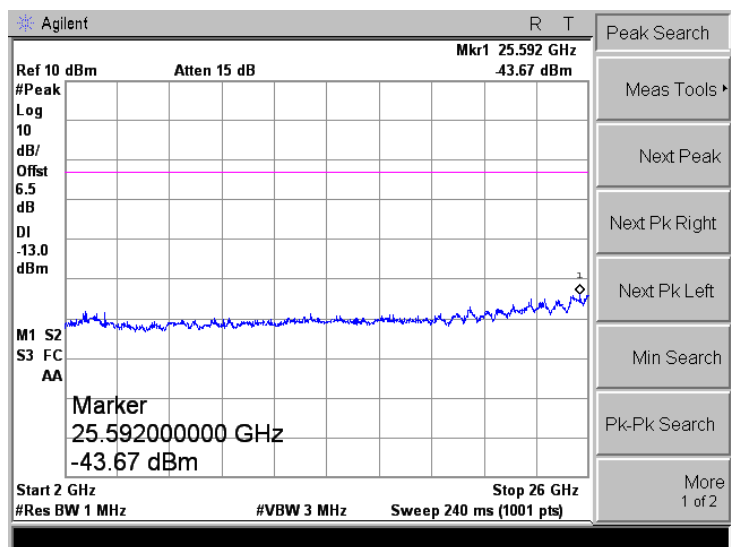
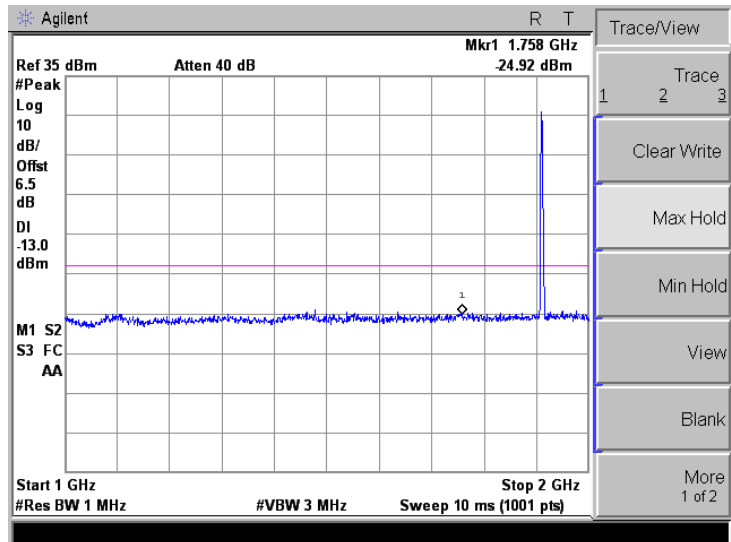
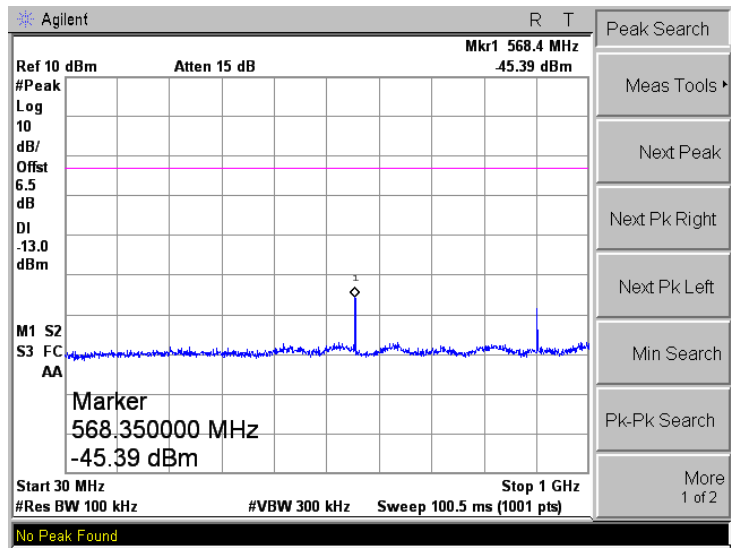
EGPRS1900

Middle Channel



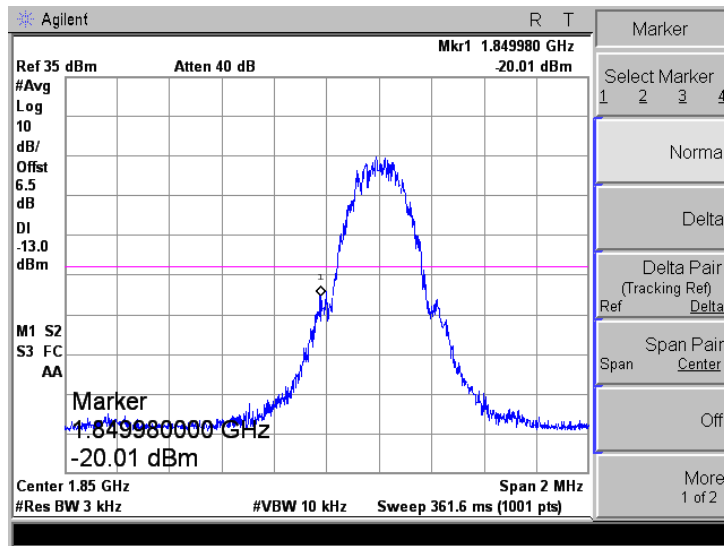
EGPRS1900

High Channel

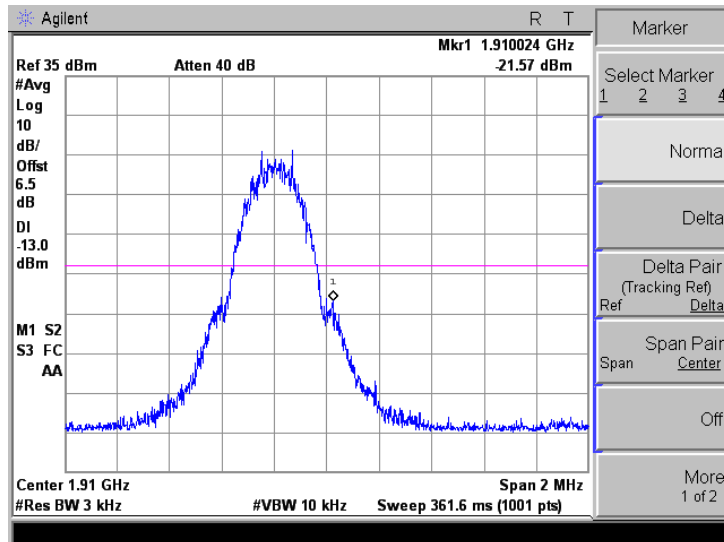


EGPRS1900

Low Band Emission

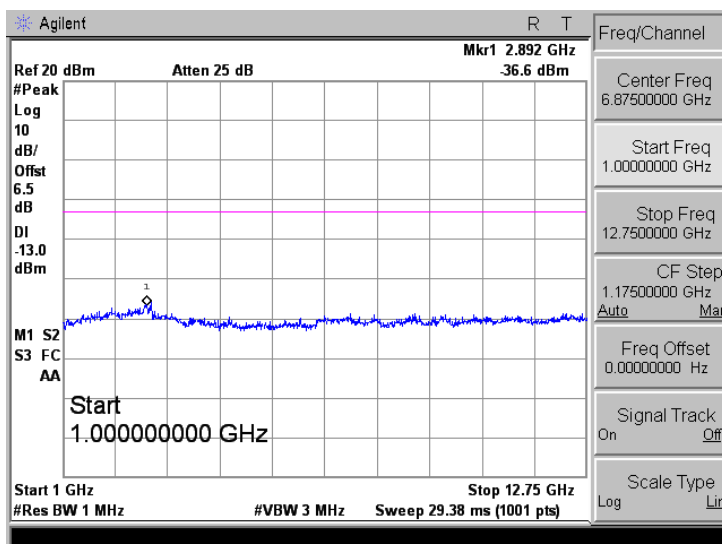
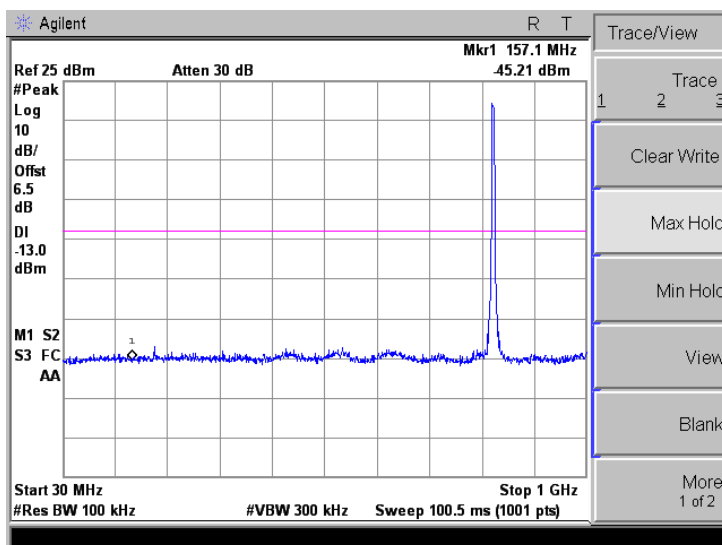


High Band Emission



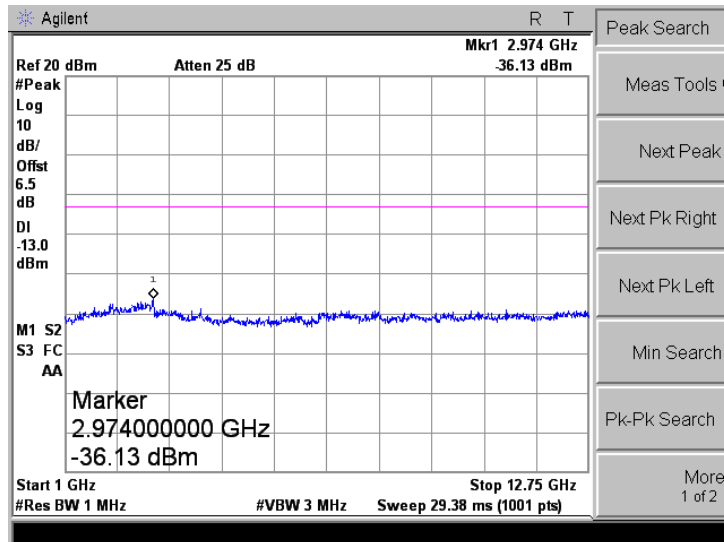
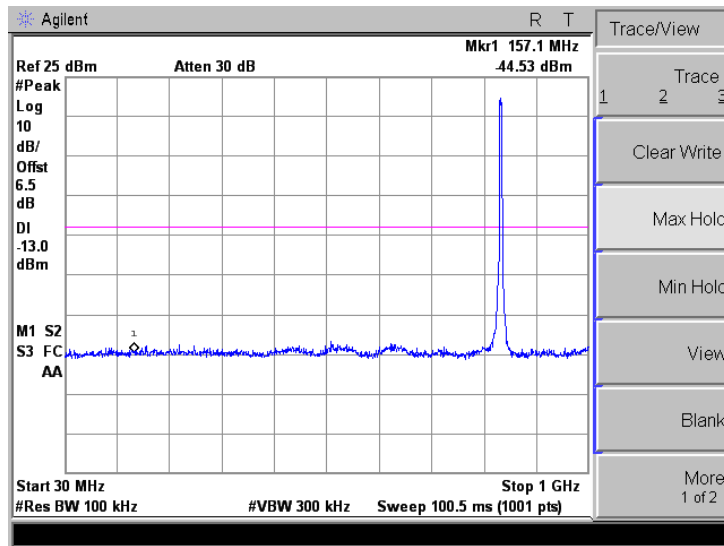
WCDMA Band V

Low Channel



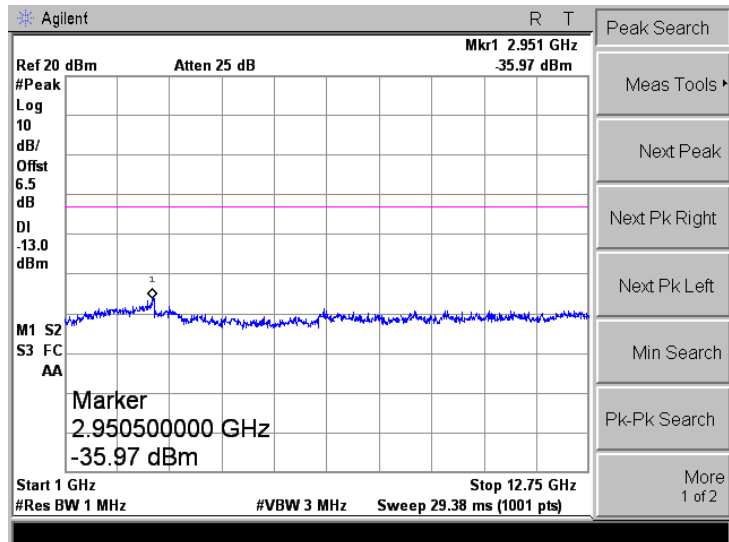
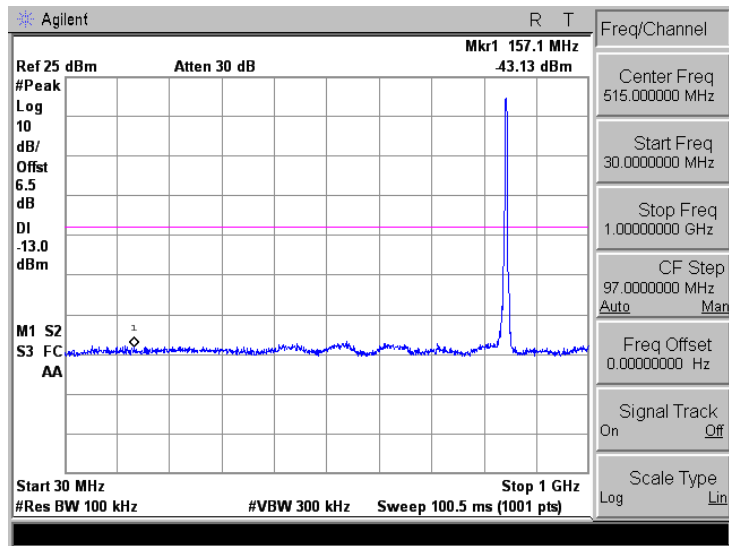
WCDMA Band V

Middle Channel



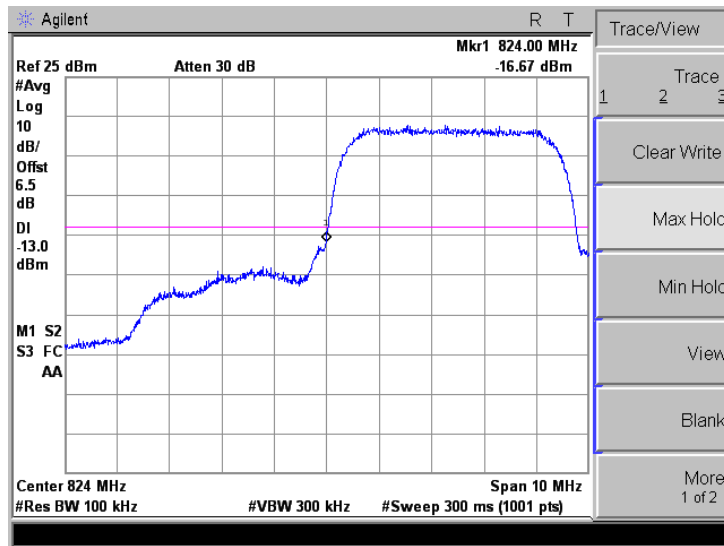
WCDMA Band V

High Channel

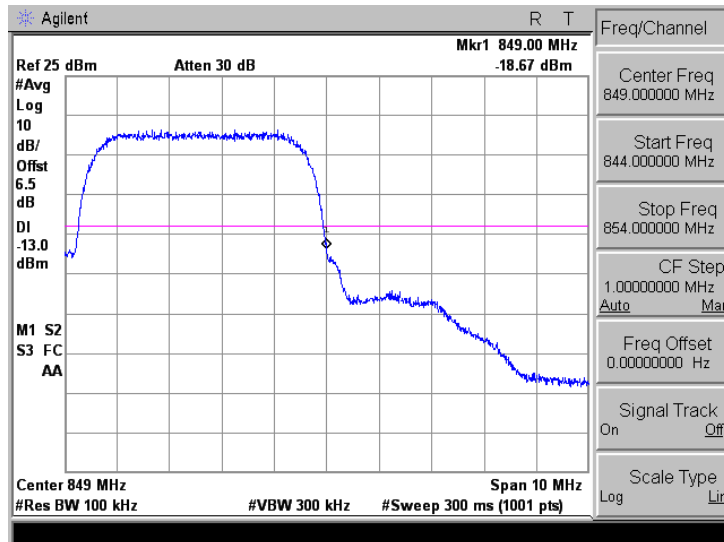


WCDMA Band V

Low Band Emission

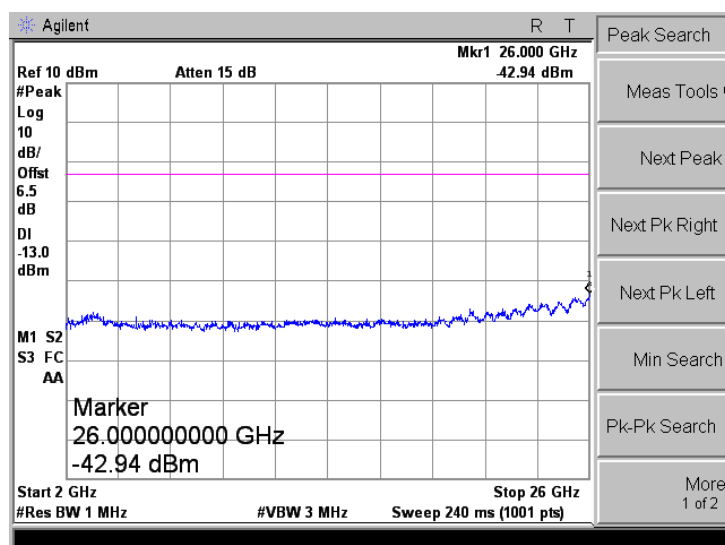
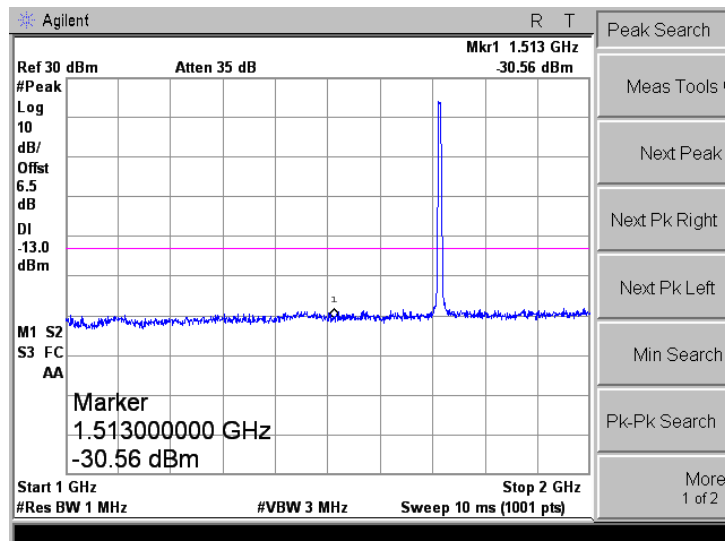
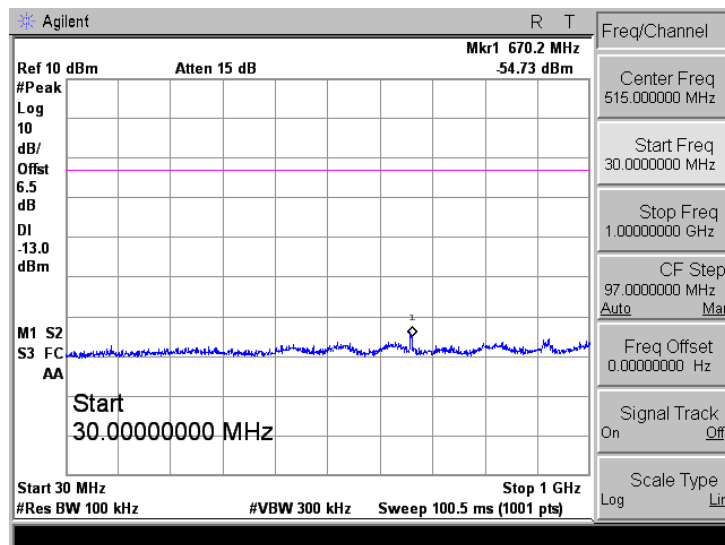


High Band Emission



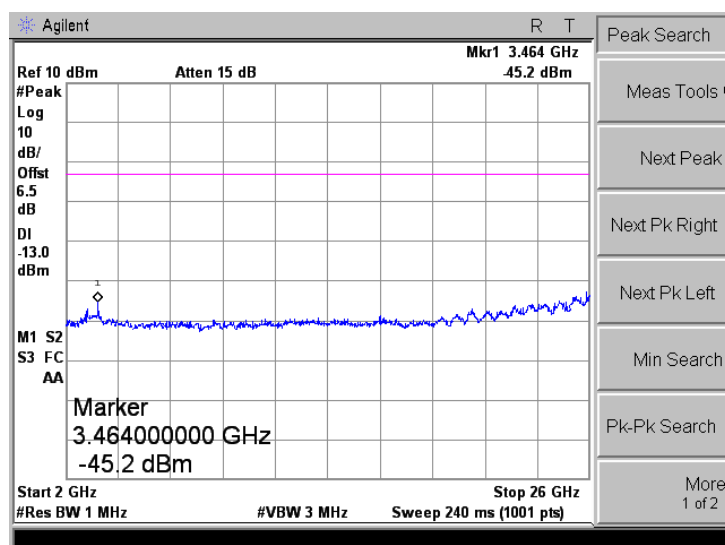
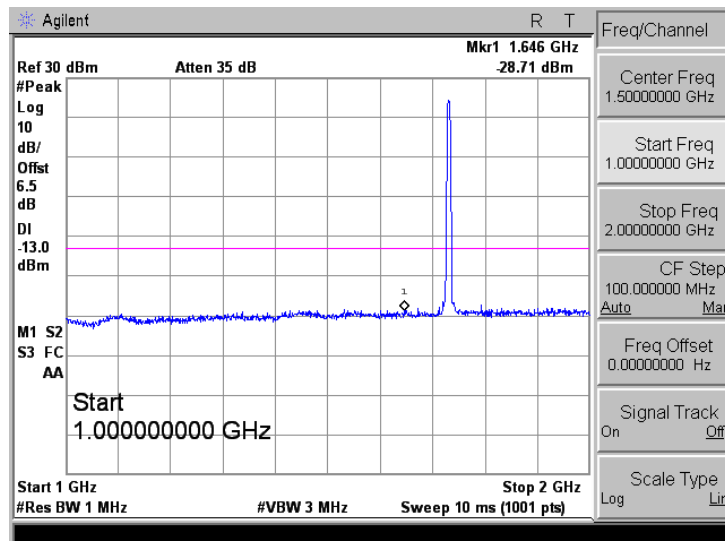
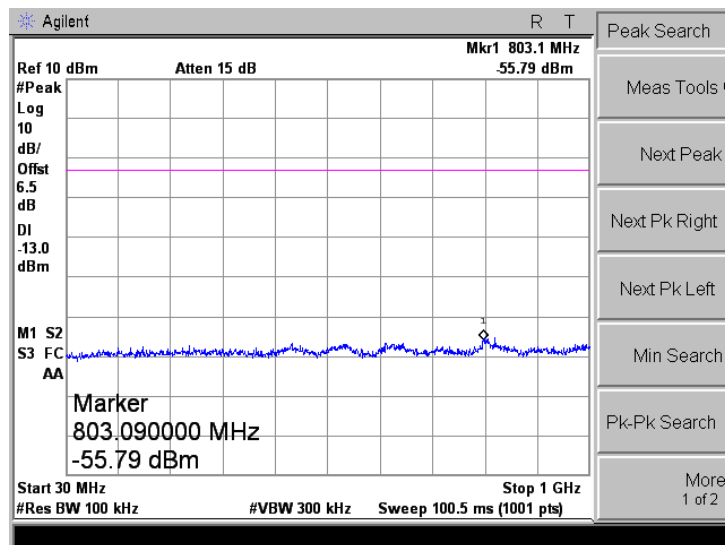
WCDMA Band IV

Low Channel



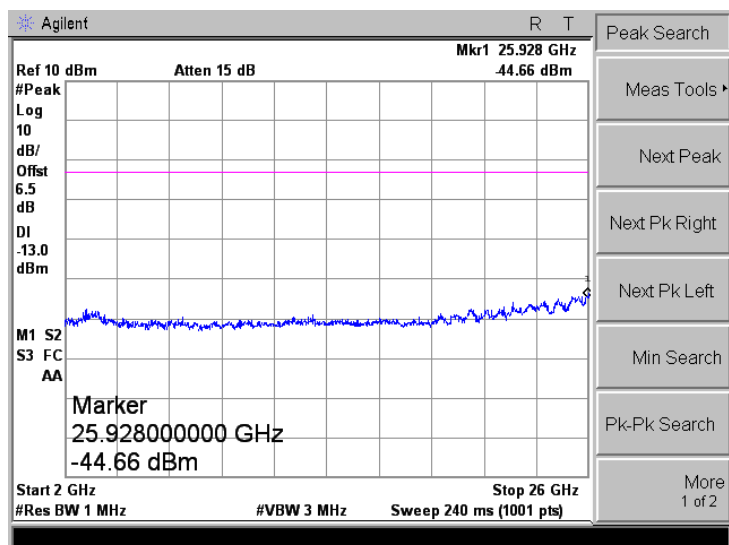
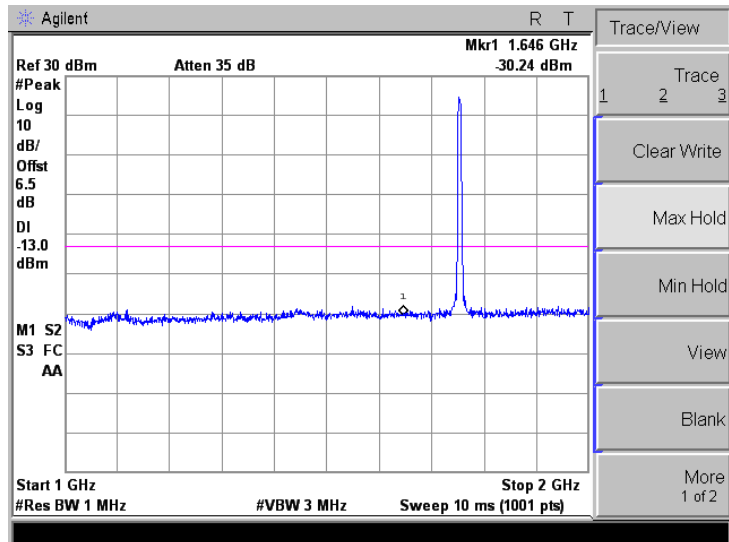
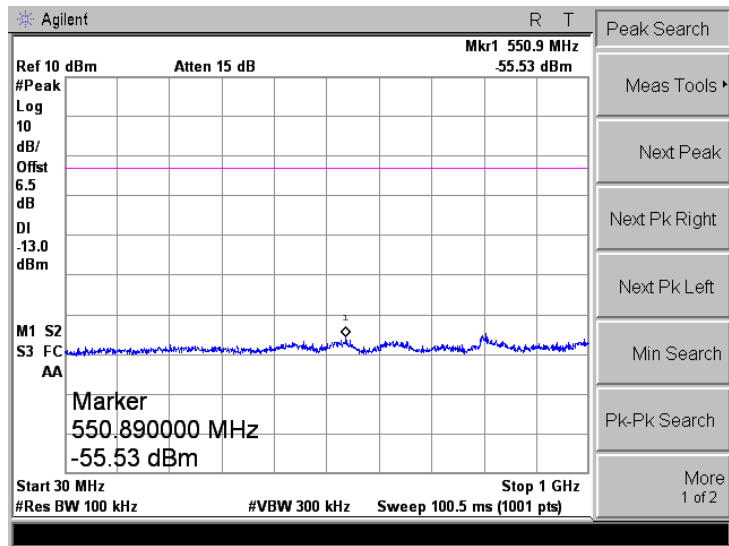
WCDMA Band IV

Middle Channel



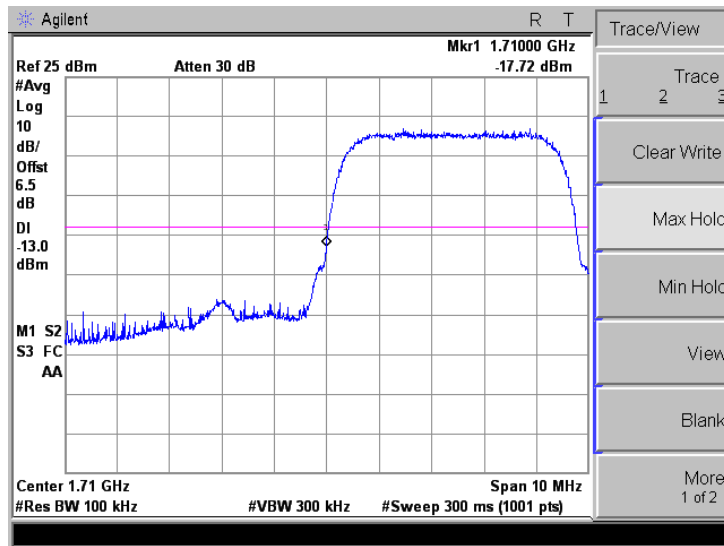
WCDMA Band IV

High Channel

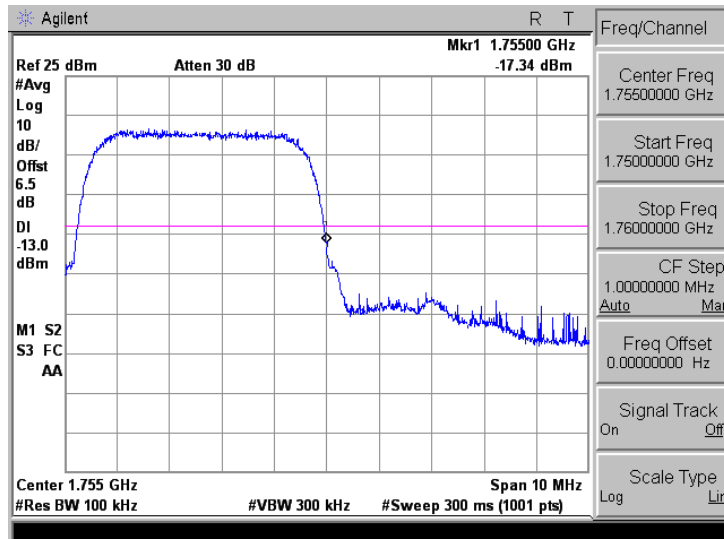


WCDMA Band IV

Low Band Emission

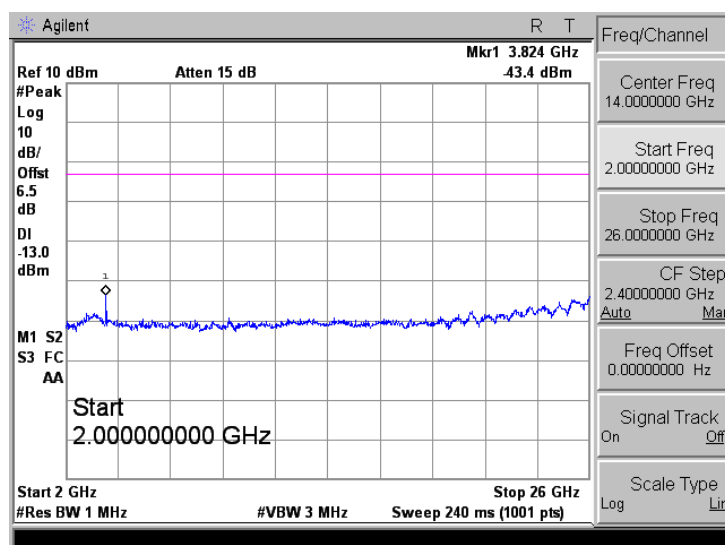
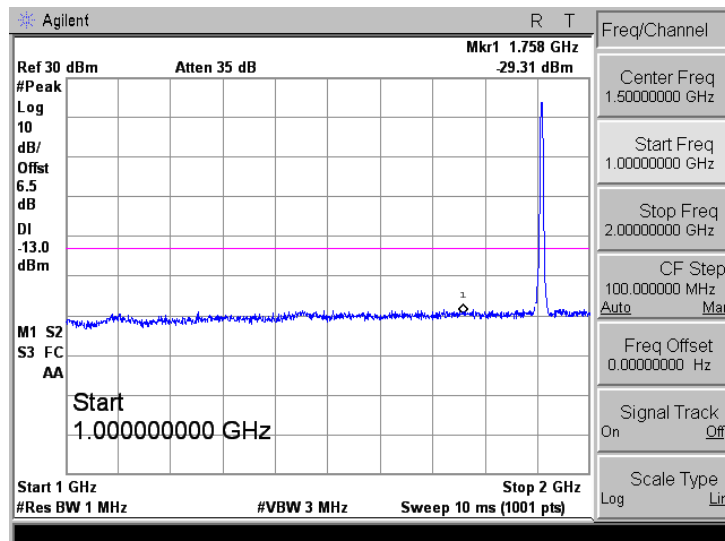
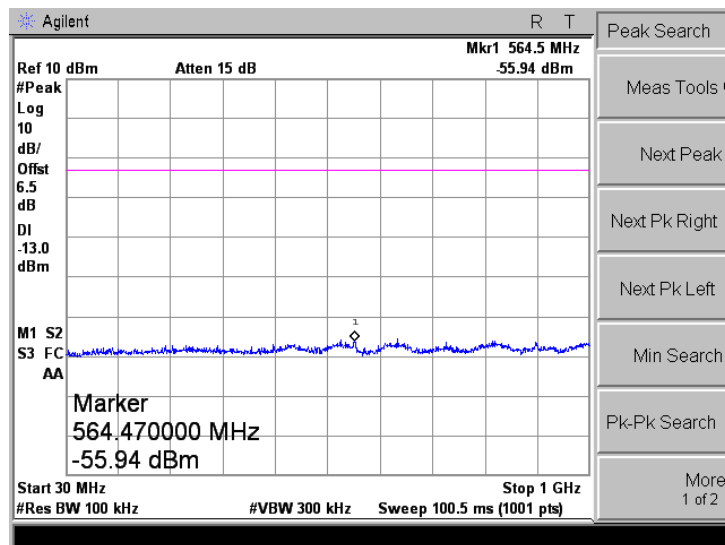


High Band Emission



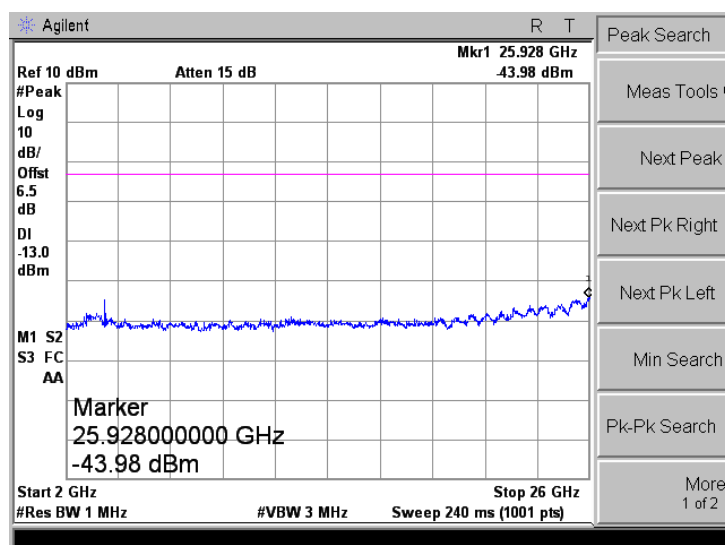
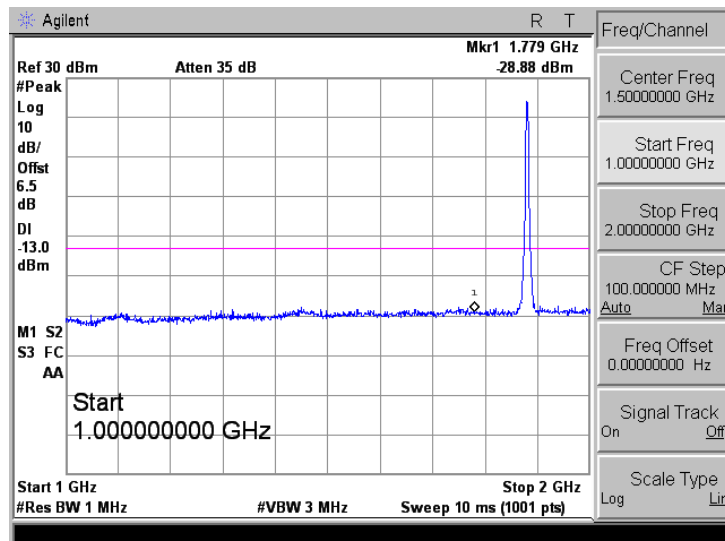
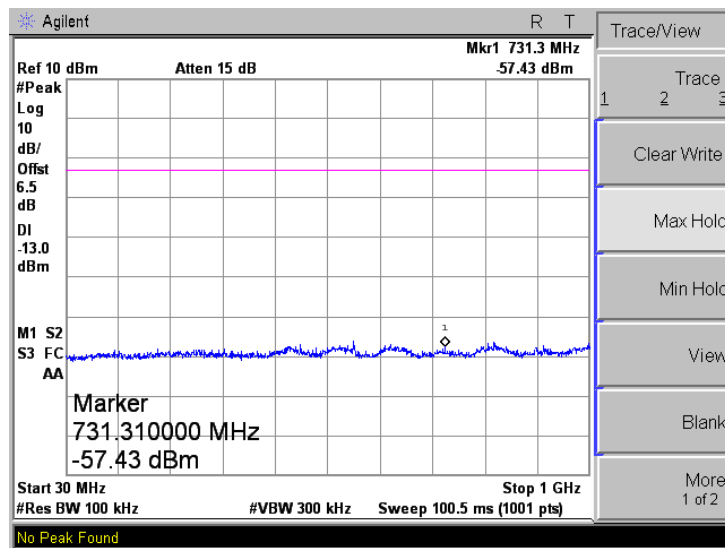
WCDMA Band II

Low Channel



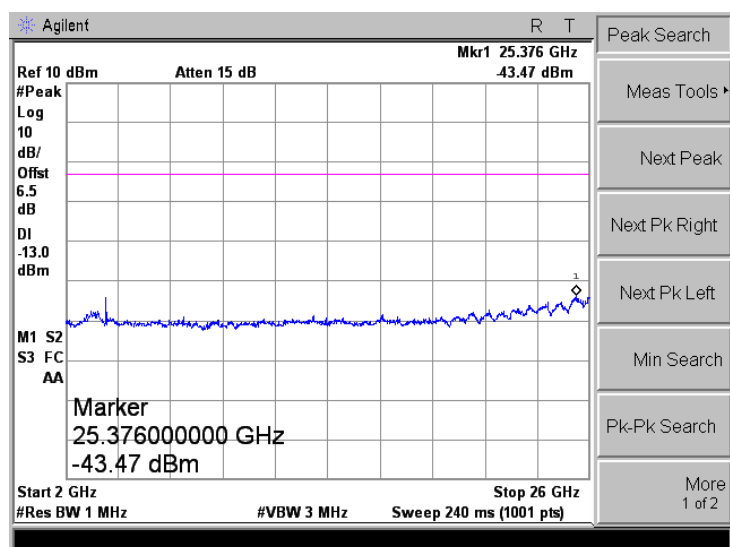
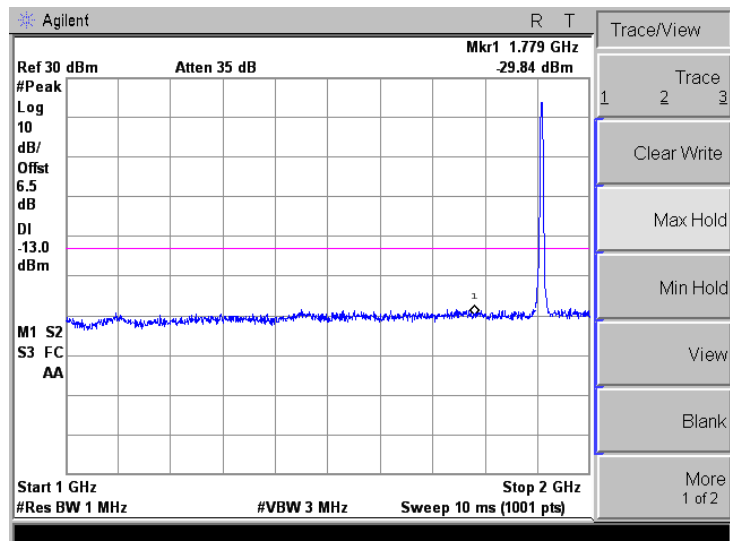
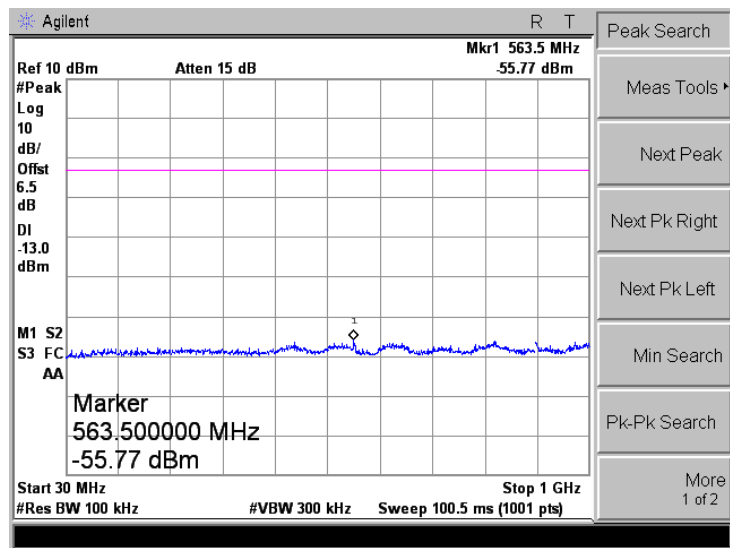
WCDMA Band II

Middle Channel



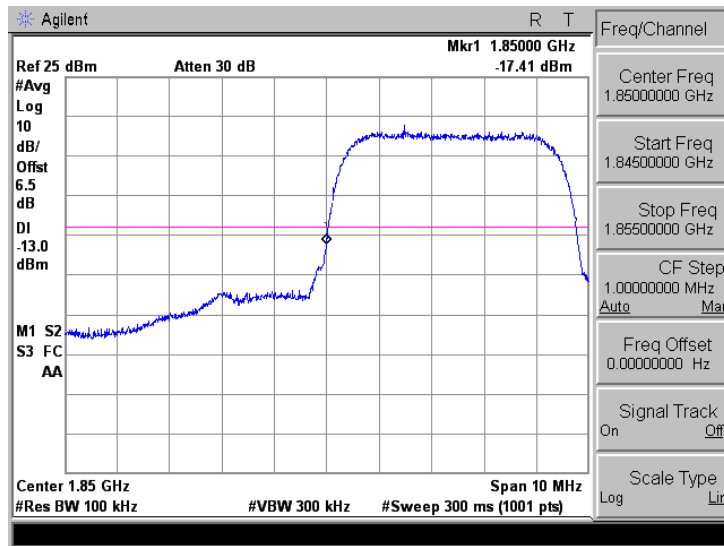
WCDMA Band II

High Channel

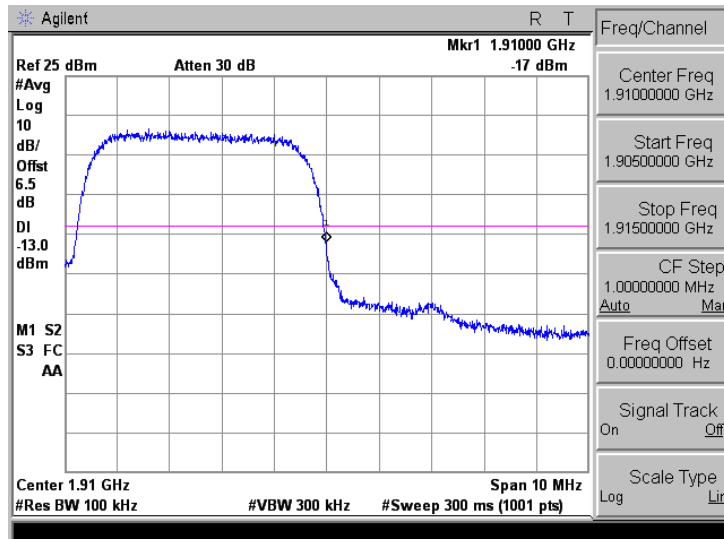


WCDMA Band II

Low Band Emission



High Band Emission



8. Spurious Radiated Emissions

8.1 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.

8.2 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.

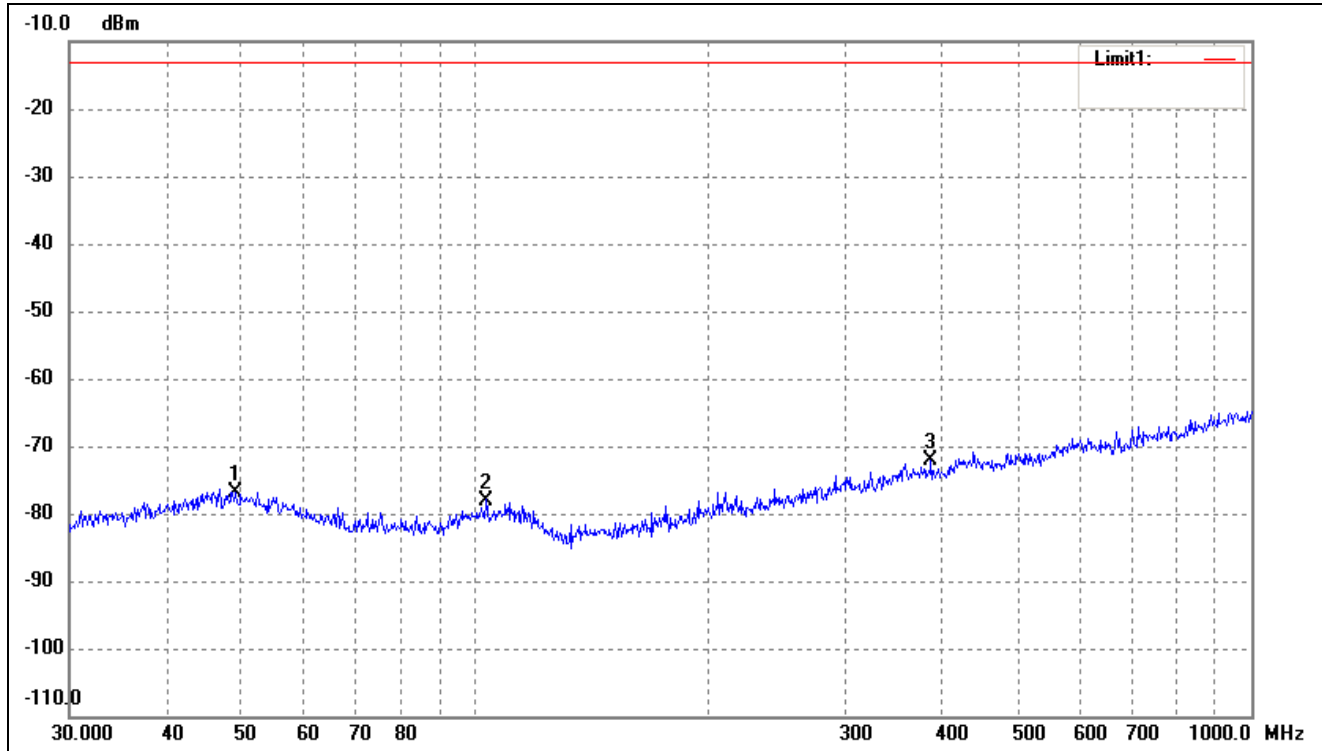
$$\text{Spurious attenuation limit in dB} = 43 + 10 \log_{10}(\text{power out in Watts})$$

8.3 Summary of Test Results/Plots

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

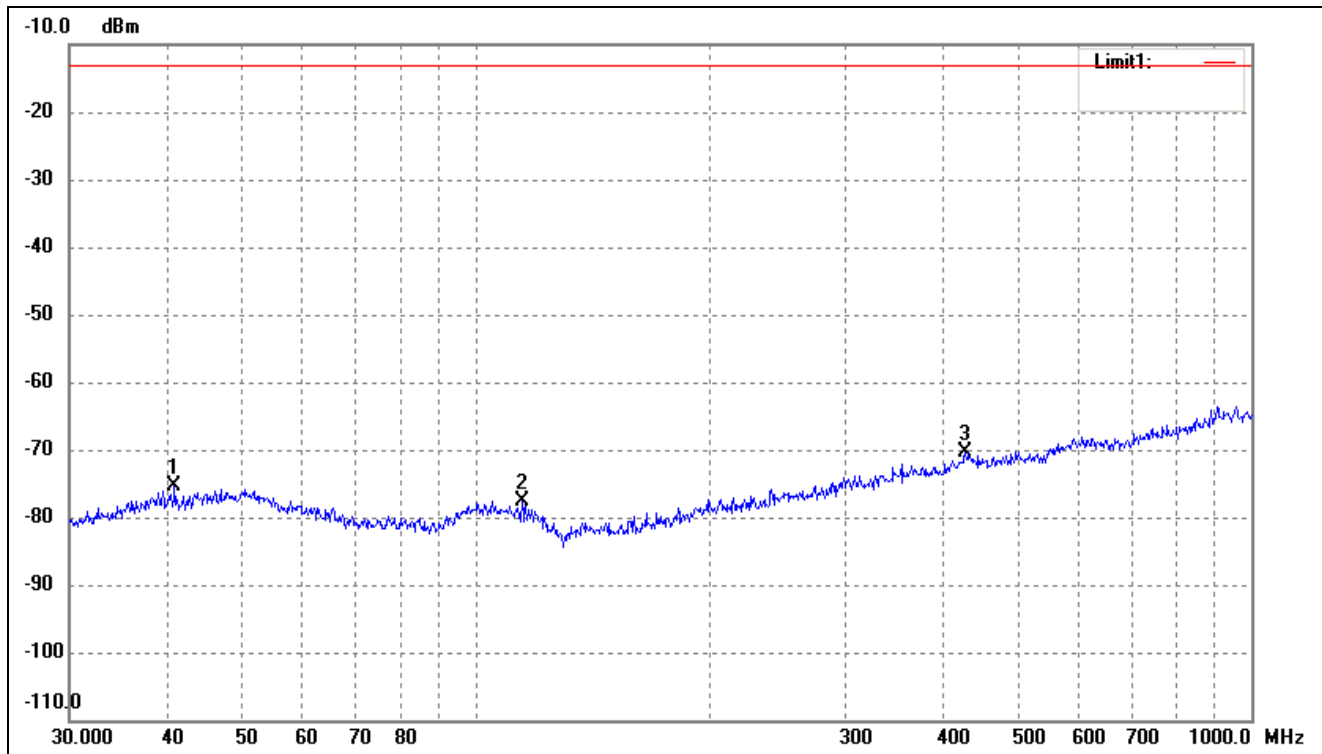
➤ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



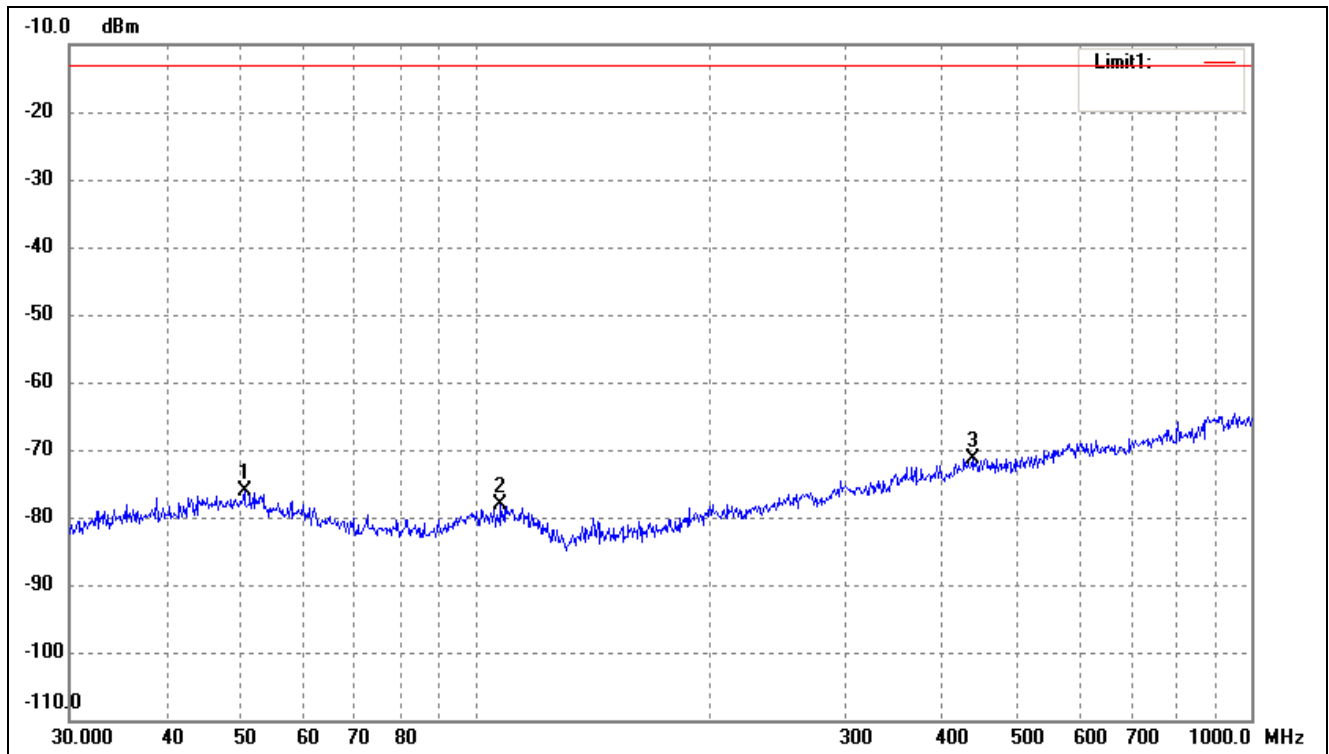
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	49.0145	-77.55	0.74	-76.81	-13.00	-63.81	ERP
2	103.4421	-76.67	-1.33	-78.00	-13.00	-65.00	ERP
3	386.6338	-76.40	4.19	-72.21	-13.00	-59.21	ERP

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



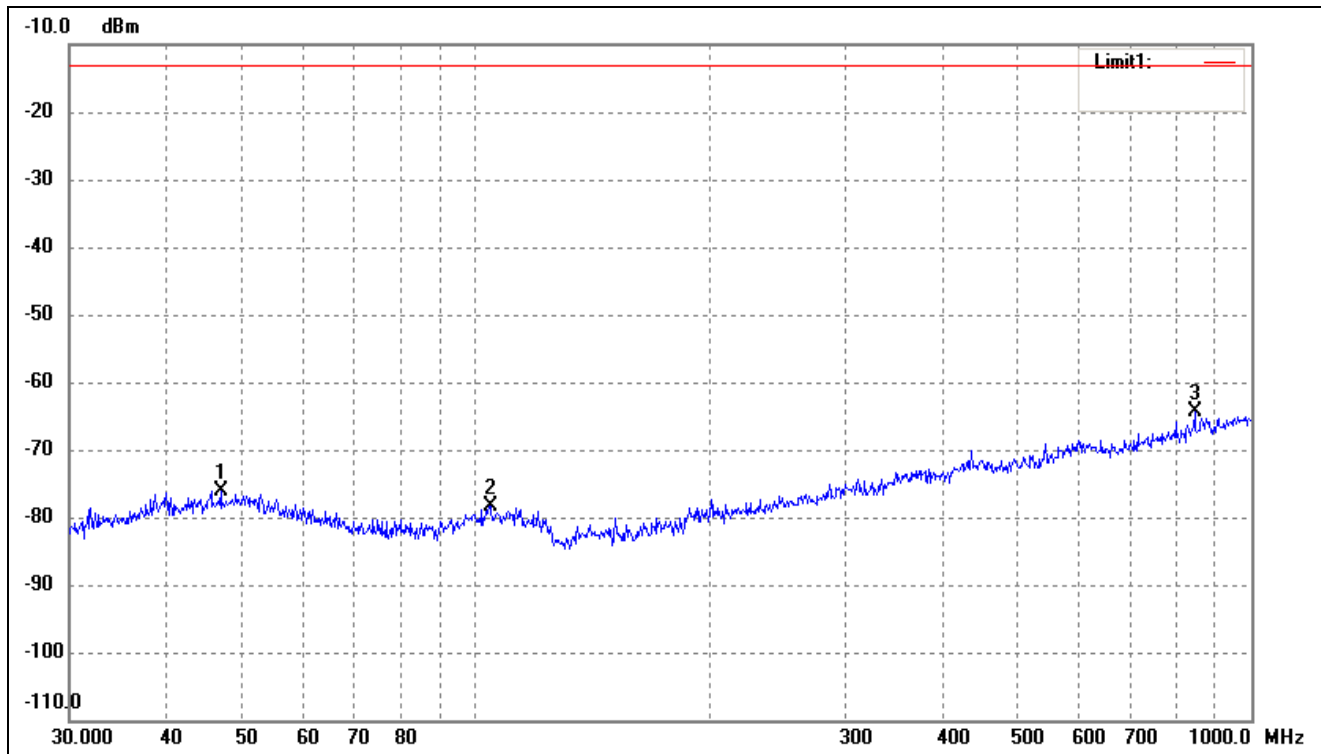
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	40.9881	-74.97	-0.48	-75.45	-13.00	-62.45	ERP
2	114.9169	-75.84	-1.78	-77.62	-13.00	-64.62	ERP
3	428.0193	-76.05	5.61	-70.44	-13.00	-57.44	ERP

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	50.4089	-76.79	0.72	-76.07	-13.00	-63.07	ERP
2	107.8877	-76.98	-1.25	-78.23	-13.00	-65.23	ERP
3	437.1199	-77.03	5.61	-71.42	-13.00	-58.42	ERP

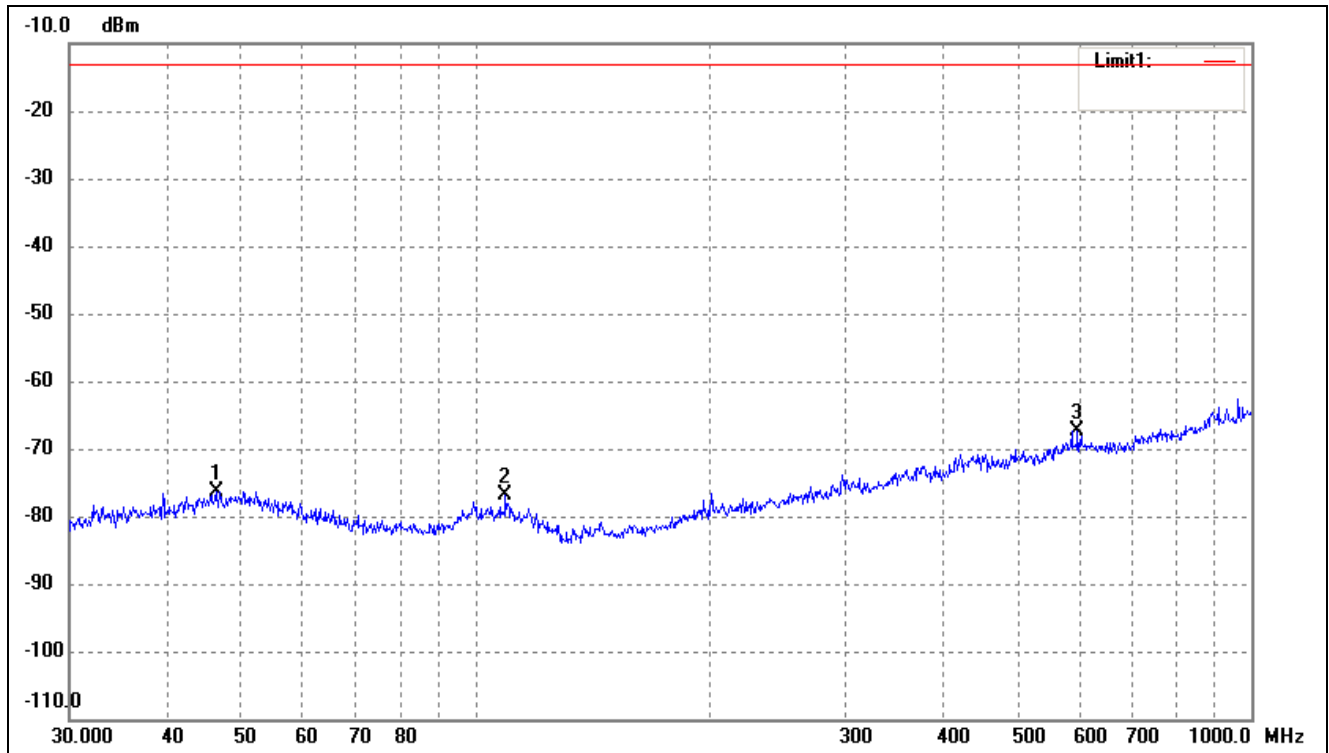
For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.9948	-76.79	0.60	-76.19	-13.00	-63.19	ERP
2	104.5361	-77.00	-1.30	-78.30	-13.00	-65.30	ERP
3	845.0878	-74.79	10.44	-64.35	-13.00	-51.35	ERP

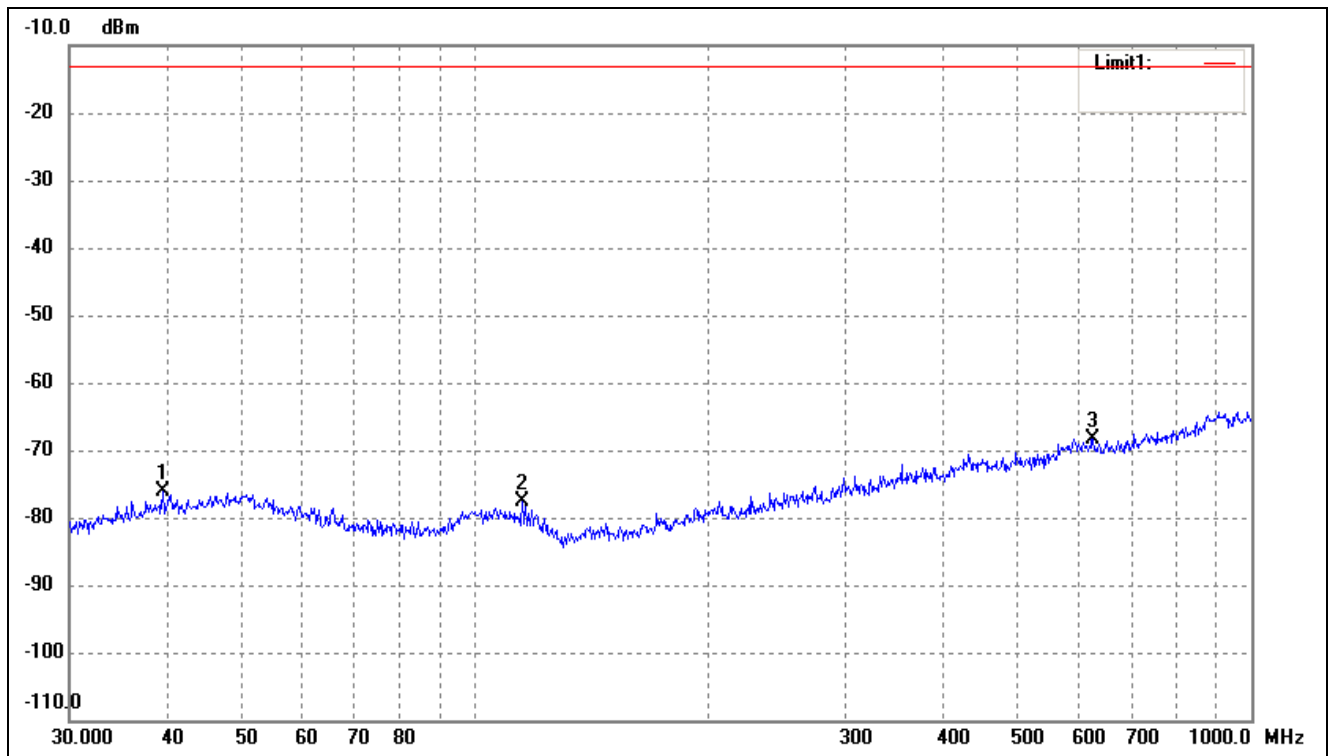
Note: Margin= (Reading+ Correct)- Limit

Test Channel	WCDMA Band V	Polarity:	Horizontal
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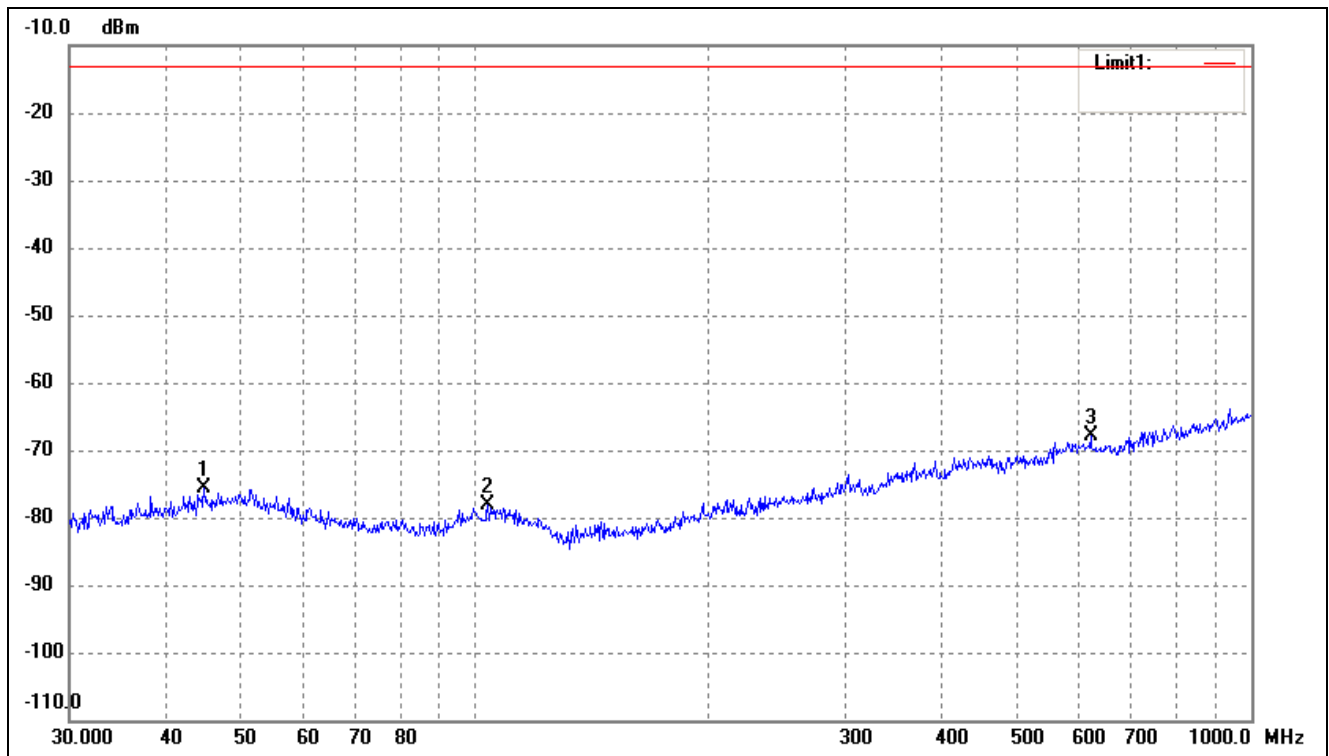
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.3402	-76.83	0.55	-76.28	-13.00	-63.28	ERP
2	109.4116	-75.55	-1.23	-76.78	-13.00	-63.78	ERP
3	597.2234	-75.15	7.76	-67.39	-13.00	-54.39	ERP

Test Channel	WCDMA Band V	Polarity:	Vertical
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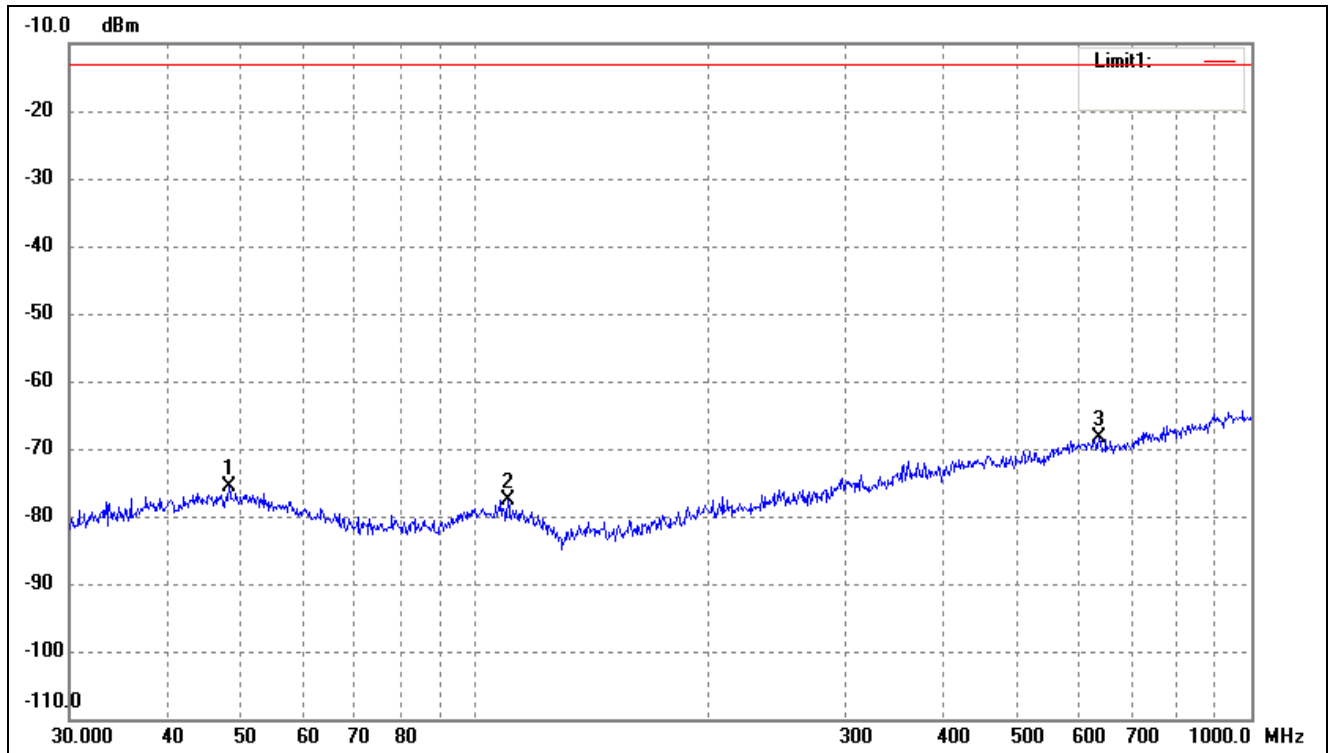
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.5757	-75.41	-0.78	-76.19	-13.00	-63.19	ERP
2	114.9169	-75.84	-1.78	-77.62	-13.00	-64.62	ERP
3	625.0780	-75.96	7.68	-68.28	-13.00	-55.28	ERP

Test Channel	WCDMA Band IV	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	44.7434	-76.09	0.40	-75.69	-13.00	-62.69	ERP
2	103.8055	-76.84	-1.32	-78.16	-13.00	-65.16	ERP
3	620.7096	-75.62	7.69	-67.93	-13.00	-54.93	ERP

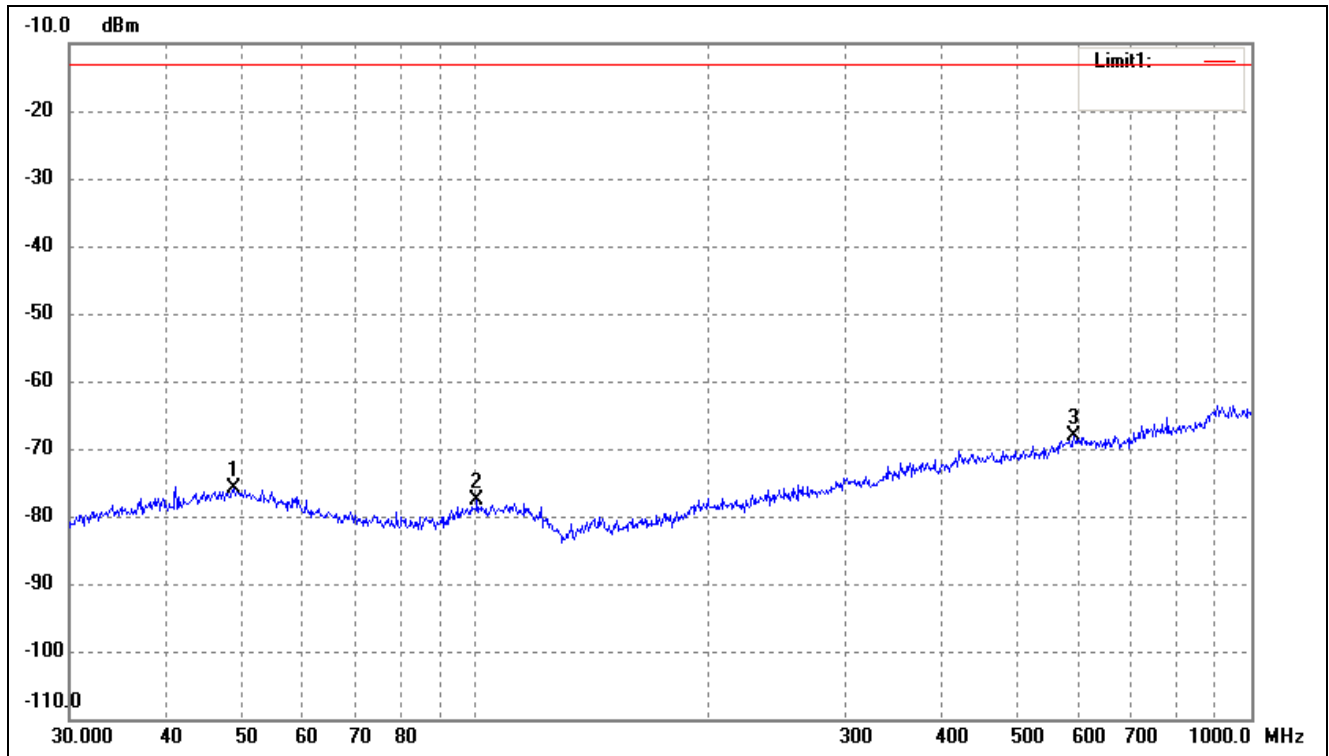
Test Channel	WCDMA Band IV	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	48.1626	-76.36	0.68	-75.68	-13.00	-62.68	ERP
2	110.1816	-76.41	-1.23	-77.64	-13.00	-64.64	ERP
3	636.1340	-76.05	7.63	-68.42	-13.00	-55.42	ERP

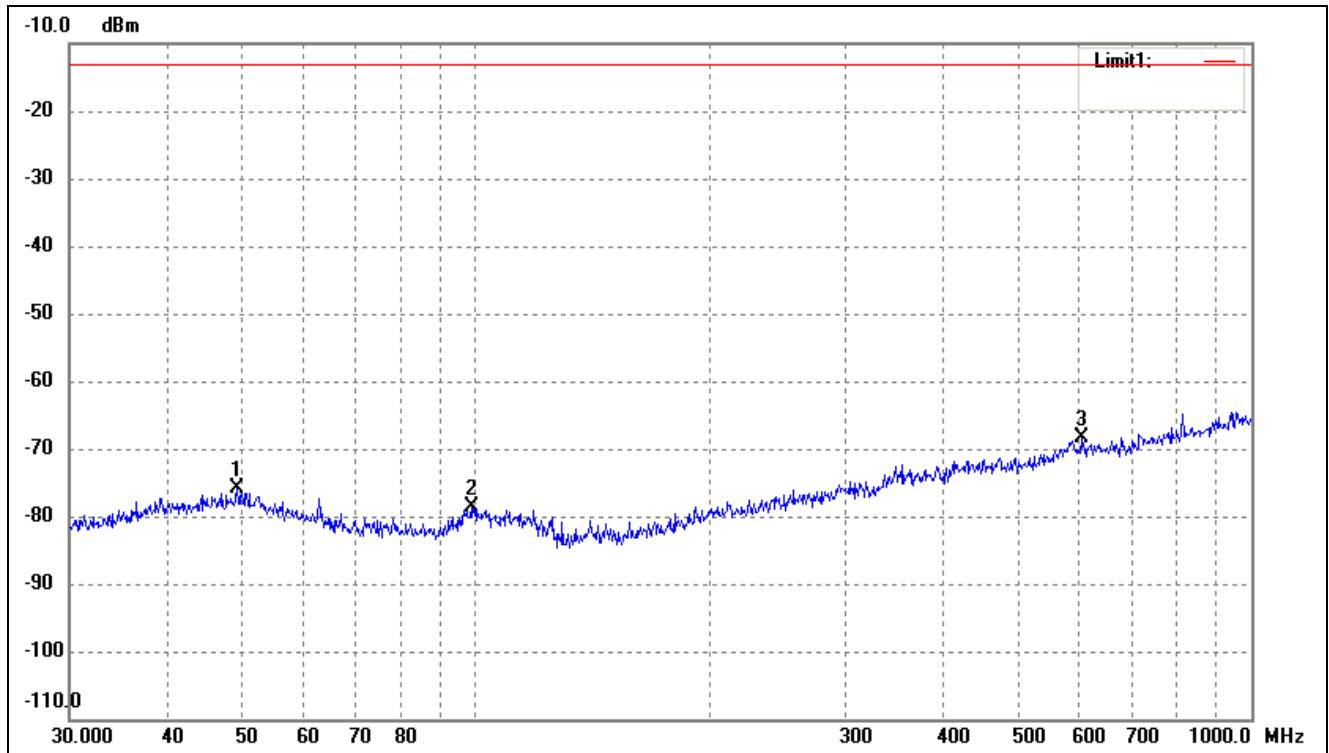
Note: $\text{Margin} = (\text{Reading} + \text{Correct}) - \text{Limit}$

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	48.8429	-76.70	0.73	-75.97	-13.00	-62.97	ERP
2	100.5806	-76.13	-1.37	-77.50	-13.00	-64.50	ERP
3	590.9737	-75.87	7.69	-68.18	-13.00	-55.18	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	49.3594	-76.64	0.76	-75.88	-13.00	-62.88	ERP
2	98.8326	-77.00	-1.65	-78.65	-13.00	-65.65	ERP
3	603.5392	-76.13	7.77	-68.36	-13.00	-55.36	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	-34.79	4.94	-29.85	-13	-16.85	H
2472.6	-42.83	8.46	-34.37	-13	-21.37	H
1648.4	-35.99	4.94	-31.05	-13	-18.05	V
2472.6	-43.48	8.46	-35.02	-13	-22.02	V
Middle Channel (836.6MHz)						
1673.2	-33.14	5.11	-28.03	-13	-15.03	H
2509.8	-42.82	8.54	-34.28	-13	-21.28	H
1673.2	-32.89	5.11	-27.78	-13	-14.78	V
2509.8	-43.37	8.54	-34.83	-13	-21.83	V
High Channel (848.8MHz)						
1697.6	-35.83	5.25	-30.58	-13	-17.58	H
2546.4	-42.99	8.57	-34.42	-13	-21.42	H
1697.6	-35.59	5.25	-30.34	-13	-17.34	V
2546.4	-41.45	8.57	-32.88	-13	-19.88	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	-39.67	10.54	-29.13	-13	-16.13	H
5550.6	-48.19	13.37	-34.82	-13	-21.82	H
3700.4	-41.33	10.54	-30.79	-13	-17.79	V
5550.6	-48.72	13.37	-35.35	-13	-22.35	V
Middle Channel (1880MHz)						
3760.0	-41.91	10.64	-31.27	-13	-18.27	H
5640.0	-49.22	13.54	-35.68	-13	-22.68	H
3760.0	-41.36	10.64	-30.72	-13	-17.72	V
5640.0	-46.95	13.54	-33.41	-13	-20.41	V
High Channel (1909.8MHz)						
3819.6	-42.33	10.74	-31.59	-13	-18.59	H
5729.4	-47.11	13.71	-33.4	-13	-20.4	H
3819.6	-41.58	10.74	-30.84	-13	-17.84	V
5729.4	-47.93	13.71	-34.22	-13	-21.22	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	-34.78	4.94	-29.84	-13	-16.84	H
2479.2	-42.19	8.46	-33.73	-13	-20.73	H
1652.8	-34.62	4.94	-29.68	-13	-16.68	V
2479.2	-42.04	8.46	-33.58	-13	-20.58	V
Middle Channel (836.6MHz)						
1672.8	-32.65	5.11	-27.54	-13	-14.54	H
2509.2	-42.02	8.54	-33.48	-13	-20.48	H
1672.8	-34.65	5.11	-29.54	-13	-16.54	V
2509.2	-41.14	8.54	-32.6	-13	-19.6	V
High Channel (846.6MHz)						
1693.2	-37.94	5.25	-32.69	-13	-19.69	H
2539.8	-44.98	8.57	-36.41	-13	-23.41	H
1693.2	-35.83	5.25	-30.58	-13	-17.58	V
2539.8	-43.61	8.57	-35.04	-13	-22.04	V

➤ For WCDMA Band IV Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1712.4MHz)						
3424.8	-34.25	8.65	-25.6	-13	-12.6	H
5137.2	-42.37	12.03	-30.34	-13	-17.34	H
3424.8	-34.54	8.65	-25.89	-13	-12.89	V
5137.2	-39.15	12.03	-27.12	-13	-14.12	V
Middle Channel (1732.4MHz)						
3466.8	-32.21	8.91	-23.3	-13	-10.3	H
5200.2	-41.32	12.29	-29.03	-13	-16.03	H
3466.8	-35.81	8.91	-26.9	-13	-13.9	V
5200.2	-42.98	12.29	-30.69	-13	-17.69	V
High Channel (1752.6MHz)						
3505.2	-33.58	9.11	-24.47	-13	-11.47	H
5257.8	-41.34	12.56	-28.78	-13	-15.78	H
3505.2	-33.46	9.11	-24.35	-13	-11.35	V
5257.8	-41.4	12.56	-28.84	-13	-15.84	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	-42.51	10.54	-31.97	-13	-18.97	H
5557.2	-46.48	13.37	-33.11	-13	-20.11	H
3704.8	-42.83	10.54	-32.29	-13	-19.29	V
5557.2	-48.99	13.37	-35.62	-13	-22.62	V
Middle Channel (1880MHz)						
3760.0	-42.73	10.64	-32.09	-13	-19.09	H
5640.0	-46.21	13.54	-32.67	-13	-19.67	H
3760.0	-41.56	10.64	-30.92	-13	-17.92	V
5640.0	-49.16	13.54	-35.62	-13	-22.62	V
High Channel (1907.6MHz)						
3815.2	-42.53	10.74	-31.79	-13	-18.79	H
5722.8	-48.09	13.71	-34.38	-13	-21.38	H
3815.2	-41.76	10.74	-31.02	-13	-18.02	V
5722.8	-49.47	13.71	-35.76	-13	-22.76	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.

9. Frequency Stability

9.1 Standard Applicable

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

9.2 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.

9.3 Summary of Test Results/Plots

Note: 1. Worst case at GSM850/PCS1900/WCDMA B2/B4/B5 middle channel

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

➤ 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	59	0.0708	2.50	Pass
	-20	51	0.0607		
	-10	41	0.0487		
	0	36	0.0432		
	10	32	0.0377		
	20	25	0.0294		
	30	32	0.0377		
	40	37	0.0441		
	50	44	0.0524		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	53	0.0282	2.50	Pass
	-20	47	0.0250		
	-10	36	0.0192		
	0	30	0.0160		
	10	23	0.0123		
	20	19	0.0102		
	30	24	0.0127		
	40	28	0.0151		
	50	34	0.0180		

Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	64	0.0763	2.50	Pass
	-20	58	0.0699		
	-10	51	0.0607		
	0	45	0.0533		
	10	38	0.0460		
	20	35	0.0414		
	30	42	0.0506		
	40	48	0.0570		
	50	52	0.0616		
Reference Frequency: WCDMA Band IV Middle channel=1412 channel=1733.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	58	0.0337	2.50	Pass
	-20	53	0.0306		
	-10	42	0.0244		
	0	37	0.0213		
	10	29	0.0169		
	20	22	0.0124		
	30	29	0.0169		
	40	35	0.0200		
	50	42	0.0244		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	63	0.0336	2.50	Pass
	-20	55	0.0295		
	-10	44	0.0233		
	0	39	0.0209		
	10	32	0.0172		
	20	25	0.0135		
	30	32	0.0168		
	40	38	0.0205		
	50	43	0.0229		

➤ 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	58	0.0690	2.50	Pass
	NV	54	0.0644		
	LV	48	0.0570		
Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	50	0.0266	2.50	Pass
	NV	45	0.0237		
	LV	35	0.0188		
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	26	0.0313	2.50	Pass
	NV	32	0.0386		
	LV	37	0.0441		
Reference Frequency: WCDMA Band IV Middle channel=1412 channel=1733.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	52	0.0302	2.50	Pass
	NV	48	0.0280		
	LV	42	0.0244		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	60	0.0319	2.50	Pass
	NV	55	0.0295		
	LV	48	0.0254		

10. Modulation characteristics

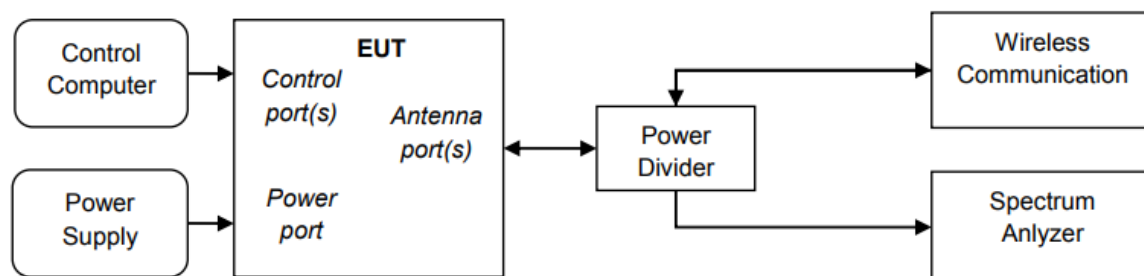
10.1 Standard Applicable

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.

10.2 Test Procedure

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

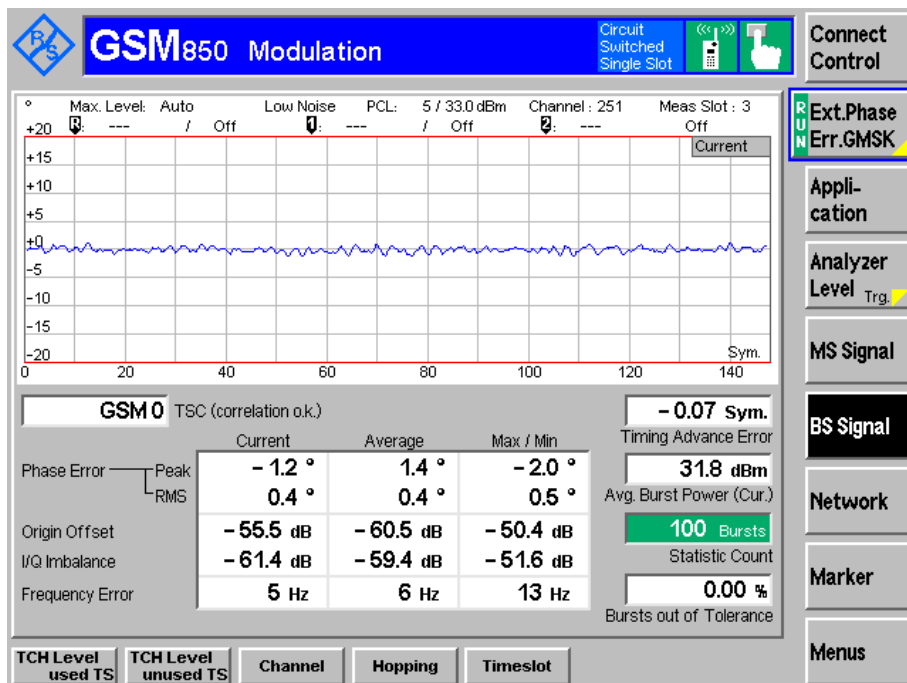


10.3 Summary of Test Results/Plots

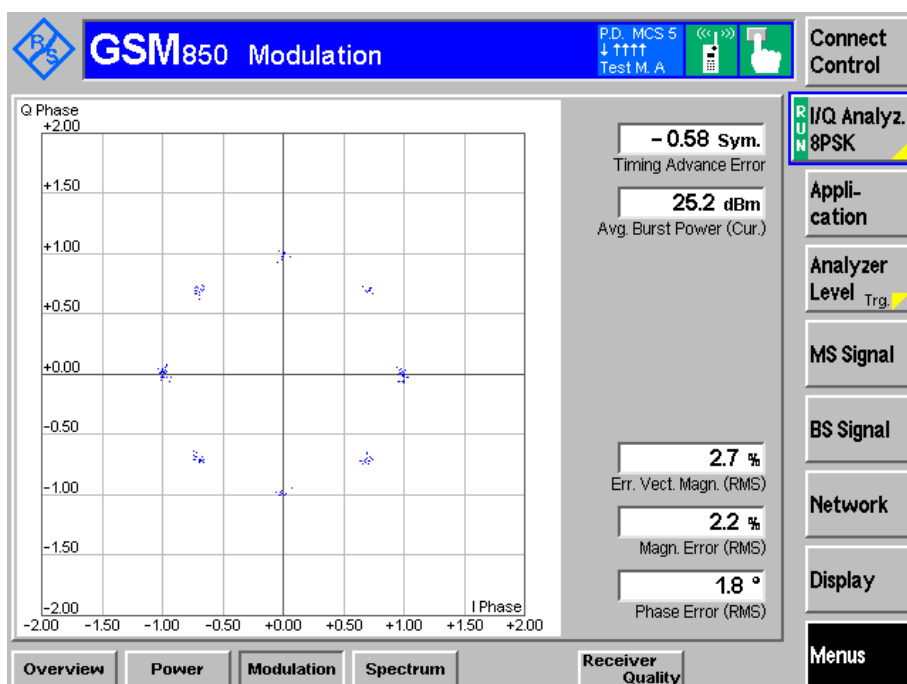
Only the worst case was selected to record

GSM850

Middle Channel-GMSK

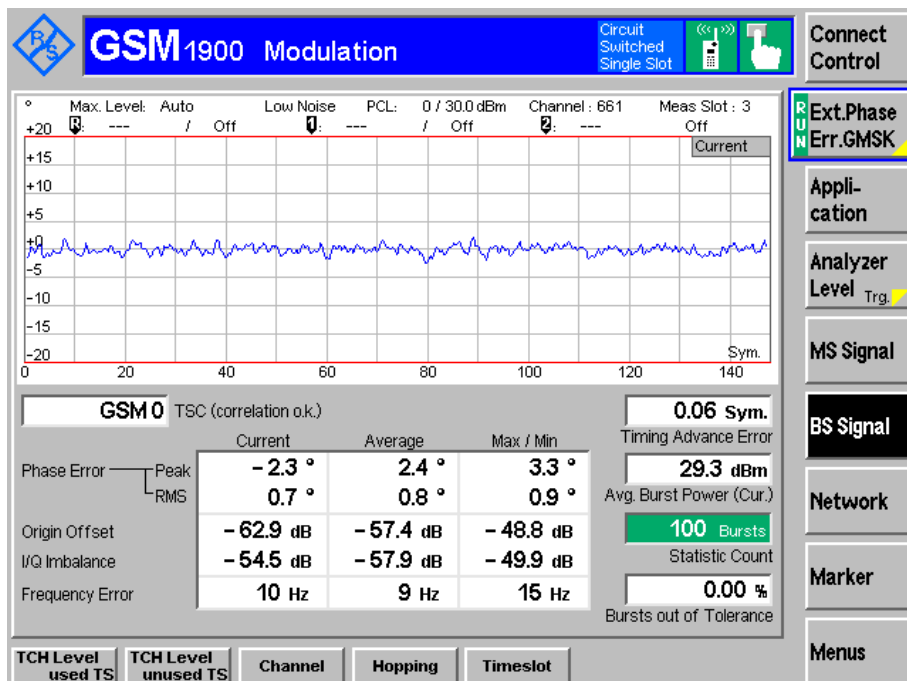


Middle Channel-8PSK

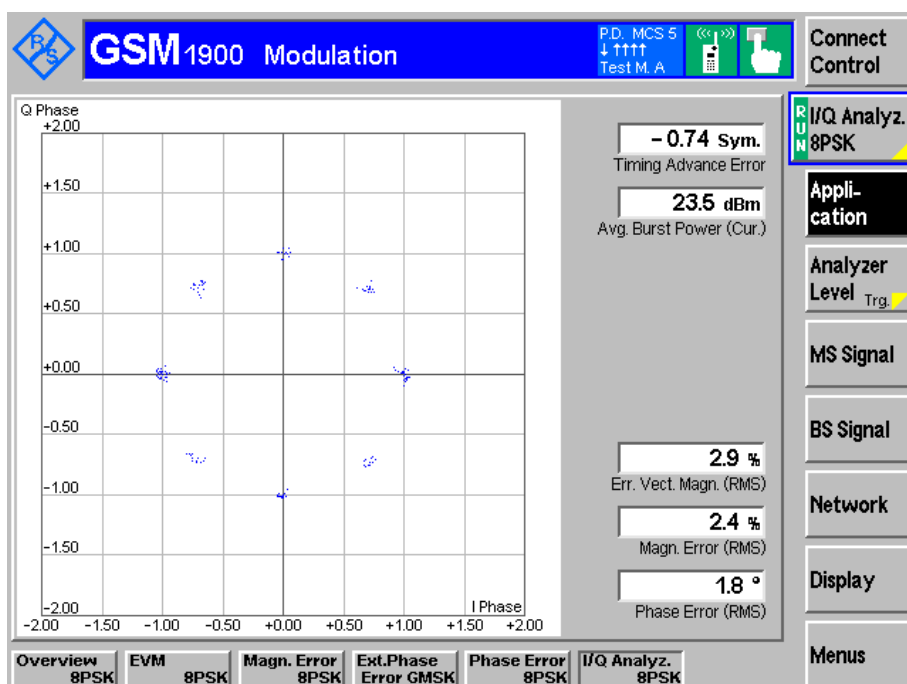


GSM1900

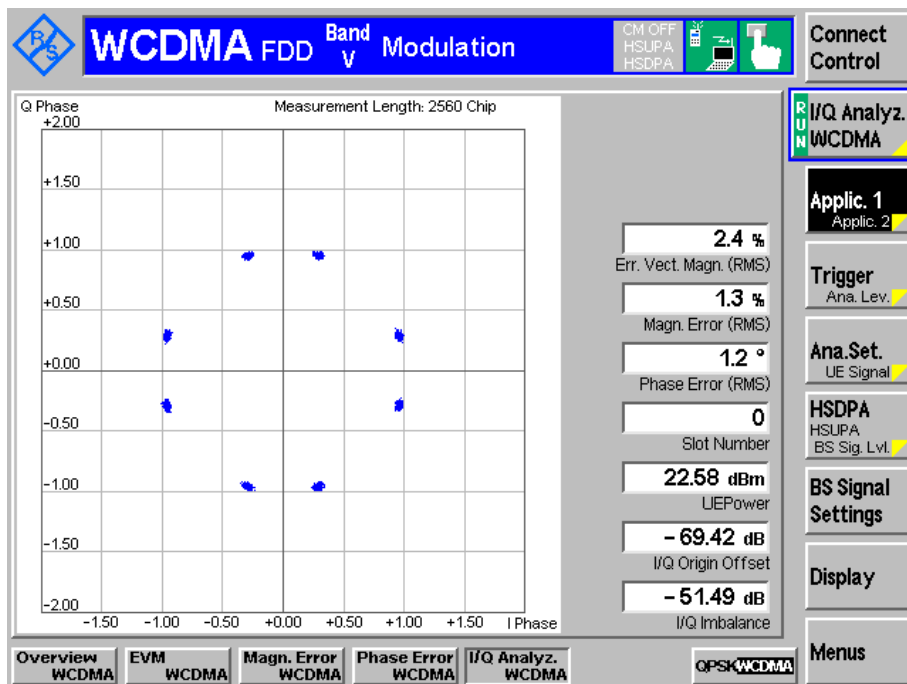
Middle Channel-GMSK



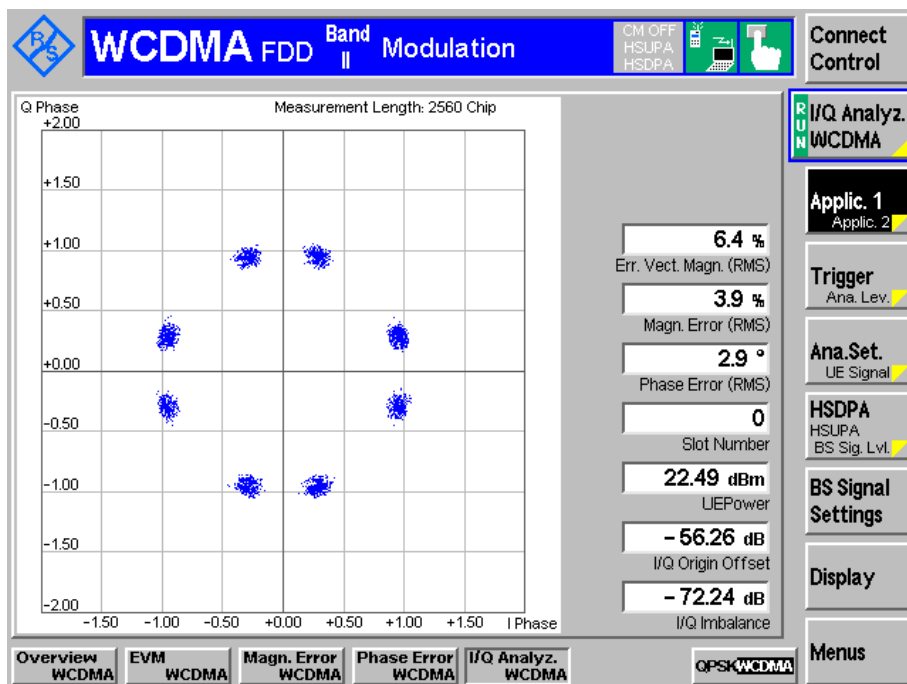
Middle Channel-8PSK



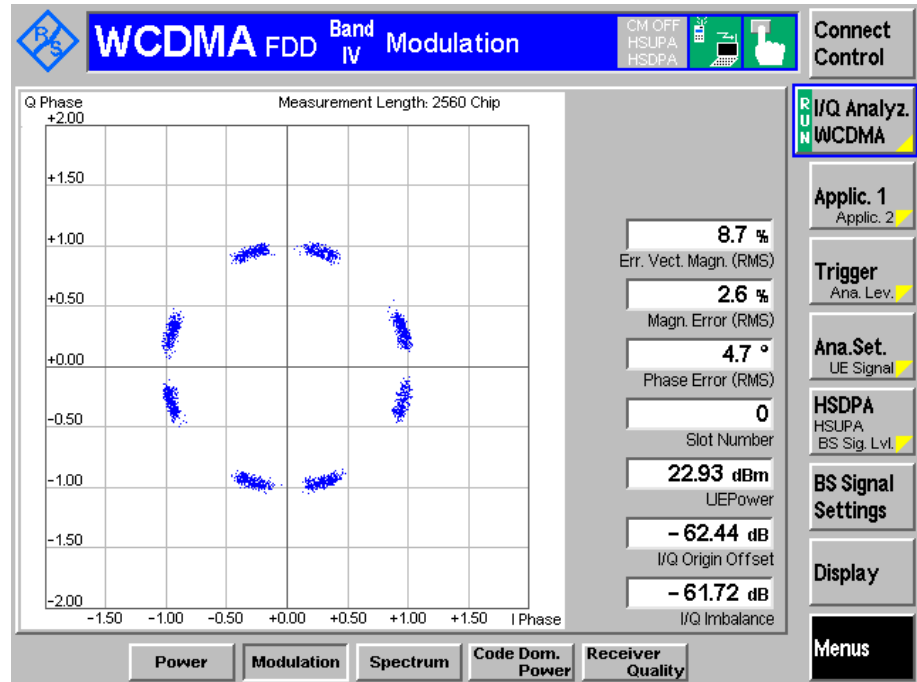
WCDMA B5



WCDMA B2



WCDMA B4



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