



FCC RADIO TEST REPORT

FCC ID: A2DA9T1183G

Product : 3G Mobile Phone

Trade Name : Cellacom /Telacom

Model Name : T118

Serial Model : K2776C

Report No. : MTE/EAH/D12050598

Prepared for

Shenzhen Telacom Science & Technology Co., Ltd.
28/F Building B, The Pavilion Hotel, Huaqiangbei Road, Futian District,
Shenzhen, Guangdong, China

Prepared by

Most Technology Service Co., Ltd.
No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan,
Shenzhen, Guangdong, China
Tel.: 86-755-8617 0306 Fax.: 86-755-8617 0310

TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Telacom Science & Technology Co., Ltd.
Address : 28/F Building B, The Pavilion Hotel, Huaqiangbei Road, Futian District, Shenzhen, Guangdong, China
Manufacturer's Name : Finmek Electronic (Shenzhen) Co., Ltd.
Address : 5/F, South Block 23, Shatoukok Free Trade Zone, Shenzhen, China

Product description

Product name : 3G Mobile Phone
Model and/or type reference : T118
Serial Model : K2776C
Rating(s) : DC 3.7V

Standards : 47 CRF Part2
47 CRF Part22 subpart H
47 CRF Part24 subpart E

Test procedure ANSI C63.4-2003

This device described above has been tested by MOST, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests 10 May. 2012 ~23 May. 2012

Date of Issue 23 May. 2012

Test Result **Pass**

Testing Engineer : Apple Huang
(Apple Huang)

Technical Manager : Tom Zhang
(Tom Zhang)

Authorized Signatory : Bovey Yang
(Bovey Yang)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Item Number	Item Description		FCC Rules	Result
1	Output Power	Conducted Output Power	22.913(a) / 24.232 (b)	Pass
		Radiated Output Power		
2	Spurious Emission	Conducted Spurious Emission	2.1051 / 22.917 / 24.238	Pass
		Radiated Spurious Emission		
3	Frequency Stability		2.1055 / 24.235	Pass
4	Occupied Bandwidth		2.1049 (h)(i)	Pass
5	Emission Bandwidth		22.917(b) / 24.238 (b)	Pass
6	Band Edge		22.917(b) / 24.238 (b)	Pass

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC FRN Registration No.:238937; IC Registration No.:9270A-1

CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	Radiated Emission Test	$\pm 3.17\text{dB}$
3	RF power,conducted	$\pm 0.16\text{dB}$
4	Spurious emissions,conducted	$\pm 0.21\text{dB}$
5	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
6	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	3G Mobile Phone
Trade Name	Cellacom /Telacom
Model Name	T118
Serial Model	K2776C
Model Difference	All model are the same circuit and RF module, except the appearance and colour. All test base on T118
Frequency:	<input checked="" type="checkbox"/> GSM 850 <input checked="" type="checkbox"/> PCS 1900 (U.S. Bands) <input checked="" type="checkbox"/> GSM 900 <input checked="" type="checkbox"/> DCS 1800 (Non-U.S. Bands) U.S. Bands: <input checked="" type="checkbox"/> WCDMA FDD Band II <input checked="" type="checkbox"/> WCDMA FDD Band V Non-U.S. Bands: <input checked="" type="checkbox"/> WCDMA FDD Band I <input checked="" type="checkbox"/> WCDMA FDD Band VIII
Output Power:	GSM850(Class 4) : 1.909 W (32.81dBm) GPRS850(Multislot Class 12) : 1.678 W (32.25 dBm) GSM1900 (Class 1) : 0.946 W (29.76dBm) GPRS1900 (Multislot Class 12) : 0.905W (29.57 dBm) WCDMA/HSDPA Band II: 0.214 W (23.32dBm) WCDMA/HSDPA BandV: 0.217W (23.37dBm)
SIM card:	SIM Card
Type of Modulation	GPRS/GSM Mode with GMSK Modulation WCDMA Mode with QPSK Modulation HSPA Mode with QPSK Modulation
Antenna Type	PIFA Antenna
Bluetooth	Frequency:2402 – 2480 MHz Modulation:GFSK+ π /4DQPSK +8-DPSK
Power Source	DC Voltage supplied from battery
Adapter	Model No.: CM-300 Input: AC 100-240V,0.2A,50/60Hz Output: DC5V,0.6A
Battery	Brand Name: Cellacom Model No.:CM-4C Capacitance:800mAh Rated Voltage:3.7V Charge Limit:4.2V

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

For Radiated Emission	
Final Test Mode	Description
GSM850	TX1
PCS1900	TX2
GPRS850	TX3
GPRS1900	TX4
WCDMA850	TX5
WCDMA1900	TX6

Note:

- (1) During the testing, the EUT (GSM Dual Band GPRS Digital Mobile Phone) was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both GSM and PCS frequency band.

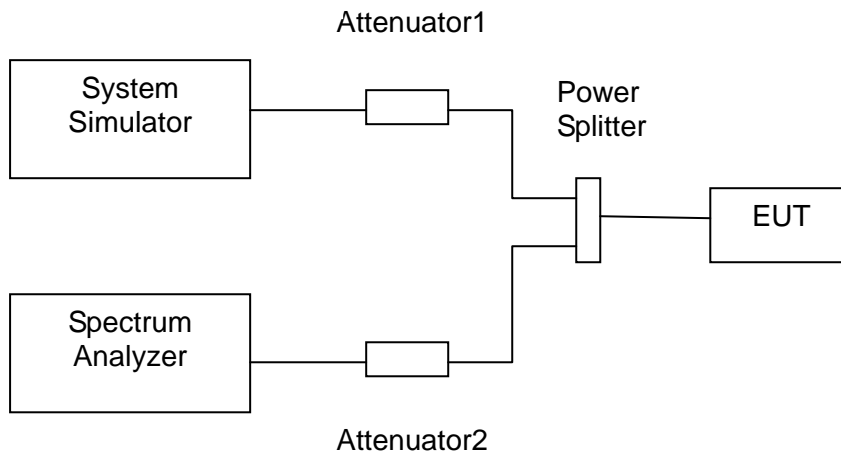
GPRS850, GPRS1900, HSDPA band II, , HSDPA band V, modes have been tested during the test.

The worst condition (GPRS 850) be recorded in the test report if no other modes test data.

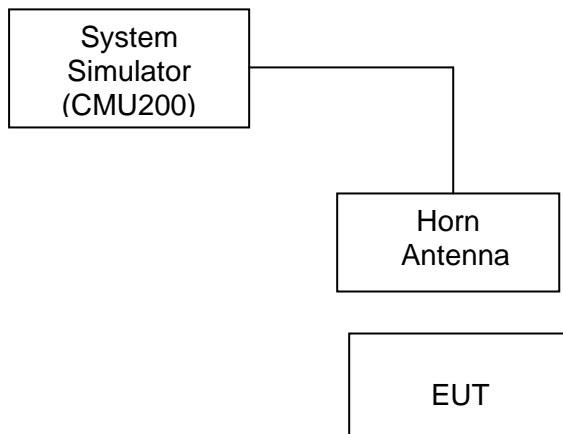
- (2) The EUT use new battery.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

CONDUCTED METHOD:



RADIATED METHOD:



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	3G Mobile Phone	Cellacom /Telacom	T118	K2776C	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	160400005	Jul. 06. 2012
2	Test Receiver	R&S	ESPI	101318	Jul. 06. 2012
3	Bilog Antenna	TESEQ	CBL6111D	31216	Jul. 06. 2012
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	Jul. 06. 2012
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	Jul. 06. 2012
6	Horn Antenna	EM	EM-AH-10180	2011071402	Jul. 06. 2012
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	Jul. 06. 2012
8	Amplifier	EM	EM-30180	060538	Jul. 06. 2012
9	Loop Antenna	ARA	PLA-1030/B	1029	Jul. 06. 2012
10	Power Meter	R&S	NRVS	100696	Jul. 06. 2012
11	Communication Tester	R&S	CMU200	A0304247	Jul. 06. 2012
12	Power Splitter	Agilent	11636A	N/A	Jul. 06. 2012

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test Receiver	R&S	ESCI	101160	Jul. 06. 2012
2	LISN	R&S	ENV216	101313	Jul. 06. 2012
3	LISN	EMCO	3816/2	00042990	Jul. 06. 2012
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	Jul. 06. 2012
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	Jul. 06. 2012
6	Absorbing clamp	R&S	MOS-21	100423	Jul. 06. 2012

3. TEST RESULT

3.1 OUTPUT POWER

3.1.1 CONDUCTED OUTPUT POWER

MEASUREMENT METHOD

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes(GPRS850, GPRS1900, HSDPA band II, HSDPA band V,) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

PROVISIONS APPLICABLE

Conducted Output Power Limits for GSM850 band		
Mode	Nominal Peak Power	Tolerance(dB)
GSM	33 dBm (2W)	- 1
GPRS	33 dBm (2W)	- 1
Conducted Output Power Limits for PCS1900 band		
Mode	Nominal Peak Power	Tolerance(dB)
GSM	30 dBm (1W)	- 1
GPRS	30 dBm (1W)	- 1
Conducted Output Power Limits for WCDMA band II		
Mode	Nominal Peak Power	Tolerance(dB)
GSM	24 dBm (0.25W)	- 2
GPRS	24 dBm (0.25W)	- 2
Conducted Output Power Limits for WCDMA band V		
Mode	Nominal Peak Power	Tolerance(dB)
GSM	24 dBm (0.25W)	- 2
GPRS	24 dBm (0.25W)	- 2

MEASUREMENT RESULT

GSM/GPRS850:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance (dB)	Avg. Burst Power	Duty cycle Factor (dB)	Frame Power (dBm)
GSM850	824.2	33	32.61	-0.39	32.54	-9	23.54
	836.6	33	32.71	-0.29	32.65	-9	23.65
	848.8	33	32.81	-0.19	32.75	-9	23.75
GPRS850 (1 Slot)	824.2	33	32.11	-0.89	32.04	-9	23.04
	836.6	33	32.25	-0.75	32.15	-9	23.15
	848.8	33	32.43	-0.57	32.34	-9	23.34
GPRS850 (2 Slot)	824.2	30	29.14	-0.86	29.01	-6	23.01
	836.6	30	29.28	-0.72	29.21	-6	23.21
	848.8	30	29.57	-0.43	29.46	-6	23.46
GPRS850 (3 Slot)	824.2	28.23	28.01	-0.22	27.95	-4.25	23.7
	836.6	28.23	27.96	-0.27	27.87	-4.25	23.62
	848.8	28.23	28.07	-0.16	27.95	-4.25	23.7
GPRS850 (4 Slot)	824.2	27	26.14	-0.86	25.94	-3	22.94
	836.6	27	26.35	-0.65	26.04	-3	23.04
	848.8	27	26.59	-0.41	26.51	-3	23.51

PCS/GPRS1900:

Mode	Frequency (MHz)	Reference Power	Peak Power (dbm)	Tolerance (dB)	Avg. Burst Power	Duty cycle Factor (dB)	Frame Power (dBm)
GSM1900	1850.2	30	29.44	-0.56	29.41	-9	20.41
	1880	30	29.59	-0.41	29.56	-9	20.56
	1909.8	30	29.76	-0.24	29.7	-9	20.7
GPRS1900 (1 Slot)	1850.2	30	29.31	-0.69	29.28	-9	20.28
	1880	30	29.43	-0.57	29.38	-9	20.38
	1909.8	30	29.57	-0.43	29.49	-9	20.49
GPRS1900 (2 Slot)	1850.2	27	26.36	-0.64	26.32	-6	20.32
	1880	27	26.39	-0.61	26.34	-6	20.34
	1909.8	27	26.51	-0.49	26.46	-6	20.46
GPRS1900 (3 Slot)	1850.2	25.23	24.71	-0.52	24.53	-4.25	20.28
	1880	25.23	24.81	-0.42	24.62	-4.25	20.37
	1909.8	25.23	24.96	-0.27	24.64	-4.25	20.39
GPRS1900 (4 Slot)	1850.2	24	23.41	-0.59	23.35	-3	20.35
	1880	24	23.56	-0.44	23.53	-3	20.53
	1909.8	24	23.72	-0.28	23.68	-3	20.68

WCDMA BAND II

Mode	Frequency (MHz)	Reference power	Peak Power (dBm)	Tolerance (dbm)	Avg.Burst Power
WCDMA 1900 RMC	1852.4	24	23.02	-0.98	22.97
	1880	24	23.14	-0.86	23.11
	1907.6	24	23.32	-0.68	23.26
WCDMA 1900 AMR	1852.4	24	22.96	-1.04	22.94
	1880	24	23.05	-0.95	22.99
	1907.6	24	23.12	-0.88	23.09
HSDPA Subtest 1	1852.4	24	22.41	-1.59	22.36
	1880	24	22.61	-1.39	22.57
	1907.6	24	22.71	-1.29	22.67
HSDPA Subtest 2	1852.4	24	22.36	-1.64	22.31
	1880	24	22.41	-1.59	22.36
	1907.6	24	22.54	-1.46	22.51
HSDPA Subtest 3	1852.4	24	22.35	-1.65	22.31
	1880	24	22.49	-1.51	22.42
	1907.6	24	22.56	-1.44	22.51
HSDPA Subtest 4	1852.4	24	22.41	-1.59	22.35
	1880	24	22.53	-1.47	22.50
	1907.6	24	22.65	-1.35	22.59
	1880	24	22.75	-1.25	22.67
	1907.6	24	22.86	-1.14	22.84

WCDMA BAND V

Mode	Frequency (MHz)	Reference power	Peak Power (dBm)	Tolerance (dbm)	Avg.Burst Power
WCDMA 850 RMC	826.4	24	23.11	-0.89	23.05
	835.0	24	23.26	-0.74	23.25
	846.6	24	23.37	-0.63	23.35
WCDMA 850 AMR	826.4	24	22.97	-1.03	22.95
	835.0	24	23.14	-0.86	23.11
	846.6	24	23.23	-0.77	23.22
HSDPA Subtest 1	826.4	24	22.54	-1.46	22.51
	835.0	24	22.56	-1.44	22.53
	846.6	24	22.71	-1.29	22.68
HSDPA Subtest 2	826.4	24	22.76	-1.24	22.73
	835.0	24	22.81	-1.19	22.75
	846.6	24	22.87	-1.13	22.82
HSDPA Subtest 3	826.4	24	22.68	-1.32	22.63
	835.0	24	22.75	-1.25	22.71
	846.6	24	22.83	-1.17	22.79
HSDPA Subtest 4	826.4	24	22.62	-1.38	22.54
	835.0	24	22.64	-1.36	22.59
	846.6	24	22.68	-1.32	22.61
	835.0	24	22.68	-1.32	22.65
	846.6	24	22.86	-1.14	22.83

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	$MAX(CM-1,0)$
Note: $CM=1$ for $\beta_c/\beta_d=12/15$, $\beta_{hs}/\beta_c=24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to-average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensate for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

3.1.2 RADIATED OUTPUT POWER MEASUREMENT METHOD

The measurements procedures specified in TIA-603C-2004 were applied.

- 1 In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (P_{in}) is applied to the input of the dipole, and the power received (P_r) at the chamber's probe antenna is recorded.
- 2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as $AR_{pl} = P_{in} + 2.15 - P_r$. The AR_{pl} is the attenuation of "reference path loss", and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: $Power = P_{Mea} + AR_{pl}$
- 3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
- 4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
- 5 The EUT is then put into continuously transmitting mode at its maximum power level.
- 6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
- 7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (P_{in}).

ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

Mode	Nominal Peak Power
GSM 850	≤ 38.45 dBm (7W)
PCS 1900	≤ 33 dBm (2W)
WCDMA BAND II	≤ 33 dBm (2W)
WCDMA BANDV	≤ 38.45 dBm (7W)

MEASUREMENT RESULT

Radiated Power (ERP) for GSM 850 MHZ				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. ERP	
GSM850	824.2	29.64	Horizontal	Pass
	836.6	29.87	Horizontal	Pass
	848.8	30.11	Horizontal	Pass

Radiated Power (E.I.R.P) for PCS 1900 MHZ				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
GSM 850	1850.2	27.62	Horizontal	Pass
	1880.0	27.98	Horizontal	Pass
	1909.8	28.07	Horizontal	Pass

Radiated Power (E.I.R.P) for WCDMA band II				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
RMC 12.2kbps	1852.4	20.59	Horizontal	Pass
	1880	20.71	Horizontal	Pass
	1907.6	20.91	Horizontal	Pass

Radiated Power (ERP) for WCDMA band V				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. ERP	
RMC 12.2kbps	826.4	20.78	Horizontal	Pass
	835.0	21.21	Horizontal	Pass
	846.6	21.54	Horizontal	Pass

3.2 SPURIOUS EMISSION

3.2.1 CONDUCTED SPURIOUS EMISSION

MEASUREMENT METHOD

The following steps outline the procedure used to measure the conducted emissions from the EUT.

- 1, Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 9 GHz.
- 2, Determine EUT transmit frequencies: the following typical channels were chosen to conducted emissions testing.

Typical Channels for testing of GSM 850 MHz	
Channel	Frequency (MHz)
128	824.2
190	836.6
251	848.8

Typical Channels for testing of PCS 1900 MHz	
Channel	Frequency (MHz)
512	1850.2
661	1880.0
810	1909.8

Typical Channels for testing of WCDMA band II	
Channel	Frequency (MHz)
9262	1852.4
9400	1880.0
9538	1907.6

Typical Channels for testing of WCDMA band V	
Channel	Frequency (MHz)
4132	826.4
4175	835.0
4233	846.6

PROVISIONS APPLICABLE

On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P , in Watts) by at least $43+10\log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

MEASUREMENT RESULT

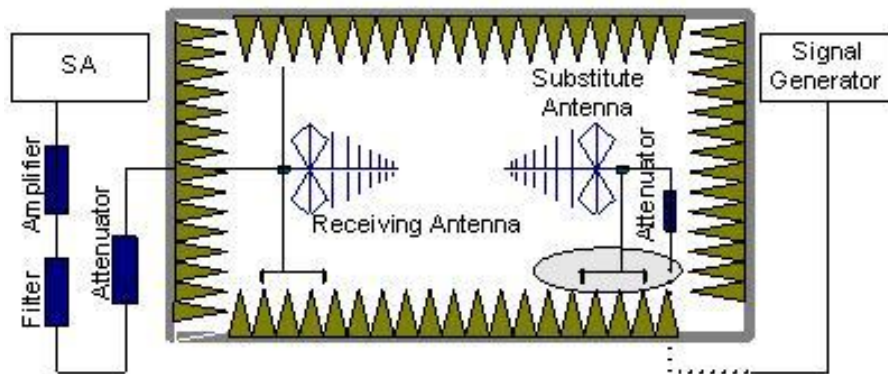
Please refers to Appendix I for compliance test plots for Conducted Spurious Emission

3.2.2 RADIATED SPURIOUS EMISSION MEASUREMENT METHOD

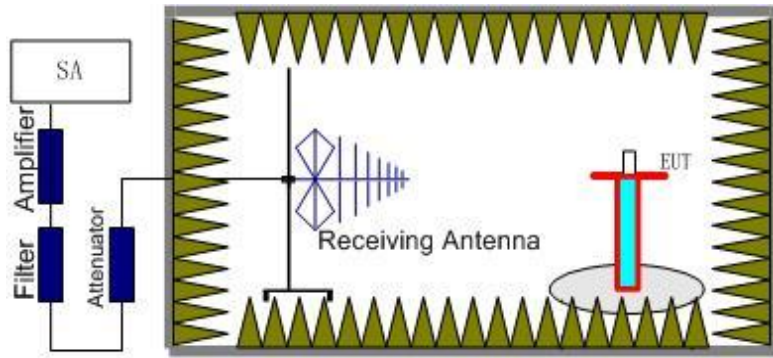
The measurements procedures specified in TIA-603C-2004 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes(GSM, GPRS,) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for both GSM band and PCS band.

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = Rx \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + Gain \text{ (dBi)} - 107 \text{ (dBuV to dBm)}$ The SA is calibrated using following setup.



b) EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS band (1850.2 MHz, 1880 MHz and 1909.8 MHz) ,GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: $Power = P_{Mea} + A_{Rpl}$

PROVISIONS APPLICABLE

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P , in Watts) by at least $43 + 10 \log(P)$ dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

MEASUREMENT RESULT

GSM 850:

The Worst Test Results for Channel 251/848.8 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit (dBm)	Polarity
1685.23	-36.20	-4.89	-41.09	-13.00	Horizontal
2456.12	-36.17	-2.07	-38.25	-13.00	Vertical
3645.78	-36.32	3.79	-32.53	-13.00	Vertical
4536.58	-38.60	2.98	-35.63	-13.00	Horizontal

PCS 1900:

The Worst Test Results for Channel 881/1909.8MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit (dBm)	Polarity
1429.36	-43.49	9.9	-33.62	-13.00	Vertical
2563.47	-37.86	11.8	-26.02	-13.00	Vertical
3645.26	-36.57	15.0	-21.52	-13.00	Horizontal
4563.56	-39.58	14.9	-24.64	-13.00	Vertical
5689.25	-43.69	20.0	-23.72	-13.00	Horizontal

WCDMA band II:

The Worst Test Results for Channel 9538/1907.6MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit (dBm)	Polarity
1536.98	-38.94	-2.25	-41.19	-13.00	Vertical
2536.41	-40.40	-3.03	-43.43	-13.00	Horizontal
3786.52	-45.51	-1.87	-47.38	-13.00	Horizontal
5123.56	-38.03	8.52	-29.51	-13.00	Vertical
6615.32	-56.36	18.7	-22.66	-13.00	Horizontal

WCDMA band V:

The Worst Test Results for Channel 4233/846.6MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit (dBm)	Polarity
1598.26	-38.90	-2.25	-41.15	-13.00	Vertical
2365.78	-40.29	-3.03	-43.32	-13.00	Horizontal
4967.65	-45.47	-1.87	-47.34	-13.00	Horizontal
6457.86	-37.98	8.52	-29.46	-13.00	Vertical
7896.56	-51.23	16.85	-34.38	-13.00	Horizontal

Note: Below 30MHz no Spurious found and The GSM modes is the worst condition.

3.3 FREQUENCY STABILITY

3.3.1 MEASUREMENT METHOD

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

- (1) Measure the carrier frequency at room temperature.
- (2) Subject the EUT to overnight soak at -30°C.
- (3) With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900, channel 190 for GSM850 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- (4) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
- (5) Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1V increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
- (6) Subject the EUT to overnight soak at +50°C.
- (7) With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- (8) Repeat the above measurements at 10°C increments from +50°C to -30°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
- (9) At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

3.3.2 PROVISIONS APPLICABLE

For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC and 4.2VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

MEASUREMENT RESULT

Frequency Error Against Voltage for GSM 850 MHz		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	31	0.038
3.8	41	0.050
4.2	21	0.025

Frequency Error Against Voltage for GSM 850 MHz		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	25	0.030
-20	37	0.045
-10	43	0.052
0	31	0.038
10	28	0.034
20	21	0.025
30	31	0.038
40	25	0.030
50	24	0.029

Frequency Error Against Voltage for PCS 1900 MHz		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	28	0.015
3.8	38	0.021
4.2	32	0.017

Frequency Error Against Temperature for PCS 1900 MHz		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	29	0.016
-20	31	0.017
-10	40	0.022
0	31	0.017
10	28	0.015
20	25	0.014
30	39	0.021
40	31	0.017
50	27	0.015

Frequency Error Against Voltage for UMTS band band II		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	52	0.055
3.8	42	0.045
4.2	46	0.049

Frequency Error Against Voltage for UMTS band band II		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	29	0.031
-20	34	0.036
-10	47	0.050
0	50	0.053
10	51	0.054
20	52	0.055
30	53	0.056
40	56	0.060
50	57	0.061

Frequency Error Against Voltage for UMTS band V		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	52	0.125
3.8	42	0.101
4.2	46	0.110

Frequency Error Against Voltage for UMTS band V		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	29	0.069
-20	34	0.081
-10	47	0.113
0	50	0.120
10	51	0.122
20	52	0.125
30	53	0.127
40	56	0.134
50	57	0.137

3.4 OCCUPIED BANDWIDTH

3.4.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

3.4.2 PROVISIONS APPLICABLE

The occupied bandwidth (99%) shall not exceed 300 KHz.

3.4.3 MEASUREMENT RESULT

Occupied Bandwidth (99%) for GSM850 band		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	824.2	246.62
Middle Channel	836.6	244.01
High Channel	848.8	246.08

Occupied Bandwidth (99%) for PCS1900 band		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	1850.2	243.84
Middle Channel	1880.0	248.35
High Channel	1909.8	246.19

Occupied Bandwidth (99%) for WCDMA band II		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(MHz)
Low Channel	1852.4	4.16
Middle Channel	1880	4.20
High Channel	1907.6	4.16

Occupied Bandwidth (99%) for WCDMA band V		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(MHz)
Low Channel	826.4	4.22
Middle Channel	835.0	4.19
High Channel	846.6	4.19

Please refers to Appendix II for compliance test plots for Occupied Bandwidth (99%)

3.5 EMISSION BANDWIDTH

3.5.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

3.5.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

3.5.3 MEASUREMENT RESULT

Emission Bandwidth (-26dBc) for GSM850 band		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	311.06
Middle Channel	836.6	311.78
High Channel	848.8	309.54

Emission Bandwidth (-26dBc) for PCS1900 band		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	312.73
Middle Channel	1880.0	313.62
High Channel	1909.8	307.65

Emission Bandwidth (-26dBc) for WCDMA band II		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)
Low Channel	1852.4	4.67
Middle Channel	1880.0	4.69
High Channel	1907.6	4.66

Emission Bandwidth (-26dBc) for WCDMA band V		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)
Low Channel	826.4	4.68
Middle Channel	835.0	4.66
High Channel	846.6	4.68

Please refers to Appendix II for compliance test plots for Emission Bandwidth (-26dBc)

3.6 BAND EDGE

3.6.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

3.6.2 PROVISIONS APPLICABLE

as Specified in FCC rules of 22.917(b) and 24.238(b)

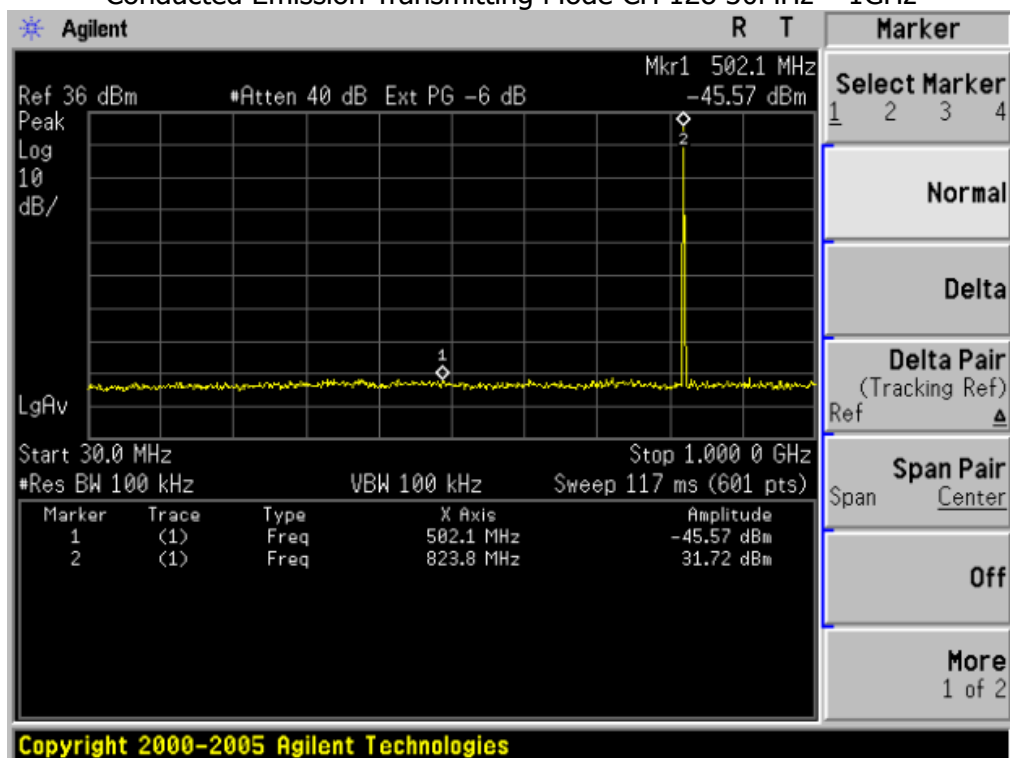
3.6.3 MEASUREMENT RESULT

Please refers to Appendix III for compliance test plots for band edges

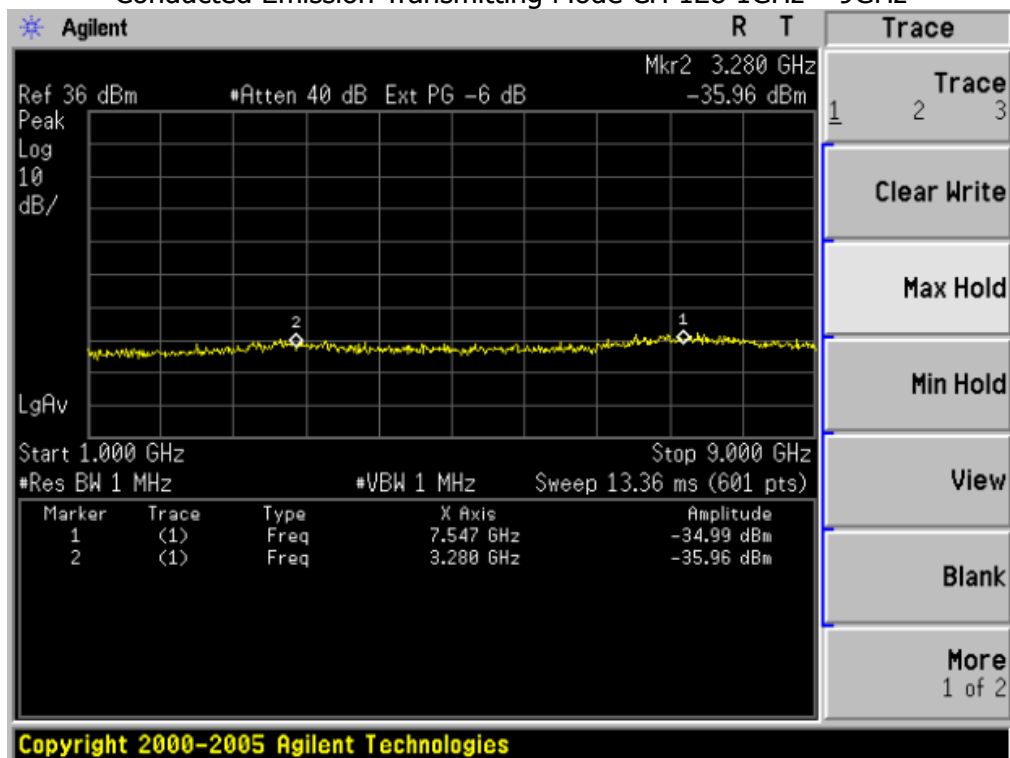
APPENDIX I

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

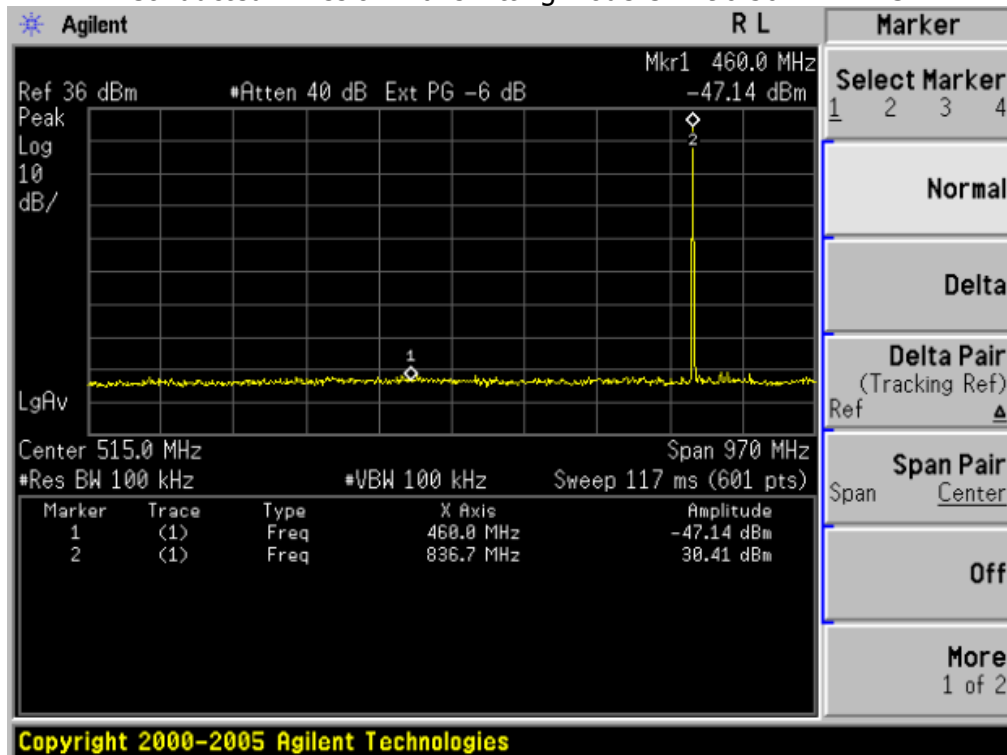
CONDUCTED EMISSION IN GSM850 BAND
Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



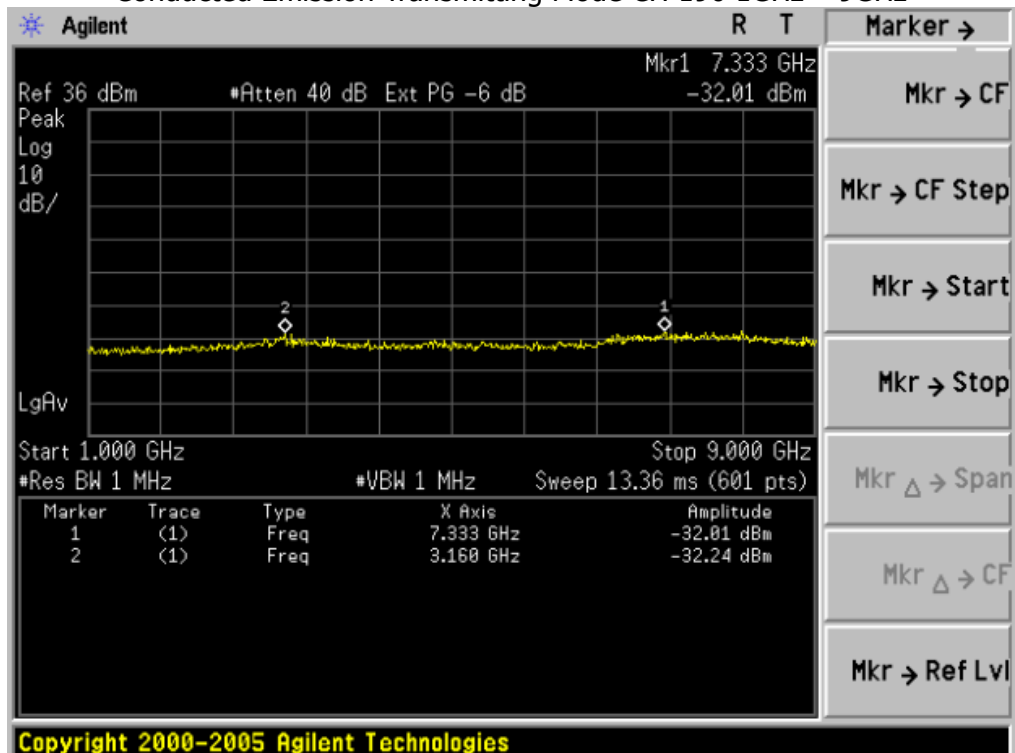
Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



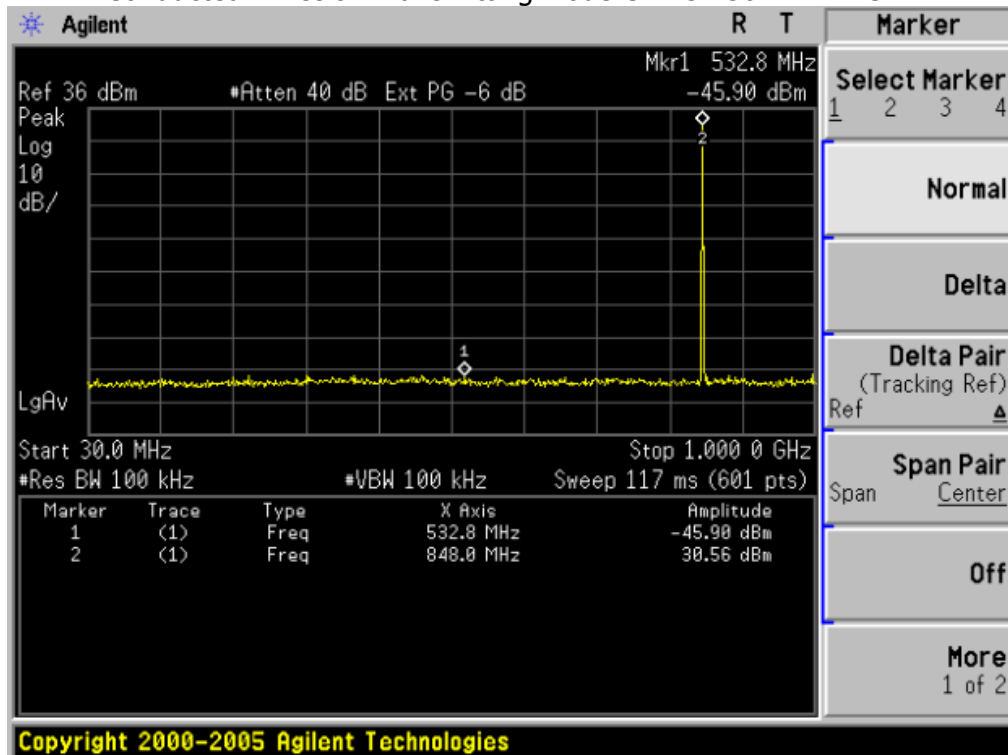
Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



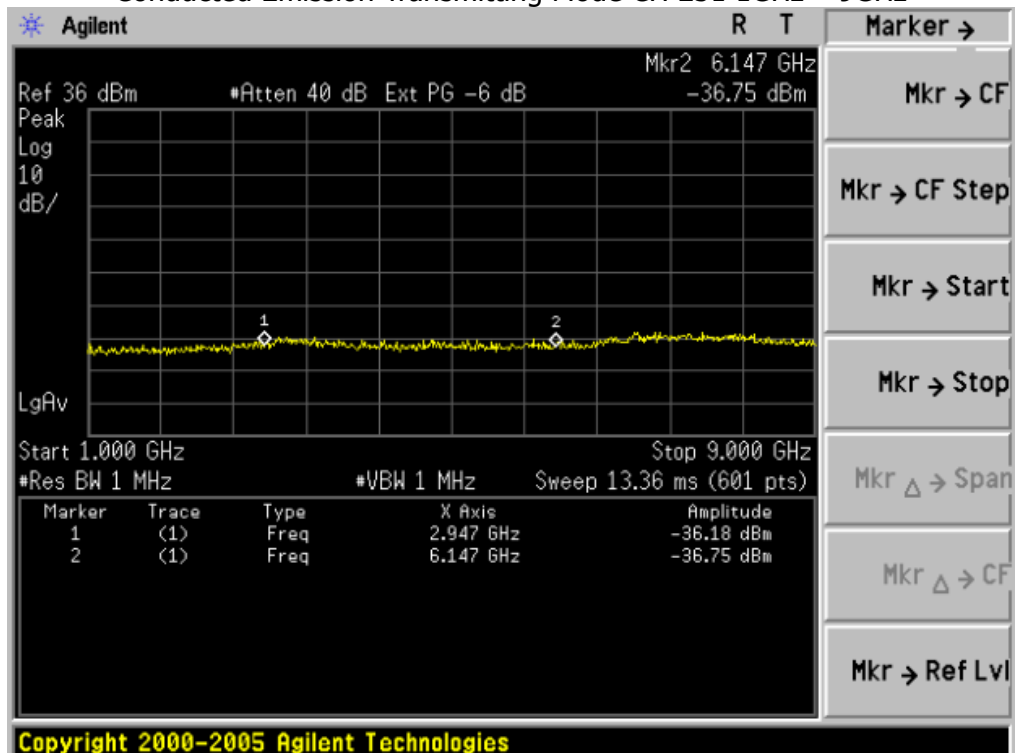
Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



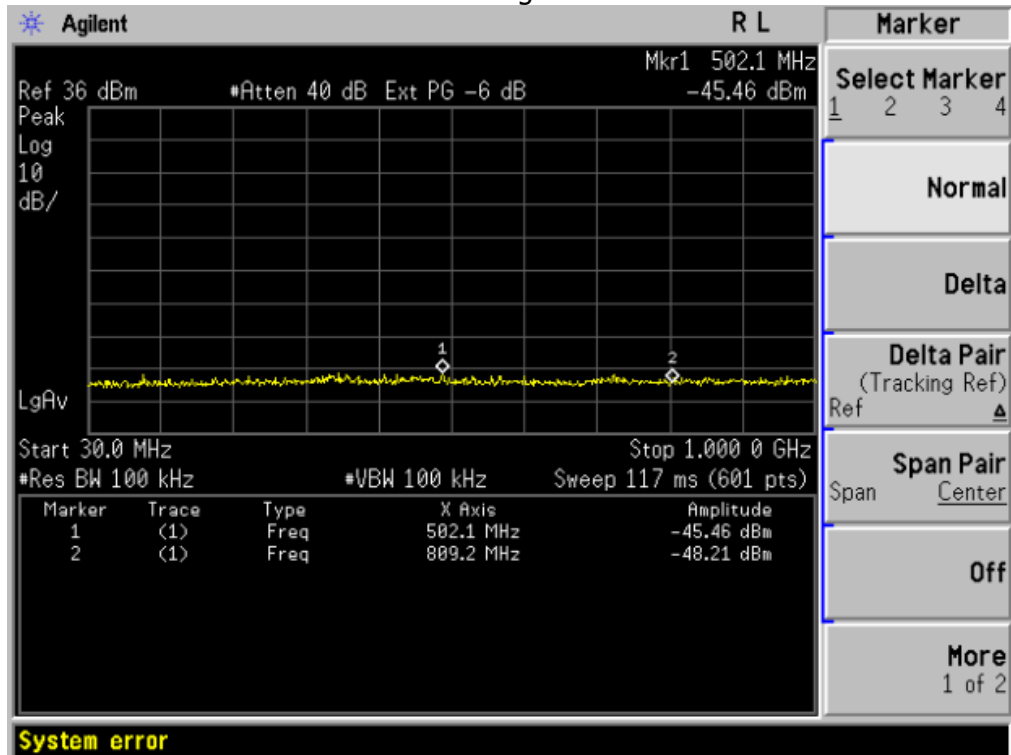
Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz



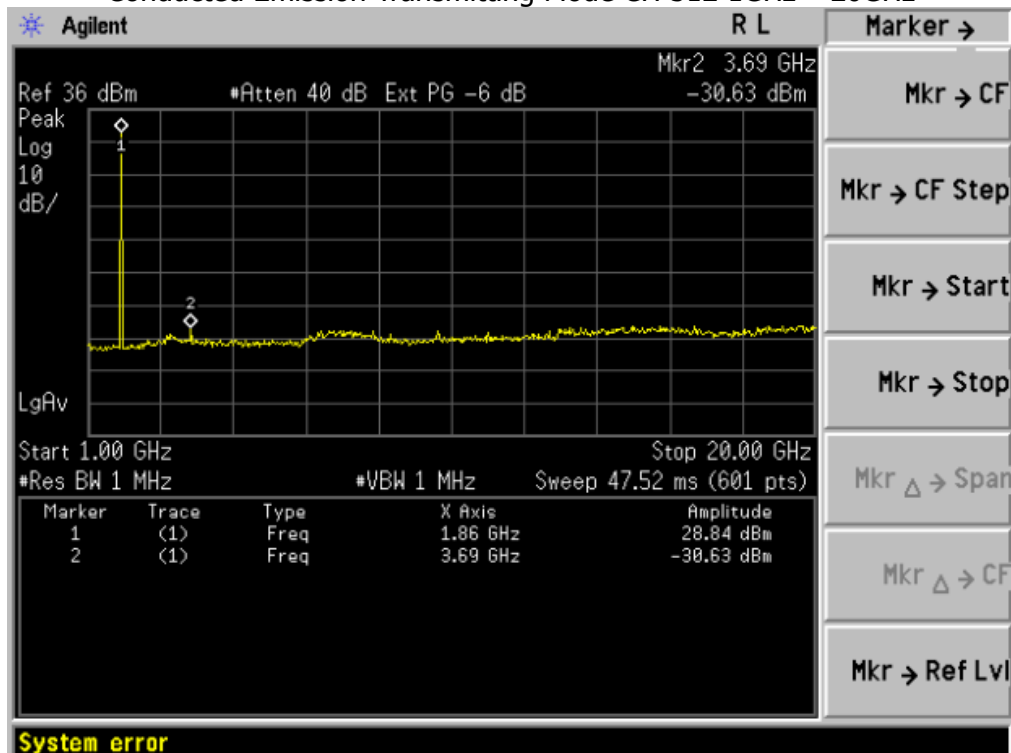
Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz



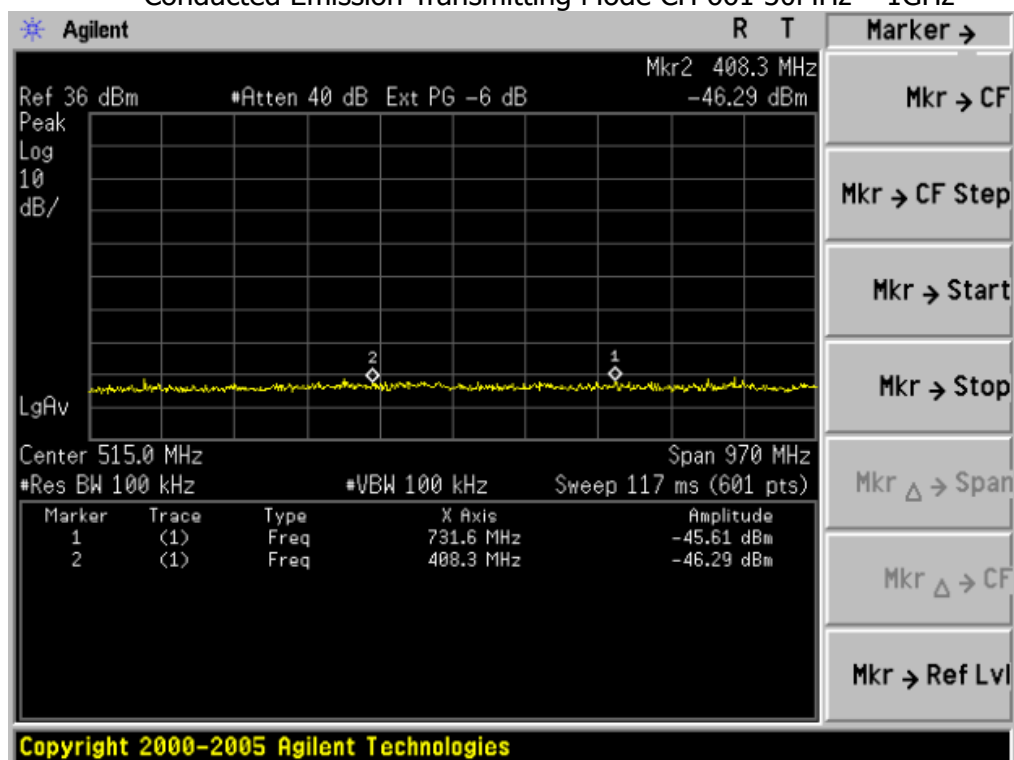
CONDUCTED EMISSION IN PCS1900 BAND
Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



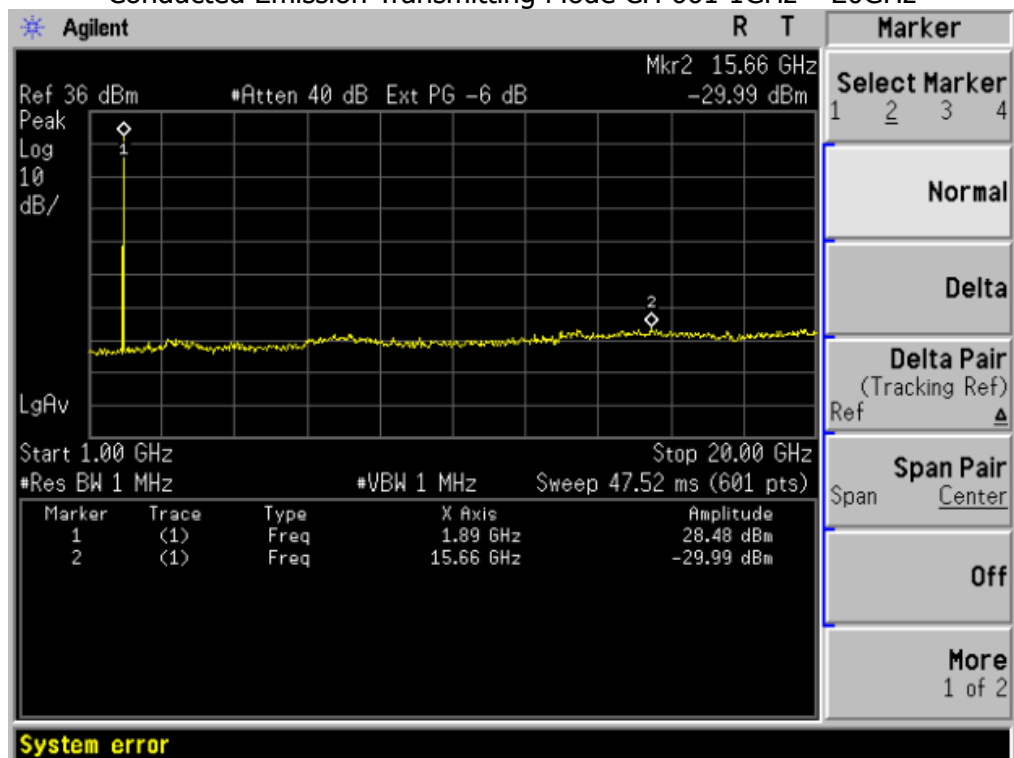
Conducted Emission Transmitting Mode CH 512 1GHz – 20GHz



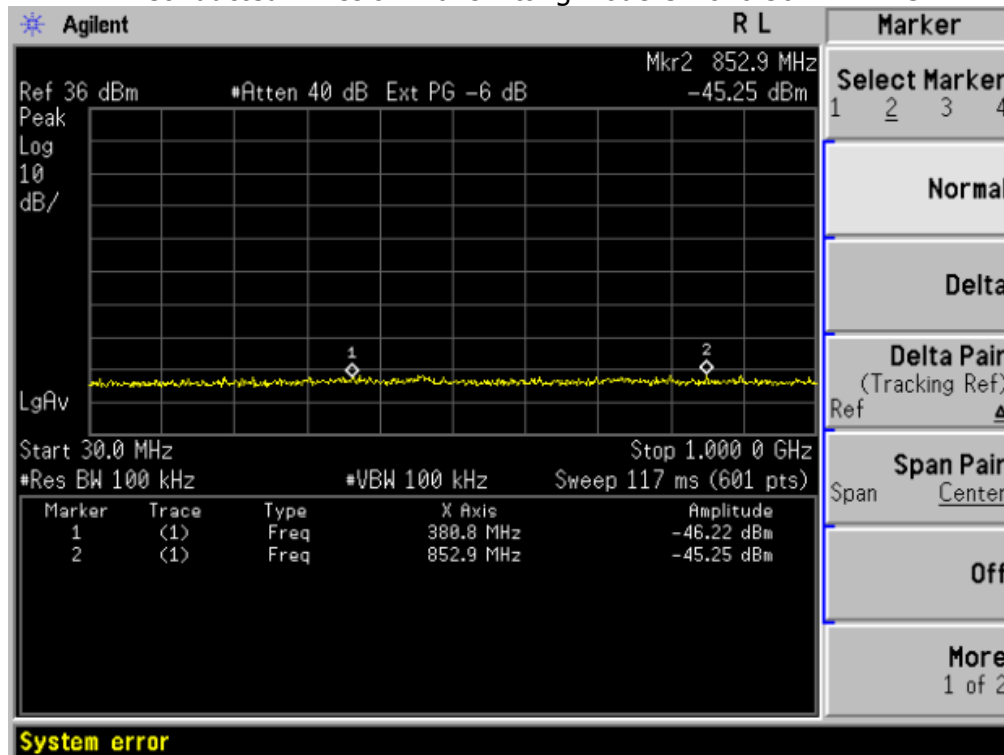
Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



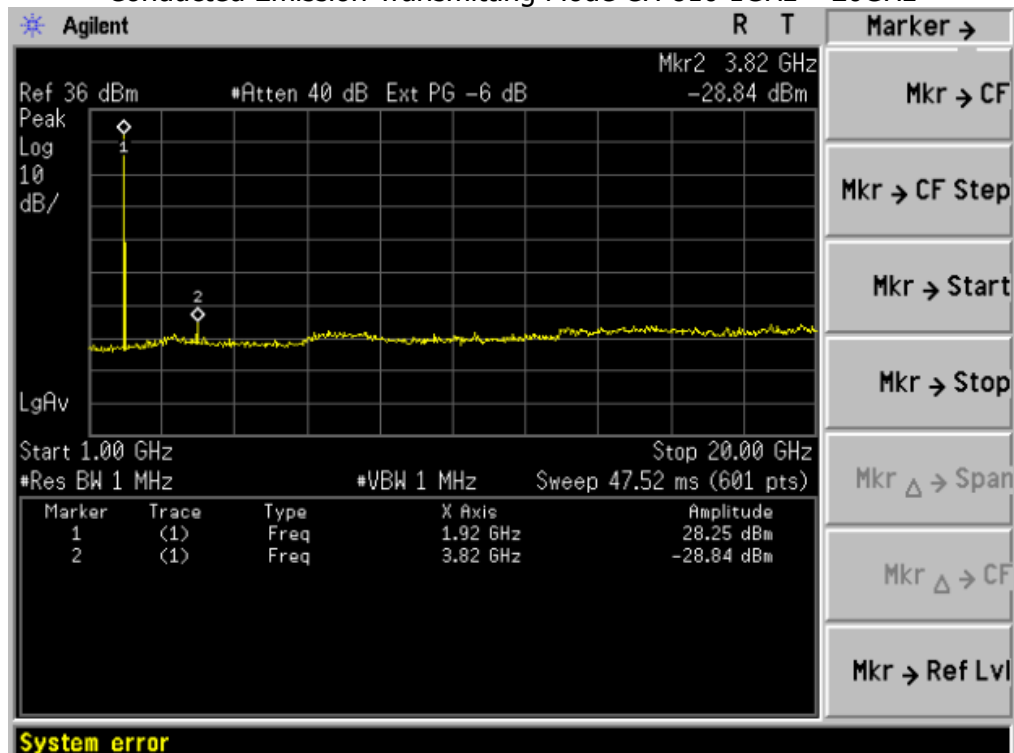
Conducted Emission Transmitting Mode CH 661 1GHz – 20GHz



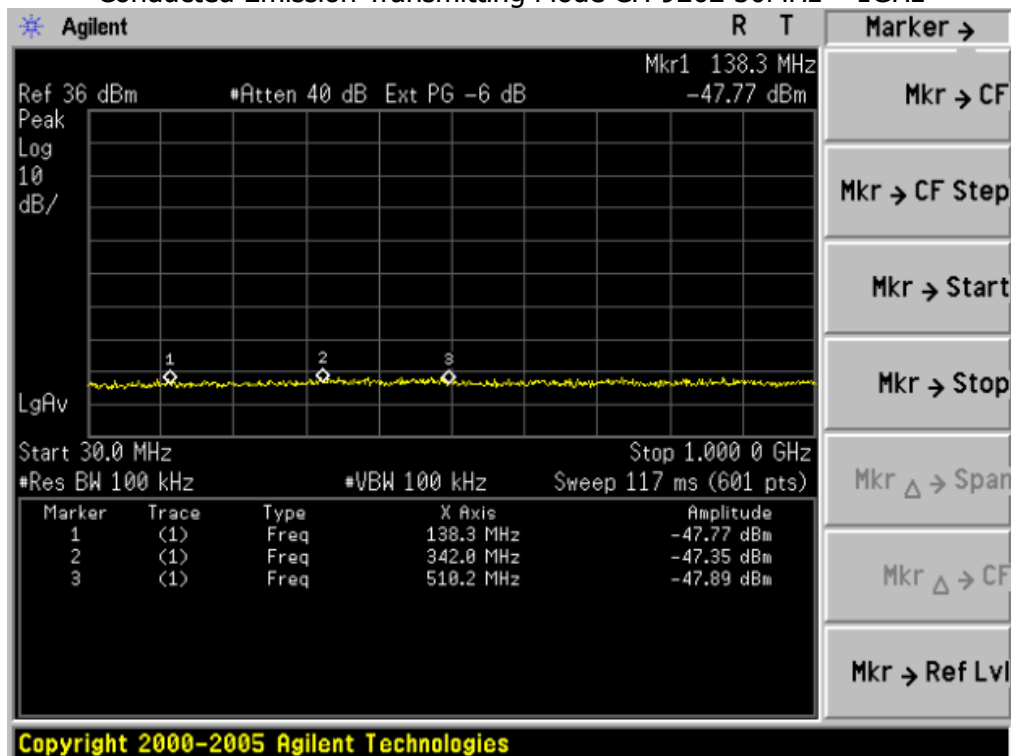
Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz



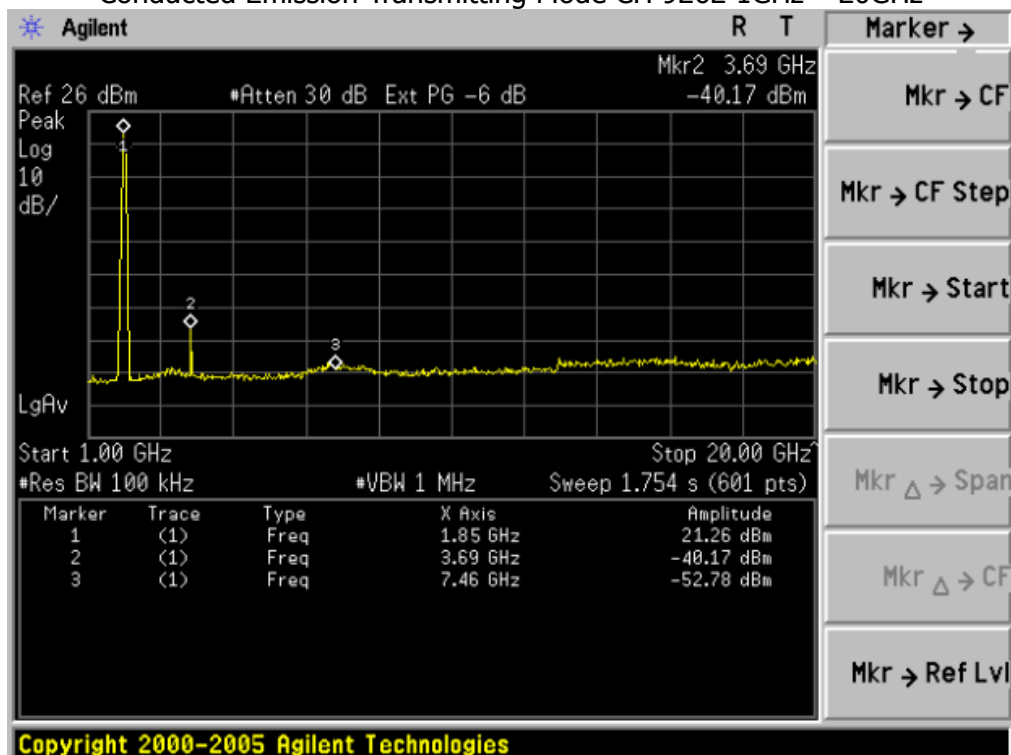
Conducted Emission Transmitting Mode CH 810 1GHz – 20GHz



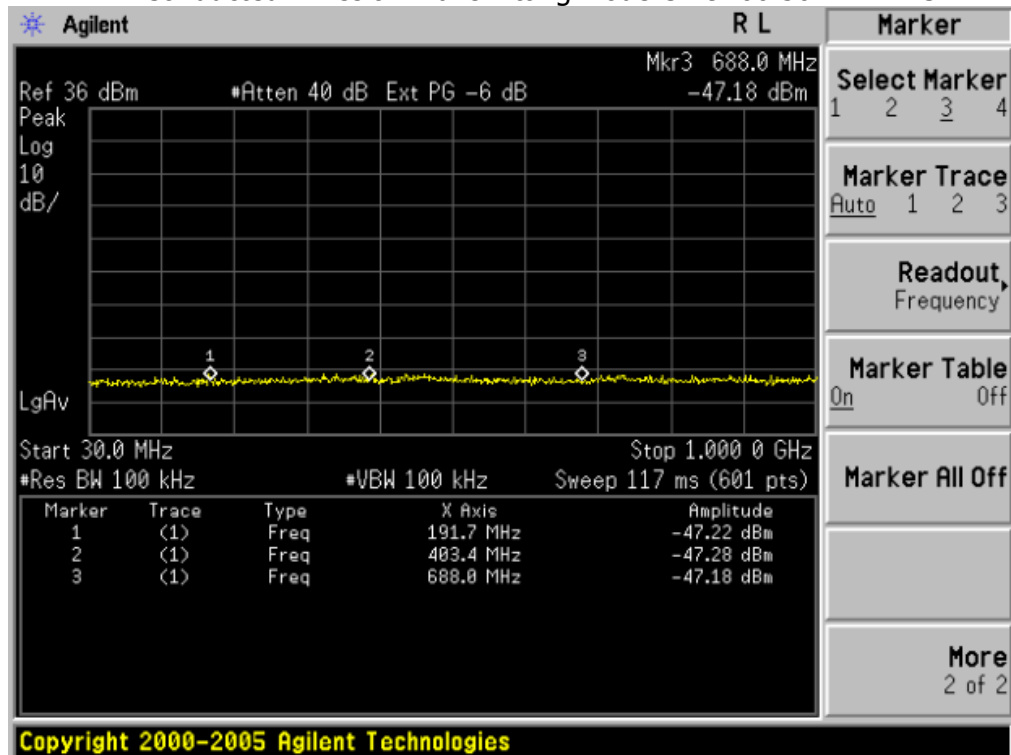
CONDUCTED EMISSION IN WCDMA band II
Conducted Emission Transmitting Mode CH 9262 30MHz – 1GHz



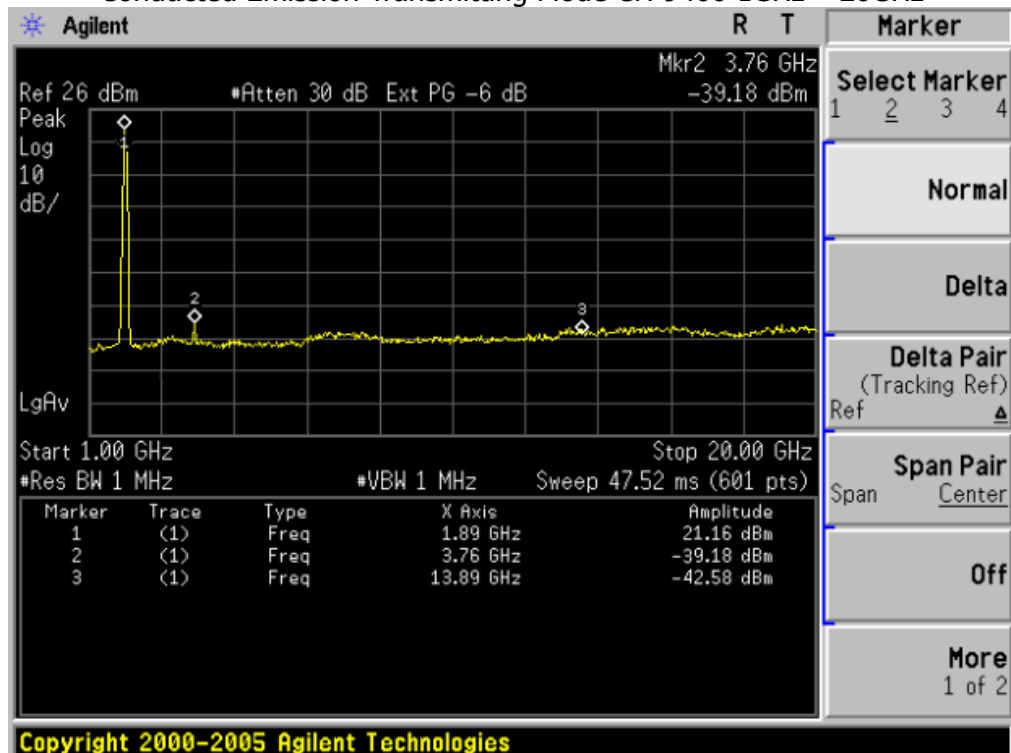
Conducted Emission Transmitting Mode CH 9262 1GHz – 20GHz



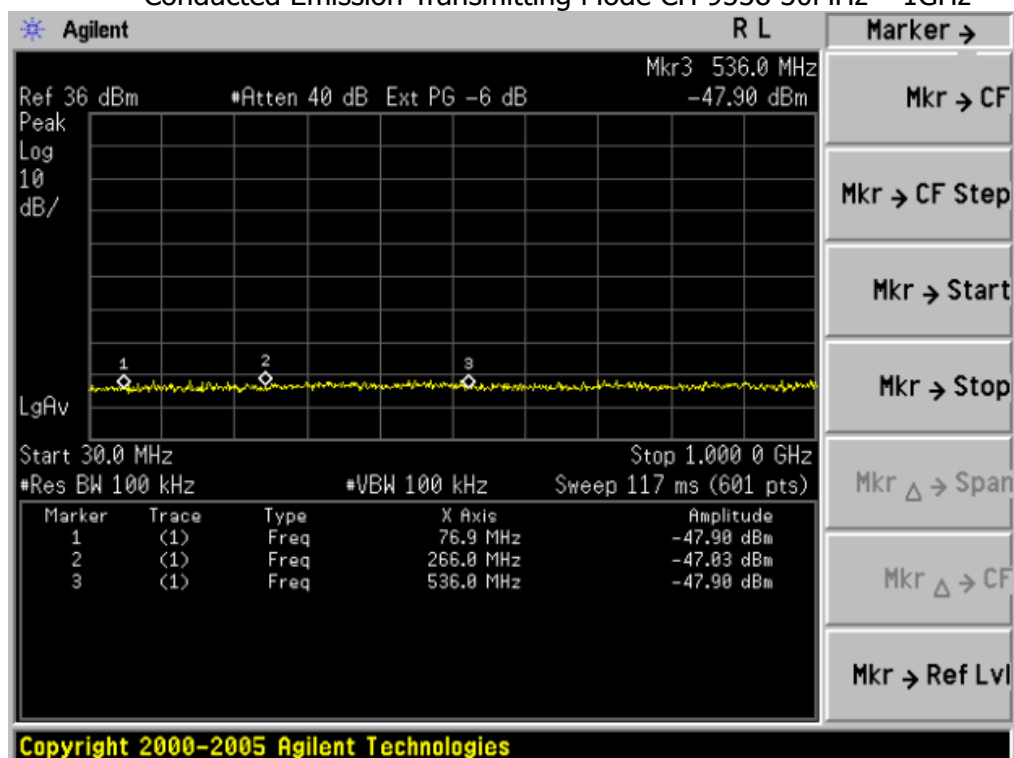
Conducted Emission Transmitting Mode CH 9400 30MHz – 1GHz



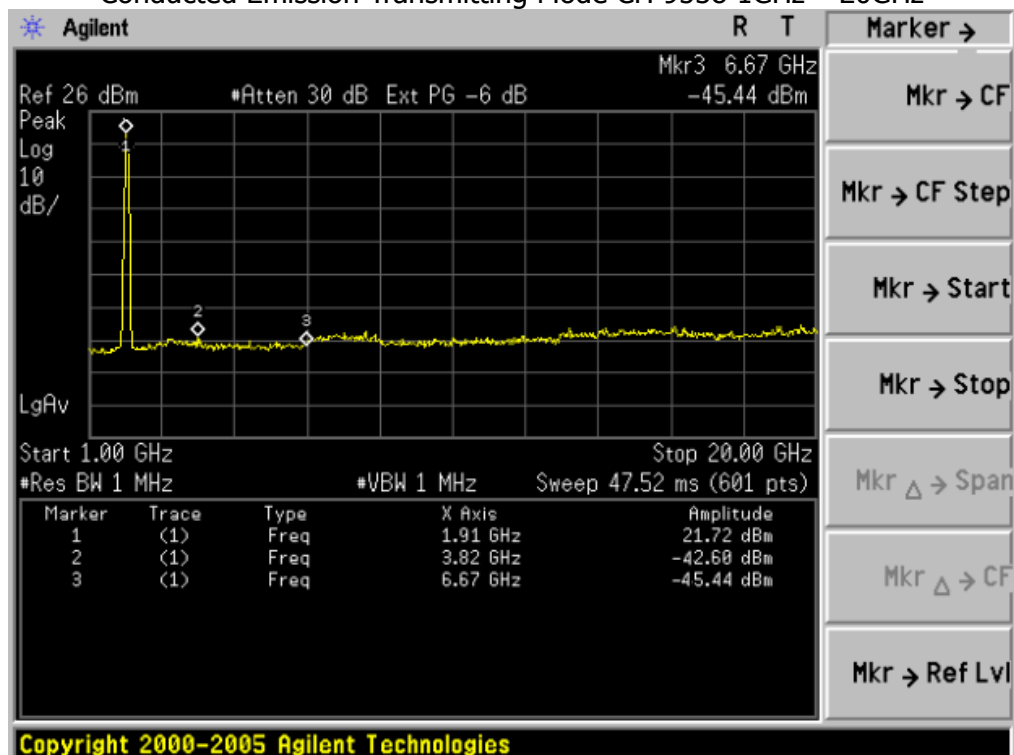
Conducted Emission Transmitting Mode CH 9400 1GHz – 20GHz



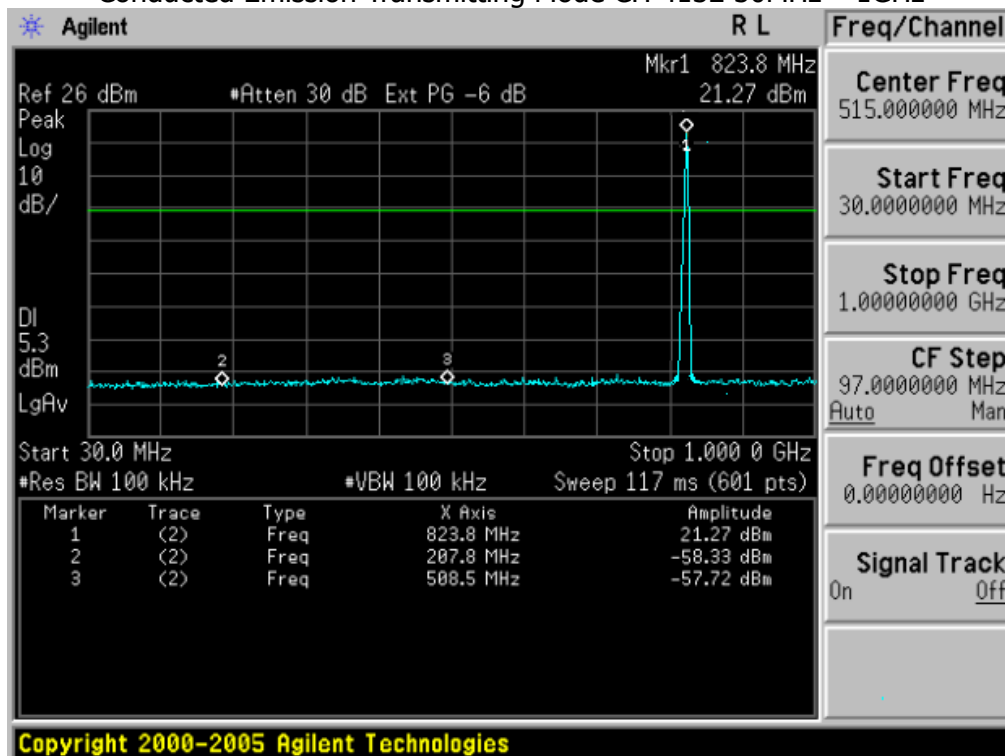
Conducted Emission Transmitting Mode CH 9538 30MHz – 1GHz



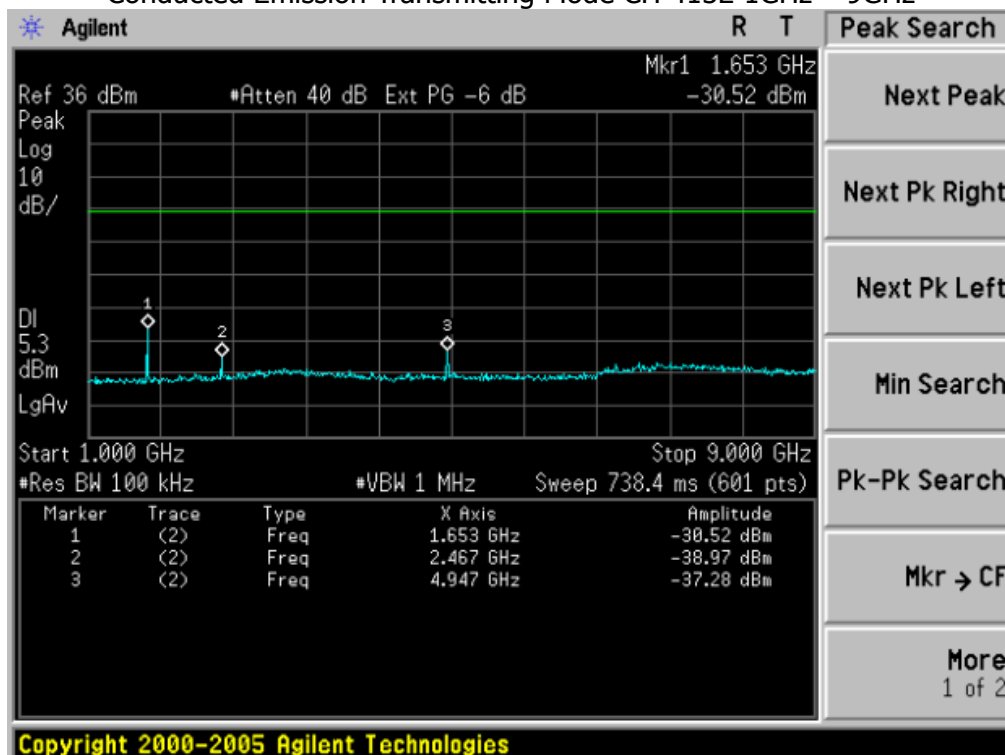
Conducted Emission Transmitting Mode CH 9538 1GHz – 20GHz



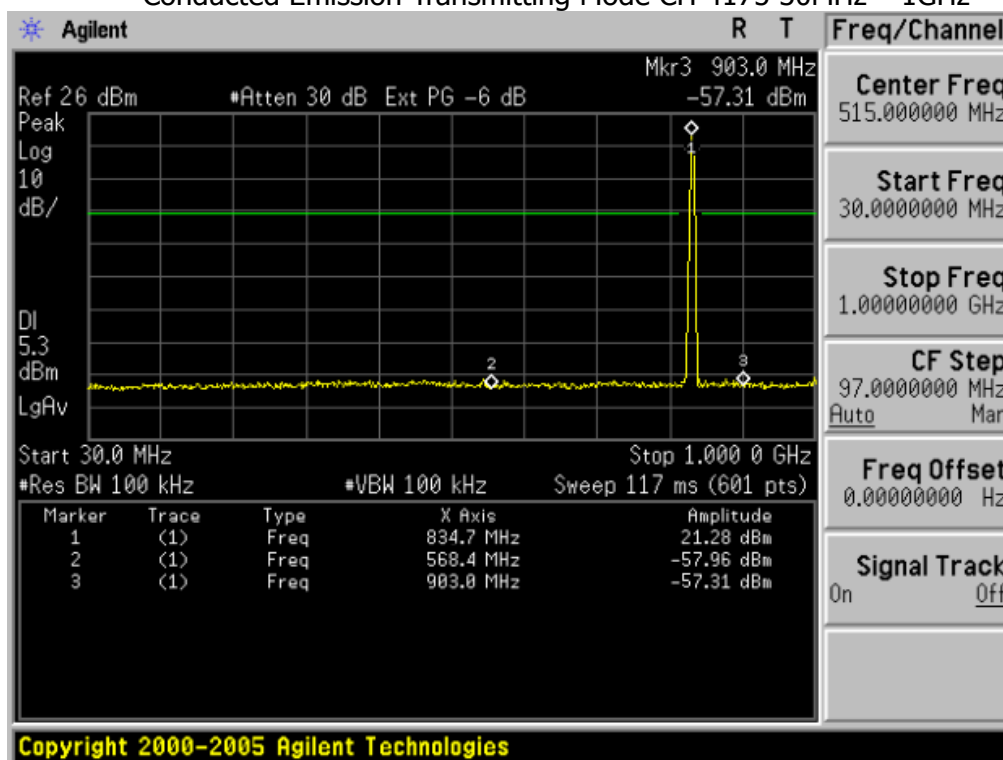
CONDUCTED EMISSION IN WCDMA band V
Conducted Emission Transmitting Mode CH 4132 30MHz – 1GHz



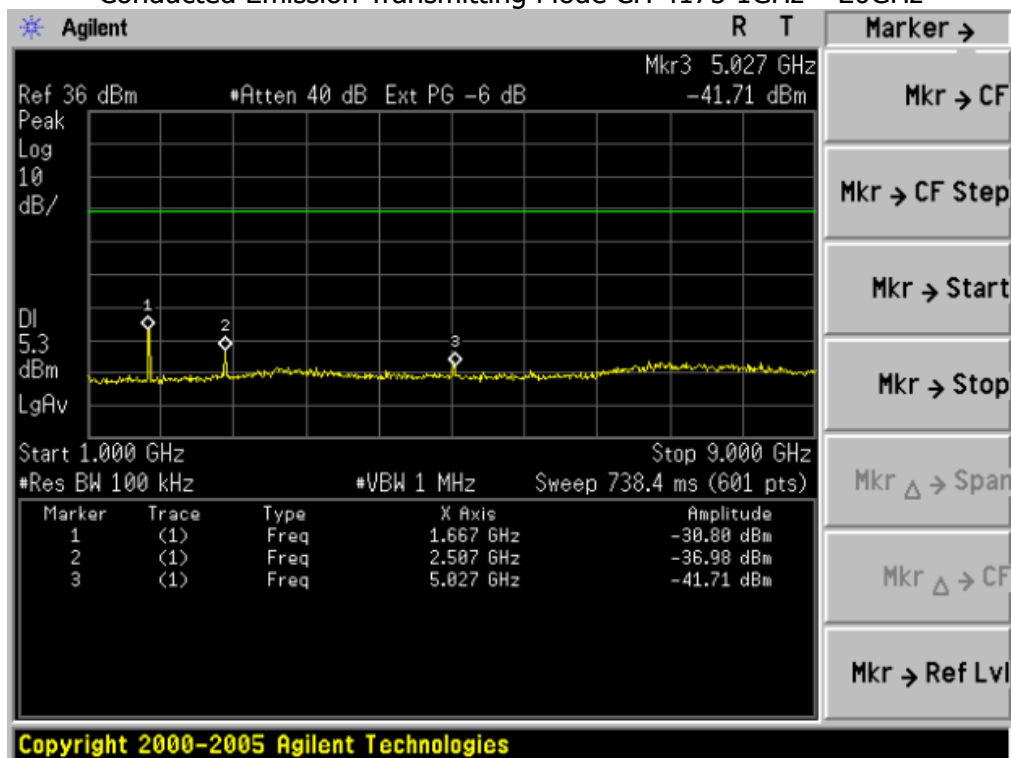
Conducted Emission Transmitting Mode CH 4132 1GHz – 9GHz



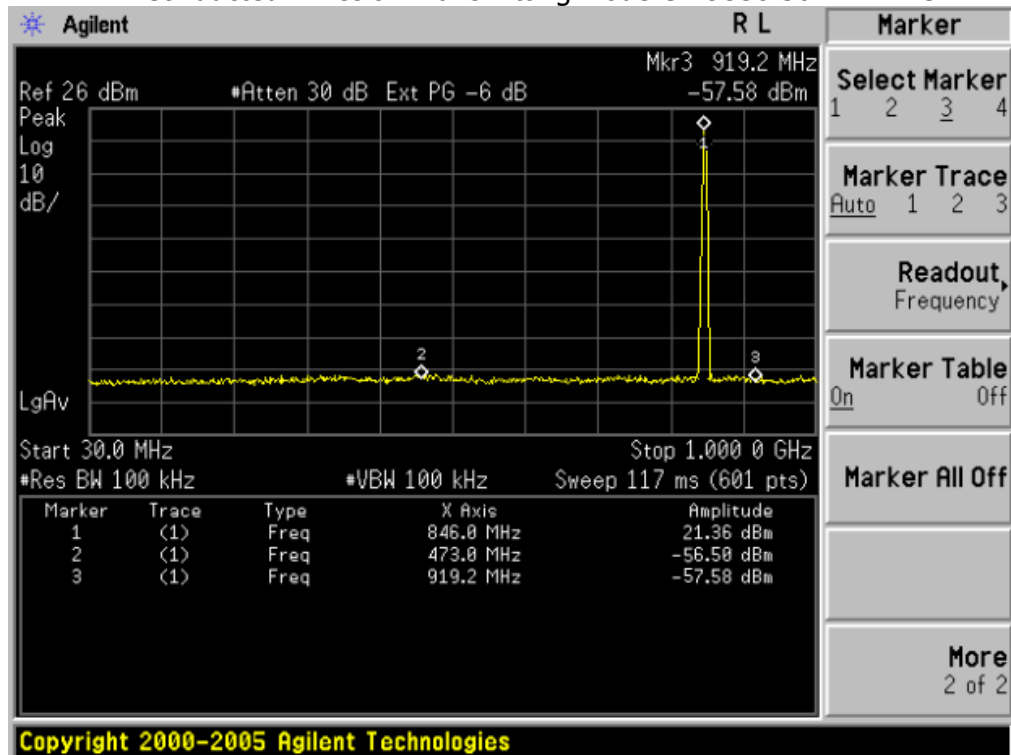
Conducted Emission Transmitting Mode CH 4175 30MHz – 1GHz



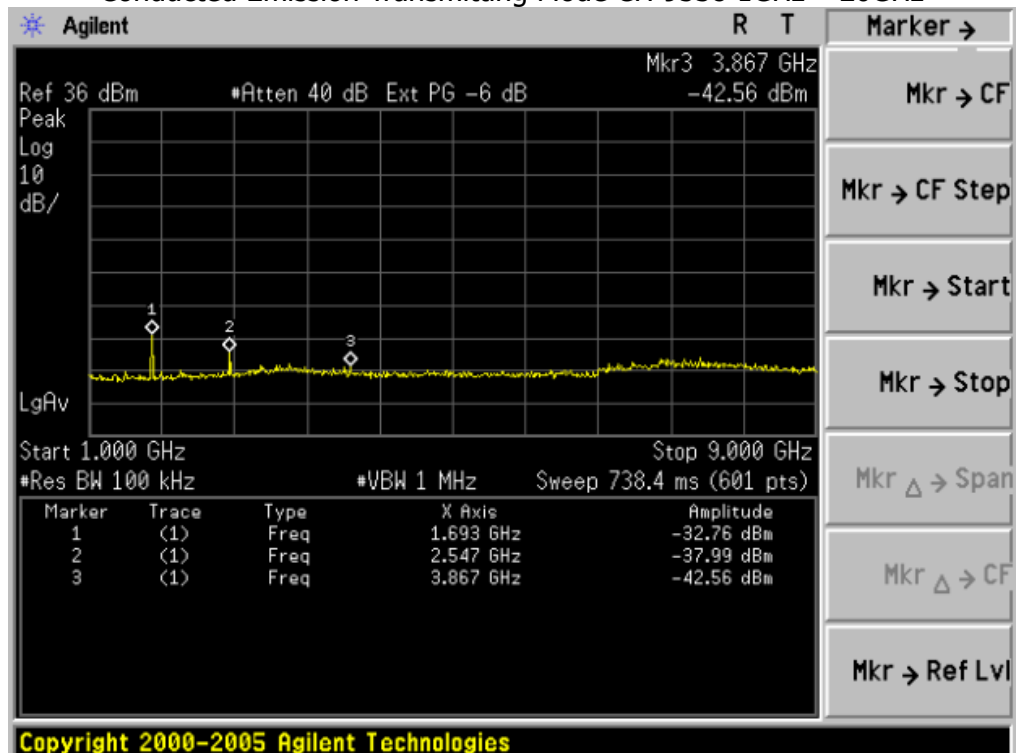
Conducted Emission Transmitting Mode CH 4175 1GHz – 20GHz



Conducted Emission Transmitting Mode CH 9538 30MHz – 1GHz



Conducted Emission Transmitting Mode CH 9538 1GHz – 20GHz

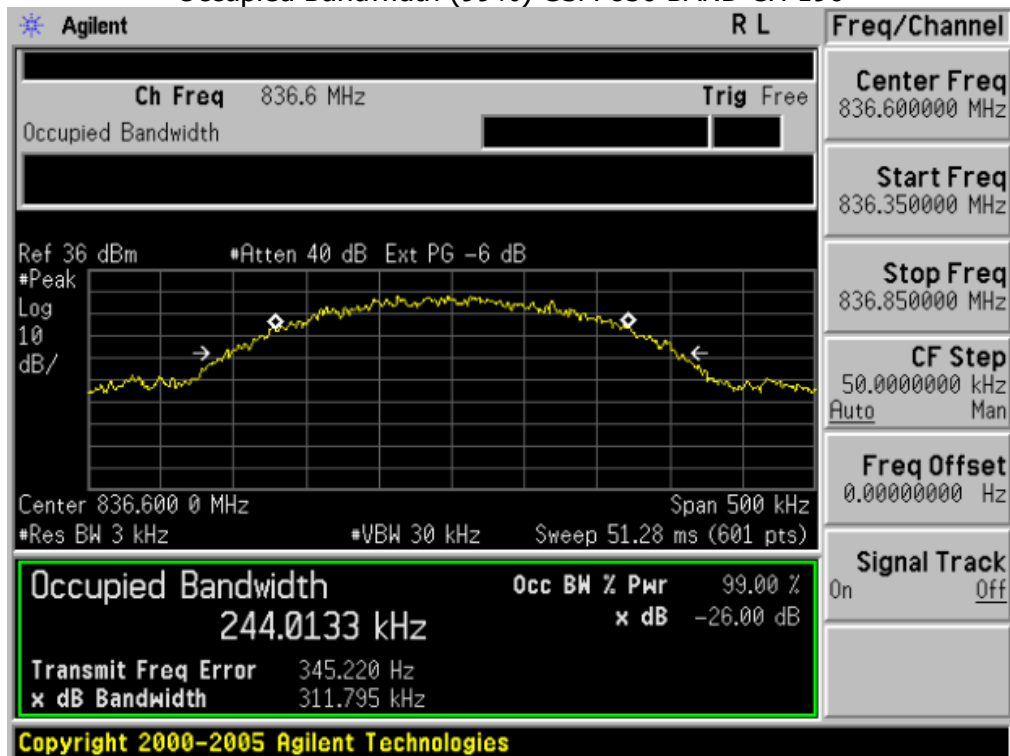


APPENDIX II
TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)
EMISSION BANDWIDTH (-26dBC)

Occupied Bandwidth (99%) GSM 850 BAND CH 128



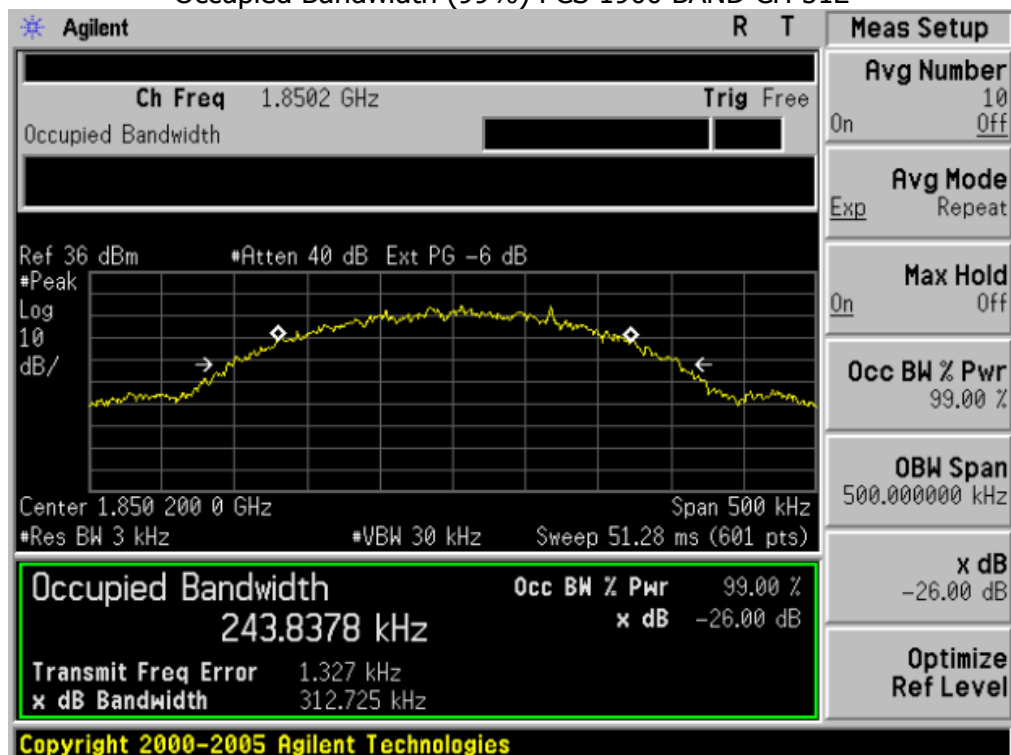
Occupied Bandwidth (99%) GSM 850 BAND CH 190



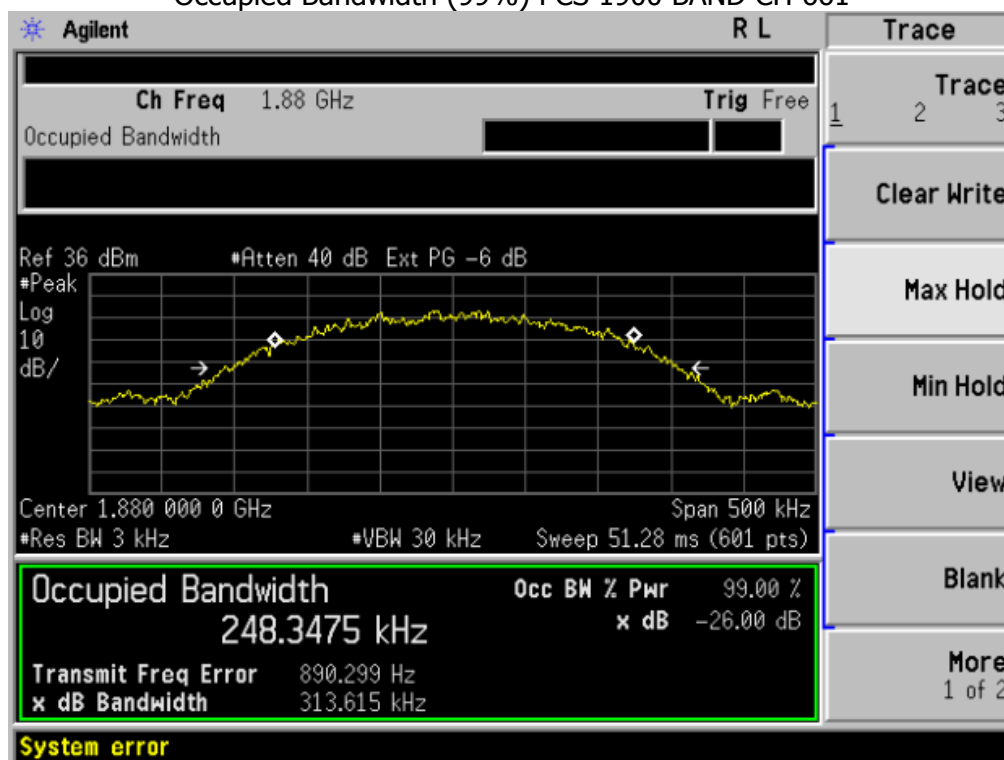
Occupied Bandwidth (99%) GSM 850 BAND CH 251



Occupied Bandwidth (99%) PCS 1900 BAND CH 512



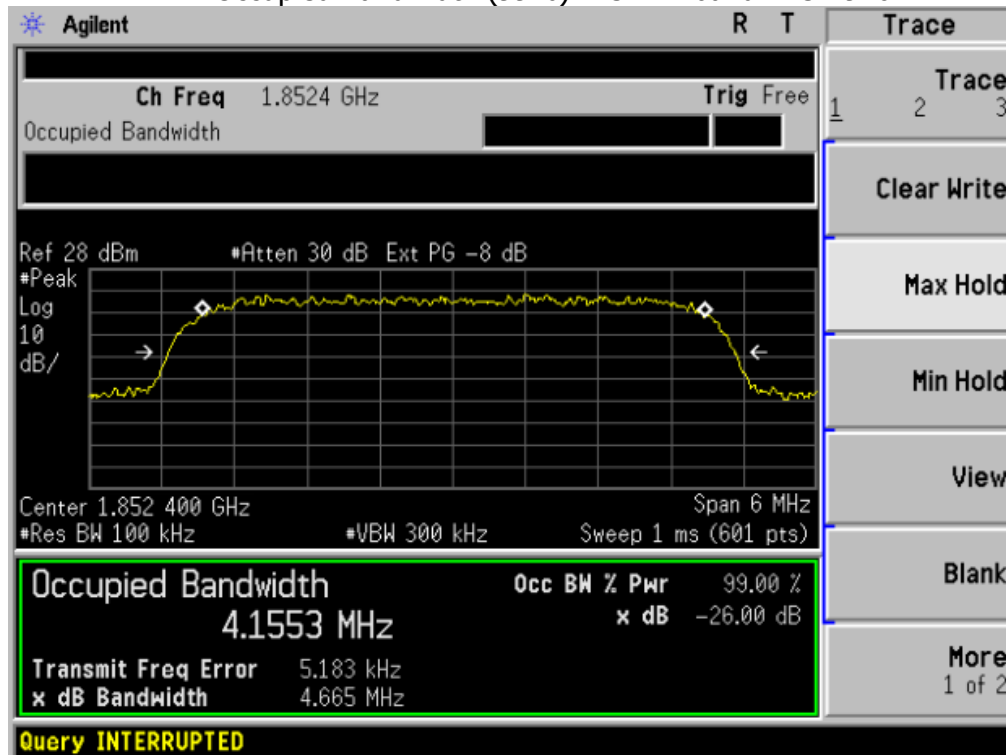
Occupied Bandwidth (99%) PCS 1900 BAND CH 661



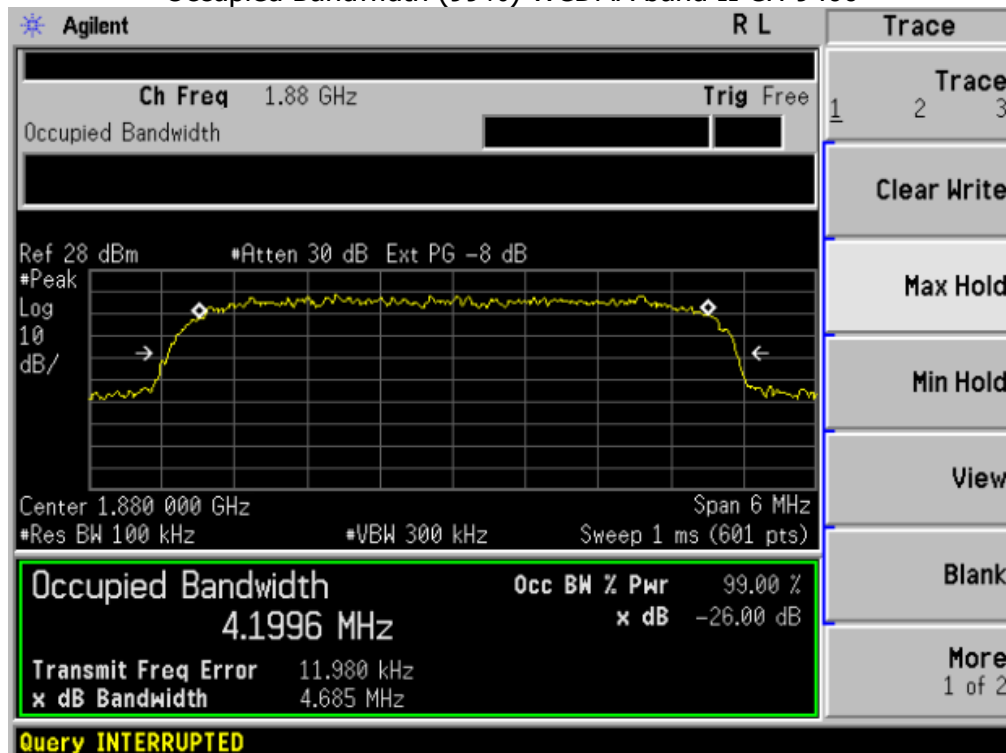
Occupied Bandwidth (99%) PCS 1900 BAND CH 810



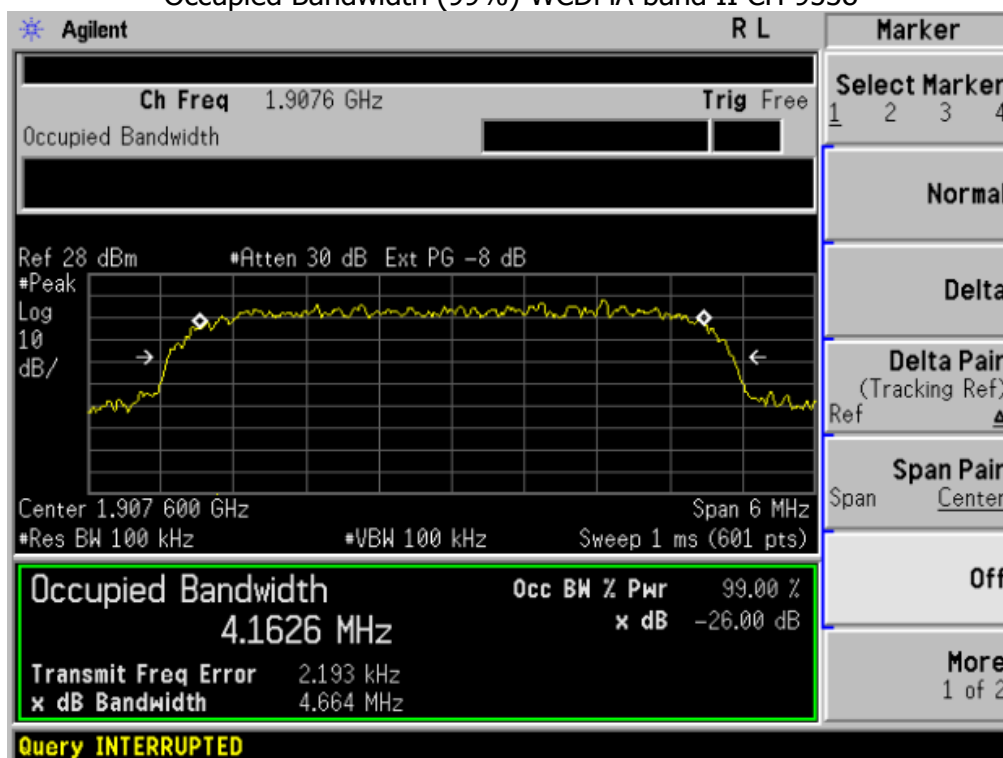
Occupied Bandwidth (99%) WCDMA band II CH 9262



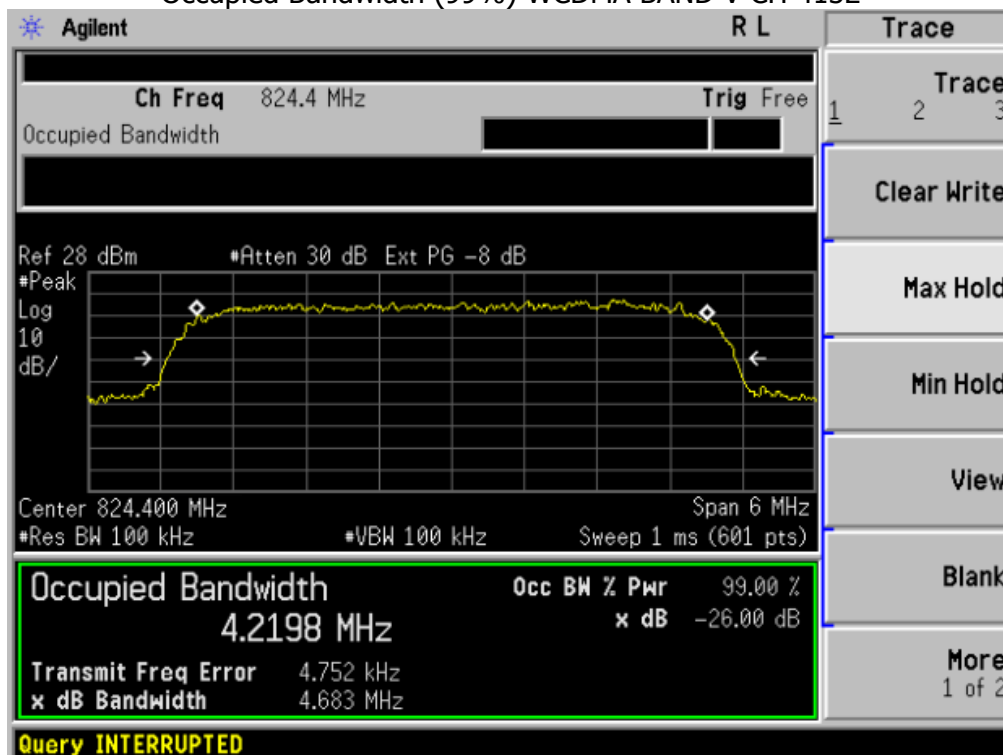
Occupied Bandwidth (99%) WCDMA band II CH 9400



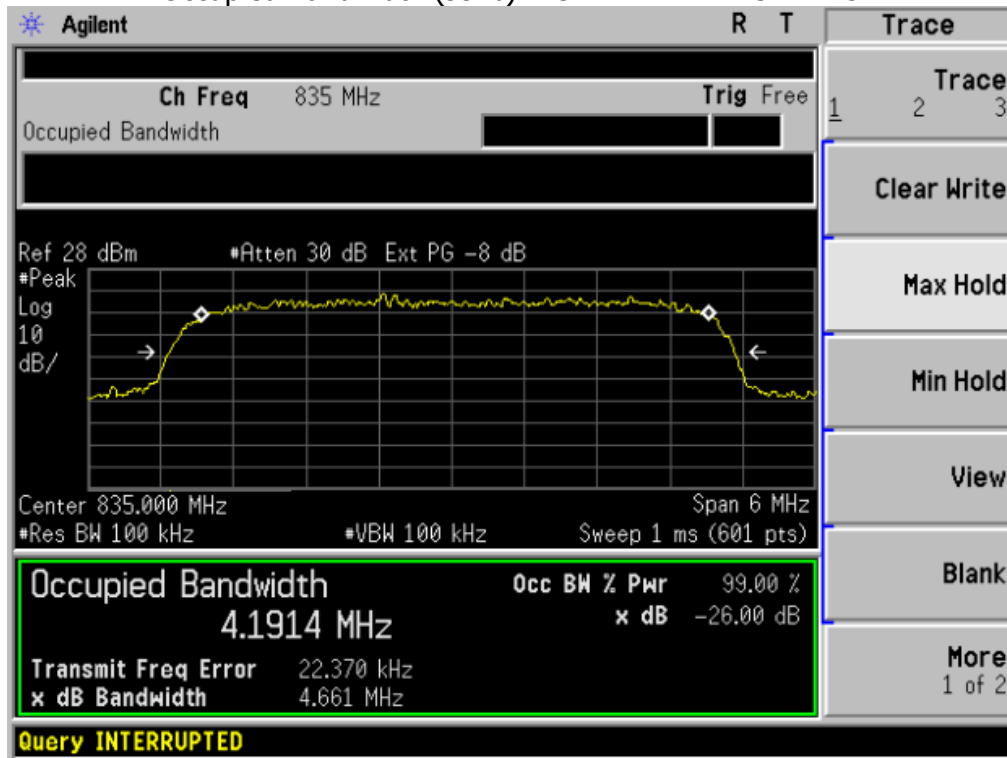
Occupied Bandwidth (99%) WCDMA band II CH 9538



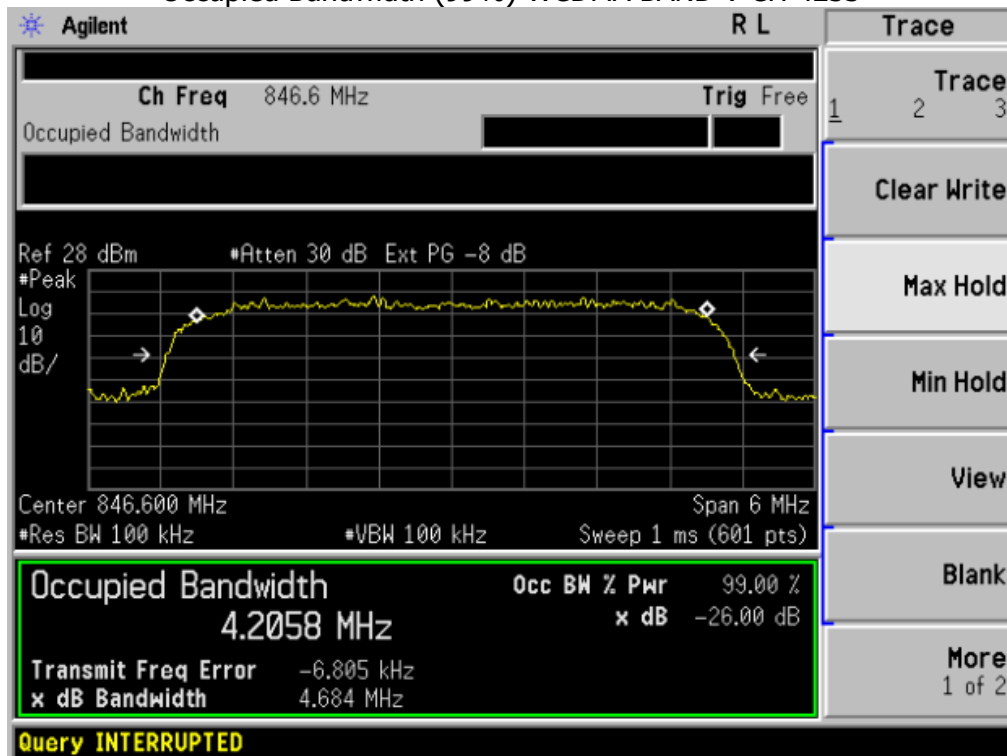
Occupied Bandwidth (99%) WCDMA BAND V CH 4132



Occupied Bandwidth (99%) WCDMA BAND V CH 4175

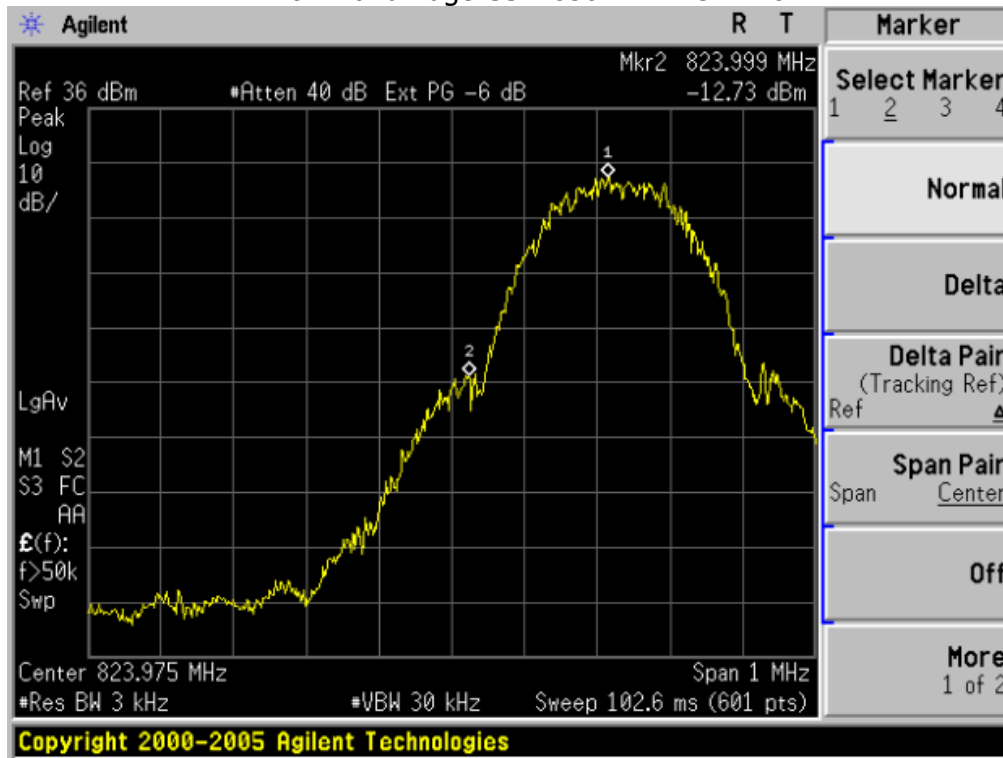


Occupied Bandwidth (99%) WCDMA BAND V CH 4233

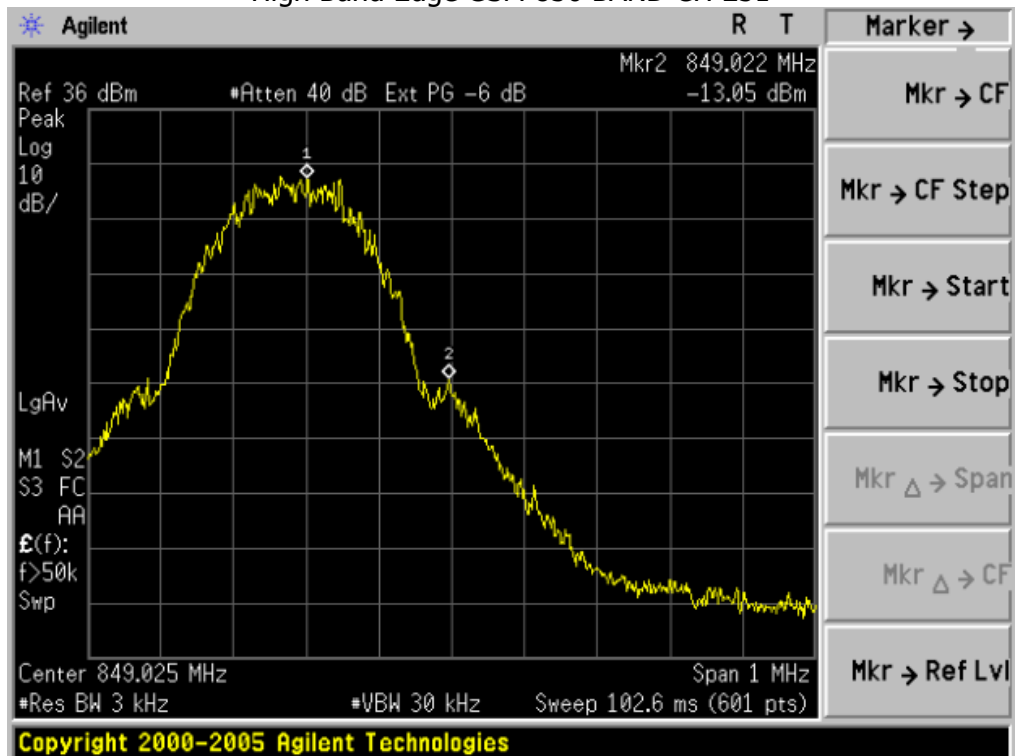


APPENDIX III TEST PLOTS FOR BAND EDGES

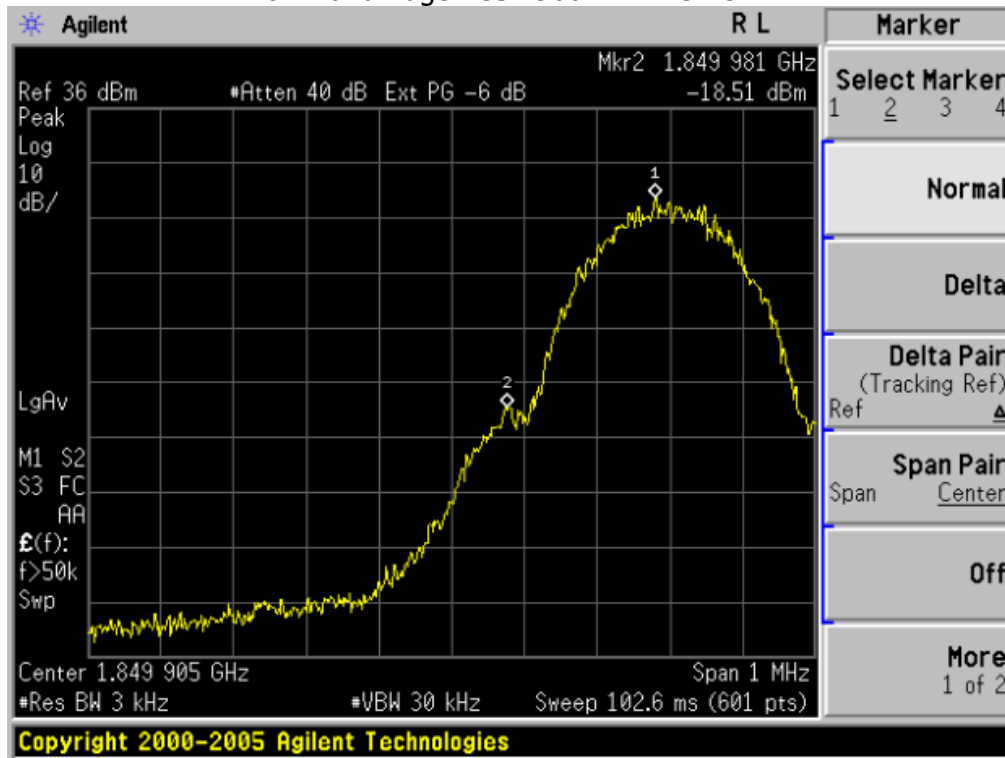
Low Band Edge GSM 850 BAND CH 128



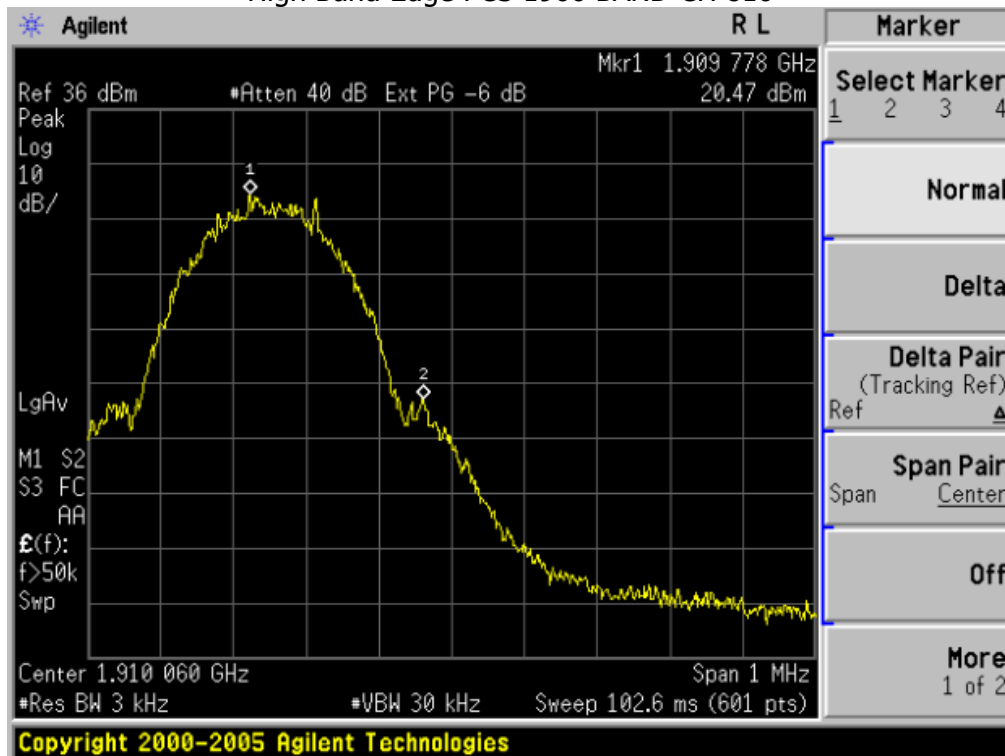
High Band Edge GSM 850 BAND CH 251



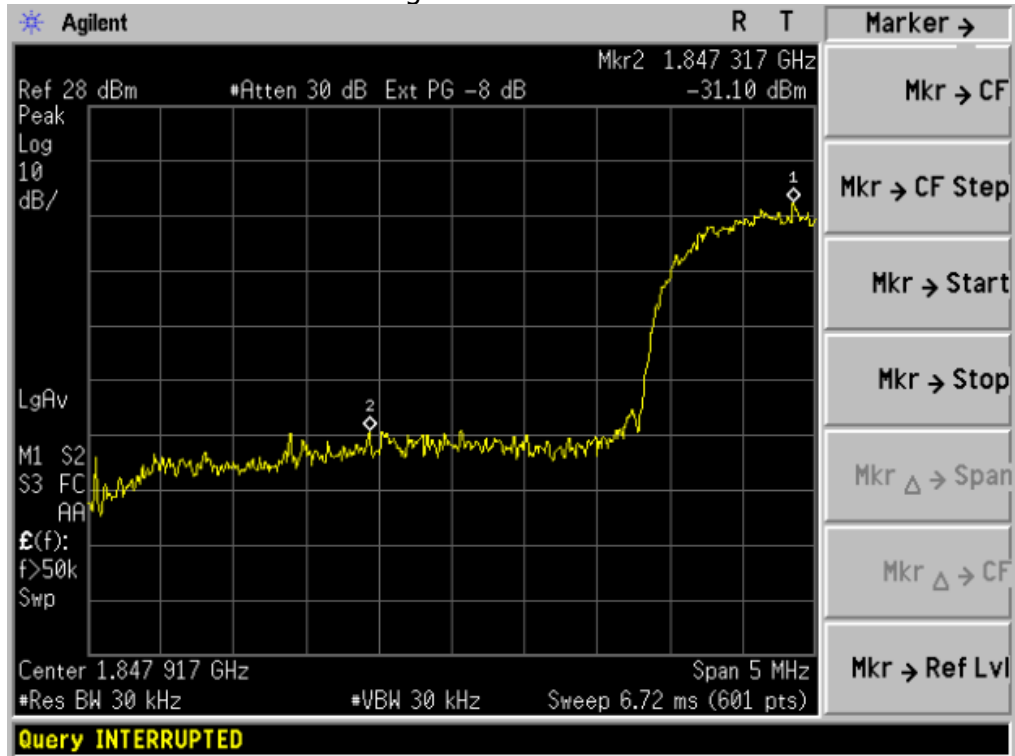
Low Band Edge PCS 1900 BAND CH 512



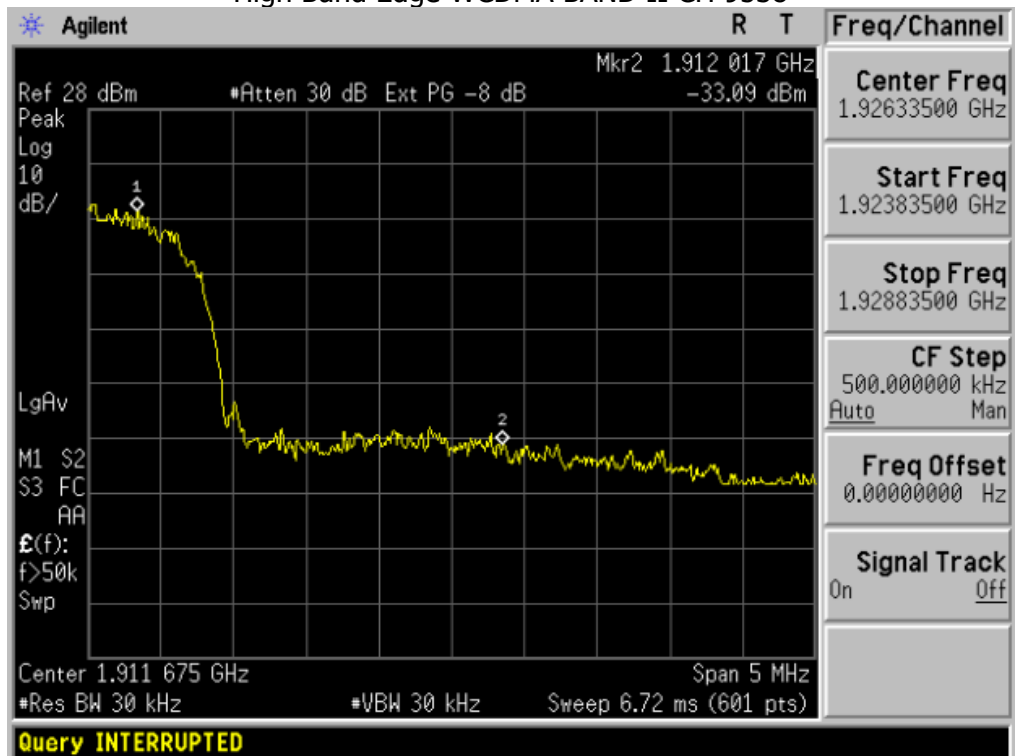
High Band Edge PCS 1900 BAND CH 810



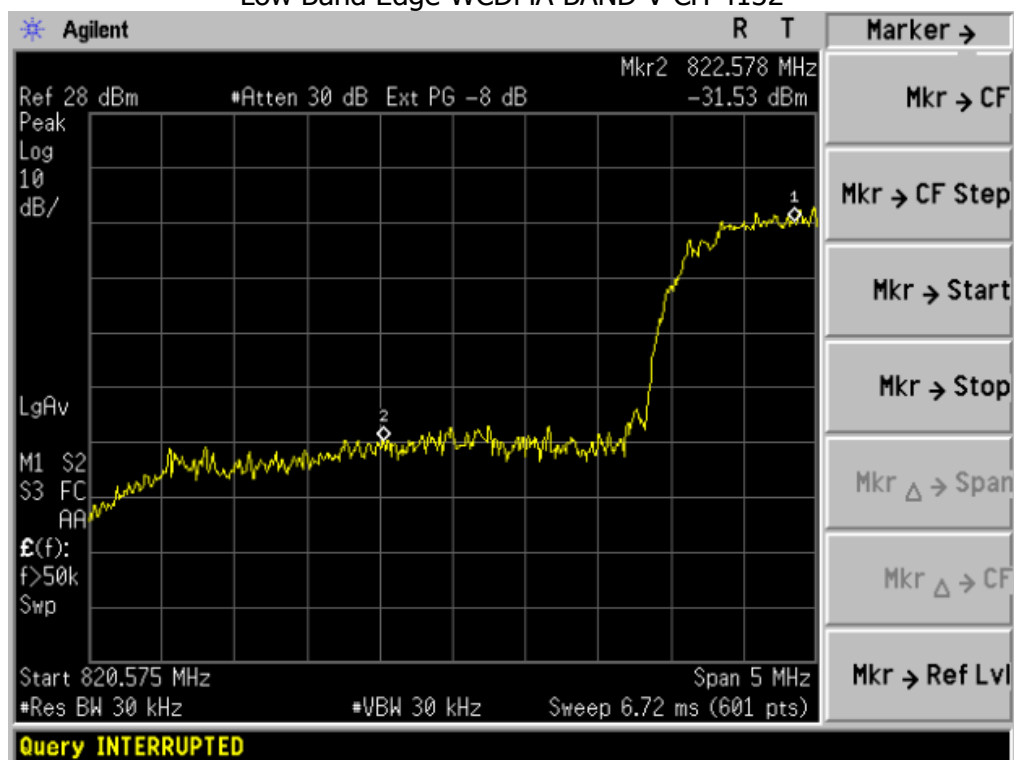
Low Band Edge WCDMA BAND II CH 9262



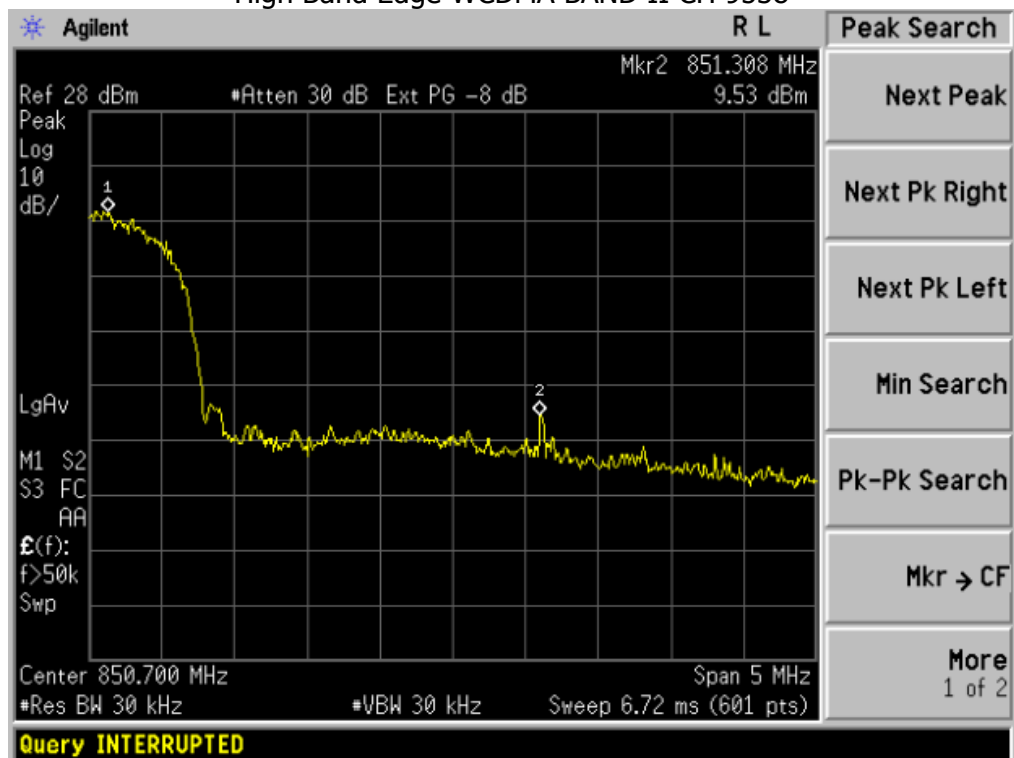
High Band Edge WCDMA BAND II CH 9538



Low Band Edge WCDMA BAND V CH 4132



High Band Edge WCDMA BAND II CH 9538



4. EUT TEST PHOTO

Radiated Measurement Photos

