
FCC Test Report

Report No.: AGC02B120401-1F2

FCC ID : NZRF2414
PRODUCT DESIGNATION : WCDMA/HSDPA/HSUPA IP MODEM
BRAND NAME : Four-Faith
TEST MODEL : F2414
CLIENT : Xiamen Four-Faith Communication Technology Co., Ltd.
DATE OF ISSUE : May 10, 2012
STANDARD(S) : FCC Part 22H & 24E Rules
REPORT VERSION : V1.0

Attestation of **Global Compliance Co., Ltd.**

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VERIFICATION OF COMPLIANCE

Applicant:	Xiamen Four-Faith Communication Technology Co., Ltd.
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Manufacturer:	Xiamen Four-Faith Communication Technology Co., Ltd.
	J1-J3, 3rd Floor, No.44, GuanRi Road, SoftWare Park, XiaMen, China. Zip Code:361008
Product Description:	WCDMA/HSDPA/HSUPA IP MODEM
Brand Name:	Four-Faith
Model Name:	F2414
FCC ID:	NZRF2414
Report Number:	AGC02B120401-1F2
Date of Test:	May 05, 2012 to May 08, 2012

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2003 and TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part 22H and 24E

The test results of this report relate only to the tested sample identified in this report.

Tested By :



Curoky Chen May 10, 2012

Reviewed By :



Forrest Lei May 10, 2012

Approved By:



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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	WCDMA/HSDPA/HSUPA IP MODEM
Hardware version:	V1.2
Software version:	V1.2
FCC ID:	NZRF2414
Frequency Bands:	<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"/> UMTS FDD Band II <input checked="" type="checkbox"/> UMTS FDD Band V Non-U.S. Bands: <input checked="" type="checkbox"/> UMTS FDD Band I
Antenna:	detachable Antenna
Antenna gain:	1.5dBi
Power Supply:	DC 12V by adapter
Adapter Input:	AC100-240V, 0.5A
Adapter Output:	DC12V, 500mA
GPRS Class	12
Extreme Vol. Limits:	AC102 V to 138 V (Normal voltage AC 120V)
Extreme Temp. Tolerance	-30°C to +50°C
** Note: The High Voltage 138V and Low Voltage 102V was declared by manufacturer, The EUT Couldn't be operating normally with higher or lower voltage.	

	Maximum ERP/EIRP (dBm)	Max. Conducted Power (dBm)	Max. Average Burst Power (dBm)
GSM 850	29.87	32.61	32.54
PCS 1900	28.36	29.71	29.65
UMTS BAND II	21.31	22.97	22.94
UMTS BAND V	21.42	22.95	22.93

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: NZRF2414** filing to comply with the FCC Part 22H&24E requirements.

1.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI C 63.4: 2003; TIA/EIA 603 and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

1.4 TEST FACILITY

The test site used to collect the radiated data is located at:
Attestation of Global Compliance Co., Ltd.

1F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.

FCC register No.: 259865

1.5 MEASUREMENT INSTRUMENTS

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	E4440A	US44300399	2012.6.26
TEST RECEIVER	R&S	ESCI	A0304218	2012.6.26
COMMUNICATION TESTER	AGILENT	8960	3104A03367	2012.6.26
COMMUNICATION TESTER	R&S	CMU200	A0304247	2012.6.26
TEST RECEIVER	R&S	FCKL1528	A0304230	2012.6.26
LISN	SCHWARZBECK	NSLK8127	A0304233	2012.6.26
CLIMATE CHAMBER	ALBATROSS	--	--	2012.6.26
Loop Antenna	Daze	ZN30900N	SEL0097	2012.6.26
Biological Antenna	A.H. Systems Inc.	SAS-521-4	N/A	2012.6.26
Horn Antenna	EM	EM-AH-10180	N/A	2012.6.26

1.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

1.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 GENERAL TECHNICAL REQUIREMENTS

Item Number	Item Description		FCC Rules
1	Output Power	Conducted output power	22.913(a) / 24.232 (b)
		Radiated output power	
2	Spurious Emission	Conducted spurious emission	2.1051 / 22.917 / 24.238
		Radiated spurious emission	
3	Mains Conducted Emission		15.107 / 15.207
4	Frequency Stability		2.1055 /24.235
5	Occupied Bandwidth		2.1049 (h)(i)
6	Emission Bandwidth		22.917(b) / 24.238 (b)
7	Band Edge		22.917(b) / 24.238 (b)

2.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

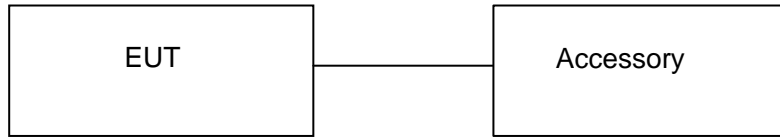


Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	WCDMA/HSDPA/HSUPA IP MODEM	F2414	FCC ID: NZRF2414	EUT
2	ADAPTER	P6-120050	Input:100-240VAC 0.5A Output: 12V DC 500mA	Accessory

*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

3. SUMMARY OF TEST RESULTS

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	Mains Conducted Emission		15.107 /15.207	Pass
4	Frequency Stability		2.1055 /24.235	Pass
5	Occupied Bandwidth		2.1049 (h)(i)	Pass
6	Emission Bandwidth		22.917(b) / 24.238 (b)	Pass
7	Band Edge		22.917(b) / 24.238 (b)	Pass

4. DESCRIPTION OF TEST MODES

During the testing, the EUT 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.

Note: GSM850, GSM1900, UMTS BAND II, UMTS BAND V modes have been tested during the test. the worst condition (GSM850) be recorded in the test report if no other modes test data.

5. OUTPUT POWER

5.1 Conducted Output Power

5.1.1 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 (GSM850, GSM1900, UMTS BAND II, UMTS BAND V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

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

5.1.2 MEASUREMENT RESULT

GSM 850:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance	Avg. Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)
GPRS850 (1 Slot)	824.2	33	32.61	-0.39	32.54	-9	23.54
	836.6	33	32.51	-0.49	32.45	-9	23.45
	848.8	33	32.43	-0.57	32.34	-9	23.34
GPRS850 (2 Slot)	824.2	30	29.57	-0.43	29.53	-6	23.53
	836.6	30	29.49	-0.51	29.44	-6	23.44
	848.8	30	29.41	-0.59	29.37	-6	23.37
GPRS850 (3 Slot)	824.2	28.23	28.02	-0.21	27.96	-4.23	23.73
	836.6	28.23	27.87	-0.36	27.82	-4.23	23.59
	848.8	28.23	27.81	-0.42	27.76	-4.23	23.53
GPRS850 (4 Slot)	824.2	27	26.79	-0.21	26.75	-3	23.75
	836.6	27	26.67	-0.33	26.62	-3	23.62
	848.8	27	26.51	-0.49	26.46	-3	23.46

PCS 1900:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance	Avg. Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)
GPRS1900 (1 Slot)	1850.2	30	29.71	-0.29	29.65	-9	20.65
	1880	30	29.64	-0.36	29.61	-9	20.61
	1909.8	30	29.53	-0.47	29.49	-9	20.49
GPRS1900 (2 Slot)	1850.2	27	26.87	-0.13	26.84	-6	20.84
	1880	27	26.63	-0.37	26.59	-6	20.59
	1909.8	27	26.51	-0.49	26.47	-6	20.47
GPRS1900 (3 Slot)	1850.2	25.23	25.11	-0.12	25.07	-4.23	20.84
	1880	25.23	25.02	-0.21	24.96	-4.23	20.73
	1909.8	25.23	24.95	-0.28	24.91	-4.23	20.68
GPRS1900 (4 Slot)	1850.2	24	23.89	-0.11	23.83	-3	20.83
	1880	24	23.65	-0.35	23.61	-3	20.61
	1909.8	24	23.54	-0.46	23.49	-3	20.49

UMTS BAND II

Mode	Frequency (MHz)	Reference power	Peak Power	Tolerance	Avg.Burst Power
WCDMA 1900	1852.4	24	22.97	-1.03	22.94
	1880	24	22.91	-1.09	22.85
	1907.6	24	22.84	-1.16	22.79
HSPA Subtest 1	1852.4	24	22.71	-1.29	22.65
	1880	24	22.64	-1.36	22.61
	1907.6	24	22.59	-1.41	22.56
HSPA Subtest 2	1852.4	24	22.64	-1.36	22.61
	1880	24	22.58	-1.42	22.54
	1907.6	24	22.54	-1.46	22.51
HSPA Subtest 3	1852.4	24	22.61	-1.39	22.56
	1880	24	22.54	-1.46	22.51
	1907.6	24	22.46	-1.54	22.43
HSPA Subtest 4	1852.4	24	22.55	-1.45	22.52
	1880	24	22.46	-1.54	22.42
	1907.6	24	22.38	-1.62	22.35
HSPA Subtest 5	1852.4	24	22.54	-1.46	22.51
	1880	24	22.41	-1.59	22.37
	1907.6	24	22.32	-1.68	22.28

UMTS BAND V

Mode	Frequency (MHz)	Reference power	Peak Power	Tolerance	Avg. Burst Power
WCDMA 850	826.4	24	22.95	-1.05	22.93
	835	24	22.89	-1.11	22.86
	846.6	24	22.85	-1.15	22.81
HSPA Subtest 1	826.4	24	22.69	-1.31	22.67
	835	24	22.65	-1.35	22.6
	846.6	24	22.63	-1.37	22.61
HSPA Subtest 2	826.4	24	22.65	-1.35	22.62
	835	24	22.56	-1.44	22.52
	846.6	24	22.51	-1.49	22.48
HSPA Subtest 3	826.4	24	22.59	-1.41	22.54
	835	24	22.53	-1.47	22.51
	846.6	24	22.44	-1.56	22.42
HSPA Subtest 4	826.4	24	22.57	-1.43	22.54
	835	24	22.45	-1.55	22.43
	846.6	24	22.39	-1.61	22.38
HSPA Subtest 5	826.4	24	22.56	-1.44	22.48
	835	24	22.46	-1.54	22.43
	846.6	24	22.37	-1.63	22.35

5.2 Radiated Output Power

5.2.1 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}).
- 8 ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15dBi..$

5.2.2 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)
UMTS BAND II	≤ 33 dBm (2W)
UMTS BAND V	≤ 38.45 dBm (7W)

5.2.3 MEASUREMENT RESULT

Radiated Power (ERP) for GSM850 band					
Mode	Frequency	Power Step	Result		Conclusion
			Max. Peak ERP (dBm)	Polarization Of Max. ERP	
GPRS850 (1 Slot)	824.2	3	29.87	Horizontal	Pass
	836.6	3	29.82	Horizontal	Pass
	848.8	3	29.76	Horizontal	Pass
Radiated Power (E.I.R.P) for PCS1900 band II					
Mode	Frequency	Power Step	Result		Conclusion
			Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
GPRS 1900 (1 Slot)	1850.2	3	28.36	Horizontal	Pass
	1880.0	3	28.28	Horizontal	Pass
	1909.8	3	28.21	Horizontal	Pass
Radiated Power (E.I.R.P) for UMTS band II					
Mode	Frequency	Power Step	Result		Conclusion
			Max. Peak E.I.R.P (dBm)	Polarization Of Max. E.I.R.P	
WCDMA 1900	1852.4	3	21.31	Horizontal	Pass
	1880	3	21.24	Horizontal	Pass
	1907.6	3	21.19	Horizontal	Pass
Radiated Power (E.R.P) for UMTS band V					
Mode	Frequency	Power Step	Result		Conclusion
			Max. Peak E.R.P (dBm)	Polarization Of Max. E.R.P	
WCDMA 850	826.4	3	21.42	Horizontal	Pass
	835.0	3	21.36	Horizontal	Pass
	846.6	3	21.27	Horizontal	Pass

NOTE: in the part, result the worst case GPRS 850 and GPRS1900, and WCDMA 1900 for UMTS band II and WCDMA 850 band V.

6. SPURIOUS EMISSION

6.1 CONDUCTED SPURIOUS EMISSION

6.1.1 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 GSM850 band	
Channel	Frequency (MHz)
128	824.2
190	836.6
251	848.8

Typical Channels for testing of PCS1900 band	
Channel	Frequency (MHz)
512	1850.2
661	1880.0
810	1909.8

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

Typical Channels for testing of UMTS band V	
Channel	Frequency (MHz)
4132	826.4
4175	835.0
4233	826.6

6.1.2 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.

6.1.3 MEASUREMENT RESULT

PLEASE REFER TO: APPENDIX I TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

- Note:**
1. below 30MHZ no Spurious found and The GSM modes is the worst condition.
 2. As no emission found in standby or receive mode, no recording in this report.

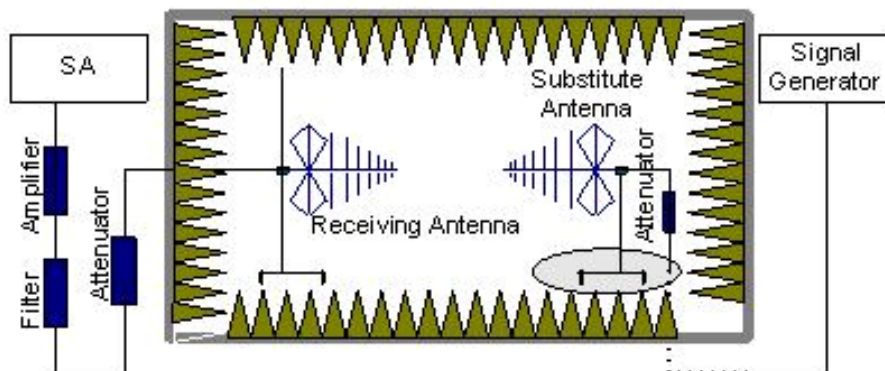
6.2 Radiated Spurious Emission

6.2.1 MEASUREMENT METHOD

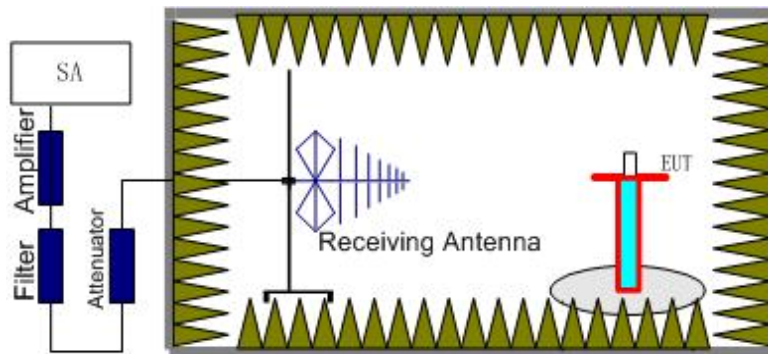
The measurements procedures specified in TIA-603C-2004 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes (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.

The procedure of radiated spurious emissions is as follows:

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



b) EUT was placed on a 0.8 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 0.8m. 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 1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz), GSM850 band (824.2MHz, 836.6MHz, 848.8MHz), UMTS band II(1852.4MHz, 1880MHz, 1907.6MHz), UMTS band V(826.4MHz, 835.0MHz, 846.6MHz). 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 any band 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: $Power = P_{Mea} + A_{Rpl}$

6.2.2 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.

Note: only result the worst condition of each test mode:

6.2.3 MEASUREMENT RESULT

GSM 850:

The Worst Test Results for Channel 251/848.8 MHz					
Frequency(MHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1365.23	-38.66	-2.15	-40.81	-13.00	Horizontal
2586.39	-40.01	-2.96	-42.97	-13.00	Vertical
3845.20	-45.29	-1.72	-47.01	-13.00	Vertical
9018.35	-37.80	8.60	-29.20	-13.00	Horizontal

PCS 1900:

The Worst Test Results for Channel 881/1909.8MHz					
Frequency(MHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1429.36	-40.91	9.63	-31.28	-13.00	Vertical
2617.91	-37.73	8.92	-28.82	-13.00	Vertical
4875.32	-37.32	12.36	-24.96	-13.00	Horizontal
5324.96	-41.19	18.76	-22.43	-13.00	Vertical
6932.14	-43.30	20.0	-23.28	-13.00	Horizontal

UMTS band II:

The Worst Test Results for Channel 9538/1907.6MHz					
Frequency(MHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1611.35	-38.56	-2.01	-40.81	-13.00	Vertical
2264.31	-39.88	-2.85	-42.97	-13.00	Horizontal
4251.62	-45.19	-1.61	-47.01	-13.00	Horizontal
5131.14	-37.68	8.74	-29.20	-13.00	Vertical
6023.19	-38.55	-2.03	-40.81	-13.00	Horizontal

UMTS band V:

The Worst Test Results for Channel 4233/846.6MHz					
Frequency(MHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1567.84	-35.80	9.91	-26.06	-13.00	Vertical
2349.51	-31.91	11.98	-20.20	-13.00	Horizontal
4412.30	-40.89	15.23	-25.88	-13.00	Horizontal
5514.11	-36.49	15.07	-21.72	-13.00	Vertical
6349.28	-42.42	19.01	-23.76	-13.00	Horizontal

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

7. MAINS CONDUCTED EMISSION

7.1 MEASUREMENT METHOD

The measurement procedure specified in ANSI C63.4-2003 was used for testing. Conducted Emission was measured with travel charger.

7.2 PROVISIONS APPLICABLE

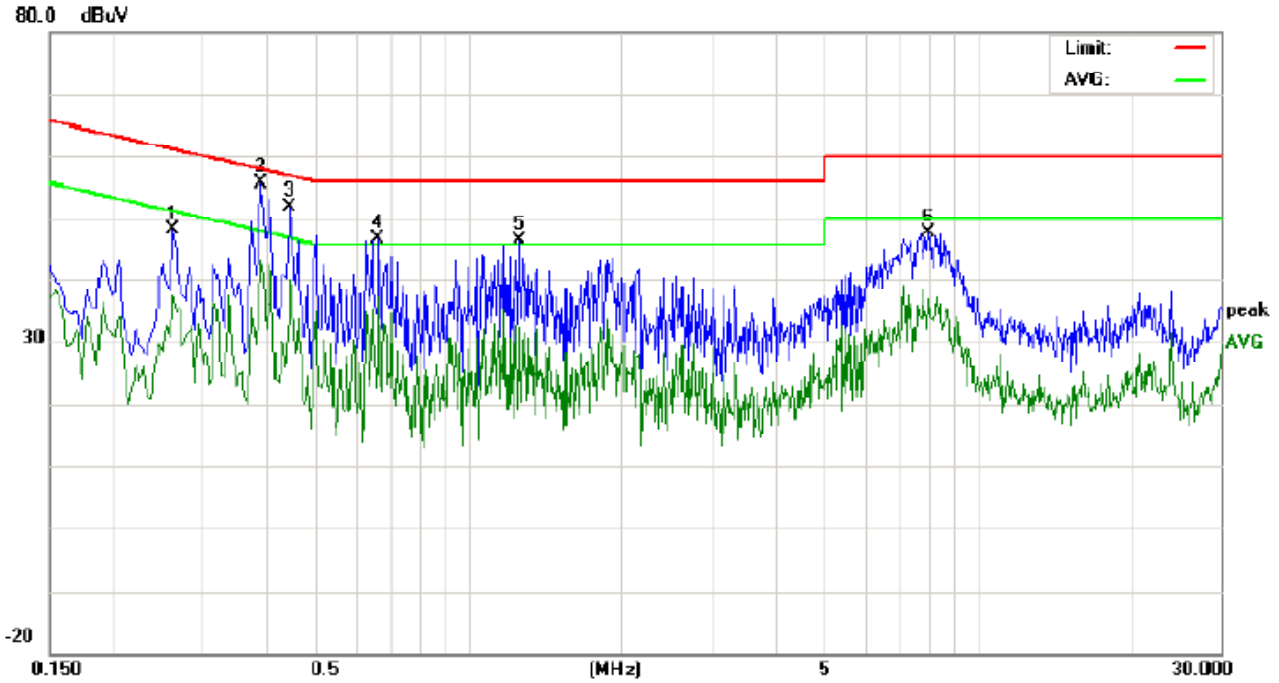
Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

*Decreases with the logarithm of the frequency.
*The lower limit shall apply at the transition frequency.

Note: The GPRS 850 1 slot mode is the worst condition and the test result as following:

7.3 MEASUREMENT RESULT

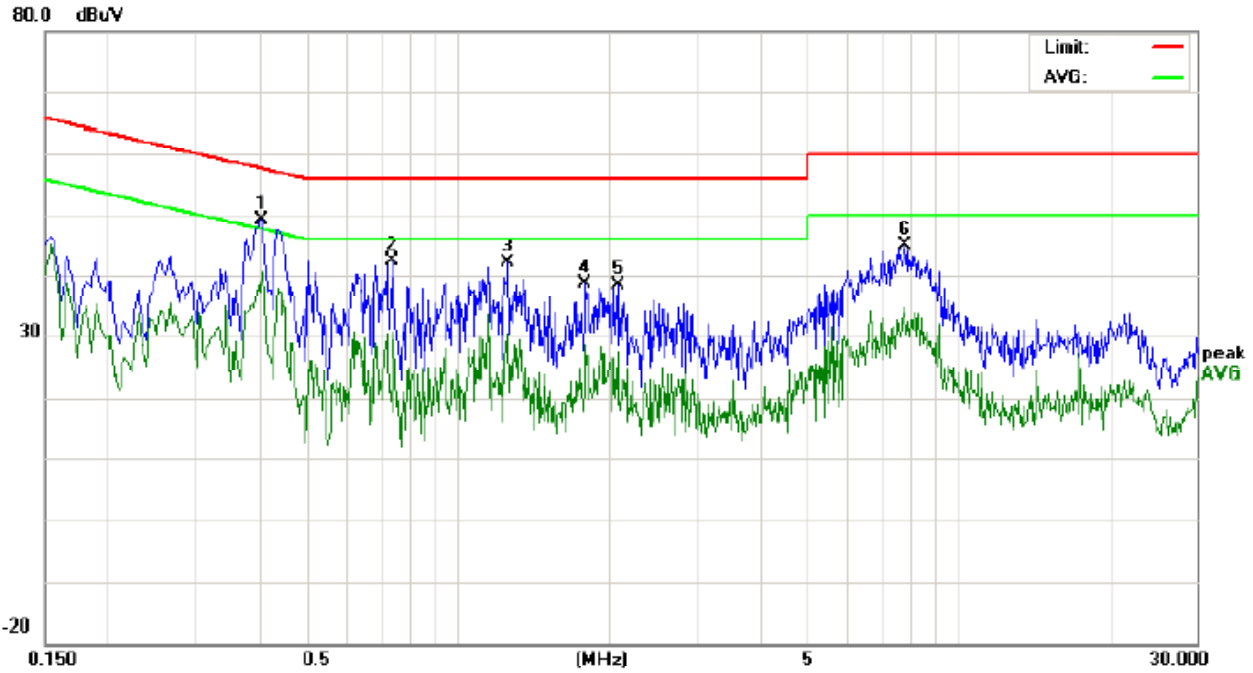
LINE CONDUCTED EMISSION - L



Site: Conduction Phase: **L1** Temperature: 26
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60 %
 EUT: WCDMA/HSDPA/HSUPA IP MODEM
 M/N: F2414
 Mode: GPRS 850 1 slot
 Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2620	37.89		27.07	10.27	48.16		37.34	61.36	51.36	-13.20	-14.02	P	
2	0.3899	45.41	42.16	27.54	10.33	55.74	52.49	37.87	58.06	48.06	-5.57	-10.19	P	
3	0.4460	41.54		29.54	10.36	51.90		39.90	56.95	46.95	-5.05	-7.05	P	
4	0.6660	36.19		26.46	10.34	46.53		36.80	56.00	46.00	-9.47	-9.20	P	
5	1.2540	35.90		22.05	10.37	46.27		32.42	56.00	46.00	-9.73	-13.58	P	
6	8.0020	37.30		26.24	10.35	47.65		36.59	60.00	50.00	-12.35	-13.41	P	

LINE CONDUCTED EMISSION - N



Site: Conduction Phase: **N** Temperature: 26
Limit: FCC Class B Conduction(QP) Power: AC 120V60Hz Humidity: 60 %
EUT: WCDMAHSDPA/HSUPA IP MODEM
M/N: F2414
Mode: GPRS 850 1slot
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor (dB)	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.4060	38.82		30.35	10.33	49.15		40.68	57.73	47.73	-8.58	-7.05	P	
2	0.7420	31.99		20.22	10.32	42.31		30.54	56.00	46.00	-13.69	-15.46	P	
3	1.2579	31.79		19.96	10.38	42.17		30.34	56.00	46.00	-13.83	-15.66	P	
4	1.8020	28.31		18.39	10.28	38.59		28.67	56.00	46.00	-17.41	-17.33	P	
5	2.0820	28.25		17.05	10.25	38.50		27.30	56.00	46.00	-17.50	-18.70	P	
6	7.8300	34.61		23.15	10.34	44.95		33.49	60.00	50.00	-15.05	-16.51	P	

8. FREQUENCY STABILITY

8.1 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 band , channel 190 for GSM 850 band, channel 9400 for UMTS band II and channel 4175 for UMTS band V 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 0.1Volt 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.

8.2 PROVISIONS APPLICABLE

8.2.1 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 102VAC and 138VAC, with a nominal voltage of 120VAC. 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.

8.2.2 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; the normal environment temperature is 20°C.

8.3 MEASUREMENT RESULT

Frequency Error Against Voltage for GSM850 band		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
102	34	0.041
120	25	0.030
138	38	0.045

Frequency Error Against Temperature for GSM850 band		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	54	0.065
-20	49	0.059
-10	47	0.056
0	38	0.045
10	31	0.037
20	26	0.031
30	28	0.033
40	35	0.042
50	41	0.049

Note: The EUT doesn't work below -30°C

Frequency Error Against Voltage for PCS1900 band		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
102	47	0.025
120	35	0.019
138	51	0.027

Frequency Error Against Temperature for PCS1900 band		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	64	0.034
-20	61	0.032
-10	57	0.030
0	44	0.023
10	43	0.023
20	37	0.020
30	36	0.019
40	45	0.024
50	55	0.029

Note: The EUT doesn't work below -30°C

Frequency Error Against Voltage for UMTS band II		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
102	49	0.026
120	38	0.020
138	51	0.027

Frequency Error Against Temperature for UMTS band II		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	67	0.036
-20	62	0.033
-10	54	0.029
0	51	0.027
10	40	0.021
20	36	0.019
30	36	0.019
40	45	0.024
50	52	0.028

Note: The EUT doesn't work below -30°C

Frequency Error Against Voltage for UMTS band V		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
102	39	0.047
120	26	0.031
138	42	0.050

Frequency Error Against Temperature for UMTS band V		
temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	65	0.078
-20	61	0.073
-10	52	0.062
0	47	0.056
10	36	0.043
20	29	0.035
30	35	0.042
40	42	0.050
50	56	0.067

Note: The EUT doesn't work below -30°C

9. OCCUPIED BANDWIDTH

9.1 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.

9.2 PROVISIONS APPLICABLE

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

9.3 MEASUREMENT RESULT

Occupied Bandwidth (99%) for GSM850 band		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	824.2	242.51
Middle Channel	836.6	245.26
High Channel	848.8	249.15

Occupied Bandwidth (99%) for PCS1900 band		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	1850.2	245.32
Middle Channel	1880.0	245.81
High Channel	1909.8	246.14

Occupied Bandwidth (99%) for UMTS band II		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(MHz)
Low Channel	1852.4	4.21
Middle Channel	1880	4.18
High Channel	1907.6	4.15

Occupied Bandwidth (99%) for UMTS band V		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(MHz)
Low Channel	826.4	4.19
Middle Channel	835.0	4.18
High Channel	846.6	4.21

10. EMISSION BANDWIDTH

10.1 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.

10.2 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

10.3 MEASUREMENT RESULT

Emission Bandwidth (-26dBc) for GSM850 band		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	305.59
Middle Channel	836.6	310.40
High Channel	848.8	306.39

Emission Bandwidth (-26dBc) for PCS1900 band		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	310.52
Middle Channel	1880.0	314.69
High Channel	1909.8	309.38

Emission Bandwidth (-26dBc) for UMTS band II		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)
Low Channel	1852.4	4.66
Middle Channel	1880	4.56
High Channel	1907.6	4.68

Emission Bandwidth (-26dBc) for UMTS band V		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)
Low Channel	826.4	4.70
Middle Channel	835.0	4.63
High Channel	846.6	4.64

11. BAND EDGE

11.1 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.

11.2 PROVISIONS APPLICABLE

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

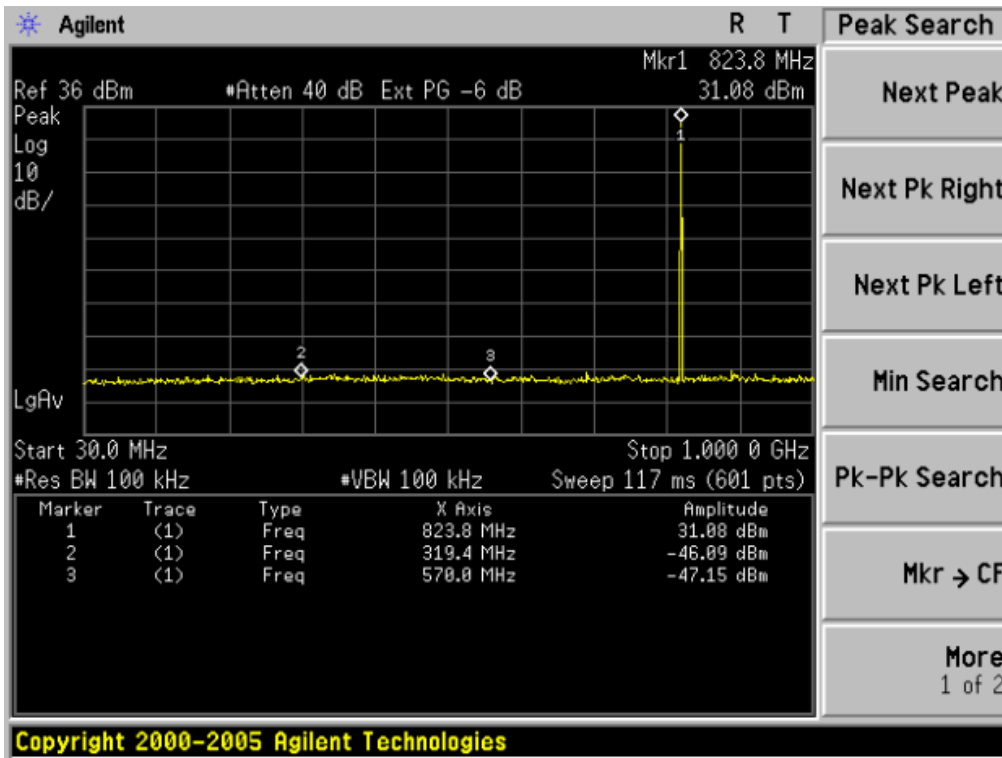
11.3 MEASUREMENT RESULT

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

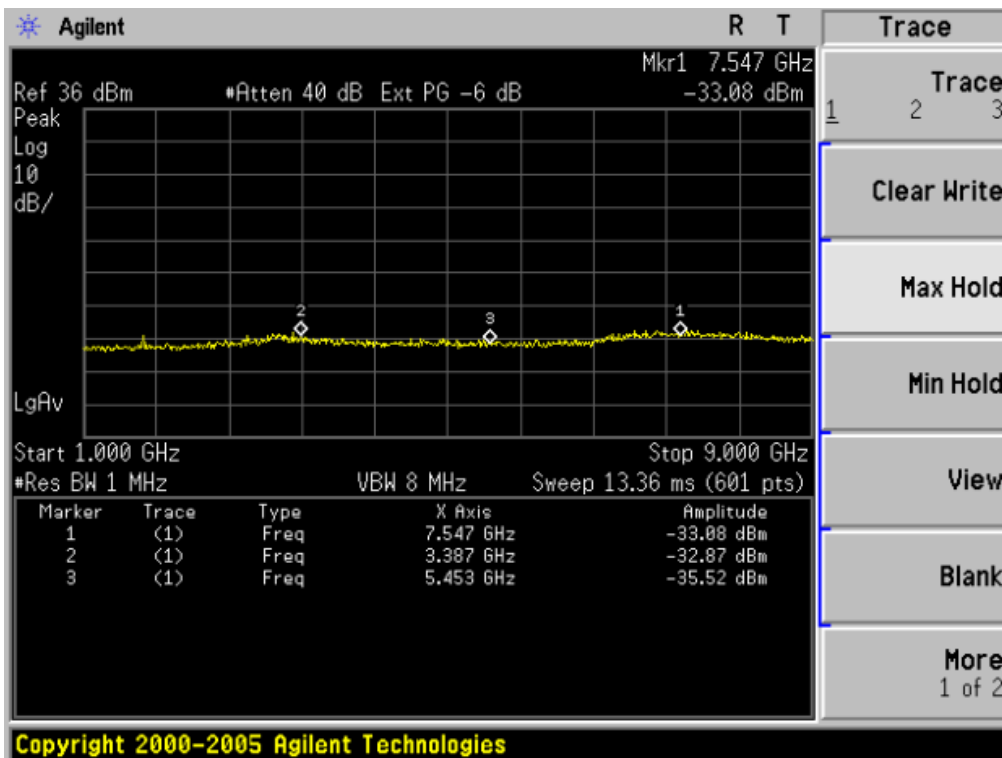
APPENDIX I

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

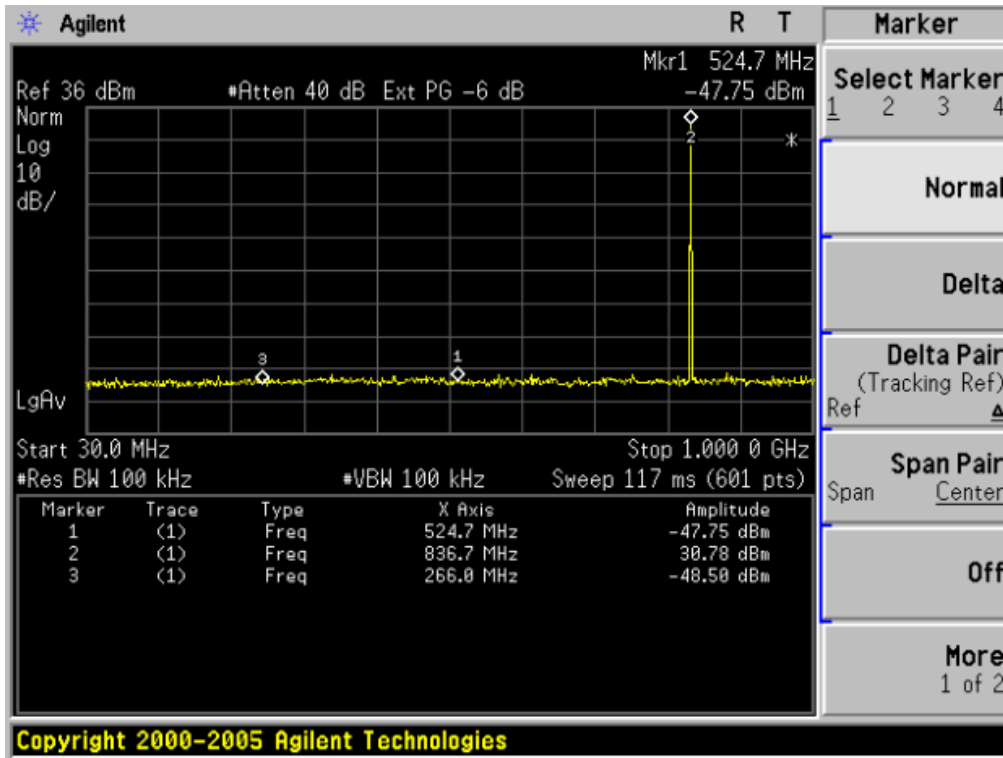
CONDUCTED EMISSION IN GSM850 BAND
 Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



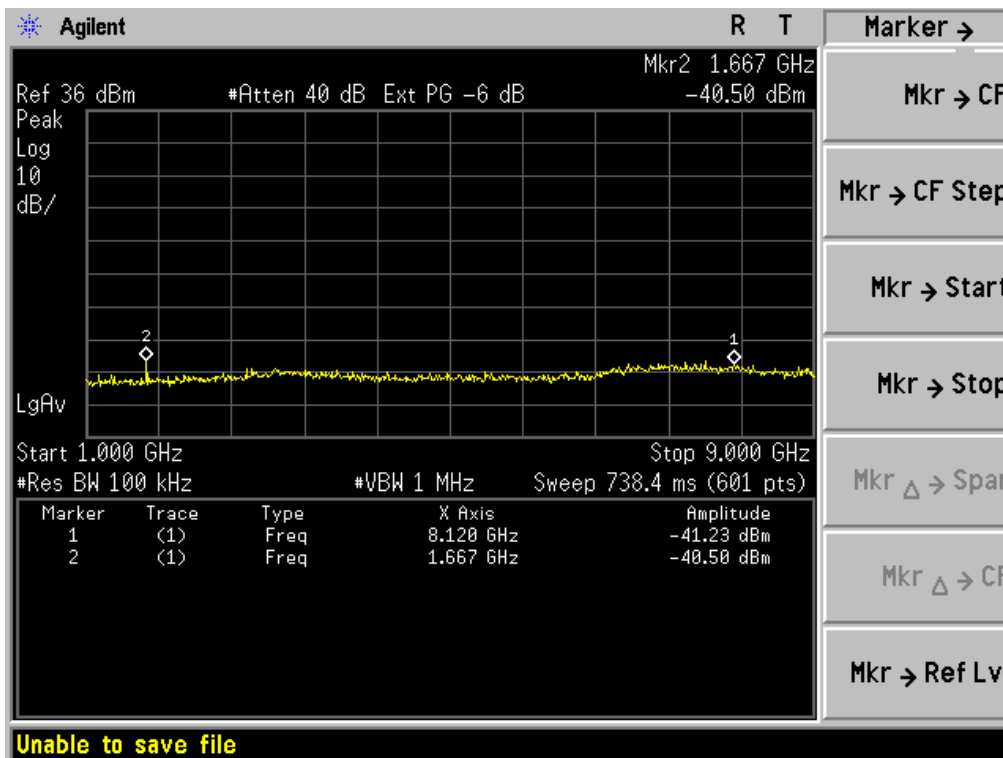
Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



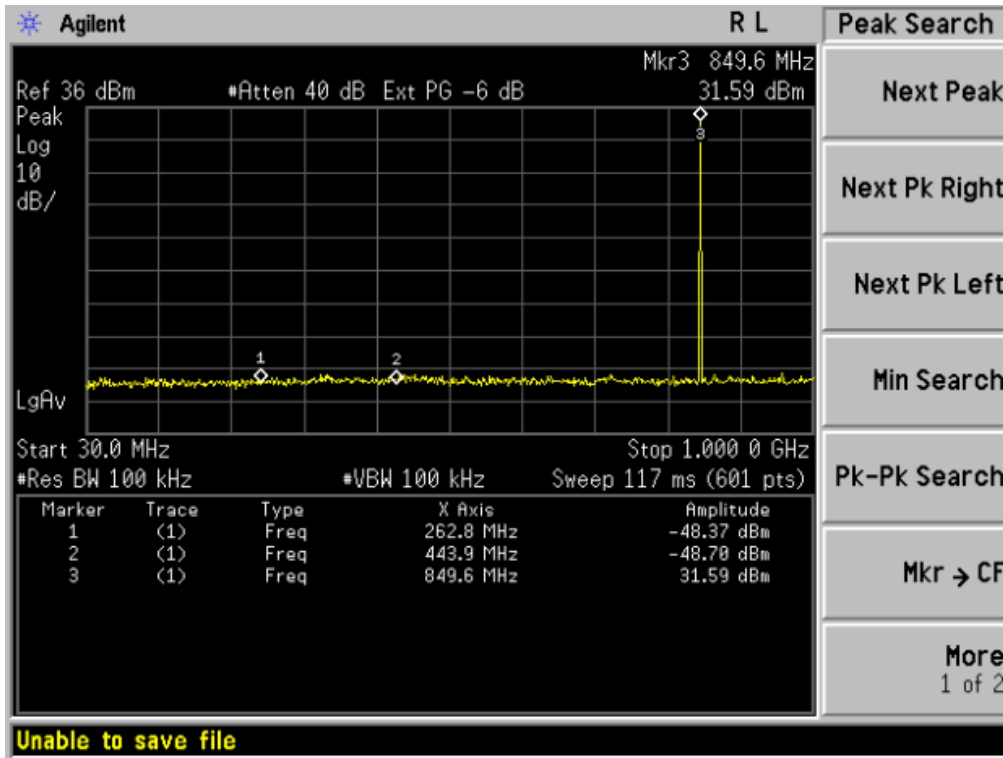
Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



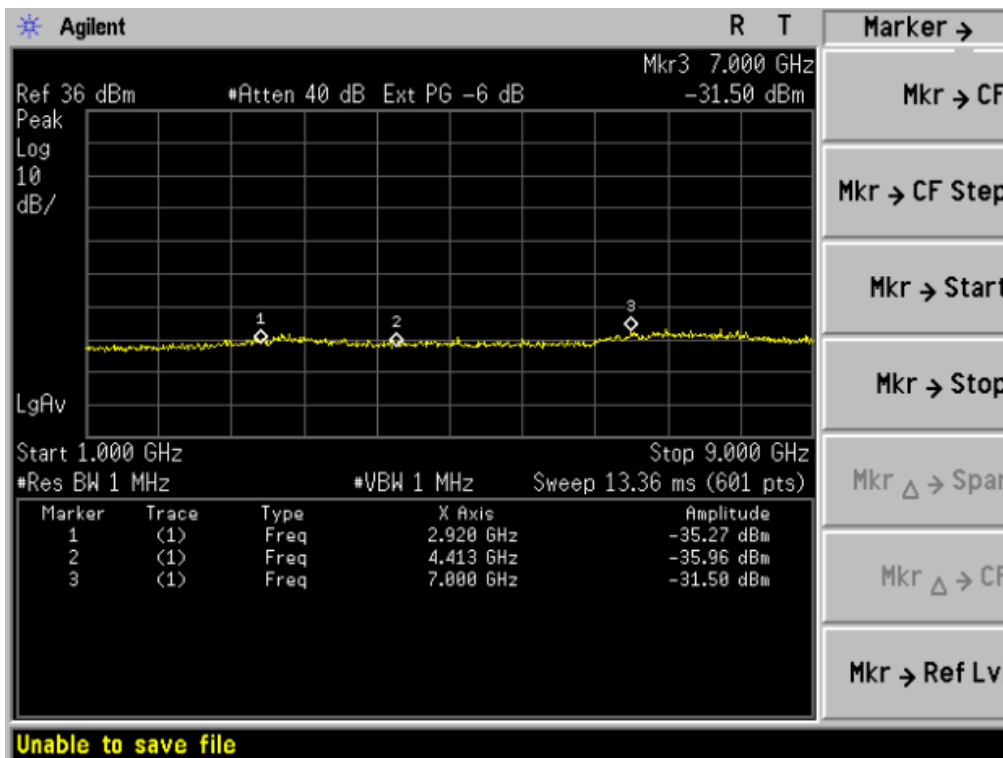
Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



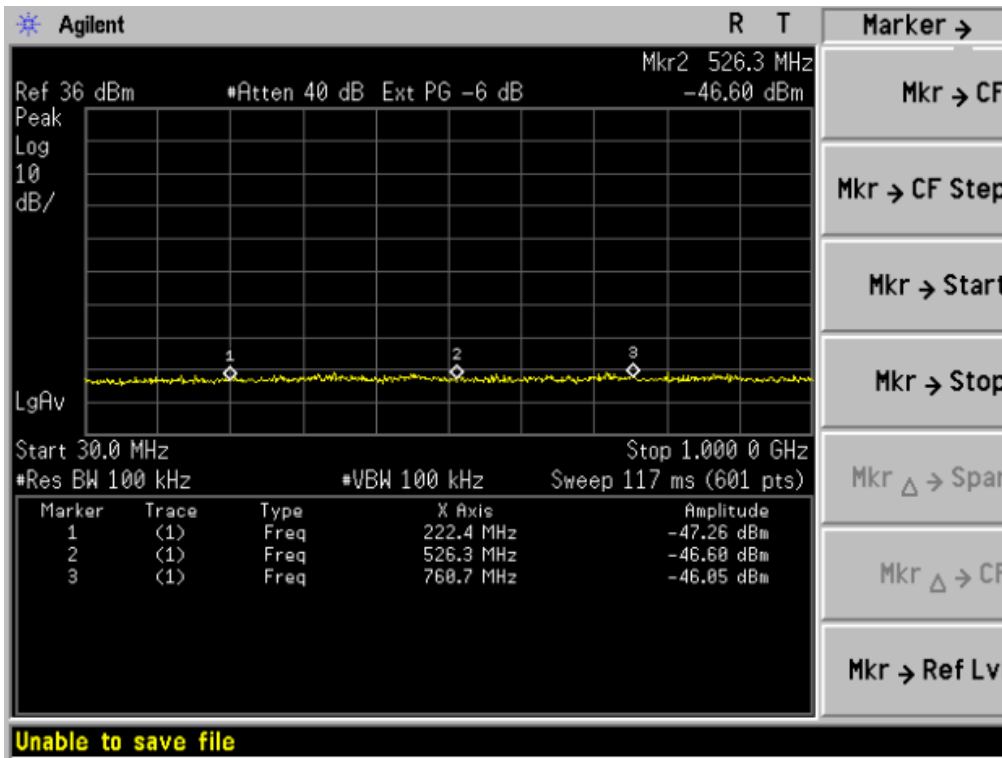
Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz



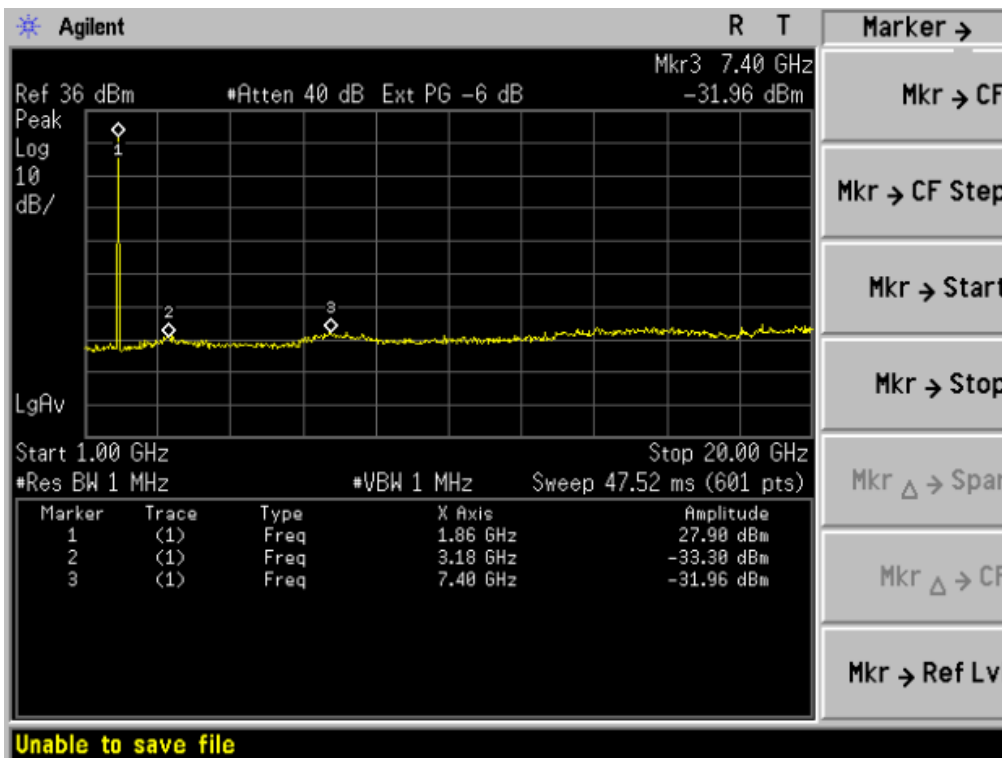
Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz



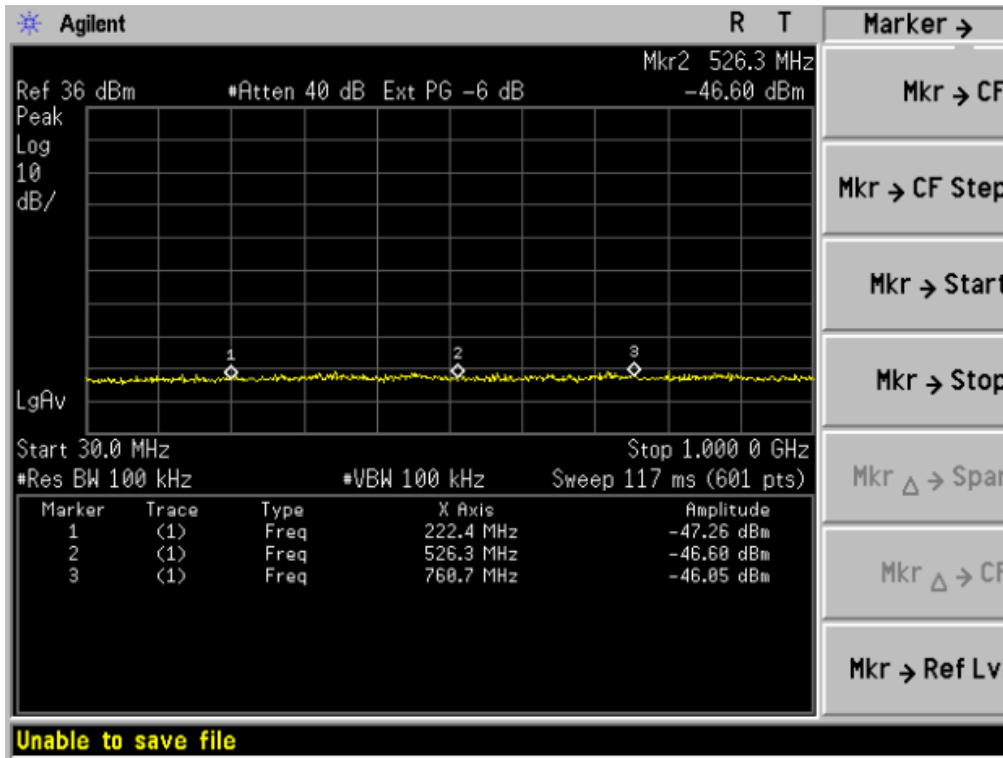
CONDUCTED EMISSION IN PCS1900 BAND
Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



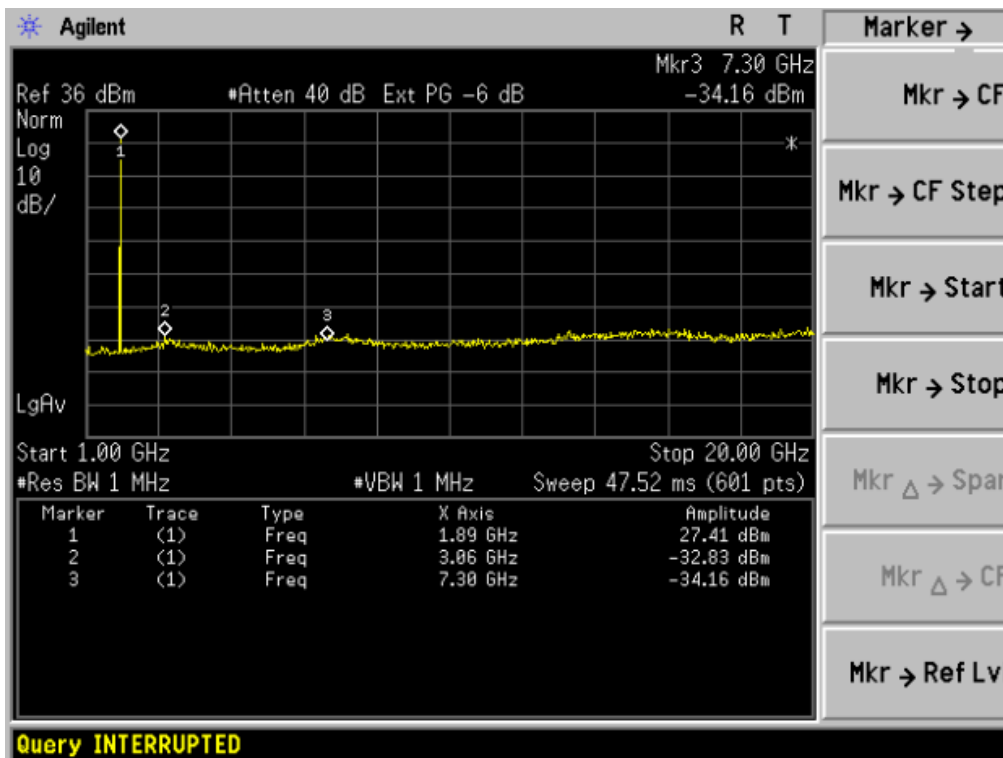
Conducted Emission Transmitting Mode CH 512 1GHz – 20GHz



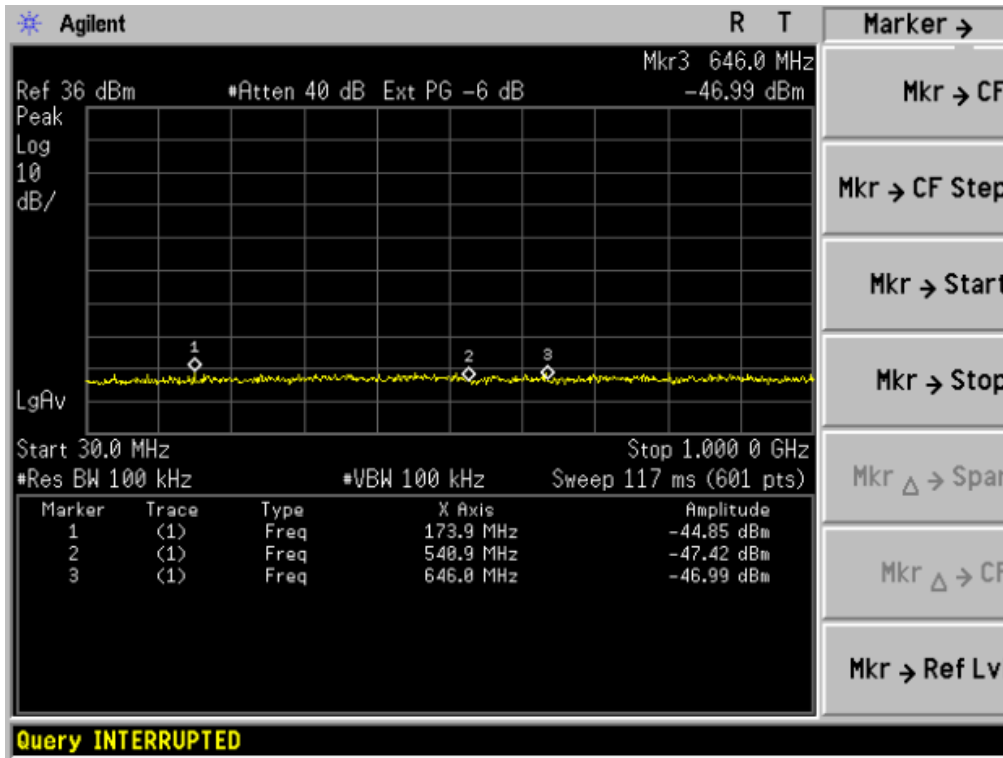
Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



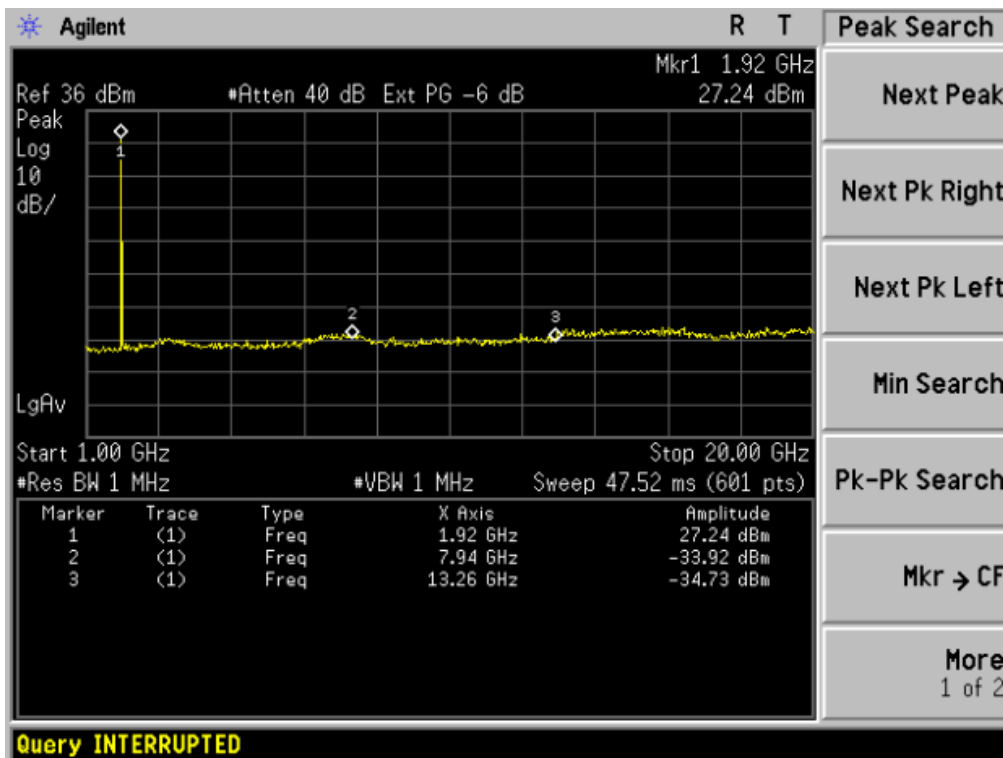
Conducted Emission Transmitting Mode CH 661 1GHz – 20GHz



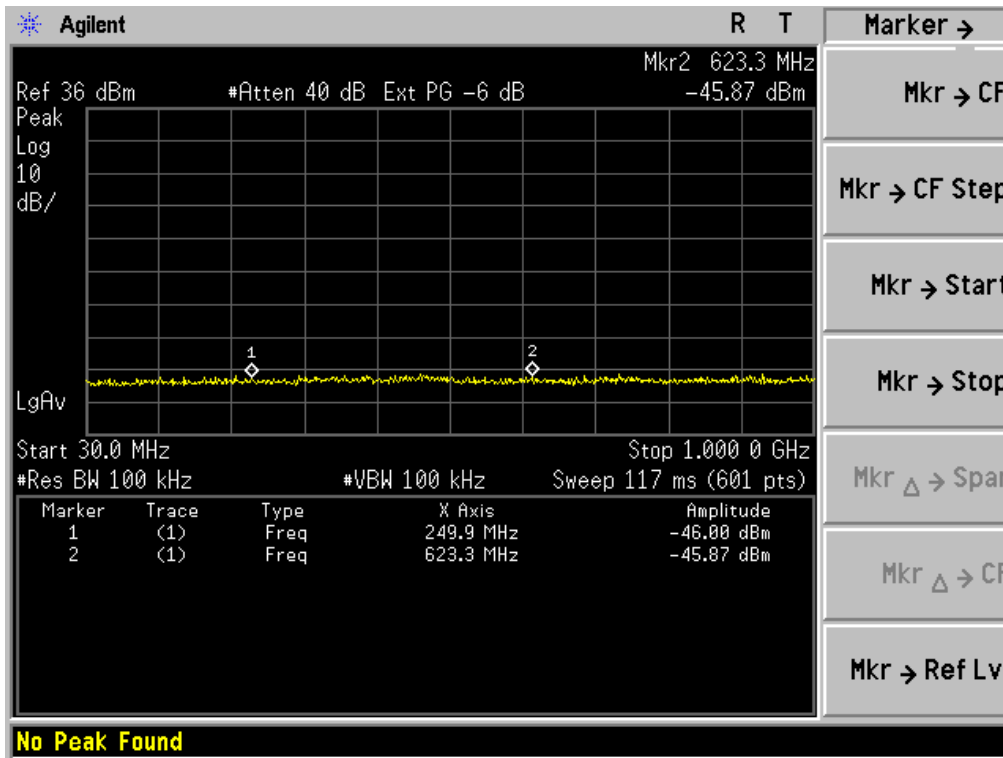
Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz



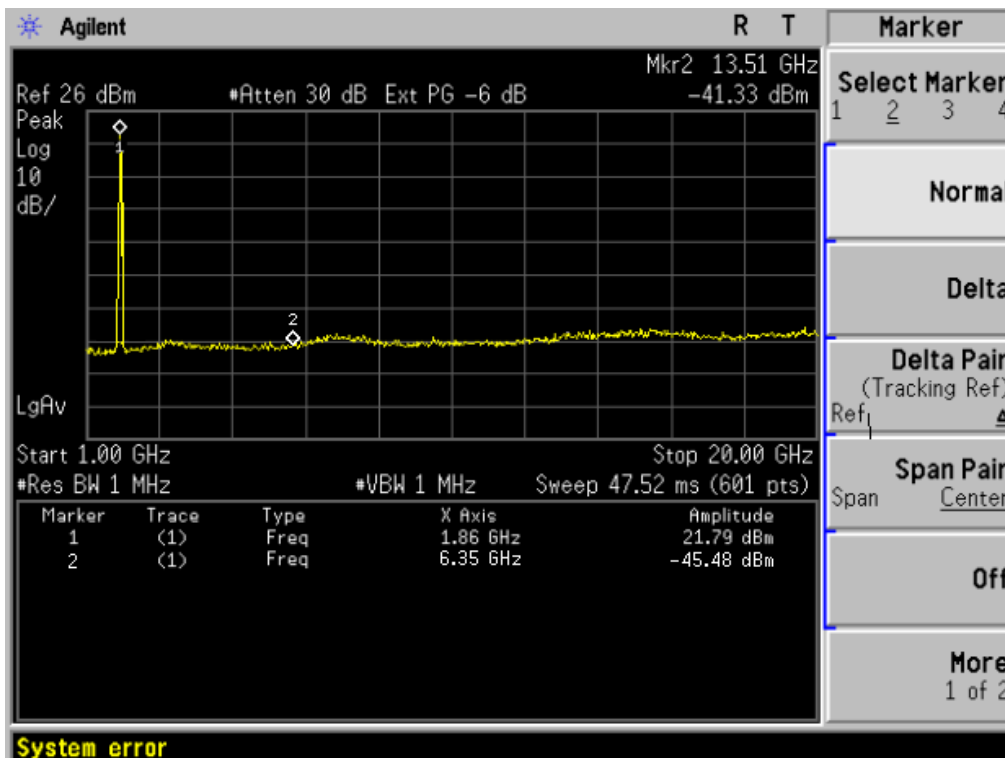
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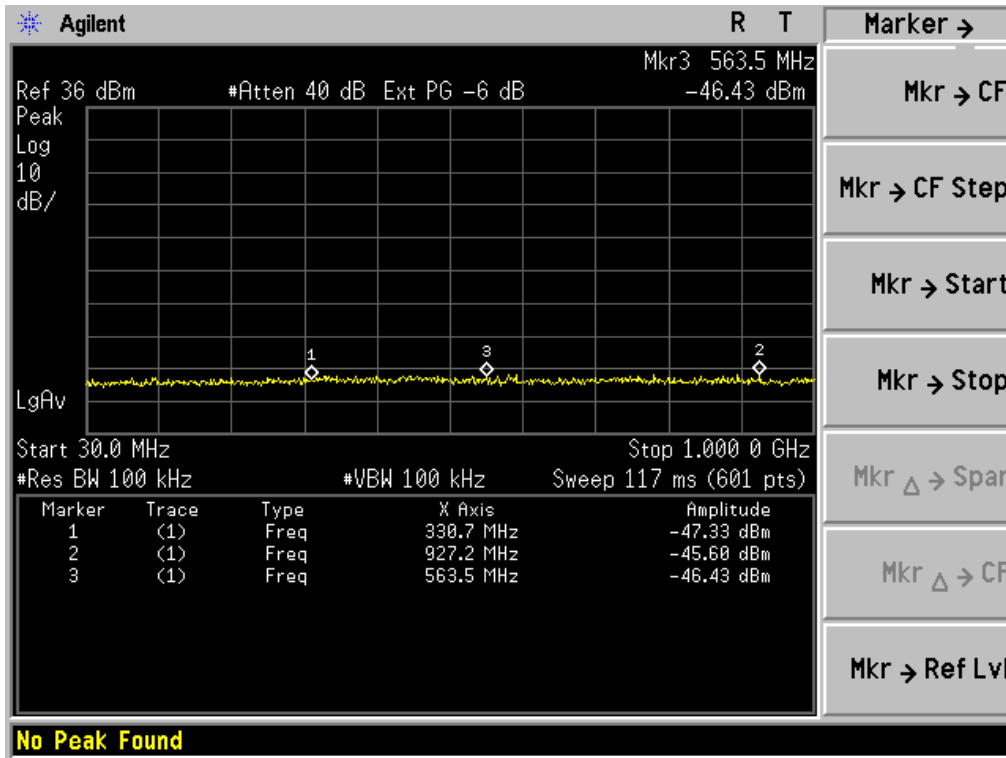
CONDUCTED EMISSION IN UMTS band II
Conducted Emission Transmitting Mode CH 9262 30MHz – 1GHz



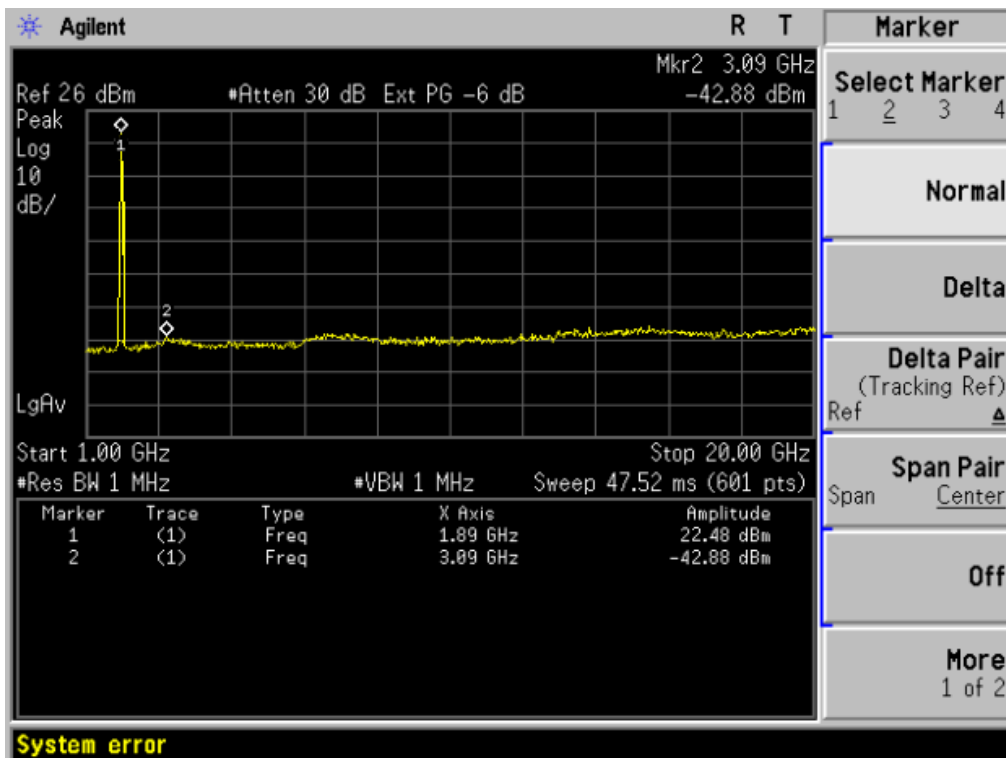
Conducted Emission Transmitting Mode CH 9262 1GHz – 20GHz



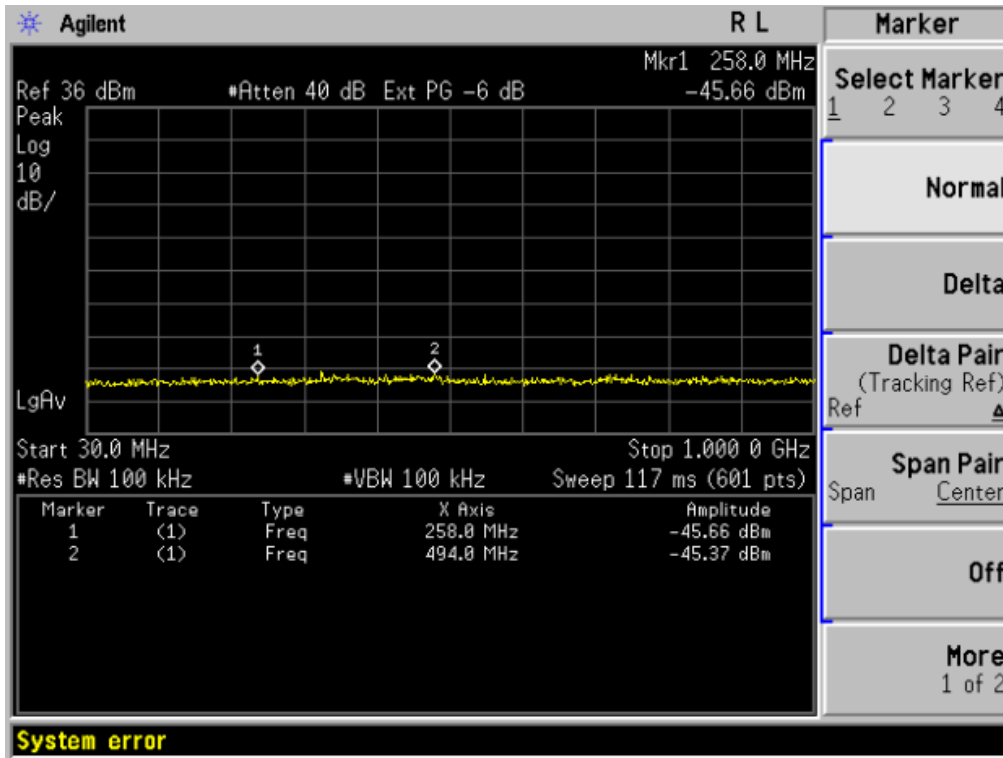
Conducted Emission Transmitting Mode CH 9400 30MHz – 1GHz



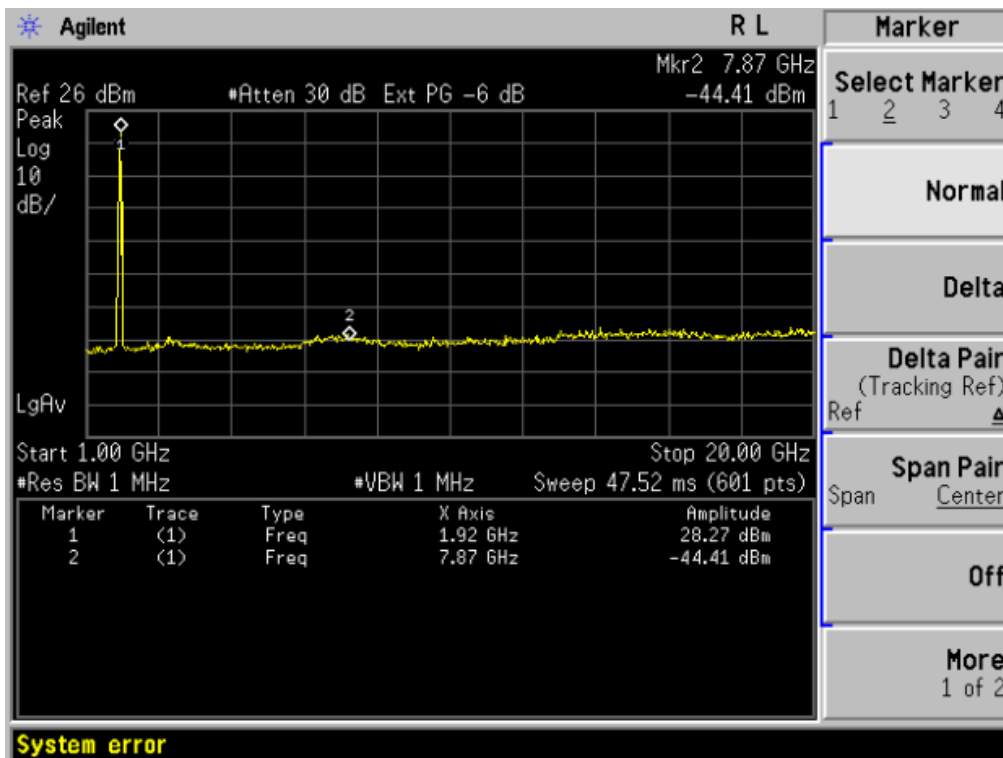
Conducted Emission Transmitting Mode CH 9400 1GHz – 20GHz



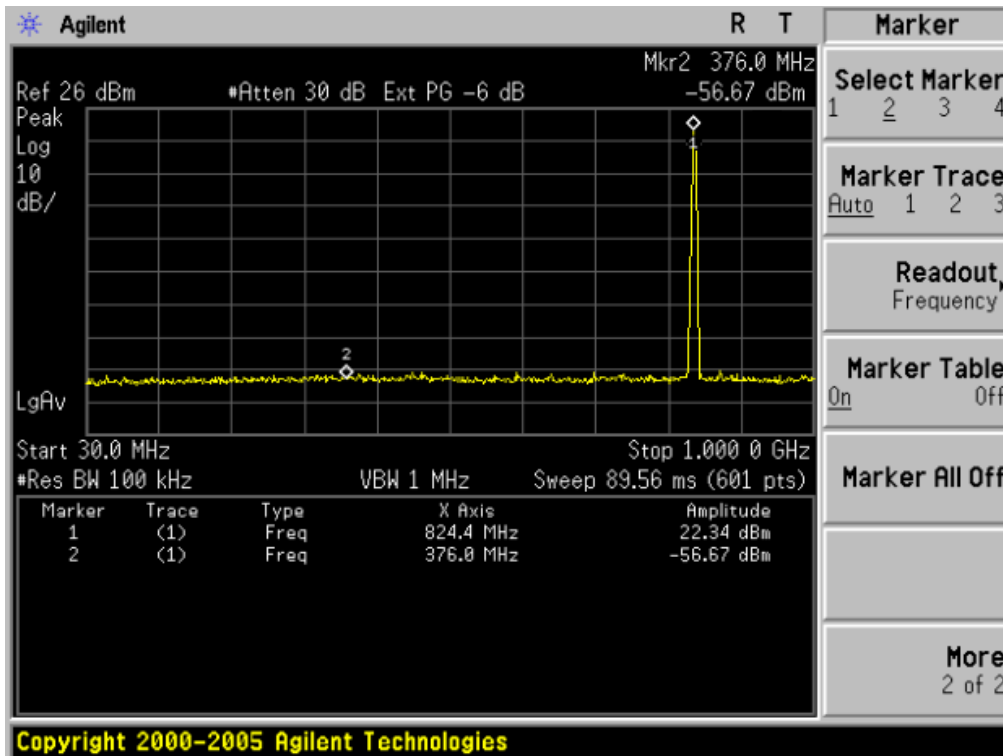
Conducted Emission Transmitting Mode CH 9538 30MHz – 1GHz



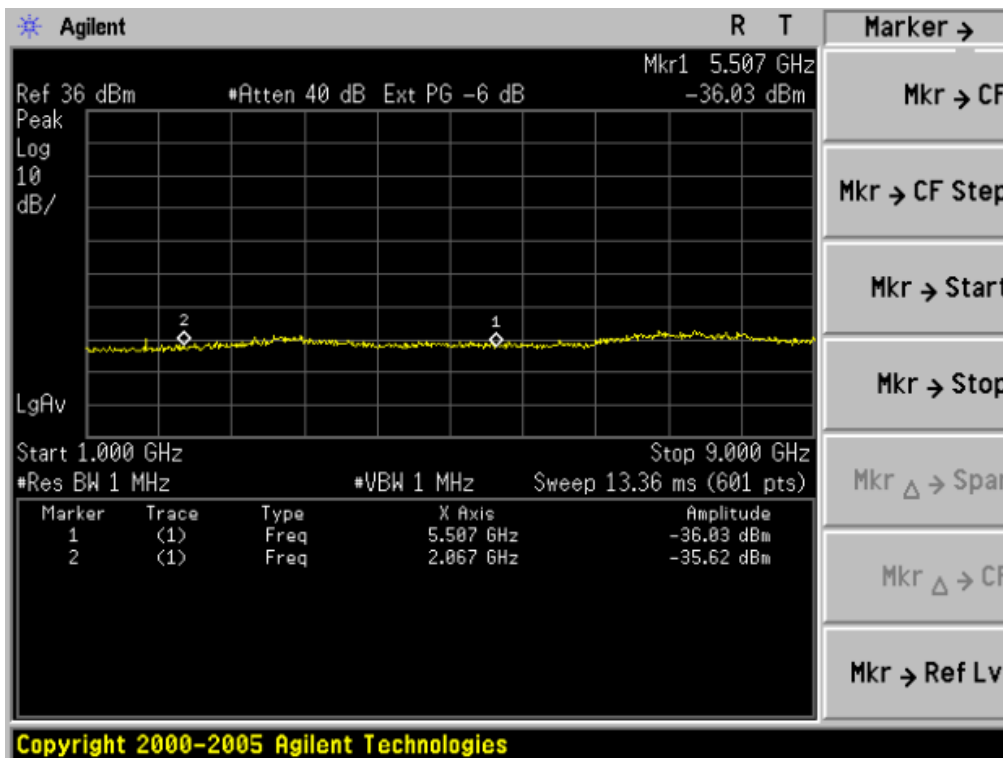
Conducted Emission Transmitting Mode CH 9538 1GHz – 20GHz



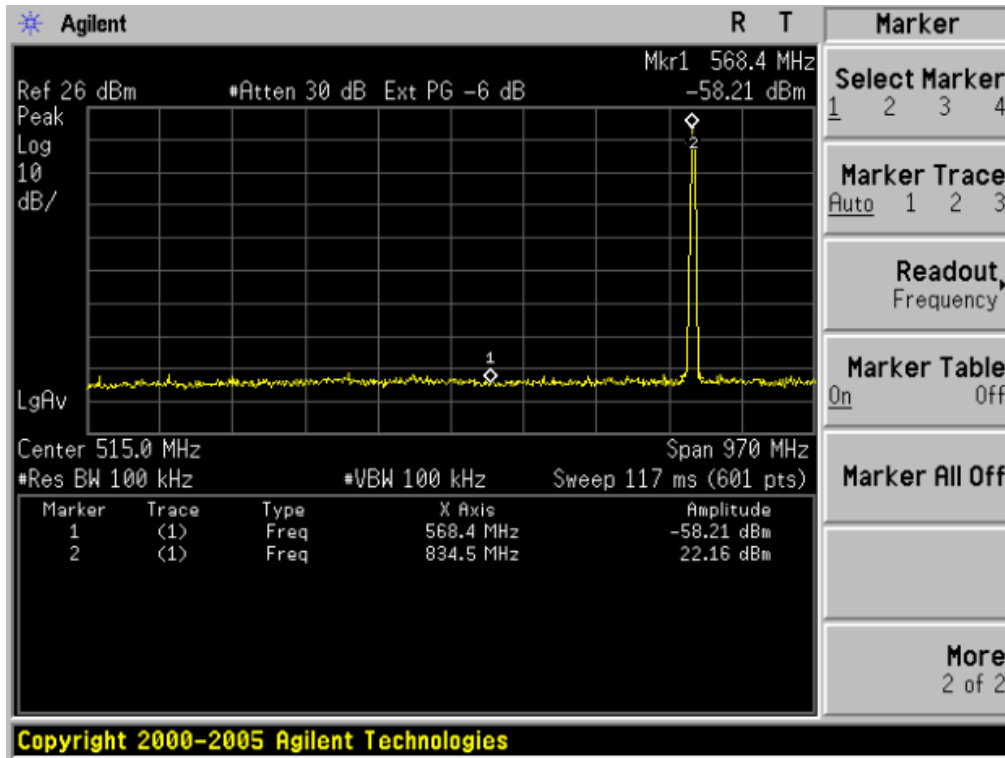
CONDUCTED EMISSION IN UMTS band V
 Conducted Emission Transmitting Mode CH 4132 30MHz – 1GHz



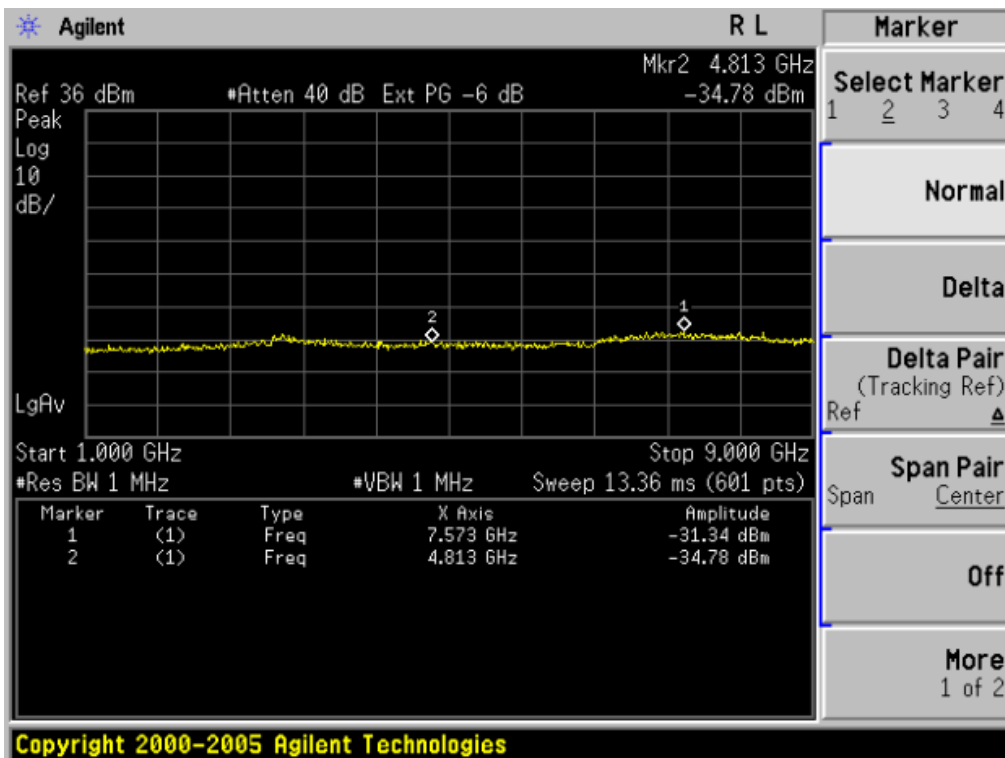
Conducted Emission Transmitting Mode CH 4132 1GHz – 9GHz



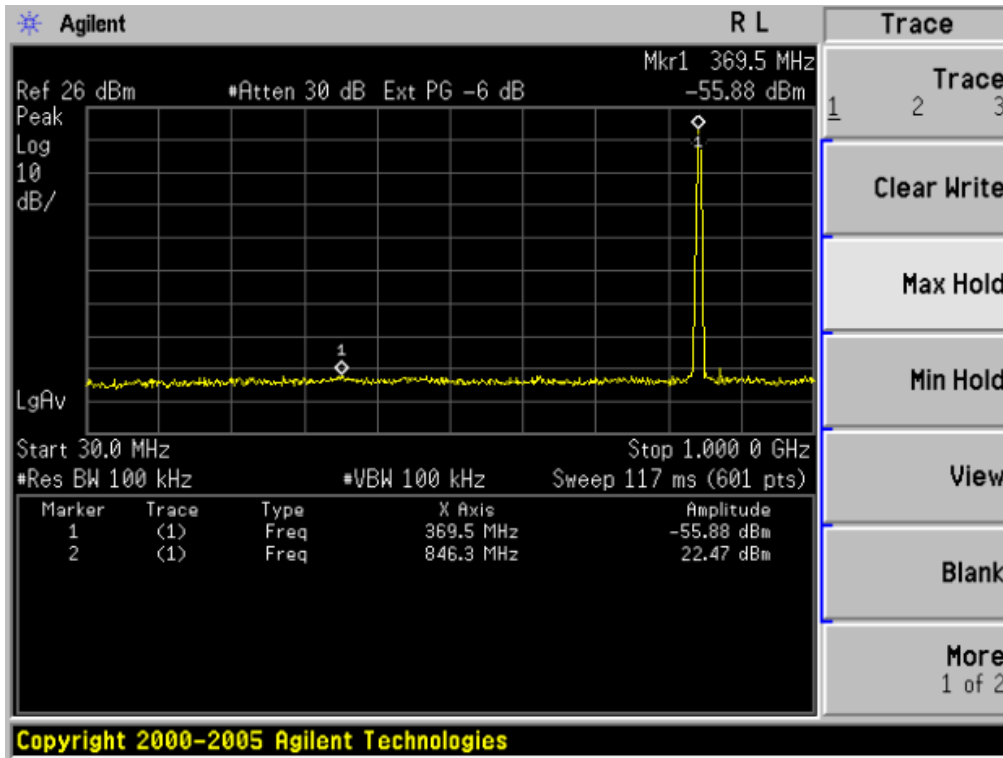
Conducted Emission Transmitting Mode CH 4175 30MHz – 1GHz



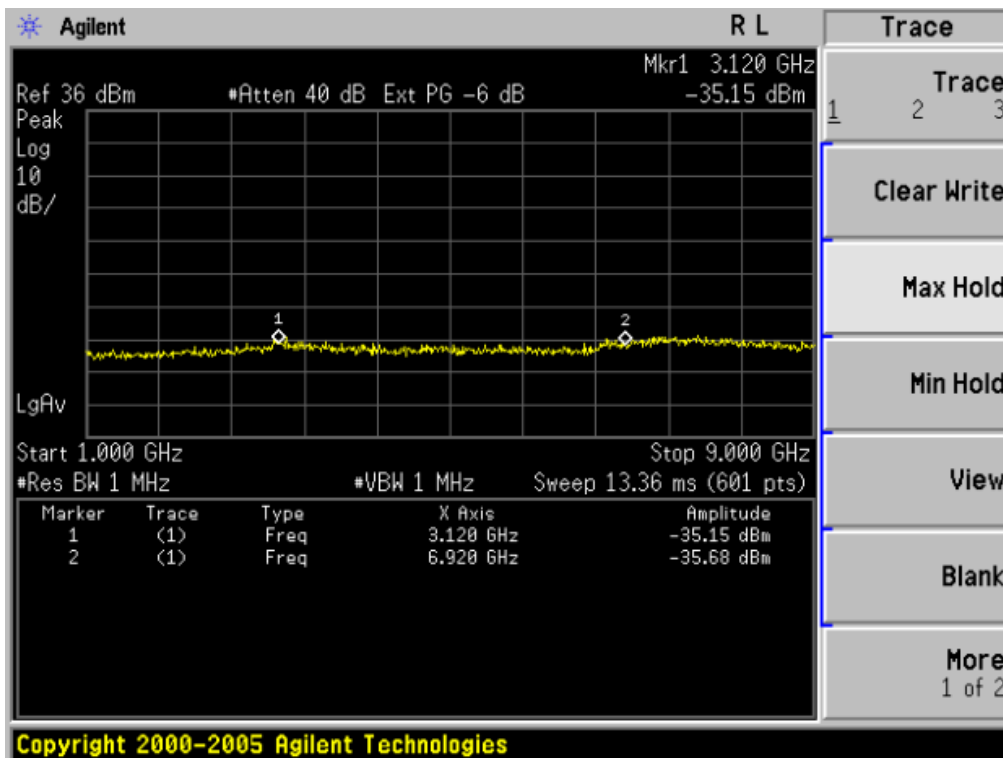
Conducted Emission Transmitting Mode CH 4175 1GHz – 20GHz



Conducted Emission Transmitting Mode CH 9538 30MHz – 1GHz



Conducted Emission Transmitting Mode CH 9538 1GHz – 20GHz

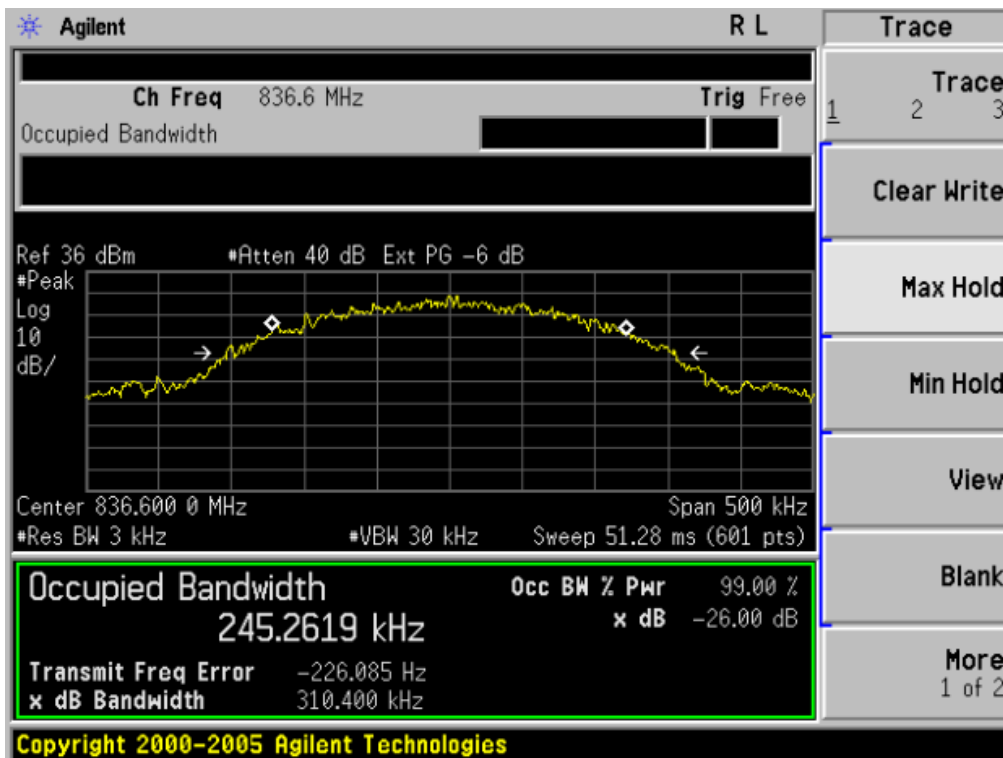


APPENDIX II
TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)
EMISSION BANDWIDTH (-26dBC)

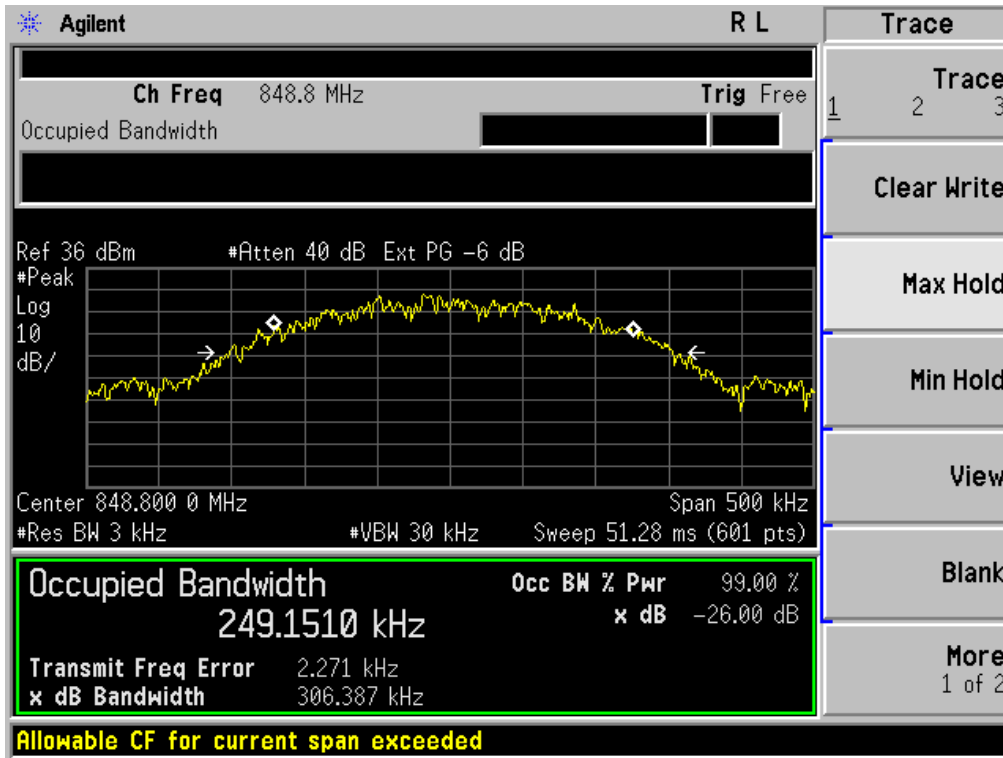
Occupied Bandwidth (99%) GSM 850 BAND CH 128



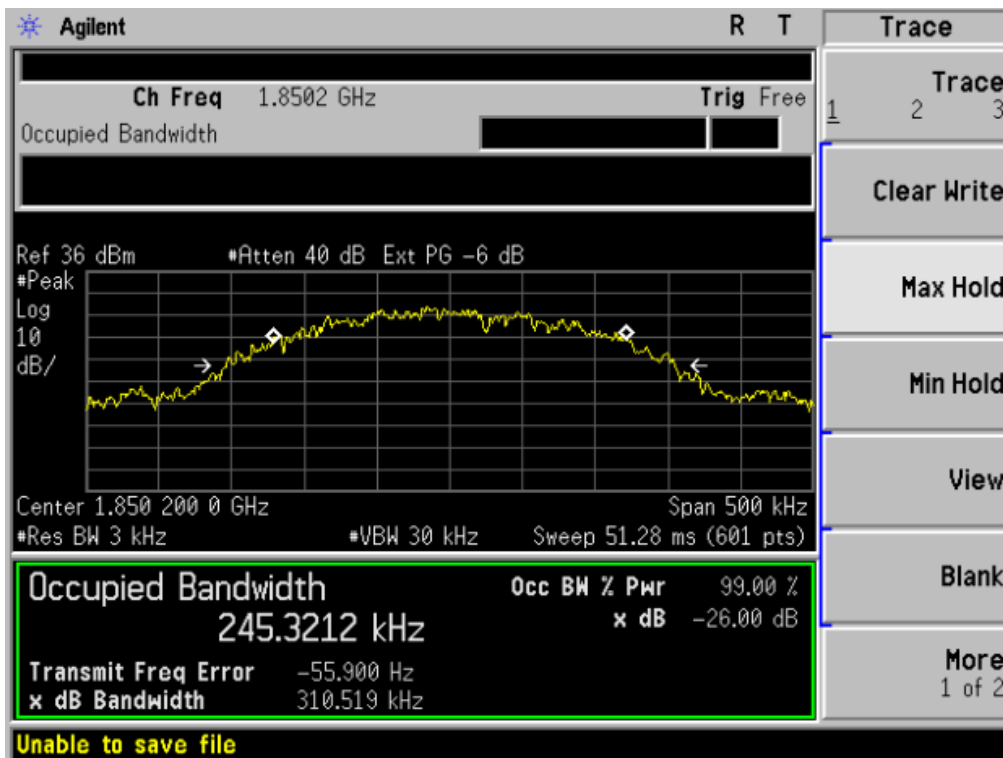
Occupied Bandwidth (99%) GSM 850 BAND CH 190



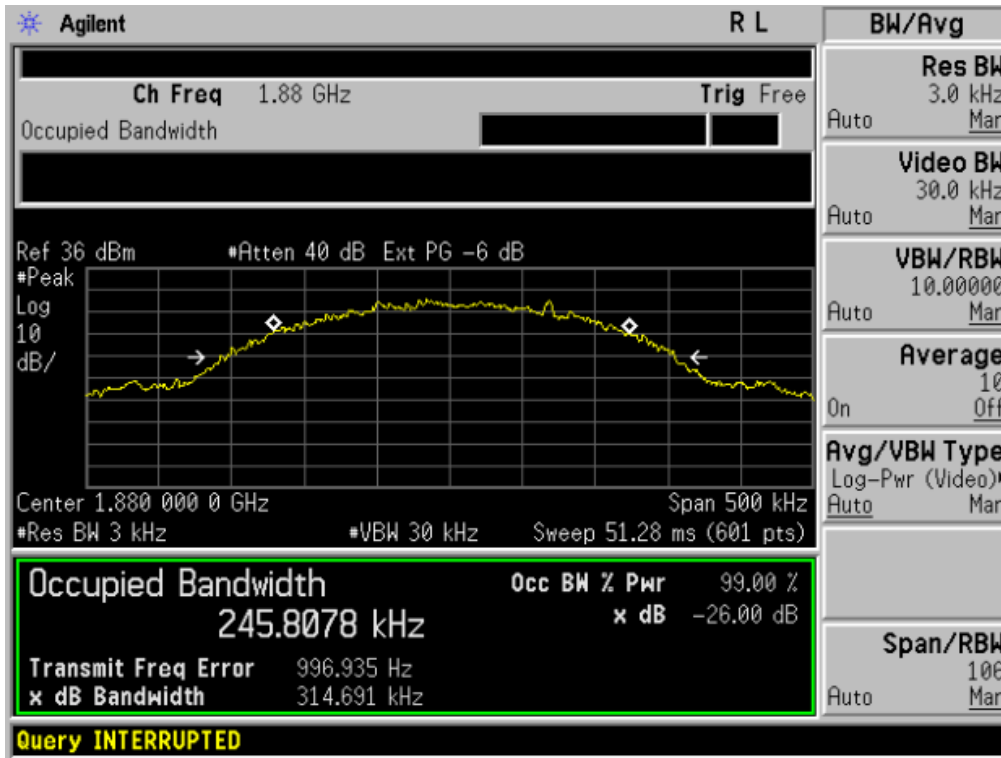
Occupied Bandwidth (99%) GSM 850 BAND CH 251



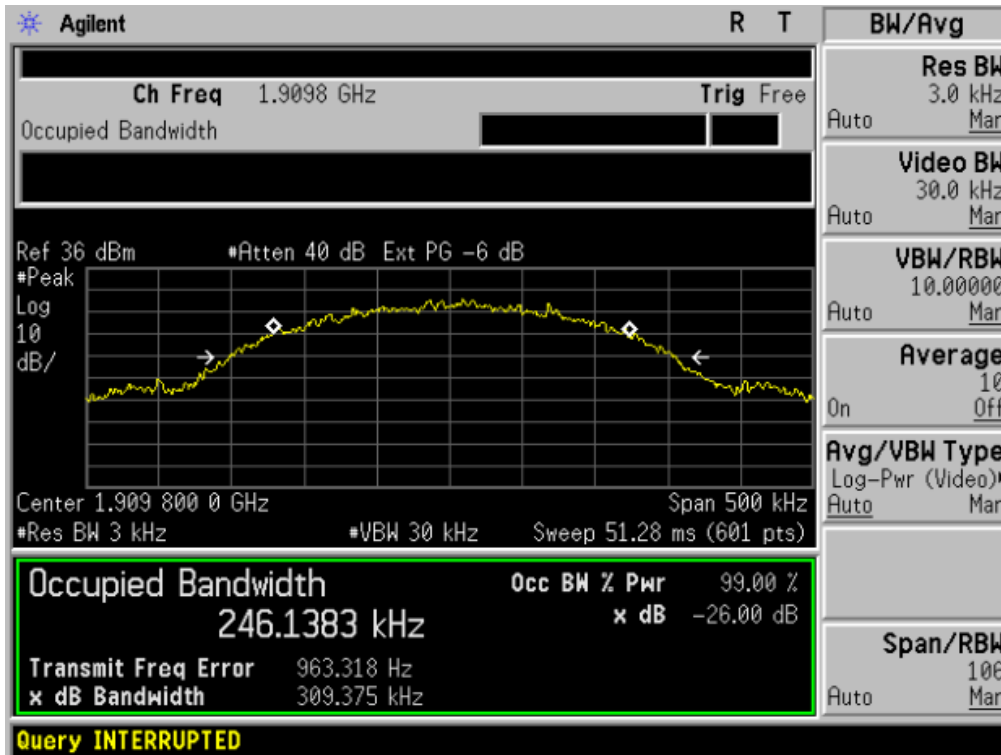
Occupied Bandwidth (99%) PCS 1900 BAND CH 512



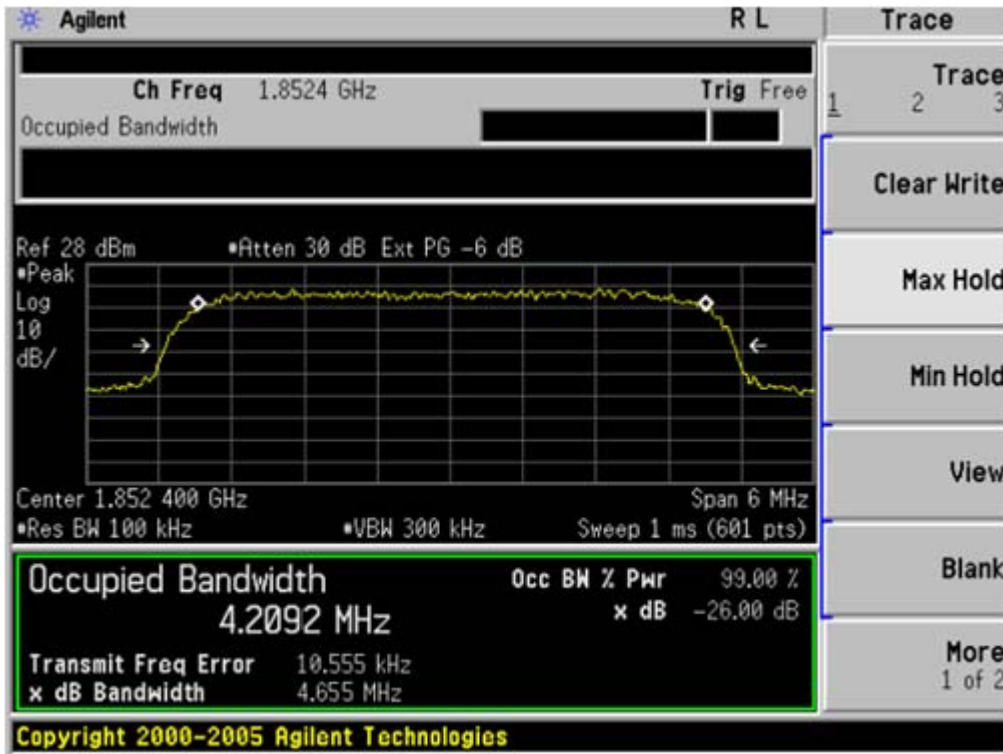
Occupied Bandwidth (99%) PCS 1900 BAND CH 661



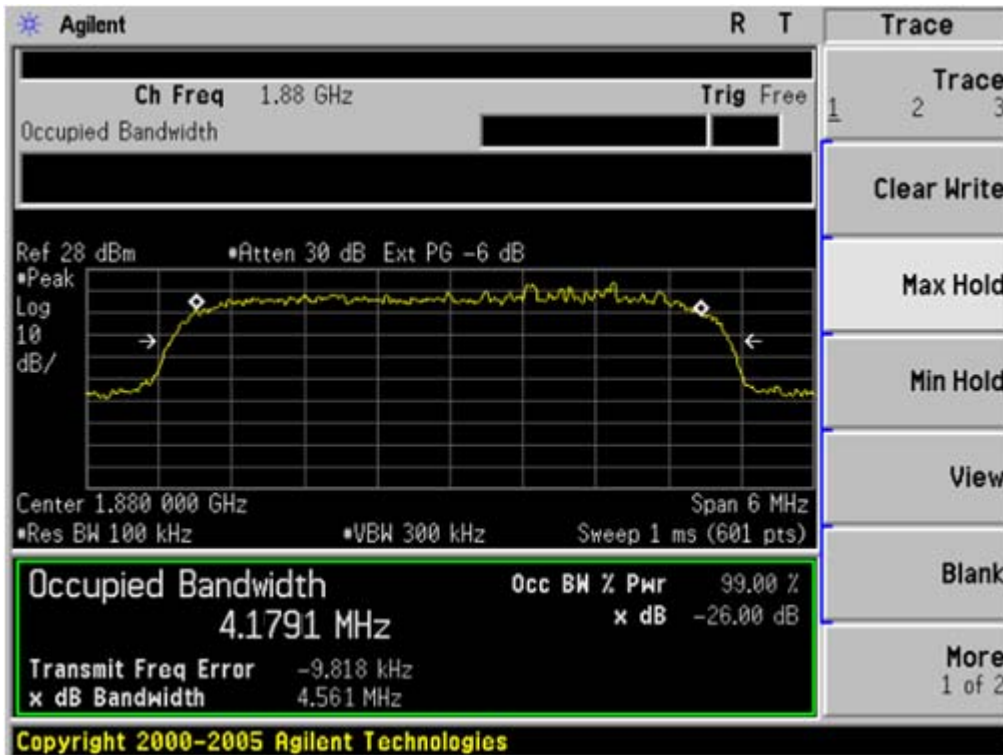
Occupied Bandwidth (99%) PCS 1900 BAND CH 810



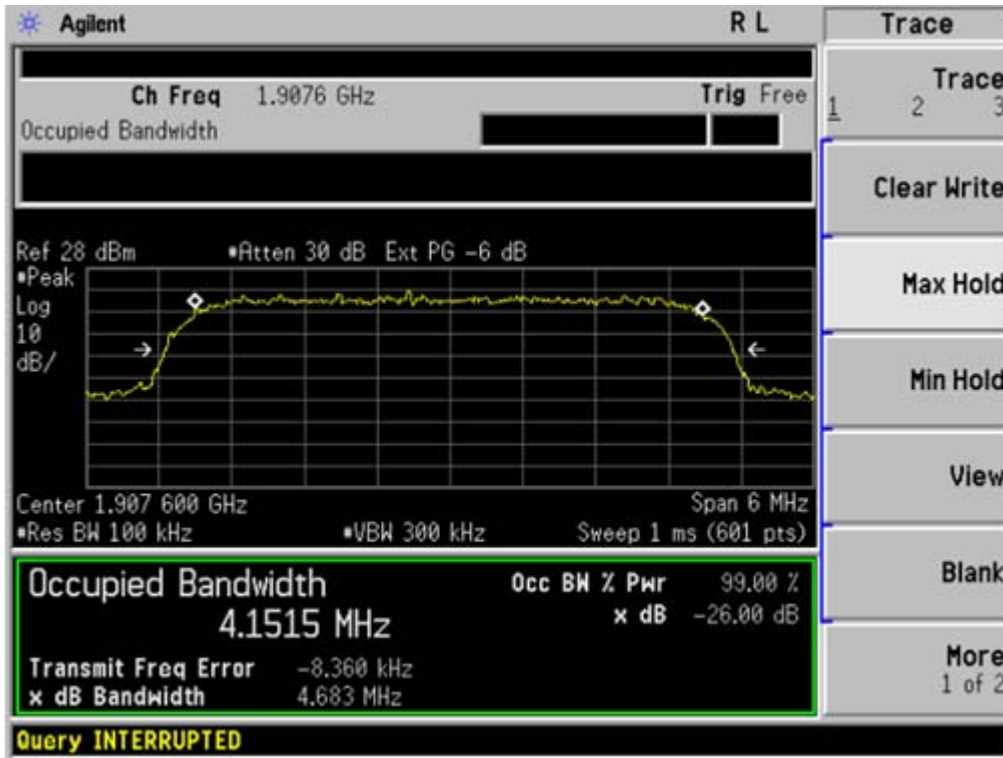
Occupied Bandwidth (99%) UMTS band II CH 9262



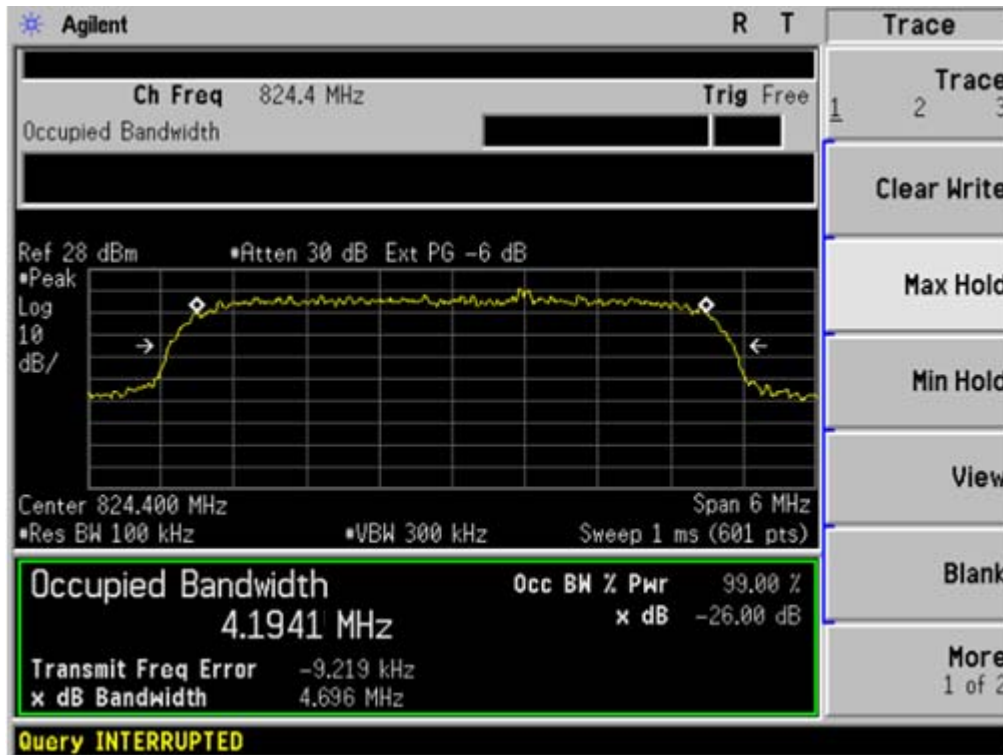
Occupied Bandwidth (99%) UMTS band II CH 9400



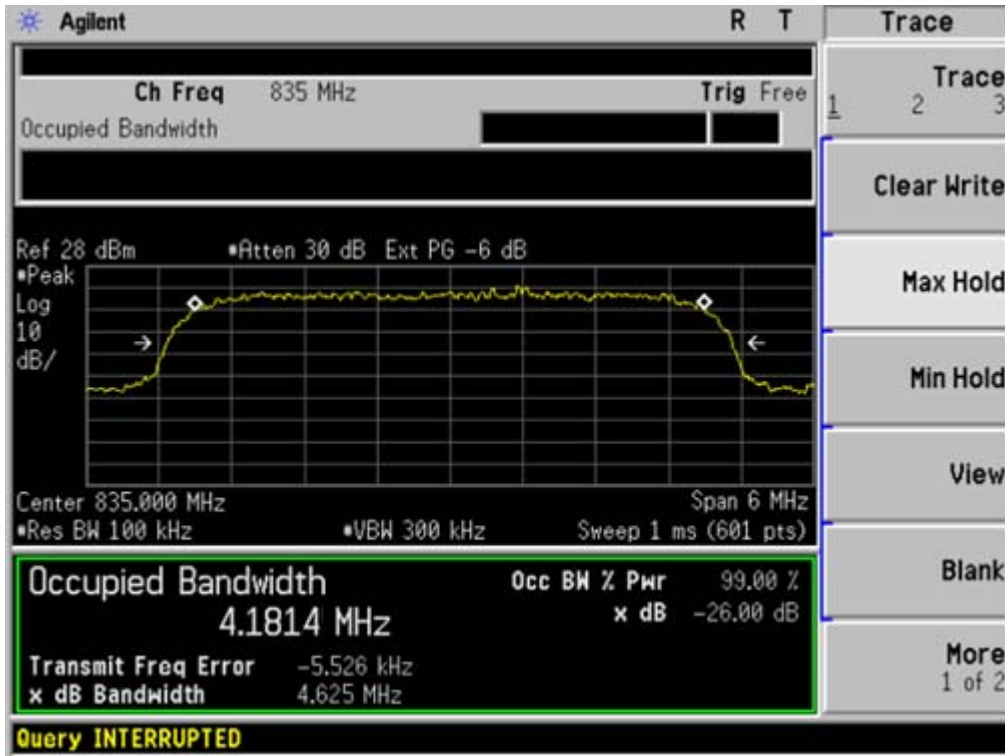
Occupied Bandwidth (99%) UMTS band II CH 9538



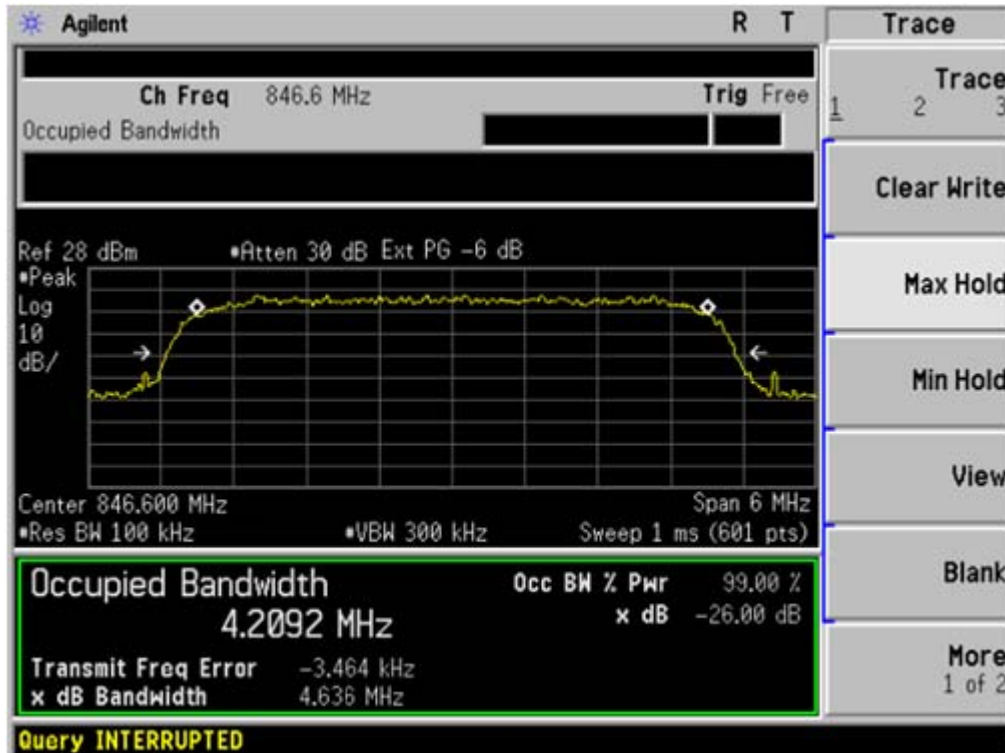
Occupied Bandwidth (99%) UMTS BAND V CH 4132



Occupied Bandwidth (99%) UMTS BAND V CH 4175



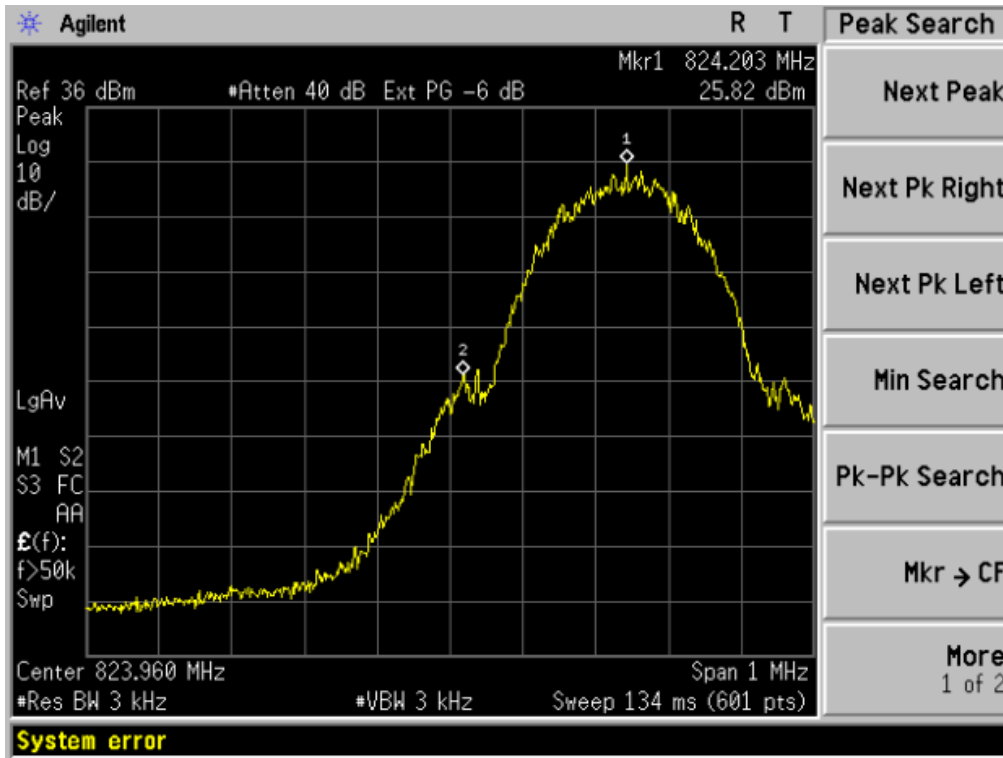
Occupied Bandwidth (99%) UMTS BAND V CH 4233



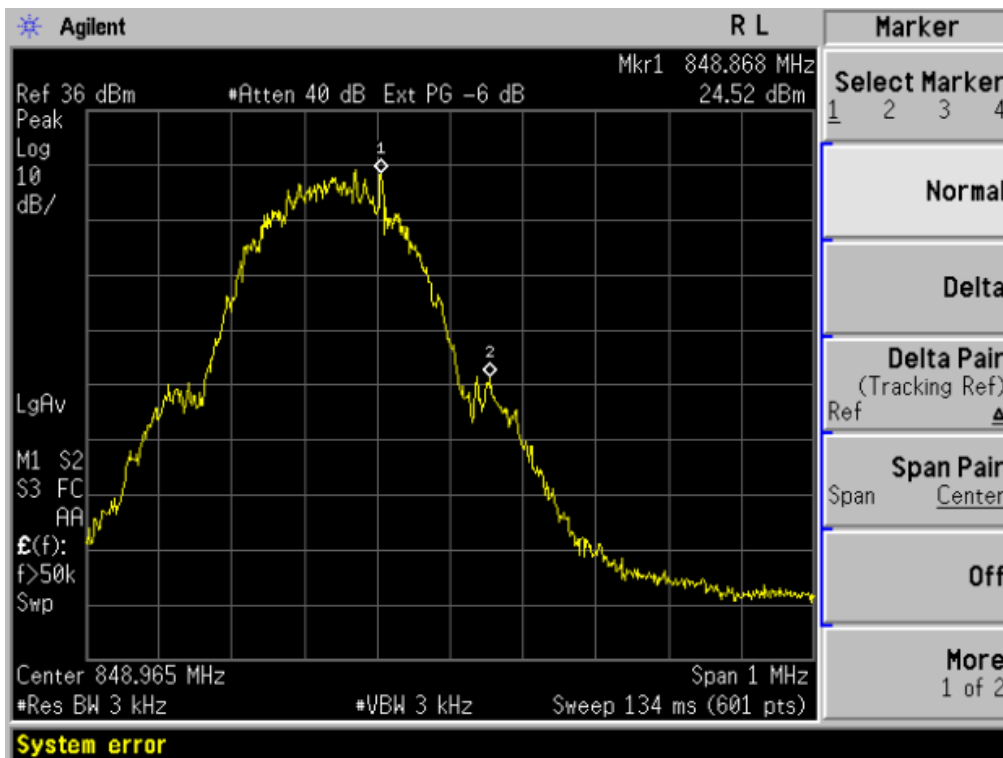
APPENDIX III

TEST PLOTS FOR BAND EDGES

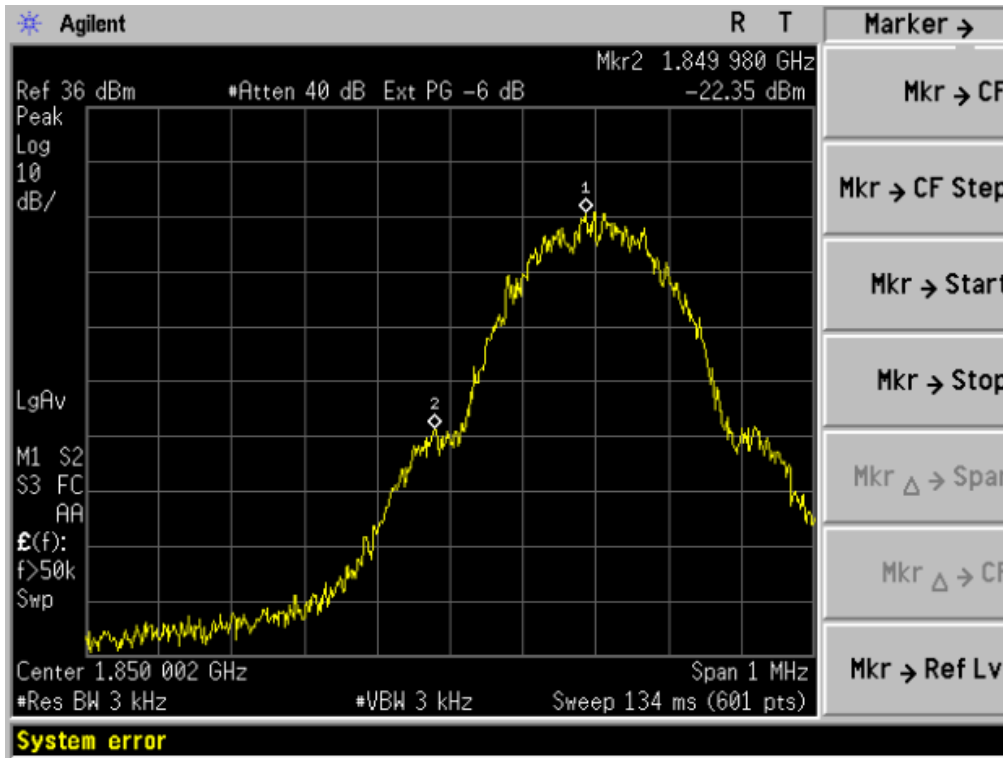
Low Band Edge GSM 850 BAND CH 128



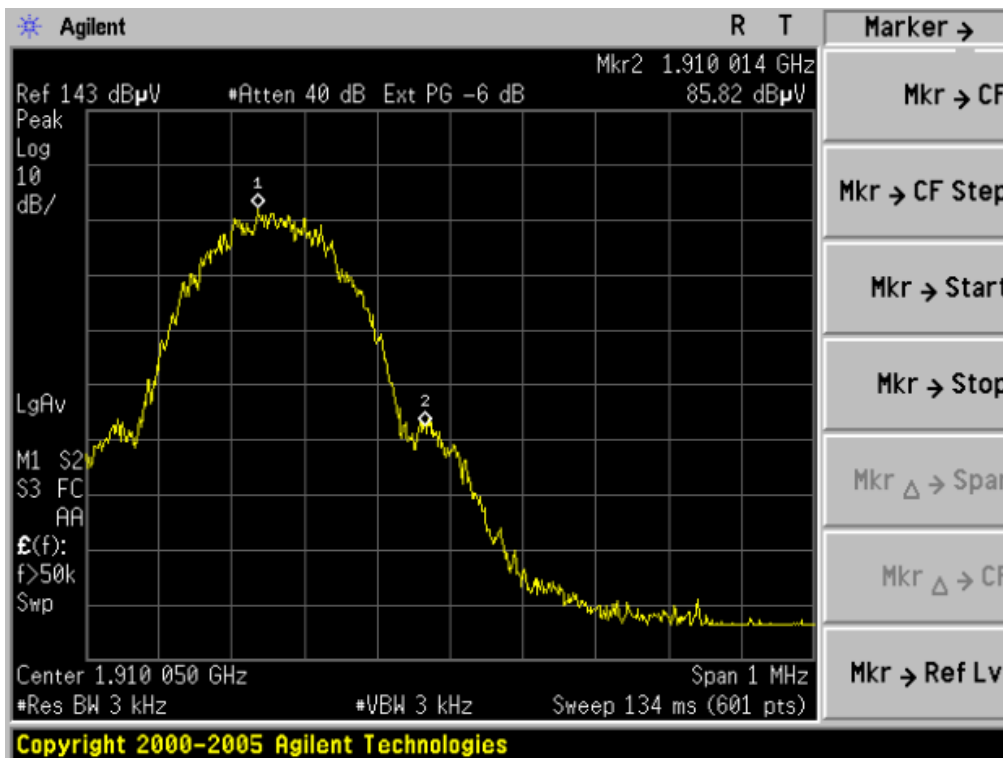
High Band Edge GSM 850 BAND CH 251



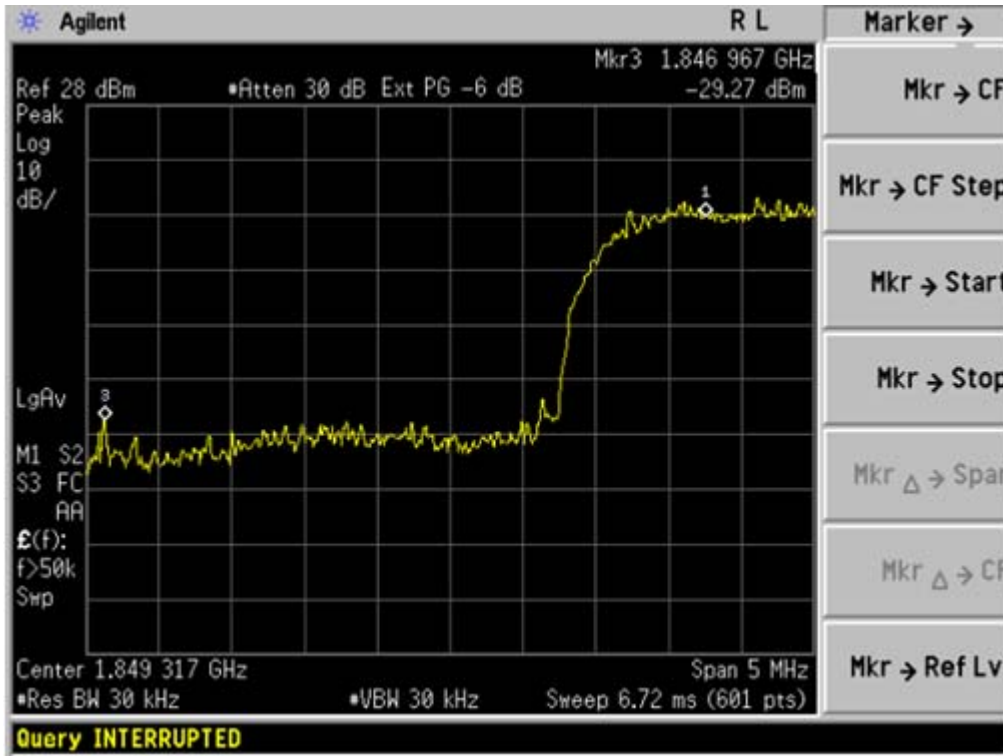
Low Band Edge PCS 1900 BAND CH 512



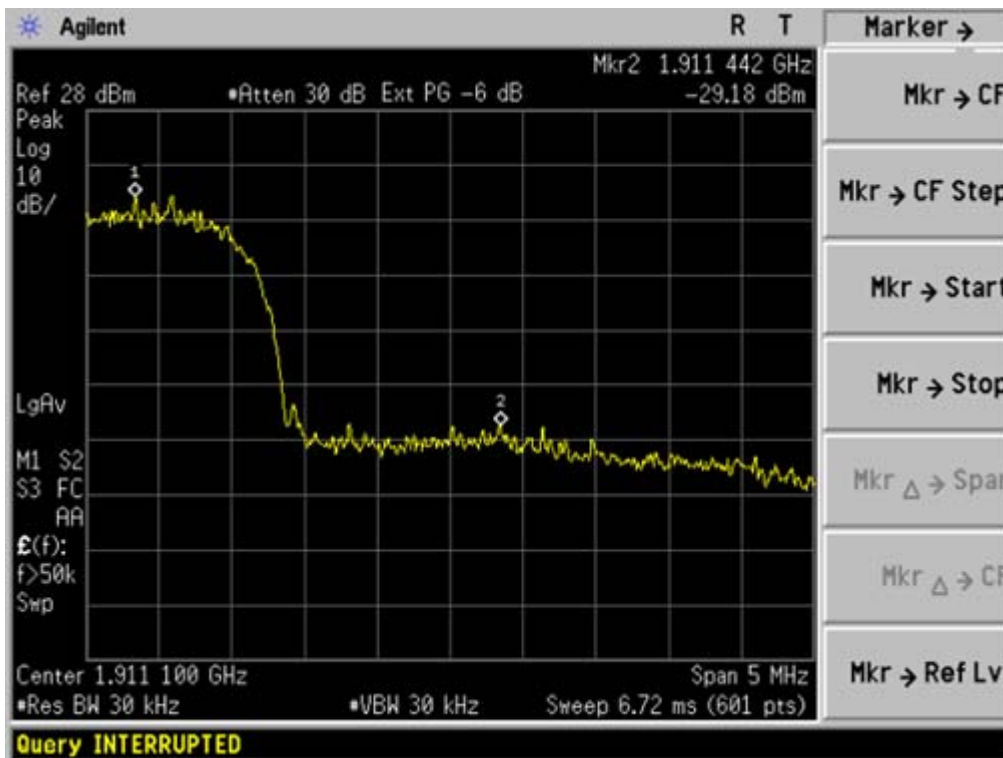
High Band Edge PCS 1900 BAND CH 810



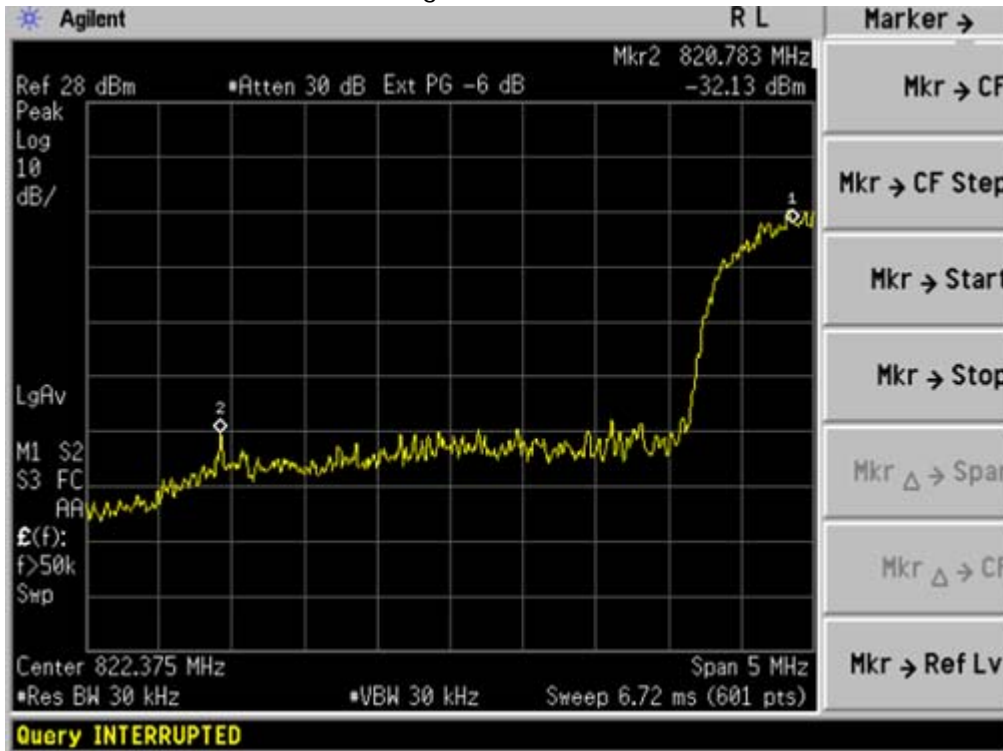
Low Band Edge UMTS BAND II CH 9262



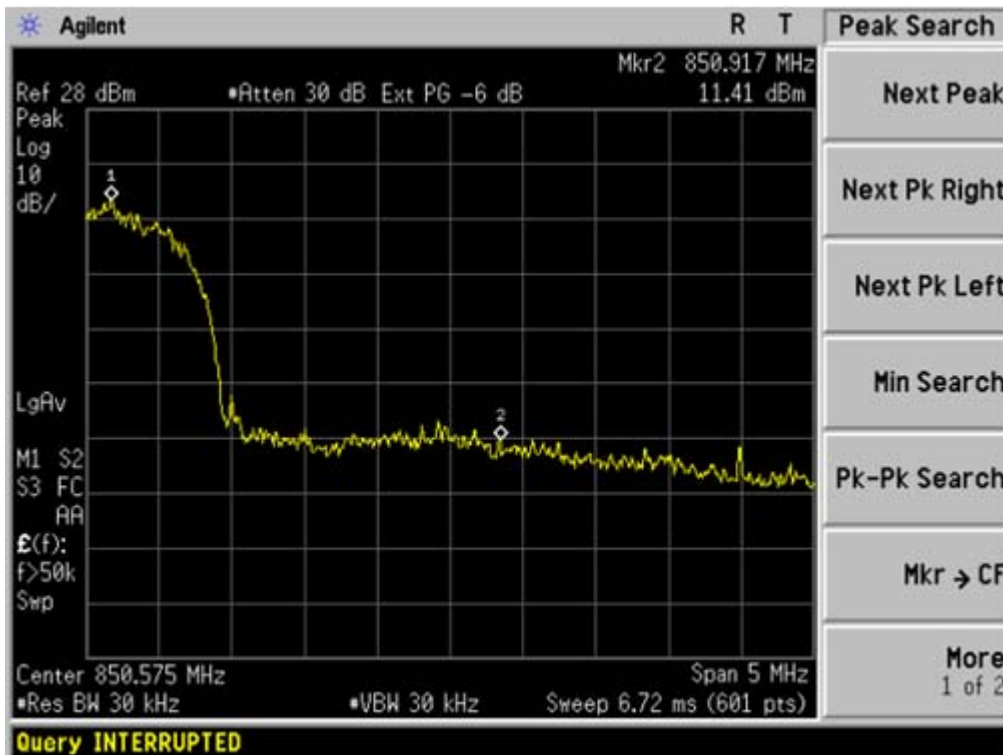
High Band Edge UMTS BAND II CH 9538



Low Band Edge UMTS BAND V CH 4132



High Band Edge UMTS BAND II CH 9538



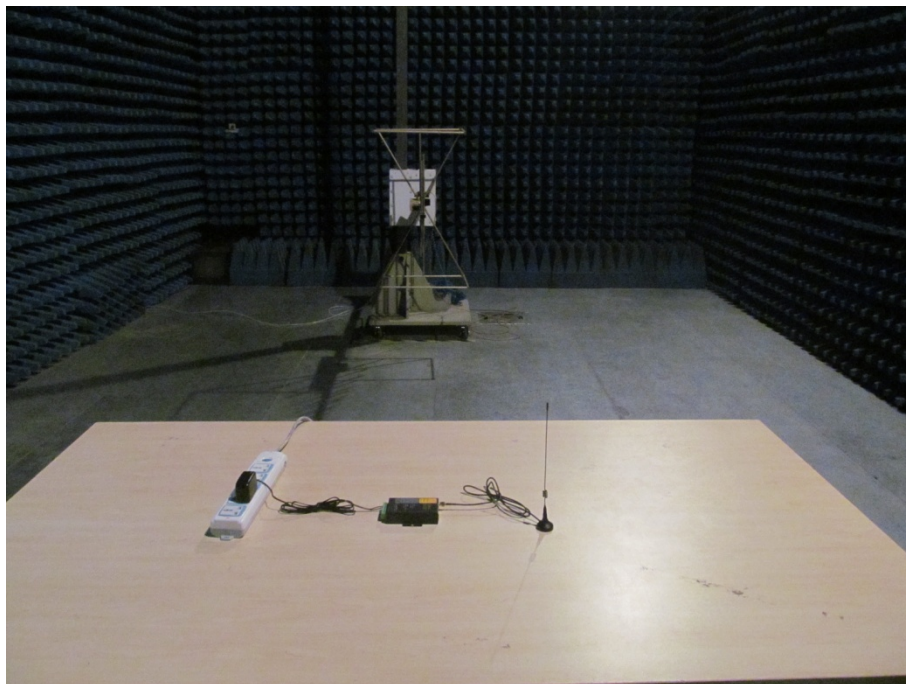
APPENDIX IV

PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION



RADIATED SPURIOUS EMISSION



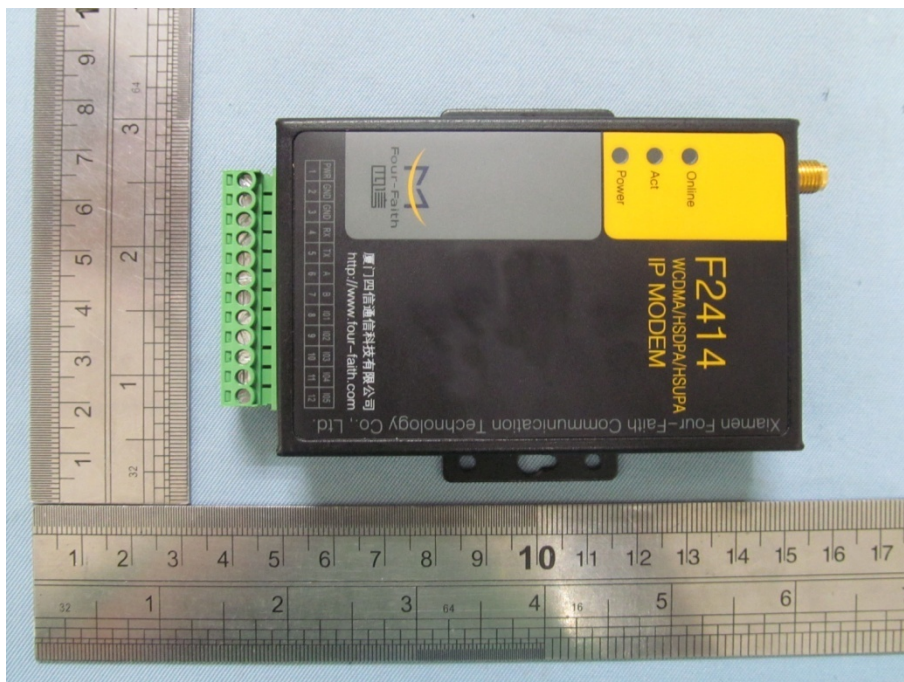
APPENDIX V

PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT



TOP VIEW OF EUT



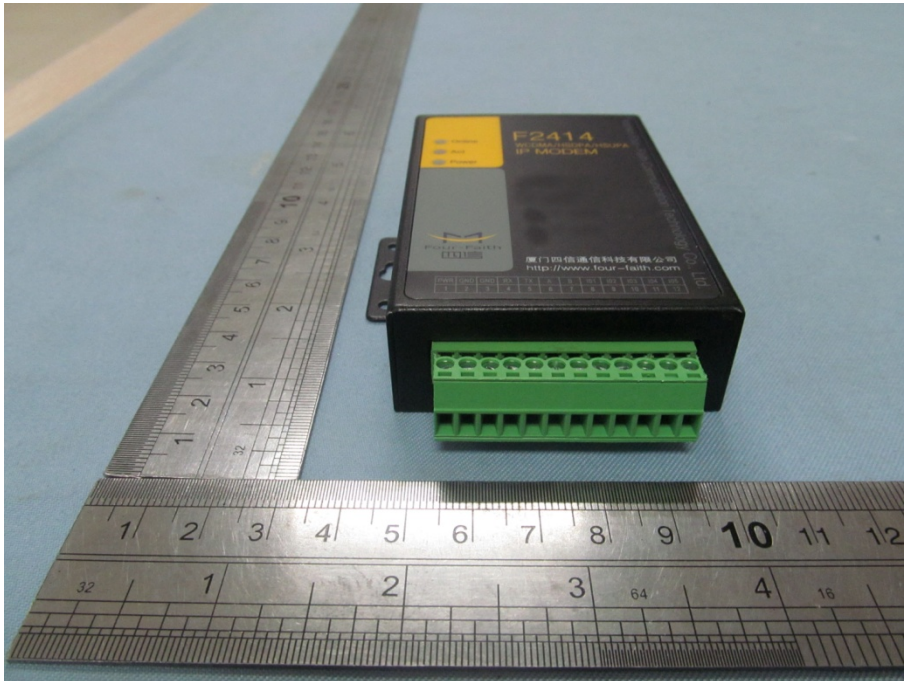
BOTTOM VIEW OF EUT



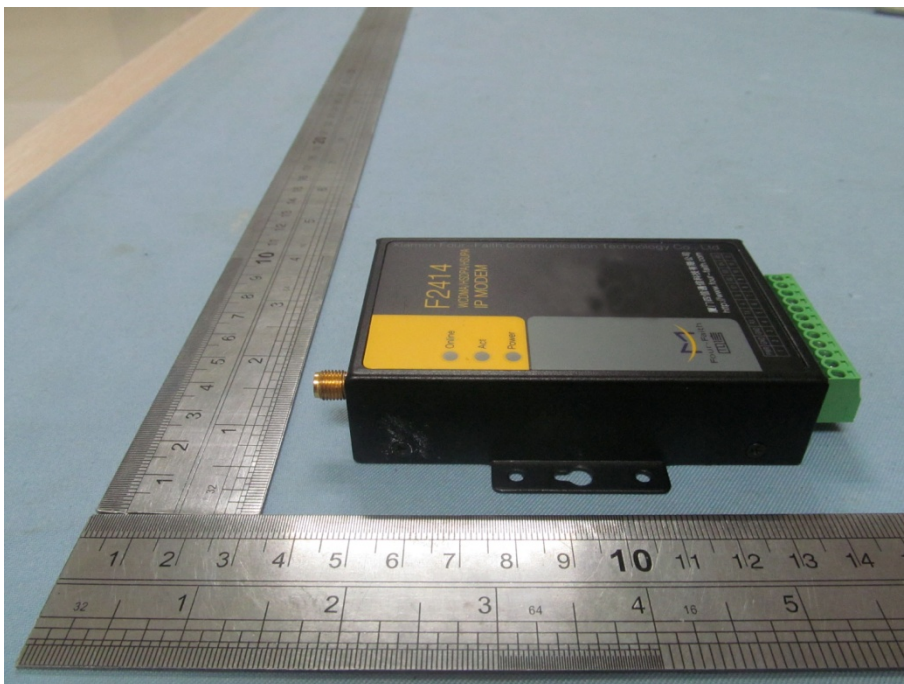
FRONT VIEW OF EUT



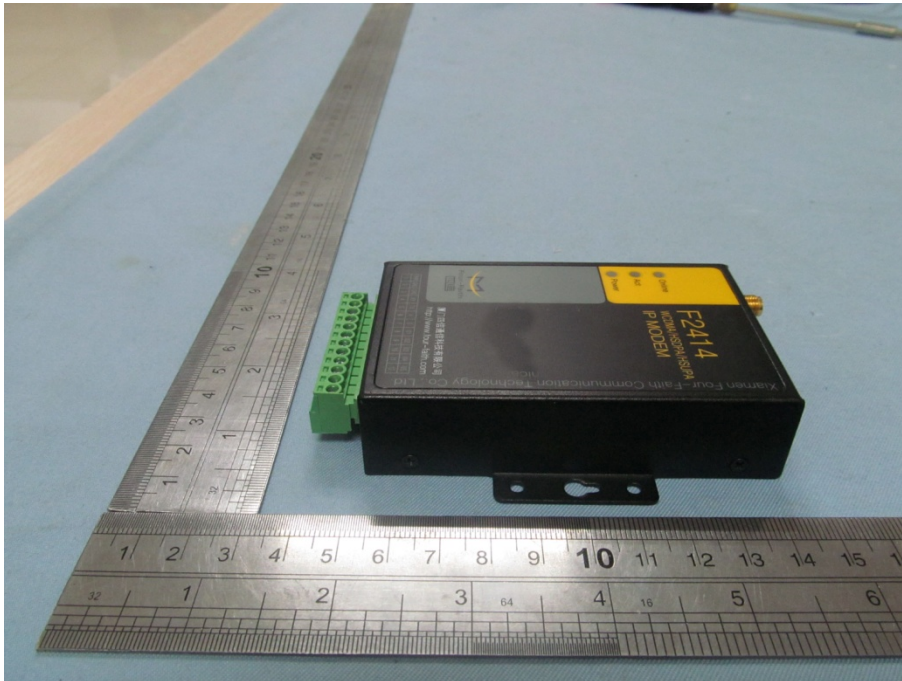
BACK VIEW OF EUT



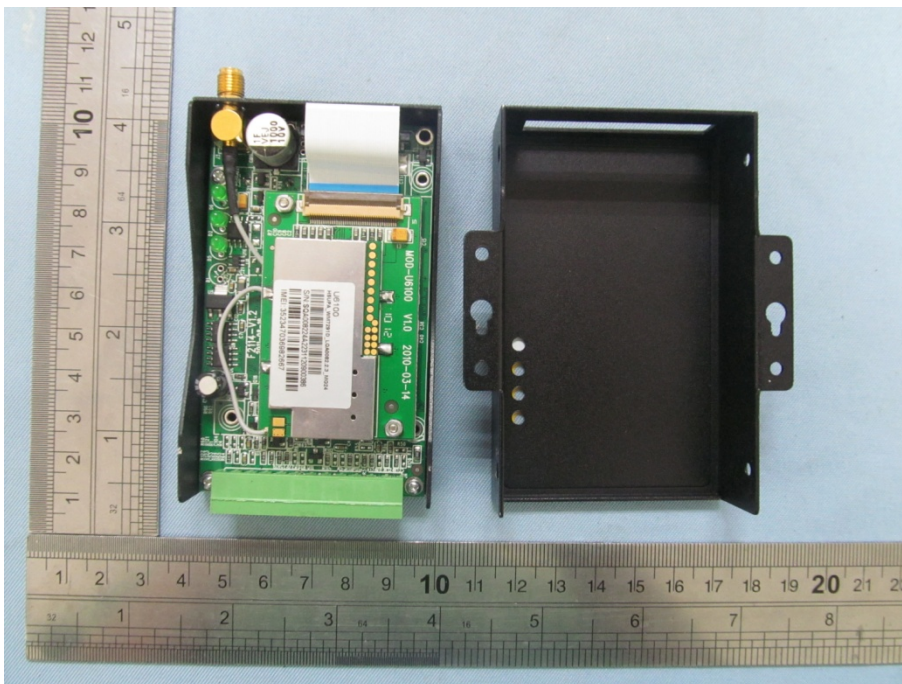
LEFT VIEW OF EUT



RIGHT VIEW OF EUT



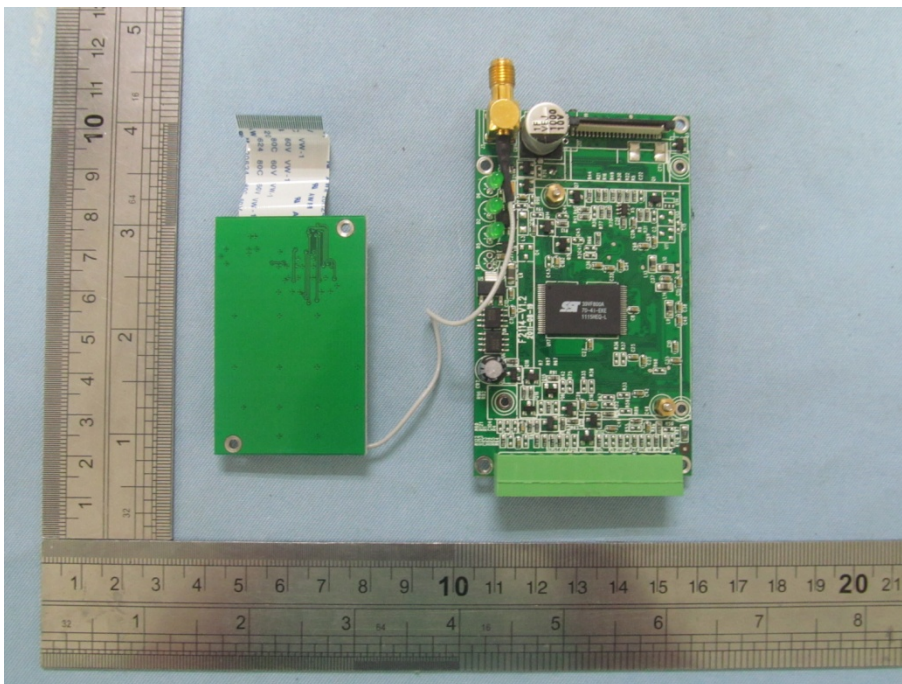
OPEN VIEW OF EUT-1



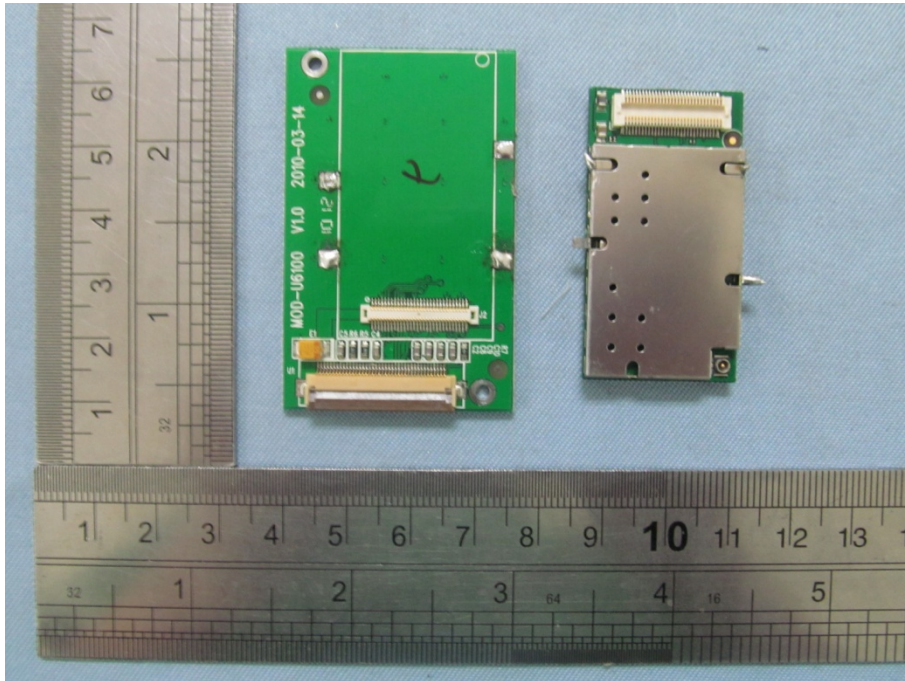
OPEN VIEW OF EUT-2



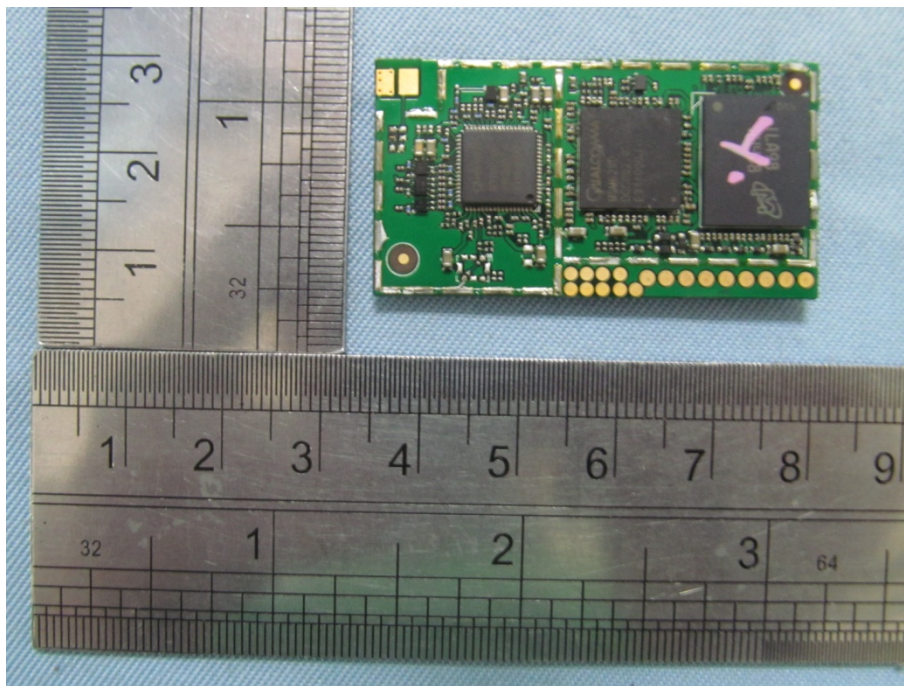
INTERNAL VIEW OF EUT-1



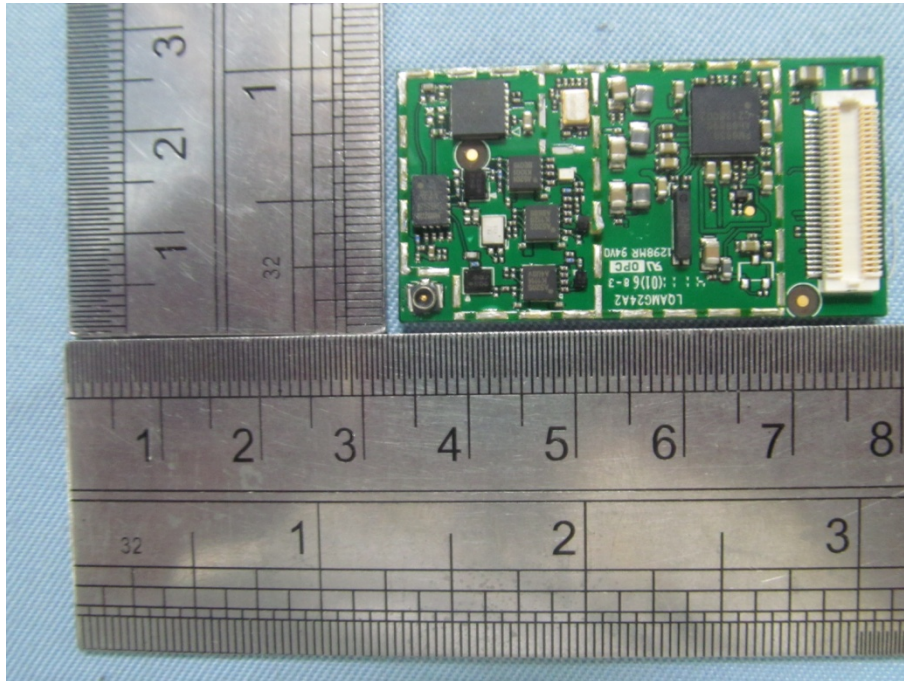
INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



---END OF REPORT---