Report No.: GTSE15050073201

FCC REPORT

Applicant:	Bravo Tech (Shenzhen) Co. Ltd.
Address of Applicant:	No. 8 Building, The 3rd Zone, Tangtou Industrial Park Shiyan, Baoan District, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	mBSC-C RUM
Model No.:	mBSC0800S-005-RUCM11
FCC ID:	WBKMBSC08S005RUM
Applicable standards:	FCC CFR Title 47 Part 2:2014 FCC CFR Title 47 Part 20:2014 FCC CFR Title 47 Part 90 Subpart I:2014
Date of sample receipt:	May 04 2015
Date of Test:	May 04-15, 2015
Date of report issued:	May 18, 2015
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*May 18, 2015*	*Original*

Prepared By:	Edward.Pan	***Date:***	*May 18, 2015*
	Project Engineer		
Check By:	hank.yan	***Date:***	*May 18, 2015*
	Reviewer		

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4 Test Summary

Test Item	Test Description	Result
Maximum Permissible Exposure(MPE)	§ 1.1307(b)(1), § 2.1091	PASS* (Please refer to MPE Report)
Effective radiated power (ERP).	§ 2.1046; § 90.219(d)(3)	PASS
Modulation Characteristics	§ 2.1047	N/A*
Passband Gain and Occupied Bandwidth	§ 2.1049 ; § 90.219 (e)	PASS
Spurious Emissions at Antenna Terminal	§ 2.1051; § 90.219(d); § 90.219 (e) (3)	PASS
Intermodulation	§ 2.1051; § 90.219(d) (6)	PASS
Field Strength of Spurious Radiation	§ 2.1053; § 90.219(d); § 90.219 (e) (3)	PASS
Out of Band Emission, Band Edge	§ 90.219(d); § 90.219 (e) (3)	PASS
Emission Mask	§ 90.210	PASS
Noise at Antenna Terminals	§ 90.219(d); § 90.219(e)	PASS
Frequency Stability vs. Temperature Frequency Stability vs. Voltage	§ 2.1055; § 90.213	PASS
Measuring the EUT AGC threshold	---	PASS
Out-of-Band Rejection	---	PASS
AC Power Line Conducted Emission Test	§ 15.207	PASS

Remark:

N/A*: Not application

5 General Information

5.1 Client Information

Applicant:	Bravo Tech (Shenzhen) Co. Ltd.
Address of Applicant:	No. 8 Building, The 3rd Zone, Tangtou Industrial Park Shiyan, Baoan District, Shenzhen, China
Manufacturer:	Bravo Tech (Shenzhen) Co. Ltd.
Address of Manufacturer:	No. 8 Building, The 3rd Zone, Tangtou Industrial Park Shiyan, Baoan District, Shenzhen, China
Factory:	BTI Wireless(ShenZhen)Co.,Ltd.
Address of Factory:	No. 8 Building, The 3rd Zone, Tangtou Industrial Park Shiyan, Baoan District, Shenzhen, China

5.2 General Description of EUT

Product Name:	mBSC-C RUM	
Model No.:	mBSC0800S-005-RUCM11	
Power supply:	RPM: Input: AC 120V/60Hz RUM: DC 28V, 3A Max RTM: Input DC 28V / 2.2A Normal test voltage: AC 120V/60Hz	
Operating Temperature:	-20℃ to + 55℃	
Operating Humidity:	up to 95%	
Technical Parameter:		
Frequency Range	Downlink	851MHz~862MHz
	Uplink	806MHz~817MHz
Operating Bandwidth	18MHz	
Channel Spacing(s) / Bandwidth(s)	iDEN: 25KHz, C4FM: 12.5KHz, Analog FM: 6.25KHz	
Maximun RF Output Power	Downlink: 36.28dBm Uplink: 5.00dBm	
Max Gain	Downlink: 53±0.5dB; Uplink: 62±0.5dB	
Type of modulation and Designator	iDEN(G7W),C4FM(D9W),Analog FM(D9W)	
Antenna Type	External antenna (N female)	
Antenna Gain	Maximum permissible antenna gain is 7.65dBd(9.8dBi-2.15dB)	

5.3 Related Submittal(s) / Grant (s)

Title 47 Part 2	General Requirements and Information for the Certification of Radio Apparatus
Title 47 Part 90	PRIVATE LAND MOBILE RADIO SERVICES
Title 47 Part 20	COMMERCIAL MOBILE SERVICES

5.4 Test Methodology

Title 47 Part 2	General Requirements and Information for the Certification of Radio Apparatus
Title 47 Part 90	PRIVATE LAND MOBILE RADIO SERVICES
Title 47 Part 20	COMMERCIAL MOBILE SERVICES
ANSI C63.4: 2014	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
KDB	AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET PART 90 700/800 BANDS INDUSTRIAL BOOSTERS REQUIREMENTS SUMMARY
KDB 935210	D01 Signal Booster Definitions v02; D02 Signal Booster Certification v03 D03 Signal Booster Measurements v03 D04 Signal Booster Provider Specific v01r01 D05 Indus Booster Basic Meas v01

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number
BTI	RTM	mBSC1430-RTM-5SW	N/A

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● CNAS —Registration No.: CNAS L5775

CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

● FCC —Registration No.: 600491

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● Industry Canada (IC)

The 3m Semi-anechoic chamber of China Certification & Inspection Services Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.7 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone,Xixiang Road, Baoan District, Shenzhen 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.8 Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2015	Mar. 27 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 01 2014	Jun. 30, 2015
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015	Feb. 21 2016
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
8	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
9	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
10	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
11	Amplifier(100KHz-5GHz)	HP	8347A	GTS204	Jul. 01 2014	Jun. 30, 2015
12	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 01 2014	Jun. 30, 2015
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015
14	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 07 2013	Sep. 06 2015
15	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 01 2014	Jun. 30, 2015
16	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 01 2014	Jun. 30, 2015
17	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 01 2014	Jun. 30, 2015
18	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 09 2014	May 08 2016
19	Spectrum Analyzer	Agilent	E4440A	GTS 536	Oct.21 2014	Oct.20 2015
20	Spectrum Analyzer	Agilent	E4445A	MY41000047	Sept. 10 2013	Sept. 01 2015
21	Splitter	Agilent	11636B	GTS237	May 09 2014	May 08 2016
22	Signal Generator	Rohde & Schwarz	SML03	GTS236	May 09 2014	May 08 2016
23	Signal Generator	AEROFLEX	IFR3414	341300/019	Sept. 10 2014	Sept. 10 2015
24	Power Reflection Meter	Rohde & Schwarz	NRT	100540	Sept. 10 2014	Sept. 10 2015
25	Power Sensor	Giga-tronics	80601A	1831785	Sept. 10 2014	Sept. 10 2015
26	Power Attenuator	BTI	30dB/250W	040706090	Sept. 10 2014	Sept. 10 2015
27	Power Attenuator	BTI	20dB	040706089	Sept. 10 2014	Sept. 10 2015
28	Power Attenuator	BTI	10dB	040706088	Sept. 10 2014	Sept. 10 2015
29	Signal Generator	Agilent	E4438C	MY45093111	Oct.21 2014	Oct.20 2015
30	Signal Generator	Agilent	4432B	GB40051373	May 09 2014	May 08 2016
31	Noise Figure Analyzer	Agilent	N8973A	GB42151304	May 09 2014	May 08 2016

6 TEST CONFIGURATION AND CONDITIONS

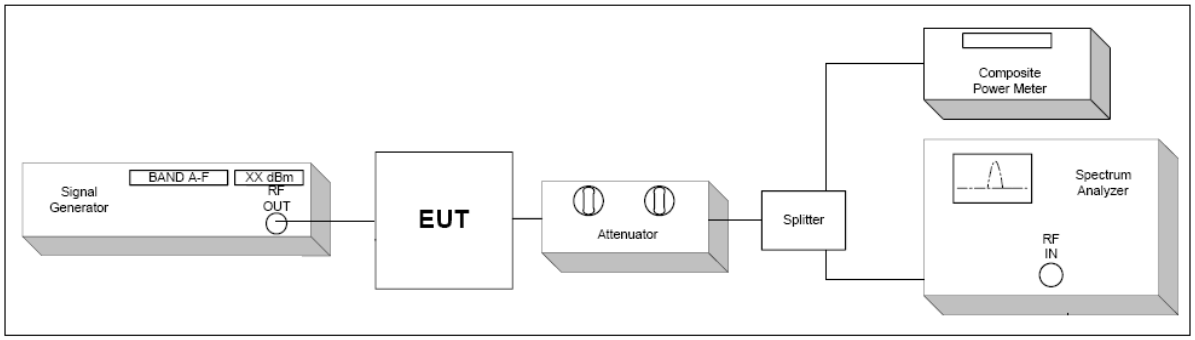
6.1 EUT Configuration

This MBSC0800S-005-RUCM11 is the Remote Unit on BTI CM system. This remote unit supports 800MHz band with the air standard iDEN, C4FM, Analog FM . The unit consists of Duplexer, PA and CPU board. This product is designed to operate in an outdoor or indoor environment. The conducted output power of the RUM at Antenna interface port is average 36.28dBm for Downlink path with Convection Cooling.

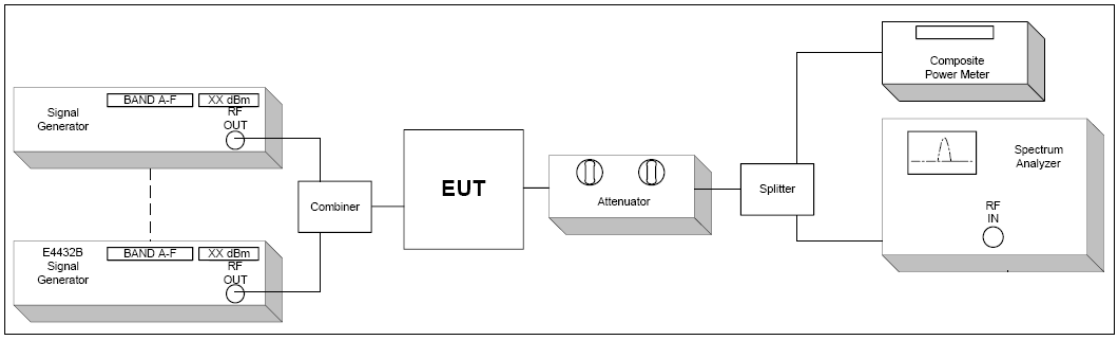
For details, refer to technical document and the user manual.

6.2 Configuration of Tested System

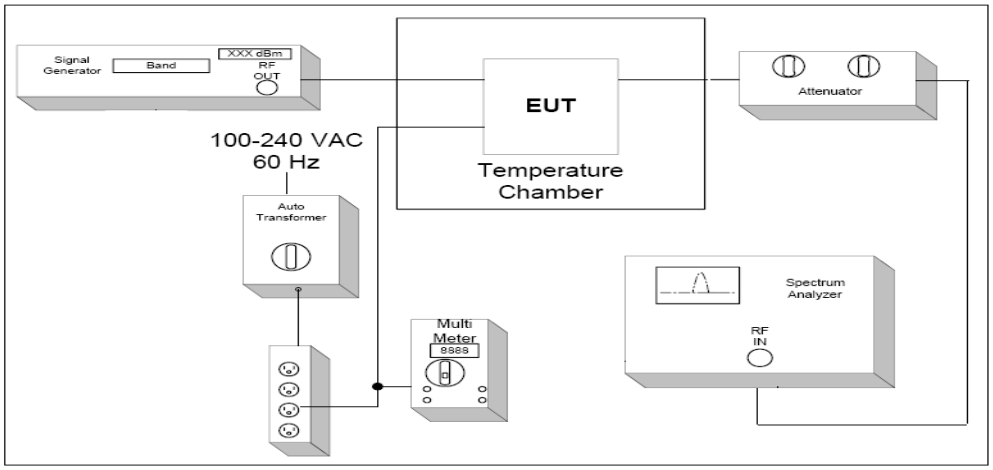
(A) RF Output Power, Occupied Bandwidth, Spurious Emissions at Antenna Terminal, Band Edge, Emission Mask , Noise Test Set-UP



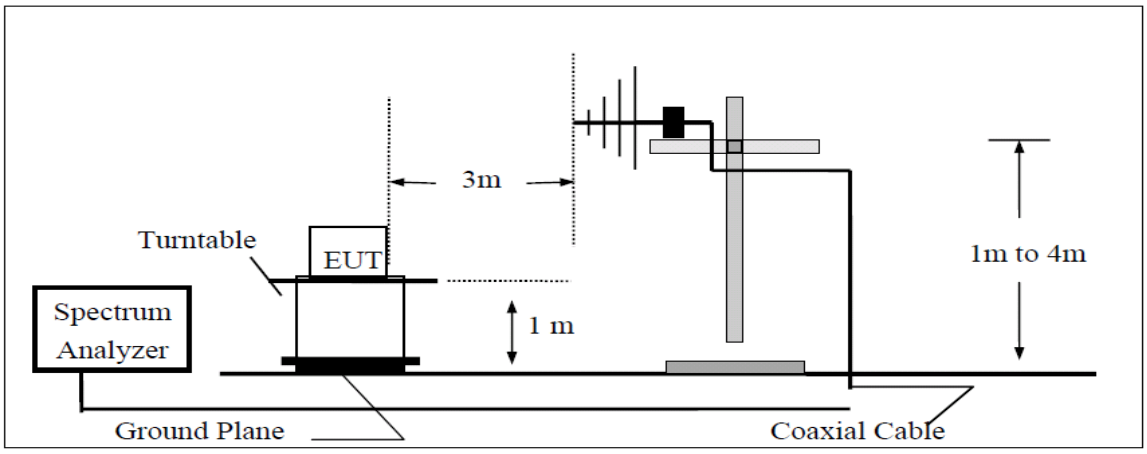
(B) Intermodulation Test Set-UP



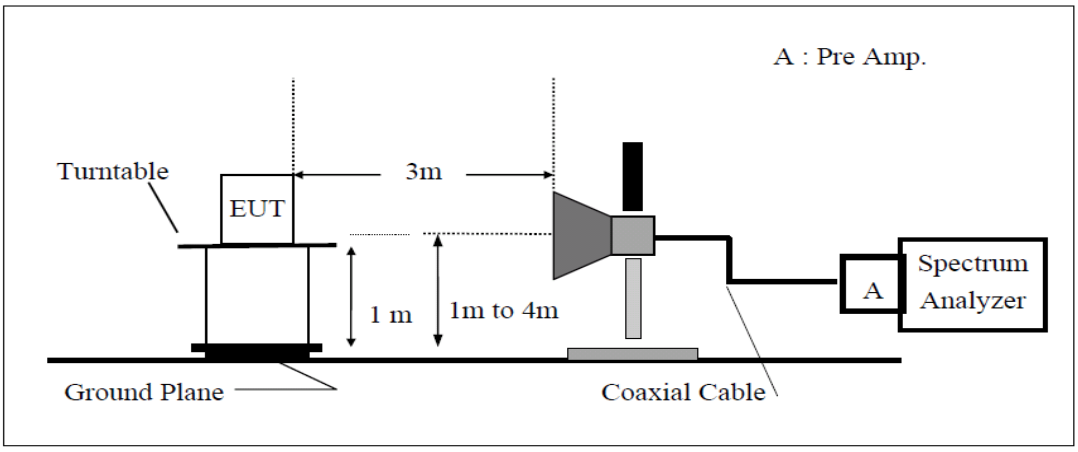
(C)Frequency stability Test Set-UP



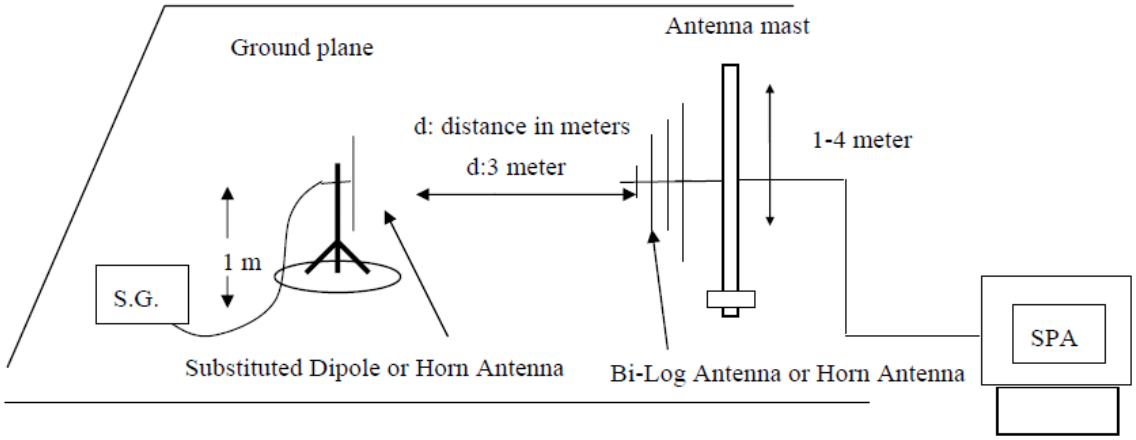
(D) Radiated Emission Test Set-Up, Frequency below 1000MHz



(E) Radiated Emission Test Set-UP Frequency over 1 GHz



(F) Substituted Method Test Set-UP



6.3 Test Environments

Condition	Minimum value	Maximum value
Barometric pressure	86 kPa	106 kPa
Temperature	15°C	30°C
Relative Humidity	20 %	75 %
Power supply range	±5% of rated voltages	
Normal Test Condition	(1).Temperature: +15 °C to +30 °C; (2). voltage is 120V AC.	
Extreme Test Conditions:	(1). Temperatures: -20°C to +55°C. (2). Voltages: 102V AC to 138V AC.	

6.4 Test frequency selection

Downlink:

Operating Mode(TX)	Channels frequency (MHz)			
	Bandplan	Low Ch.	Mid Ch.	High Ch.
iDEN	B9B	851.0125	856.5125	861.9875
C4FM	B9B	851.0125	856.5125	861.9875
Analog FM	B9B	851.00625	856.50625	861.99375

Uplink:

Operating Mode(TX)	Channels frequency (MHz)			
	Bandplan	Low Ch.	Mid Ch.	High Ch.
iDEN	B9B	806.0125	811.5125	816.9875
C4FM	B9B	806.0125	811.5125	816.9875
Analog FM	B9B	806.00625	811.50625	816.99375

6.5 DESCRIPTION OF TEST MODES

Test mode	Detail description of the test mode
Downlink	Downlink (Low channel; middle channel; high channel)
Uplink	Uplink (Low channel; middle channel; high channel)
Modulation type	iDEN, C4FM, Analog FM

Remark:

1: The EUT was powered by 120VAC.

2: The EUT was configured for maximum gain and maximum ouput power. The input power was the maximum declared by the manufacturer.This is to ensure that the equipment is operating in the linear output range.

3: Signal generator was used to provide the input signals to the EUT. Tests were performed with iDEN, C4FM, Analog FM signal input and multi-carrier signal mode input.

4: Pre-test all test modes as above, only the worst case and typical mode is list in report it.

5: All testing is end-to-end (input to host through to output from remote, and vice-versa)

7 RF POWER OUTPUT(ERP) MEASUREMENT

7.1 Standard Applicable

According to FCC § 2.1046 and § 90.219(e) (1) .

(e) *Device Specifications.* In addition to the general rules for equipment certification in §90.203(a)(2) and part 2, subpart J of this chapter, a signal booster must also meet the rules in this paragraph.

(1) The output power capability of a signal booster must be designed for deployments providing a radiated power not exceeding 5 Watts ERP for each retransmitted channel.

7.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

7.3 Measurement Procedure

1. The output from the EUT t signal shall be increased, antenna connector was connected to the power meter.
2. The level of RF input until the maximum output power per channel, declared by client, is reached.
3. The RF output power was measured at low, middle and high channel with iDEN、C4FM、Analog FM signal.

7.4 Test Result

Downlink:

Test mode	Channel Freq.	Conducted output Power (dBm)	Cable loss (dB)	Ant Gain	ERP		ERP Limit	Result
					dBm	w		
iDEN	Low	36.45	8.0	9.8	36.10	4.07	5W / 37dBm	Pass
	Middle	36.63	8.0	9.8	36.28	4.25		
	High	36.37	8.0	9.8	36.02	4.00		
C4FM	Low	36.42	8.0	9.8	36.07	4.05		
	Middle	36.45	8.0	9.8	36.10	4.07		
	High	36.56	8.0	9.8	36.21	4.18		
Analog FM	Low	36.44	8.0	9.8	36.09	4.06		
	Middle	36.53	8.0	9.8	36.18	4.15		
	High	36.39	8.0	9.8	36.04	4.02		

Uplink:

Test mode	Channel Freq.	Conducted output Power (dBm)	Cable loss (dB)	Ant Gain	ERP		ERP Limit	Result
					dBm	w		
iDEN	Low	5.24	8.0	9.8	4.89	0.0031	5W / 37dBm	Pass
	Middle	5.33	8.0	9.8	4.98	0.0031		
	High	5.29	8.0	9.8	4.94	0.0031		
C4FM	Low	5.19	8.0	9.8	4.84	0.0030		
	Middle	5.35	8.0	9.8	5.00	0.0032		
	High	5.17	8.0	9.8	4.82	0.0030		
Analog FM	Low	5.11	8.0	9.8	4.76	0.0030		
	Middle	5.26	8.0	9.8	4.91	0.0031		
	High	5.13	8.0	9.8	4.78	0.0030		

Remark: ERP=Conducted output Power+Ant Gain-2.15-Cable loss

Ant Gain=9.8dBi, Cable loss=8db

Peak to Average Ratio

Downlink:

Test mode	Peak to Average Ratio (dB)			Limit (dB)	Result
	Low Ch.	Middle Ch.	High Ch.		
iDEN	8.42	7.16	7.59	13	Compliant
C4FM	0.92	0.87	0.94	13	Compliant
Analog FM	0.04	0.04	0.04	13	Compliant

Uplink:

Test mode	Peak to Average Ratio (dB)			Limit (dB)	Result
	Low Ch.	Middle Ch.	High Ch.		
iDEN	8.32	7.34	7.24	13	Compliant
C4FM	0.89	0.92	0.95	13	Compliant
Analog FM	0.04	0.04	0.04	13	Compliant

8 MEASURING THE EUT AGC THRESHOLD

8.1 Standard Applicable

Please refer the section §3.2 8 MEASURING THE EUT AGC THRESHOLD of D05 Indus Booster Basic Meas v01

8.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

8.3 Test Procedure

Please refer the section §3.2 8 MEASURING THE EUT AGC THRESHOLD of D05 Indus Booster Basic Meas v01

8.4 Test Result

Downlink:

Test mode	AGC threshold level (dB)			Result
	Low Ch.	Middle Ch.	High Ch.	
iDEN	39.01	39.07	39.12	Compliant
C4FM	39.02	39.13	39.11	Compliant
Analog FM	38.98	39.03	39.07	Compliant

Uplink:

Test mode	AGC threshold level (dB)			Result
	Low Ch.	Middle Ch.	High Ch.	
iDEN	5.51	5.56	5.48	Compliant
C4FM	5.47	5.46	5.51	Compliant
Analog FM	5.53	5.61	5.59	Compliant

9 PASSBAND GAIN AND OCCUPIED BANDWIDTH

9.1 Standard Applicable

According to FCC § 2.1049 , § 90.219(d), § 90.219(e)

9.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

9.3 Test Procedure

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
3. The spectrum analyzer was setup to measure the Occupied Bandwidth (defined as the 99% Power Bandwidth).
4. The Occupied Bandwidth was measured at the input and output ports of the EUT at low, middle and high channel of each type of modulation and each type of carrier signal.

Spectrum analyzer settings:

Detector: RMS.

iDEN: RBW= 300Hz, VBW≥RBW, Sweep: Auto

C4FM/Analog FM: RBW= 100Hz, VBW≥RBW, Sweep: Auto

9.4 Test Result

Pass band Gain

Downlink:

Test mode	Channel	Input Power (dBm)	Output Power (dBm)	Passband Gain (dB)	Nominal Gain (dB)	Result
iDEN	Low	-16.89	36.45	53.34	53±0.5dB	Compliant
	Middle	-16.62	36.63	53.25		Compliant
	High	-16.87	36.37	53.24		Compliant
C4FM	Low	-16.75	36.42	53.17		Compliant
	Middle	-16.84	36.45	53.29		Compliant
	High	-16.75	36.56	53.31		Compliant
Analog FM	Low	-16.70	36.44	53.14		Compliant
	Middle	-16.76	36.53	53.29		Compliant
	High	-16.86	36.39	53.25		Compliant

Uplink:

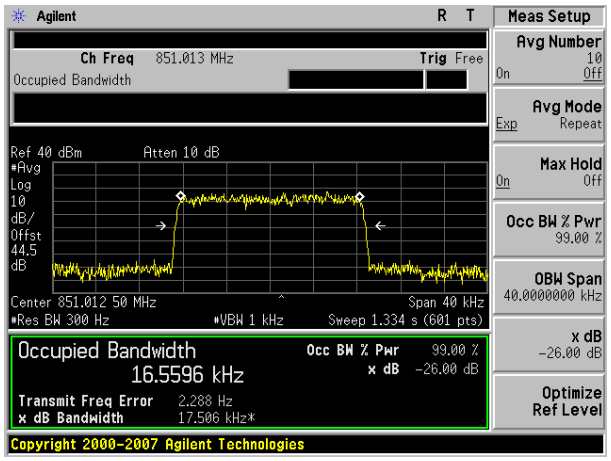
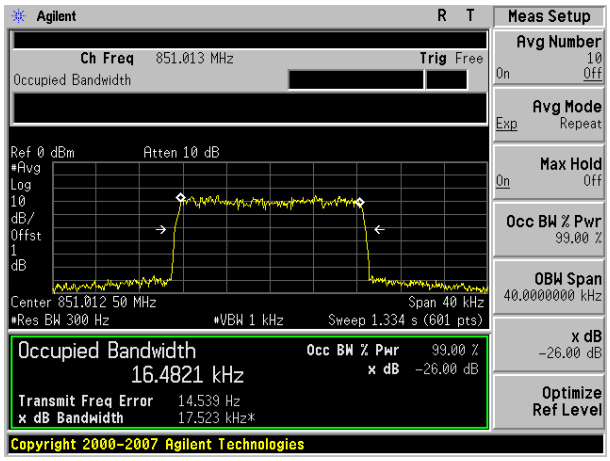
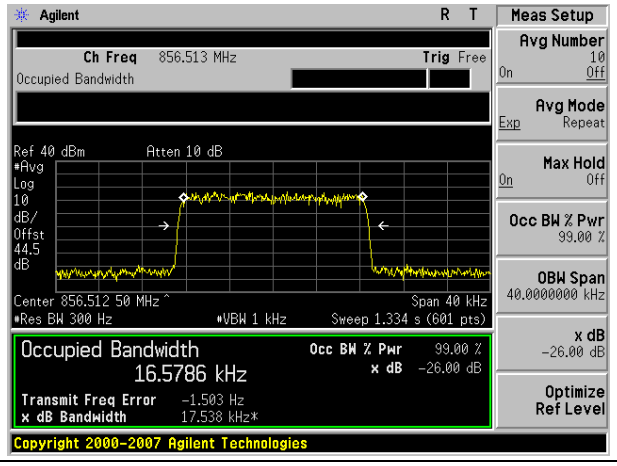
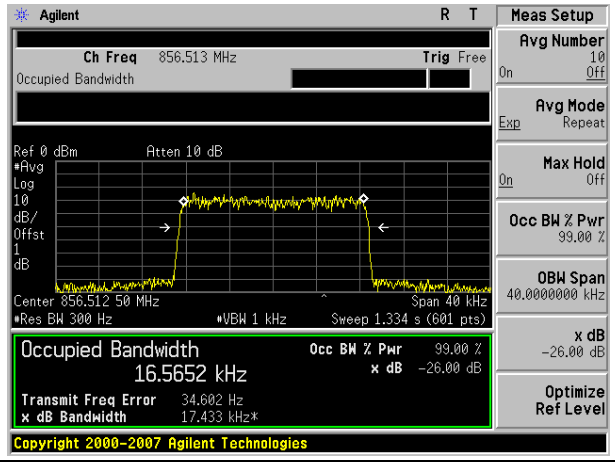
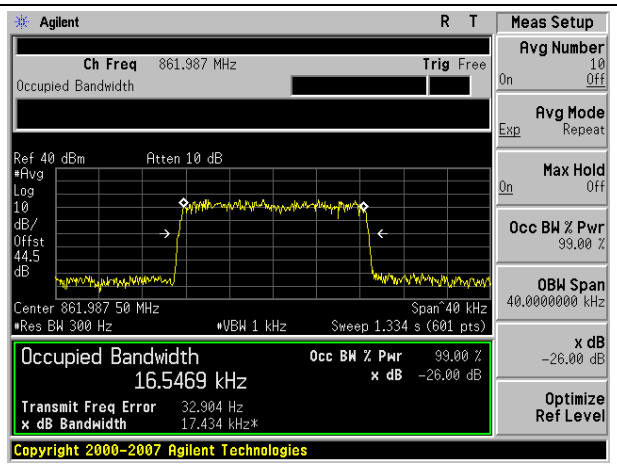
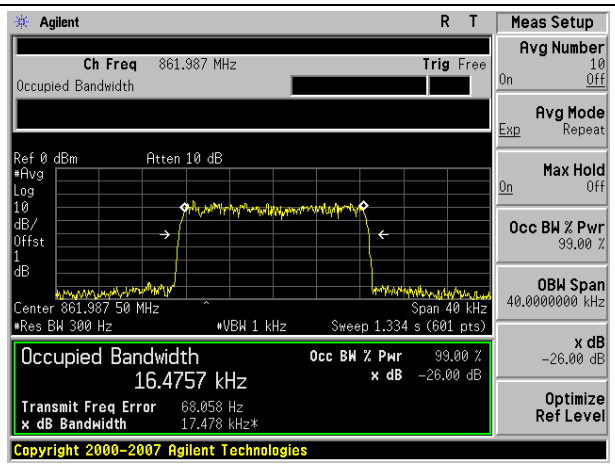
Test mode	Channel	Input Power (dBm)	Output Power (dBm)	Passband Gain (dB)	Nominal Gain (dB)	Result
iDEN	Low	-56.91	5.24	62.15	62±0.5dB	Compliant
	Middle	-56.94	5.33	62.27		Compliant
	High	-56.94	5.29	62.23		Compliant
C4FM	Low	-56.88	5.19	62.07		Compliant
	Middle	-56.86	5.35	62.21		Compliant
	High	-56.99	5.17	62.16		Compliant
Analog FM	Low	-57.02	5.11	62.13		Compliant
	Middle	-56.98	5.26	62.24		Compliant
	High	-56.94	5.13	62.07		Compliant

Remark: Gain (dB) = output power (dBm) − input power (dBm).

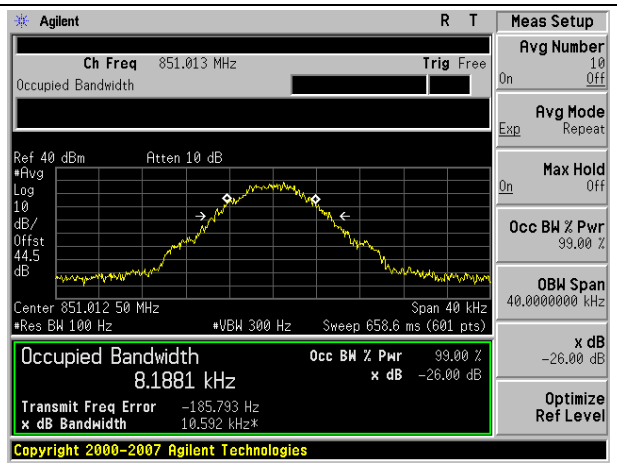
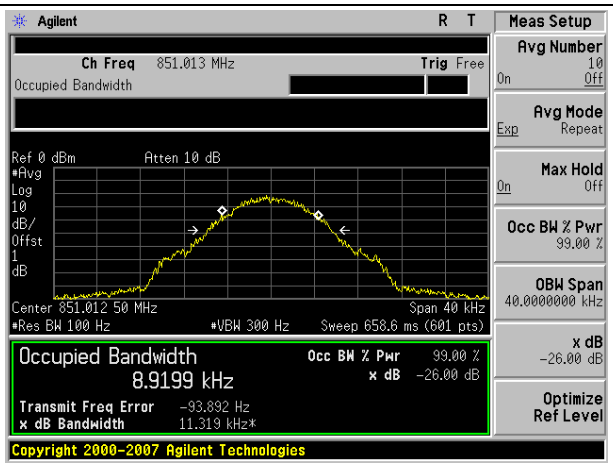
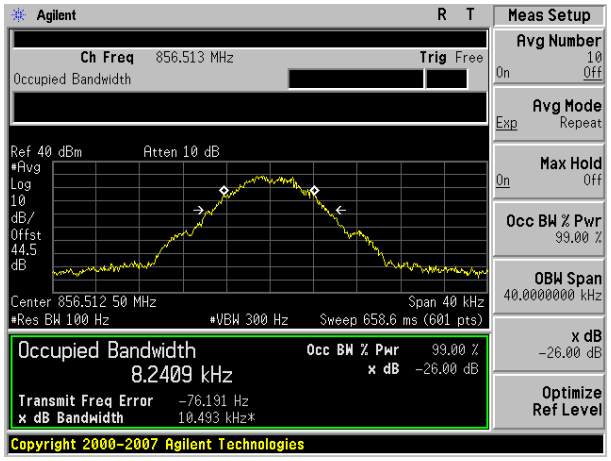
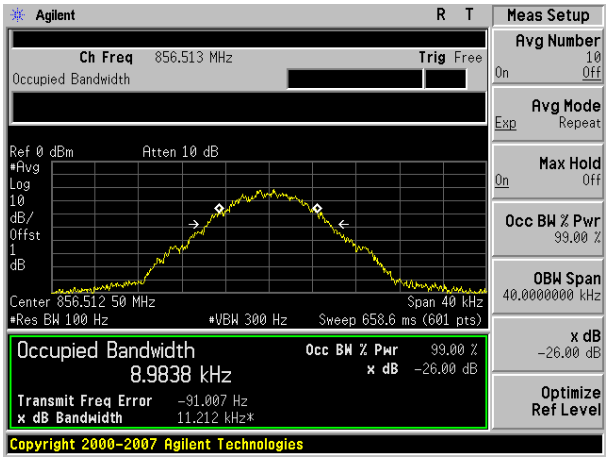
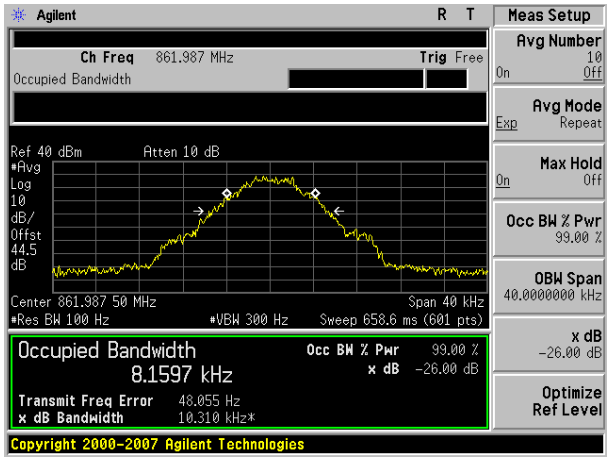
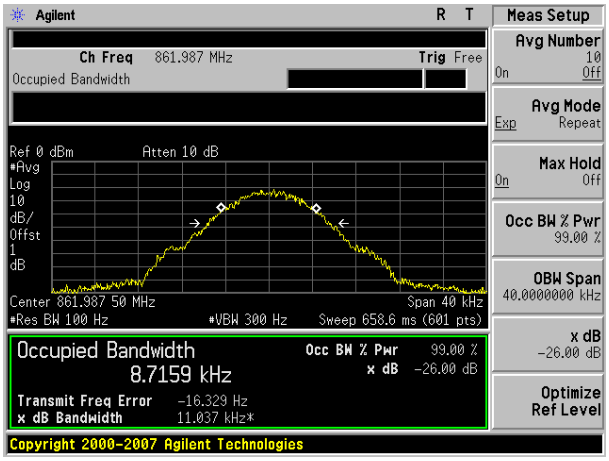
Input/output Bandwidth Comparison

Downlink:

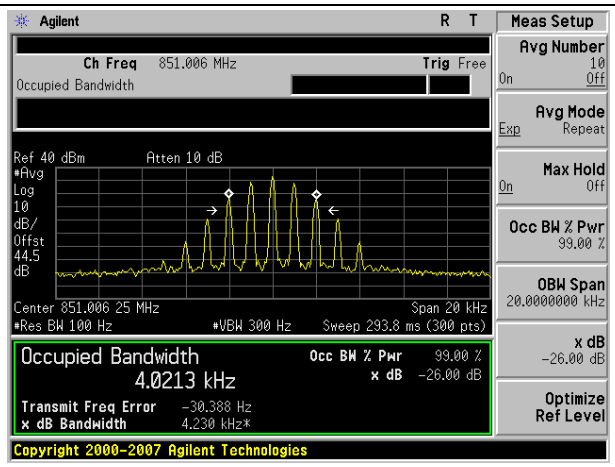
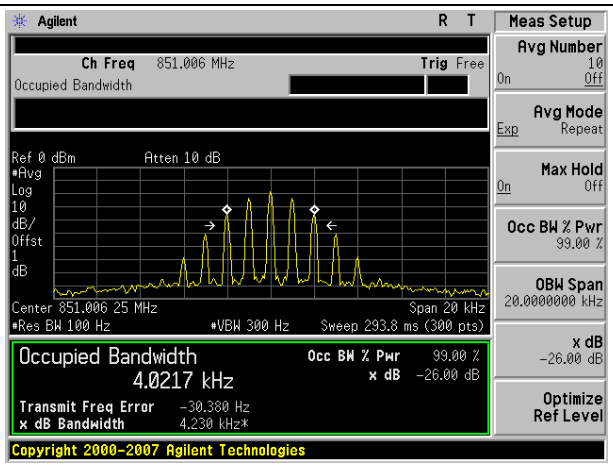
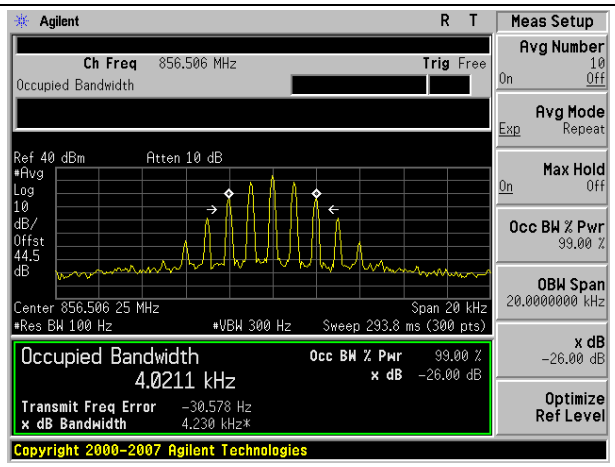
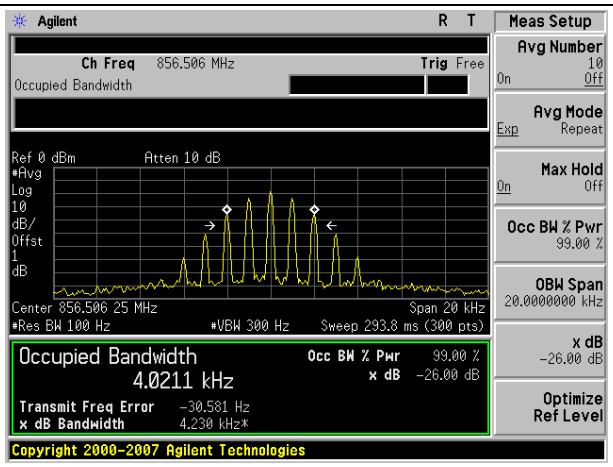
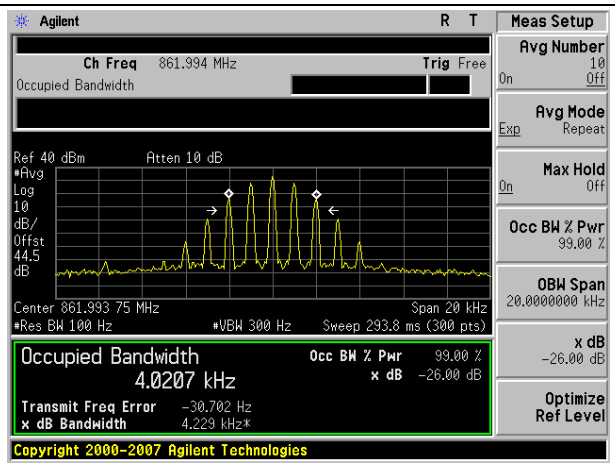
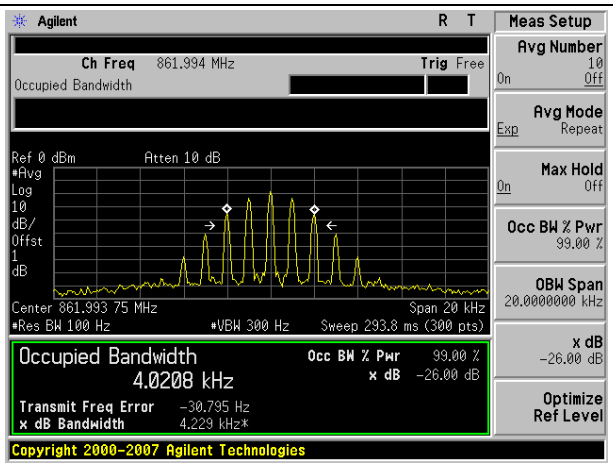
Input/output Bandwidth Comparison for iDEN

Output(Lowest channel)	Input(Lowest channel)
	
Output(Middle channel)	Input(Middle channel)
	
Output(Highest channel)	Input(Highest channel)
	

Input/output Bandwidth Comparison for C4FM

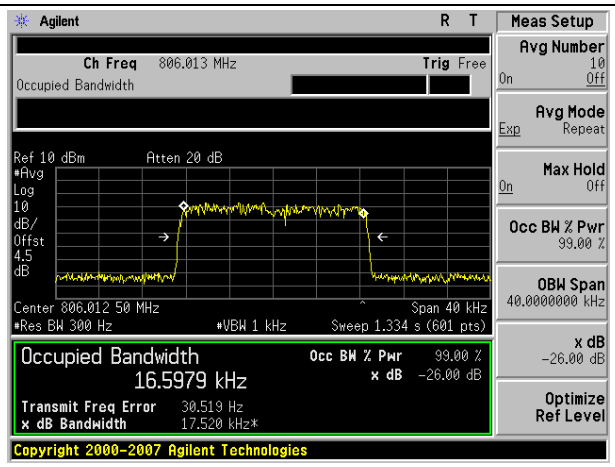
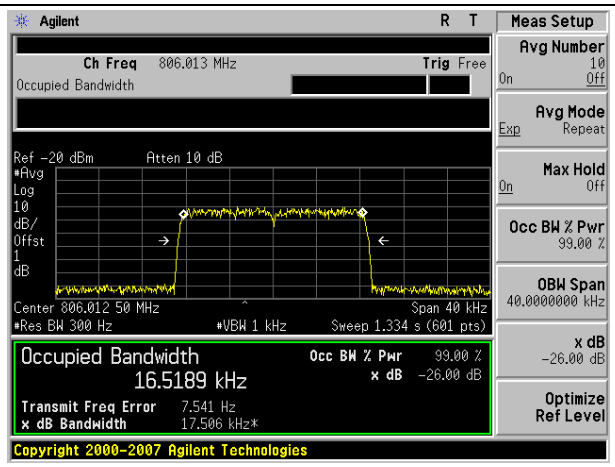
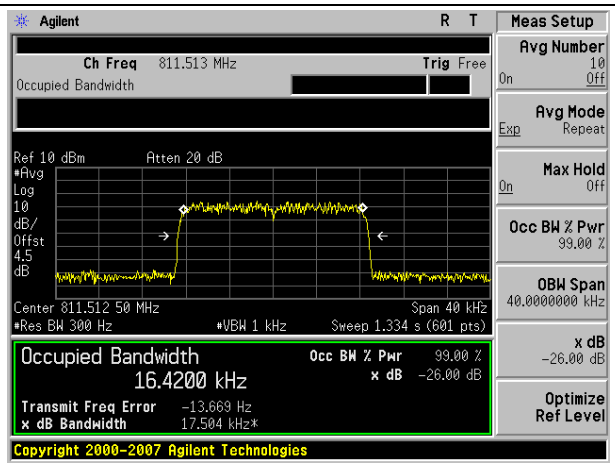
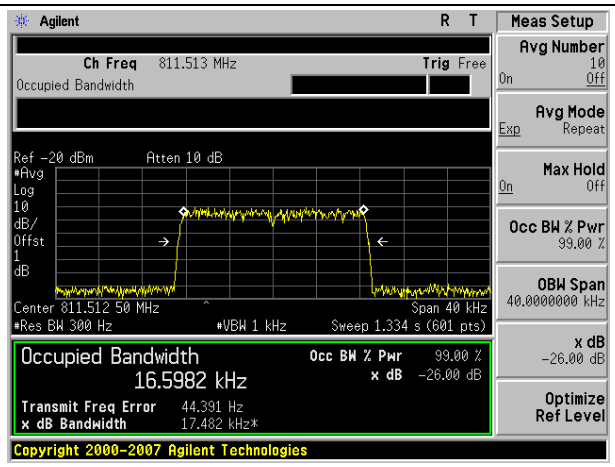
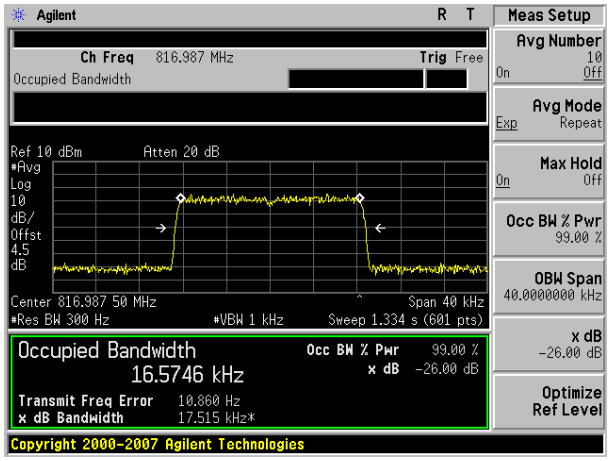
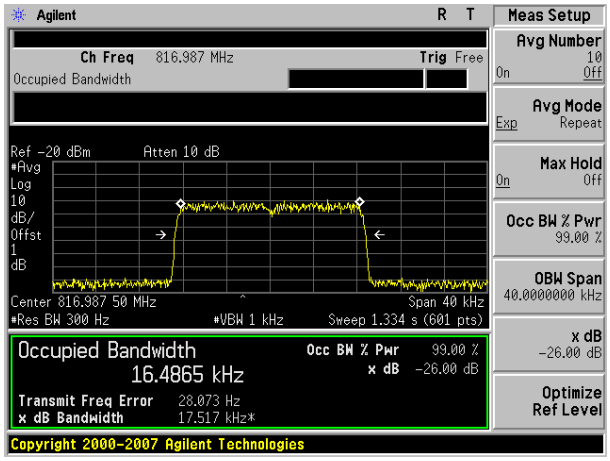
Output(Lowest channel)	Input(Lowest channel)
	
Output(Middle channel)	Input(Middle channel)
	
Output(Highest channel)	Input(Highest channel)
	

Input/output Bandwidth Comparison for Analog FM

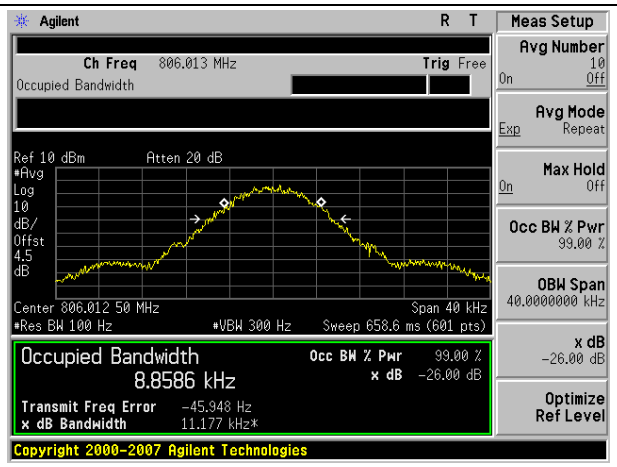
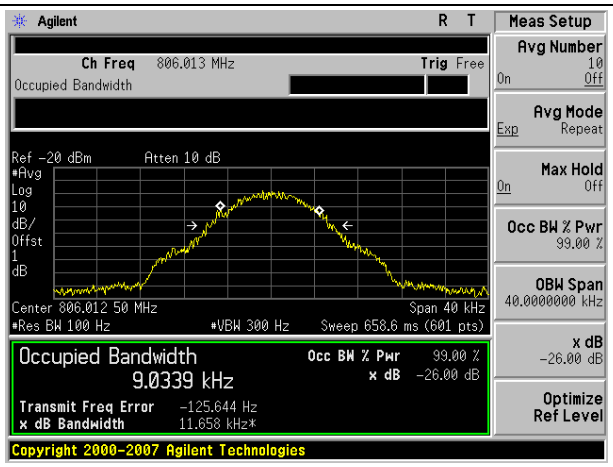
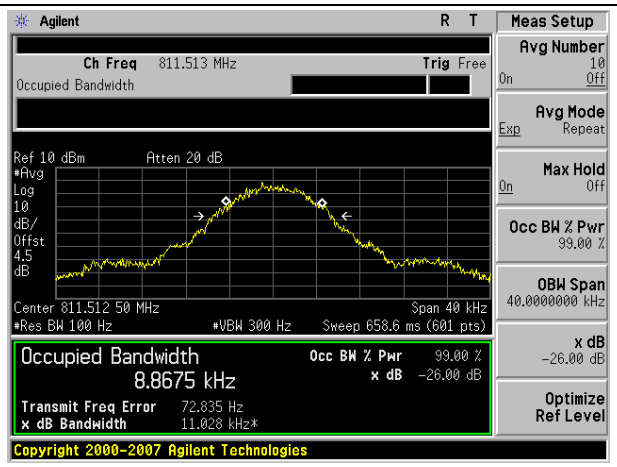
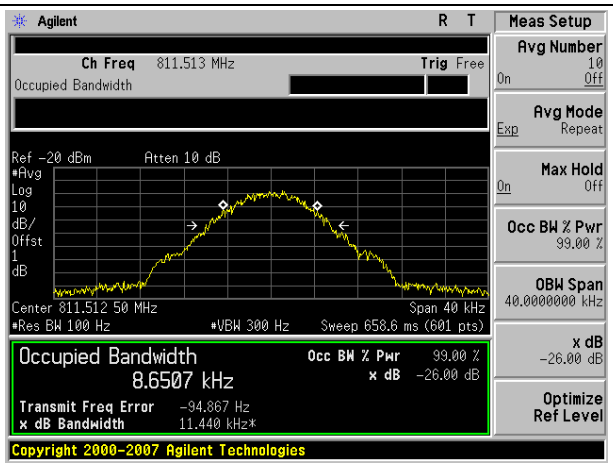
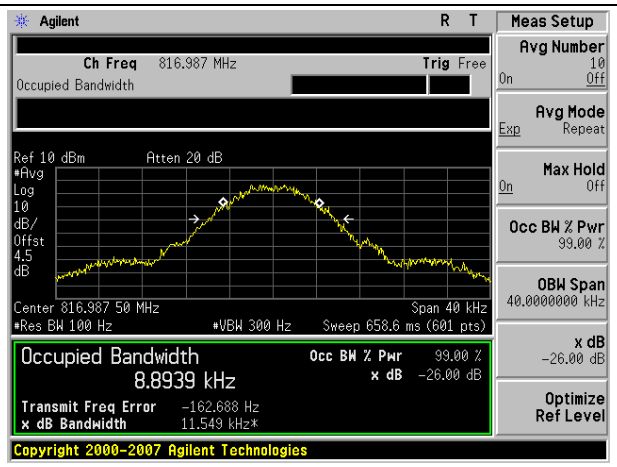
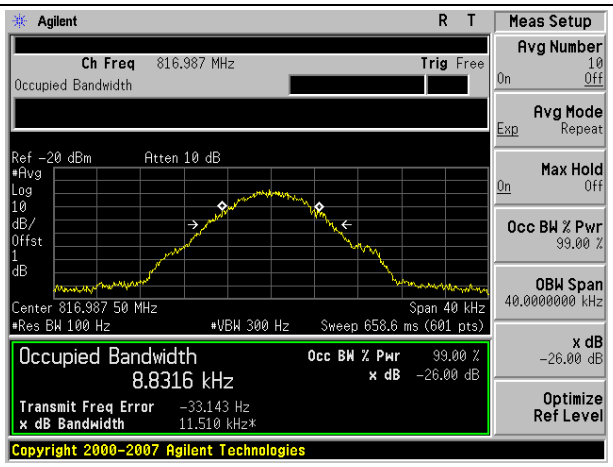
Output(Lowest channel)	Input(Lowest channel)
	
Output(Middle channel)	**Input(Middle channel)**
	
Output(Highest channel)	**Input(Highest channel)**
	

Uplink:

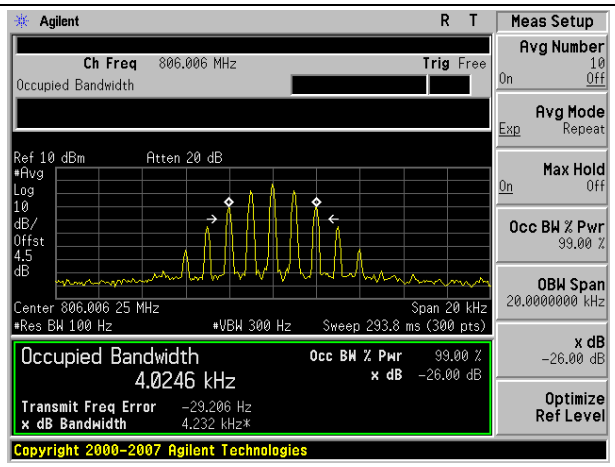
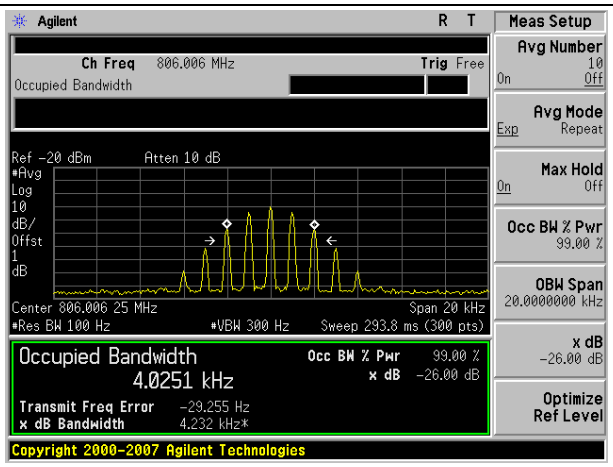
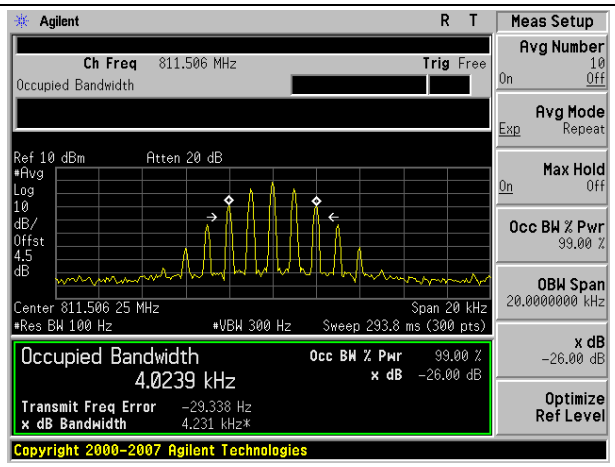
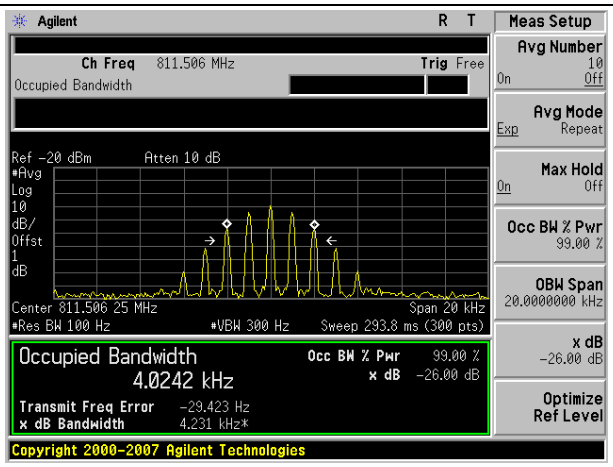
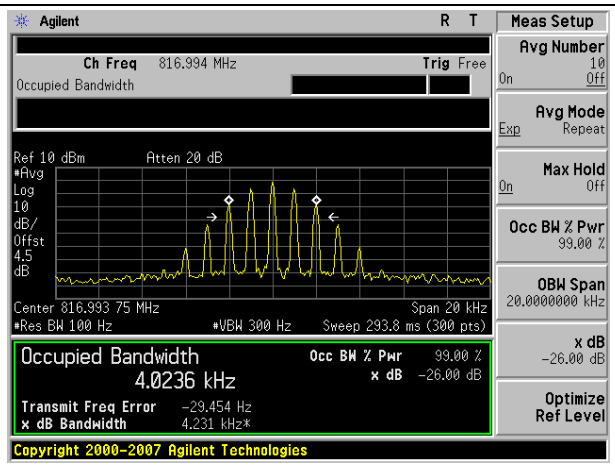
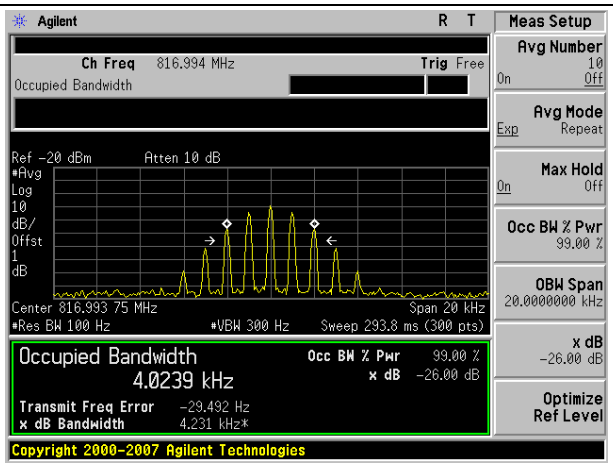
Input/output Bandwidth Comparison for iDEN

Output(Lowest channel)	Input(Lowest channel)
	
Output(Middle channel)	Input(Middle channel)
	
Output(Highest channel)	Input(Highest channel)
	

Input/output Bandwidth Comparison for C4FM

Output(Lowest channel)	Input(Lowest channel)
	
Output(Middle channel)	**Input(Middle channel)**
	
Output(Highest channel)	**Input(Highest channel)**
	

Input/output Bandwidth Comparison for Analog FM

Output(Lowest channel)	Input(Lowest channel)
	
Output(Middle channel)	**Input(Middle channel)**
	
Output(Highest channel)	**Input(Highest channel)**
	

10 OUT OF BAND EMISSION AT ANTENNA TERMINALS

10.1 Standard Applicable

According to FCC § 2.1051 and § 90.219(d)

10.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

10.3 Measurement Procedure

The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10th harmonic of the highest carrier frequency. Test signals used is iDEN、C4FM、Analog FM. The different signals were input one at a time to the EUT. Tests was performed with iDEN、C4FM、Analog FM signal input.

Band edge compliance is also demonstrated using a iDEN、C4FM、Analog FM signal at the upper and lower limits of the band.

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
3. The spurious emissions at antenna were measured at the RF output port of the EUT at middle channel of each type of modulation.

Spectrum analyzer settings:

Detector: RMS.

Band Edge:

RBW=1%of the occupied channel bandwidth without going below 1%, VBW≥ RBW

Spurious emissions:

Below 1G: RBW=100kHz; VBW=300KHz; Above 1G: RBW=1 MHz ; VBW≥ RBW

10.4 Measurement Result

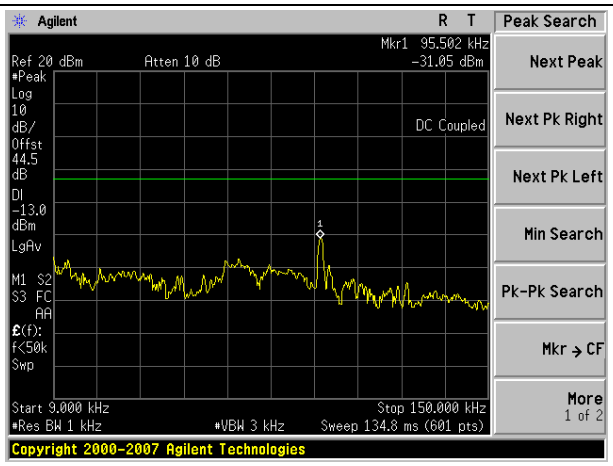
10.4.1 Spurious emission

Downlink:

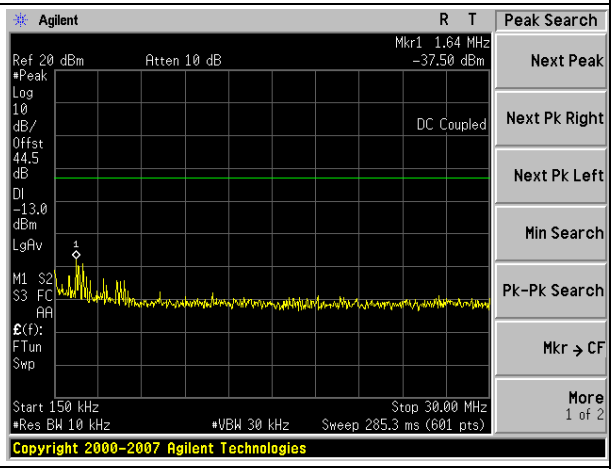
Spurious emission of iDEN

Lowest channel

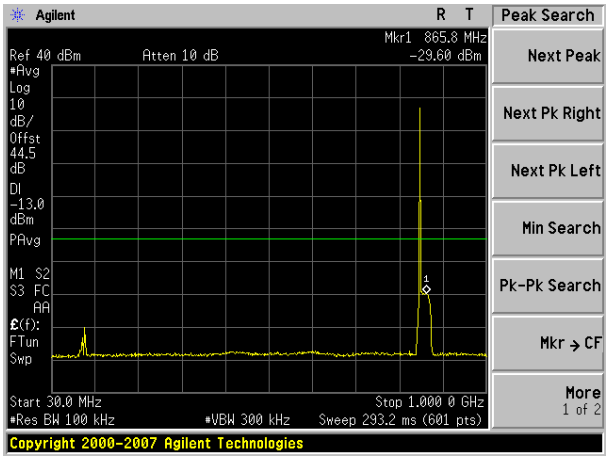
9KHz-150KHz



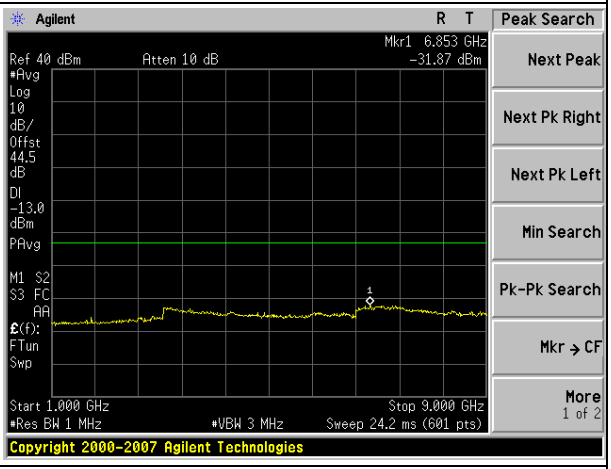
150KHz-30MHz



30MHz-1000MHz

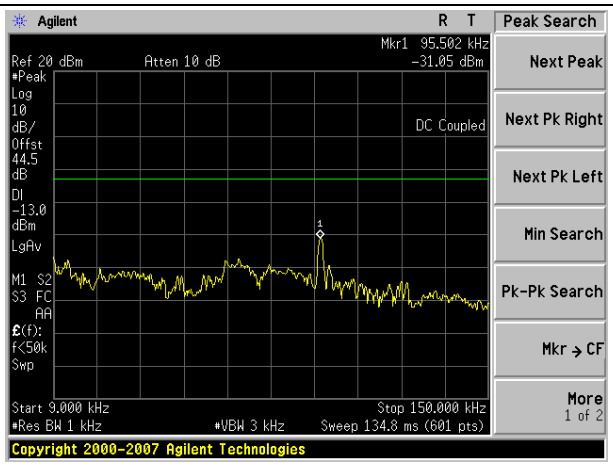


1000MHz-9000MHz

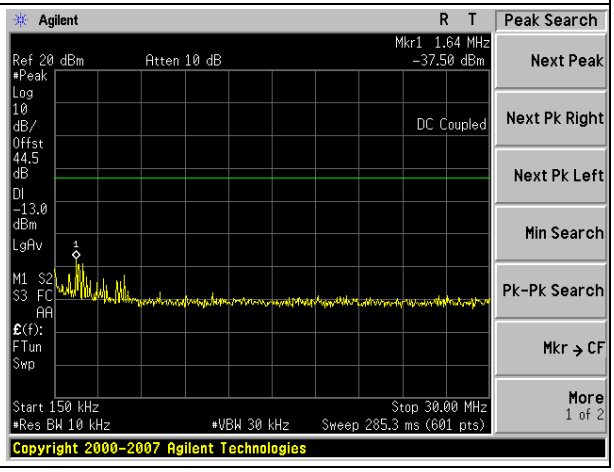


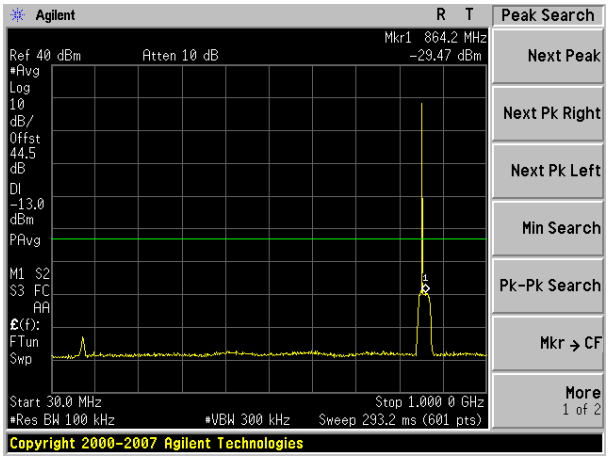
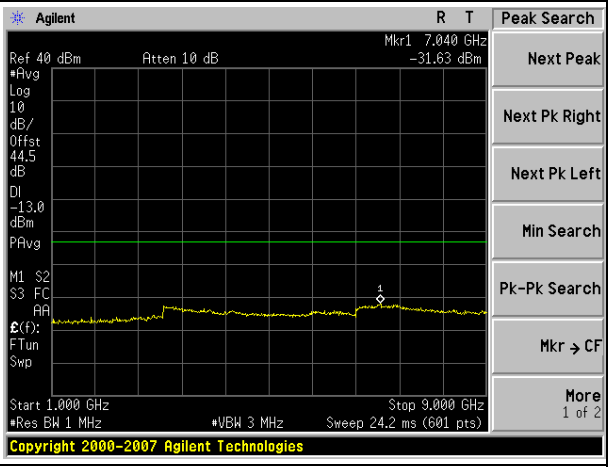
Middle channel

9KHz-150KHz

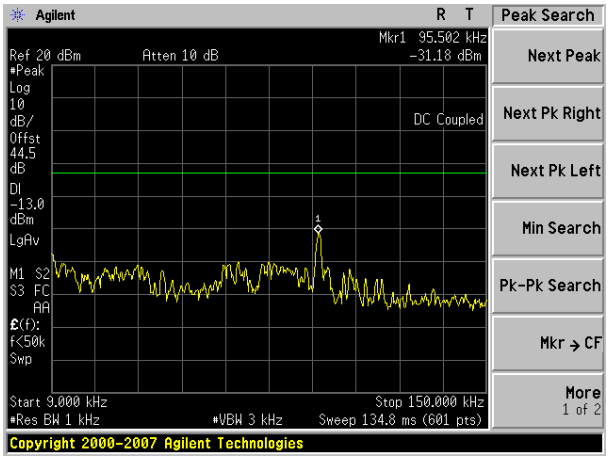
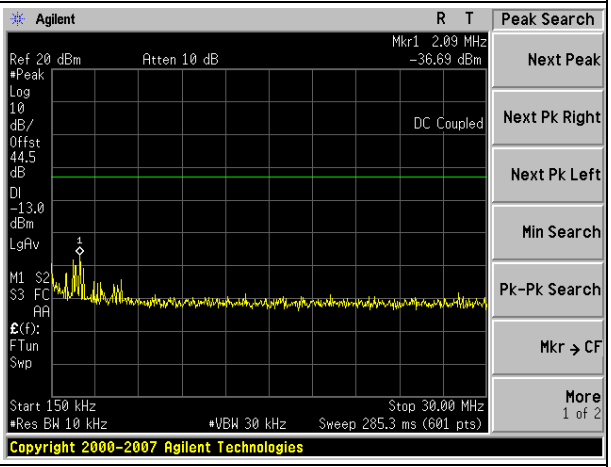


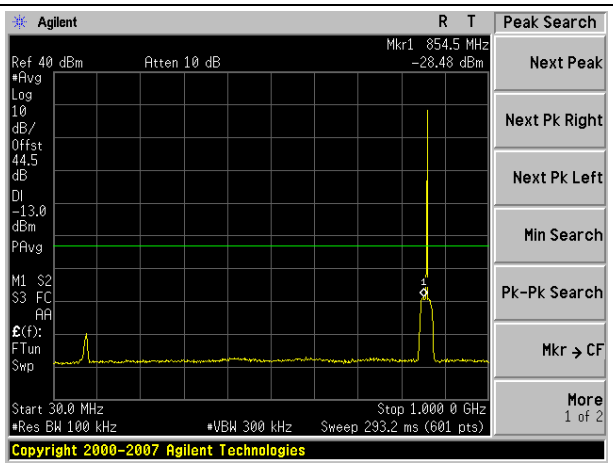
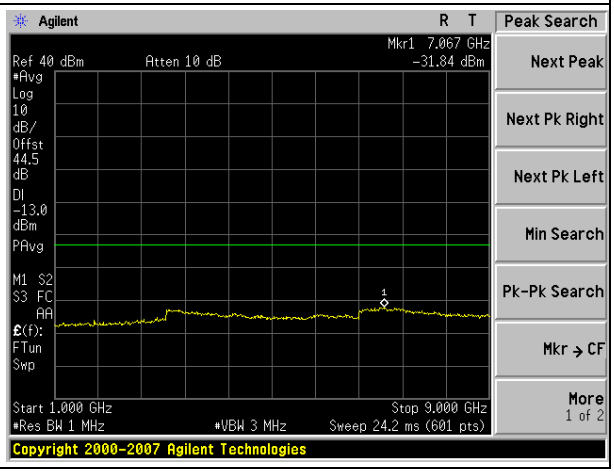
150KHz-30MHz



30MHz-1000MHz	1000MHz-9000MHz
	

Highest channel

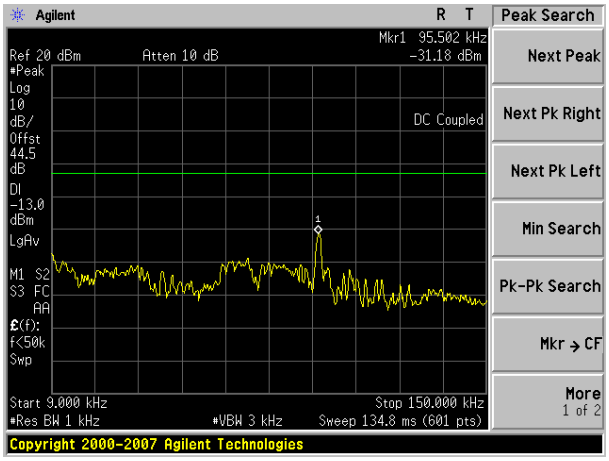
9KHz-150KHz	150KHz-30MHz
	

30MHz-1000MHz	1000MHz-9000MHz
	

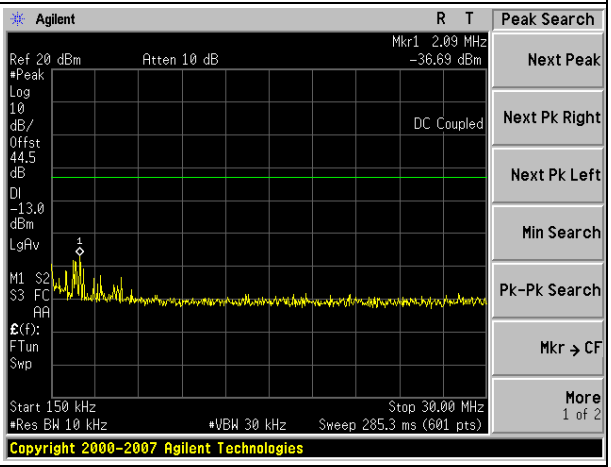
Spurious emission of C4FM

Lowest channel

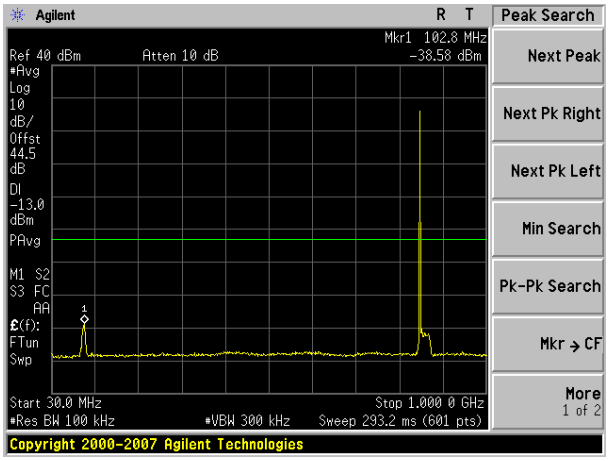
9KHz-150KHz



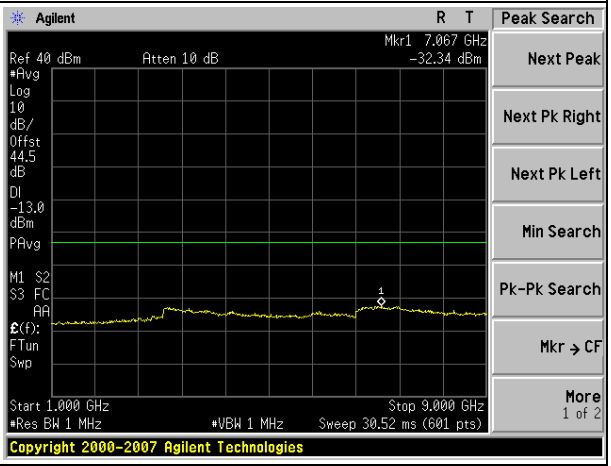
150KHz-30MHz



30MHz-1000MHz

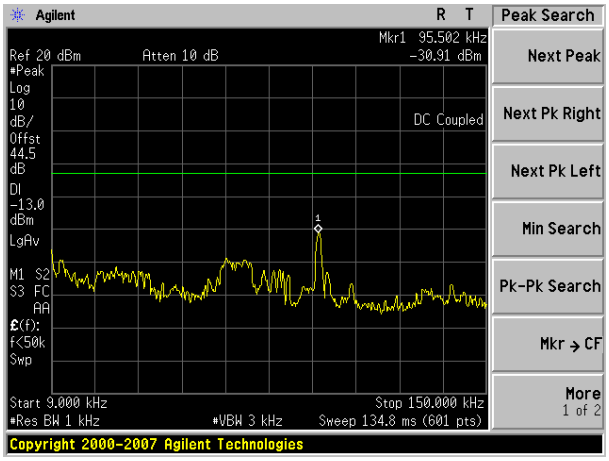


1000MHz-9000MHz

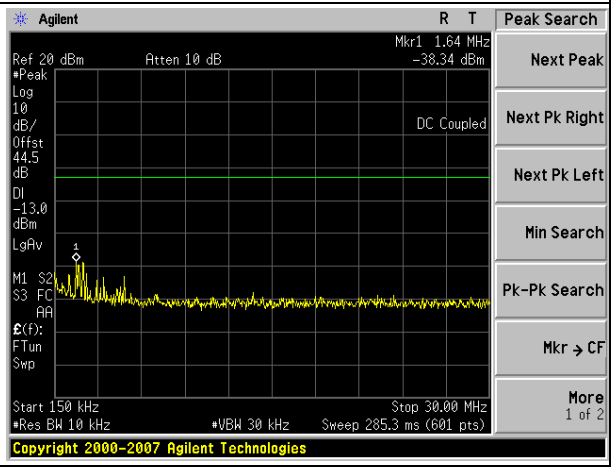


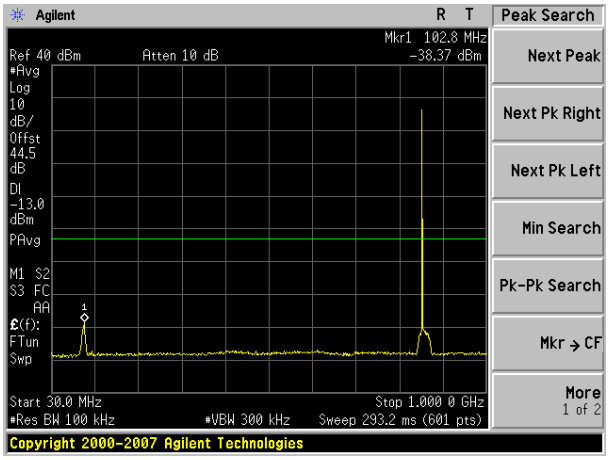
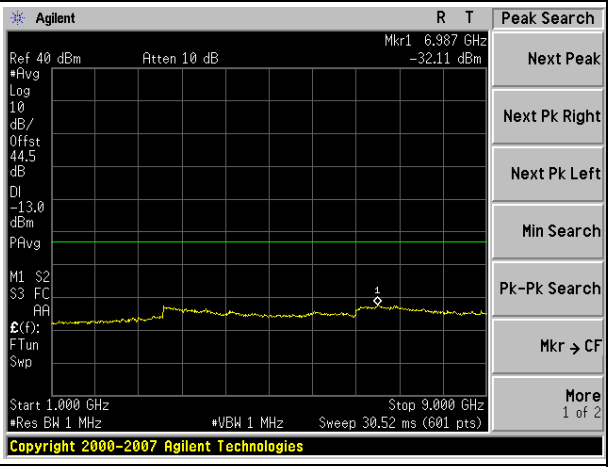
Middle channel

9KHz-150KHz

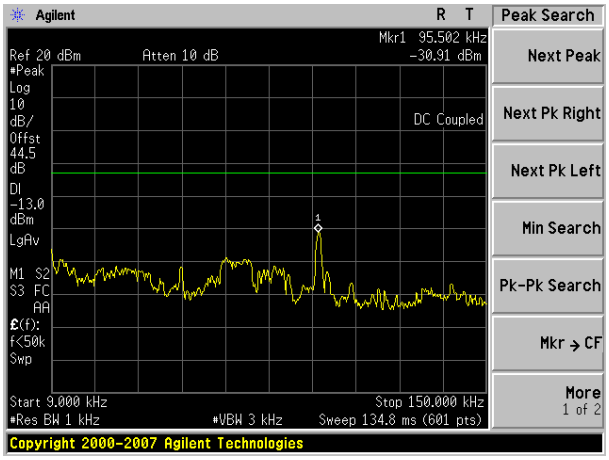
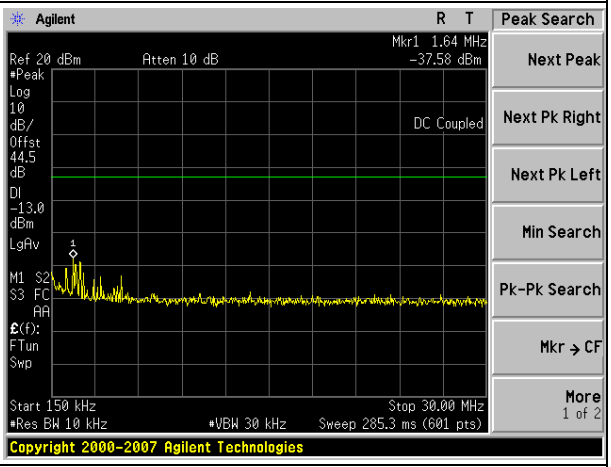


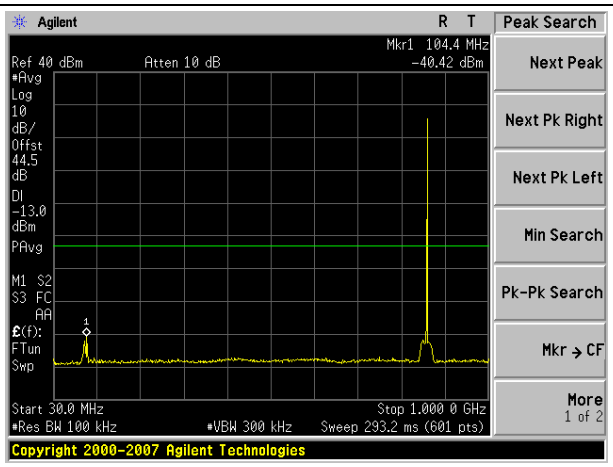
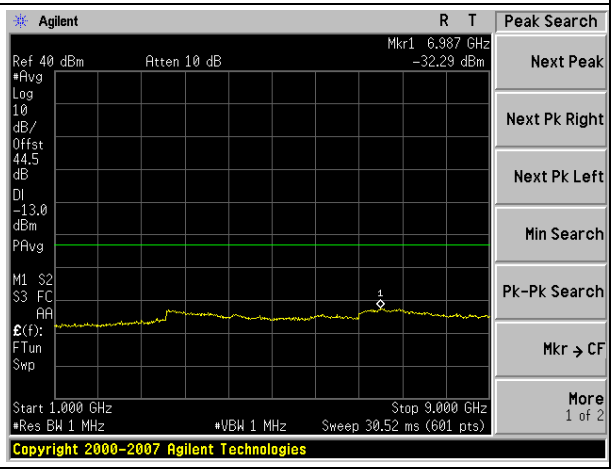
150KHz-30MHz



30MHz-1000MHz	1000MHz-9000MHz
	

Highest channel

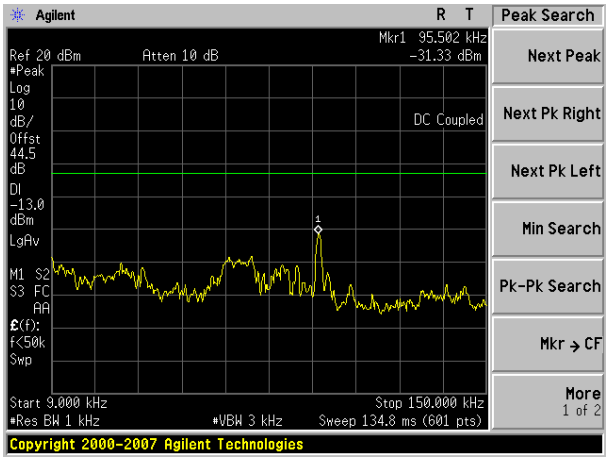
9KHz-150KHz	150KHz-30MHz
	

30MHz-1000MHz	1000MHz-9000MHz
	

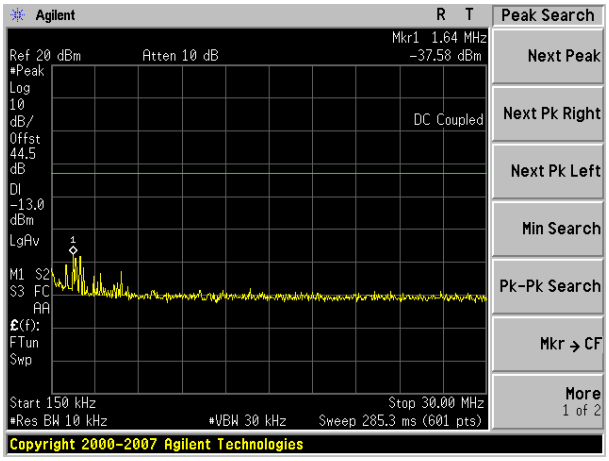
Spurious emission of Analog FM

Lowest channel

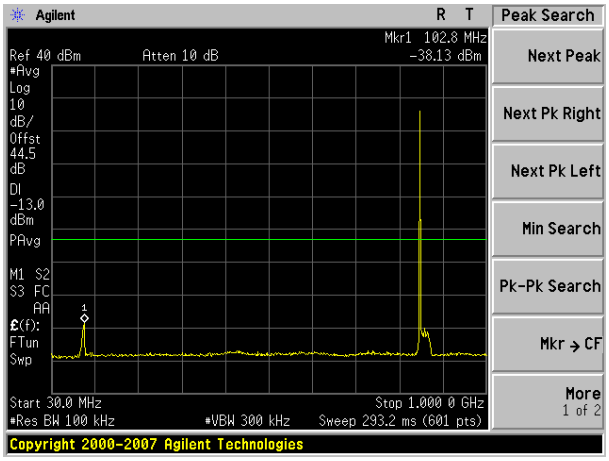
9KHz-150KHz



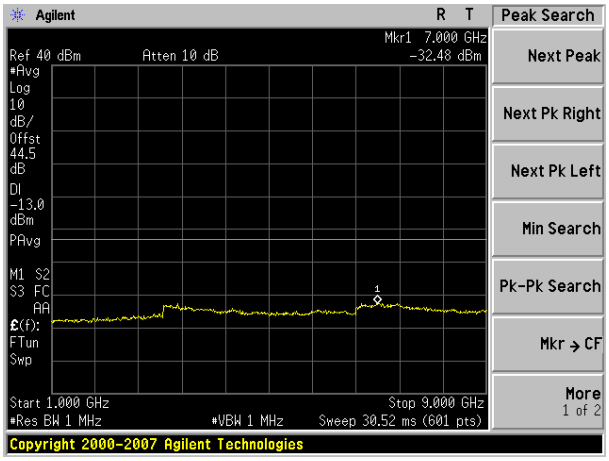
150KHz-30MHz



30MHz-1000MHz

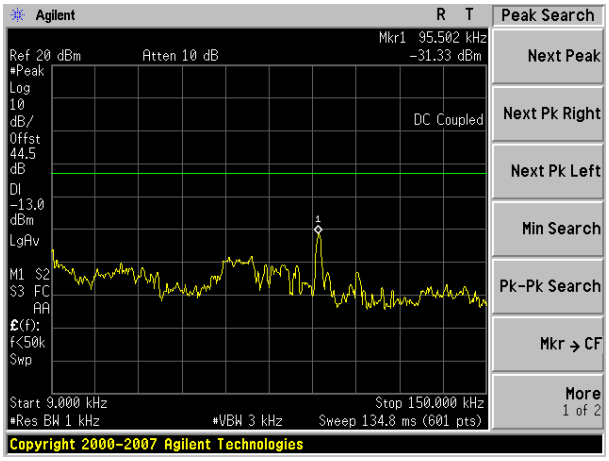


1000MHz-9000MHz

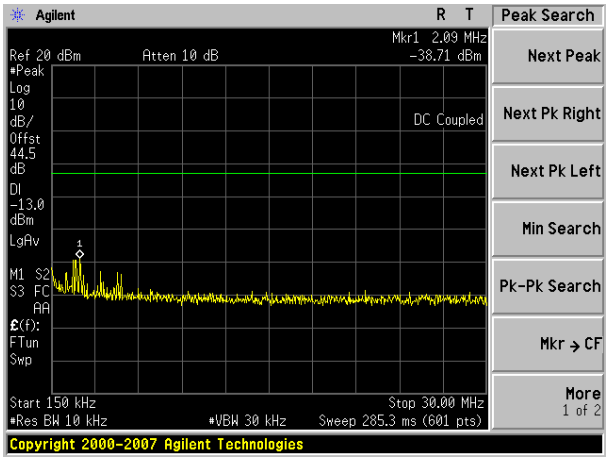


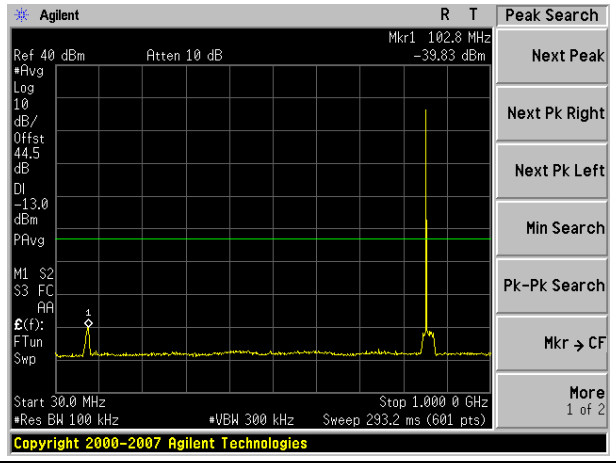
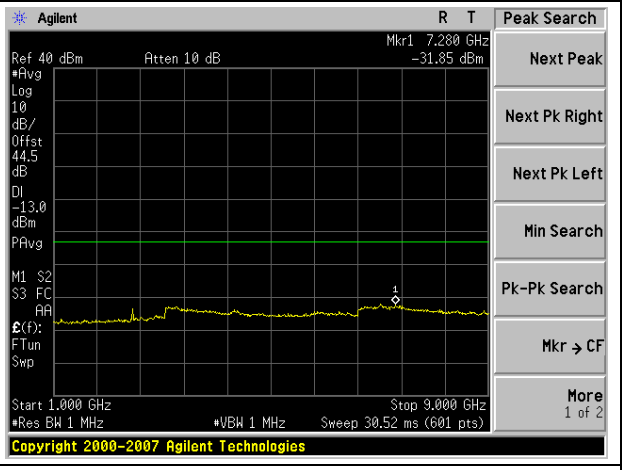
Middle channel

9KHz-150KHz

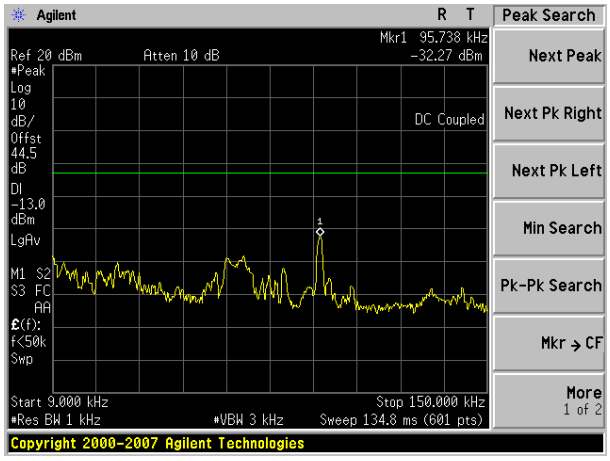
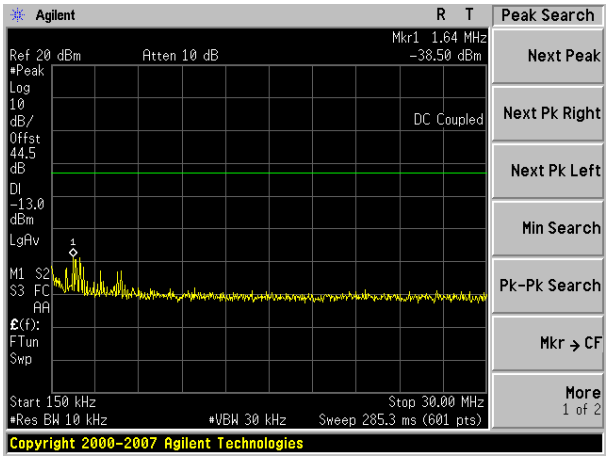


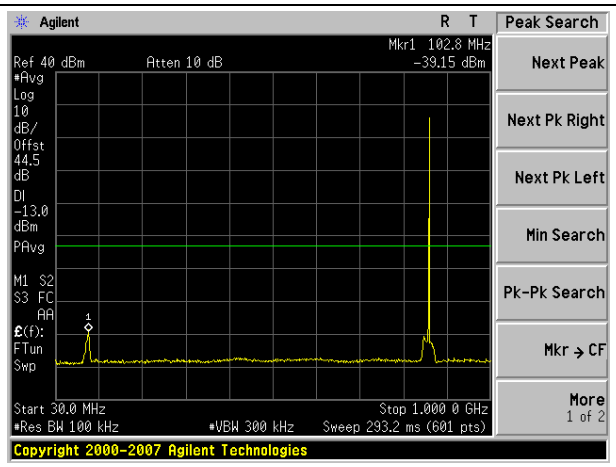
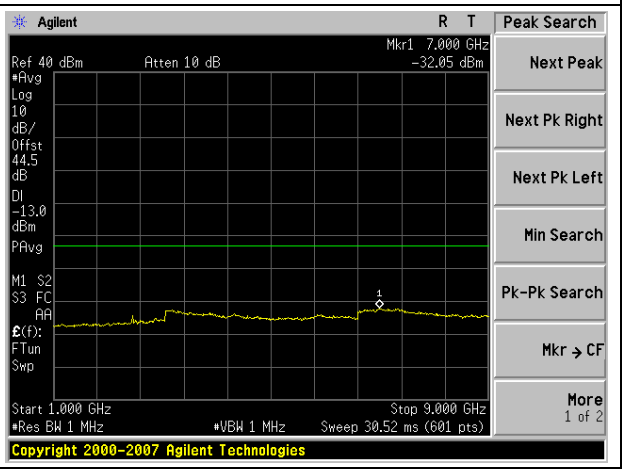
150KHz-30MHz



30MHz-1000MHz	1000MHz-9000MHz
	

Highest channel

9KHz-150KHz	150KHz-30MHz
	

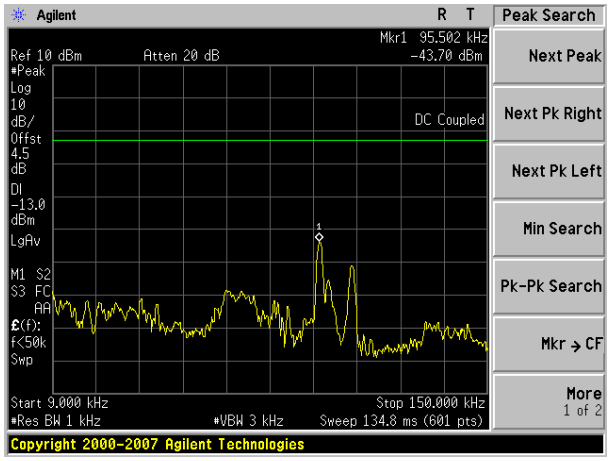
30MHz-1000MHz	1000MHz-9000MHz
	

Uplink:

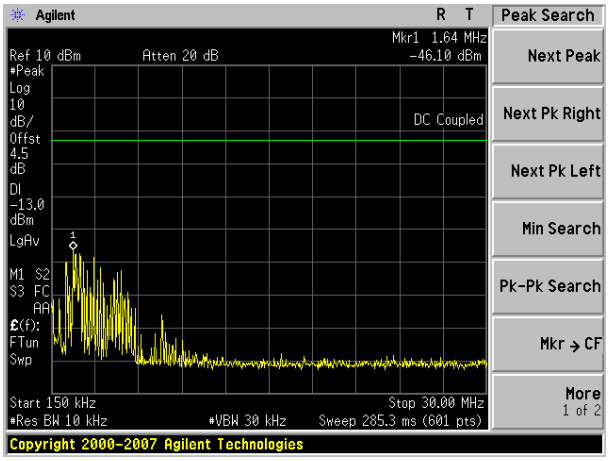
Spurious emission of iDEN

Lowest channel

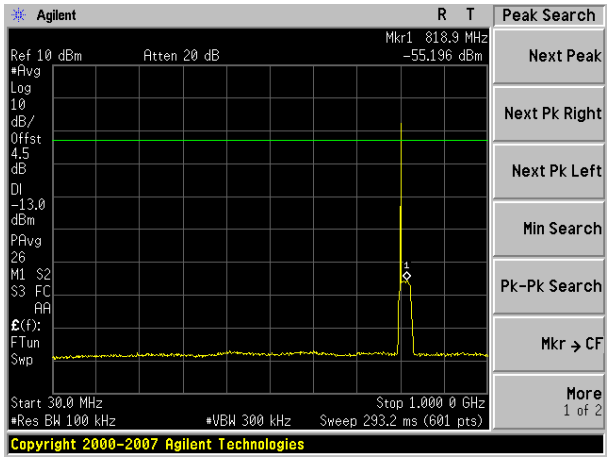
9KHz-150KHz



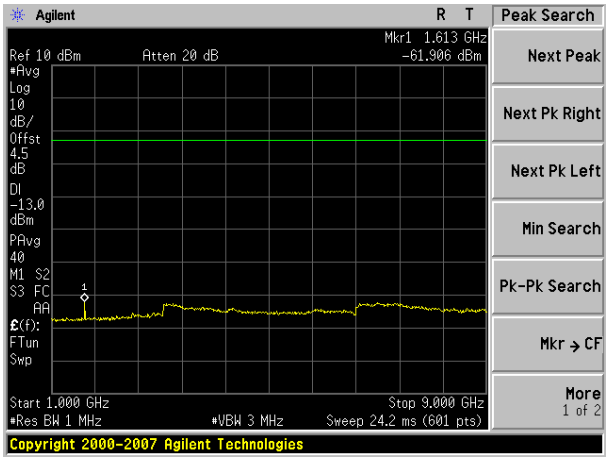
150KHz-30MHz



30MHz-1000MHz

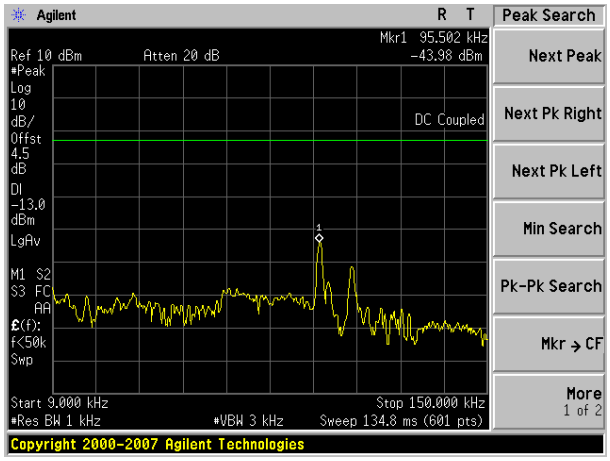


1000MHz-9000MHz

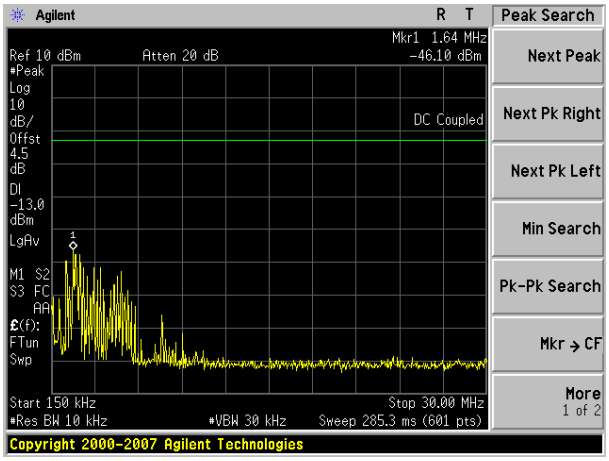


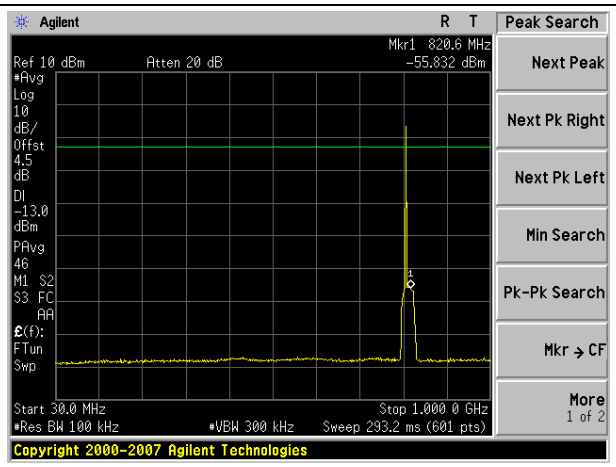
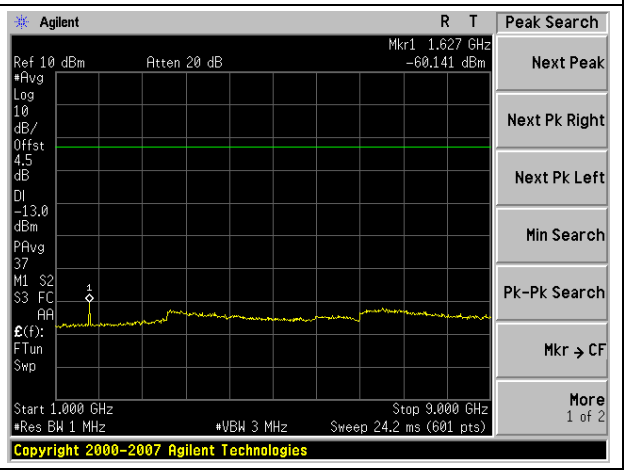
Middle channel

9KHz-150KHz

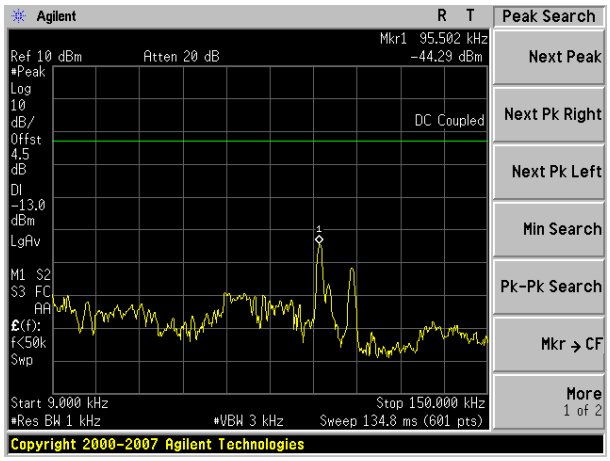
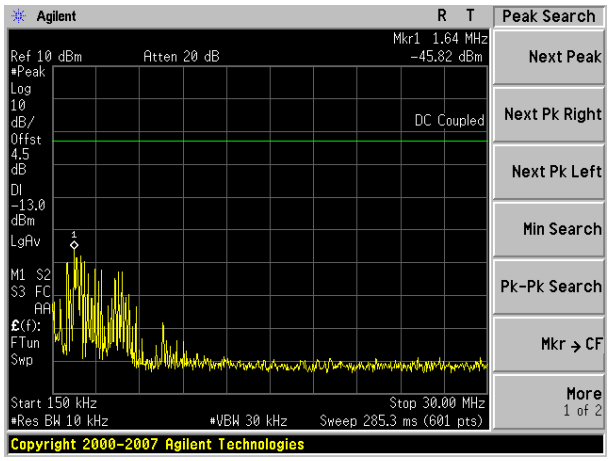


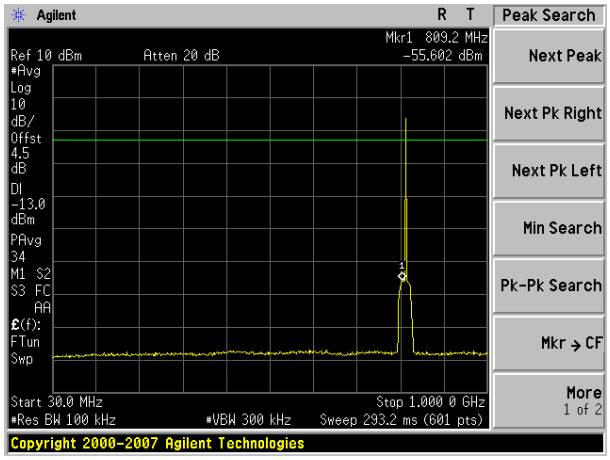
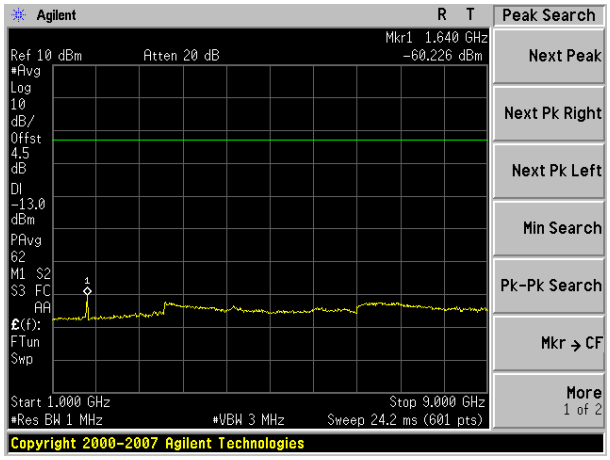
150KHz-30MHz



30MHz-1000MHz	1000MHz-9000MHz
	

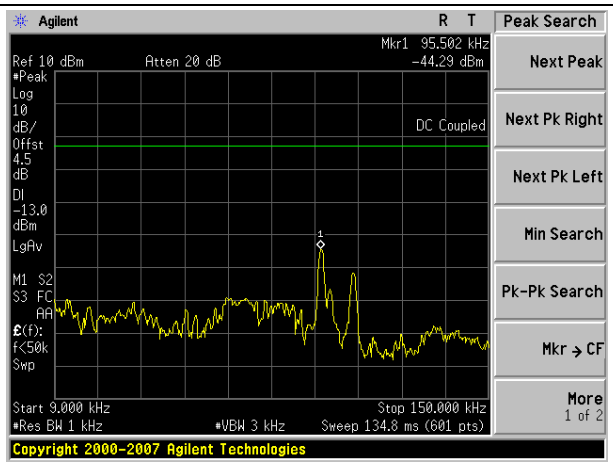
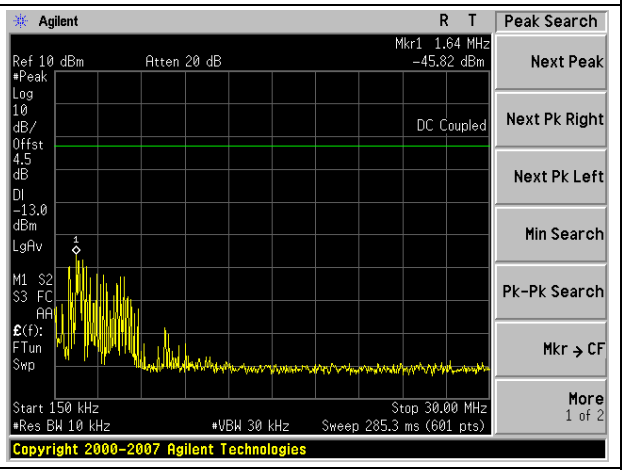
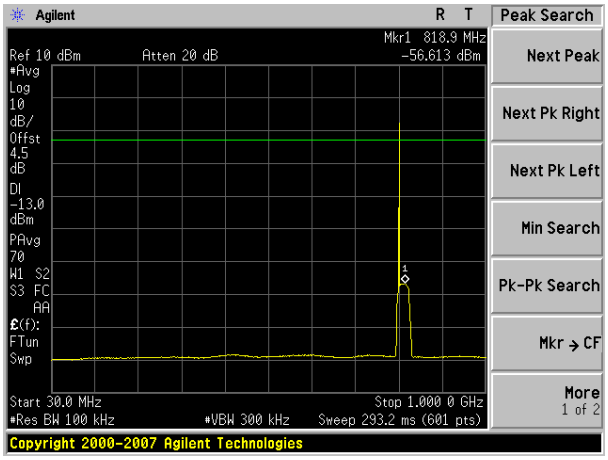
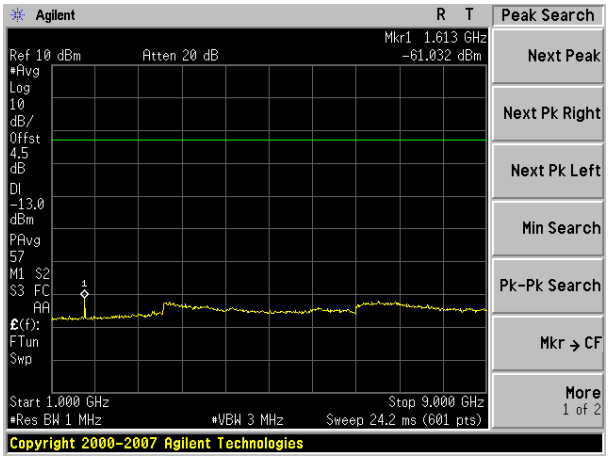
Highest channel

9KHz-150KHz	150KHz-30MHz
	

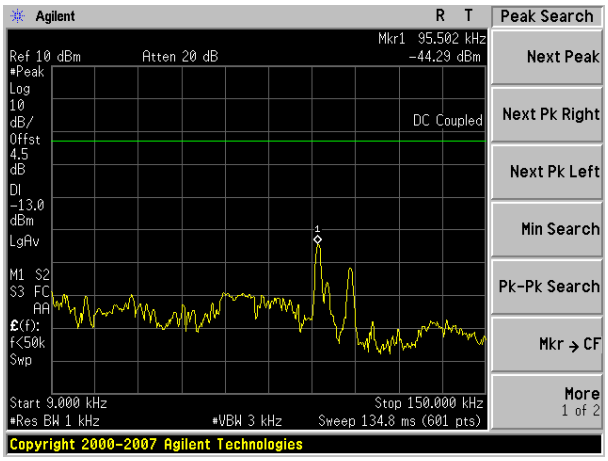
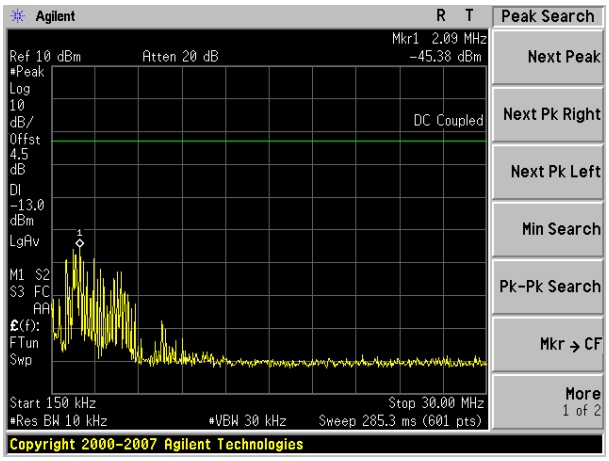
30MHz-1000MHz	1000MHz-9000MHz
	

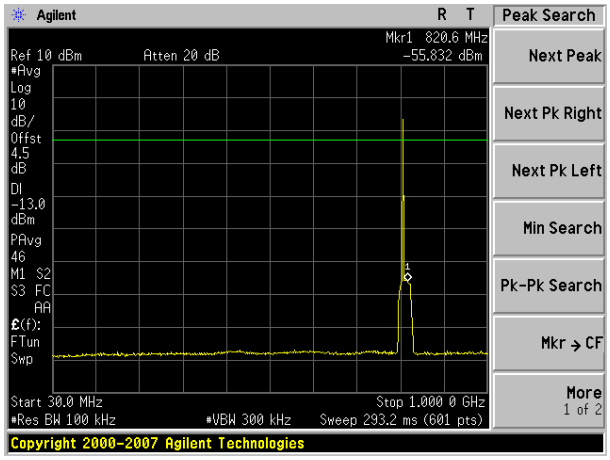
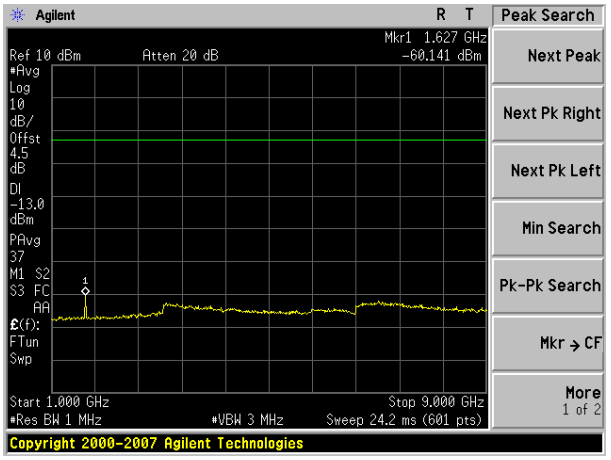
Spurious emission of C4FM

Lowest channel

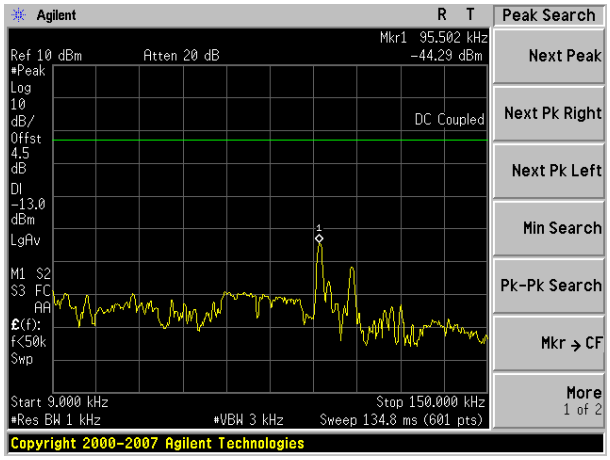
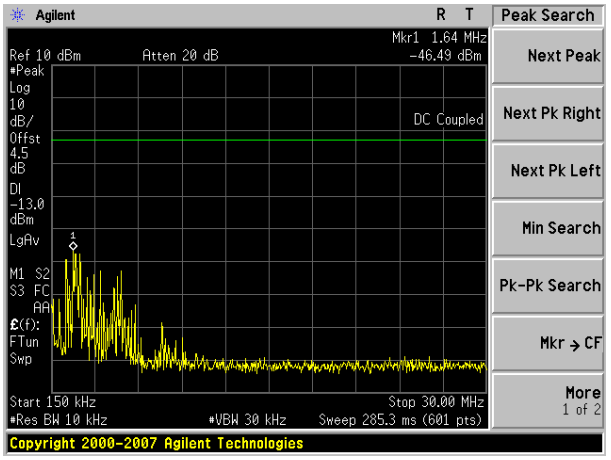
9KHz-150KHz	150KHz-30MHz
	
30MHz-1000MHz	**1000MHz-9000MHz**
	

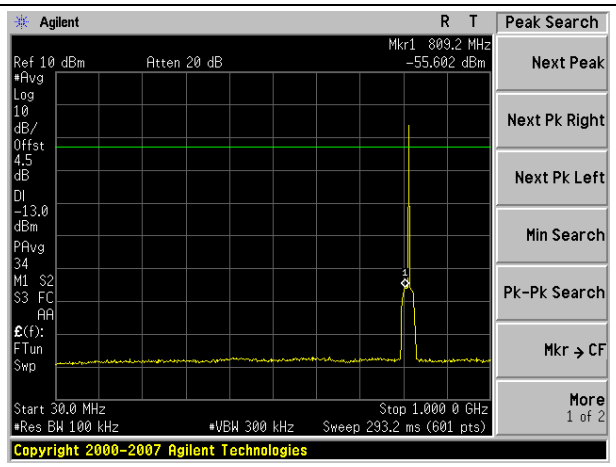
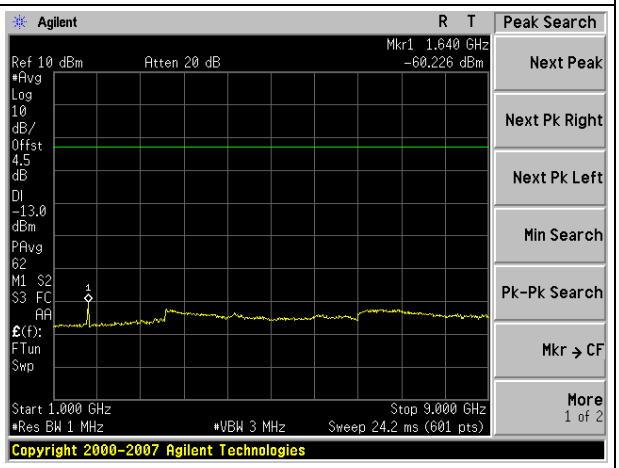
Middle channel

9KHz-150KHz	150KHz-30MHz
	

30MHz-1000MHz	1000MHz-9000MHz
	

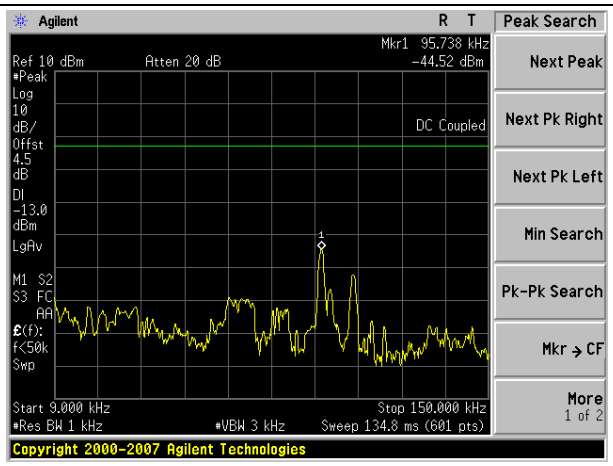
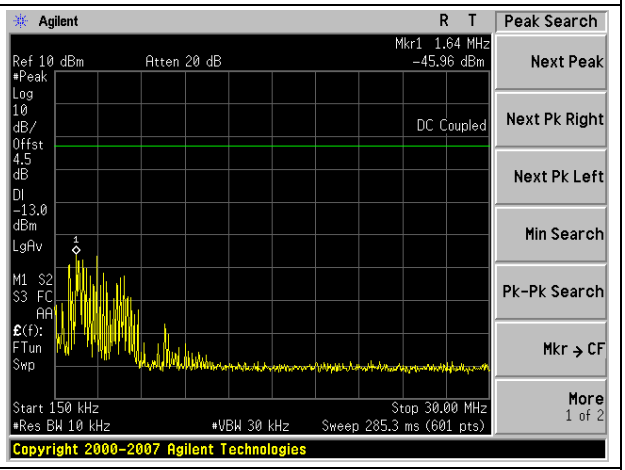
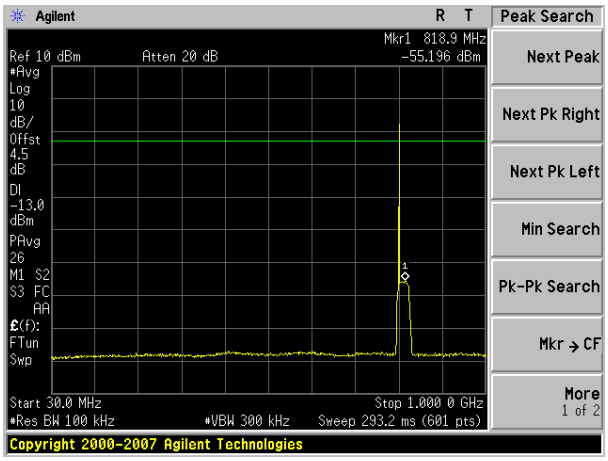
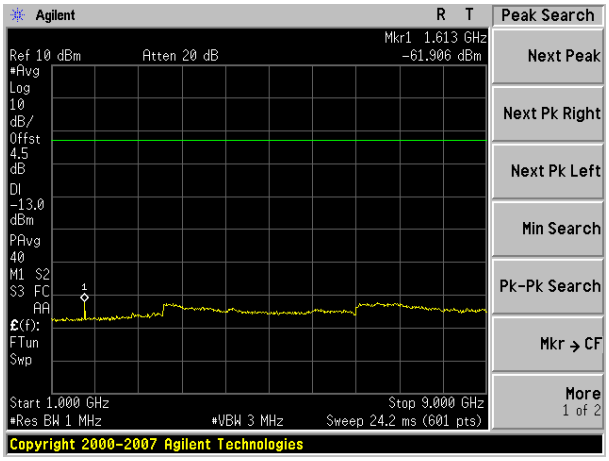
Highest channel

9KHz-150KHz	150KHz-30MHz
	

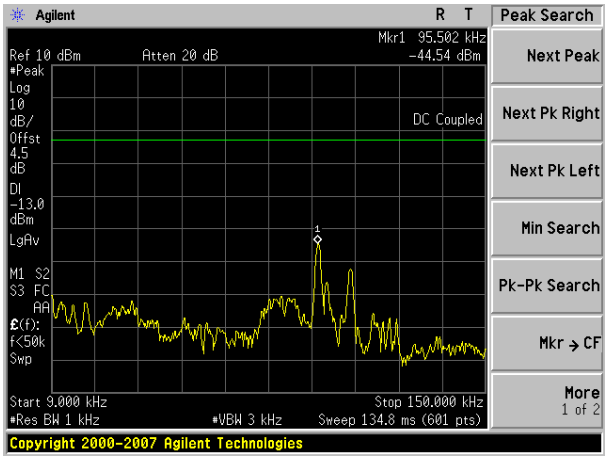
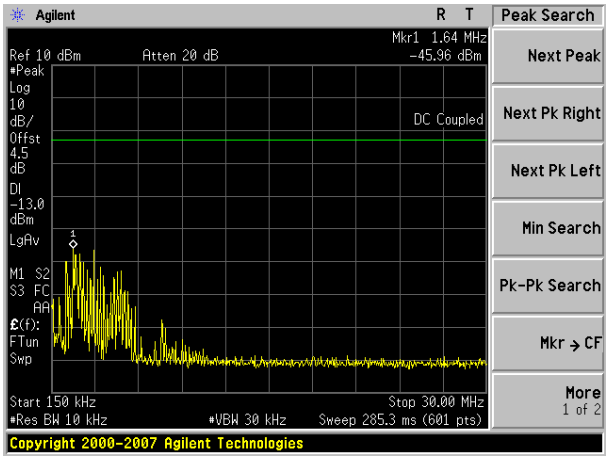
30MHz-1000MHz	1000MHz-9000MHz
	

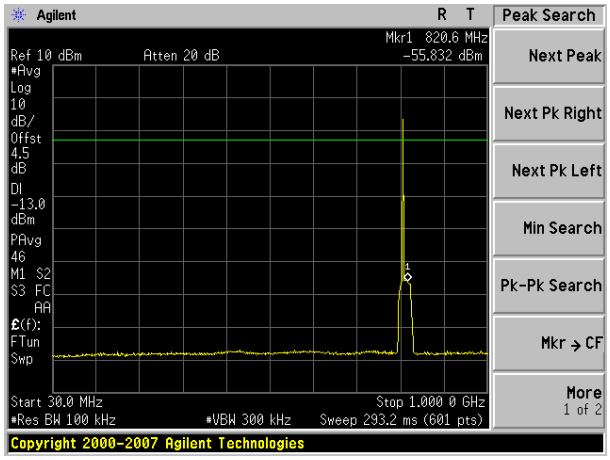
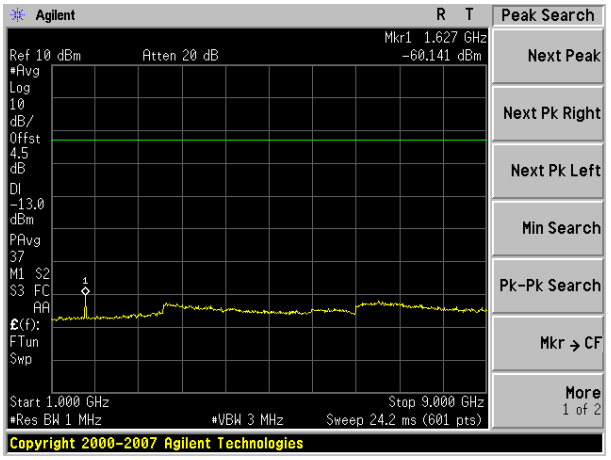
Spurious emission of Analog FM

Lowest channel

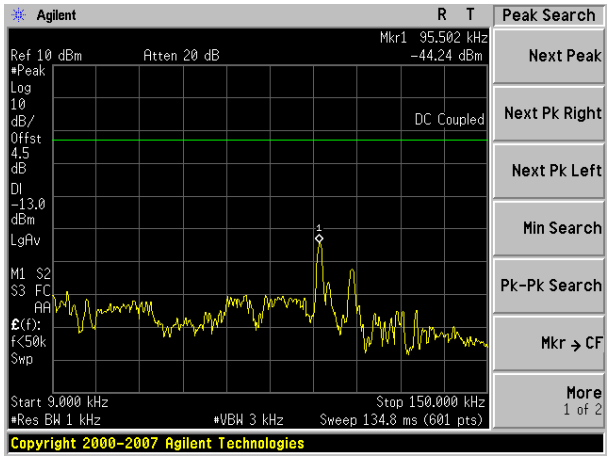
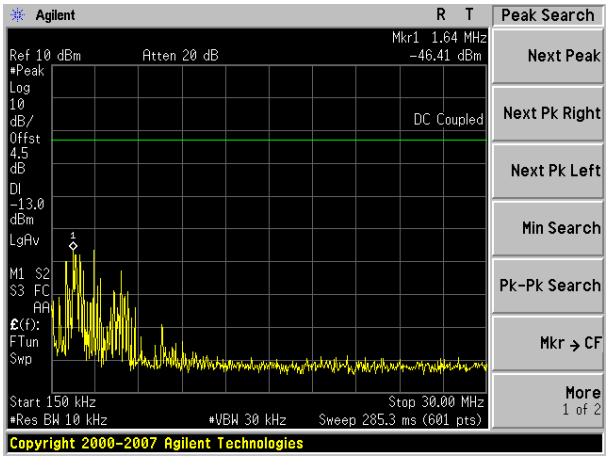
9KHz-150KHz	150KHz-30MHz
	
30MHz-1000MHz	**1000MHz-9000MHz**
	

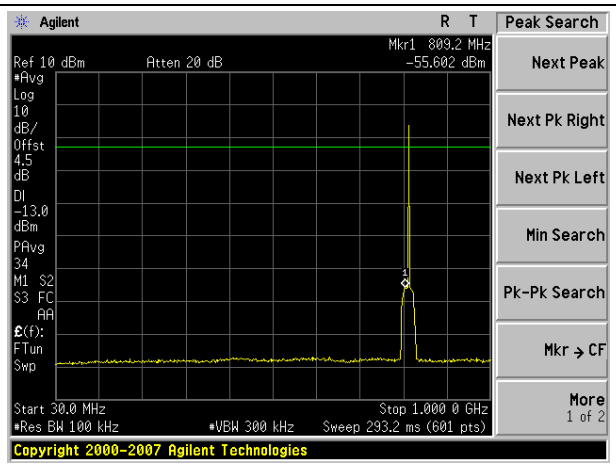
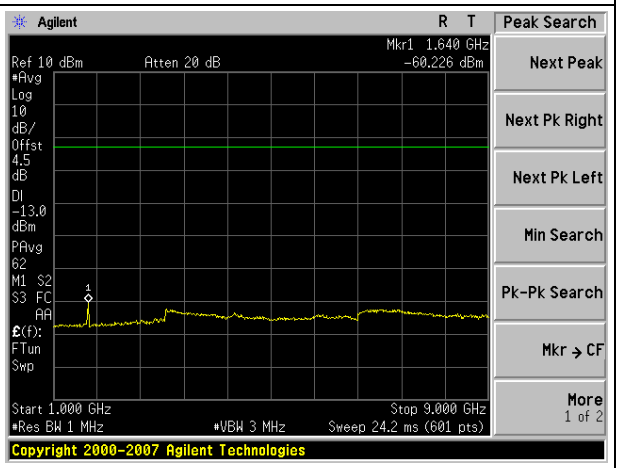
Middle channel

9KHz-150KHz	150KHz-30MHz
	

30MHz-1000MHz	1000MHz-9000MHz
	

Highest channel

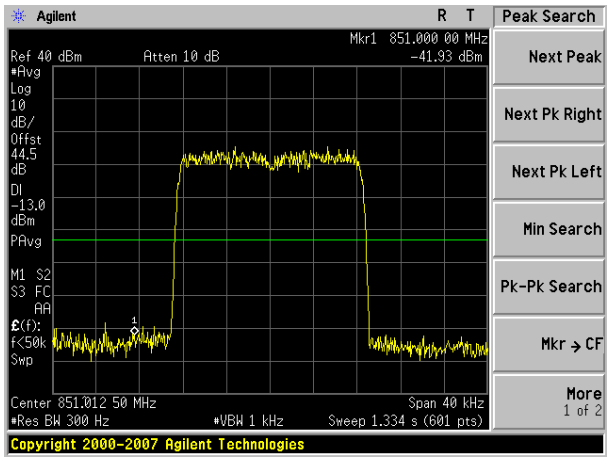
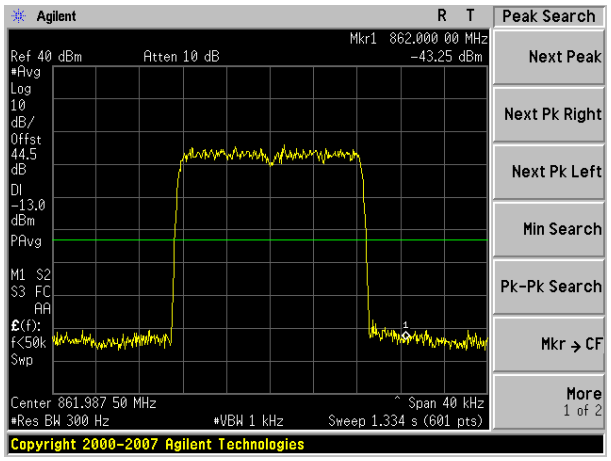
9KHz-150KHz	150KHz-30MHz
	

30MHz-1000MHz	1000MHz-9000MHz
	

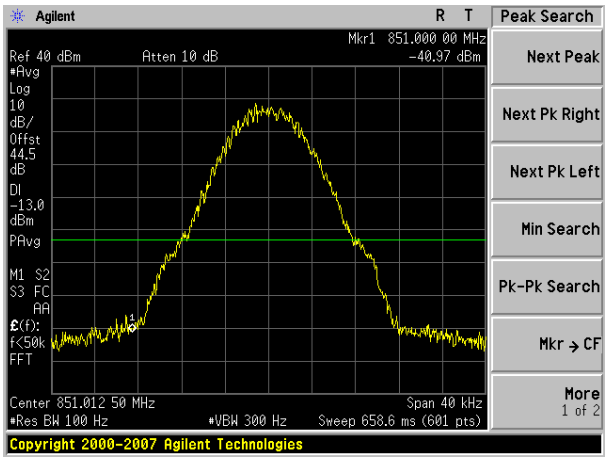
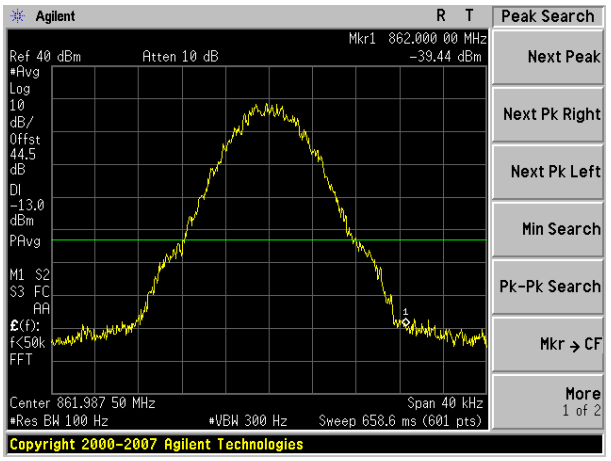
10.4.2 Band edge emission

Downlink:

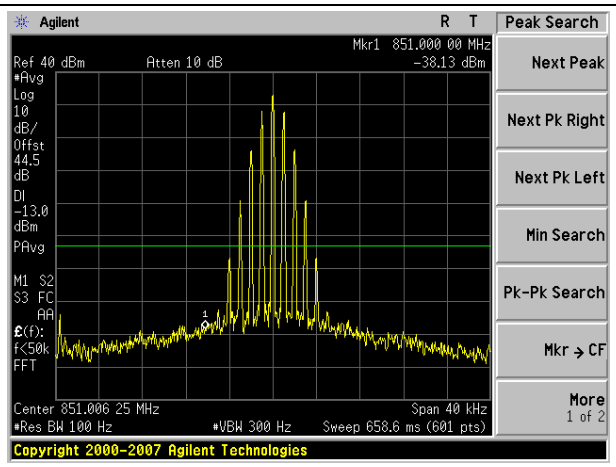
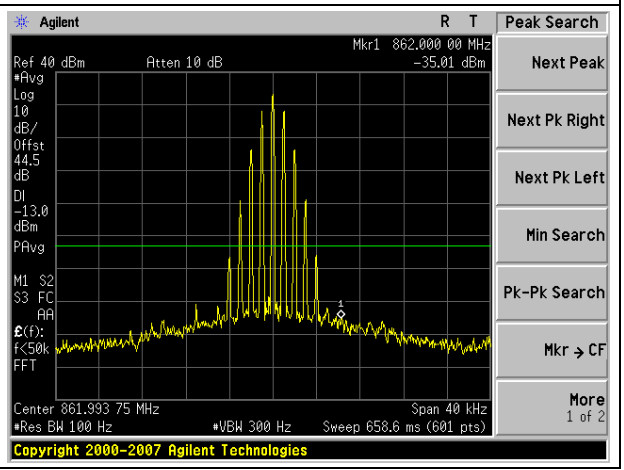
Band edge of iDEN

Left edge of band	Right edge of band
	

Band edge of C4FM

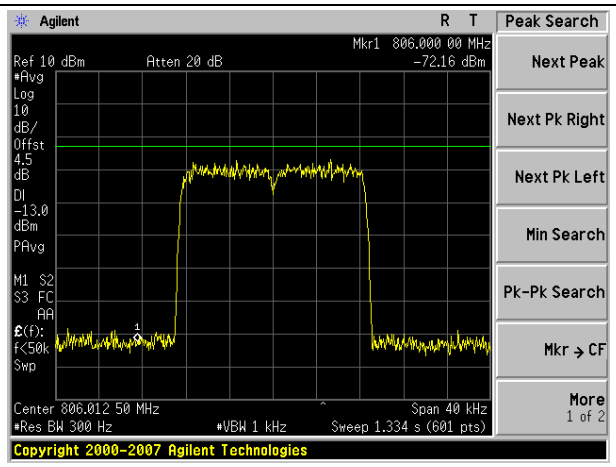
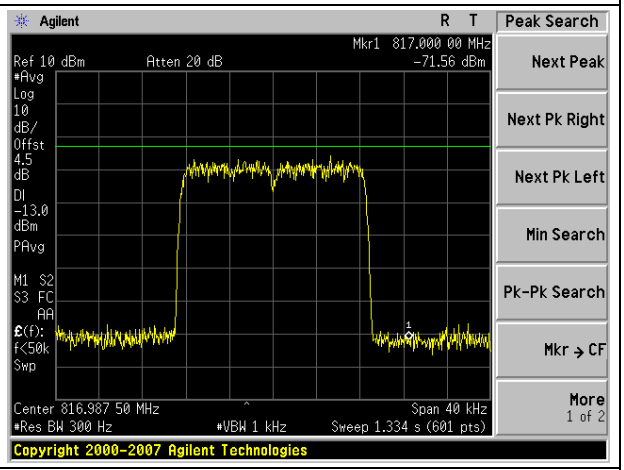
Left edge of band	Right edge of band
	

Band edge of Analog FM

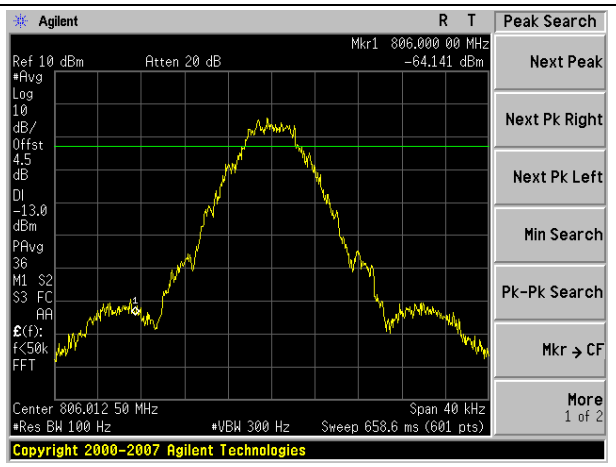
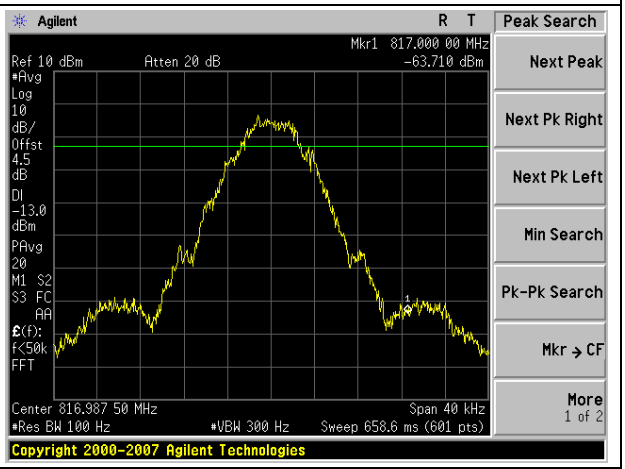
Left edge of band	Right edge of band
	

Uplink:

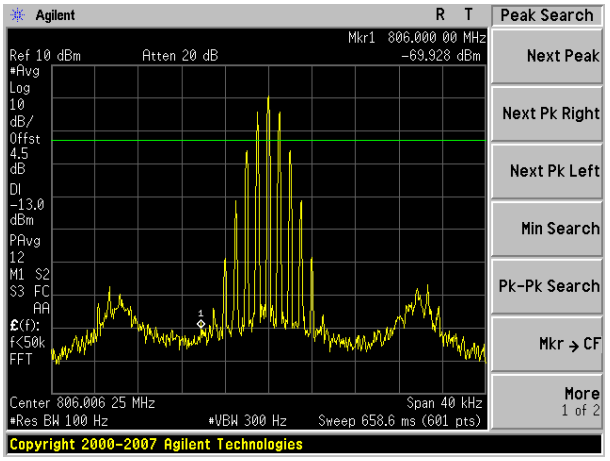
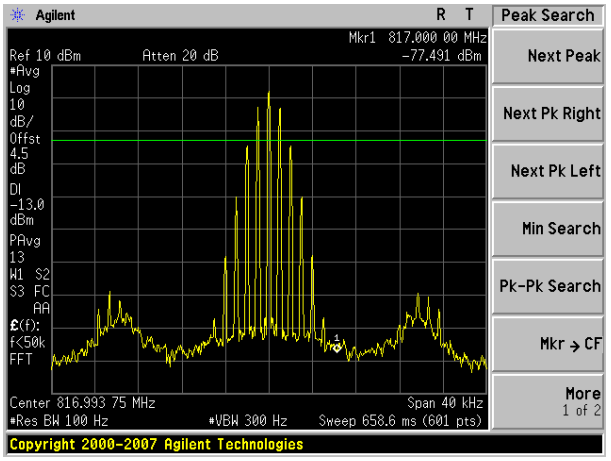
Band edge of iDEN

Left edge of band	Right edge of band
	

Band edge of C4FM

Left edge of band	Right edge of band
	

Band edge of Analog FM

Left edge of band	Right edge of band
	

11 EMISSION MASK

11.1 Standard Applicable

According to FCC § 90.210

11.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

11.3 Measurement Procedure

The test signals used is iDEN、C4FM、Analog FM. The different signals were input one at a time to the EUT. Tests was performed with iDEN、C4FM、Analog FM signal input.

1. The 806MHz-809MHz/851MHz-854MHz band conforms to emission mask H.
2. For other band, the equipment designed must accord with emission mask B----- For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

Spectrum analyzer settings:
Detector: RMS.
RBW=1%of the occupied channel bandwidth without going below 1%; VBW≥ RBW

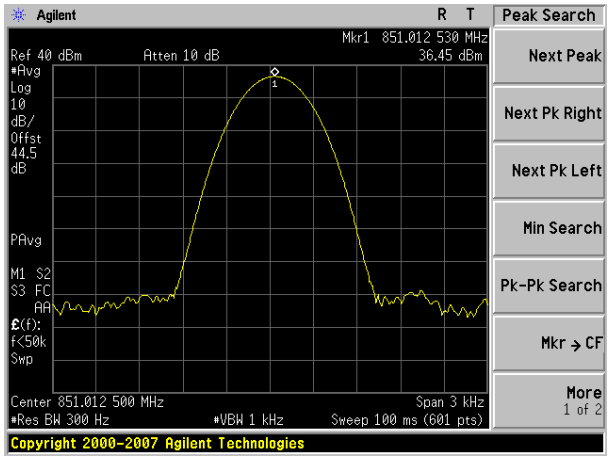
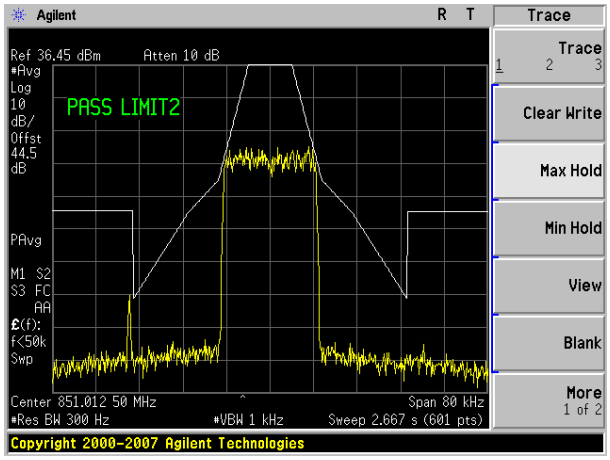
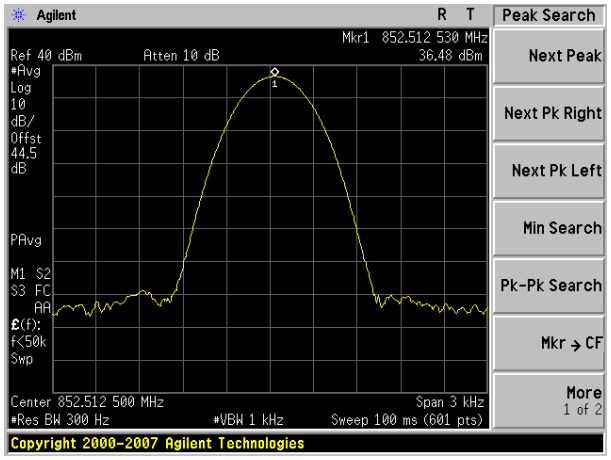
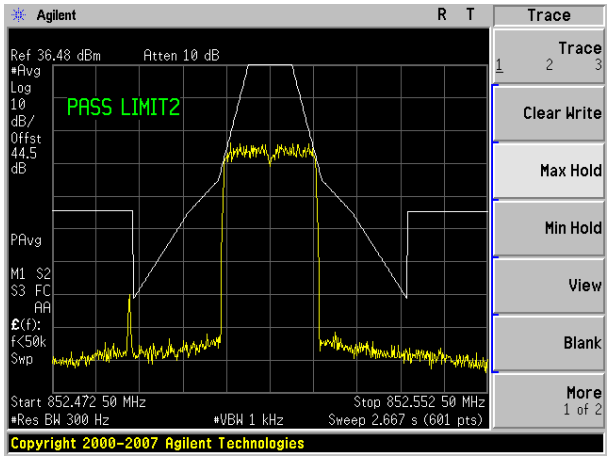
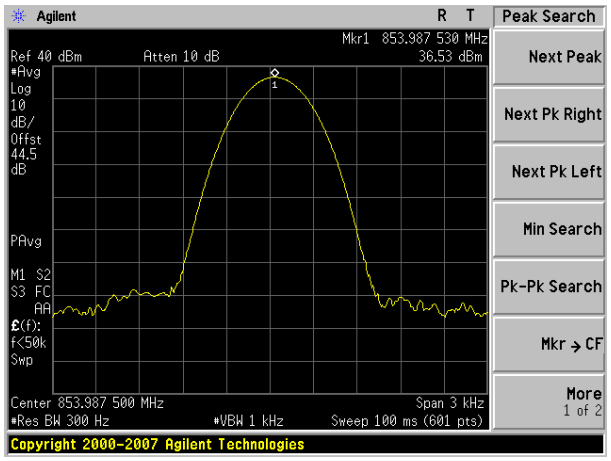
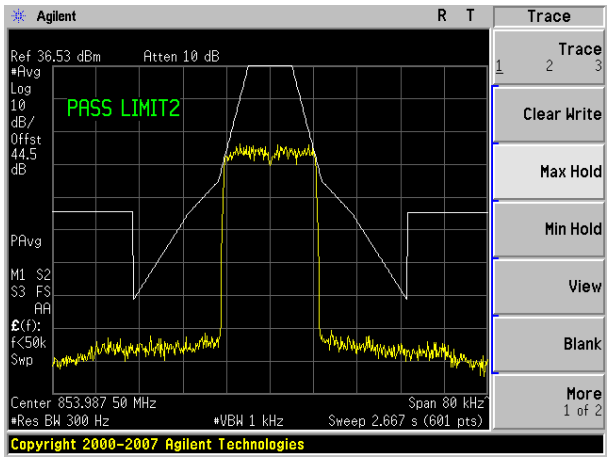
11.4 Test Result

Passed.

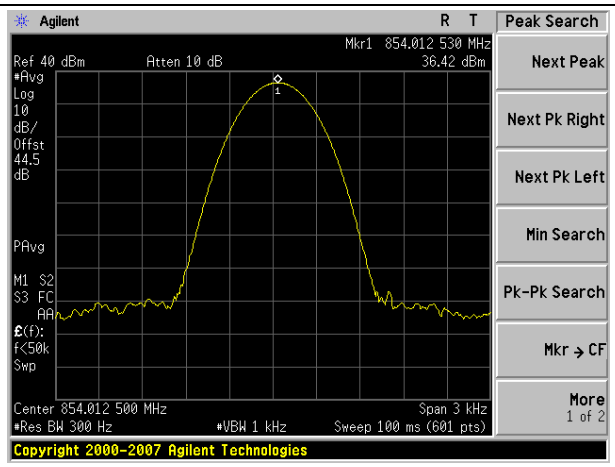
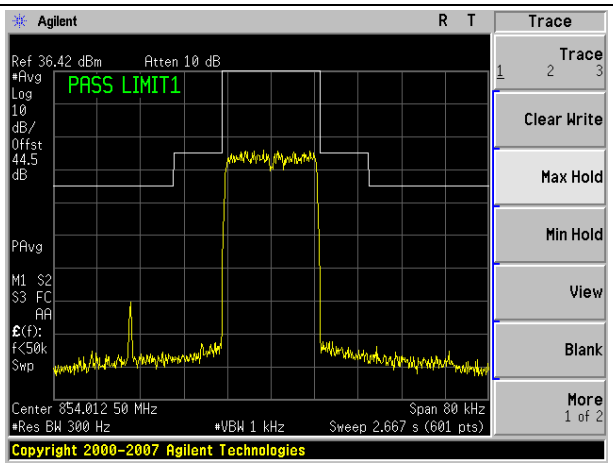
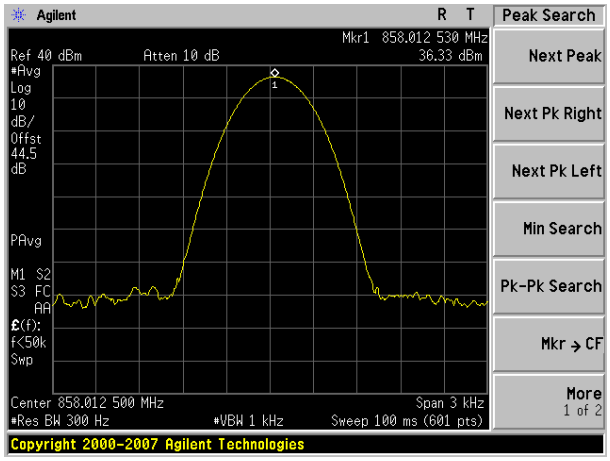
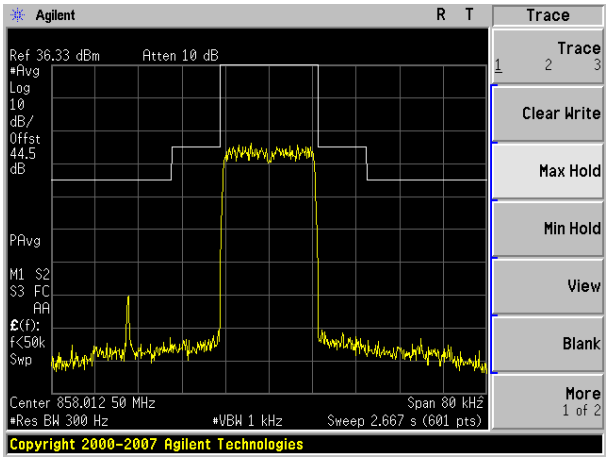
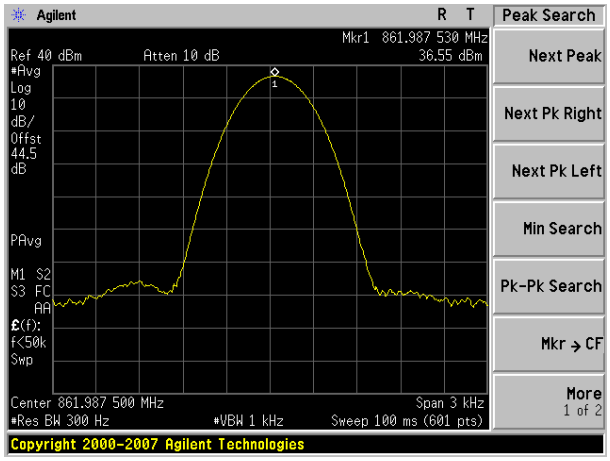
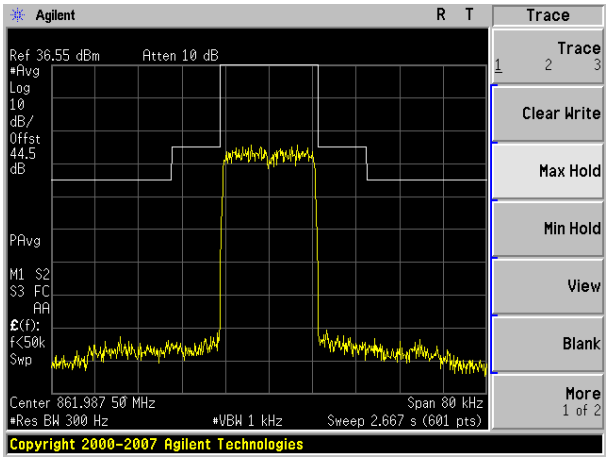
Downlink:

Emission Mask for iDEN

851.00MHz-854.00MHz(Mask H)

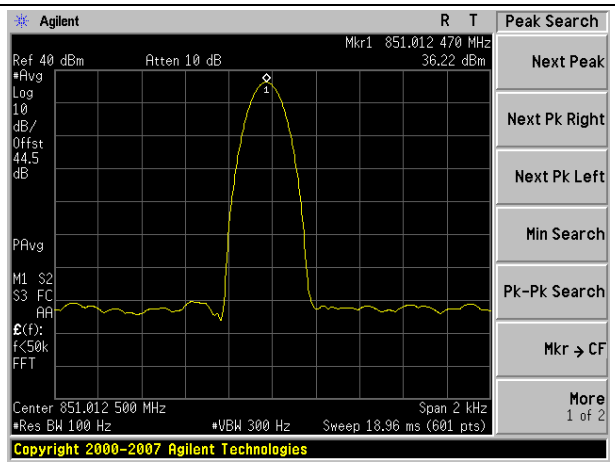
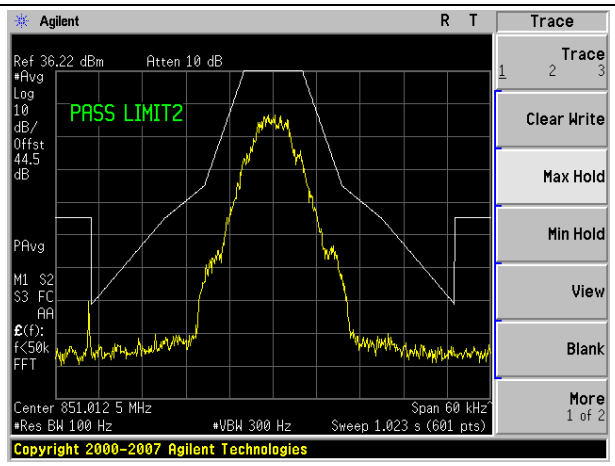
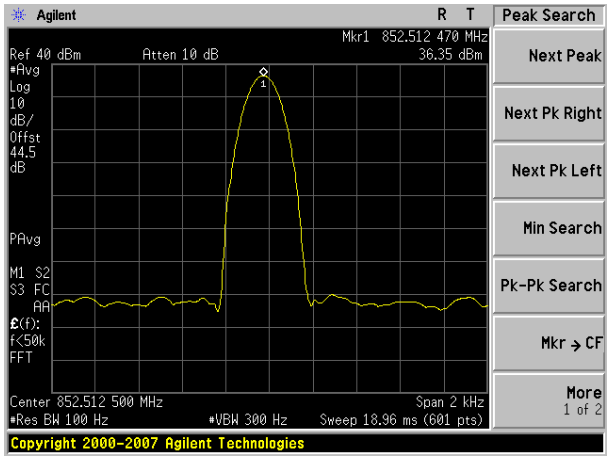
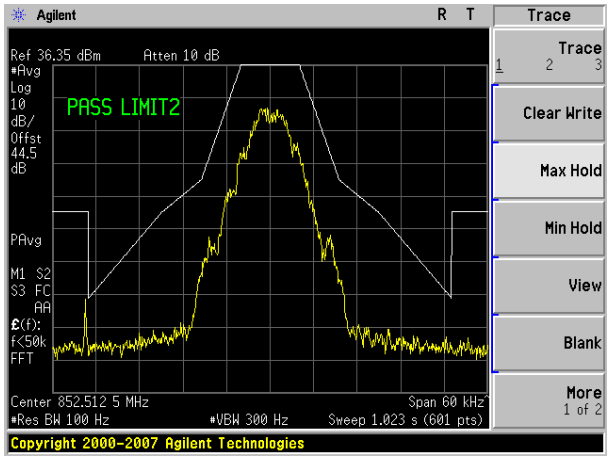
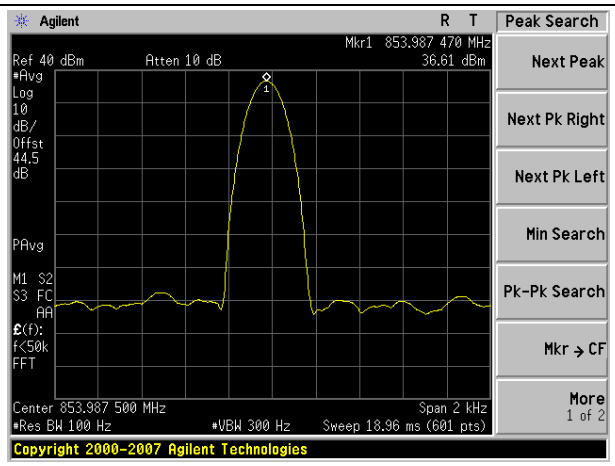
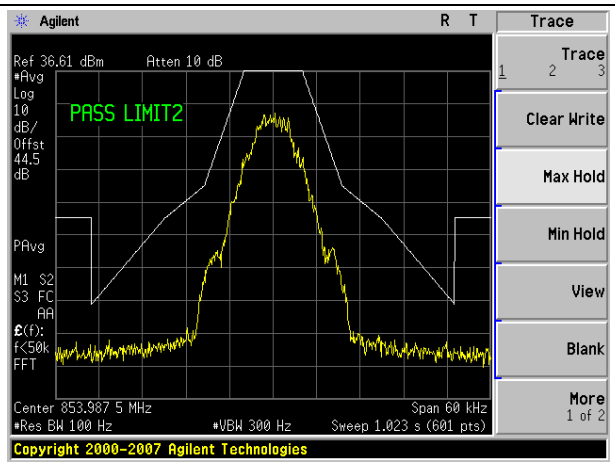
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power (Middle channel)	Mask(Middle channel)
	
Unmodulated power (Highest channel)	Mask(Highest channel)
	

854.00MHz-862.00MHz(Mask B)

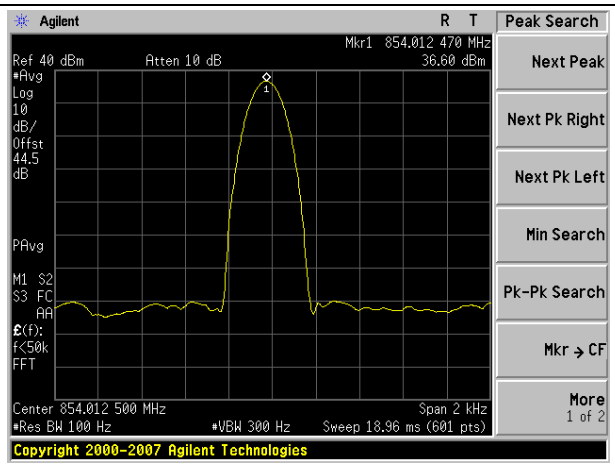
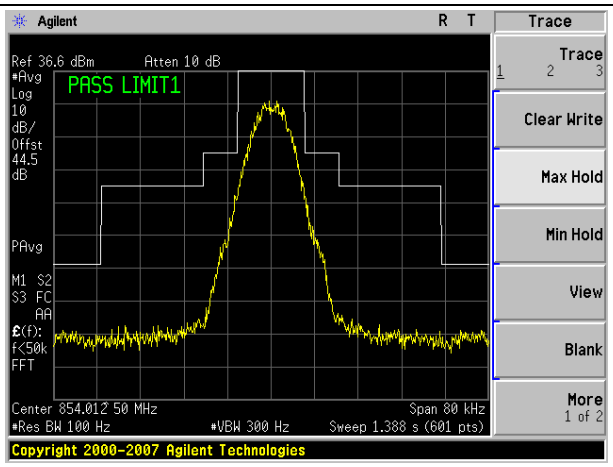
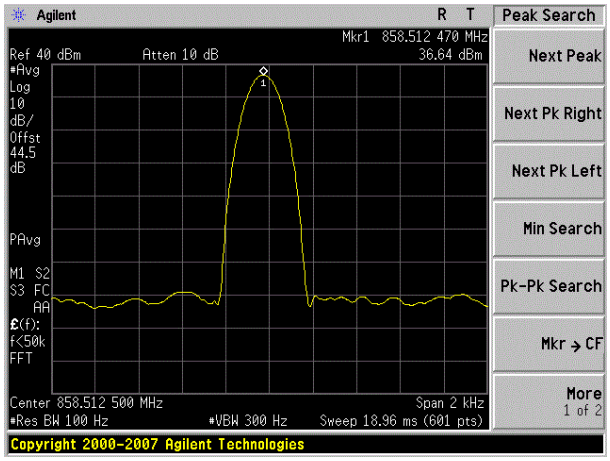
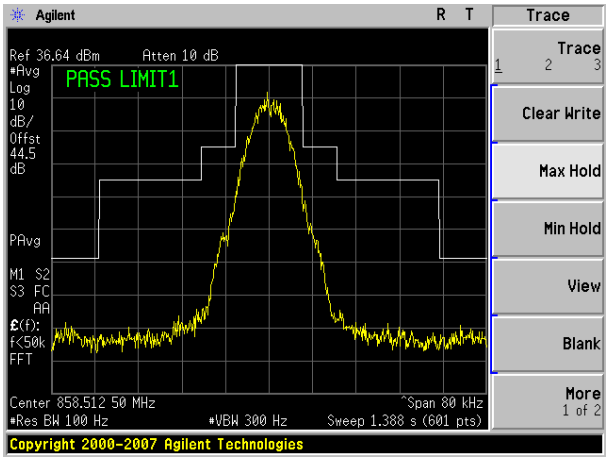
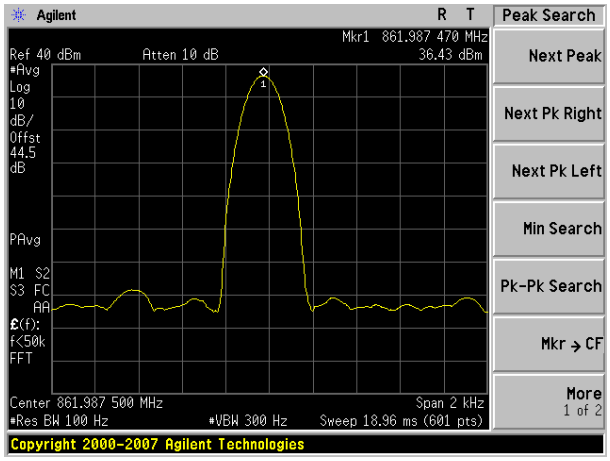
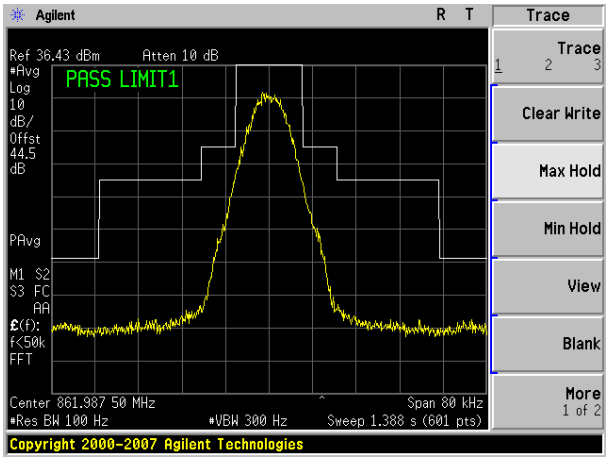
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power(Middle channel)	Mask(Middle channel)
	
Unmodulated power(Highest channel)	Mask(Highest channel)
	

Emission Mask for C4FM

851.00MHz-854.00MHz(Mask H)

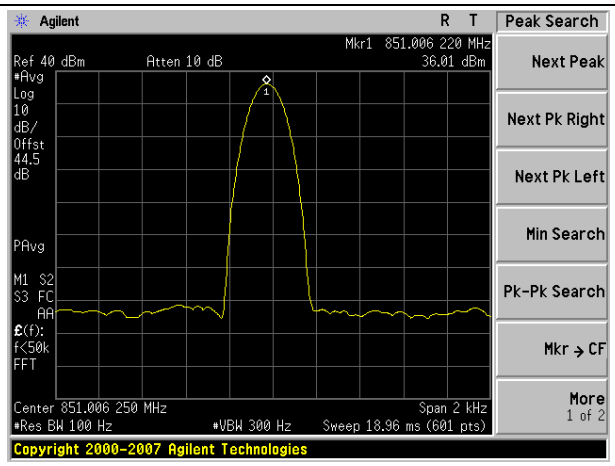
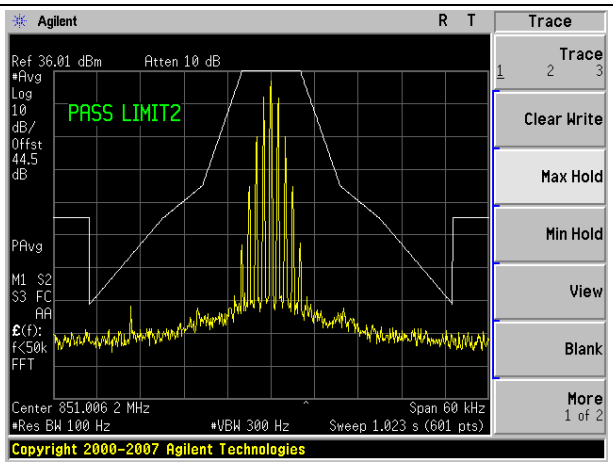
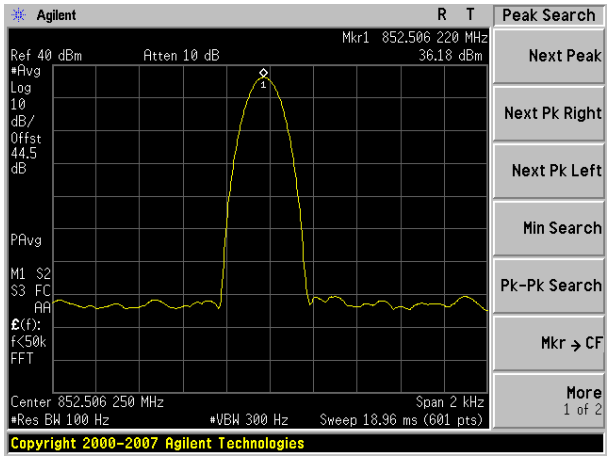
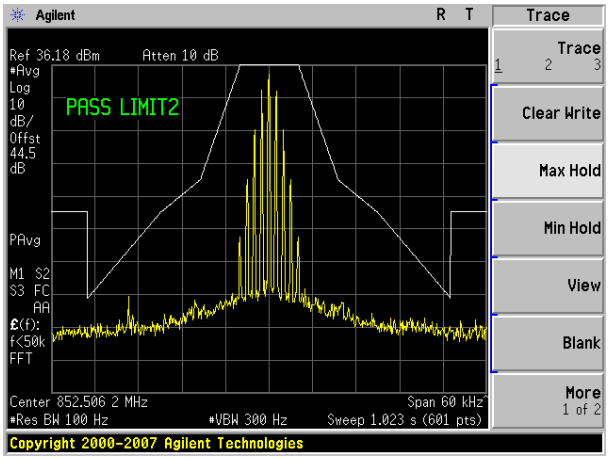
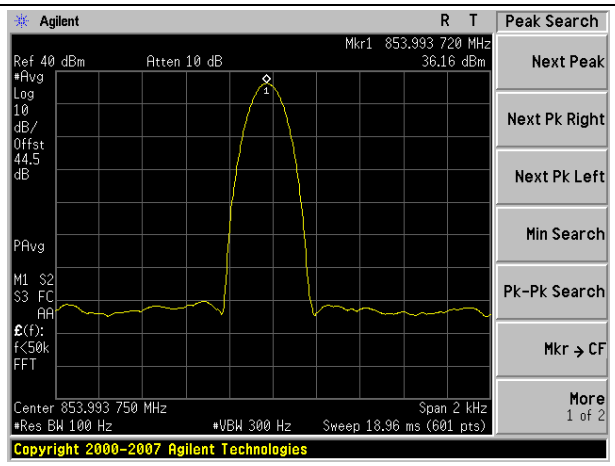
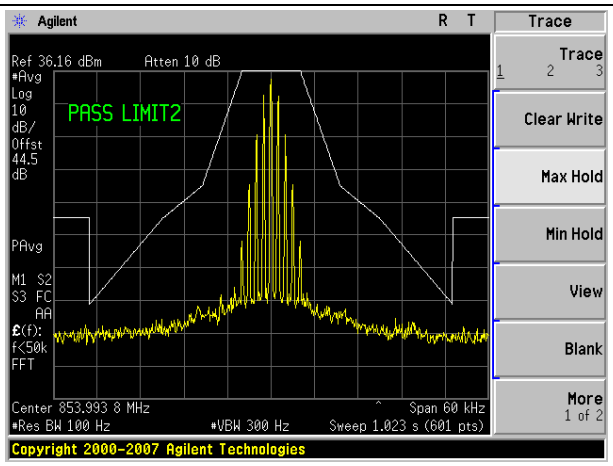
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power (Middle channel)	Mask(Middle channel)
	
Unmodulated power (Highest channel)	Mask(Highest channel)
	

854.00MHz-862.00MHz(Mask B)

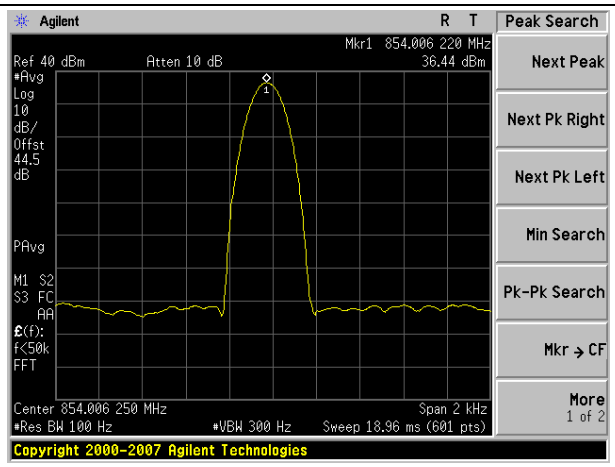
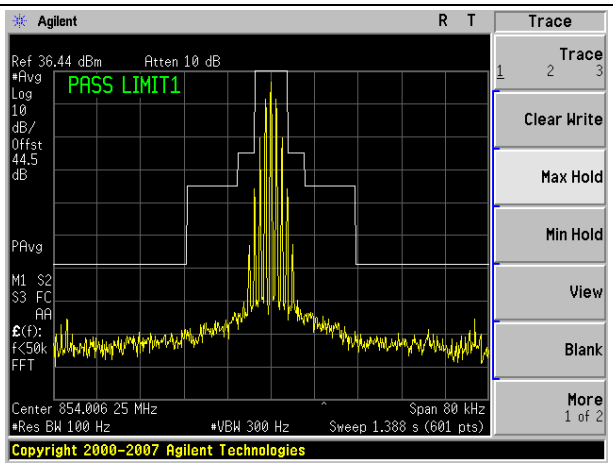
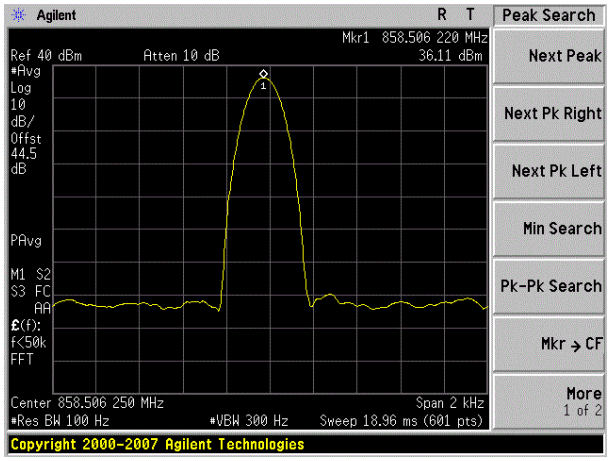
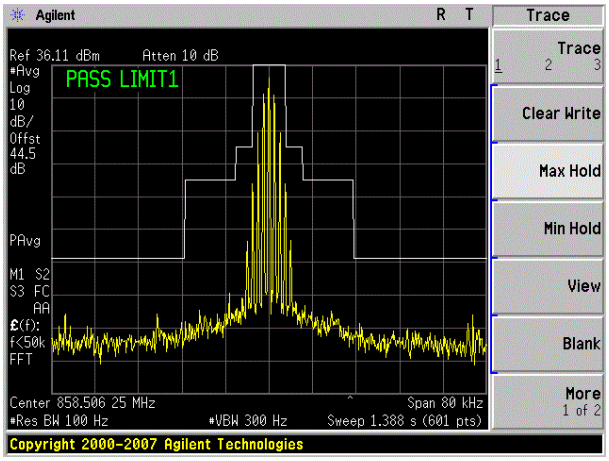
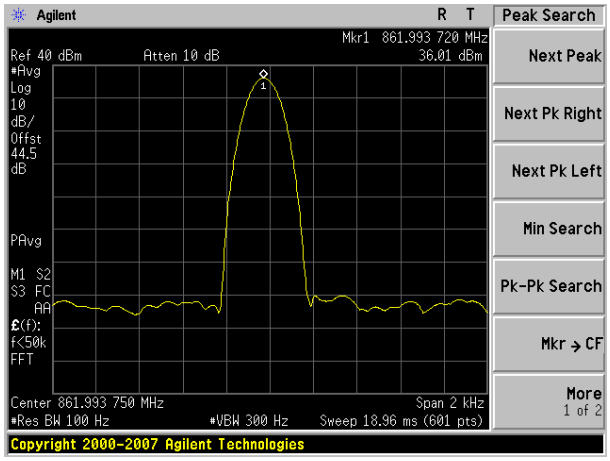
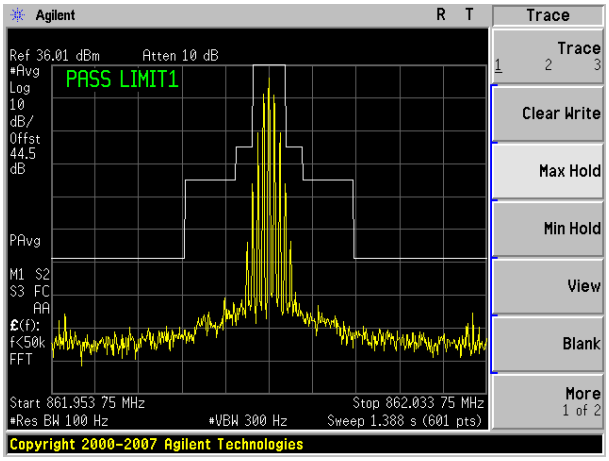
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power(Middle channel)	Mask(Middle channel)
	
Unmodulated power(Highest channel)	Mask(Highest channel)
	

Emission Mask for Analog FM

851.00MHz-854.00MHz(Mask H)

Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power (Middle channel)	Mask(Middle channel)
	
Unmodulated power (Highest channel)	Mask(Highest channel)
	

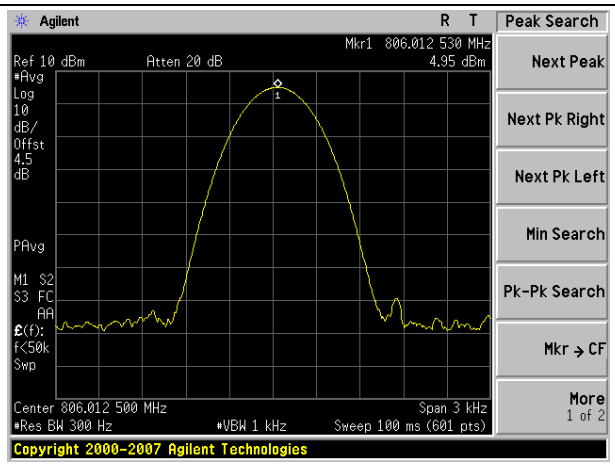
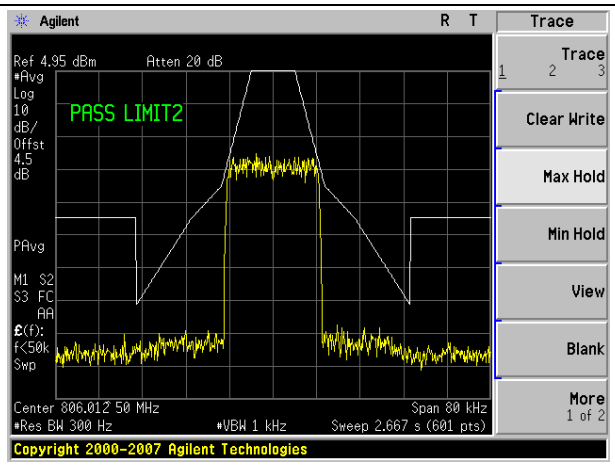
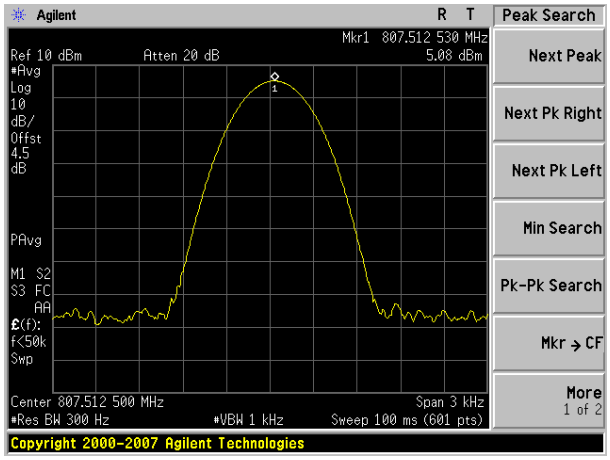
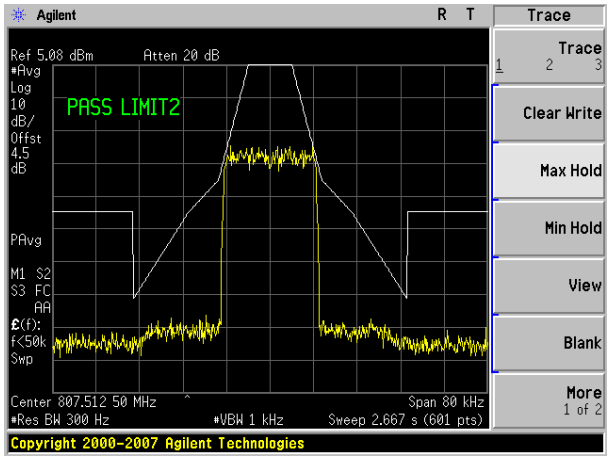
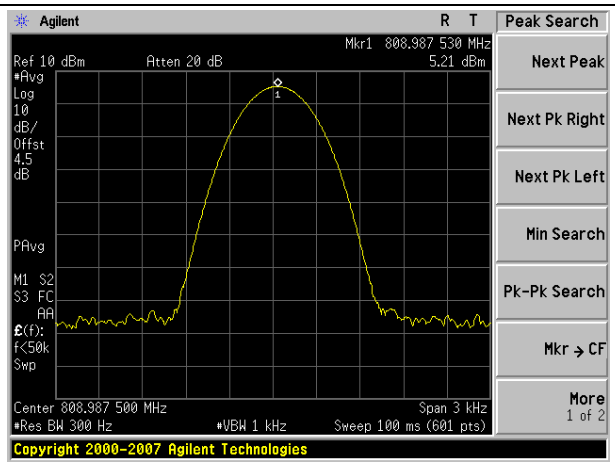
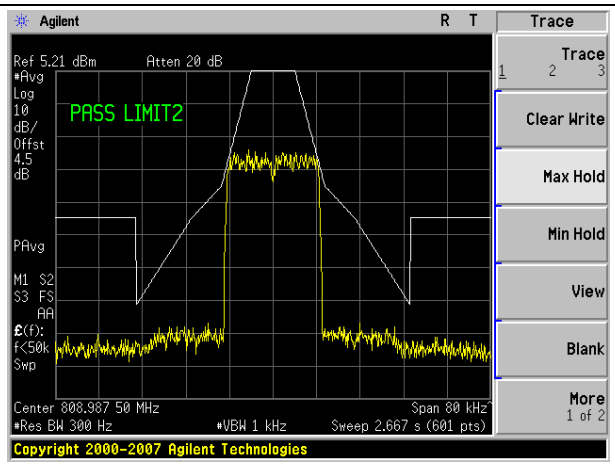
854.00MHz-862.00MHz(Mask B)

Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power(Middle channel)	Mask(Middle channel)
	
Unmodulated power(Highest channel)	Mask(Highest channel)
	

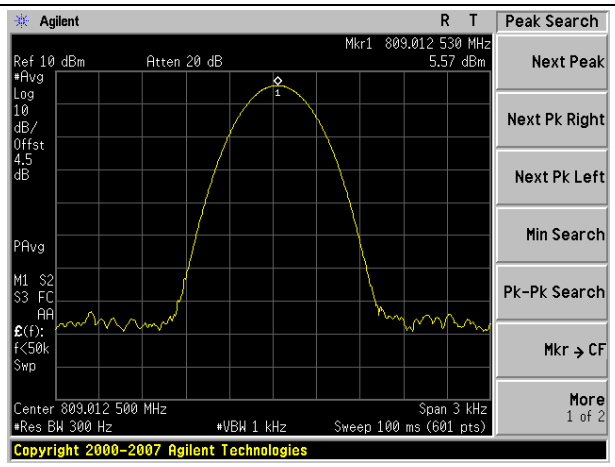
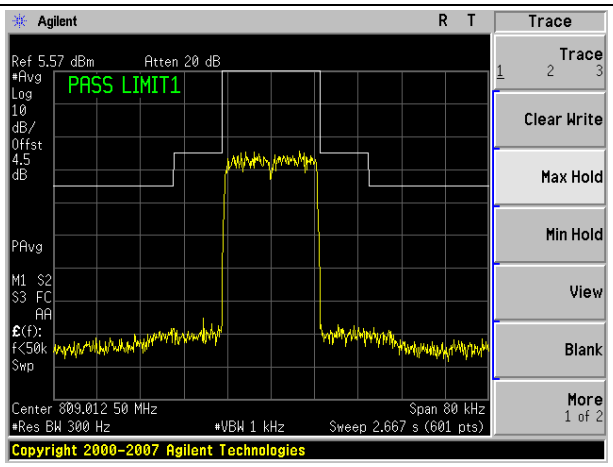
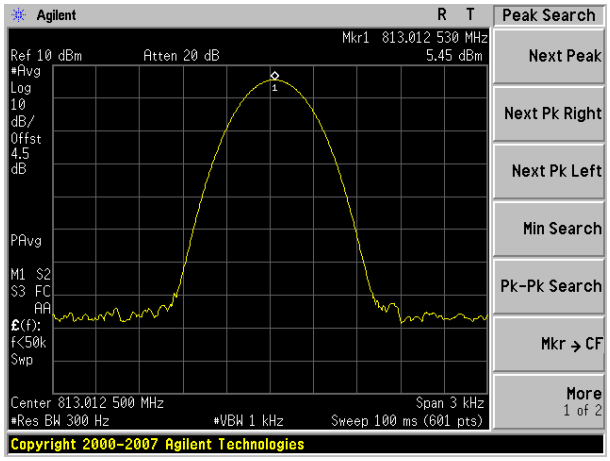
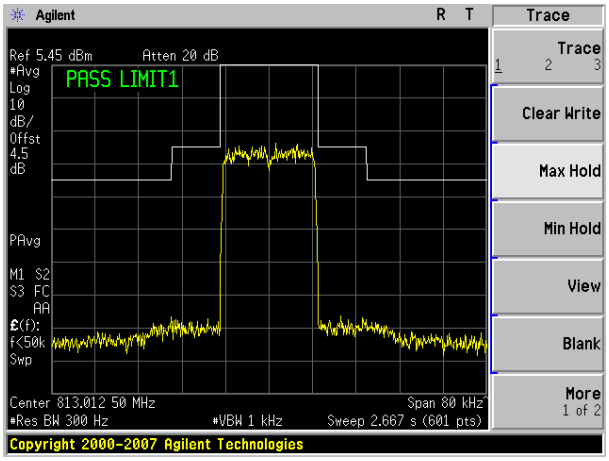
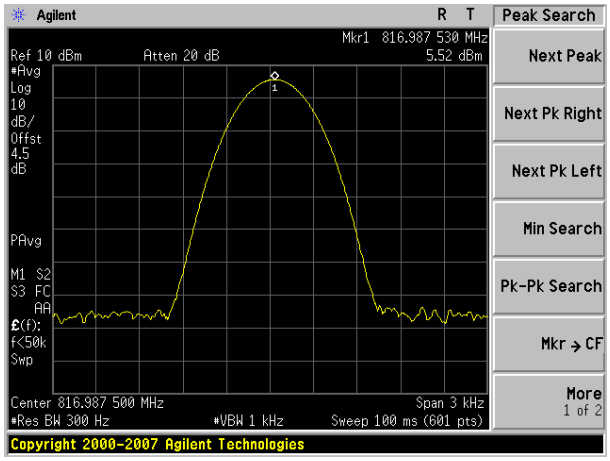
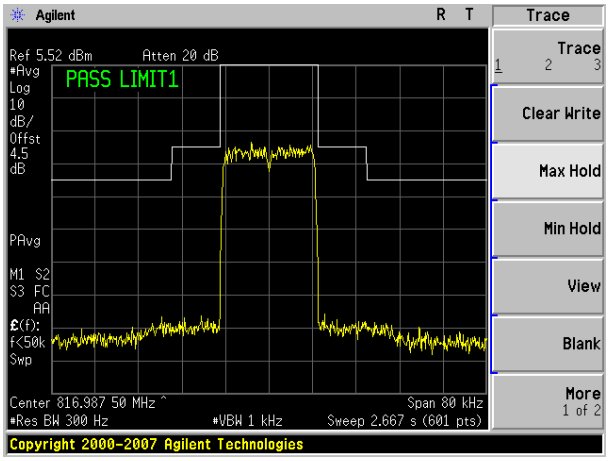
Uplink:

Emission Mask for iDEN

806.00MHz-809.00MHz(Mask H)

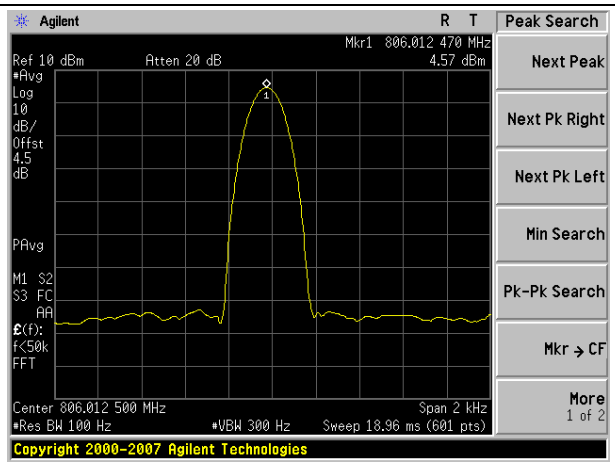
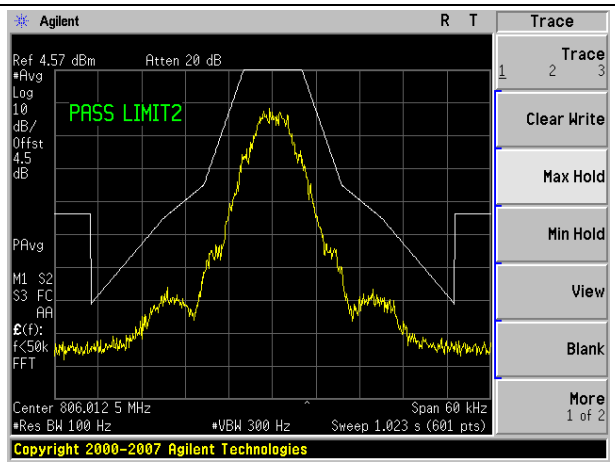
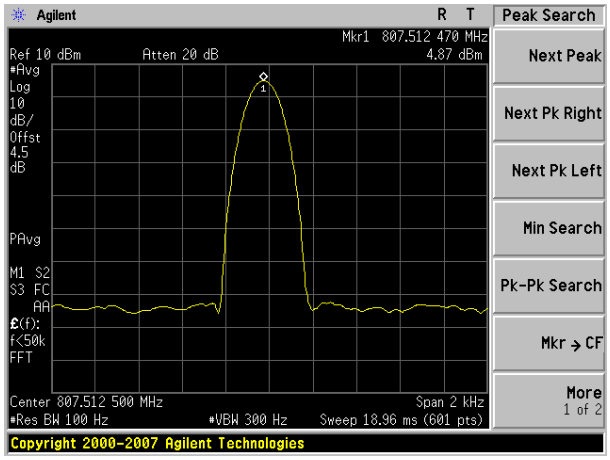
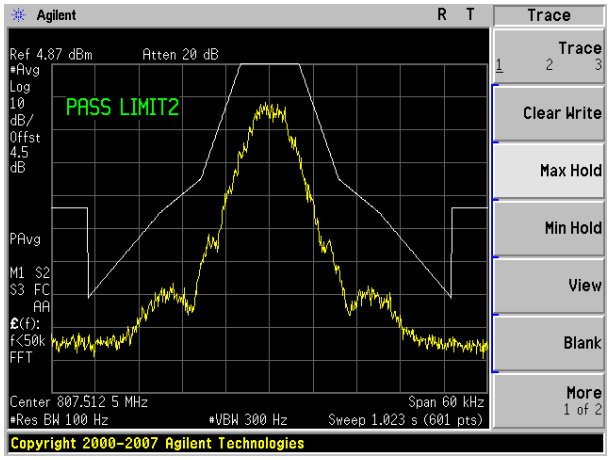
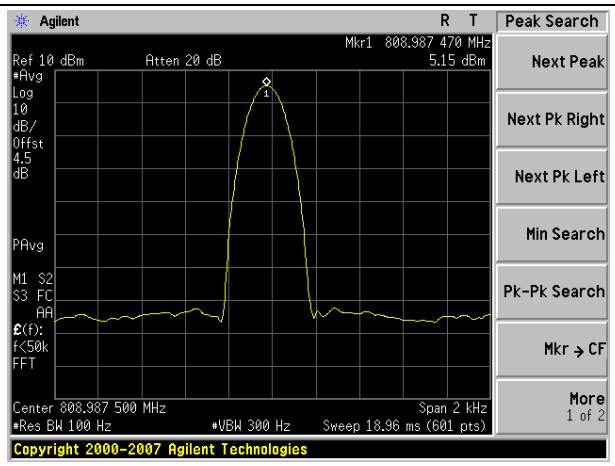
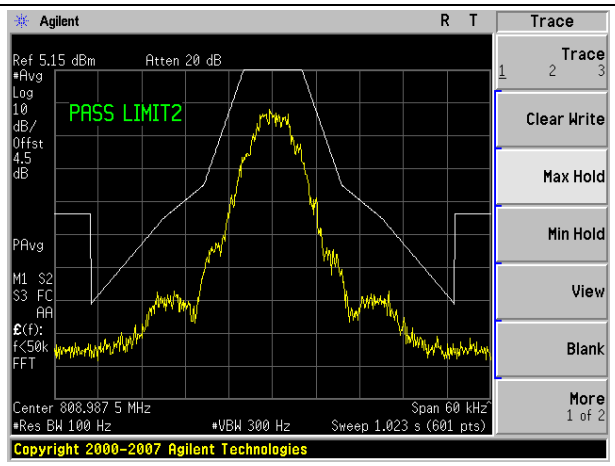
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power (Middle channel)	Mask(Middle channel)
	
Unmodulated power (Highest channel)	Mask(Highest channel)
	

809.00MHz-817.00MHz(Mask B)

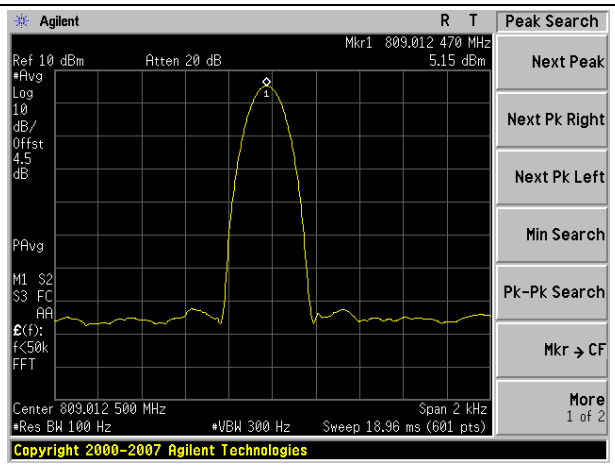
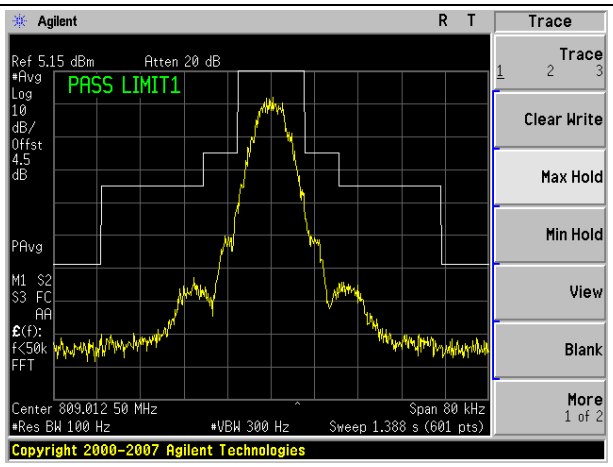
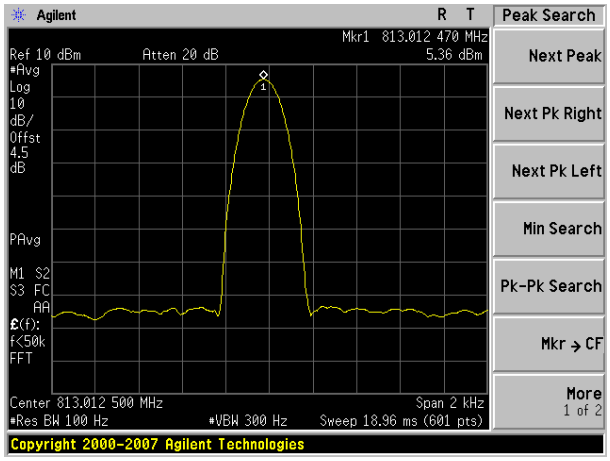
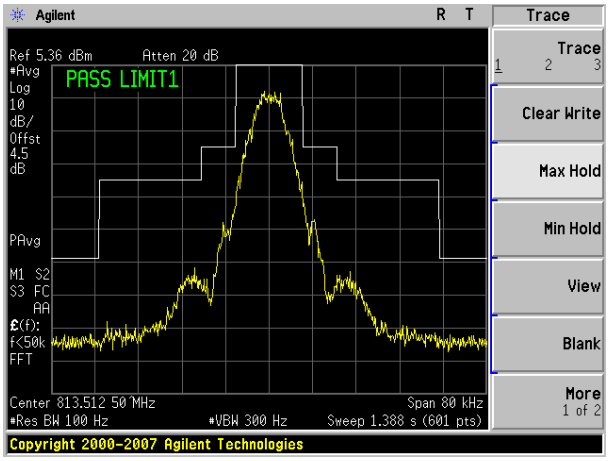
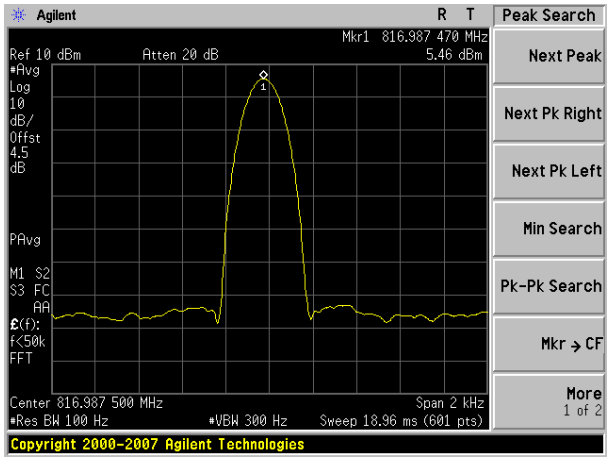
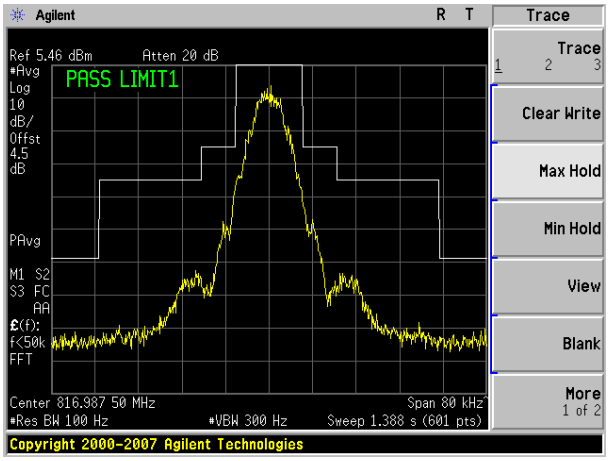
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power(Middle channel)	Mask(Middle channel)
	
Unmodulated power(Highest channel)	Mask(Highest channel)
	

Emission Mask for C4FM

806.00MHz-809.00MHz(Mask H)

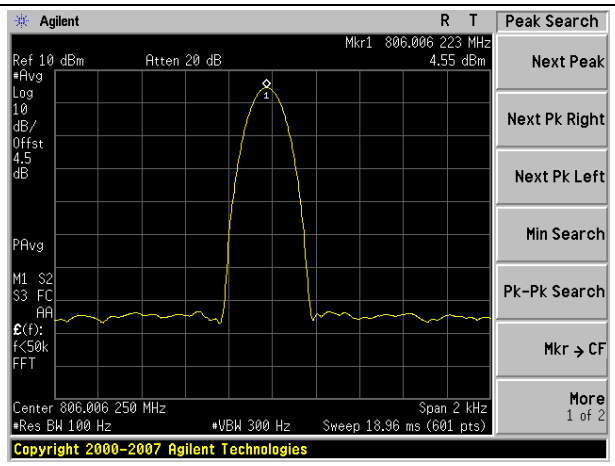
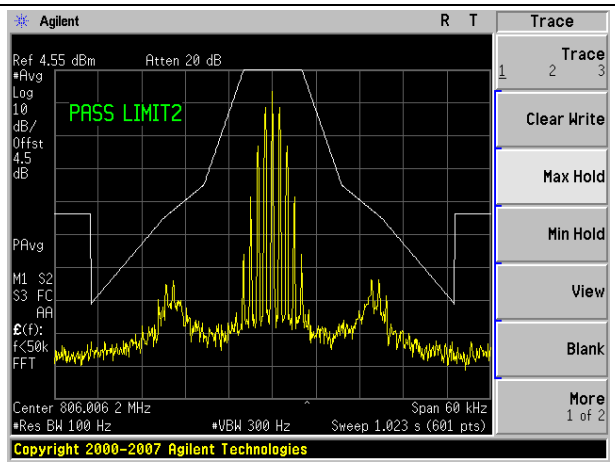
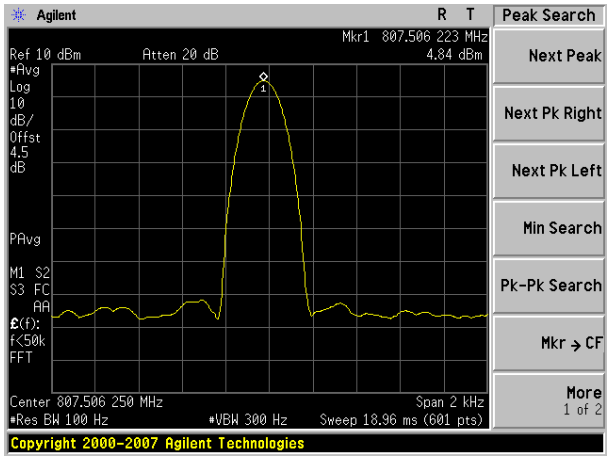
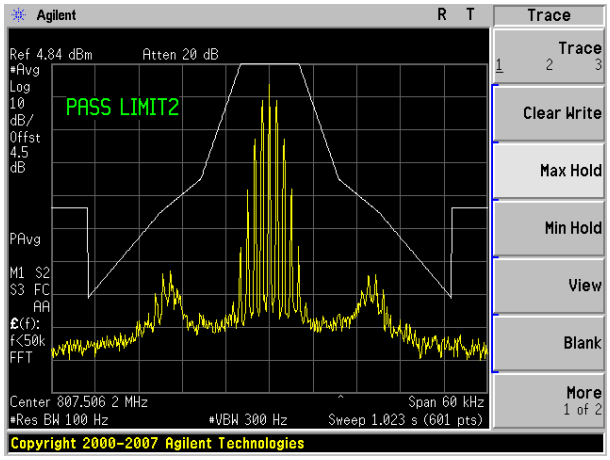
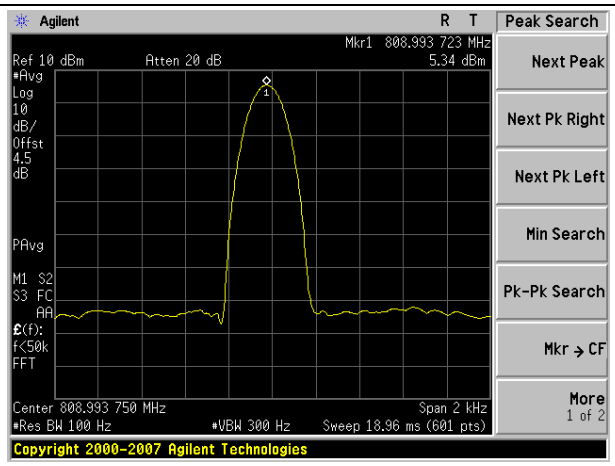
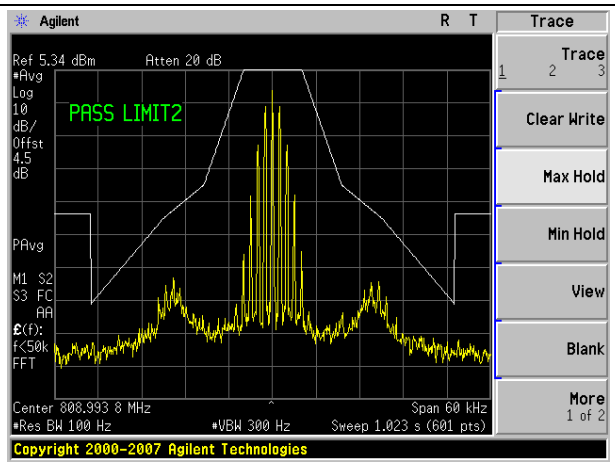
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power (Middle channel)	Mask(Middle channel)
	
Unmodulated power (Highest channel)	Mask(Highest channel)
	

809.00MHz-817.00MHz(Mask B)

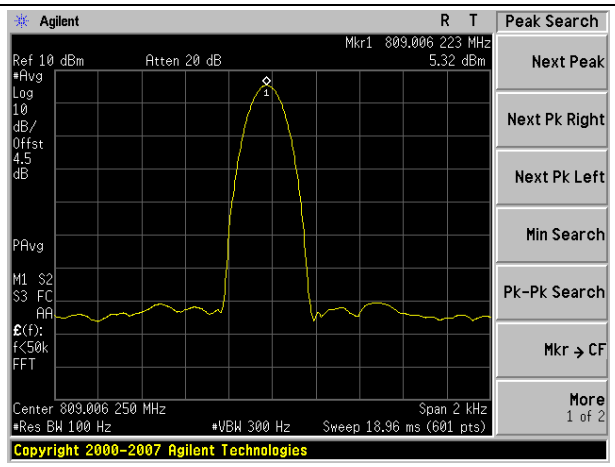
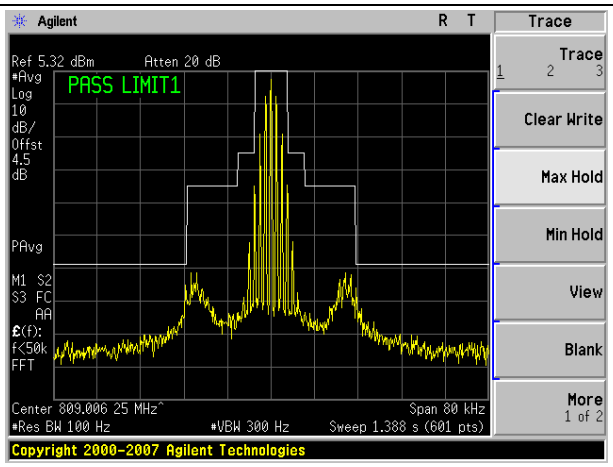
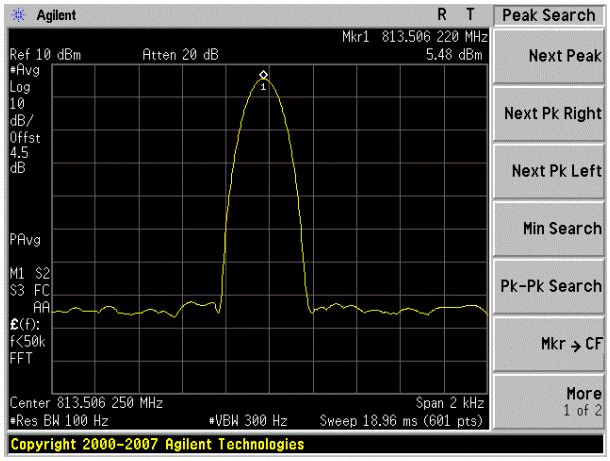
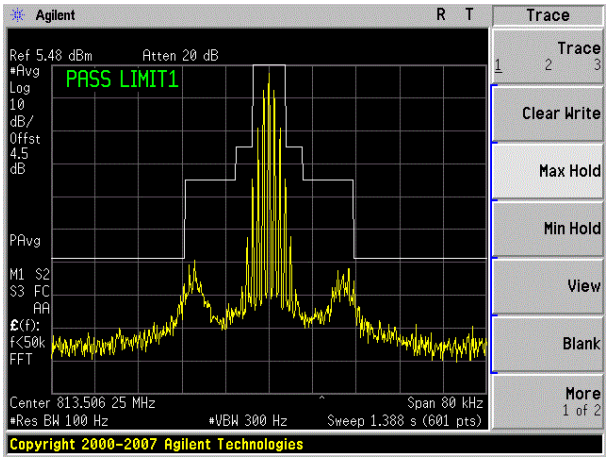
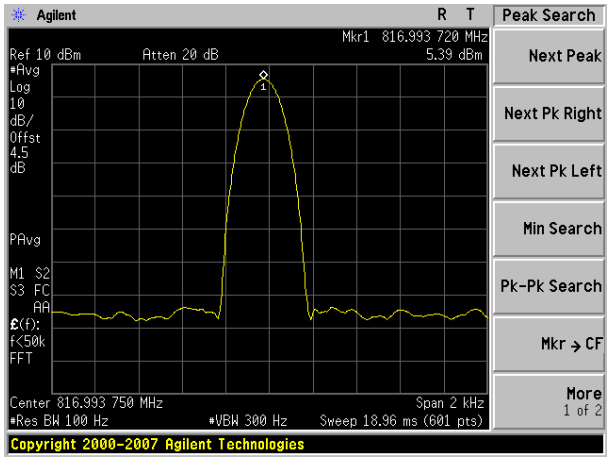
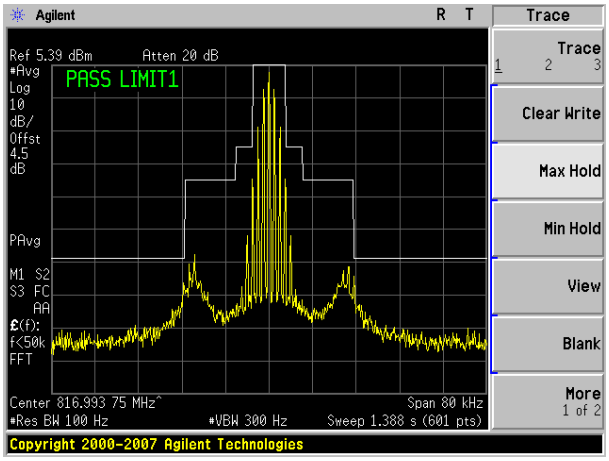
Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power(Middle channel)	Mask(Middle channel)
	
Unmodulated power(Highest channel)	Mask(Highest channel)
	

Emission Mask for Analog FM

806.00MHz-809.00MHz(Mask H)

Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power (Middle channel)	Mask(Middle channel)
	
Unmodulated power (Highest channel)	Mask(Highest channel)
	

809.00MHz-817.00MHz(Mask B)

Unmodulated power(Lowest channel)	Mask(Lowest channel)
	
Unmodulated power(Middle channel)	Mask(Middle channel)
	
Unmodulated power(Highest channel)	Mask(Highest channel)
	

12 NOISE AT ANTENNA TERMINALS

12.1 Standard Applicable

According to FCC § 90.210(d) and § 90.210(e)

12.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

12.3 Measurement Procedure

The test signals used is iDEN、C4FM、Analog FM. The different signals were input one at a time to the EUT. Tests was performed with iDEN、C4FM、Analog FM signal input.

1. The ERP of noise within the signal booster passband should not exceed -43dBm.
2. The ERP of noise on spectrum more than 1MHz outside of the signal booster passband should not exceed -70dBm.
3. The noise figure of a signal booster mast not exceed 9dB in either direction.

Spectrum analyzer settings:

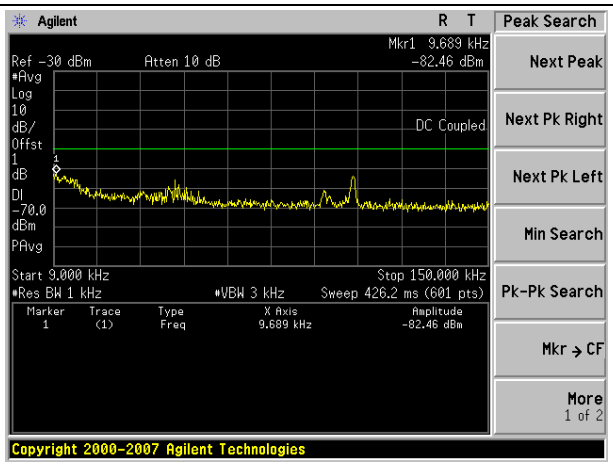
RBW=10KHz, VBW=30KHz

12.4 Test Result

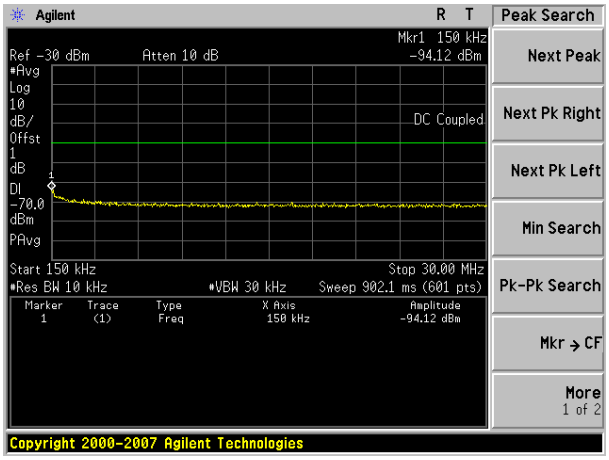
Passed.

more than 1MHz outside of the signal booster passband

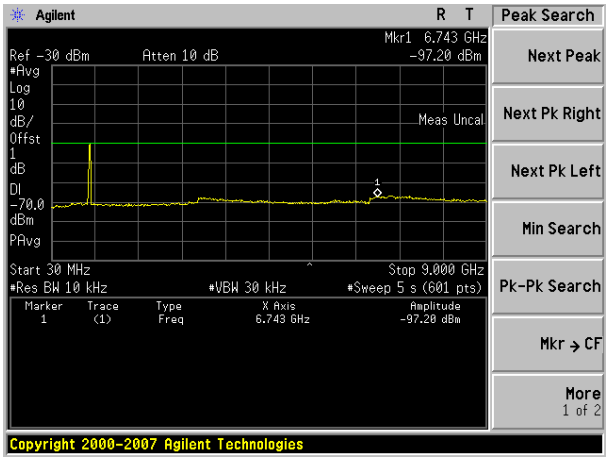
9KHz-150KHz



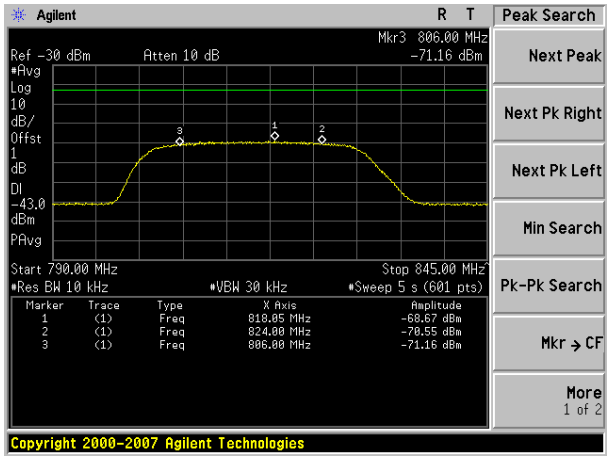
150KHz-30MHz

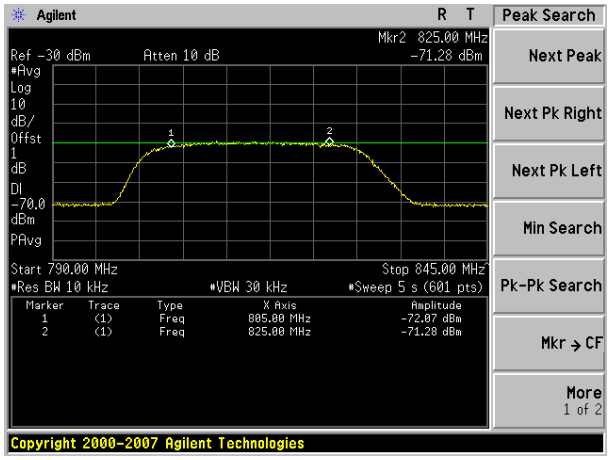


30MHz-9000MHz



within the signal booster passband





noise figure of a signal booster

13 INTERMODULATION

13.1 Standard Applicable

According to FCC § 2.1051 and § 90.219(d)

13.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

13.3 Measurement Procedure

1. The EUT RF output port was connected to spectrum analyzer. The EUT shall be set to maximum gain
   and maximum rated output power per channel.
2. Two continuous sinusoidal RF signals shall be fed to the input antenna port of the repeater using a combining device. The two channels near each other should be separated by at least one operating channel width.
3. The spurious emissions at antenna were measured at the RF output port of the EUT.
4. The modulation types tested is iDEN、C4FM、Analog FM.

Spectrum analyzer settings:

Detector: RMS.

Intermodulation:

RBW=1%of the occupied channel bandwidth without going below 1%; VBW≥ RBW

Spurious emissions:

Below 1G: RBW=100kHz; Above 1G: RBW=1 MHz ; VBW≥ RBW

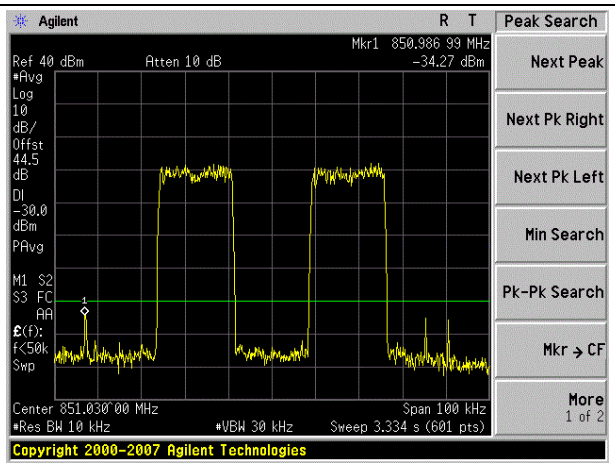
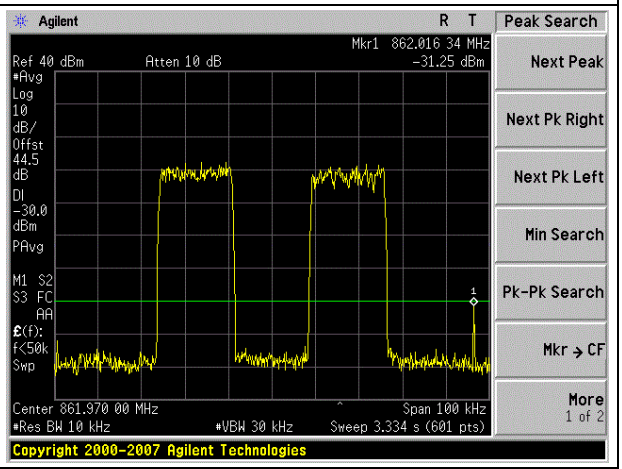
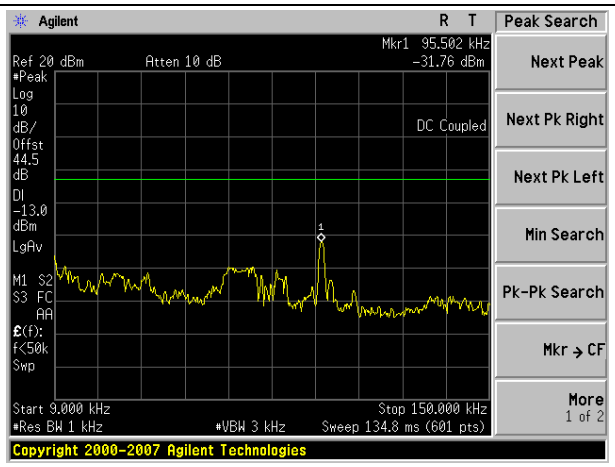
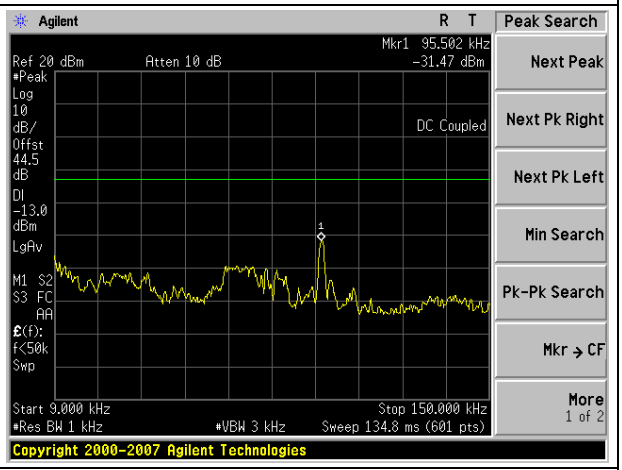
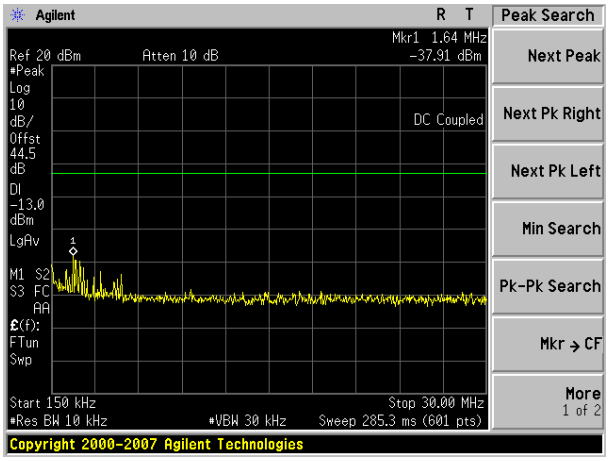
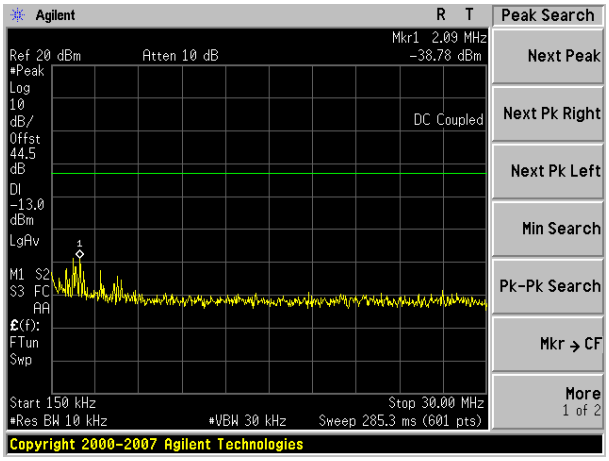
13.4 Test Result

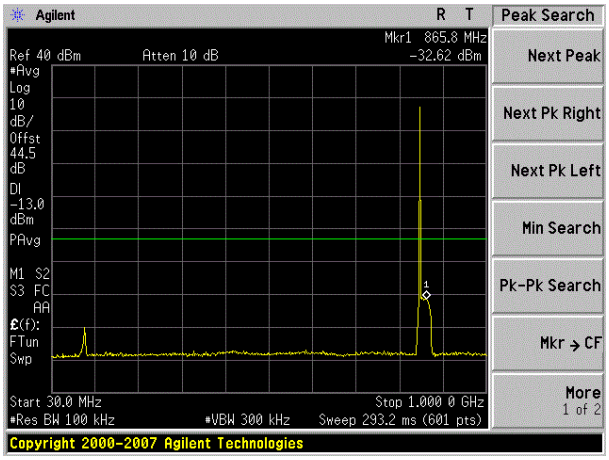
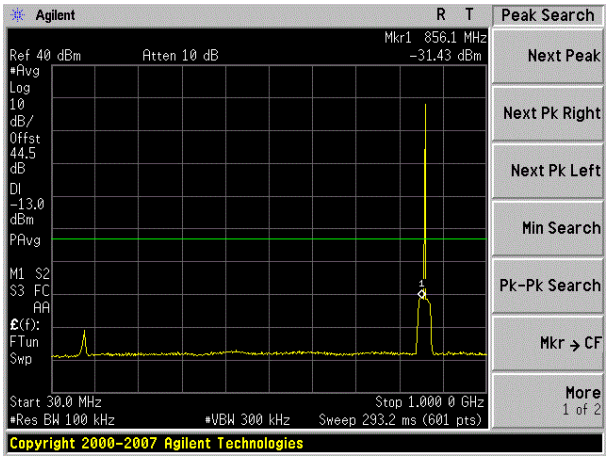
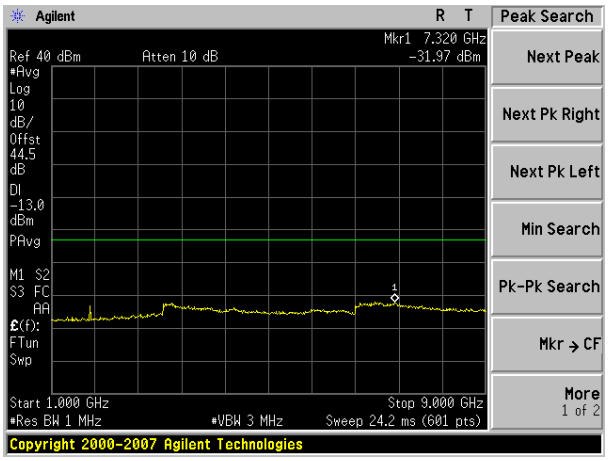
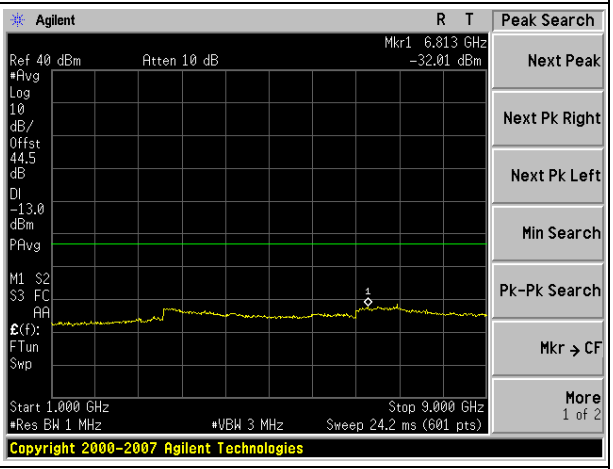
Passed.

Remark: Both case of the normal input power level and increase 3dB above the AGC threshold were tested, we found this case increase 3dB above the AGC threshold which was the worst, and record in the report.

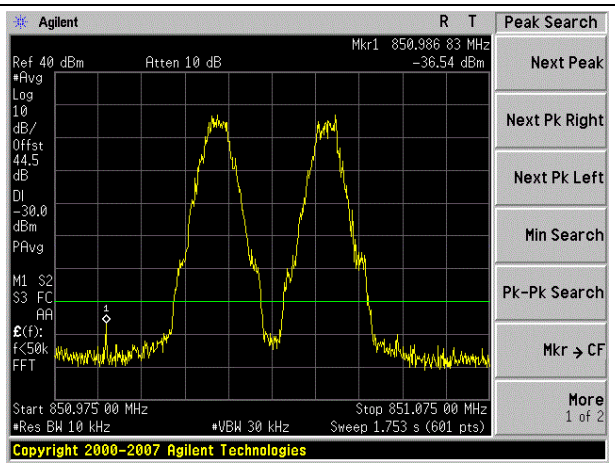
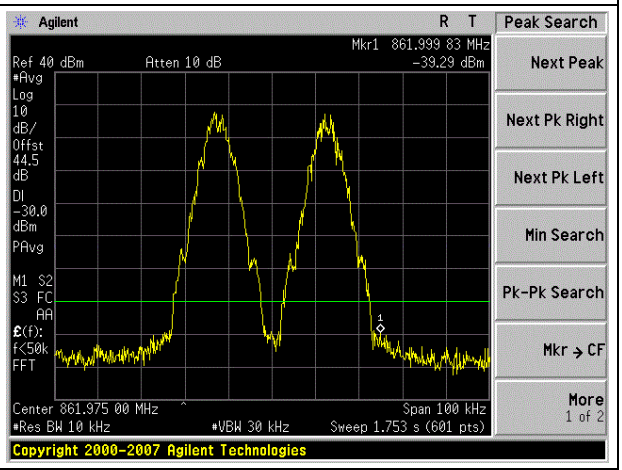
Downlink:

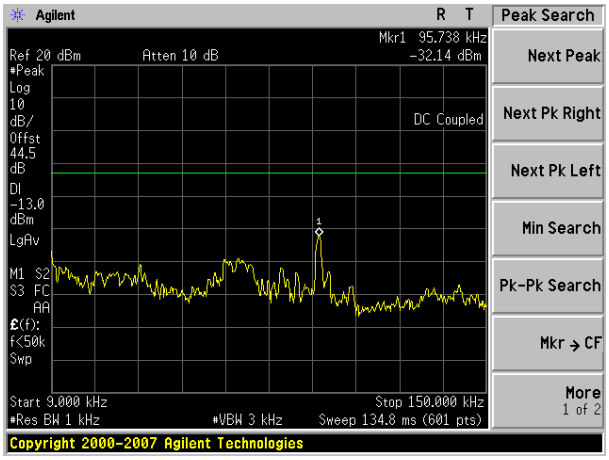
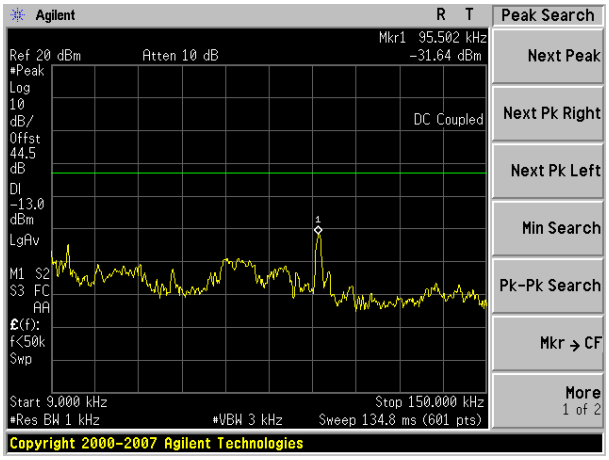
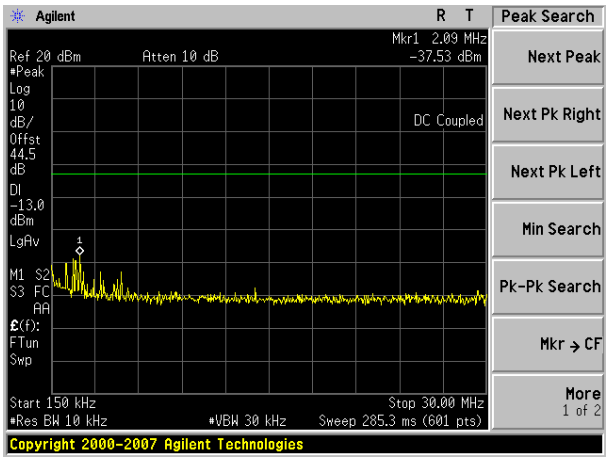
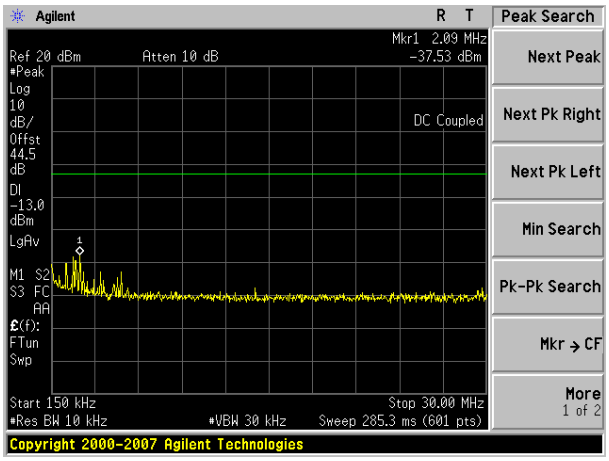
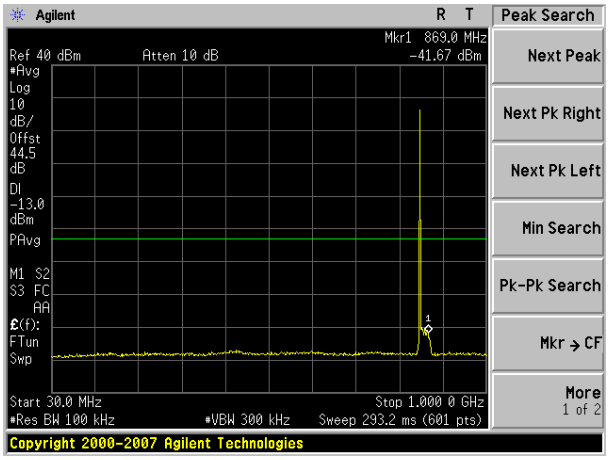
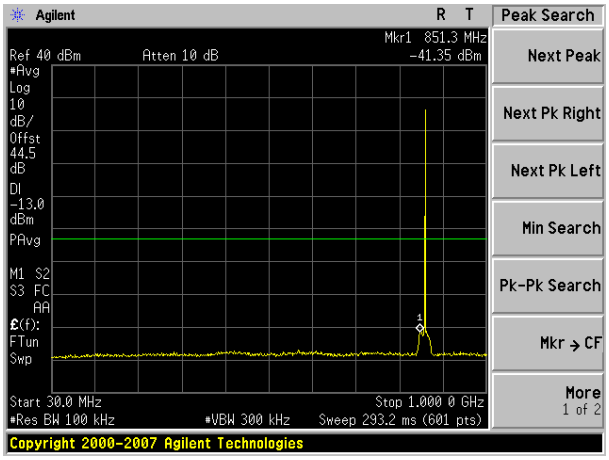
Intermodulation of iDEN

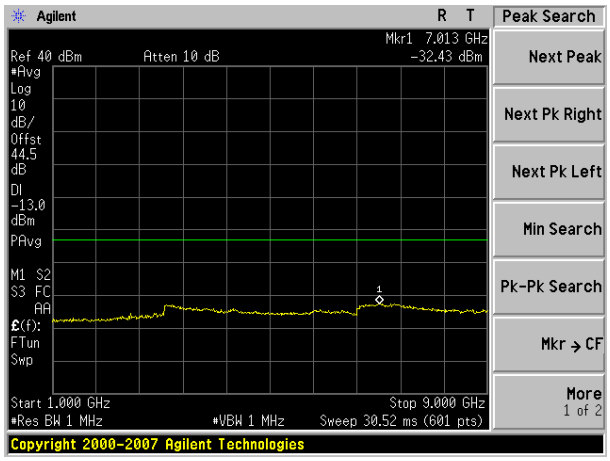
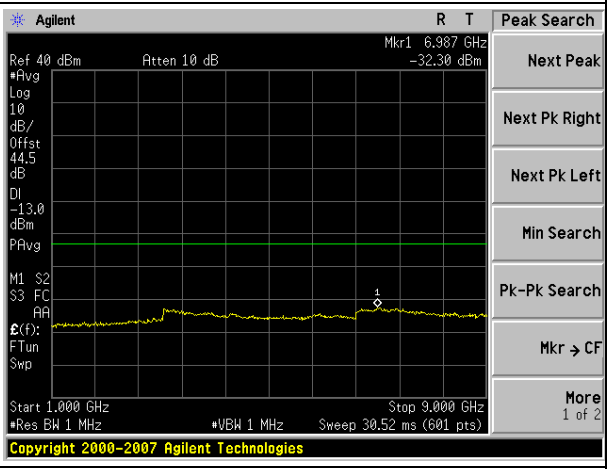
Intermodulation - Low part of band	Intermodulation - High part of band
	
9KHz-150KHz spurious emissions	9KHz-150KHz spurious emissions
	
150KHz-30MHz spurious emissions	150KHz-30MHz spurious emissions
	

30MHz-1000MHz spurious emissions	30MHz-1000MHz spurious emissions
	
1000MHz-9000MHz spurious emissions	1000MHz-9000MHz spurious emissions
	

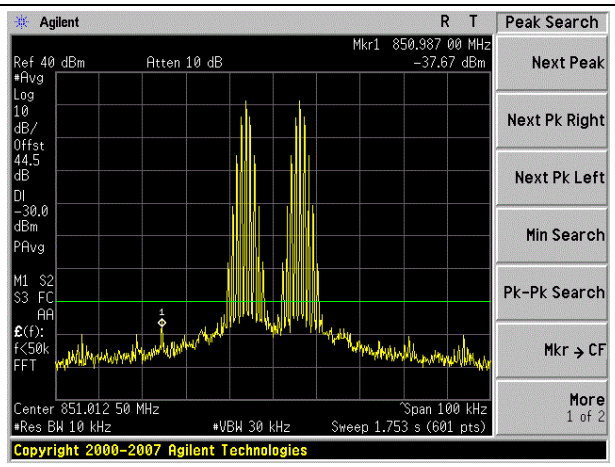
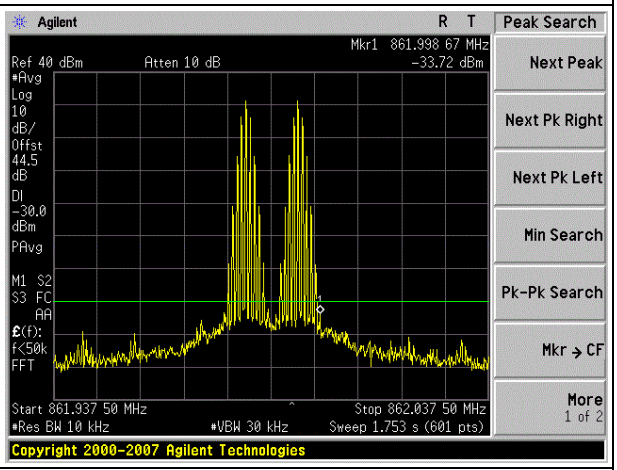
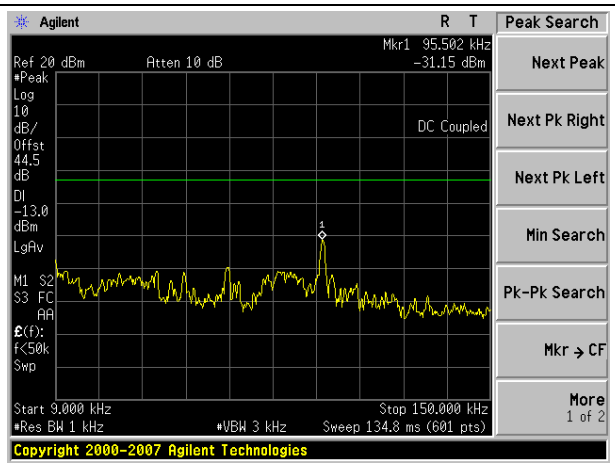
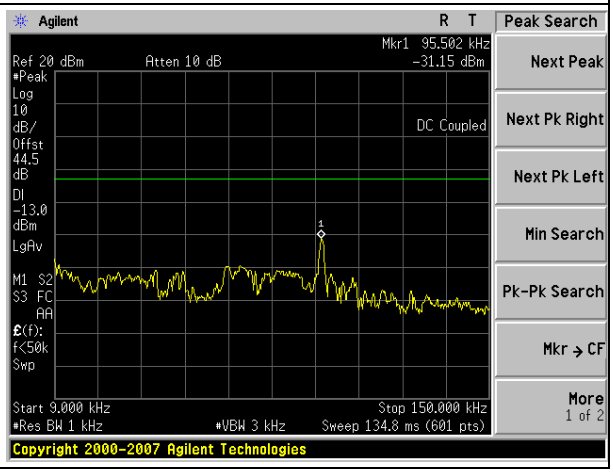
Intermodulation of C4FM

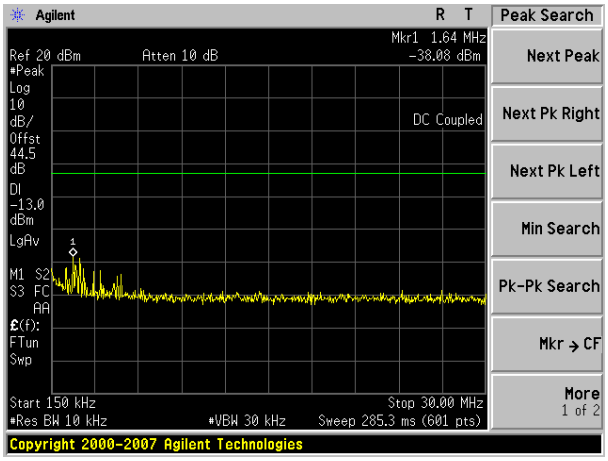
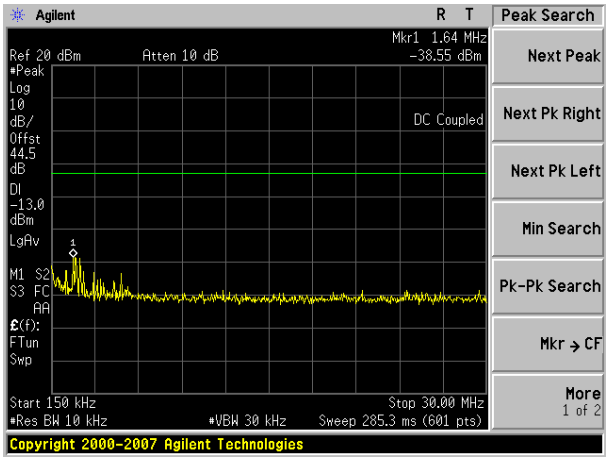
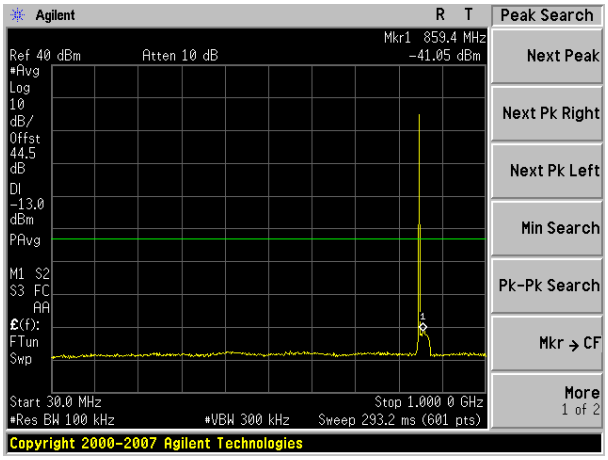
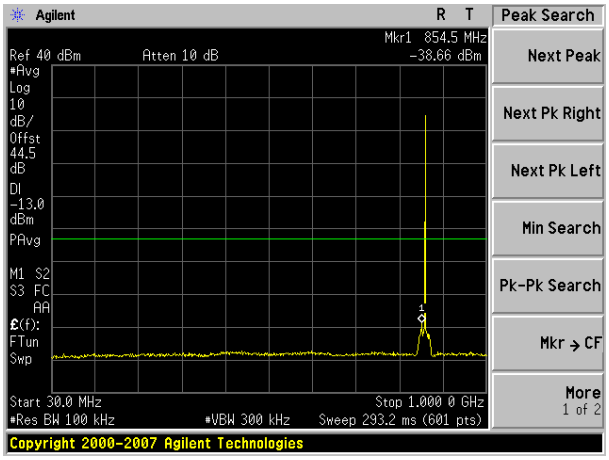
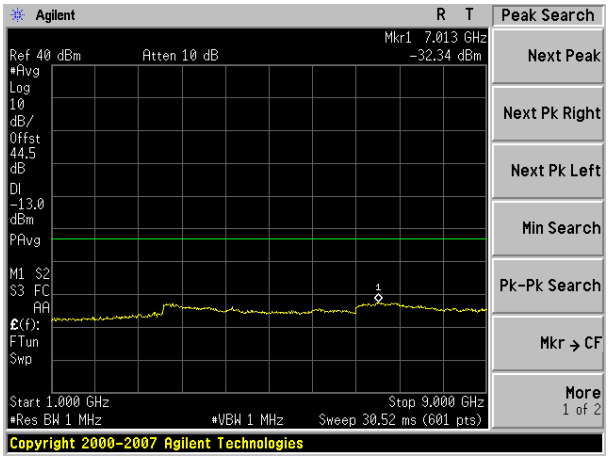
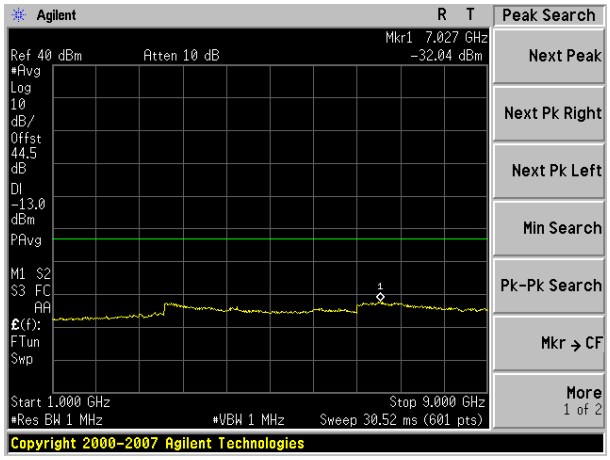
Intermodulation - Low part of band	Intermodulation - High part of band
	

9KHz-150KHz spurious emissions	9KHz-150KHz spurious emissions
	
150KHz-30MHz spurious emissions	150KHz-30MHz spurious emissions
	
30MHz-1000MHz spurious emissions	30MHz-1000MHz spurious emissions
	

1000MHz-9000MHz spurious emissions	1000MHz-9000MHz spurious emissions
	

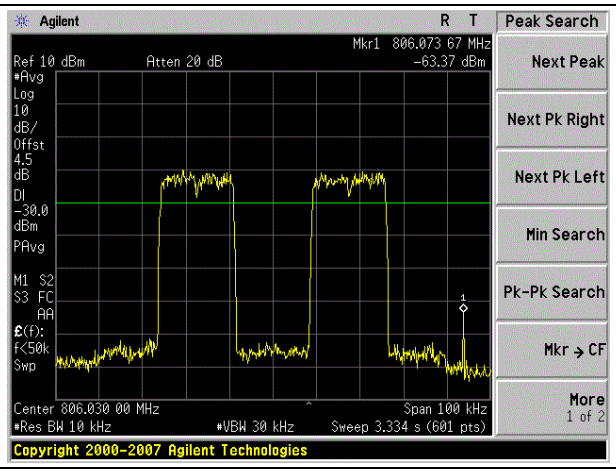
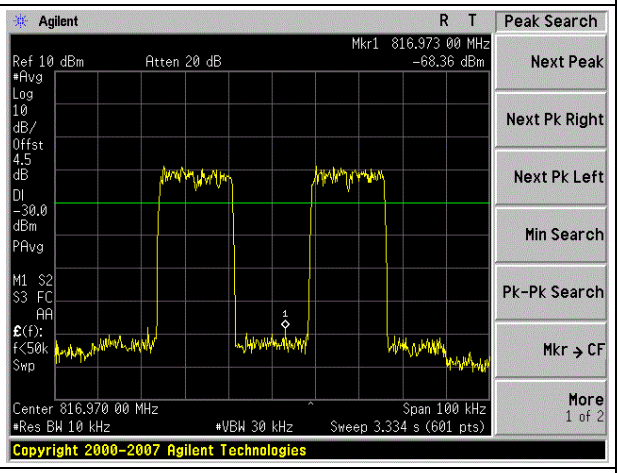
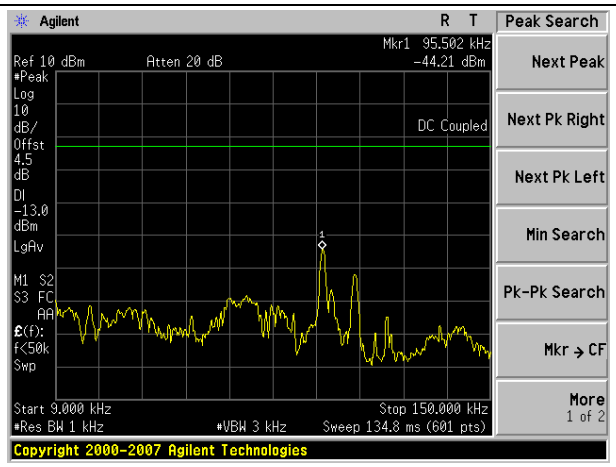
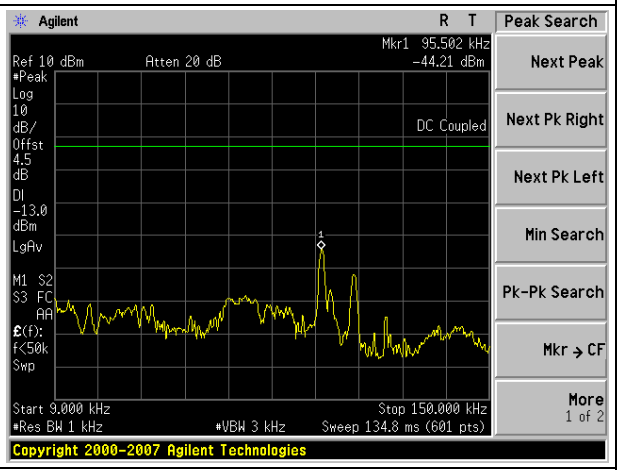
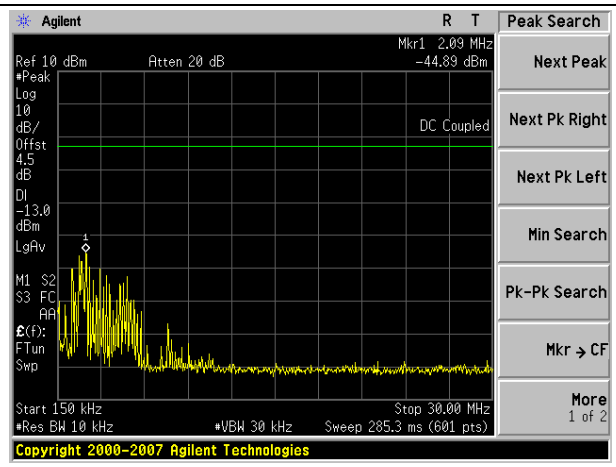
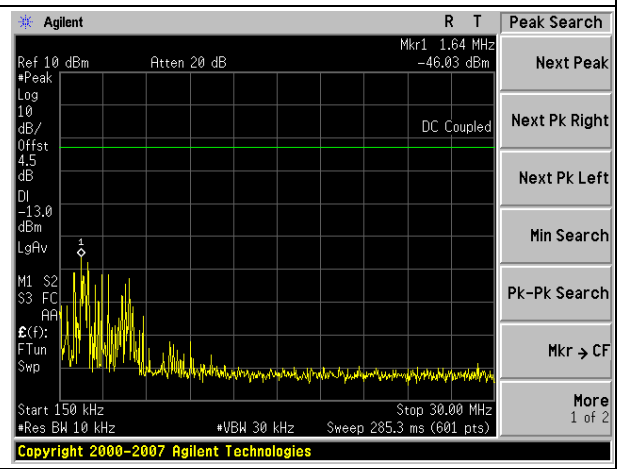
Intermodulation of Analog FM

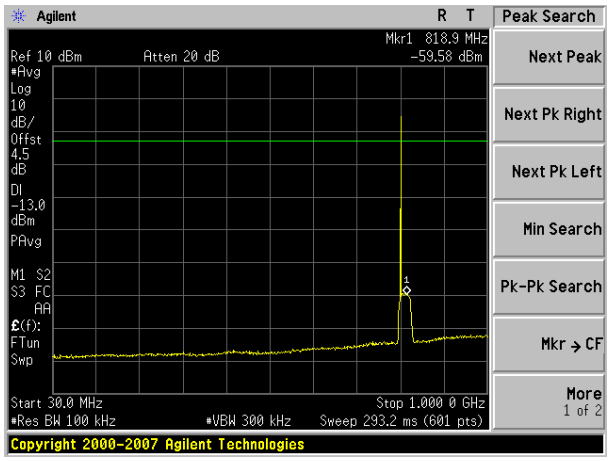
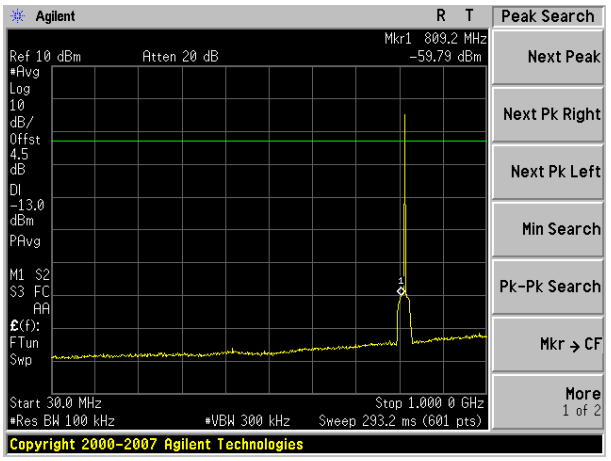
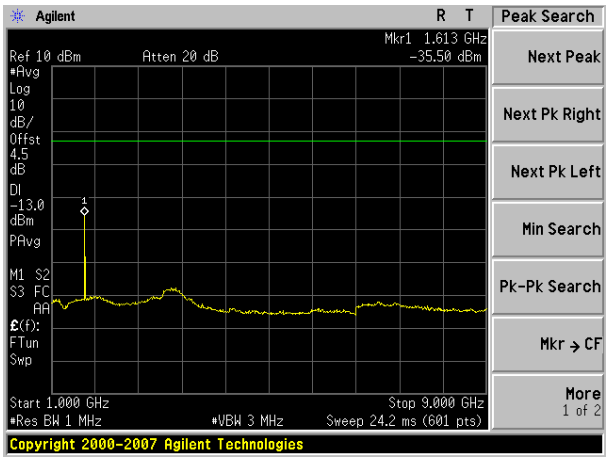
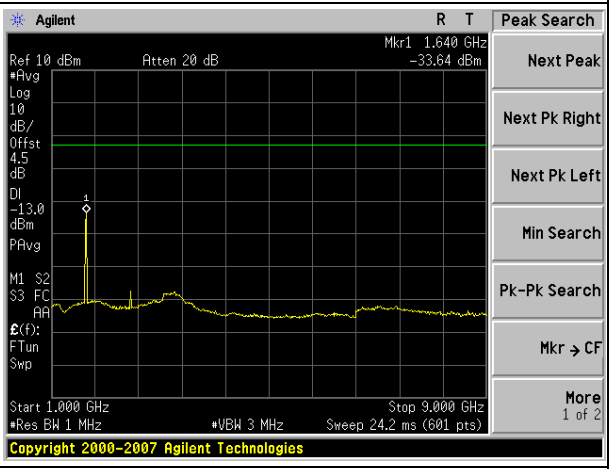
Intermodulation - Low part of band	Intermodulation - High part of band
	
9KHz-150KHz spurious emissions	9KHz-150KHz spurious emissions
	

150KHz-30MHz spurious emissions	150KHz-30MHz spurious emissions
	
30MHz-1000MHz spurious emissions	30MHz-1000MHz spurious emissions
	
1000MHz-9000MHz spurious emissions	1000MHz-9000MHz spurious emissions
	

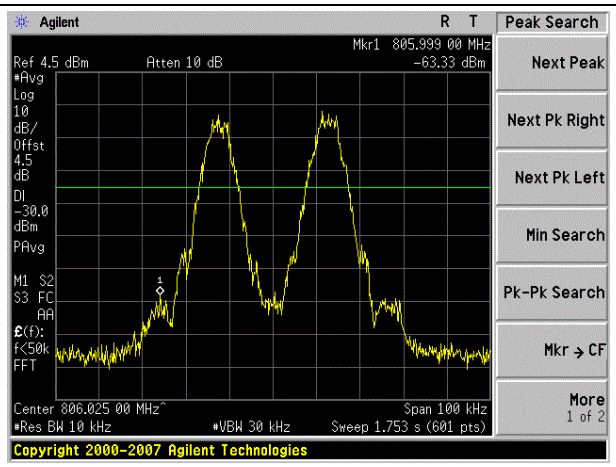
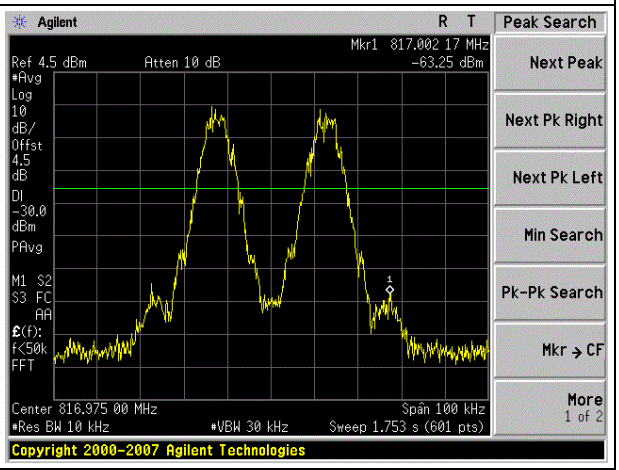
Uplink:

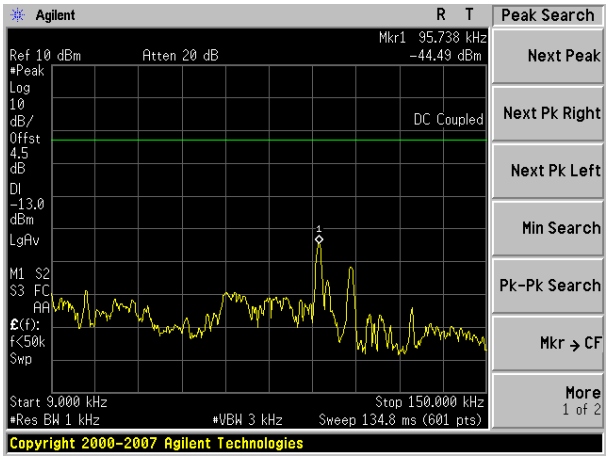
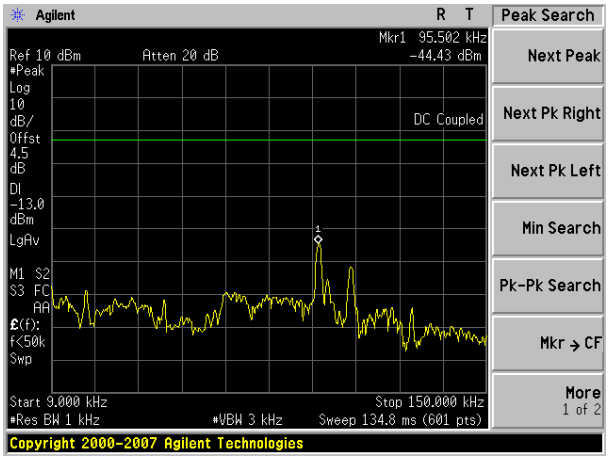
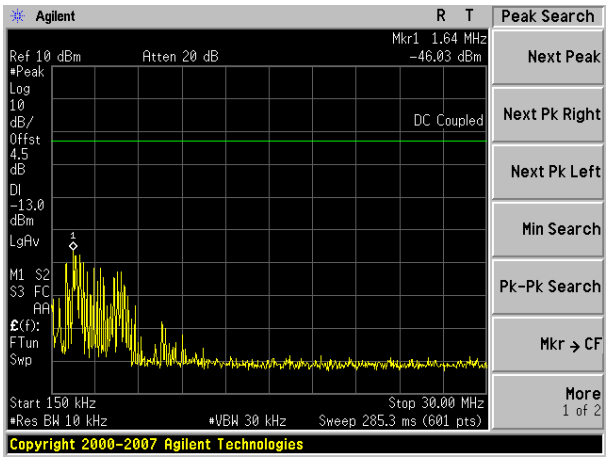
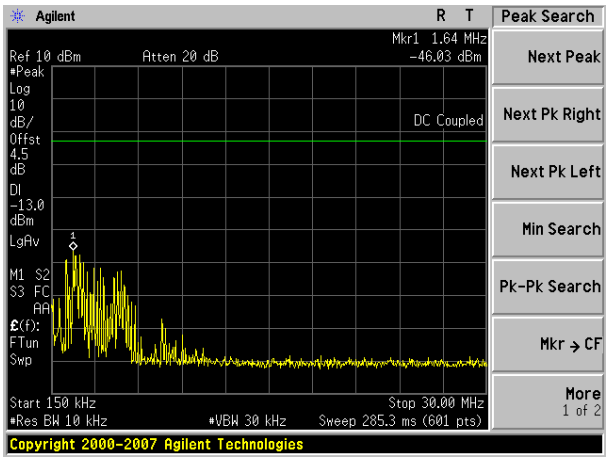
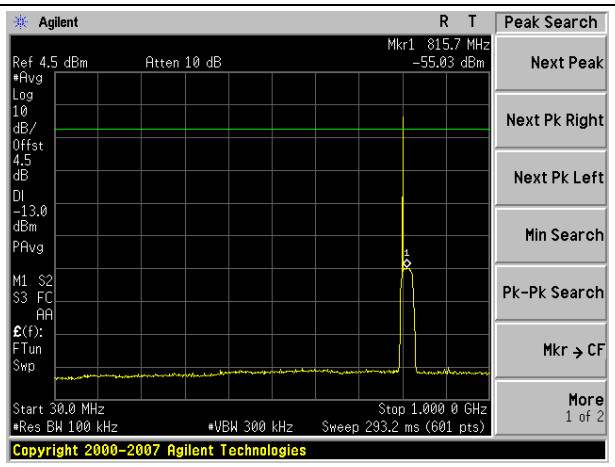
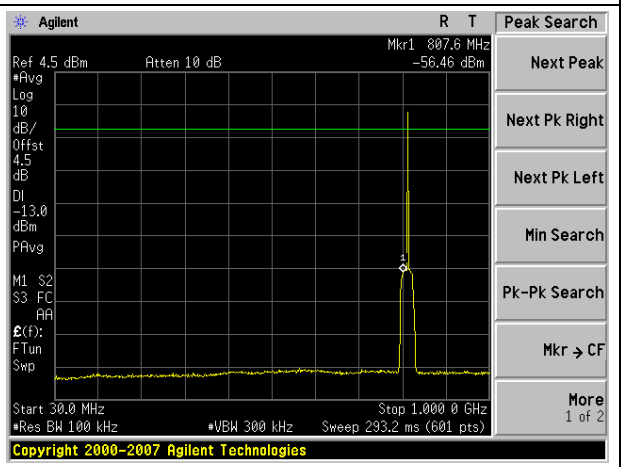
Intermodulation of iDEN

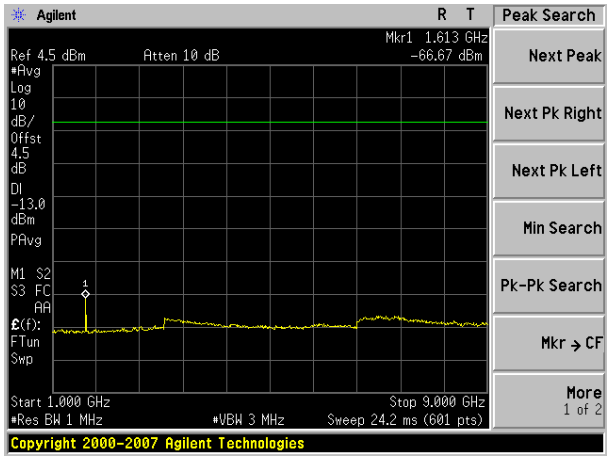
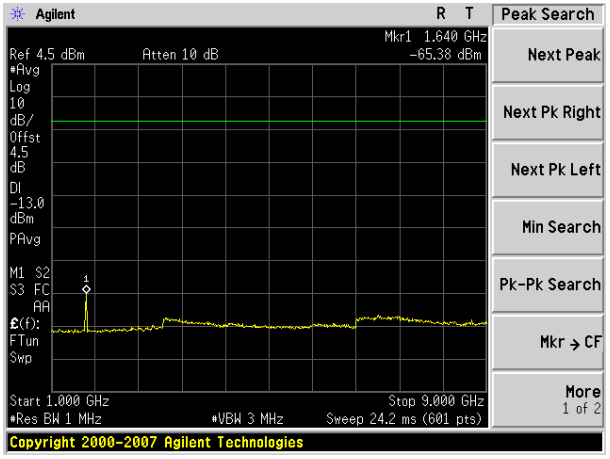
Intermodulation - Low part of band	Intermodulation - High part of band
	
9KHz-150KHz spurious emissions	9KHz-150KHz spurious emissions
	
150KHz-30MHz spurious emissions	150KHz-30MHz spurious emissions
	

30MHz-1000MHz spurious emissions	30MHz-1000MHz spurious emissions
	
1000MHz-9000MHz spurious emissions	30MHz-1000MHz spurious emissions
	

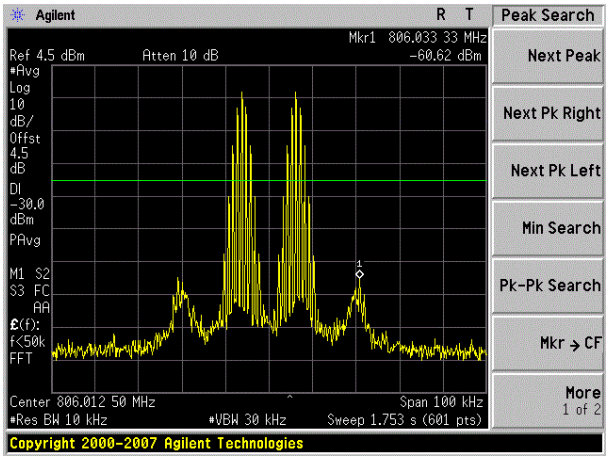
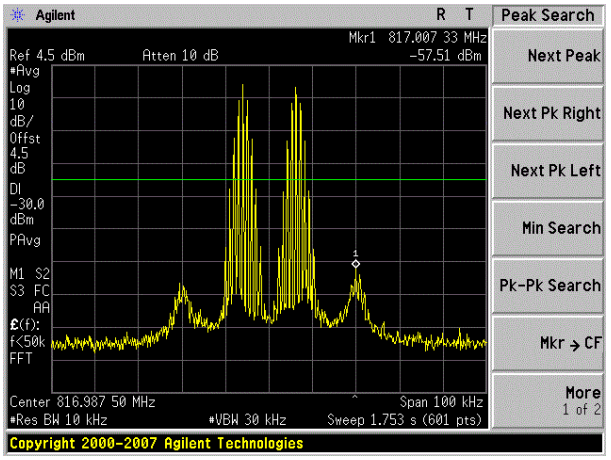
Intermodulation of C4FM

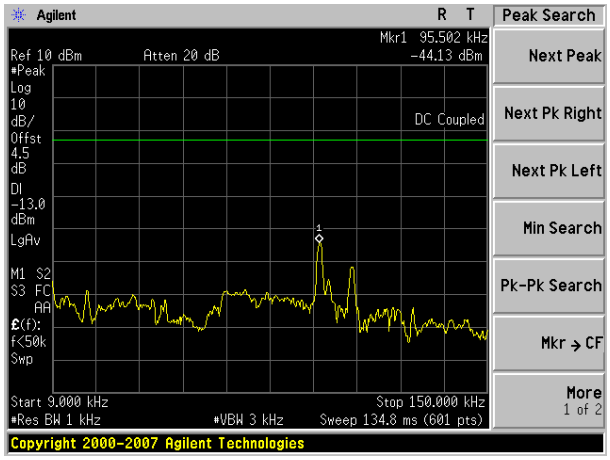
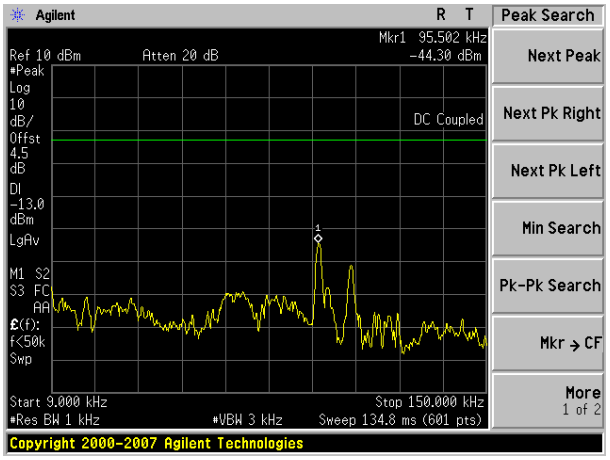
Intermodulation - Low part of band	Intermodulation - High part of band
	

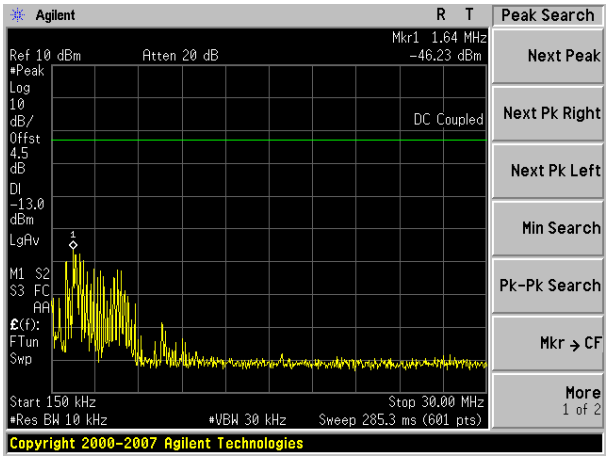
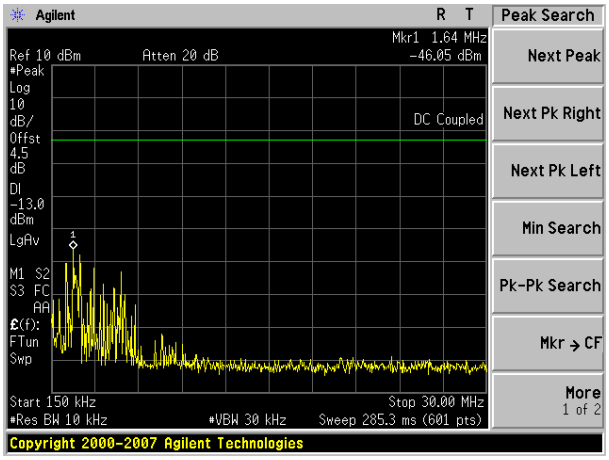
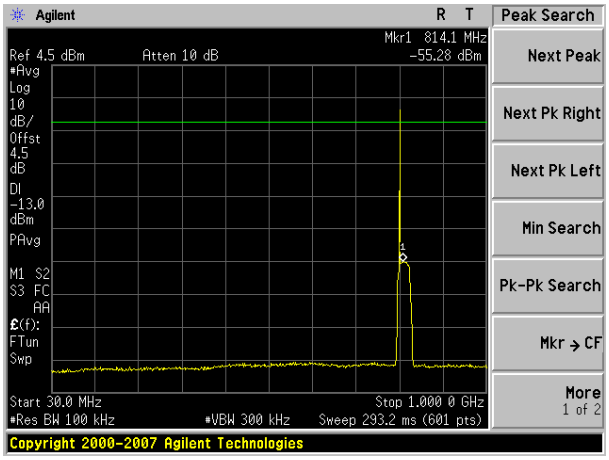
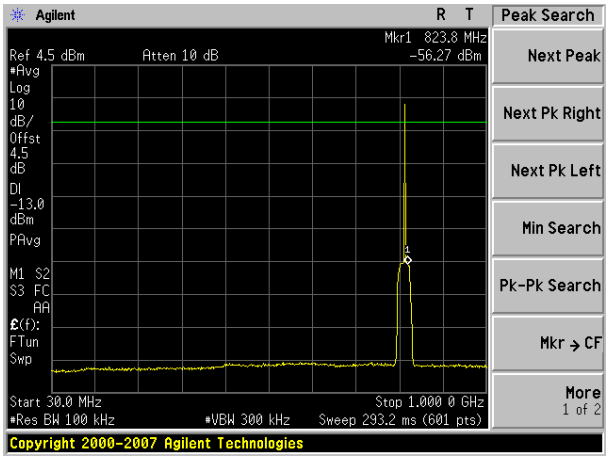
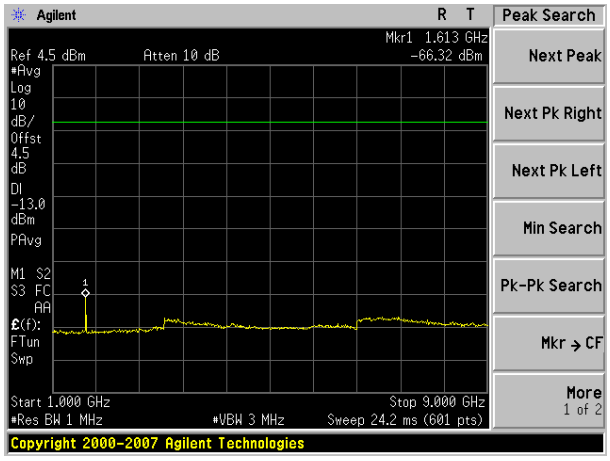
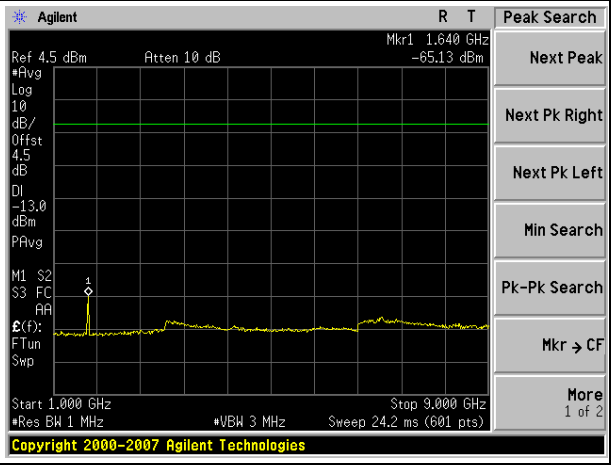
9KHz-150KHz spurious emissions	9KHz-150KHz spurious emissions
	
150KHz-30MHz spurious emissions	150KHz-30MHz spurious emissions
	
30MHz-1000MHz spurious emissions	30MHz-1000MHz spurious emissions
	

1000MHz-9000MHz spurious emissions	1000MHz-9000MHz spurious emissions
	

Intermodulation of Analog FM

Intermodulation - Low part of band	Intermodulation - High part of band
	

9KHz-150KHz spurious emissions	9KHz-150KHz spurious emissions
	

150KHz-30MHz spurious emissions	150KHz-30MHz spurious emissions
	
30MHz-1000MHz spurious emissions	30MHz-1000MHz spurious emissions
	
1000MHz-9000MHz spurious emissions	1000MHz-9000MHz spurious emissions
	

14 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

14.1 Standard Applicable

According to FCC § 2.1053 and § 90.219(d)

14.2 EUT Setup (Block Diagram of Configuration)

Please refer the section §6.2 Configuration of Tested System.

14.3 Measurement Procedure

1. The EUT RF output port was connected to 50 ohm RF load.
2. The EUT input port was connected to signal generator and was setup to transmit maximum power.
3. The measurement antenna was placed at a distance of 3 meters from the EUT.
4. 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 EUT.
5. The frequency range up to 10-th harmonic of each of the three fundamental frequencies (low, middle and high channels) was investigated. The worst case of emissions was reported.
6. For spurious emissions attenuation, the substitution method was used.
7. The EUT was substituted by a reference antenna (half-wave dipole – below 1 GHz, or Horn antenna – above 1 GHz), connected to a signal generator.
8. The signal generator output level was adjusted to obtain the same reading as from EUT. The EIRP at the spurious emissions frequency was calculated as follows:

   EIRP = S.G. output (dBm) + Antenna Gain(dBi) – Cable Loss (dB)
9. The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic dipole
10. From KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET): Radiated spurs (enclosure) – Use of CW signal (low, mid. and high freq.) is acceptable rather than all modulations.
11. The maximum RFI field strength was determined during the measurement by rotating the turntable (±180 degrees) and varying the height of the receive antenna (h = 1 ... 4 m) as like defined in ANSI C63.4. A measurement receiver has been used with a RBW 120 kHz up to 1 GHz and 1 MHz above 1 GHz. Steps with during pre measurement was half the RBW.
12. Both, the Fully Anechoic Chamber (FAC) and the Semi Anechoic Chamber (SAC) fulfil the requirements of ANSI C63.4 and CISPR 16-1-4 with regards to NSA and SVSWR.

14.4 Measurement data

Downlink mode

Test mode:	Below 1G		Test channel:	Lowest channel
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
46.58	Vertical	-50.86	-13.00	Pass
68.55	V	-55.68		
153.86	V	-47.38		
275.68	V	-56.53		
569.35	V	---		
756.35	V	---		
58.45	Horizontal	-53.85	-13.00	Pass
163.52	H	-51.24		
243.53	H	-45.75		
546.35	H	-48.33		
728.86	H	---		
849.53	H	---		
Test mode:	**Above 1G**		**Test channel:**	**Lowest channel**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
2534.00	Vertical	-55.35	-13.00	Pass
4537.00	V	-45.75		
5325.00	V	-49.55		
6728.00	V	---		
8725.00	V	---		
2435.00	Horizontal	-57.53	-13.00	Pass
4247.00	H	-51.42		
5356.00	H	-49.04		
6716.00	H	---		
8243.00	H	---		

Test mode:	Below 1G		Test channel:	Middle channel
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
57.83	Vertical	-53.86	-13.00	Pass
153.75	V	-46.58		
246.77	V	-47.86		
293.42	V	-56.55		
546.86	V	---		
843.56	V	---		
32.75	Horizontal	-52.16	-13.00	Pass
146.53	H	-56.32		
286.57	H	-47.22		
469.17	H	-46.92		
682.35	H	---		
843.27	H	---		
Test mode:	**Above 1G**		**Test channel:**	**Middle channel**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
2367.00	Vertical	-56.82	-13.00	Pass
3846.00	V	-54.61		
534100	V	-50.35		
7108.00	V	---		
8354.00	V	---		
1381.00	Horizontal	-56.87	-13.00	Pass
4108.00	H	-53.27		
5350.00	H	-52.88		
6637.00	H	---		
8169.00	H	---		

Test mode:	Below 1G		Test channel:	Highest channel
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
46.54	Vertical	-53.76	-13.00	Pass
128.16	V	-56.27		
243.65	V	-46.46		
562.07	V	-50.35		
672.43	V	---		
931.44	V	---		
53.42	Horizontal	-55.43	-13.00	Pass
156.74	H	-50.17		
275.17	H	-47.16		
571.24	H	-49.66		
729.53	H	---		
877.82	H	---		
Test mode:	**Above 1G**		**Test channel:**	**Highest channel**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1861.00	Vertical	-54.26	-13.00	Pass
2963.00	V	-53.44		
4371.00	V	-53.64		
6857.00	V	---		
8276.00	V	---		
1851.00	Horizontal	-56.85	-13.00	Pass
3926.00	H	-53.61		
5377.00	H	-53.09		
6351.00	H	---		
7328.00	H	---		

Remark:
1. Remark”---“ means that the emission level is too low to be measured

Uplink mode

Test mode:	Below 1G		Test channel:	Lowest channel
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
43.82	Vertical	-55.38	-13.00	Pass
57.85	V	-49.78		
163.77	V	-52.71		
375.42	V	-46.93		
671.56	V	---		
846.52	V	---		
46.75	Horizontal	-56.69	-13.00	Pass
148.78	H	-49.68		
376.42	H	-52.41		
524.71	H	-50.27		
708.30	H	---		
873.11	H	---		
Test mode:	**Above 1G**		**Test channel:**	**Lowest channel**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
2507.00	Vertical	-56.17	-13.00	Pass
4234.00	V	-55.37		
5730.00	V	-55.27		
6275.00	V	---		
8396.00	V	---		
1351.00	Horizontal	-55.86	-13.00	Pass
2637.00	H	-56.27		
3864.00	H	-55.96		
5963.00	H	---		
7928.00	H	---		

Test mode:	Below 1G		Test channel:	Middle channel
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
32.99	Vertical	-52.53	-13.00	Pass
124.78	V	-48.24		
246.53	V	-50.88		
527.74	V	-49.35		
726.86	V	---		
924.77	V	---		
39.53	Horizontal	-56.35	-13.00	Pass
136.52	H	-52.41		
368.45	H	-50.75		
563.75	H	-56.72		
726.55	H	---		
941.45	H	---		
Test mode:	**Above 1G**		**Test channel:**	**Middle channel**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1463.00	Vertical	-55.35	-13.00	Pass
2963.00	V	-54.21		
4237.00	V	-53.53		
6534.00	V	---		
7692.00	V	---		
2634.00	Horizontal	-55.58	-13.00	Pass
3759.00	H	-53.82		
5782.00	H	-54.22		
7350.00	H	---		
8296.00	H	---		

Test mode:	Below 1G		Test channel:	Highest channel
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
52.16	Vertical	-46.83	-13.00	Pass
124.61	V	-53.22		
213.16	V	-49.65		
361.19	V	-48.45		
519.26	V	---		
756.63	V	---		
50.16	Horizontal	-53.82	-13.00	Pass
103.52	H	-47.26		
242.86	H	-50.24		
356.25	H	-52.33		
564.58	H	---		
758.86	H	---		
Test mode:	**Above 1G**		**Test channel:**	**Highest channel**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
2568.00	Vertical	-55.68	-13.00	Pass
3856.00	V	-54.53		
4284.00	V	-54.16		
6752.00	V	---		
8325.00	V	---		
1686.00	Horizontal	-55.38	-13.00	Pass
2964.00	H	-55.02		
4536.00	H	-54.59		
6823.00	H	---		
8329.00	H	---		

Remark:
1. Remark"---" means that the emission level is too low to be measured
2. 10GHz-26.5GHz: No substitution measurement has been performed, because there were no emissions detected during the pre measurement other than noise.

15 FREQUENCY STABILITY

15.1 Standard Applicable

According to FCC § 2.1055 and § 90.213

15.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

15.3 Test Procedure

1. The EUT was placed inside the temperature chamber.
2. The RF output port was connected to a spectrum analyzer.
3. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
4. After the temperature stabilized for approximately 20 min, the transmitting frequency was measured by the spectrum analyzer and recorded.
5. At room temperature, the frequency was measured when EUT was powered with the nominal voltage and with 85% and 115% of the nominal voltage.

15.4 Test Result

Passed.

Downlink:

iDEN mode					
Reference Frequency: Middle channel=856.5125MHz					
Voltage with nominal Voltage	Power Supplied (VAC)	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	Result
100%	120V	-40	16.7	0.019	Passed
100%		-30	14.5	0.017	Passed
100%		-20	12.4	0.014	Passed
100%		-10	10.7	0.012	Passed
100%		0	8.3	0.010	Passed
100%		10	10.7	0.012	Passed
100%		20	11.3	0.013	Passed
100%		30	13.4	0.016	Passed
100%		40	13.7	0.016	Passed
100%		50	15.6	0.018	Passed
100%		55	13.8	0.016	Passed
85%	102V	20	13.6	0.016	Passed
115%	138V	20	11.5	0.013	Passed

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

Uplink:

iDEN mode					
Reference Frequency: Middle channel=811.5125MHz					
Voltage with nominal Voltage	Power Supplied (VAC)	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	Result
100%	120V	-40	15.5	0.019	Passed
100%		-30	13.2	0.016	Passed
100%		-20	12.4	0.015	Passed
100%		-10	10.7	0.013	Passed
100%		0	6.5	0.008	Passed
100%		10	5.3	0.007	Passed
100%		20	12.5	0.015	Passed
100%		30	13.2	0.016	Passed
100%		40	13.5	0.017	Passed
100%		50	14.7	0.018	Passed
100%		55	13.6	0.017	Passed
85%	102V	20	11.9	0.015	Passed
115%	138V	20	8.3	0.010	Passed

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

16 OUT-OF-BAND REJECTION

16.1 Standard Applicable

According to KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET):

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

Please refer the section §3.3 OUT-OF-BAND REJECTION of D05 Indus Booster Basic Meas v01

16.2 Test setup

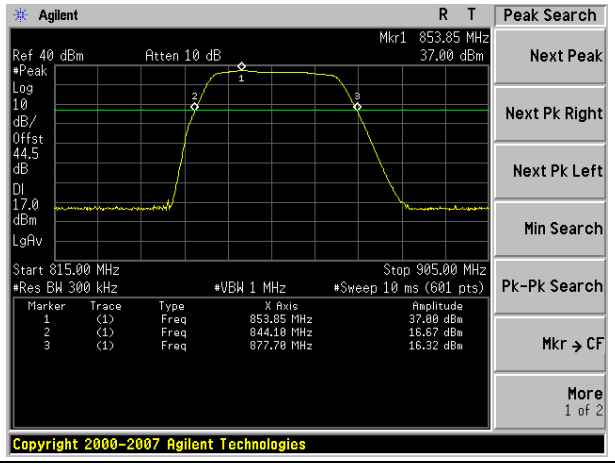
Please refer the section §6.2 Configuration of Tested System.

16.3 Test Procedure

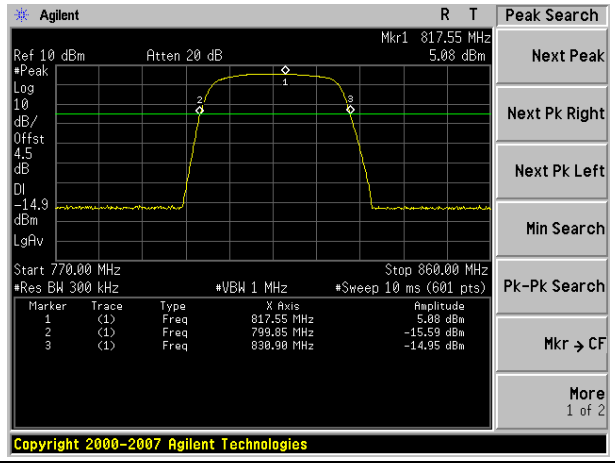
Please refer the section §3.3 OUT-OF-BAND REJECTION of D05 Indus Booster Basic Meas v01

16.4 Test Result

Out-of-Band Rejection



Downlink



Uplink

17 POWER LINE CONDUCTED EMISSION TEST

17.1 Standard Applicable

According to FCC §15.207. The emission value for frequency within 150KHz to 30MHz shall not Exceed criteria of below chart.

Frequency range (MHz)	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

17.2 Test setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2001.
2. The EUT was plug-in DC power adaptort and was placed on the center of the back edge on the test table. The peripherals like earphone was placed on the side of the EUT. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The Power adaptor was connected with 110VAC/60Hz power source.

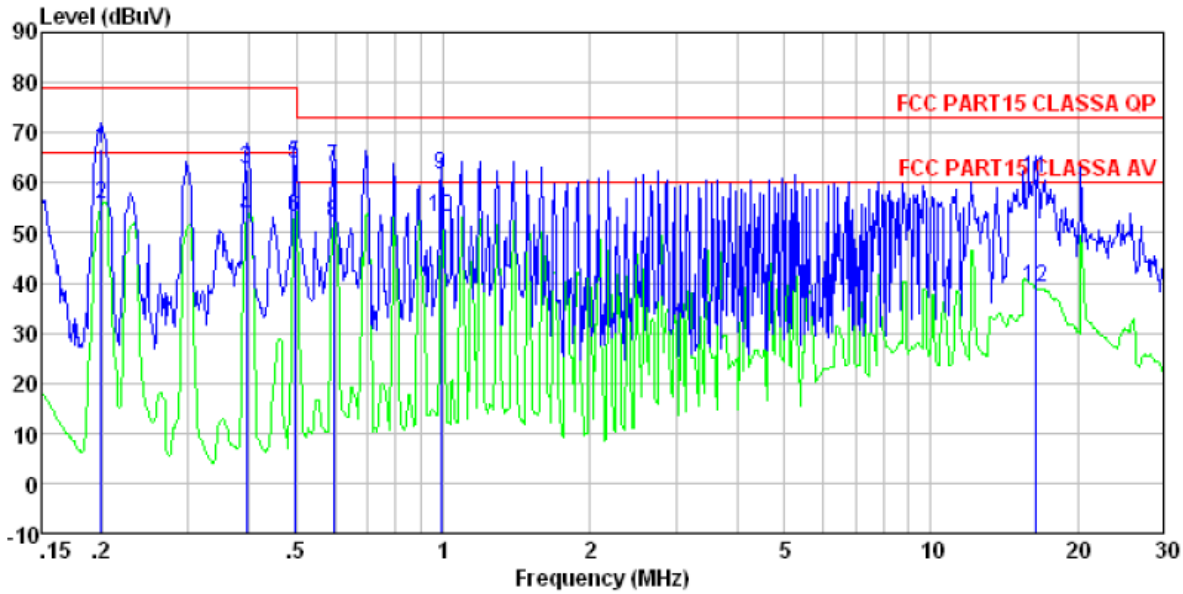
17.3 Test Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

17.4 Measurement Result

Downlink:

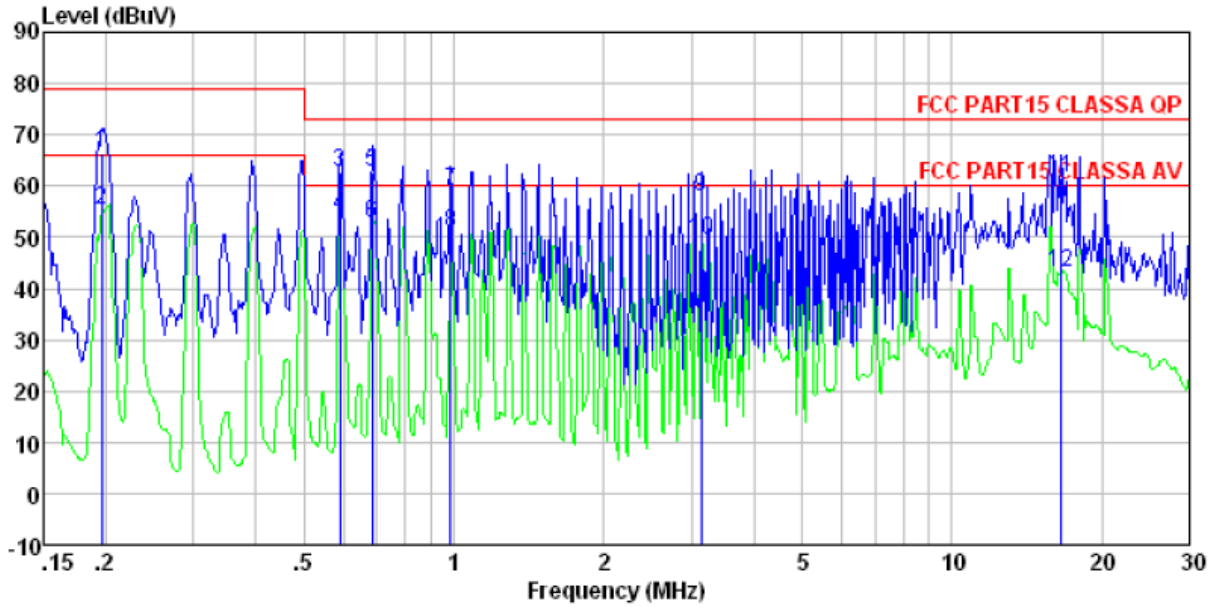
Line:



Condition : FCC PART15 CLASSA QP LISN-2013 LINE
Job No. : 0732RF
Test mode : Downlink mode
Test Engineer: Edward

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.199	66.48	0.14	0.13	66.75	79.00	-12.25	QP
2	0.199	55.48	0.14	0.13	55.75	66.00	-10.25	Average
3	0.396	62.55	0.11	0.11	62.77	79.00	-16.23	QP
4	0.396	52.80	0.11	0.11	53.02	66.00	-12.98	Average
5	0.497	63.47	0.12	0.11	63.70	79.00	-15.30	QP
6	0.497	52.85	0.12	0.11	53.08	66.00	-12.92	Average
7	0.595	62.84	0.13	0.12	63.09	73.00	-9.91	QP
8	0.595	51.89	0.13	0.12	52.14	60.00	-7.86	Average
9	0.989	61.35	0.14	0.13	61.62	73.00	-11.38	QP
10	0.989	52.70	0.14	0.13	52.97	60.00	-7.03	Average
11	16.398	60.16	0.39	0.22	60.77	73.00	-12.23	QP
12	16.398	38.51	0.39	0.22	39.12	60.00	-20.88	Average

Neutral:

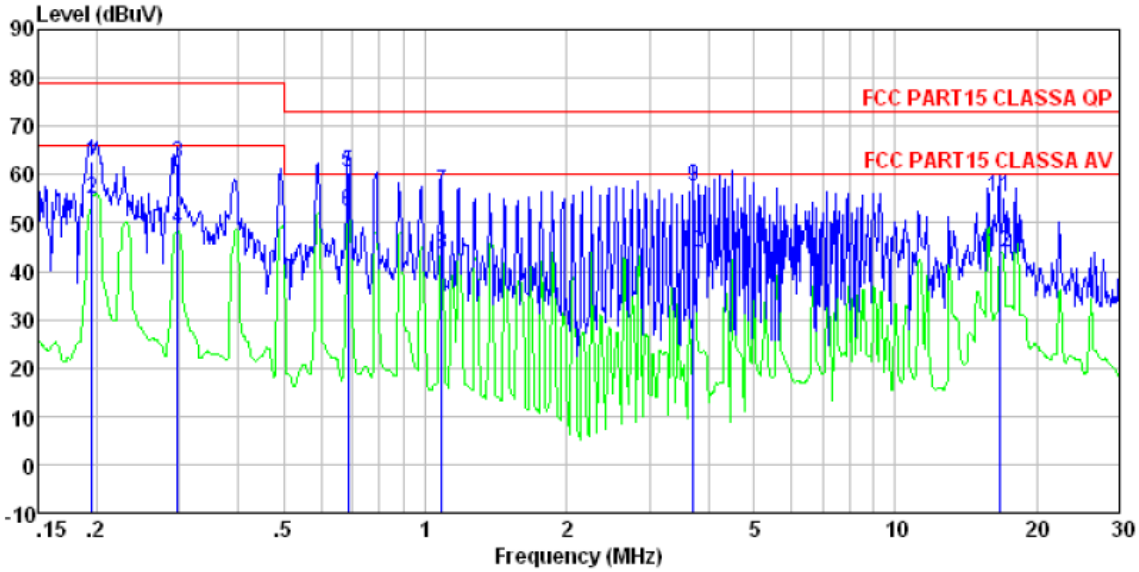


Condition : FCC PART15 CLASSA QP LISN-2013 NEUTRAL
Job No. : 0732RF
Test mode : Downlink mode
Test Engineer: Edward

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.197	66.35	0.07	0.13	66.55	79.00	-12.45	QP
2	0.197	55.13	0.07	0.13	55.33	66.00	-10.67	Average
3	0.592	62.58	0.07	0.12	62.77	73.00	-10.23	QP
4	0.592	54.02	0.07	0.12	54.21	60.00	-5.79	Average
5	0.686	62.44	0.07	0.13	62.64	73.00	-10.36	QP
6	0.686	52.49	0.07	0.13	52.69	60.00	-7.31	Average
7	0.984	58.69	0.07	0.13	58.89	73.00	-14.11	QP
8	0.984	50.71	0.07	0.13	50.91	60.00	-9.09	Average
9	3.140	57.48	0.12	0.15	57.75	73.00	-15.25	QP
10	3.140	49.27	0.12	0.15	49.54	60.00	-10.46	Average
11	16.486	61.05	0.37	0.22	61.64	73.00	-11.36	QP
12	16.486	42.57	0.37	0.22	43.16	60.00	-16.84	Average

Uplink:

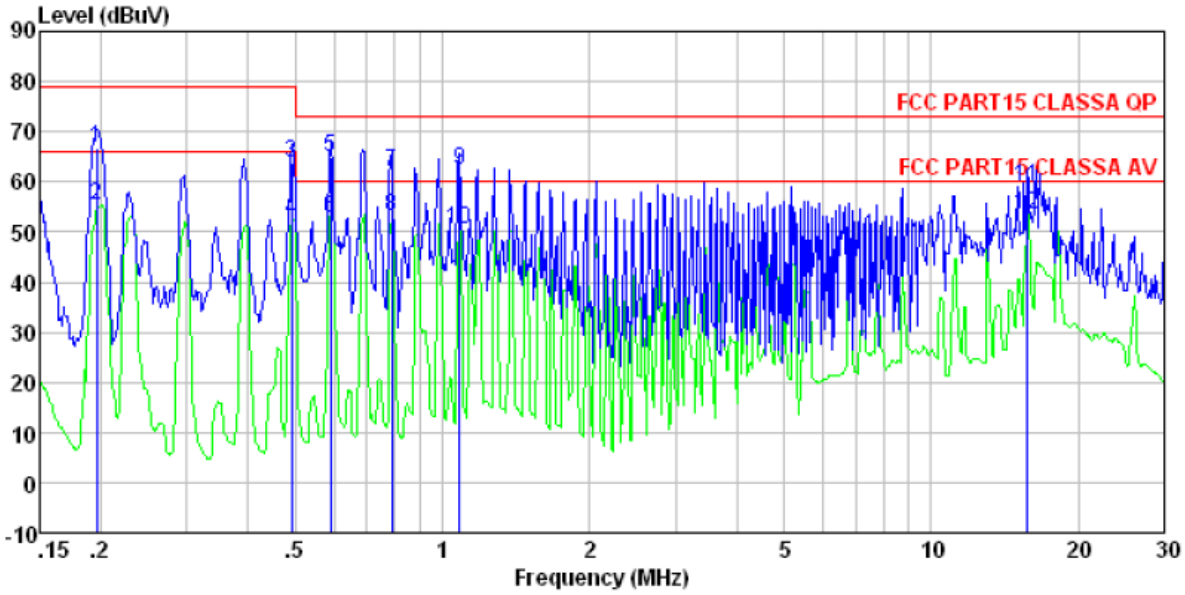
Line:



Condition : FCC PART15 CLASSA QP LISN-2013 LINE
Job No. : 0732RF
Test mode : Uplink mode
Test Engineer: Edward

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.195	62.53	0.14	0.13	62.80	79.00	-16.20	QP
2	0.195	54.50	0.14	0.13	54.77	66.00	-11.23	Average
3	0.297	62.17	0.11	0.10	62.38	79.00	-16.62	QP
4	0.297	48.54	0.11	0.10	48.75	66.00	-17.25	Average
5	0.686	60.17	0.14	0.13	60.44	73.00	-12.56	QP
6	0.686	52.13	0.14	0.13	52.40	60.00	-7.60	Average
7	1.082	56.34	0.13	0.13	56.60	73.00	-16.40	QP
8	1.082	43.43	0.13	0.13	43.69	60.00	-16.31	Average
9	3.720	57.15	0.19	0.15	57.49	73.00	-15.51	QP
10	3.720	43.40	0.19	0.15	43.74	60.00	-16.26	Average
11	16.661	54.59	0.41	0.22	55.22	73.00	-17.78	QP
12	16.661	43.20	0.41	0.22	43.83	60.00	-16.17	Average

Neutral:

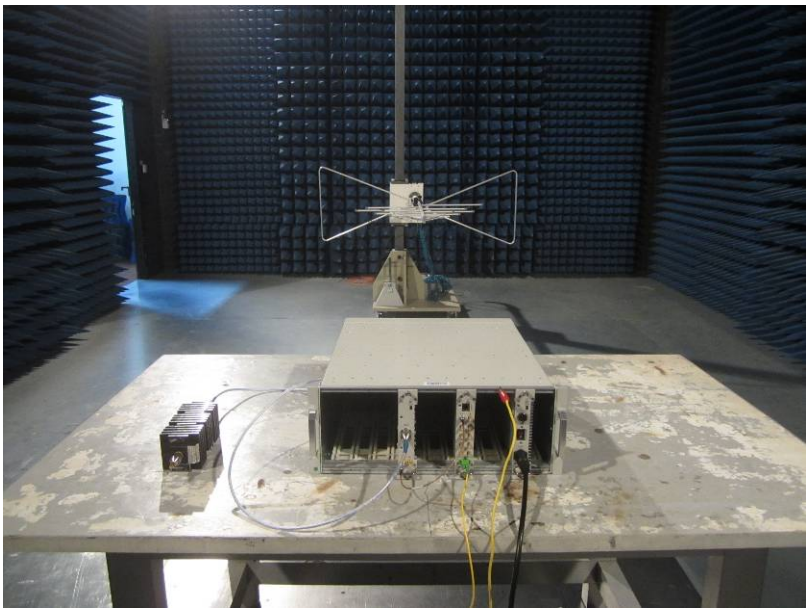


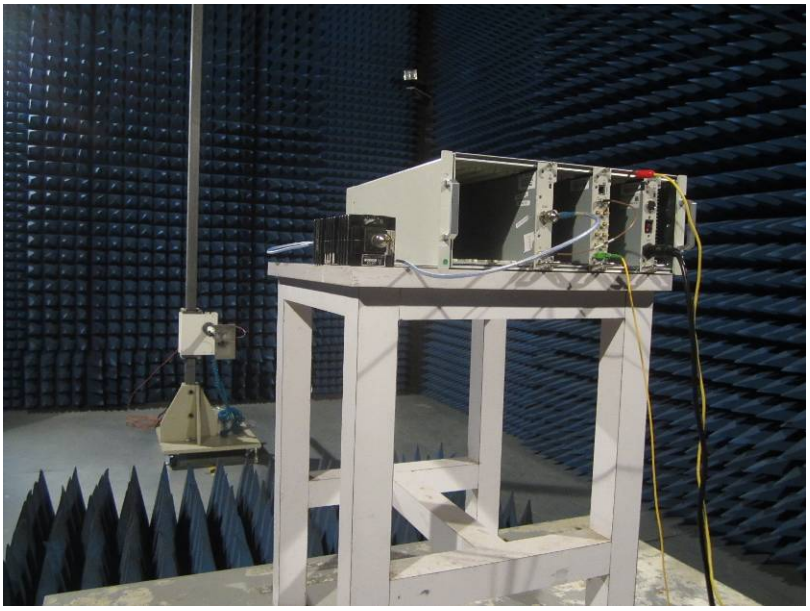
Condition : FCC PART15 CLASSA QP LISN-2013 NEUTRAL
Job No. : 0732RF
Test mode : Uplink mode
Test Engineer: Edward

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.197	66.41	0.07	0.13	66.61	79.00	-12.39	QP
2	0.197	55.23	0.07	0.13	55.43	66.00	-10.57	Average
3	0.491	63.48	0.06	0.11	63.65	79.00	-15.35	QP
4	0.491	52.33	0.06	0.11	52.50	66.00	-13.50	Average
5	0.592	64.55	0.07	0.12	64.74	73.00	-8.26	QP
6	0.592	52.49	0.07	0.12	52.68	60.00	-7.32	Average
7	0.788	61.87	0.07	0.13	62.07	73.00	-10.93	QP
8	0.788	53.08	0.07	0.13	53.28	60.00	-6.72	Average
9	1.082	62.30	0.08	0.13	62.51	73.00	-10.49	QP
10	1.082	50.26	0.08	0.13	50.47	60.00	-9.53	Average
11	15.718	58.56	0.34	0.22	59.12	73.00	-13.88	QP
12	15.718	52.78	0.34	0.22	53.34	60.00	-6.66	Average

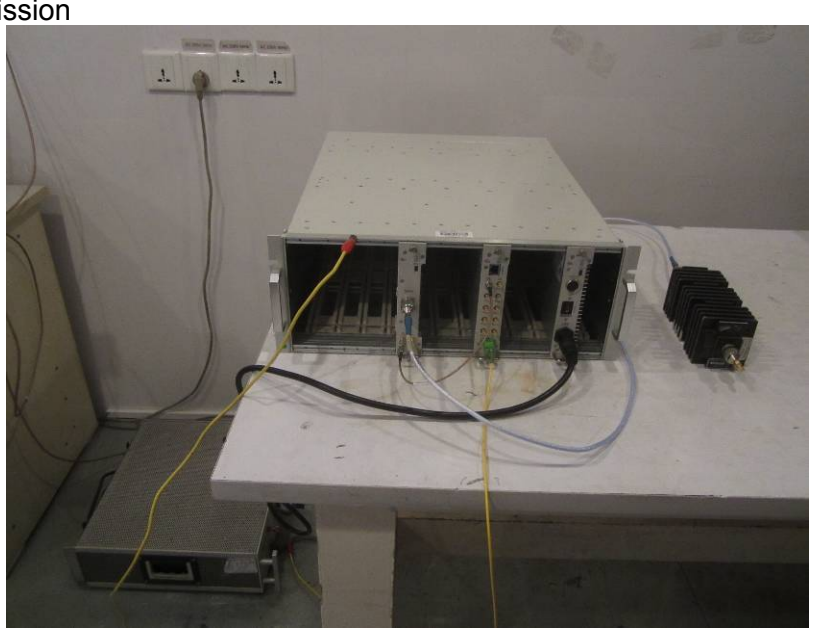
18 Test Setup Photo

Radiated Emission





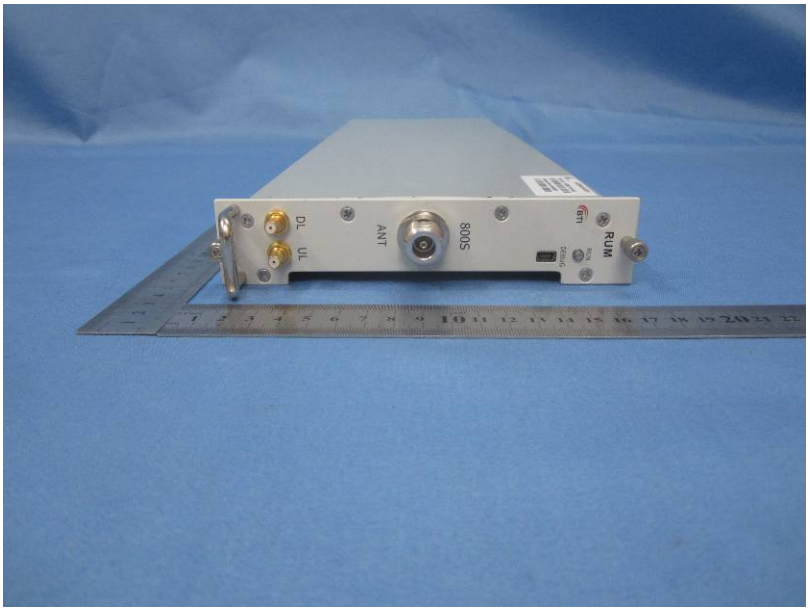
Conducted Emission



Noise figure

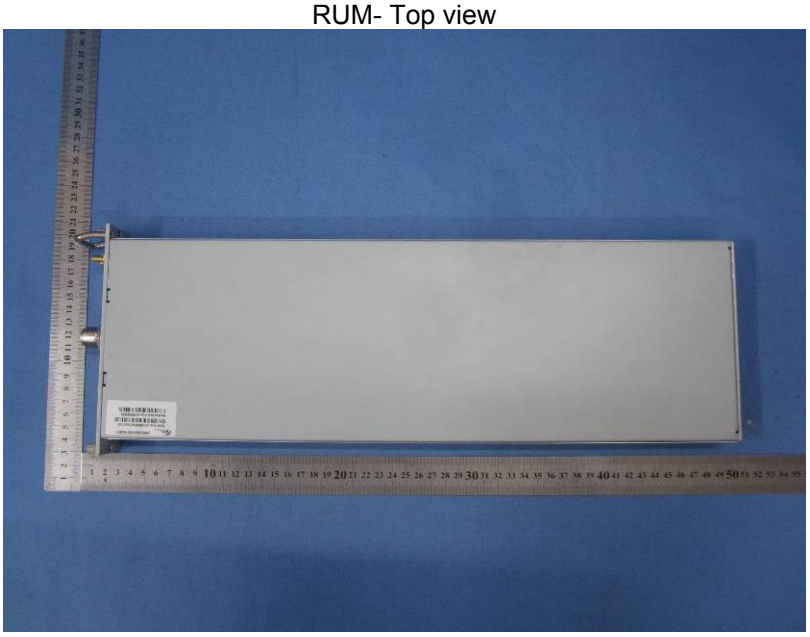
19 EUT Constructional Details

RUM- Front view

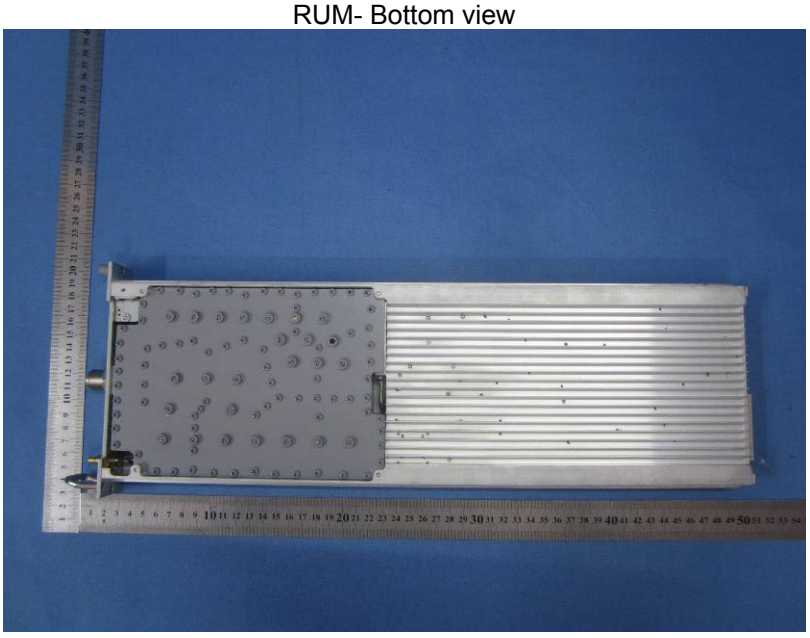


RUM- Rear view

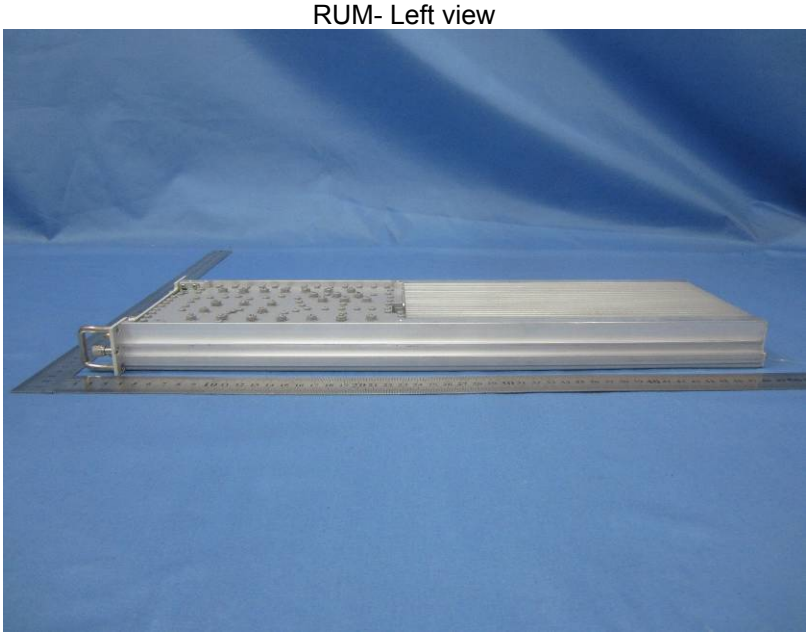
RUM- Top view



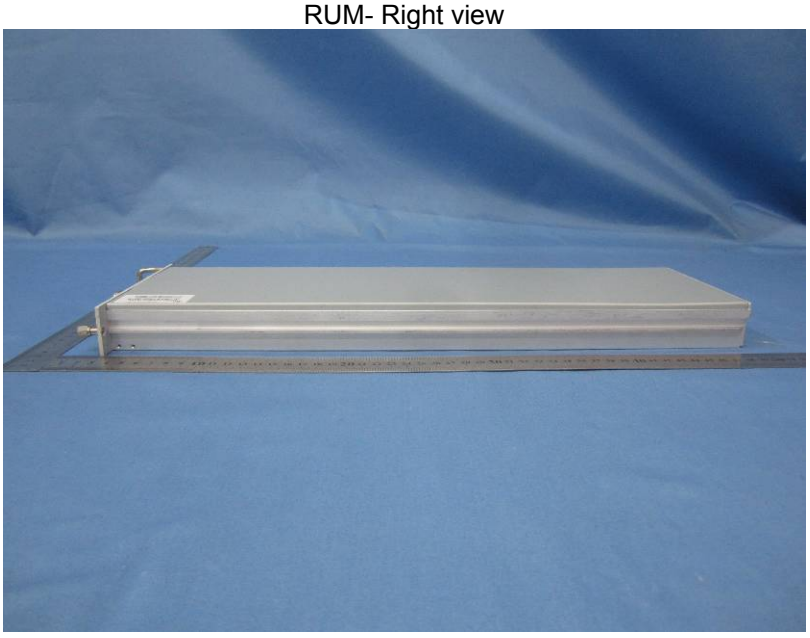
RUM- Bottom view

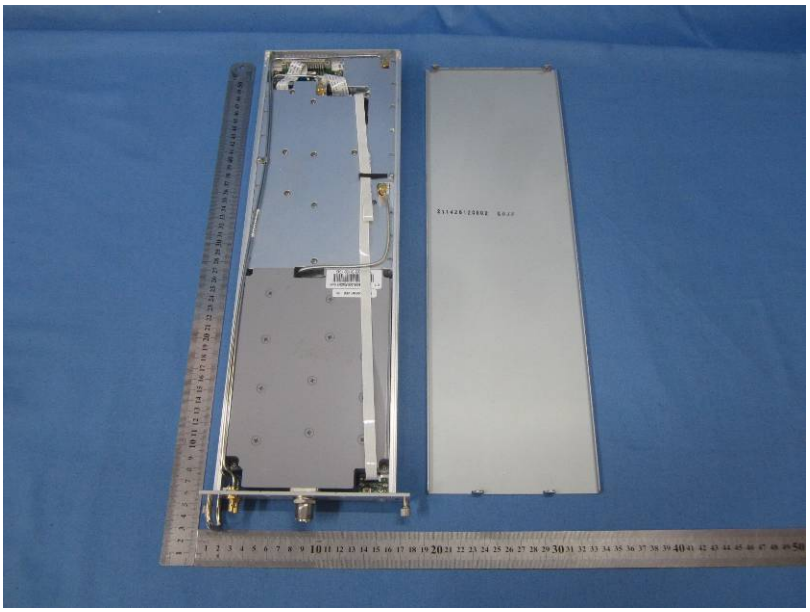


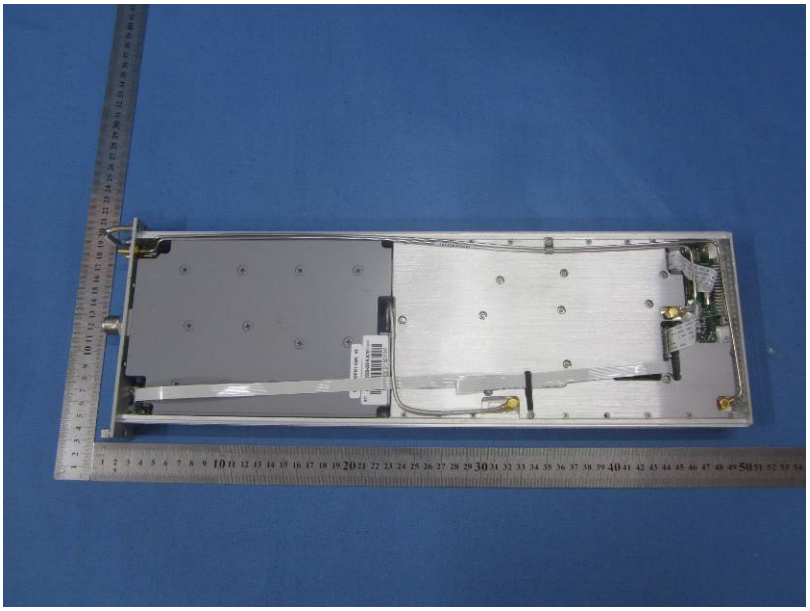
RUM- Left view



RUM- Right view





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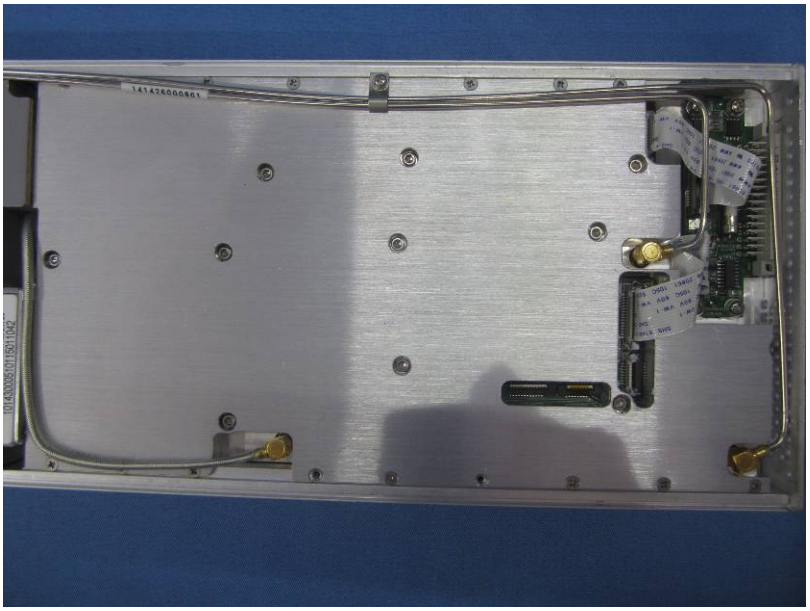

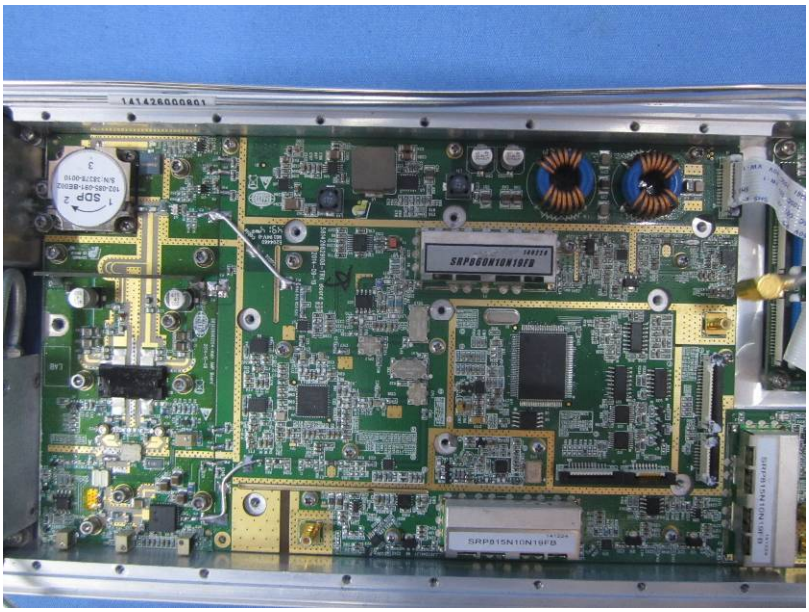

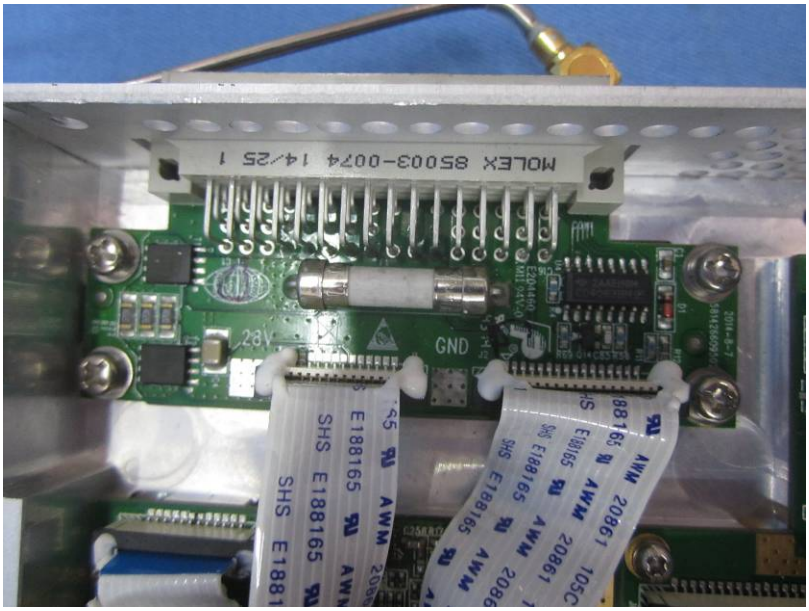
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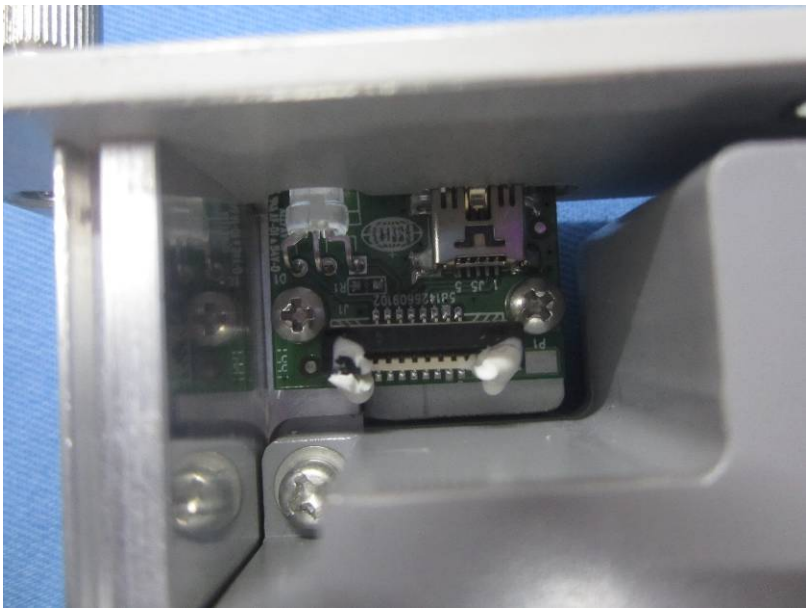

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