NVLAP LAB CODE 200707-0

FCC PART 27

MEASUREMENT AND TEST REPORT

For

ADC Telecommunications, Inc.

P.O. Box 1101, Minneapolis, Minnesota 55440, USA

FCC ID: NOO-F0687-011

Report Type:	**Product Type:**
Original Report	Remote Access Unit

Test Engineer:	Bruce Zhang
Report Number:	RSZ10053102-27
Report Date:	2010-07-27
Reviewed By:	Merry Zhao EMC Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *ADC Telecommunications, Inc.*'s product, FCC ID: NOO-F0687-011 is the Remote Access Unit of InterReach Fusion 700 MHz LTE (2x2 MIMO) system. The system includes Main HUB, Expansion HUB and Remote Acc*ess* Unit. Model number: Main Hub: *FSN-W2-MH-2, EHUB: FSN-W1-EH-2, RAU: FSN-W2-7070-*. Main Hub: FSN-W2-MH-2 measures approximately: 48.8 cm L x 42.8 cm W x 9.1 cm H, EHUB : FSN-W1-EH-2 measures approximately: 48.8 cm L x 42.8 cm W x 9.1 cm H, RAU: FSN-W2-7070-1 measures approximately: 32.5 cm L x 30.0 cm W x 5.4 cm H, rated input voltage: AC 120 V power source.

Frequency Range:

698-716 MHz (Uplink), 728-746 MHz (Downlink)

Transmitter Typical Output Power:

-30 dBm (Uplink); 15 dBm (Downlink)

Maximum gain: 15 dB (Uplink and Downlink)

** All measurement and test data in this report was gathered from production sample serial number: 1005098 (Assigned by BACL). The EUT was received on 2010-05-31*

Objective

This type approval report is prepared on behalf of *ADC Telecommunications, Inc.* in accordance with Part 2, Part 27 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, band edge and radiated margin.

Related Submittal(s)/Grant(s)

No related submittals.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-C.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2007070.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

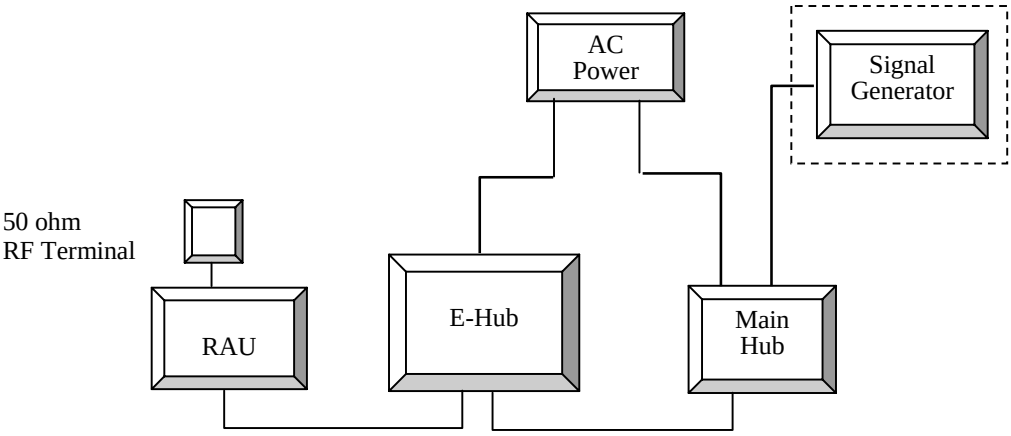
Manufacturer	Description	Model	Serial Number	FCC ID
Agilent	ESG-D Series Signal Generator	E4432B	US40053685	DOC
ADC Telecommunications Inc.	RAU PCB Assembly	740687-0 Rev1	R1017M0103NC	N/A
ADC Telecommunications Inc.	Main Hub PCB 1	740621-2 Rev2	R0921M0102NC	N/A
ADC Telecommunications Inc.	Main Hub PCB 2	560018-2 Rev D	TS-004-7037	N/A
ADC Telecommunications Inc.	Main Hub PCB 3	710622-1 Rev A	R0905G0008NC	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable CATV Cable	10	RAU	Expansion Hub
Unshielded Detachable Fiber Cable	3.0	Main Hub	E-hub

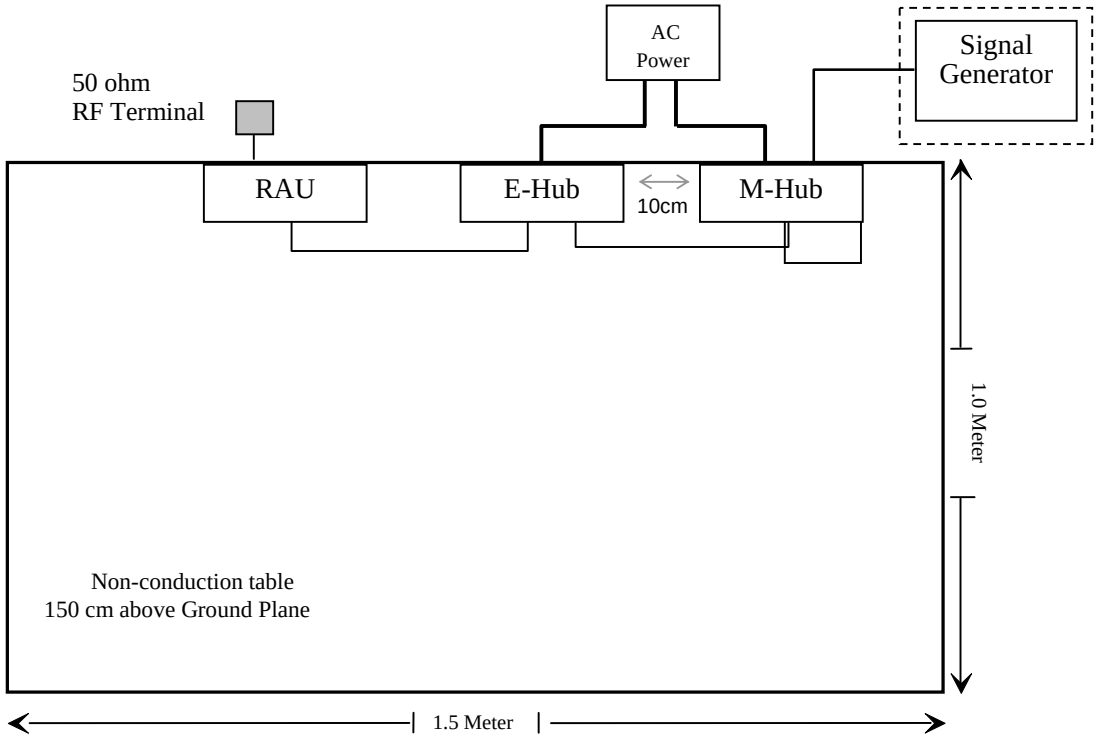
Configuration of Test Setup

For downlink mode:



Block Diagram of Test Setup

For downlink mode:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b)(1), §2.1091	Maximum Permissible exposure (MPE)	Compliant
§ 2.1047	Modulation Characteristics	N/A
§2.1046; §27.50(c)	Effective Radiated Power	Compliant
§2.1049	99% & -26 dB Occupied Bandwidth	Compliant
§2.1051; §27.53(g)	Spurious Emissions at Antenna Terminal	Compliant
§2.1053; §27.53(g)	Spurious Radiation Emission	Compliant
§27.53(g)	Band Edge	Compliant
§2.1055; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant

FCC §1.1307 (b)(1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to FCC subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally ***numeric*** gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
WCDMA	737	8.39	6.902	15.28	33.729	20	0.04613	0.4913
LTE	741	8.39	6.902	15.00	31.623	20	0.04342	0.4940

Result:

For Downlink, the highest power density level at 20 cm is 0.04613 mW/cm², which is below the uncontrolled exposure limit of 0.4913 mW/cm² at 737 MHz.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC §2.1047(d), Part 27, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046 & § 27.50(c) – RF OUTPUT POWER

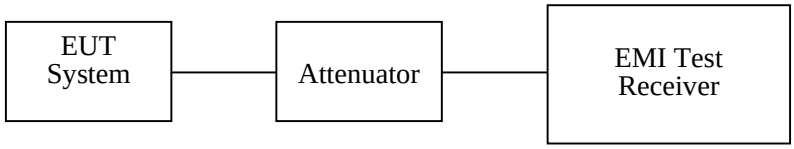
Applicable Standard

According to FCC §2.1046 and §27.50(c),

Test Procedure

Conducted method:

The RF output port of the EUT system was connected to the wireless test set and the EMI test receiver through sufficient attenuation.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Agilent	PSA Series Spectrum Analyzer	E4446A	US44300386	2010-05-28	2012-05-27
Agilent	ESG Vector Signal Generator	E4438C	MY42083251	2009-12-08	2010-12-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2010-07-02.

WCDMA Output:

Mode	Channel	Frequency (MHz)	Input (dBm)	Output (dBm)	Result
Downlink	Port 1				
	Low	730.4	-0.2	15.11	Compliant
	Middle	737.0	-0.7	15.28	Compliant
	High	743.6	-0.1	15.06	Compliant
	Port 3				
	Low	730.4	0.7	14.90	Compliant
	Middle	737.0	0.4	14.87	Compliant
	High	743.6	0.6	14.90	Compliant

Antenna Port #1 + Antenna Port #3:

Channel	Frequency (MHz)	Output Power #1 (dBm)	Output Power #3 (dBm)	Total Output Power (dBm)
Low	730.4	15.11	14.90	18.02
Middle	737.0	15.28	14.87	18.09
High	743.6	15.06	14.90	17.99

LTE Output Power

Mode	Channel	Modulation	Frequency (MHz)	Input (dBm)	Output (dBm)	Result
Downlink	**Antenna Port 1**					
	Low	QPSK	733	-1.22	14.99	Compliant
		16 QAM	733	-1.24	14.99	Compliant
		64 QAM	733	-1.22	15.00	Compliant
	High	QPSK	741	-1.63	15.00	Compliant
		16 QAM	741	-1.62	14.99	Compliant
		64 QAM	741	-1.62	15.00	Compliant
	Antenna Port 3					
	Low	QPSK	733	-1.8	14.97	Compliant
		16 QAM	733	-3.02	15.00	Compliant
		64 QAM	733	-3.02	15.00	Compliant
	High	QPSK	741	-2.1	15.00	Compliant
		16 QAM	741	-3.08	15.00	Compliant
		64 QAM	741	-3.08	15.00	Compliant

Antenna Port #1 + Antenna Port #3:

Modulation	Frequency (MHz)	Output Power #1 (dBm)	Output Power #3 (dBm)	Total Output Power (dBm)
QPSK	733	14.99	14.97	17.99
16QAM	733	14.99	15.00	18.01
64QAM	733	15.00	15.00	18.00
QPSK	741	15.00	15.00	18.00
16QAM	741	14.99	15.00	18.01
64QAM	741	15.00	15.00	18.00

FCC §2.1049- 99% & 26 dB OCCUPIED BANDWIDTH

Applicable Standards Requirements:

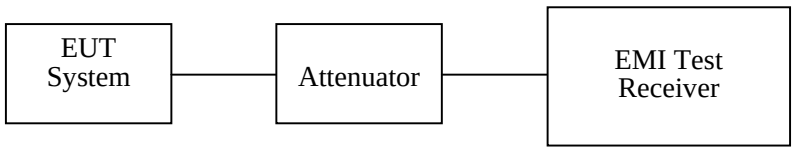
FCC §2.1049

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

Test Procedure

The RF output of the EUT system was connected to the simulator and the EMI test receiver through sufficient attenuation.

The resolution bandwidth of the EMI test receiver was set at 100 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Agilent	PSA Series Spectrum Analyzer	E4446A	US44300386	2010-05-28	2012-05-27
Agilent	ESG Vector Signal Generator	E4438C	MY42083251	2009-12-08	2010-12-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2010-07-02 and 2010-07-20.

WCDMA Modulation

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Downlink (728-746 MHz)	**Antenna Port 1**			
	Low	730.4	4.14	4.66
	Mid	737.0	4.14	4.66
	High	743.6	4.16	4.68
	Antenna Port 3			
	Low	730.4	4.14	4.66
	Mid	737.0	4.14	4.66
	High	743.6	4.14	4.66

LTE Modulation

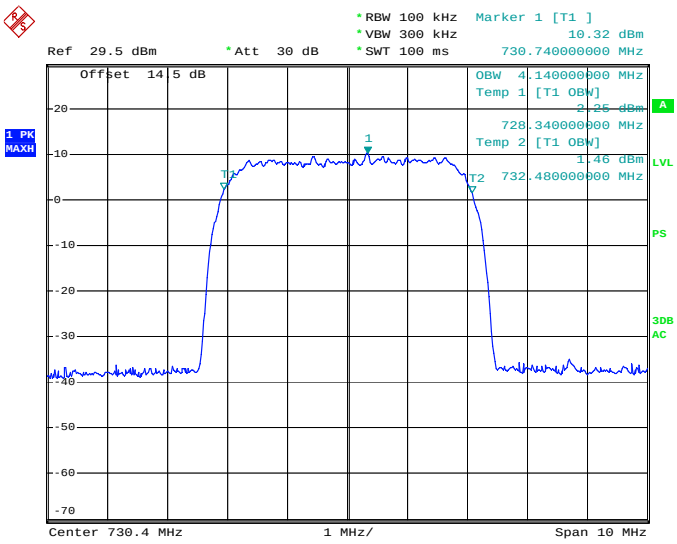
Mode	Channel	Modulation	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Downlink (728-746 MHz)	**Antenna Port 1**				
	Low	QPSK	733	8.9205	9.518
		16 QAM	733	8.9213	9.530
		64 QAM	733	8.9224	9.518
	High	QPSK	741	8.9072	9.427
		16 QAM	741	8.9095	9.470
		64 QAM	741	8.9091	9.447
	Antenna Port 3				
	Low	QPSK	733	8.9186	9.479
		16 QAM	733	8.9201	9.512
		64 QAM	733	8.9204	9.515
	High	QPSK	741	8.9122	9.456
		16 QAM	741	8.9138	9.482
		64 QAM	741	8.9142	9.475

Please refer to the following plots.

WCDMA, Downlink:

99% Occupied Bandwidth

Low Channel for Antenna port 1



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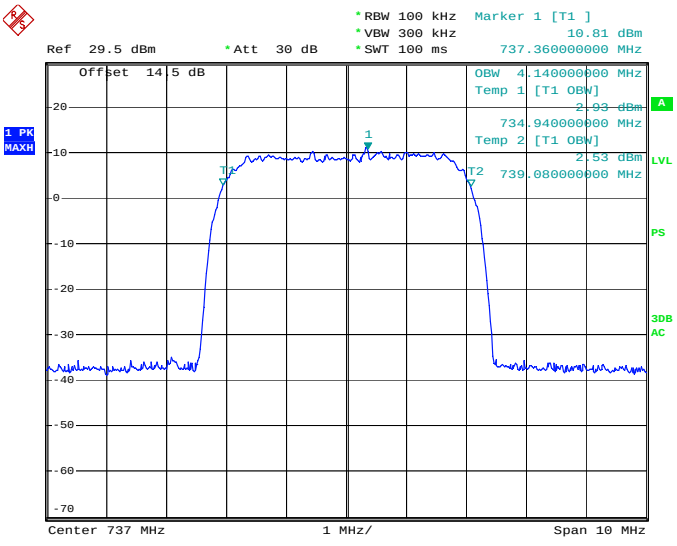
Middle Channel for Antenna port 1



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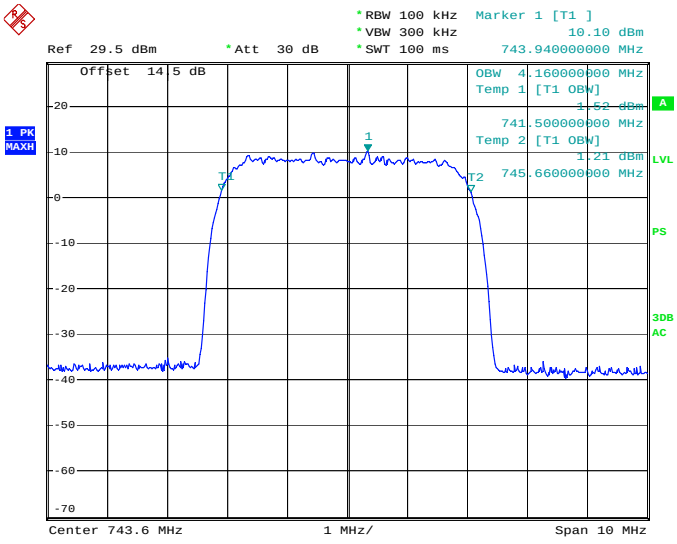
High Channel for Antenna Port 1



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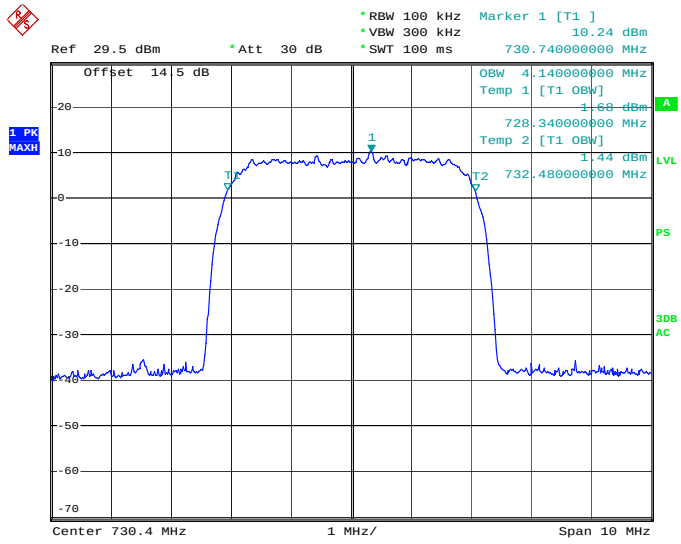
Low Channel for Antenna port 3



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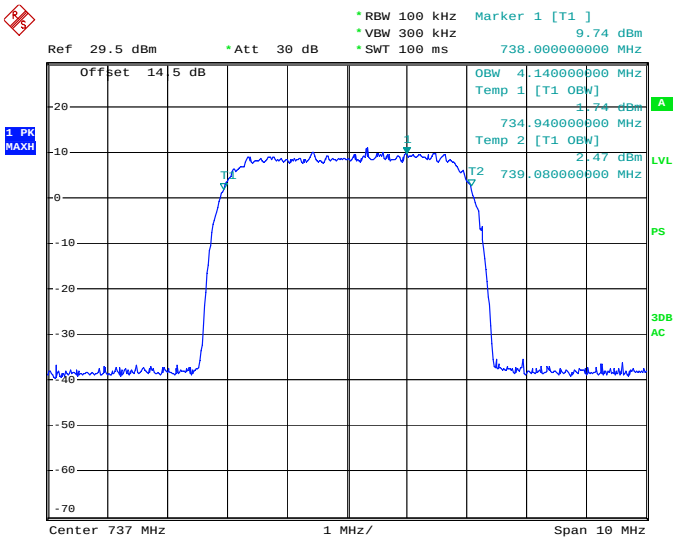
Middle Channel for Antenna port 3



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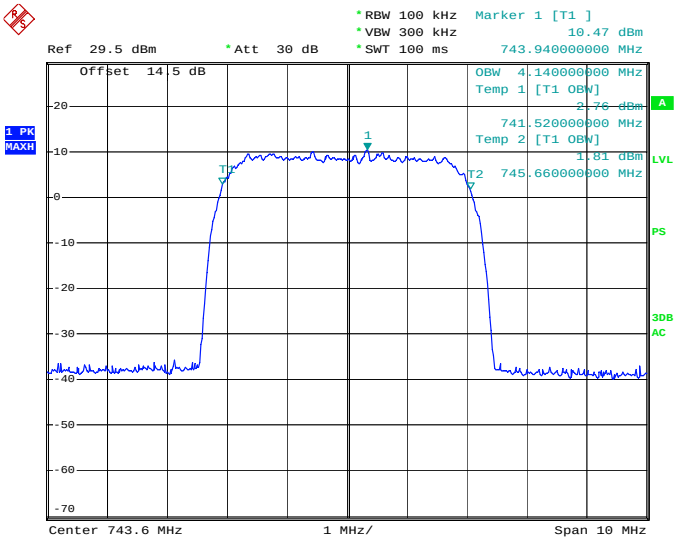

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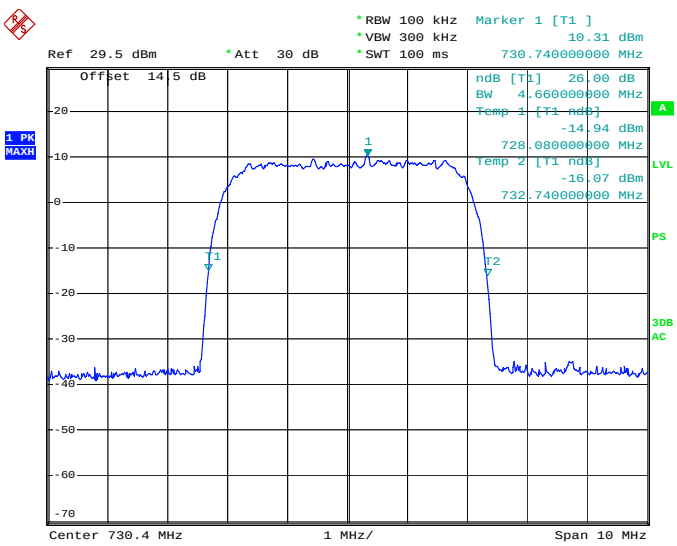
26 dB Occupied Bandwidth

Low Channel for Port 1



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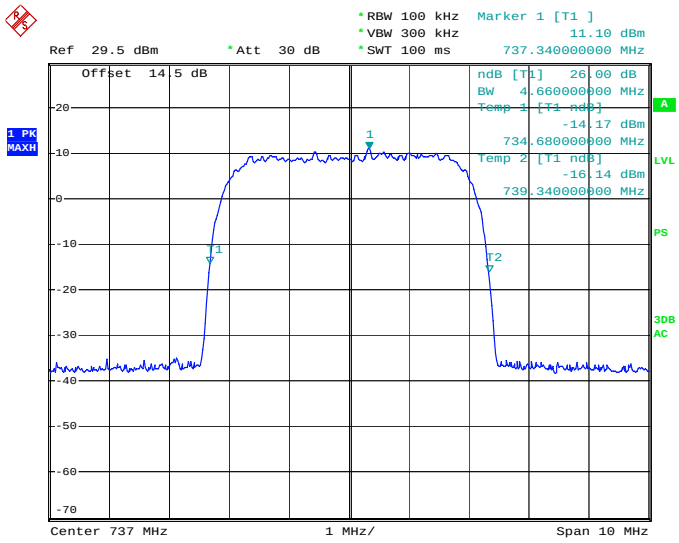
Middle Channel for Antenna Port 1



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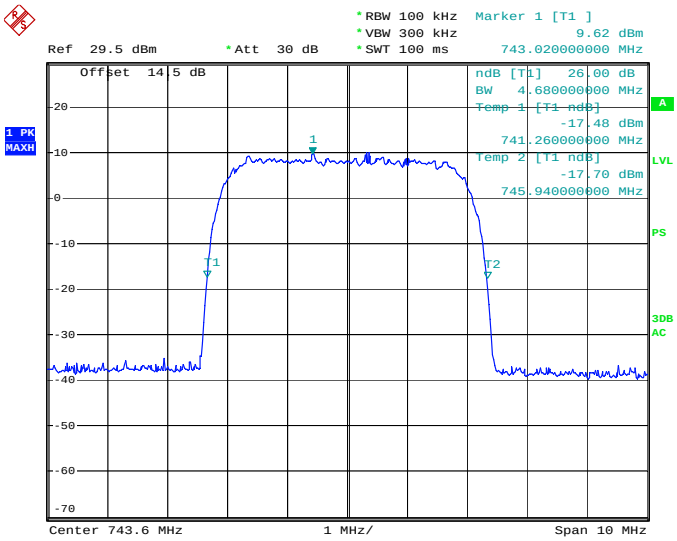
High Channel for Antenna Port 1



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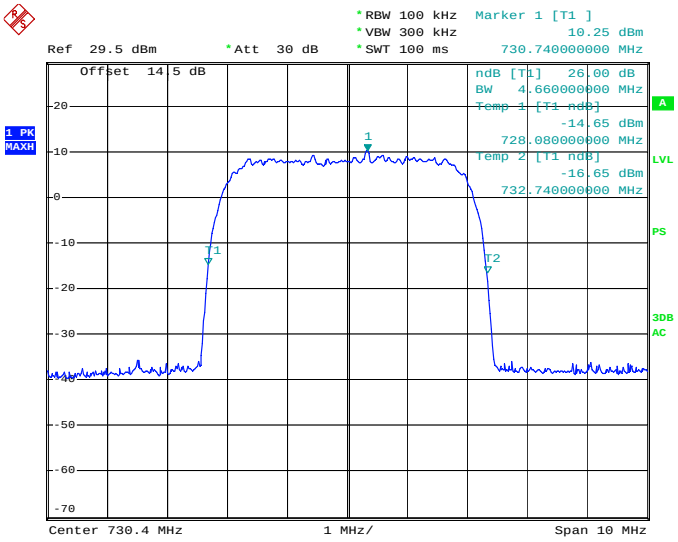

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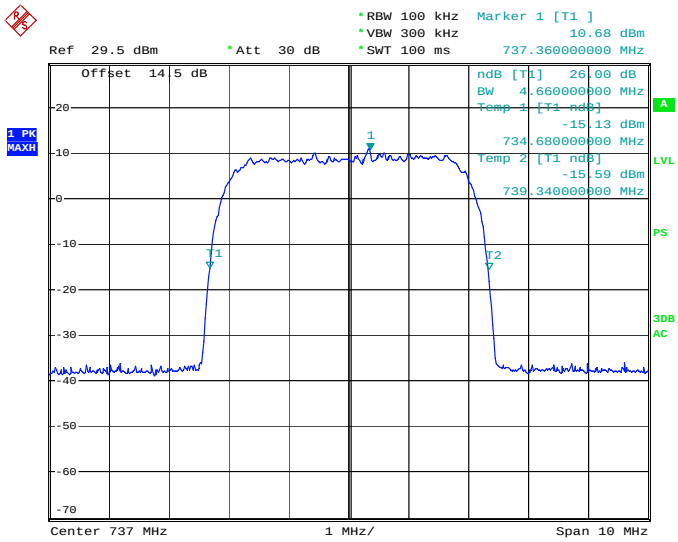

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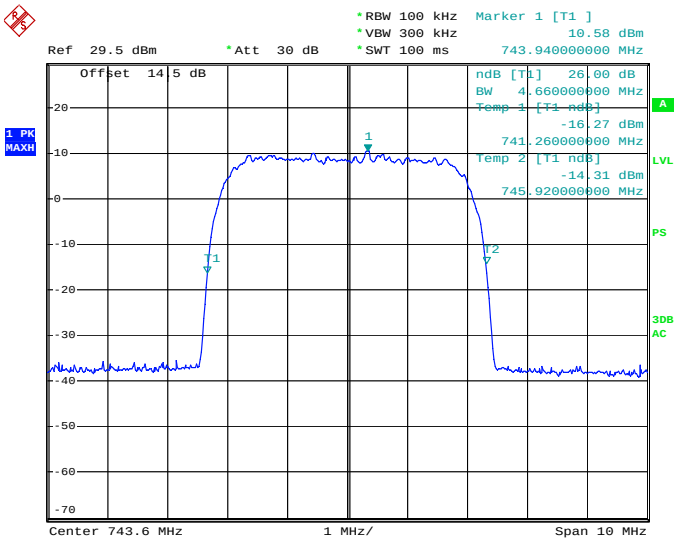
High Channel for Antenna Port 3



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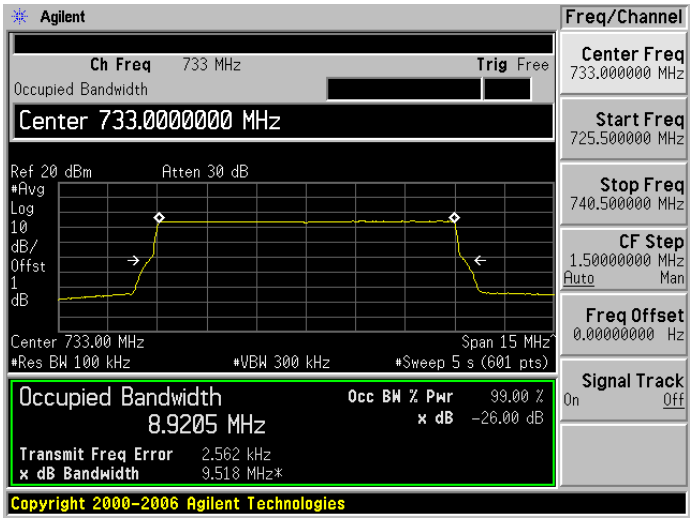
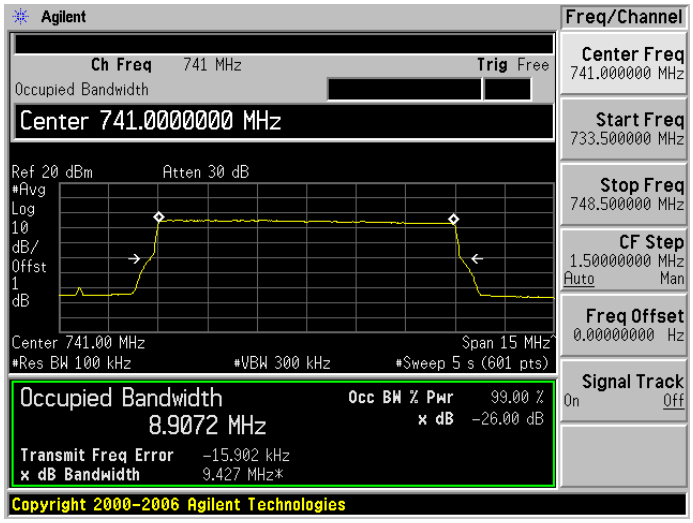
LTE, Downlink:

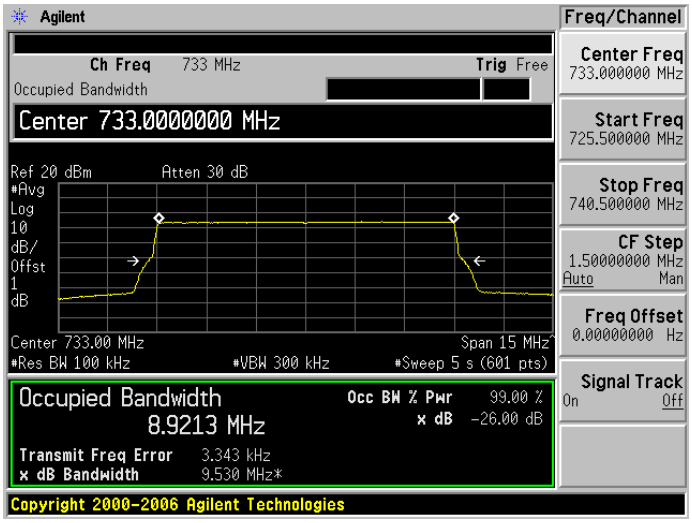
Antenna Port 1, QPSK Low Channel



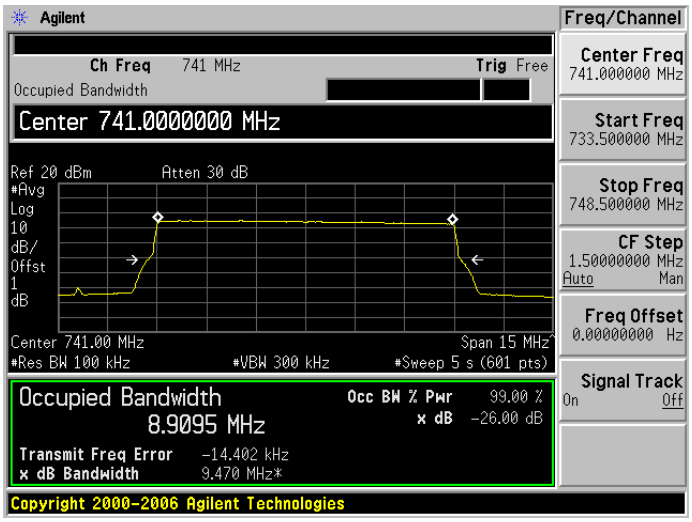
Antenna Port 1, QPSK High Channel



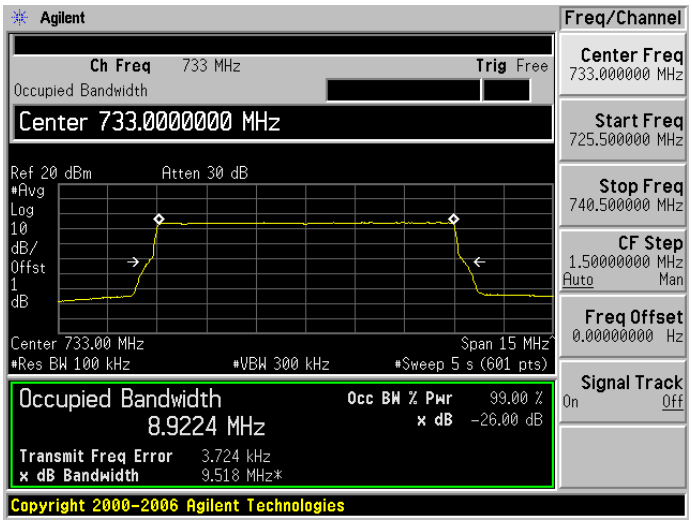
Antenna Port 1, 16QAM Low Channel



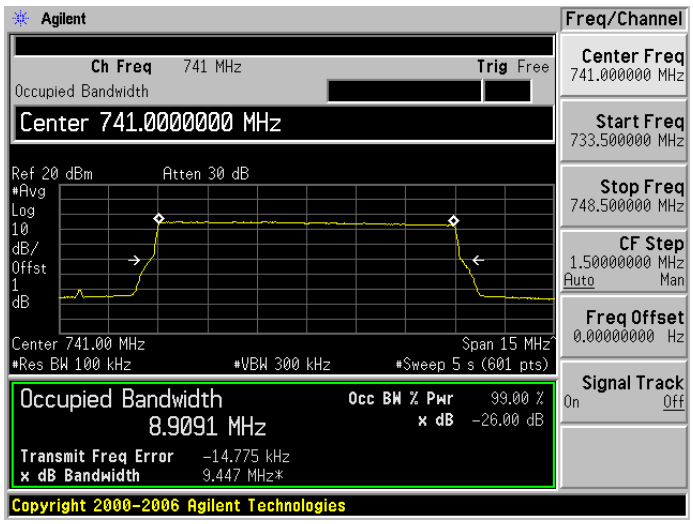
Antenna Port 1, 16QAM High Channel



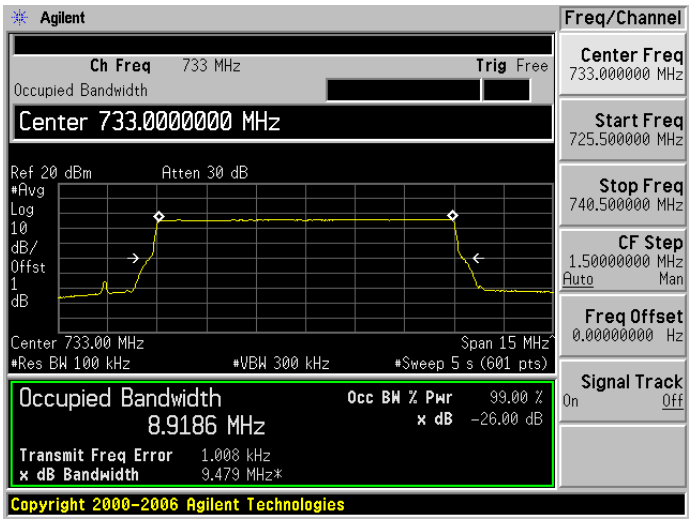
Antenna Port 1, 64QAM Low Channel



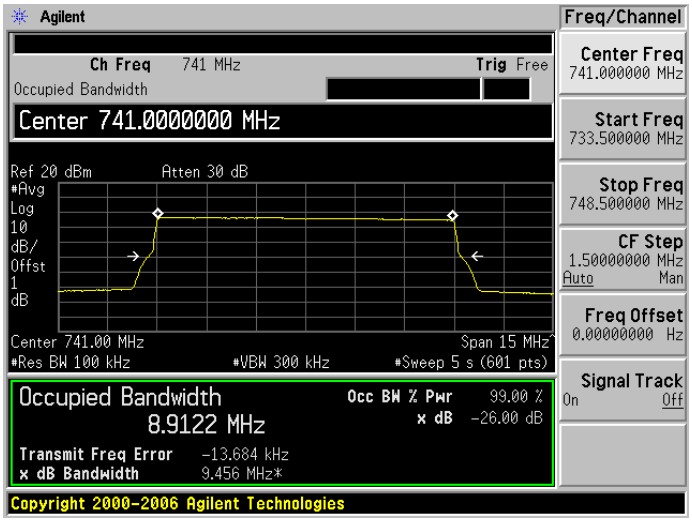
Antenna Port 1, 64QAM High Channel



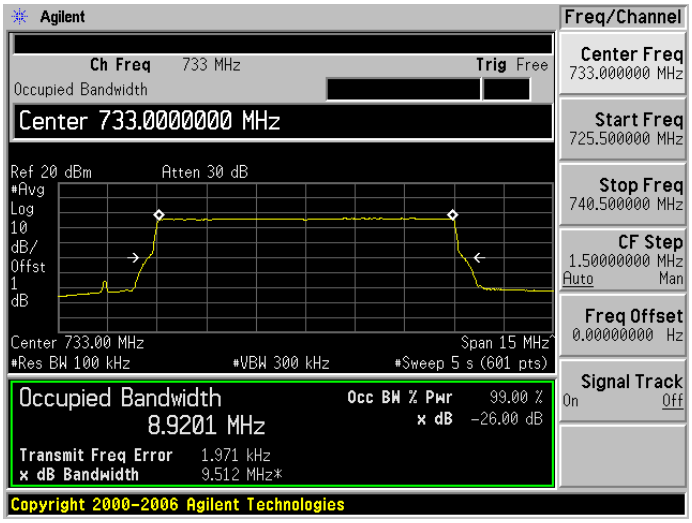
Antenna Port 3, QPSK Low Channel



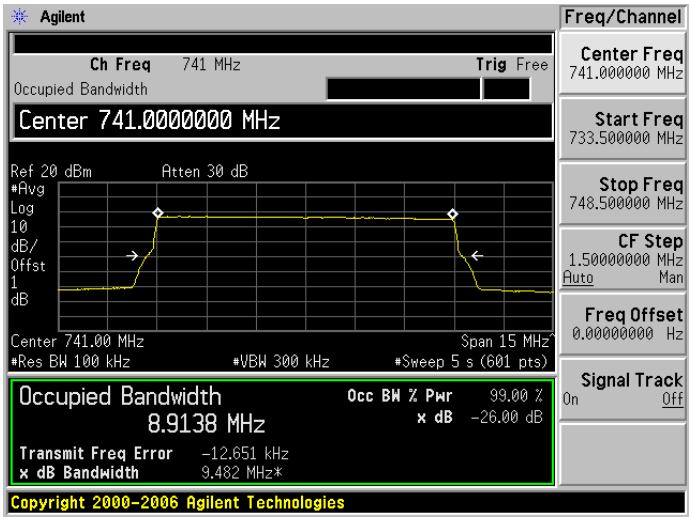
Antenna Port 3, QPSK High Channel



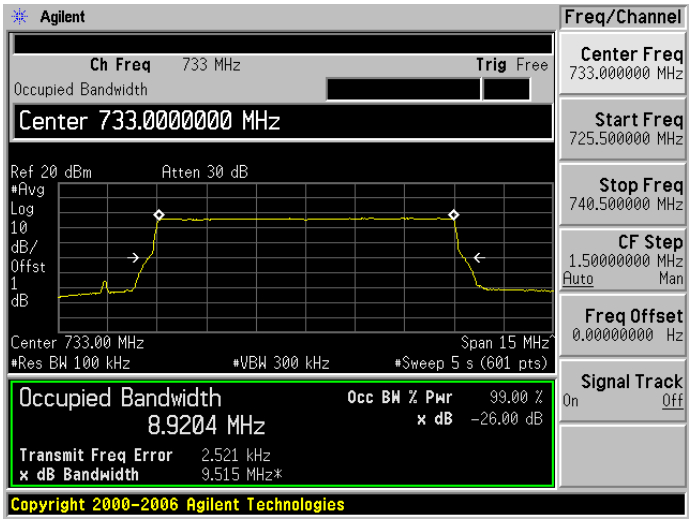
Antenna Port 3, 16QAM Low Channel



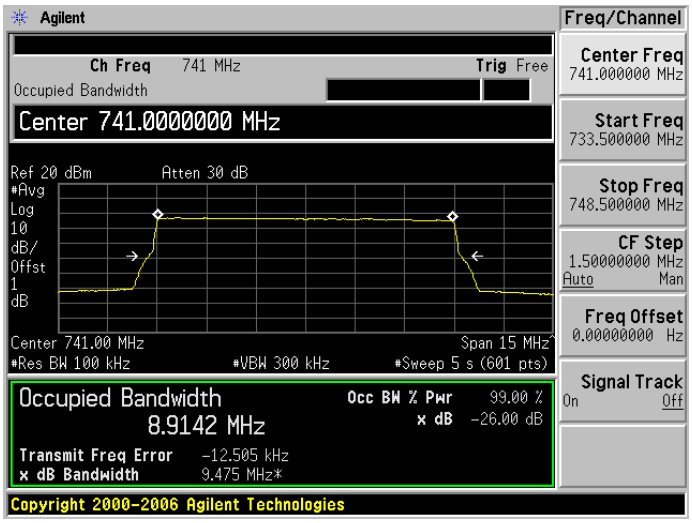
Antenna Port 3, 16QAM High Channel



Antenna Port 3, 64QAM Low Channel



Antenna Port 3, 64QAM High Channel



FCC §2.1051 & §27.53(g) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standards

FCC §2.1051 and §27.53(g).

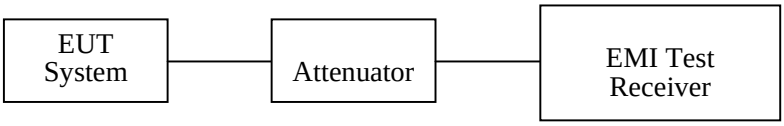
g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the EUT system was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the EMI test receiver was set at as following table. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Frequency	RBW	VBW
9 kHz~150 kHz	1 kHz	3 kHz
150 kHz~30 MHz	10 kHz	30 kHz
30 MHz~1 GHz	100 kHz	300 kHz
Above 1 GHz	1 MHz	3 MHz



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Agilent	PSA Series Spectrum Analyzer	E4446A	US44300386	2010-05-28	2012-05-27
Agilent	ESG Vector Signal Generator	E4438C	MY42083251	2009-12-08*	2011-12-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

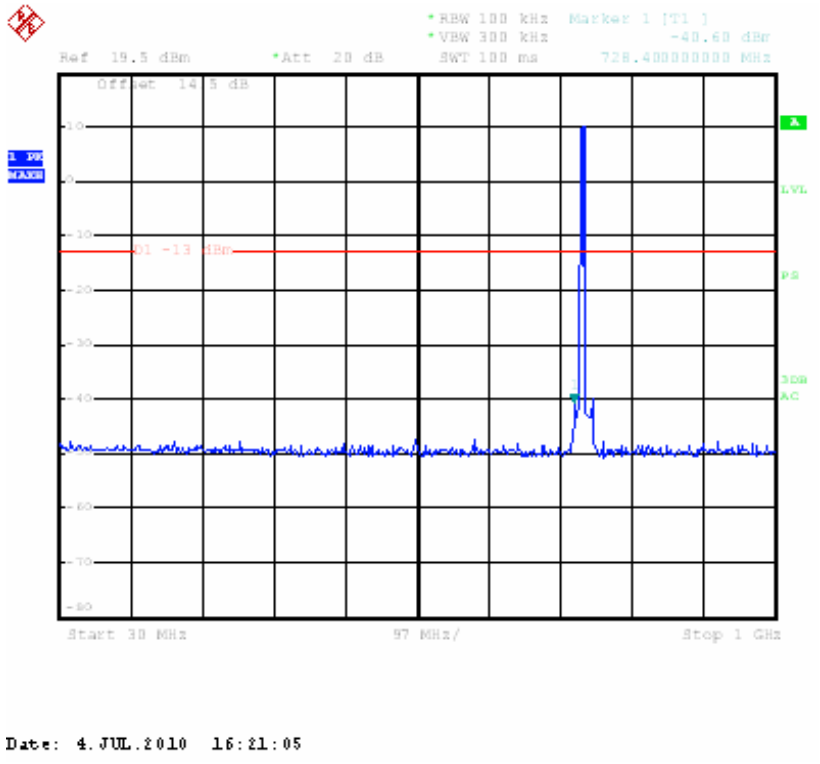
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2010-07-04 and 2010-07-05

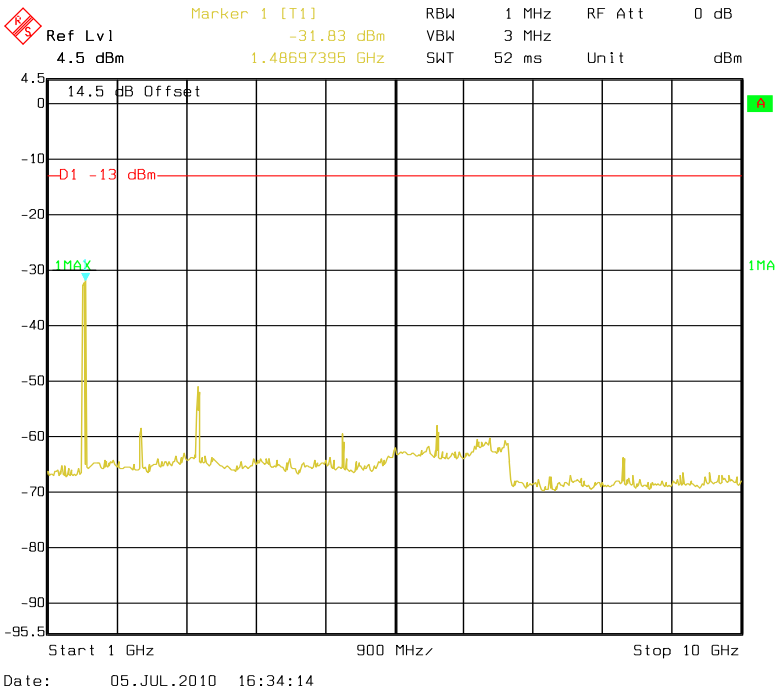
Please refer to the following plots.

WCDMA, Downlink:

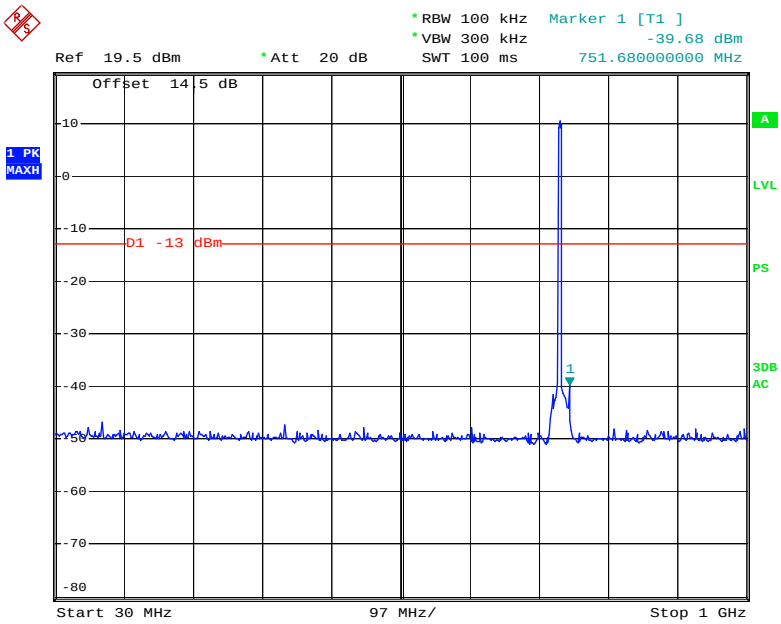
30-1000 MHz - for Antenna Port 1



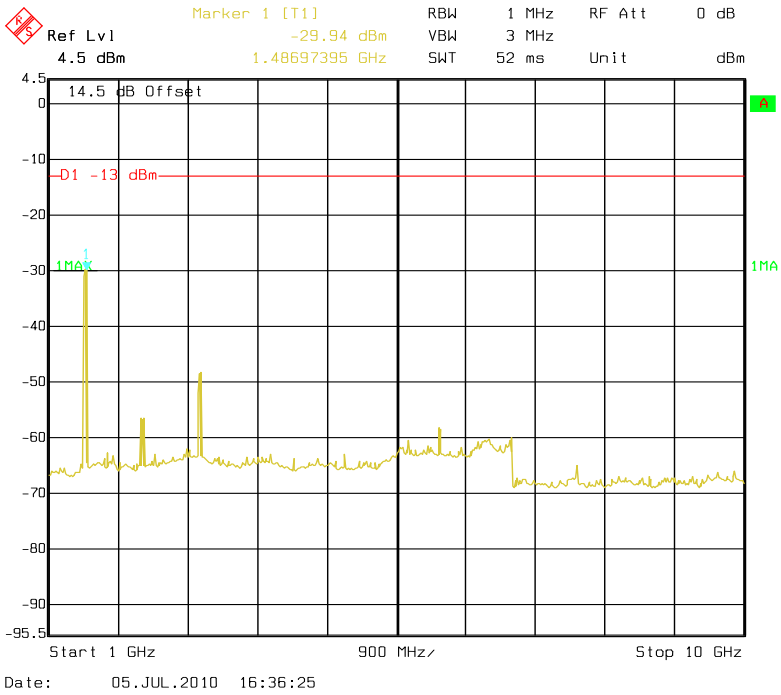
1-10 GHz - for Antenna Port 1



30-1000 MHz - for Antenna Port 3



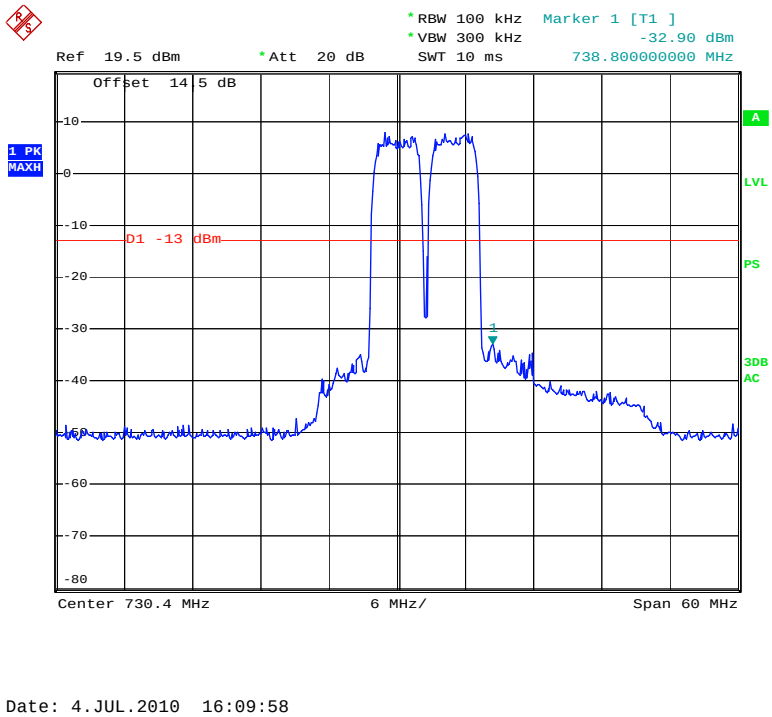
1-10 GHz - for Antenna Port 3



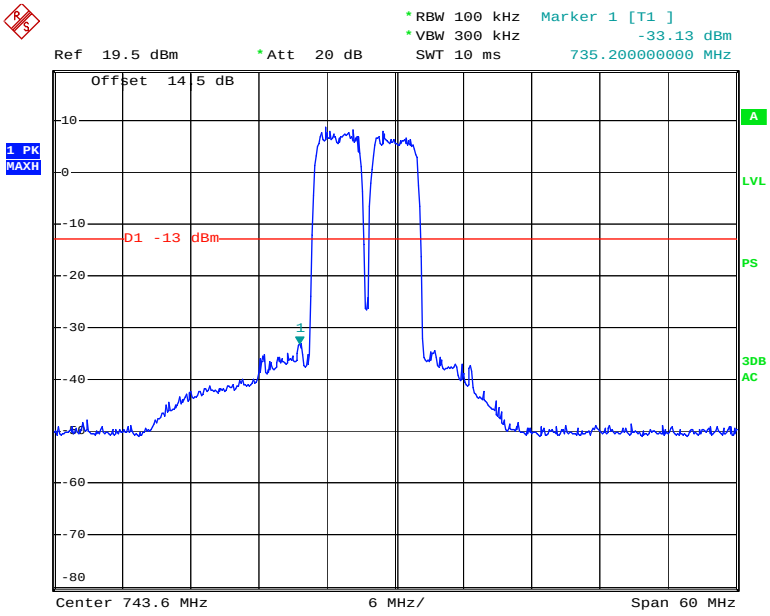
Inter Modulation

In the band 728-746 MHz, inter-modulation products levels as follows, and the max level are less than -13 dBm

Set the operating frequency to 730.4 MHz, and the other input signal at 735.4 MHz, Low Channel for Port 1

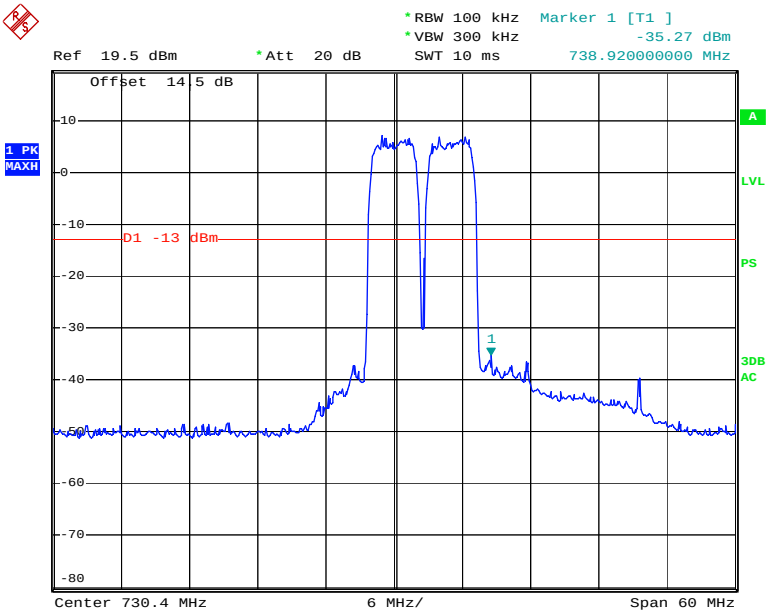


Set the operating frequency to743.6 MHz, and the other input signal at 738.6 MHz, High Channel for Port 1



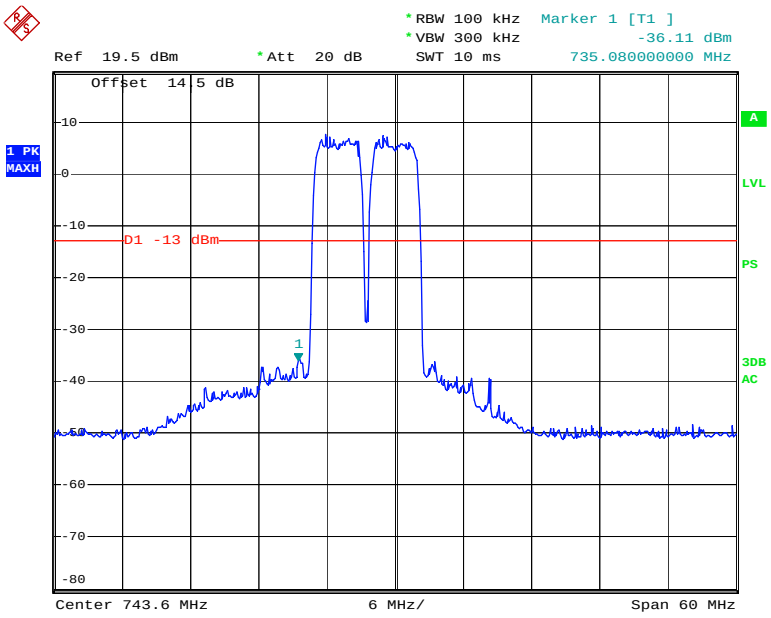
Date: 4.JUL.2010 16:12:03

Set the operating frequency to 730.4 MHz, and the other input signal at735.4 MHz, Low Channel for Port 3

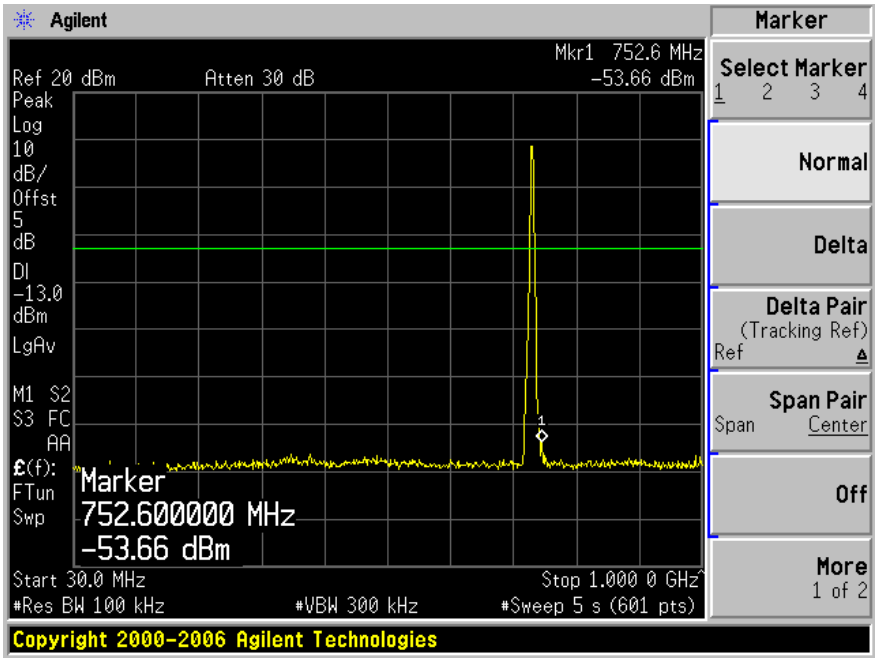


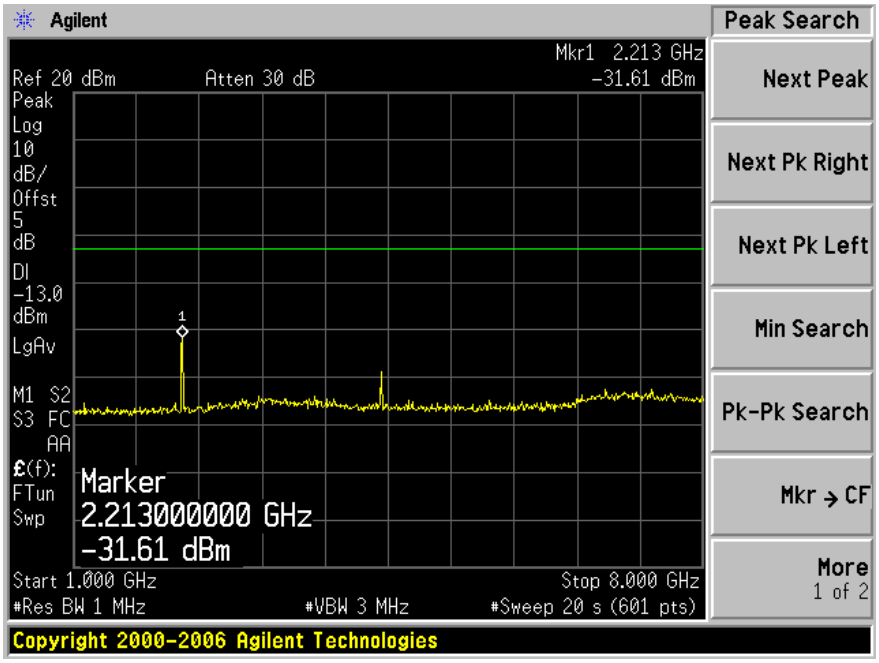
Date: 4.JUL.2010 16:16:41

Set the operating frequency to 743.6 MHz, and the other input signal at 738.6 MHz, High Channel for Port 3



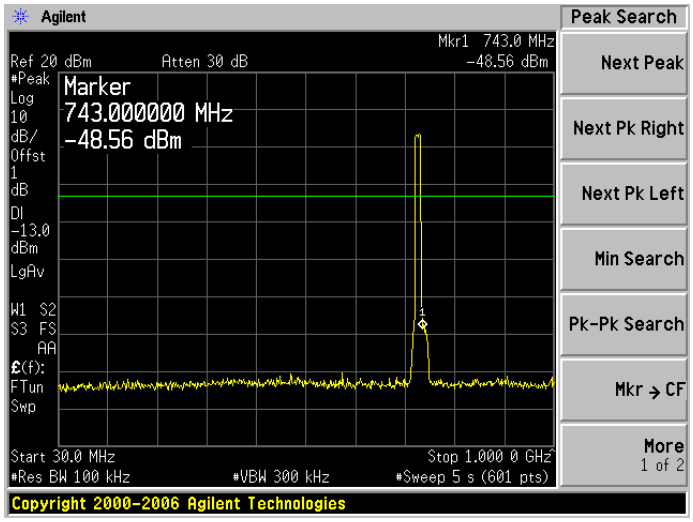
Conducted Spurious Emissions using Combiner:

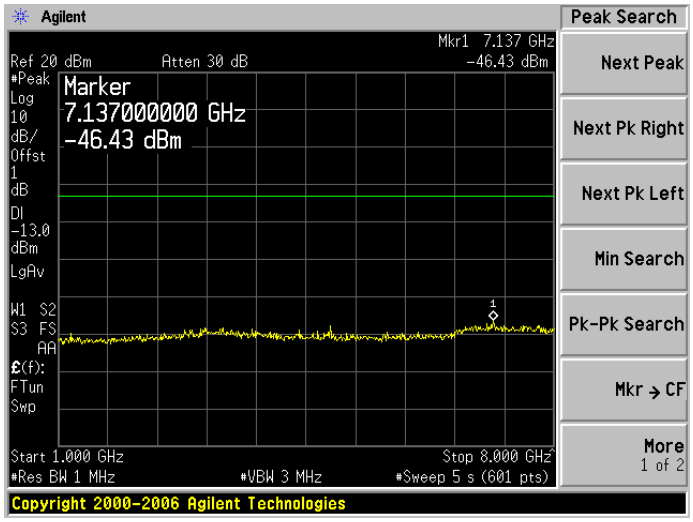




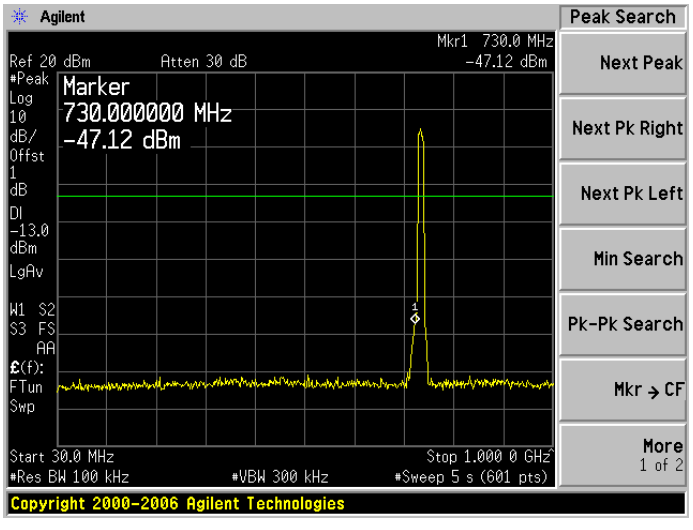
LTE, Downlink:

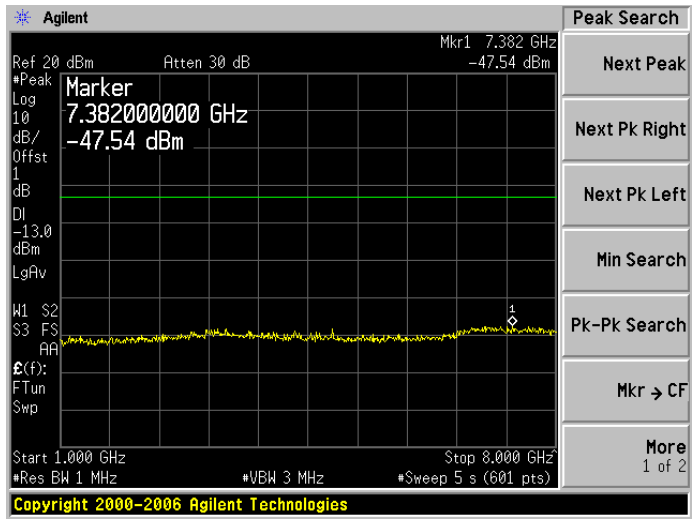
Antenna Port 1, QPSK Low Channel



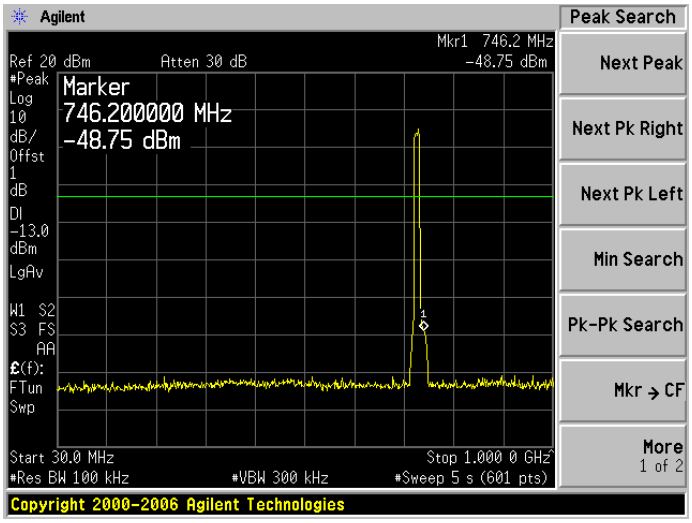


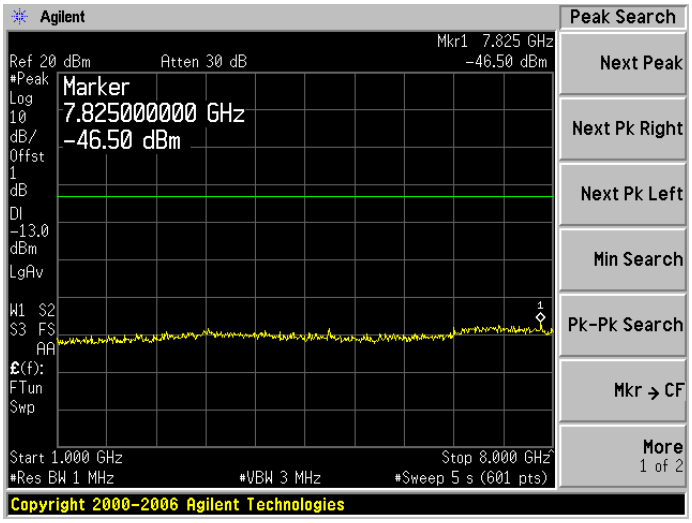
Antenna Port 1, QPSK High Channel



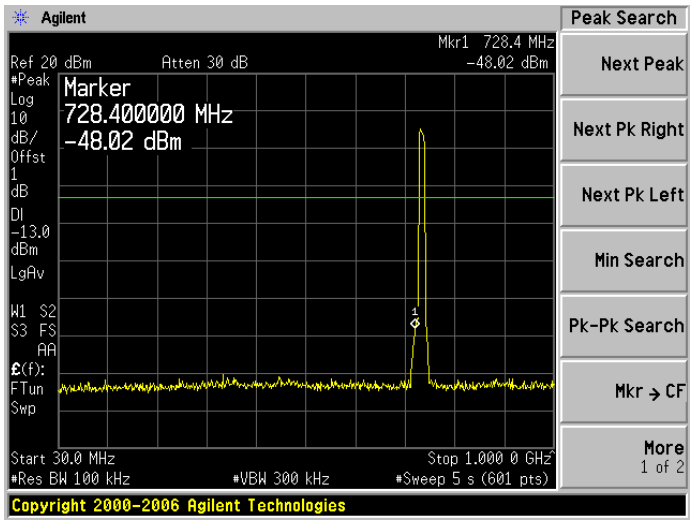


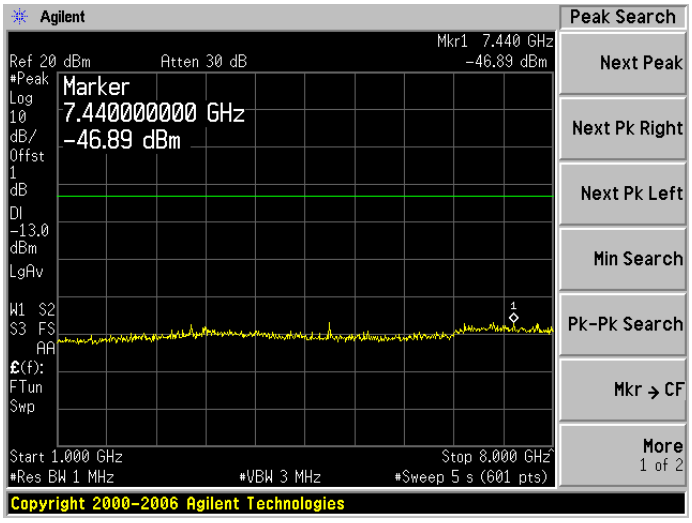
Antenna Port 1, 16QAM Low Channel



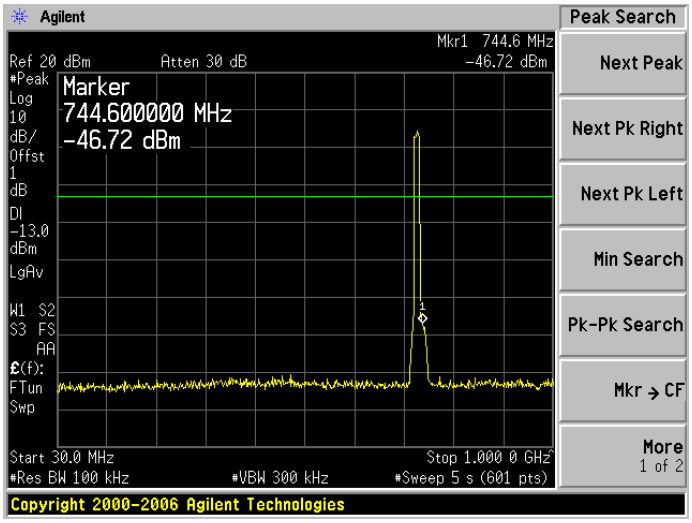


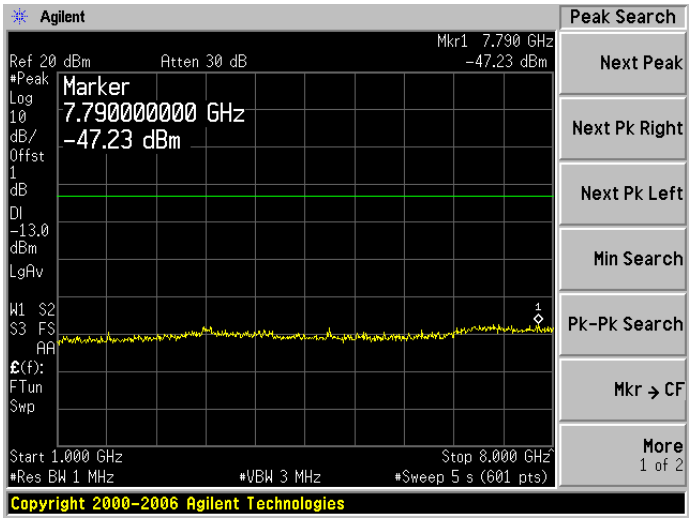
Antenna Port 1, 16QAM High Channel



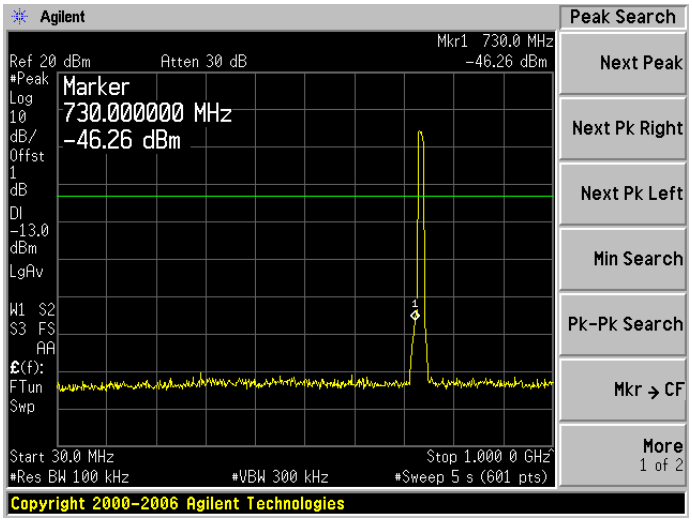


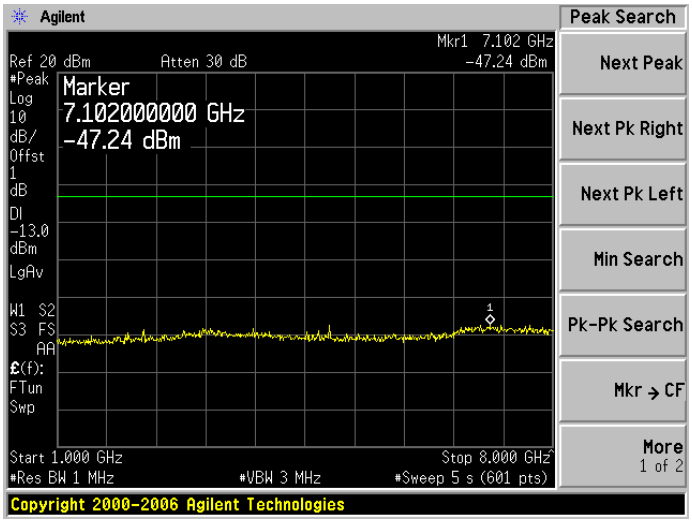
Antenna Port 1, 64QAM Low Channel



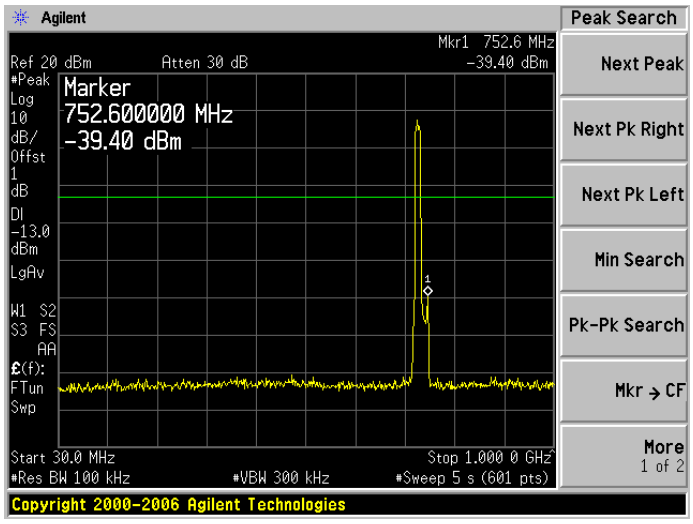


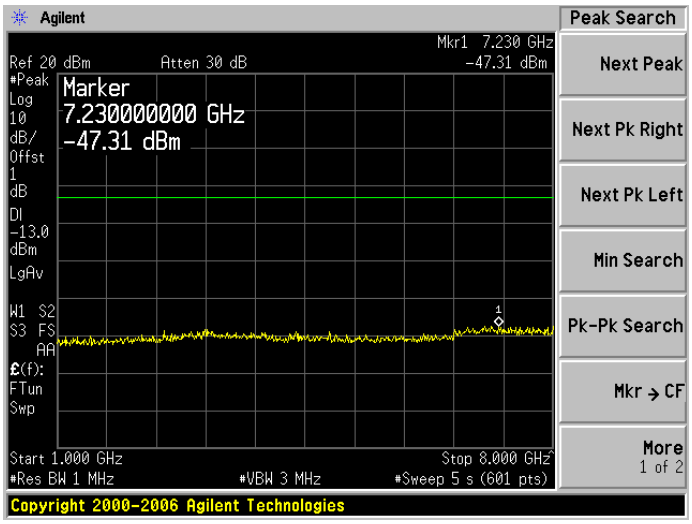
Antenna Port 1, 64QAM High Channel



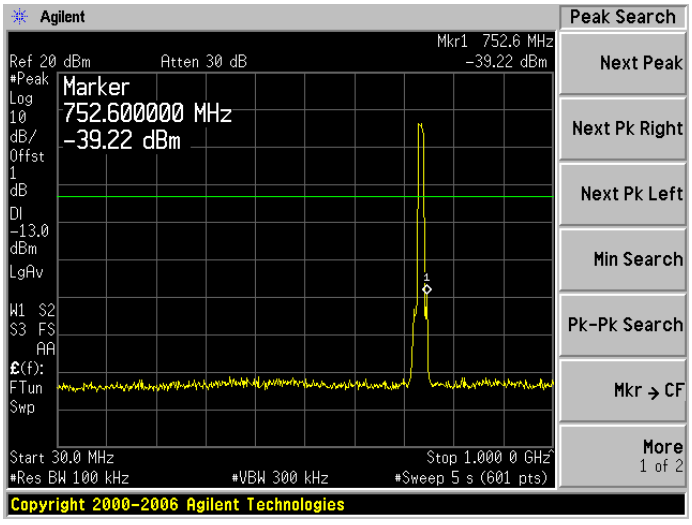


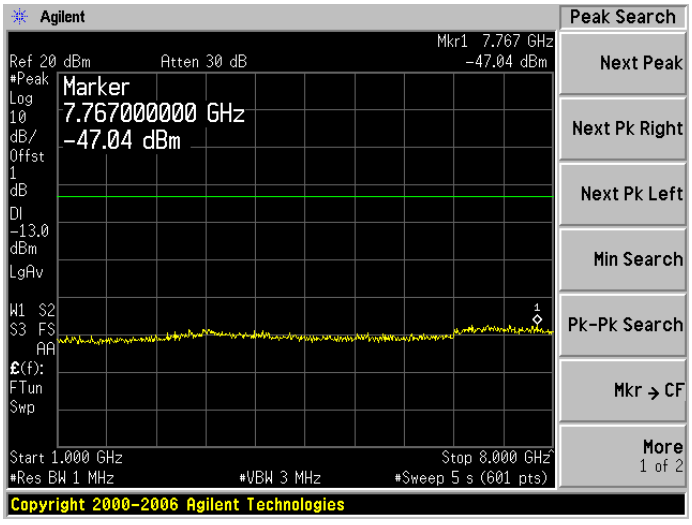
Antenna Port 3, QPSK Low Channel



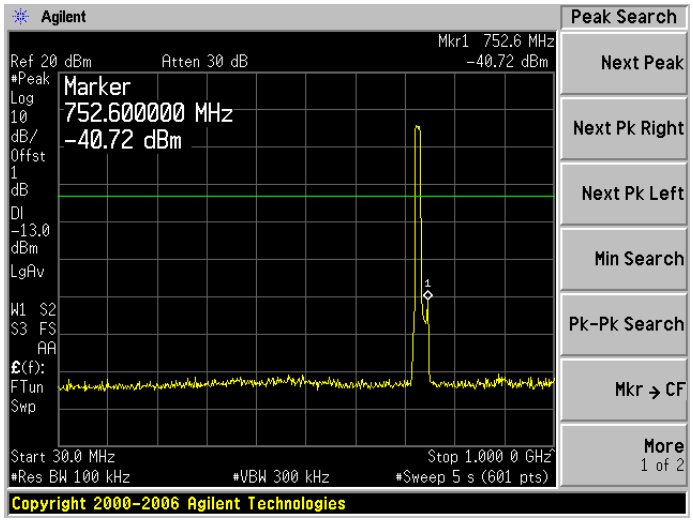


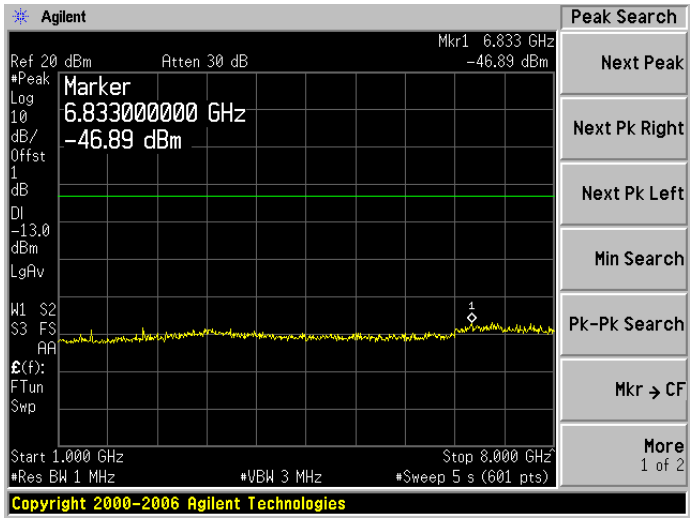
Antenna Port 3, QPSK High Channel



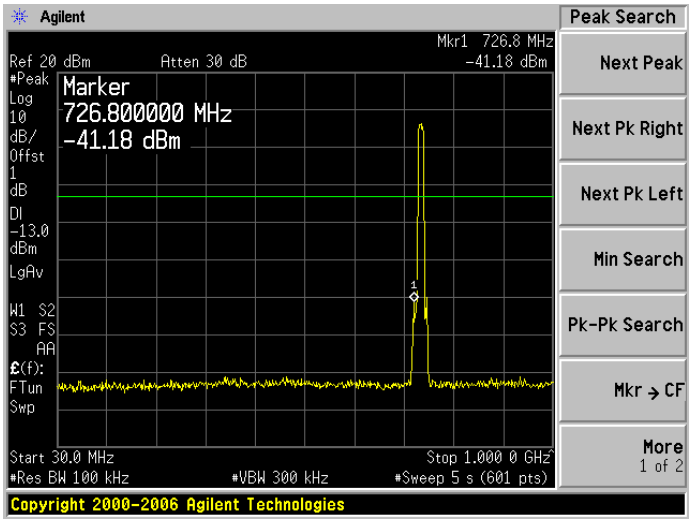


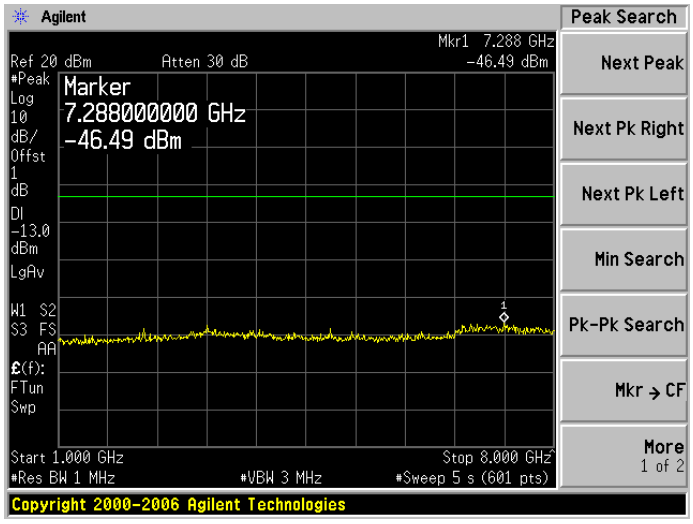
Antenna Port 3, 16QAM Low Channel



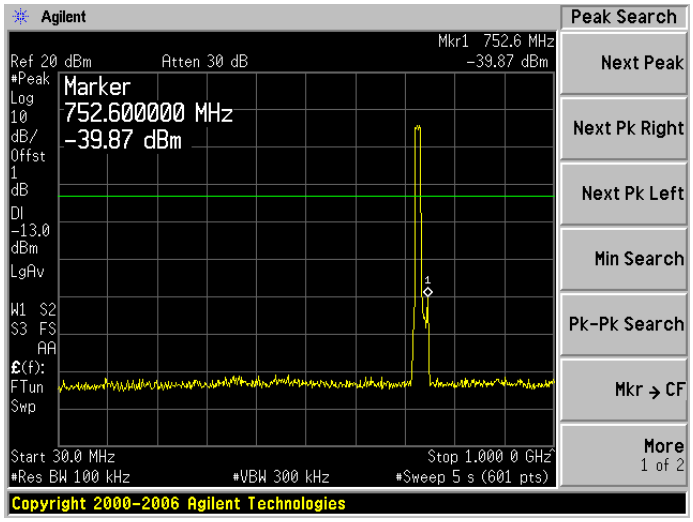


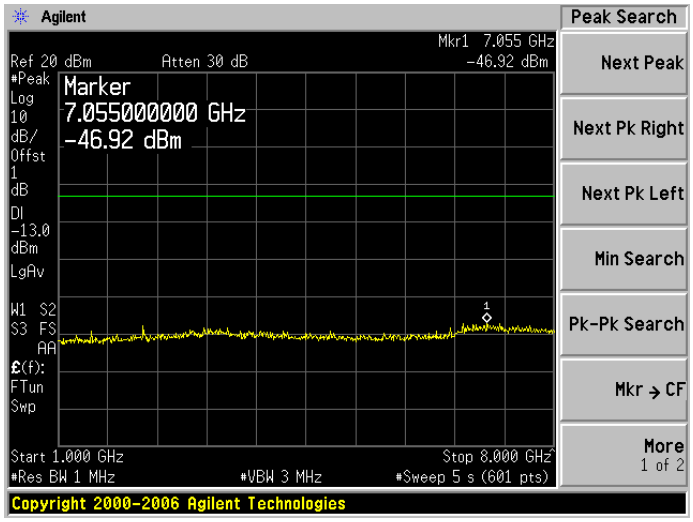
Antenna Port 3, 16QAM High Channel



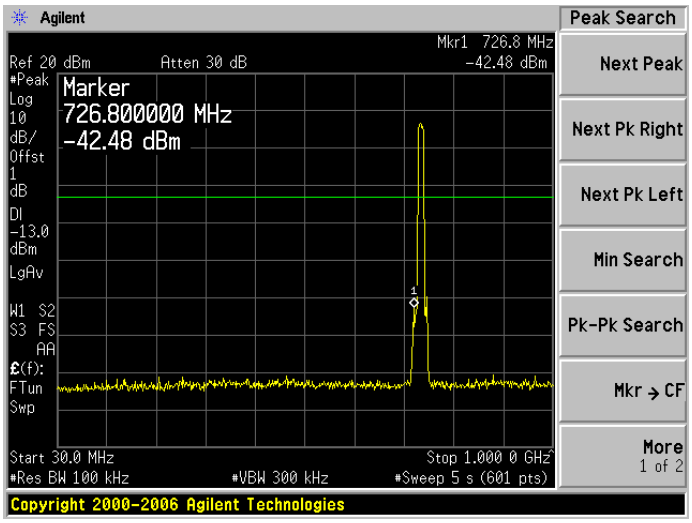


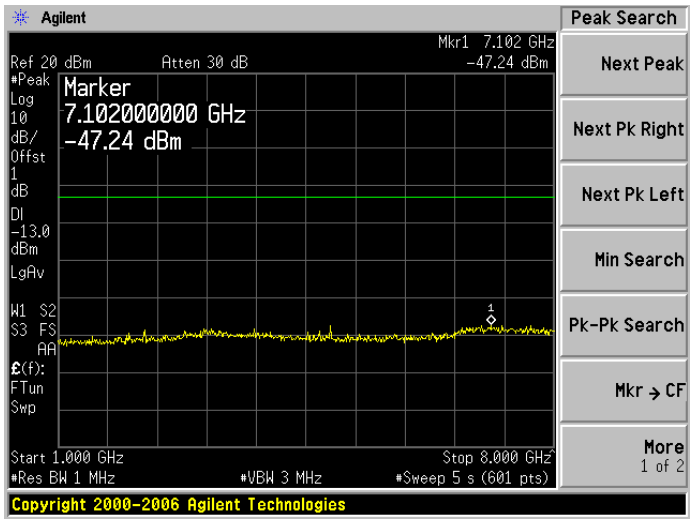
Antenna Port 3, 64QAM Low Channel





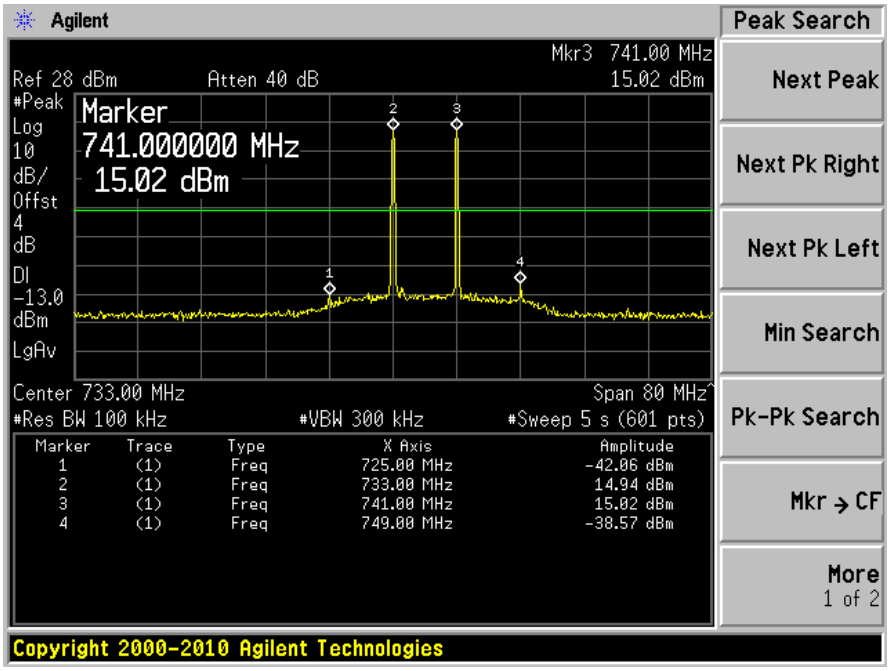
Antenna Port 3, 64QAM High Channel



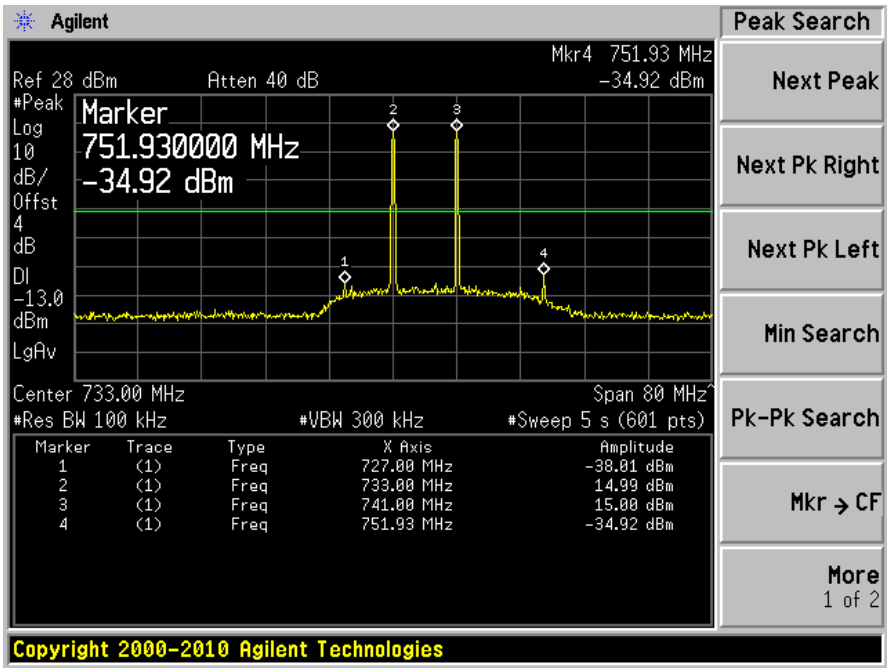


Inter Modulation

Antenna Port 1

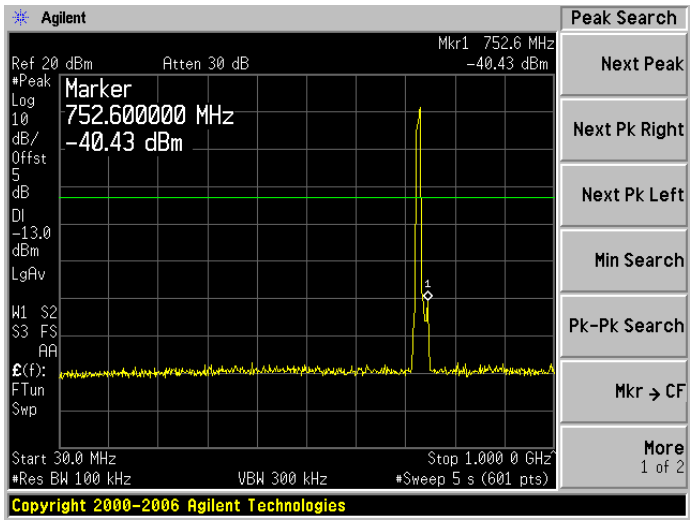


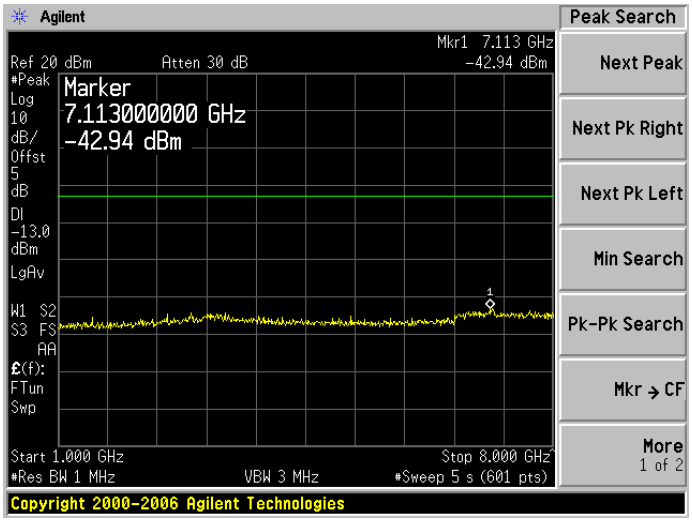
Antenna Port 3



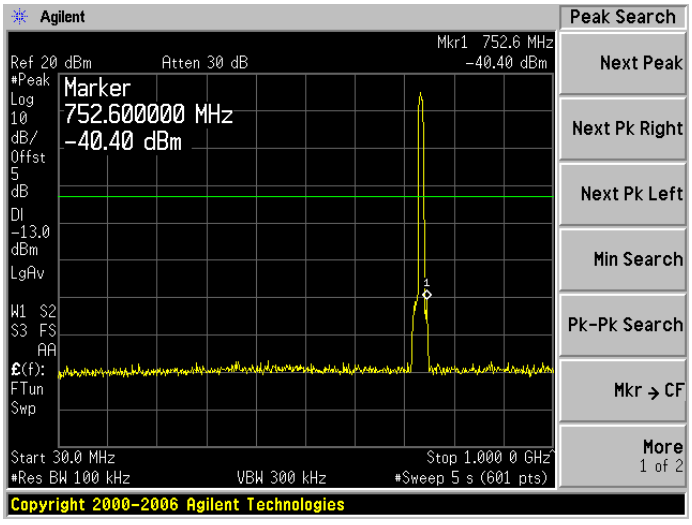
Conducted Spurious Emissions using Combiner:

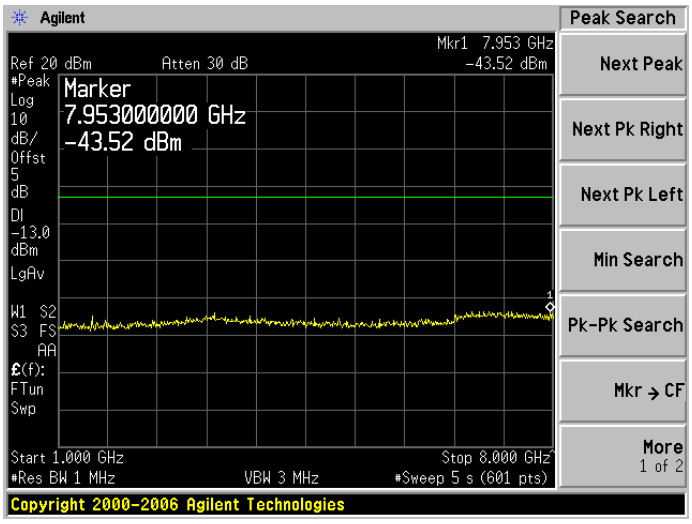
QPSK Low Channel



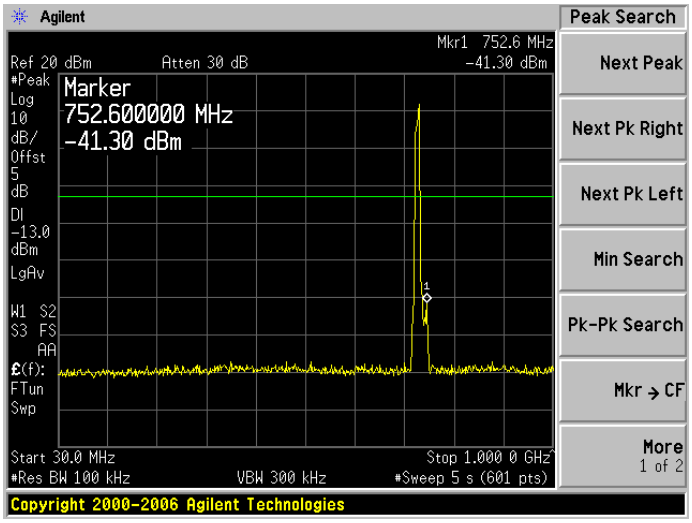


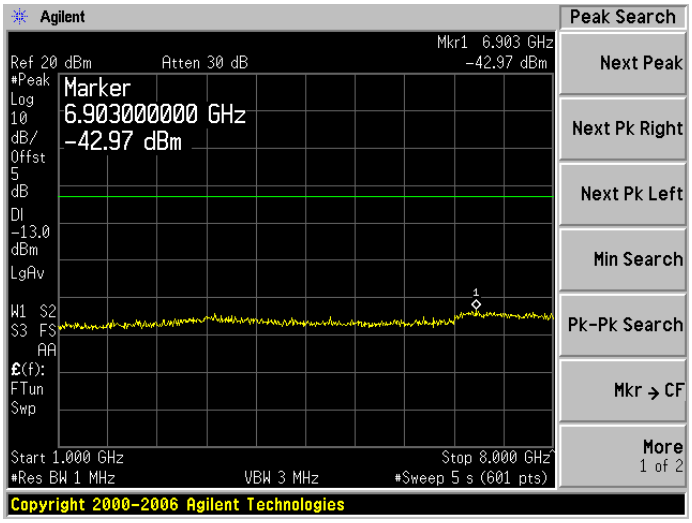
QPSK High Channel



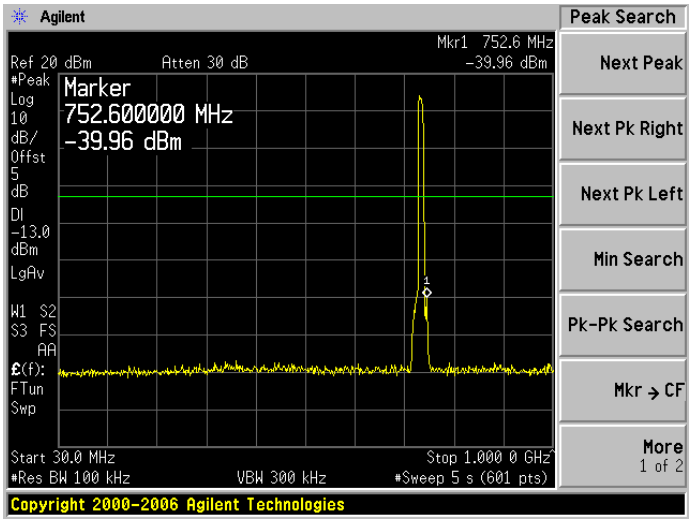


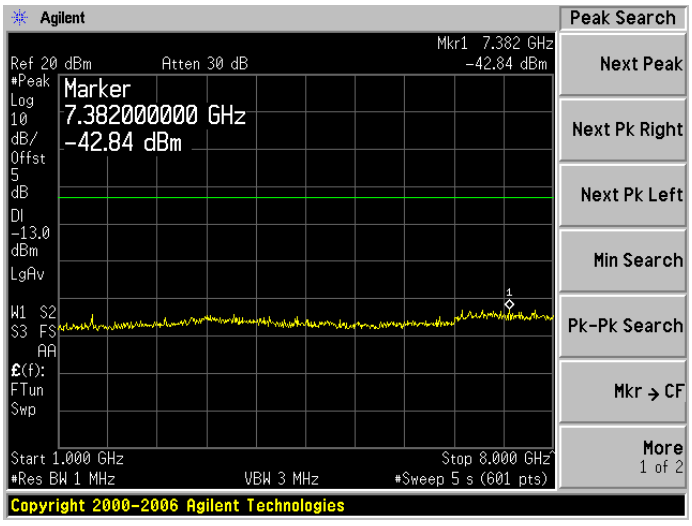
16QAM Low Channel



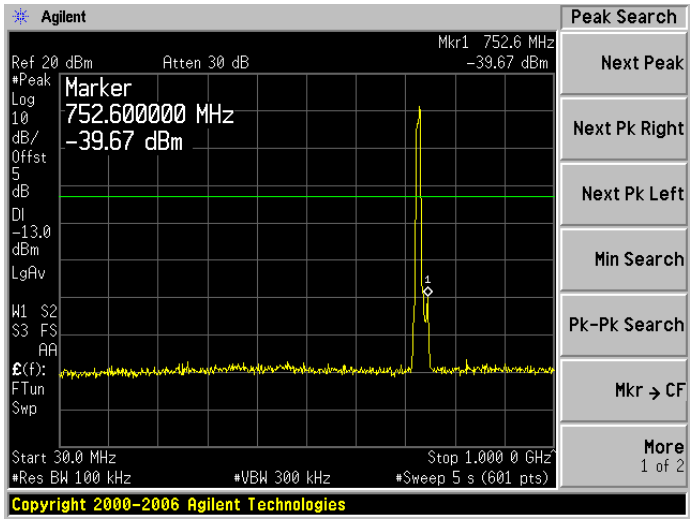


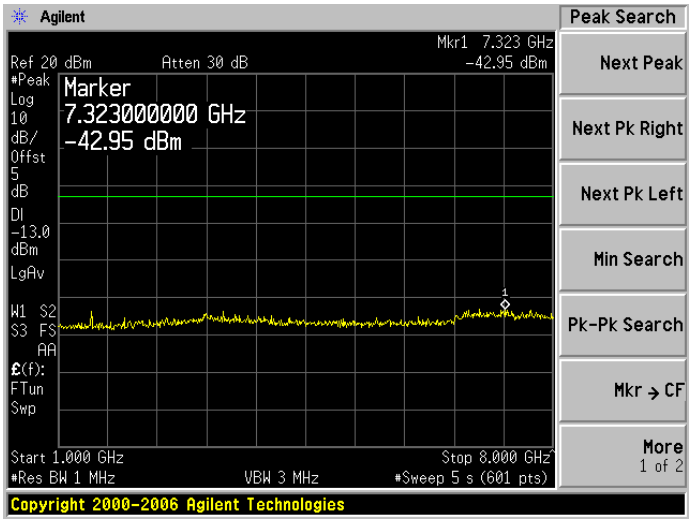
16QAM High Channel



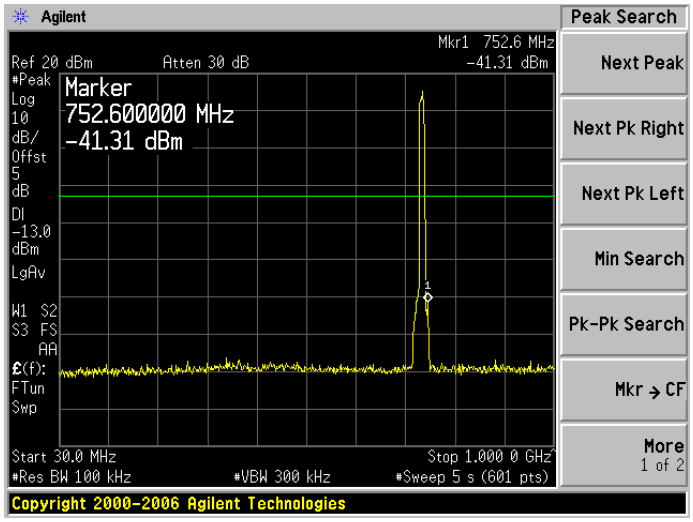


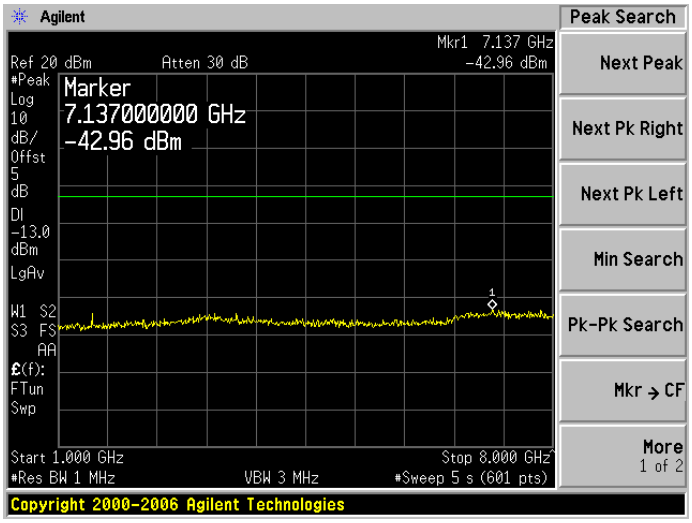
64QAM Low Channel





64QAM High Channel





FCC §2.1053 & §27.53(g) - SPURIOUS RADIATED EMISSIONS

Applicable Standards

FCC §2.1053 & §27.53(g)

Test Procedure

The EUT system was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07
HP	Preamplifier	8449B	3008A00277	2009-09-12	2010-09-11
HP	Signal Generator	HP8657A	2849U00982	2009-10-28	2010-10-27
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
HP	Synthesized Sweeper	8341B	2624A00116	2009-11-07	2010-11-06
COM POWER	Dipole Antenna	AD-100	041000	2009-09-25	2010-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2010-05-17	2011-05-17

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2010-07-02.

WCDMA, Downlink:

Run 1#

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel (737 MHz)											
4110.7	63.46	146	1.9	H	4110.7	-30.7	7.6	1.57	-24.67	-13	11.67
4110.7	61.70	12	2.0	V	4110.7	-32.2	7.6	1.57	-26.17	-13	13.17
6266.5	43.24	15	2.0	V	6266.5	-49.4	8.4	1.89	-42.89	-13	29.89
6266.5	42.20	120	2.2	H	6266.5	-50.3	8.4	1.89	-43.79	-13	30.79
3633.3	44.05	120	2.2	H	3633.3	-52.5	7.1	1.44	-46.84	-13	33.84
3633.3	42.20	15	2.0	V	3633.3	-53.4	7.1	1.44	-47.74	-13	34.74
1474.0	41.25	120	2.2	H	1474.0	-59.2	6.4	0.88	-53.68	-13	40.68
66.7	41.2	250	1.0	H	66.7	-53.8	0	0.24	-54.04	-13	41.04
1474.0	40.23	15	2.0	V	1474.0	-61.6	6.4	0.88	-56.08	-13	43.08
88.6	36.3	160	1.0	V	88.6	-58.7	0	0.24	-58.94	-13	45.94

Run 2#

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle channel (737 MHz)											
4126.3	64.17	146	1.9	H	4126.3	-30.1	7.6	1.57	-24.07	-13	11.07
4126.3	61.79	12	2.0	V	4126.3	-32.1	7.6	1.57	-26.07	-13	13.07
6266.5	43.29	15	2.0	V	6266.5	-49.3	8.4	1.89	-42.79	-13	29.79
6266.5	41.49	120	2.2	H	6266.5	-51.0	8.4	1.89	-44.49	-13	31.49
3633.3	42.91	15	2.0	V	3633.3	-52.7	7.1	1.44	-47.04	-13	34.04
3633.3	43.85	120	2.2	H	3633.3	-52.7	7.1	1.44	-47.04	-13	34.04
1474.0	41.95	120	2.2	H	1474.0	-58.5	6.4	0.88	-52.98	-13	39.98
66.7	41.5	230	1.0	H	66.7	-53.4	0	0.24	-53.64	-13	40.64
1474.0	41.89	15	2.0	V	1474.0	-59.9	6.4	0.88	-54.38	-13	41.38
88.6	36.7	140	1.0	V	88.6	-58.4	0	0.24	-58.64	-13	45.64

LTE, Downlink:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBµV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Low Channel (731 MHz)											
4398	65.16	184	100	V	4398	-35.31	12.106	1.65	-24.854	-13	11.854
4398	64.53	12	100	H	4398	-35.26	12.106	1.65	-24.804	-13	11.804
High Channel (741 MHz)											
4446	65.67	183	100	V	4446	-34.8	12.106	1.65	-24.344	-13	11.344
4446	64.09	10	100	H	4446	-35.7	12.106	1.65	-25.244	-13	12.244

FCC §27.53(g) - BAND EDGES

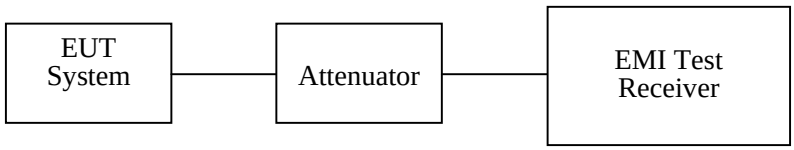
Applicable Standards

According to FCC §27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Test Procedure

The RF output of the EUT system was connected to the input of the EMI test receiver through sufficient attenuation.

The center of the EMI test receiver was set to block edge frequency, RBW set to 10 kHz.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Agilent	PSA Series Spectrum Analyzer	E4446A	US44300386	2010-05-28	2012-05-27
Agilent	ESG Vector Signal Generator	E4438C	MY42083251	2009-12-08*	2011-12-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2010-07-04.

Please refer to the following tables and plots.

WCDMA:

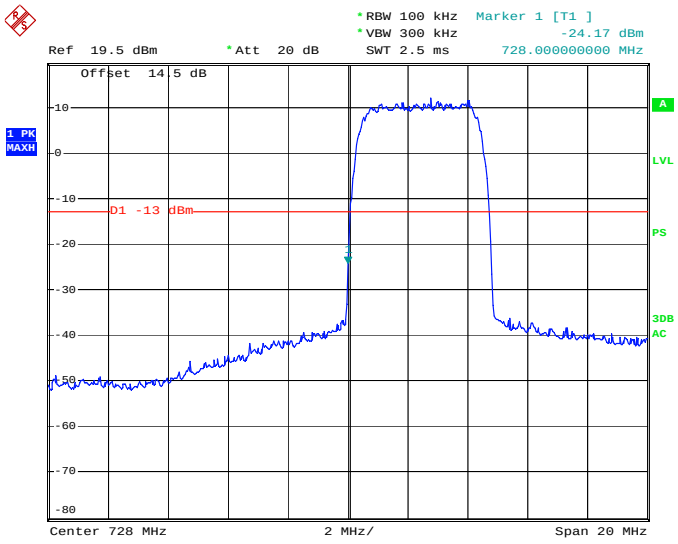
Mode	Channel	Frequency (MHz)	Emission (dBm)	Limit (dBm)
Downlink	Port 1			
	Low	728	-24.17	-13
	High	746	-22.45	-13
	Port 3			
	Low	728	-26.25	-13
	High	746	-23.04	-13

LTE:

Mode	Channel	Modulation	Frequency (MHz)	Emission (dBm)	Limit (dBm)
Downlink	**Antenna Port 1**				
	Low	QPSK	728	-18.64	-13
		16 QAM	728	-15.97	-13
		64 QAM	728	-21.33	-13
	High	QPSK	746	-19.84	-13
		16 QAM	746	-19.30	-13
		64 QAM	746	-21.37	-13
	Antenna Port 3				
	Low	QPSK	728	-20.06	-13
		16 QAM	728	-17.35	-13
		64 QAM	728	-20.47	-13
	High	QPSK	746	-20.51	-13
		16 QAM	746	-17.68	-13
		64 QAM	746	-19.07	-13

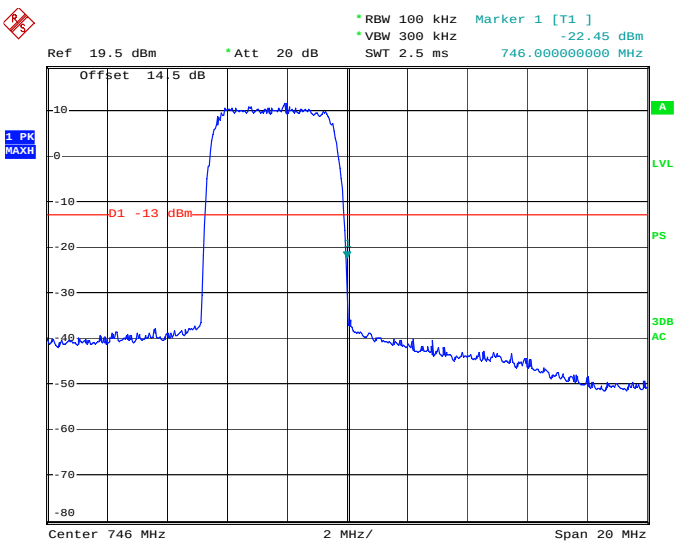
WCDMA, Downlink:

Low Channel for Antenna Port 1



Date: 4.JUL.2010 16:38:58

High Channel for Antenna Port 1



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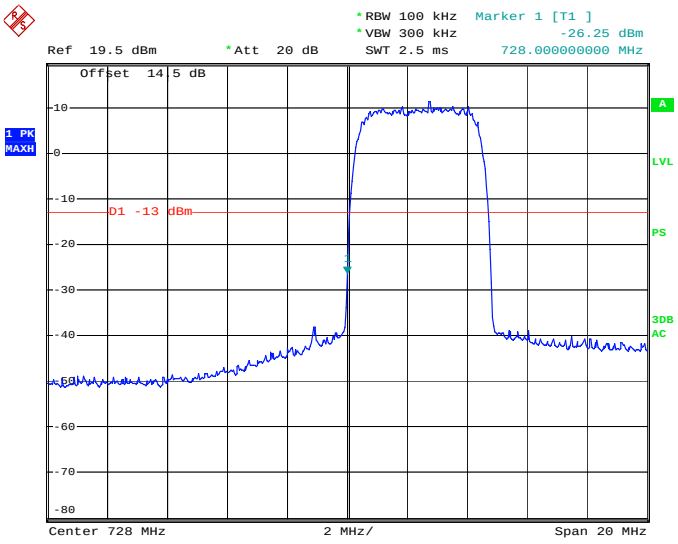
Low Channel for Antenna Port 3



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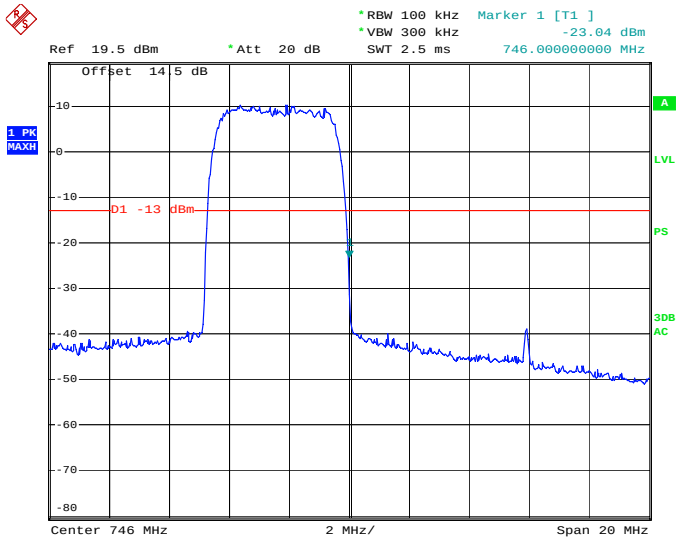
High Channel for Antenna Port 3



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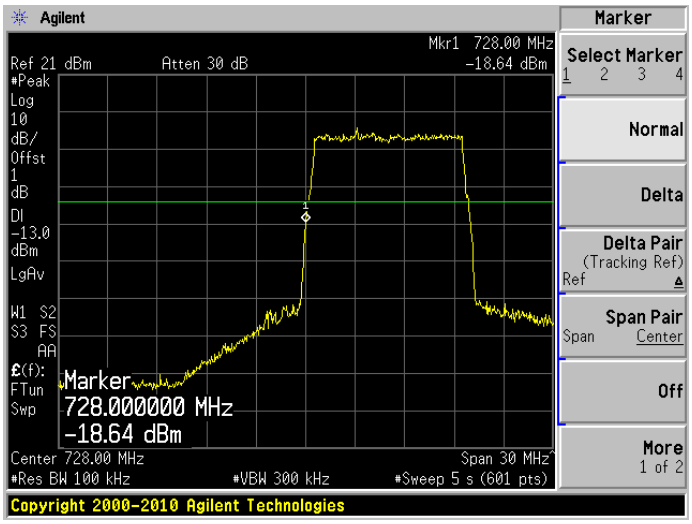
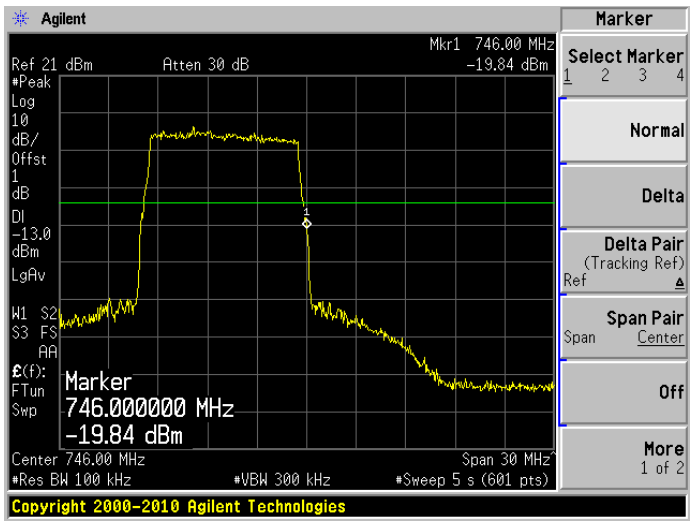
LTE, Downlink:

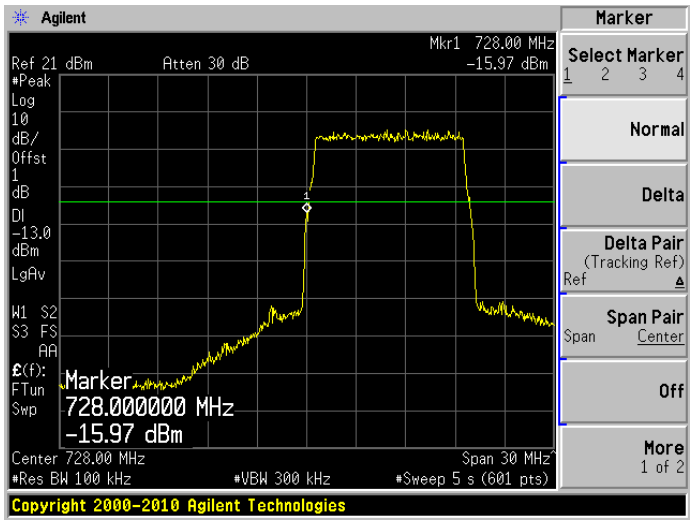
Antenna Port 1, QPSK Low Channel



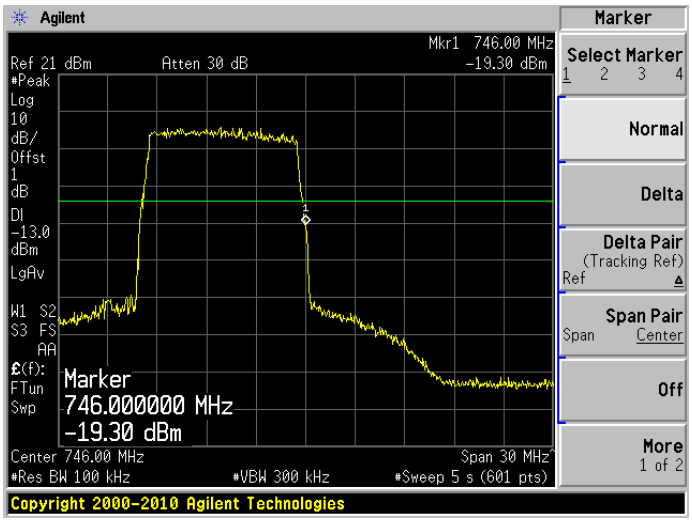
Antenna Port 1, QPSK High Channel



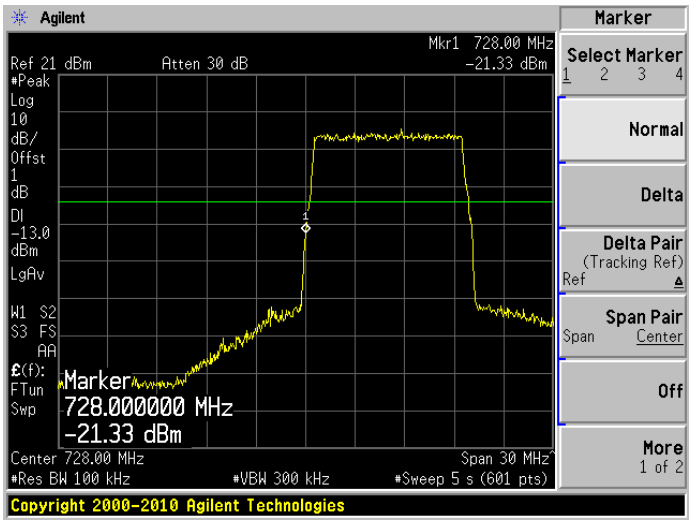
Antenna Port 1, 16QAM Low Channel



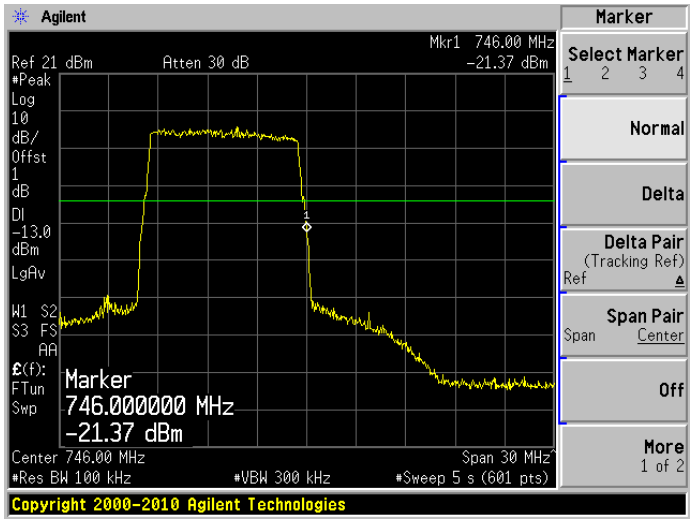
Antenna Port 1, 16QAM High Channel



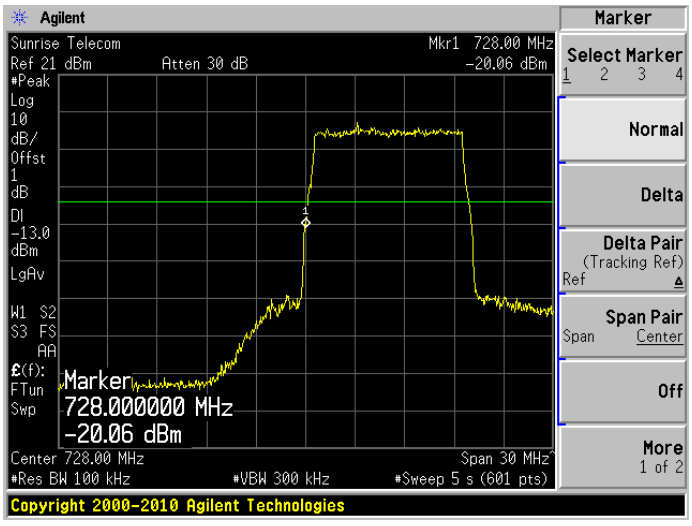
Antenna Port 1, 64QAM Low Channel



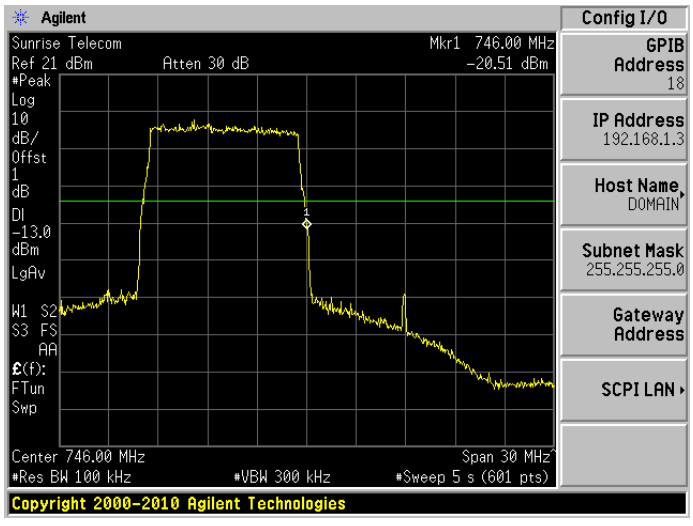
Antenna Port 1, 64QAM High Channel



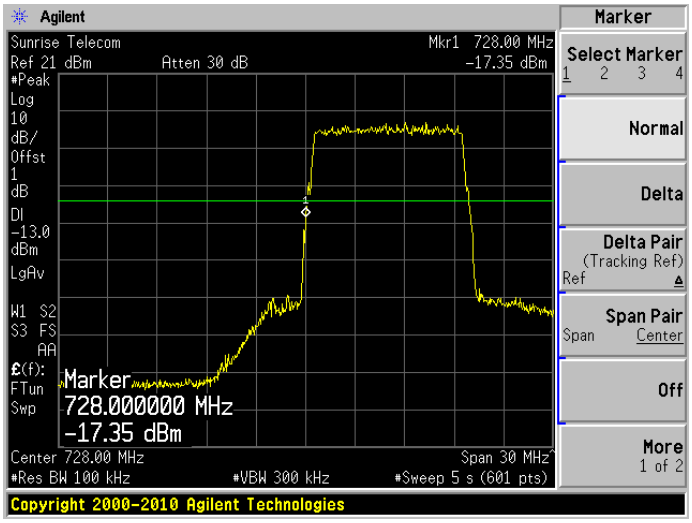
Antenna Port 3, QPSK Low Channel



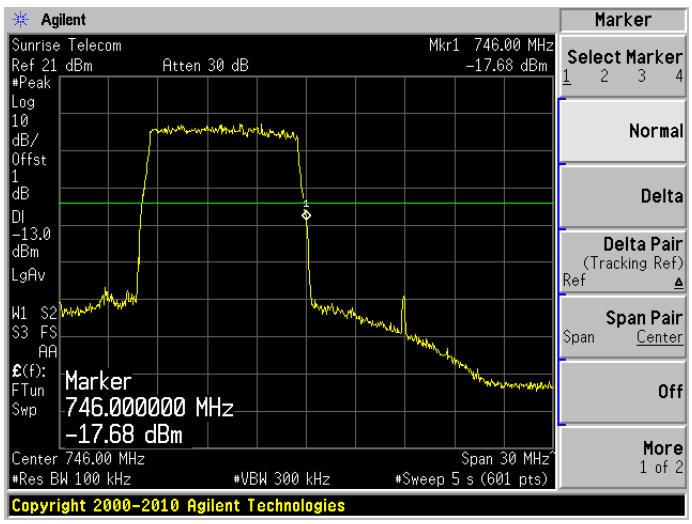
Antenna Port 3, QPSK High Channel



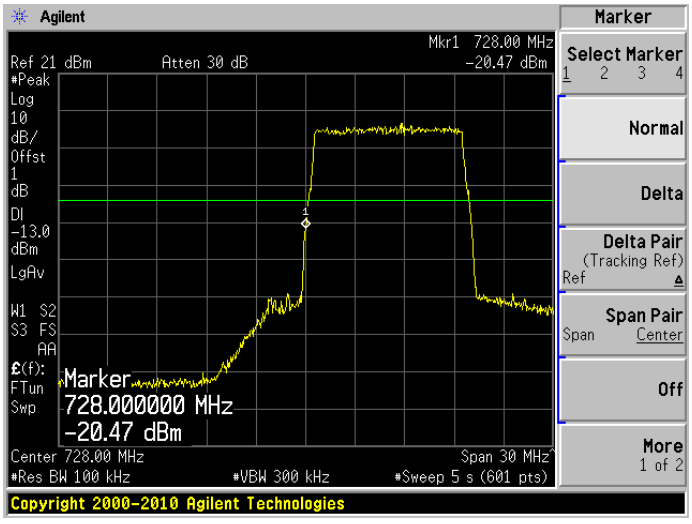
Antenna Port 3, 16QAM Low Channel



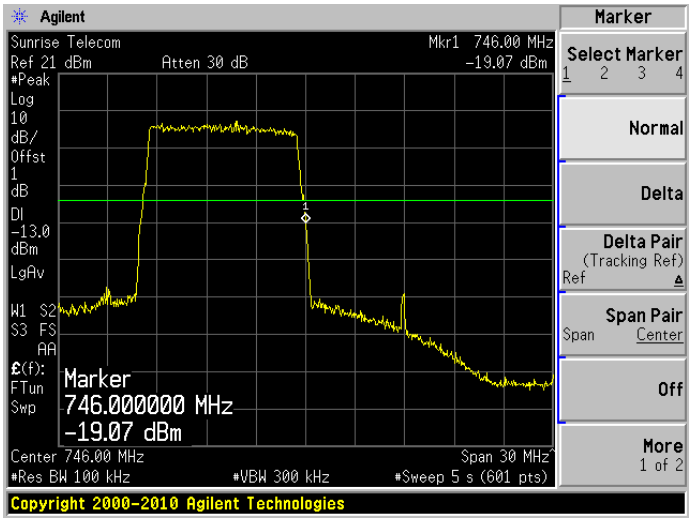
Antenna Port 3, 16QAM High Channel



Antenna Port 3, 64QAM Low Channel



Antenna Port 3, 64QAM High Channel Input



FCC §2.1055 & §27.54 – FREQUENCY STABILITY

Applicable Standard

According to FCC §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Procedure

The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
b.) Primary Supply Voltage: The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification — the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 0.000 25%(± 2.5 ppm) of the center frequency.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2010-07-04.

Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	PSA Series Spectrum Analyzer	E4446A	US44300386	2010-05-28
Agilent	ESG Vector Signal Generator	E4438C	MY42083251	2009-12-08*
Tenney	Temperature Oven	Versa Tenn	12.431-8	2009-12-20

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Results

Please refer to the following tables.

Downlink

The EUT is tested at 733 MHz

(Frequency Drift with Supply Voltage Variation)

Voltage (Vac)	Frequency Error (Hz)	Frequency Error (ppm)
102	-145	-0.19781719
120	-135	-0.184174625
138	-140	-0.190995907

(Frequency Drift with Supply Temperature Variation)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)
50	-120	-0.163710778
-20	-128	-0.174624829

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