

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE
FCC Certification**Applicant Name:**
Franklin Wireless Corp**Address:**
6205 Lusk Blvd, San Diego CA 92121**Date of Issue:**
August 29, 2012**Location:**
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon,
Icheon-si, Kyunggi-Do, Korea**Test Report No.:** HCTR1208FR50**HCT FRN:** 0005866421**FCC ID : RB2-U770****APPLICANT : Franklin Wireless Corp****Model(s):** U770**EUT Type:** CDMA/LTE/WiMax USB Dongle**Tx Frequency:** 2 498.5 MHz ~ 2 687.5 MHz (5 MHz Bandwidth)
2 501.0 MHz ~ 2 685.0 MHz (10 MHz Bandwidth)**Rx Frequency:** 2 498.5 MHz ~ 2 687.5 MHz (5 MHz Bandwidth)
2 501.0 MHz ~ 2 685.0 MHz (10 MHz Bandwidth)**Max. RF Output Power:** TX1: 1.216 W 5 MHz 16QAM(30.85 dBm)/ 1.127 W 5 MHz QPSK(30.52 dBm)/
1.191 W 10 MHz 16QAM(30.76 dBm)/ 1.191 W 10 MHz QPSK(30.76 dBm)
TX2: 0.075 W 5 MHz 16QAM(18.77 dBm)/ 0.076 W 5 MHz QPSK(18.82 dBm)/
0.063 W 10 MHz 16QAM(18.02 dBm)/ 0.062 W 10 MHz QPSK(17.95 dBm)**Emission Designator(s):** 5 MHz BW : 4M45G7D (QPSK) / 4M46W7D(16QAM)
10 MHz BW : 9M09G7D (QPSK) / 9M10W7D(16QAM)**FCC Classification:** PCS Licensed Transmitter (PCB)**FCC Rule Part(s):** §27, §2

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C.853(a)


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FCC CERTIFICATION REPORT			www.hct.co.kr
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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1208FR50	August 29, 2012	First Approval Report

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name: Franklin Wireless Corp

Address: 6205 Lusk Blvd, San Diego CA 92121

FCC ID: RB2-U770

Application Type: Certification

FCC Classification: PCS Licensed Transmitter (PCB)

FCC Rule Part(s): §27, §2

EUT Type: CDMA/LTE/WiMax USB Dongle

Model(s): U770

Tx Frequency: 2 498.5 MHz ~ 2 687.5 MHz (5 MHz Bandwidth)
2 501.0 MHz ~ 2 685.0 MHz (10 MHz Bandwidth)

Rx Frequency: 2 498.5 MHz ~ 2 687.5 MHz (5 MHz Bandwidth)
2 501.0 MHz ~ 2 685.0 MHz (10 MHz Bandwidth)

Max. RF Output Power: TX1: 1.216 W 5 MHz 16QAM(30.85 dBm)/ 1.127 W 5 MHz QPSK(30.52 dBm)/
1.191 W 10 MHz 16QAM(30.76 dBm)/ 1.191 W 10 MHz QPSK(30.76 dBm)

TX2: 0.075 W 5 MHz 16QAM(18.77 dBm)/ 0.076 W 5 MHz QPSK(18.82 dBm)/
0.063 W 10 MHz 16QAM(18.02 dBm)/ 0.062 W 10 MHz QPSK(17.95 dBm)

Emission Designator(s): 5 MHz BW : 4M45G7D (QPSK) / 4M46W7D(16QAM)
10 MHz BW : 9M09G7D (QPSK) / 9M10W7D(16QAM)

Date(s) of Tests: August 08, 2012 ~ August 22, 2012

Antenna Specification Manufacturer: KWANG HYUN AIRTECH CO.,LTD
Antenna type: Monopole Antenna
Peak Gain: 1.68 dBi

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2. INTRODUCTION

2.1. EUT DESCRIPTION

The U770 CDMA/LTE/WiMax USB Dongle consists of WiMax.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

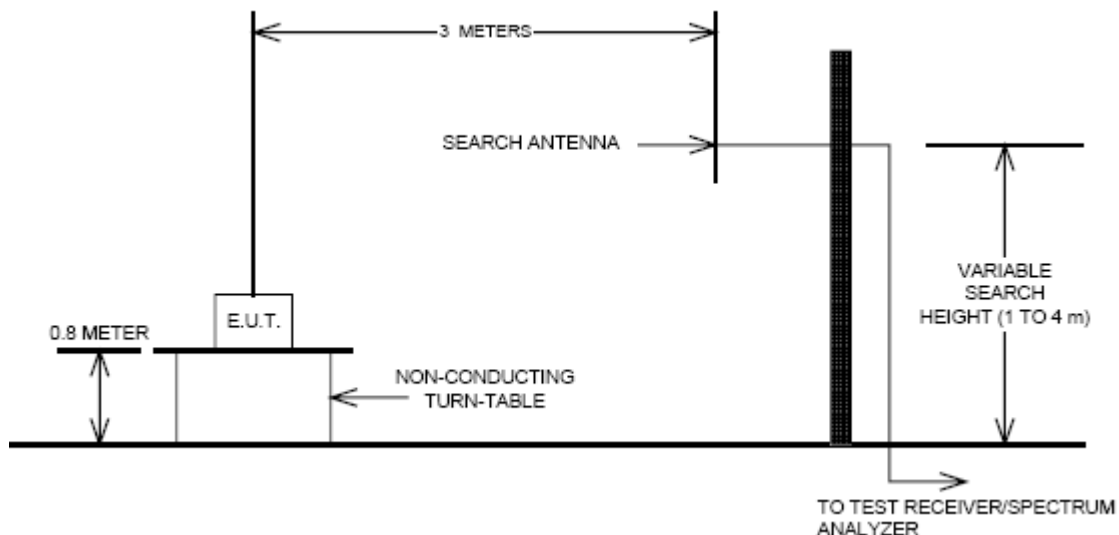
The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

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3. DESCRIPTION OF TESTS

3.1 EQUIVALENT ISOTROPIC RADIATED POWER

Test Set-up



Test Procedure

Radiated emission measurements were performed at an Fully-anechoic chamber.

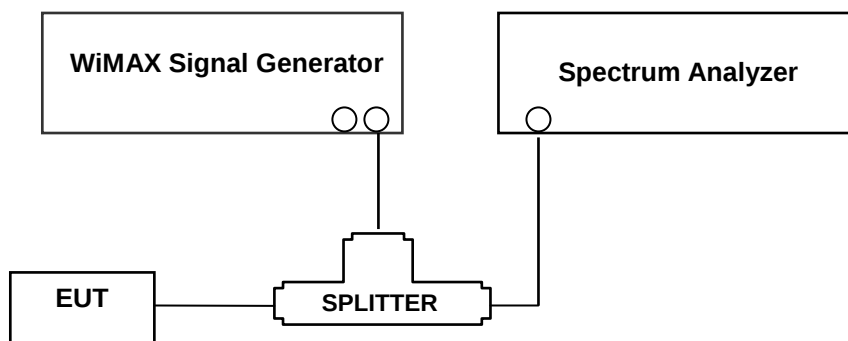
The equipment under test is placed on a non-conductive table 3-meters from the receive antenna. A turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration

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3.2 OCCUPIED BANDWIDTH.

Test set-up



(Configuration of conducted Emission measurement)

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

Test Procedure

The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels(low, middle and high operational range.)

The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

3.3 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the -13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 30 MHz to 26.5 GHz.. A display line was placed at -25 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

- Band Edge Requirement : When measuring conducted band edge, the ACP feature of the signal analyzer was used. For each segment of the band edge, the allowed integration bandwidth was configured to calculate the channel power that is highest within that band edge segment.

- Occupied Bandwidth Emission Limits

- On any frequency outside but within 5.5 MHz from the band edge of a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB. At frequencies greater than 5.5 MHz from any in-band channel edge, the transmitter power (P) shall be attenuated by at least $55 + 10\log(P)$ dB.

- Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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 emission are attenuated at least 26 dB below the transmitter power.

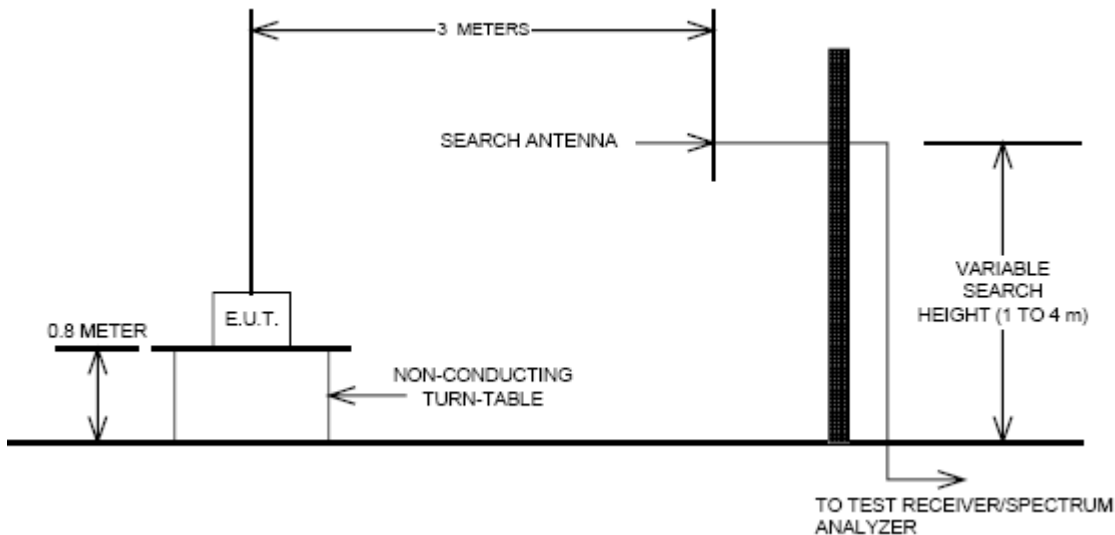
- When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

- The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

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3.4 RADIATED SPURIOUS AND HARMONIC EMISSIONS

Test Set-up



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The Fully-anechoic chamber meets requirements in ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable platform mounted at three from the antenna mast.

- 1) The unit mounted on a turntable 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
- 2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
- 3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
- 4) The spectrum shall be scanned up to the 10th harmonic of the fundamental frequency.

Test Procedure

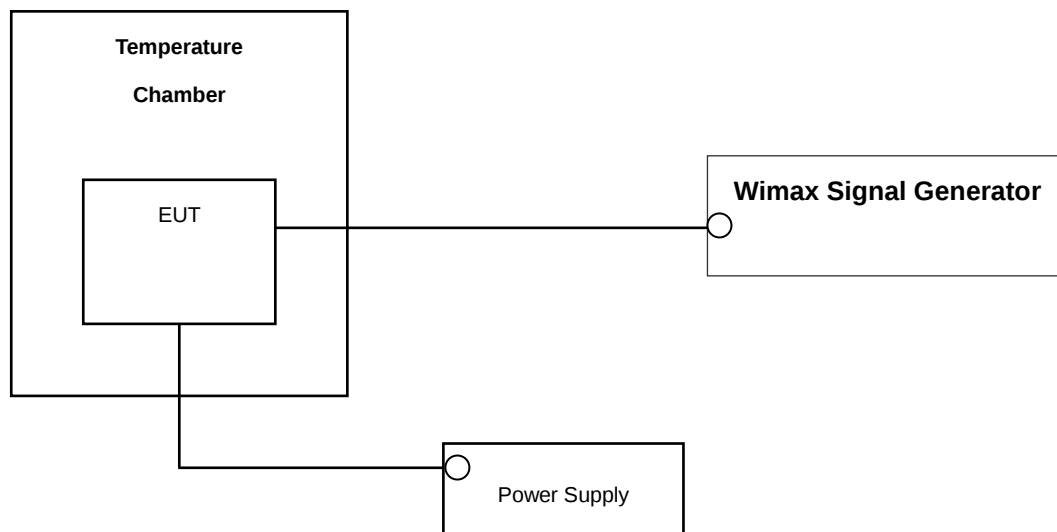
The equipment under test is placed on a non-conductive table 3-meters from the receive antenna. A turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

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3.5 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



* Nominal Operating Voltage

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 $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

1. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

NOTE: The EUT is tested down to the battery endpoint.

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4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	N9020A	MY51110020	Annual	07/30/2013
Agilent	E9327A/ Power Sensor	MY4442009	Annual	05/02/2013
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	Annual	09/24/2012
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	05/02/2013
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	05/02/2013
Hewlett Packard	11667B / Power Splitter	10126	Annual	11/04/2012
Digital	EP-3010/ Power Supply	3110117	Annual	11/07/2012
Schwarzbeck	UHAP/ Dipole Antenna	557	Biennial	03/11/2013
Schwarzbeck	UHAP/ Dipole Antenna	558	Biennial	03/11/2013
Korea Engineering	KR-1005L / Chamber	KRAB05063-3CH	Annual	11/07/2012
Schwarzbeck	BBHA 9120D/ Horn Antenna	296	Biennial	02/20/2014
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	05/02/2013
WEINSCHL	ATTENUATOR	BR0592	Annual	11/07/2012
REOHDE&SCHWARZ	FSV40/Spectrum Analyzer	1307.9002K40-100931-NK	Annual	06/11/2013
Agilent	N5182A / Signal Generator	MY50141649	Annual	06/11/2013

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049, 27.53(l)(6)	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 27.53(l)(4)(6)	Band Edge	$< 43 + 10\log_{10}(P[\text{Watts}])$ within 5.5MHz from the band edge		PASS
2.1046	Conducted Output Power	N/A		PASS
2.1051, 27.53(l)(4)(6)	Conducted Spurious Emissions	$< 55 + 10\log_{10}(P[\text{Watts}])$ for all emissions greater than 5.5MHz from the band edge		
2.1055, 27.54	Frequency stability	Fundamental emissions must stay within the allotted band		PASS
27.50(h)(2)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP	RADIATED	PASS
2.1053, 27.53(l)(4)	Undesirable Emissions	$< 55 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS

6. SAMPLE CALCULATION

A. ERP Sample Calculation

Mode	Ch./ Freq.	Measured Level(dBm)	Substitute LEVEL(dBm)	Ant. Gain	C.L	Pol.	ERP	
	Freq.(MHz)						W	dBm
WiMAX	2596.00	-18.19	15.16	10.28	2.33	H	0.205	23.11

$$\text{ERP} = \text{SubstituteLEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
- 2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (ERP).

B. Emission Designator

Wimax Emission Designator

Emission Designator = 1M27F9W

QPSK Modulation

Emission Designator = 9M11G7D

Wimax BW = 9.11 MHz (Measured at the 99% power bandwidth)

G= Phase Modulation

7 = Quantized/Digital Info

D= Amplitude/Angle Modulated

16QAM / 64QAM Modulation

Emission Designator = 9M12W7D

Wimax BW = 9.12 MHz (Measured at the 99% power bandwidth)

W= Combination (Audio/Data)

7 = Quantized/Digital Info

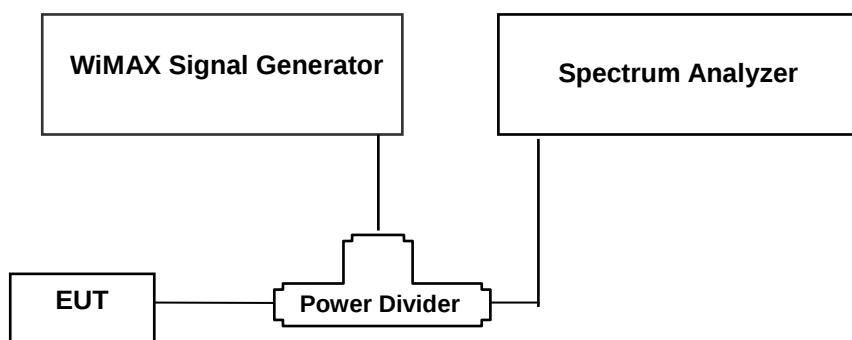
D= Amplitude/Angle Modulated

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7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



Test Result

TX1-5 MHz

5 MHz channel BW		
Frequency(MHz)	Modulation	Average Power (dBm)
2498.5	QPSK 1/2	22.77
	QPSK 3/4	22.77
	16QAM 1/2	22.75
	16QAM 3/4	22.65
2593.0	QPSK 1/2	22.91
	QPSK 3/4	22.93
	16QAM 1/2	22.90
	16QAM 3/4	22.83
2687.5	QPSK 1/2	22.71
	QPSK 3/4	22.78
	16QAM 1/2	22.73
	16QAM 3/4	22.63

(WiMAX Conducted Average Output Powers)

TX1-10 MHz

10 MHz channel BW		
Frequency(MHz)	Modulation	Average Power (dBm)
2501.0	QPSK 1/2	22.84
	QPSK 3/4	22.77
	16QAM 1/2	22.75
	16QAM 3/4	22.69
2593.0	QPSK 1/2	22.98
	QPSK 3/4	22.96
	16QAM 1/2	22.92
	16QAM 3/4	22.79
2685.0	QPSK 1/2	22.79
	QPSK 3/4	22.71
	16QAM 1/2	22.74
	16QAM 3/4	22.70

(WiMAX Conducted Average Output Powers)

TX2-5 MHz

5 MHz channel BW		
Frequency(MHz)	Modulation	Average Power (dBm)
2498.5	QPSK 1/2	22.88
	QPSK 3/4	22.89
	16QAM 1/2	22.88
	16QAM 3/4	22.82
2593.0	QPSK 1/2	22.96
	QPSK 3/4	22.95
	16QAM 1/2	22.94
	16QAM 3/4	22.86
2687.5	QPSK 1/2	22.79
	QPSK 3/4	22.84
	16QAM 1/2	22.83
	16QAM 3/4	22.76

(WiMAX Conducted Average Output Powers)

TX2-10 MHz

10 MHz channel BW		
Frequency(MHz)	Modulation	Average Power (dBm)
2501.0	QPSK 1/2	22.90
	QPSK 3/4	22.93
	16QAM 1/2	22.89
	16QAM 3/4	22.82
2593.0	QPSK 1/2	23.00
	QPSK 3/4	22.93
	16QAM 1/2	22.95
	16QAM 3/4	22.85
2685.0	QPSK 1/2	22.83
	QPSK 3/4	22.84
	16QAM 1/2	22.79
	16QAM 3/4	22.80

(WiMAX Conducted Average Output Powers)

Note : Detecting mode is average.

TX1

- 5 MHz: Plots of the EUT's Conducted Output Power are shown Page 46 ~ 51.
- 10 MHz: Plots of the EUT's Conducted Output Power are shown Page 52 ~ 57.

TX2

- 5 MHz: Plots of the EUT's Conducted Output Power are shown Page 58 ~ 63.
- 10 MHz: Plots of the EUT's Conducted Output Power are shown Page 64 ~ 69.

7.2 OCCUPIED BANDWIDTH

5 MHz

Frequency [MHz]	Modulation	Occupied Bandwidth [MHz]
2498.5	QPSK 1/2	4.4475
	QPSK 3/4	4.4543
	16QAM 1/2	4.4640
	16QAM 3/4	4.4449
2593.0	QPSK 1/2	4.4455
	QPSK 3/4	4.4532
	16QAM 1/2	4.4614
	16QAM 3/4	4.4436
2687.5	QPSK 1/2	4.4469
	QPSK 3/4	4.4543
	16QAM 1/2	4.4631
	16QAM 3/4	4.4444

10 MHz

Frequency [MHz]	Modulation	Occupied Bandwidth [MHz]
2501.0	QPSK 1/2	9.0897
	QPSK 3/4	9.0929
	16QAM 1/2	9.0974
	16QAM 3/4	9.0922
2593.0	QPSK 1/2	9.0830
	QPSK 3/4	9.0877
	16QAM 1/2	9.0944
	16QAM 3/4	9.0871
2685.0	QPSK 1/2	9.0859
	QPSK 3/4	9.0912
	16QAM 1/2	9.0958
	16QAM 3/4	9.0904

- 5 MHz: Plots of the EUT's Occupied Bandwidth are shown Page 34 ~ 39.

- 10 MHz: Plots of the EUT's Occupied Bandwidth are shown Page 40 ~ 45.

7.3 CONDUCTED SPURIOUS EMISSIONS

5 MHz

Frequency(MHz)	Modulation	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
2498.5	QPSK 1/2	26.398	-32.298
	QPSK 3/4	25.837	-32.092
	16QAM 1/2	25.883	-32.337
	16QAM 3/4	25.883	-32.644
2593.0	QPSK 1/2	25.327	-32.480
	QPSK 3/4	26.347	-31.641
	16QAM 1/2	26.398	-32.313
	16QAM 3/4	26.500	-32.515
2687.5	QPSK 1/2	25.302	-32.719
	QPSK 3/4	25.965	-32.362
	16QAM 1/2	26.500	-32.513
	16QAM 3/4	26.398	-31.802

10 MHz

Frequency(MHz)	Modulation	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
2501.0	QPSK 1/2	26.347	-32.311
	QPSK 3/4	25.353	-31.227
	16QAM 1/2	26.271	-32.207
	16QAM 3/4	25.914	-33.529
2593.0	QPSK 1/2	26.016	-32.396
	QPSK 3/4	26.449	-32.436
	16QAM 1/2	26.424	-31.933
	16QAM 3/4	25.327	-32.109
2685.0	QPSK 1/2	26.449	-32.485
	QPSK 3/4	25.965	-32.134
	16QAM 1/2	25.251	-32.220
	16QAM 3/4	26.424	-32.200

- 5 MHz: Plots of the EUT's Conducted Spurious Emissions are shown Page 78 ~ 89.

- 10 MHz: Plots of the EUT's Conducted Spurious Emissions are shown Page 90 ~ 101.

7.3.1 CHANNEL EDGE

- 5 MHz: Plots of the EUT's Band Edge are shown Page 70 ~ 73.

- 10 MHz: Plots of the EUT's Band Edge are shown Page 74 ~ 77.

7.4 EFFECTIVE RADIATED POWER OUTPUT (WiMAX)

TX1: 5 MHz

Mode	Freq. (MHz)	Measured Level(dBm)	Substitute LEVEL (dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
							W	dBm
QPSK	2498.5	-16.56	18.67	11.21	2.11	H	0.598	27.77
	2593.0	-15.52	20.02	10.65	2.16	H	0.710	28.51
	2687.5	-13.90	21.95	10.76	2.19	H	1.127	30.52
16QAM	2498.5	-16.51	18.72	11.21	2.11	H	0.605	27.82
	2593.0	-15.53	20.01	10.65	2.16	H	0.708	28.50
	2687.5	-13.57	22.28	10.76	2.19	H	1.216	30.85

Note: Worst case are QPSK 1/2 (2593 MHz = 3/4) and 16QAM 3/4 (2687.5 MHz=1/2) This unit was tested with a notebook computer.

TX2: 5 MHz

Mode	Freq. (MHz)	Measured Level(dBm)	Substitute LEVEL (dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
							W	dBm
QPSK	2498.5	-25.51	9.72	11.21	2.11	H	0.076	18.82
	2593.0	-34.08	1.46	10.65	2.16	H	0.010	9.95
	2687.5	-30.45	5.40	10.76	2.19	H	0.025	13.97
16QAM	2498.5	-25.56	9.67	11.21	2.11	H	0.075	18.77
	2593.0	-34.01	1.53	10.65	2.16	H	0.010	10.02
	2687.5	-30.12	5.73	10.76	2.19	H	0.027	14.30

Note: Worst case are QPSK 3/4 (2687.5 MHz = 1/2) and 16QAM 3/4 (2498.5 MHz=1/2) This unit was tested with a notebook computer.

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For 5 MHz BW signals, a peak detector is used, with RBW = VBW = 5 MHz. For 10 MHz BW signals, a peak detector is used, with RBW = VBW = 10MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

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Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUT is in z plane in 5 MHz BW mode. Also worst case of detecting Antenna is in horizontal polarization in 5 MHz BW mode.

FCC CERTIFICATION REPORT			www.hct.co.kr
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7.5 EFFECTIVE RADIATED POWER OUTPUT (WiMAX)

TX1: 10 MHz

Mode	Freq. (MHz)	Measured Level(dBm)	Substitute LEVEL (dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
							W	dBm
QPSK	2501.0	-16.84	18.48	10.56	2.11	H	0.493	26.93
	2593.0	-15.49	20.05	10.65	2.16	H	0.714	28.54
	2685.0	-13.38	22.20	10.75	2.19	H	1.191	30.76
16QAM	2501.0	-16.54	18.78	10.56	2.11	H	0.528	27.23
	2593.0	-15.61	19.93	10.65	2.16	H	0.695	28.42
	2685.0	-13.38	22.20	10.75	2.19	H	1.191	30.76

Note: Worst case are QPSK 3/4 (2685MHz = 1/2) and 16QAM 3/4 (2501MHz = 1/2). This unit was tested with a notebook computer.

TX2: 10 MHz

Mode	Freq. (MHz)	Measured Level(dBm)	Substitute LEVEL (dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
							W	dBm
QPSK	2501.0	-25.82	9.50	10.56	2.11	H	0.062	17.95
	2593.0	-33.77	1.77	10.65	2.16	H	0.011	10.26
	2685.0	-30.20	5.38	10.75	2.19	H	0.025	13.94
16QAM	2501.0	-25.75	9.57	10.56	2.11	H	0.063	18.02
	2593.0	-33.56	1.98	10.65	2.16	H	0.011	10.47
	2685.0	-30.24	5.34	10.75	2.19	H	0.025	13.90

Note: Worst case are QPSK 1/2 (2593MHz 3/4) and 16QAM 3/4 (2501 MHz=1/2) This unit was tested with a notebook computer.

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For 5 MHz BW signals, a peak detector is used, with RBW = VBW = 5 MHz. For 10 MHz BW signals, a peak detector is used, with RBW = VBW = 10MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

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Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUT is in z plane in 10 MHz BW mode. Also worst case of detecting Antenna is in horizontal polarization in 10 MHz BW mode.

FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

7.6 RADIATED SPURIOUS EMISSIONS

7.6.1 RADIATED SPURIOUS EMISSIONS (TX1: WiMAX 5 MHz)

- ☐ MEASURED OUTPUT POWER: 30.85 dBm = 1.216 W
☐ MODULATION SIGNAL: WiMAX 5 MHz (16QAM)
☐ DISTANCE: 3 meters
☐ LIMIT: $-(55 + 10 \log_{10}(W)) =$ - 55.85 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
2498.50	4,997.00	-58.54	12.45	-60.78	5.81	H	-54.14	-84.99
	7,495.50	-54.48	10.84	-46.62	6.90	V	-42.68	-73.53
	9,994.00	-51.86	11.72	-41.47	8.71	H	-38.46	-69.31
2593.00	5,186.00	-58.22	12.50	-59.21	6.41	H	-53.12	-83.97
	7,779.00	-55.32	10.89	-45.83	7.68	V	-42.62	-73.47
	10,372.00	-58.19	11.44	-47.42	8.01	H	-43.99	-74.84
2687.50	5,375.00	-56.12	12.55	-57.94	6.53	H	-51.92	-82.77
	8,062.50	-51.58	11.00	-42.11	7.77	V	-38.88	-69.73
	10,750.00	-	-	-	-	-	-	-

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. Worst case is QPSK 1/2

7.6.2 RADIATED SPURIOUS EMISSIONS (TX2: WiMAX 5 MHz)

- ☐ MEASURED OUTPUT POWER: 18.82 dBm = 0.076 W
☐ MODULATION SIGNAL: WiMAX 5 MHz (QPSK)
☐ DISTANCE: 3 meters
☐ LIMIT: - (55 + 10 log₁₀ (W)) = - 43.82 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
2498.50	4,997.00	-51.21	12.45	-53.45	5.81	V	-46.81	-65.63
	7,495.50	-52.13	10.84	-44.27	6.90	H	-40.33	-59.15
	9,994.00	-54.54	11.72	-44.15	8.71	H	-41.14	-59.96
2593.00	5,186.00	-45.05	12.50	-46.04	6.41	V	-39.95	-58.77
	7,779.00	-47.61	10.89	-38.12	7.68	V	-34.91	-53.73
	10,372.00	-55.08	11.44	-44.31	8.01	H	-40.88	-59.70
2687.50	5,375.00	-54.68	12.55	-56.50	6.53	V	-50.48	-69.30
	8,062.50	-45.18	11.00	-35.71	7.77	V	-32.48	-51.30
	10,750.00	-50.32	11.37	-38.00	8.79	V	-35.42	-54.24

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. Worst case is 16QAM 3/4.

7.6.3 RADIATED SPURIOUS EMISSIONS (TX1: WiMAX 10 MHz)

■ MEASURED OUTPUT POWER: 30.76 dBm = 1.191 W
 ■ MODULATION SIGNAL: WiMAX 10 MHz (16QAM)
 ■ DISTANCE: 3 meters
 ■ LIMIT: - (55 + 10 log₁₀ (W)) = - 55.76 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
2501.00	5,002.00	-58.68	12.45	-60.92	5.81	H	-54.28	-85.04
	7,503.00	-54.02	10.84	-46.16	6.90	V	-42.22	-72.98
	10,004.00	-56.44	11.72	-46.05	8.71	H	-43.04	-73.80
2593.00	5,186.00	-57.76	12.50	-58.75	6.41	H	-52.66	-83.42
	7,779.00	-58.75	10.89	-49.26	7.68	H	-46.05	-76.81
	10,372.00	-	-	-	-	-	-	-
2685.00	5,370.00	-56.82	12.55	-58.64	6.53	H	-52.62	-83.38
	8,055.00	-52.91	11.00	-43.44	7.77	V	-40.21	-70.97
	10,740.00	-57.92	11.37	-45.60	8.79	H	-43.02	-73.78

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. Worst case is QPSK 3/4.

7.6.4 RADIATED SPURIOUS EMISSIONS (TX2: WiMAX 10 MHz)

■ MEASURED OUTPUT POWER: 18.02 dBm = 0.063 W
 ■ MODULATION SIGNAL: WiMAX 10 MHz (16QAM)
 ■ DISTANCE: 3 meters
 ■ LIMIT: - (55 + 10 log₁₀ (W)) = - 43.02 dBc

Operating Freq. (MHz)	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
2501.00	5,002.00	-53.25	12.45	-55.49	5.81	H	-48.85	-66.87
	7,503.00	-55.05	10.84	-47.19	6.90	V	-43.25	-61.27
	10,004.00	-58.81	11.72	-48.42	8.71	H	-45.41	-63.43
2593.00	5,186.00	-48.83	12.50	-49.82	6.41	V	-43.73	-61.75
	7,779.00	-51.58	10.89	-42.09	7.68	V	-38.88	-56.90
	10,372.00	-57.78	11.44	-47.01	8.01	H	-43.58	-61.60
2685.00	5,370.00	-56.31	12.55	-58.13	6.53	V	-52.11	-70.13
	8,055.00	-48.13	11.00	-38.66	7.77	V	-35.43	-53.45
	10,740.00	-54.27	11.37	-41.95	8.79	V	-39.37	-57.39

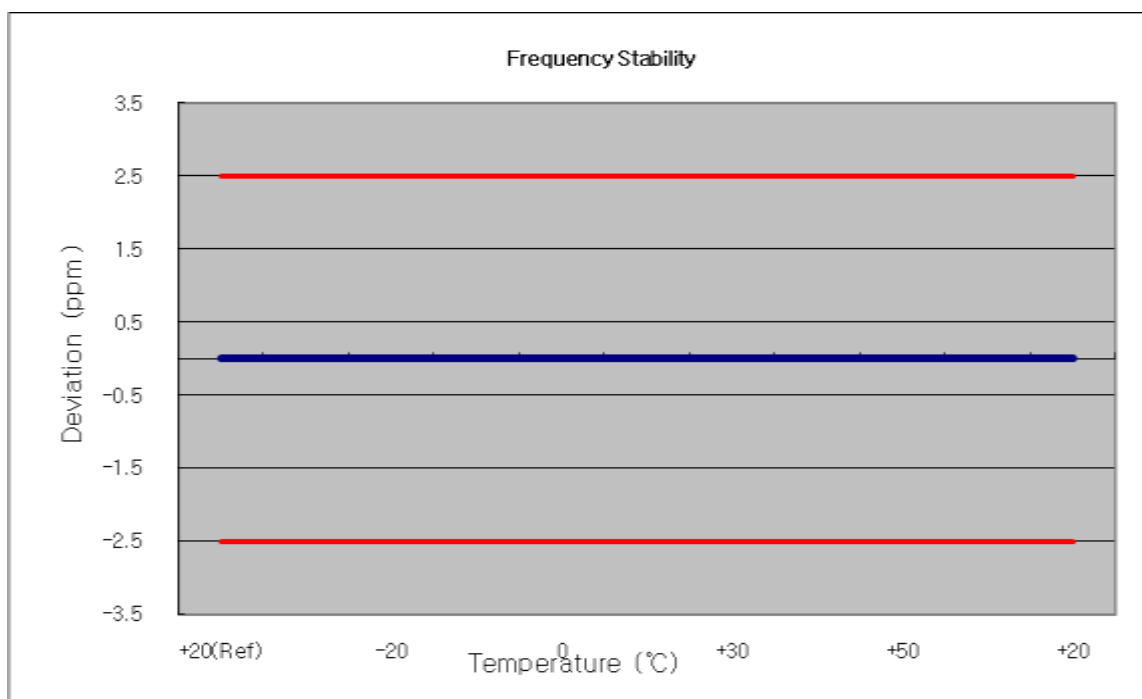
- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
 4. Worst case is 16QAM 3/4.

7.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.7.1 FREQUENCY STABILITY (WiMAX 5 MHz)

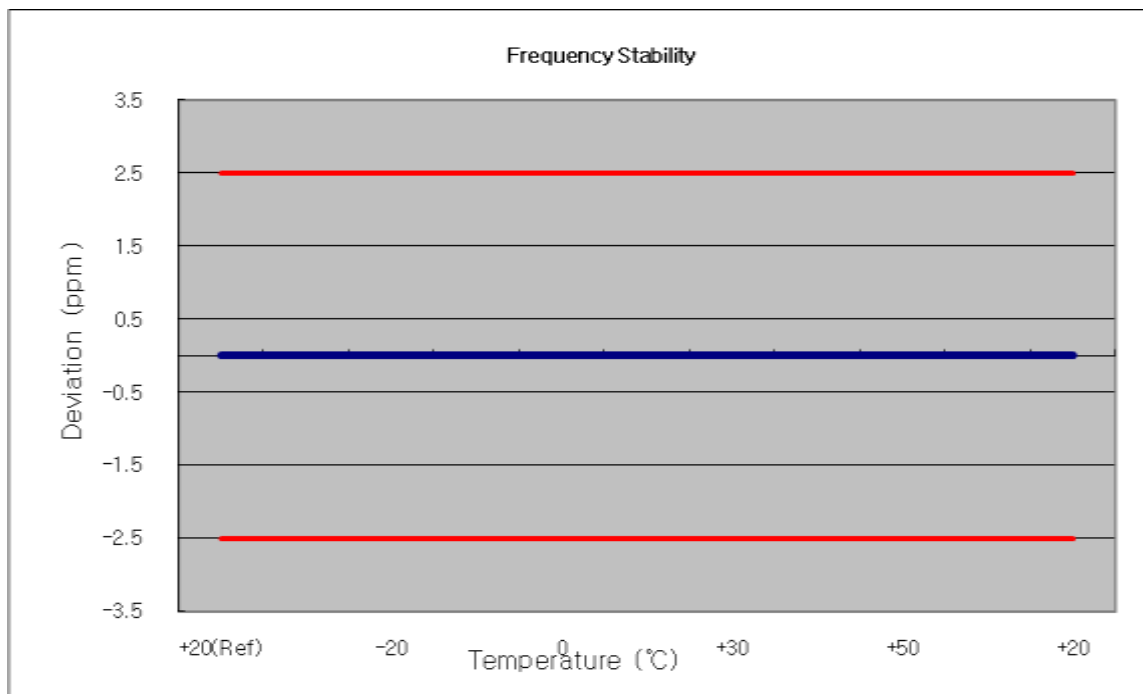
- ☒ OPERATING FREQUENCY: 2593,000,000 Hz
☒ MODULATION SIGNAL: WiMAX 5 MHz (QPSK)
☒ REFERENCE VOLTAGE: 5.0 VDC
☒ DEVIATION LIMIT: $\pm 0.00025\%$ or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	5.00	+20(Ref)	2592 999 993	0	0.000 000	0.000
100%		-30	2592 999 997	-3.40	0.000 000	-0.001
100%		-20	2593 000 002	1.60	0.000 000	0.001
100%		-10	2593 000 005	5.40	0.000 000	0.002
100%		0	2593 000 004	4.30	0.000 000	0.002
100%		+10	2593 000 010	9.80	0.000 000	0.004
100%		+30	2593 000 007	7.40	0.000 000	0.003
100%		+40	2593 000 014	13.70	0.000 001	0.005
100%		+50	2593 000 017	17.00	0.000 001	0.007
115%	5.75	+20	2593 000 009	9.10	0.000 000	0.004



☒ OPERATING FREQUENCY: 2593,000,000 Hz
☒ MODULATION SIGNAL: WiMAX 5 MHz (16QAM)
☒ REFERENCE VOLTAGE: 5.0 VDC
☒ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

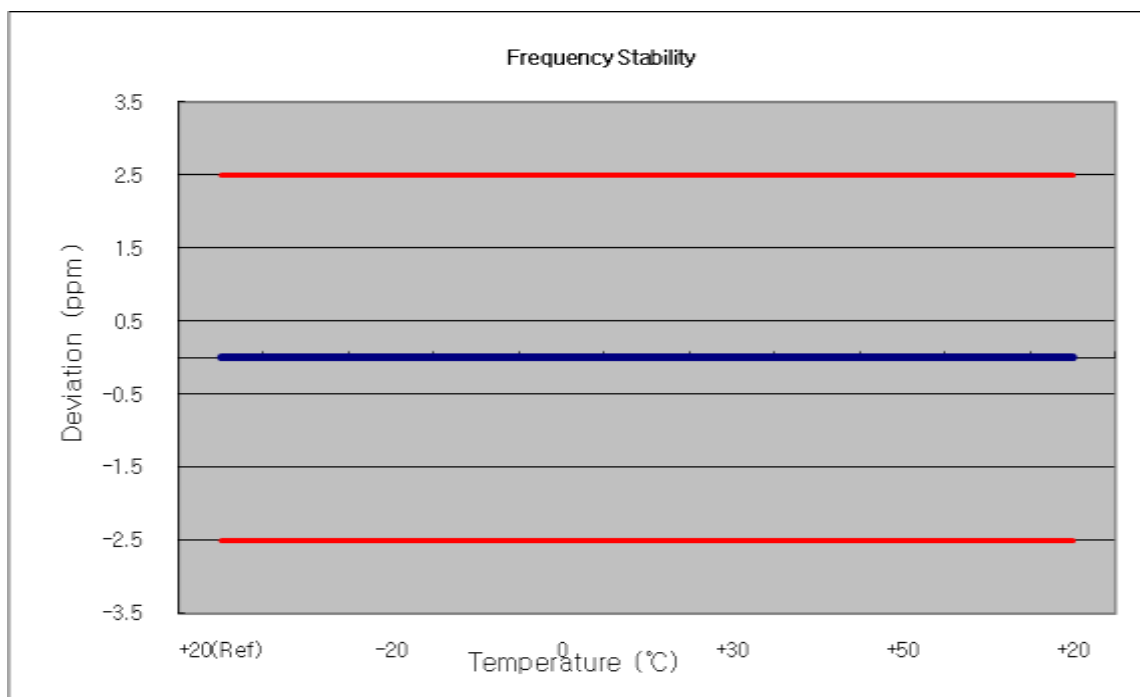
Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	5.00	+20(Ref)	2592 999 991	0	0.000 000	0.000
100%		-30	2593 000 005	5.40	0.000 000	0.002
100%		-20	2593 000 004	3.70	0.000 000	0.001
100%		-10	2593 000 008	8.40	0.000 000	0.003
100%		0	2593 000 005	5.00	0.000 000	0.002
100%		+10	2593 000 012	11.50	0.000 000	0.004
100%		+30	2593 000 008	8.10	0.000 000	0.003
100%		+40	2593 000 010	10.00	0.000 000	0.004
100%		+50	2593 000 014	14.00	0.000 001	0.005
115%	5.75	+20	2593 000 010	10.40	0.000 000	0.004



7.7.2 FREQUENCY STABILITY (WiMAX 10 MHz)

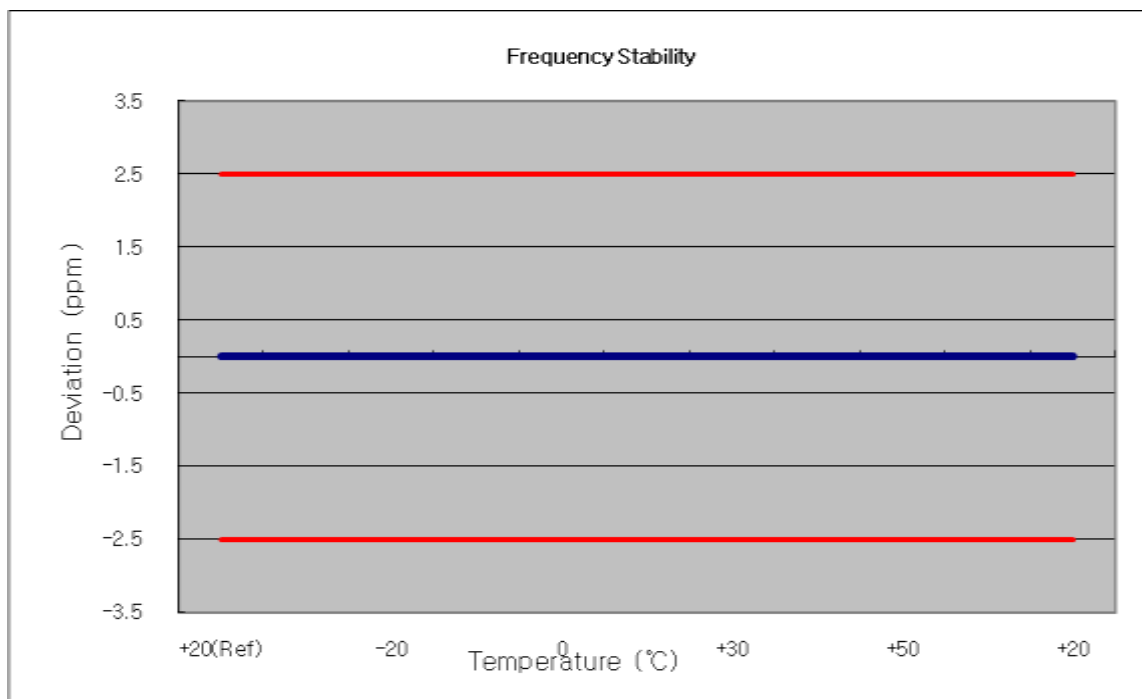
- ☒ OPERATING FREQUENCY: 2593,000,000 Hz
☒ MODULATION SIGNAL: WiMAX 10 MHz (QPSK)
☒ REFERENCE VOLTAGE: 5.0 VDC
☒ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	5.00	+20(Ref)	2592 999 988	0	0.000 000	0.000
100%		-30	2593 000 008	8.30	0.000 000	0.003
100%		-20	2593 000 009	8.90	0.000 000	0.003
100%		-10	2593 000 010	10.40	0.000 000	0.004
100%		0	2593 000 009	9.10	0.000 000	0.004
100%		+10	2593 000 008	7.80	0.000 000	0.003
100%		+30	2593 000 010	10.40	0.000 000	0.004
100%		+40	2593 000 011	11.10	0.000 000	0.004
100%		+50	2593 000 008	7.50	0.000 000	0.003
115%	5.75	+20	2593 000 011	11.40	0.000 000	0.004



☒ OPERATING FREQUENCY: 2593,000,000 Hz
☒ MODULATION SIGNAL: WiMAX 10 MHz (16QAM)
☒ REFERENCE VOLTAGE: 5.0 VDC
☒ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	5.00	+20(Ref)	2592 999 986	0	0.000 000	0.000
100%		-30	2593 000 009	8.70	0.000 000	0.003
100%		-20	2593 000 005	5.40	0.000 000	0.002
100%		-10	2593 000 008	7.90	0.000 000	0.003
100%		0	2593 000 004	4.30	0.000 000	0.002
100%		+10	2593 000 011	10.80	0.000 000	0.004
100%		+30	2593 000 008	8.20	0.000 000	0.003
100%		+40	2593 000 013	12.60	0.000 000	0.005
100%		+50	2593 000 016	16.00	0.000 001	0.006
115%	5.75	+20	2593 000 011	10.80	0.000 000	0.004

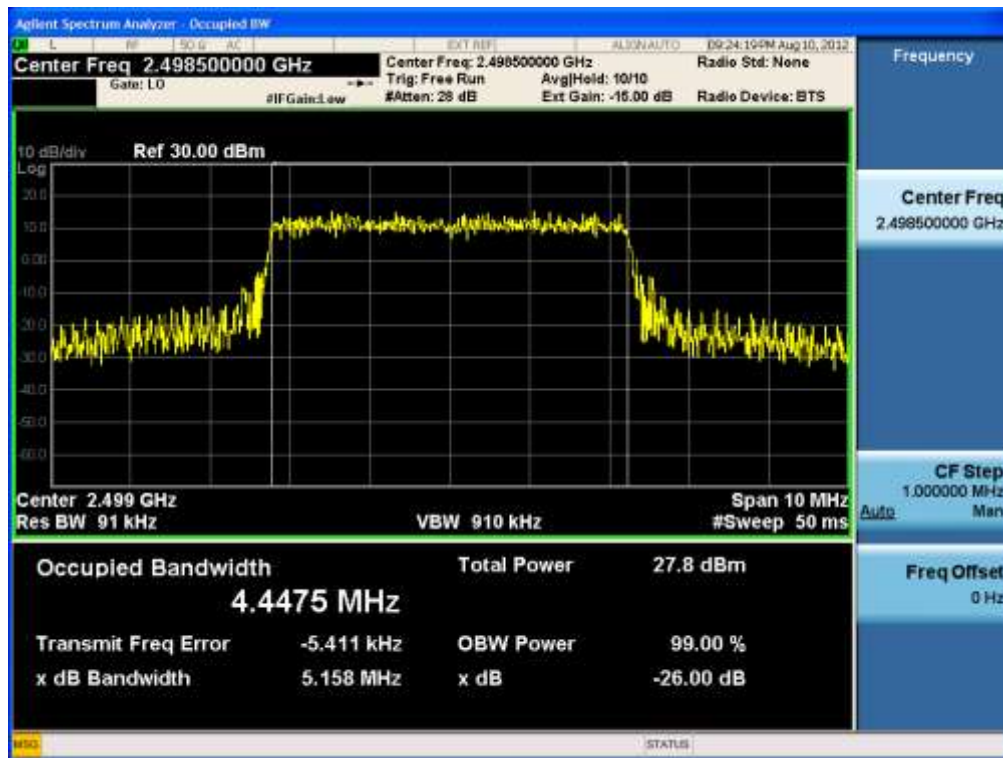


8. TEST PLOTS

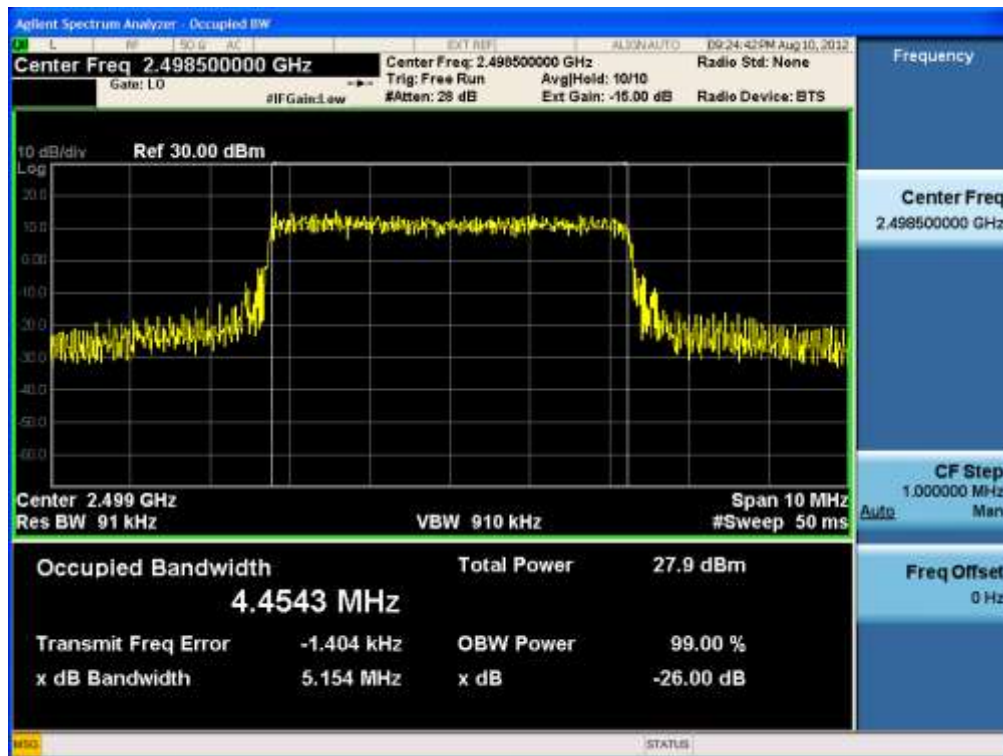
FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

5 MHz

■ QPSK MODE 1/2 (2498.5 MHz) Occupied Bandwidth

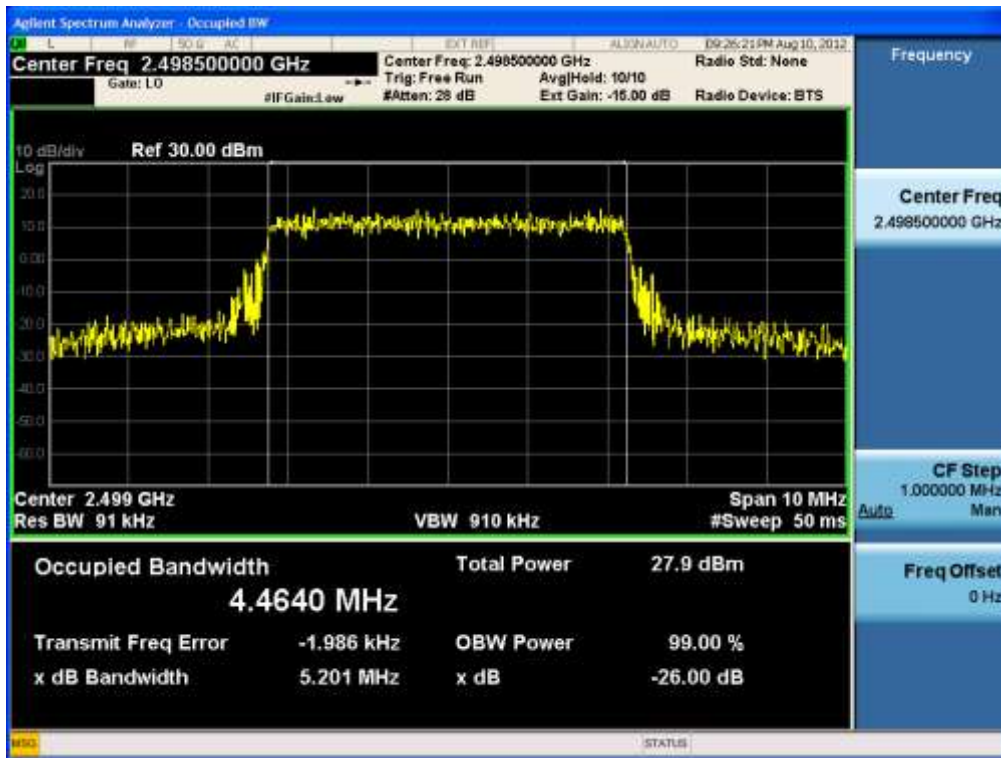


■ QPSK MODE 3/4 (2498.5 MHz) Occupied Bandwidth

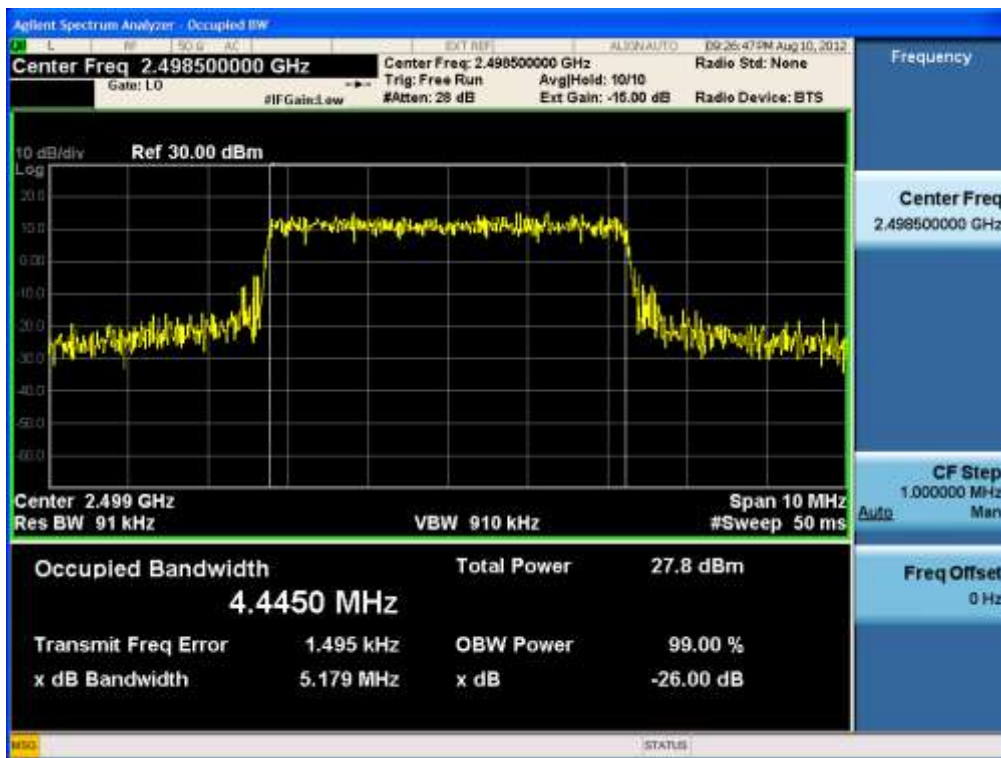


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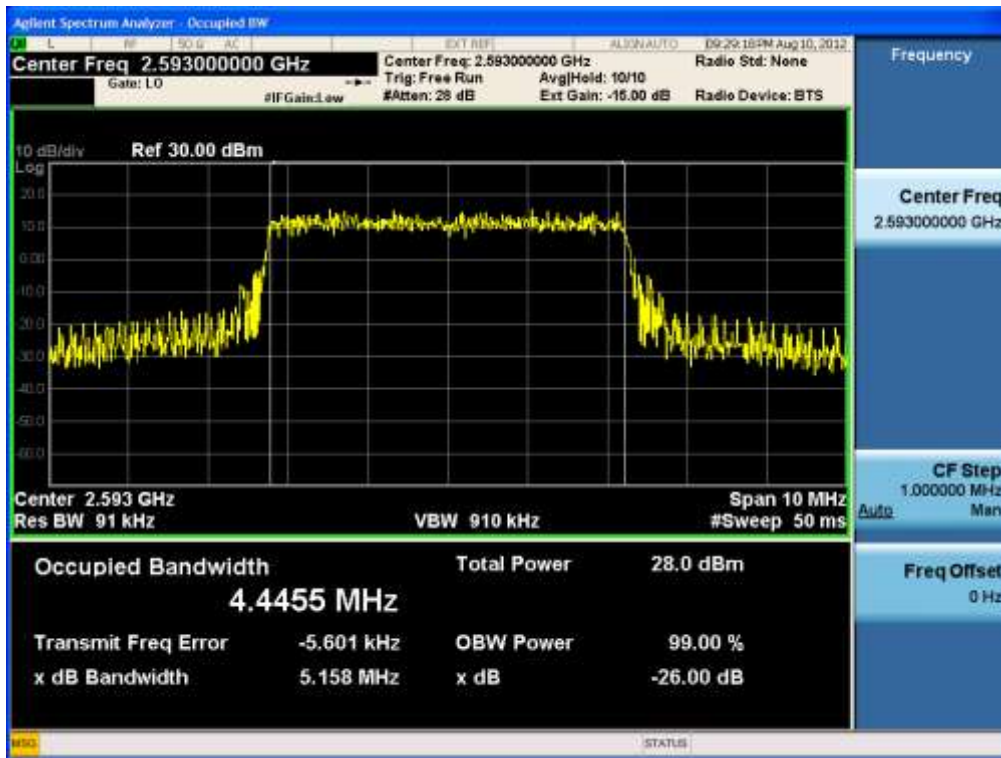
■ 16QAM 1/2 MODE (2498.5 MHz) Occupied Bandwidth



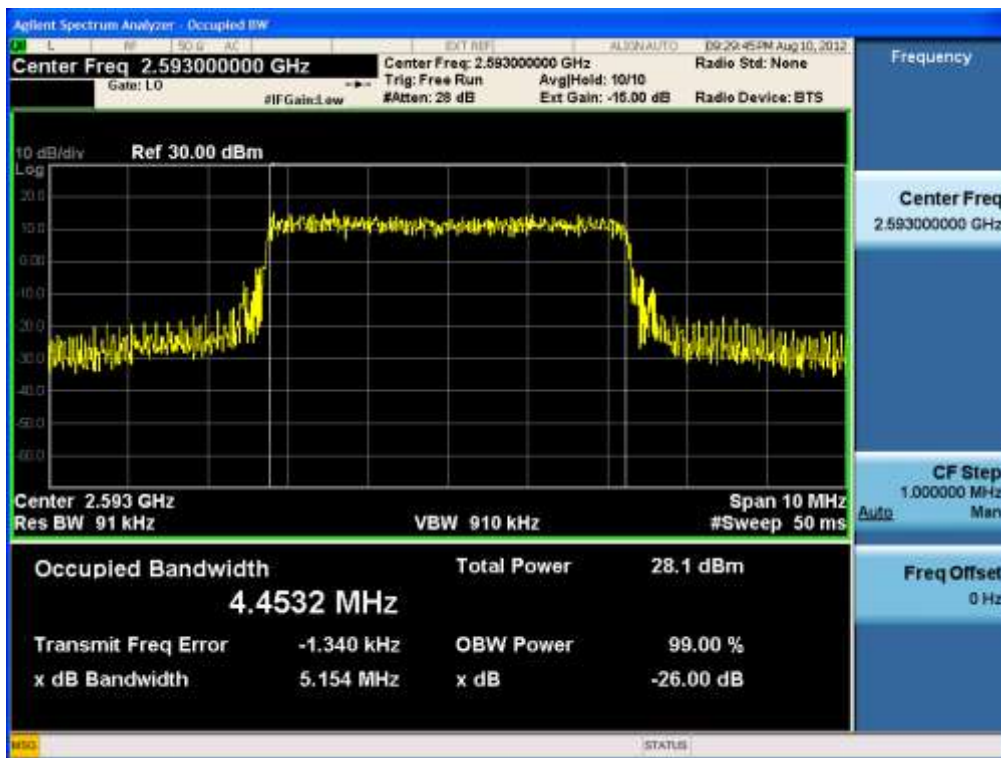
■ 16QAM 3/4 MODE (2498.5 MHz) Occupied Bandwidth



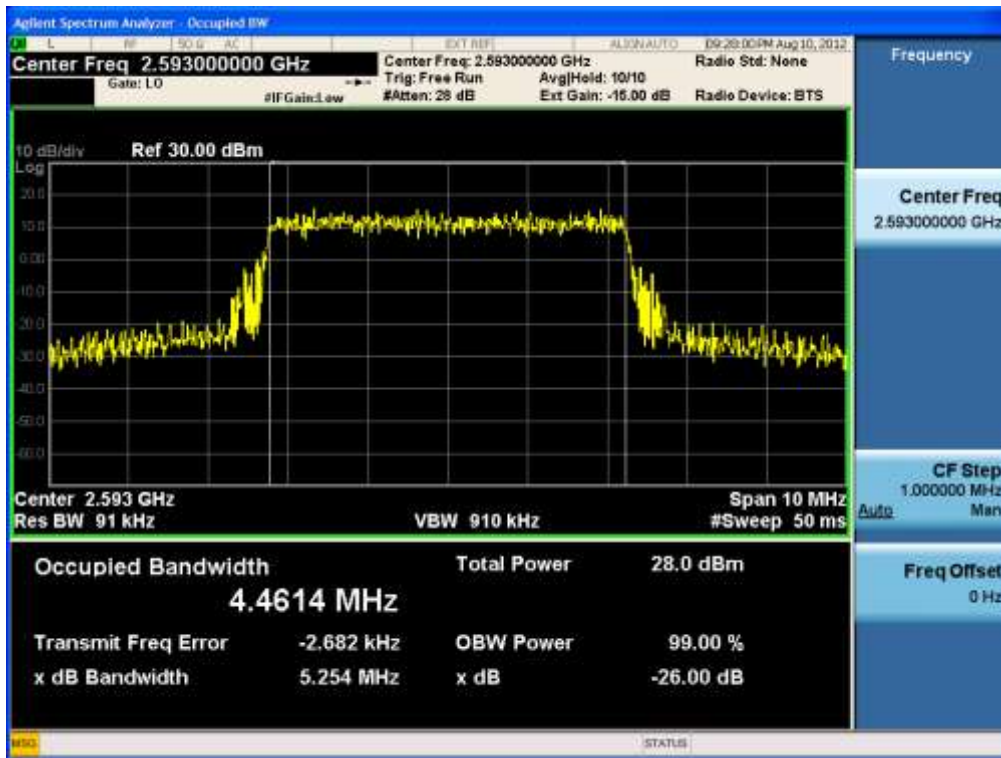
■ QPSK 1/2 MODE (2593.0 MHz) Occupied Bandwidth



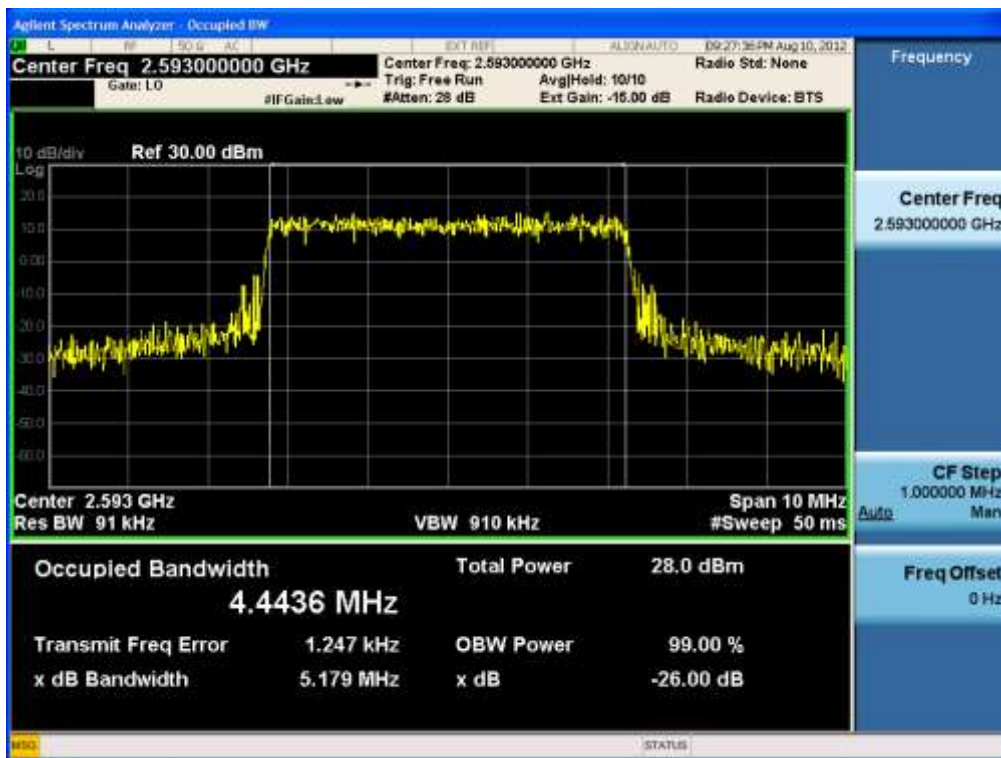
■ QPSK MODE 3/4 (2593.0 MHz) Occupied Bandwidth



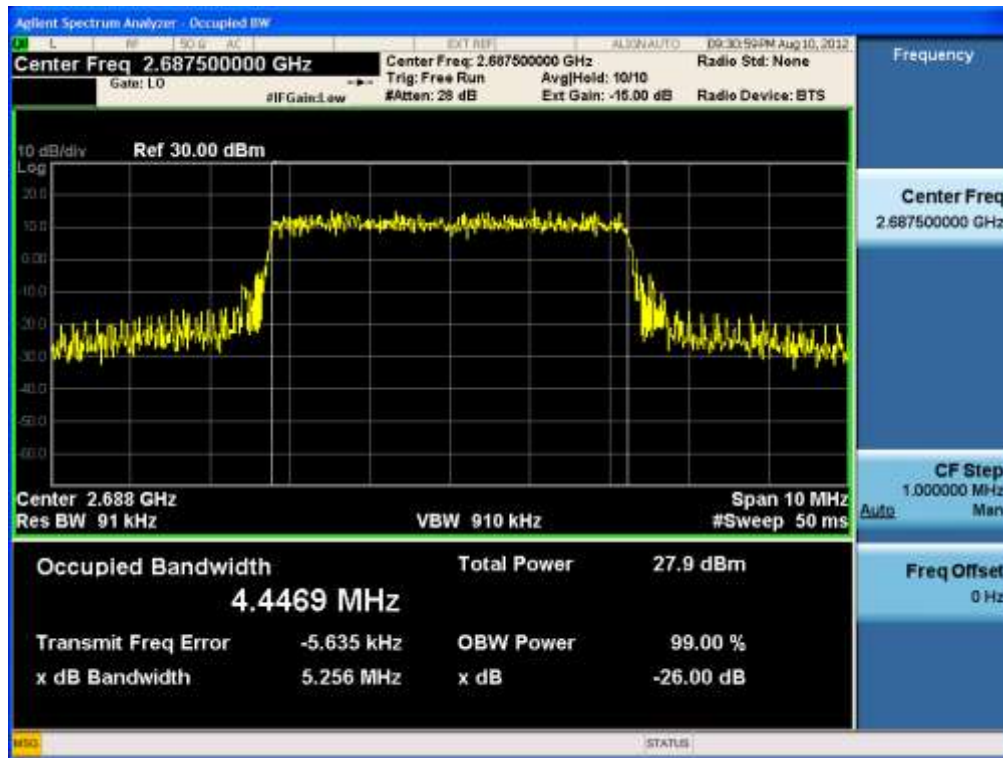
■ 16QAM 1/2 MODE (2593.0 MHz) Occupied Bandwidth



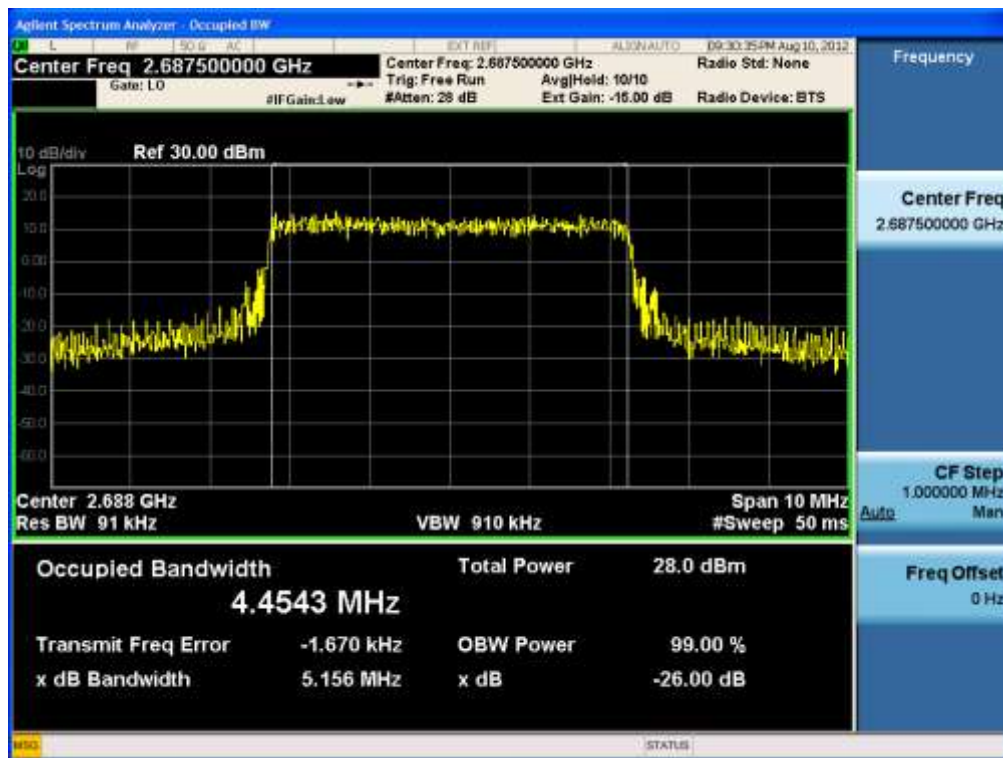
■ 16QAM 3/4 MODE (2593.0 MHz) Occupied Bandwidth



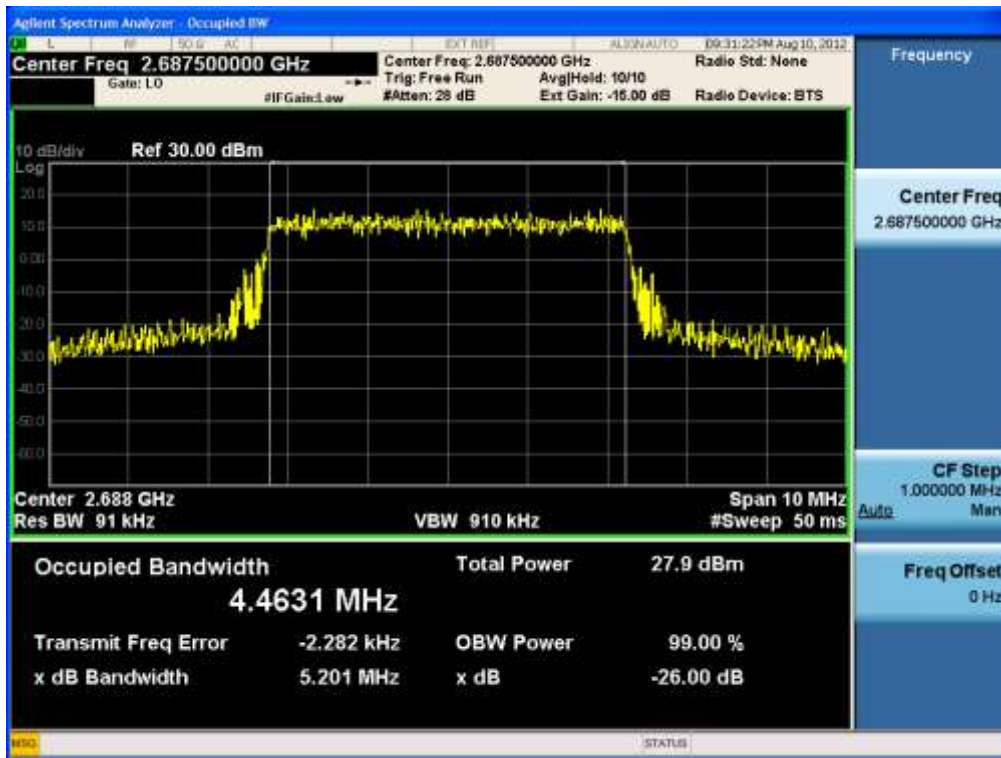
■ QPSK 1/2 MODE (2687.5 MHz) Occupied Bandwidth



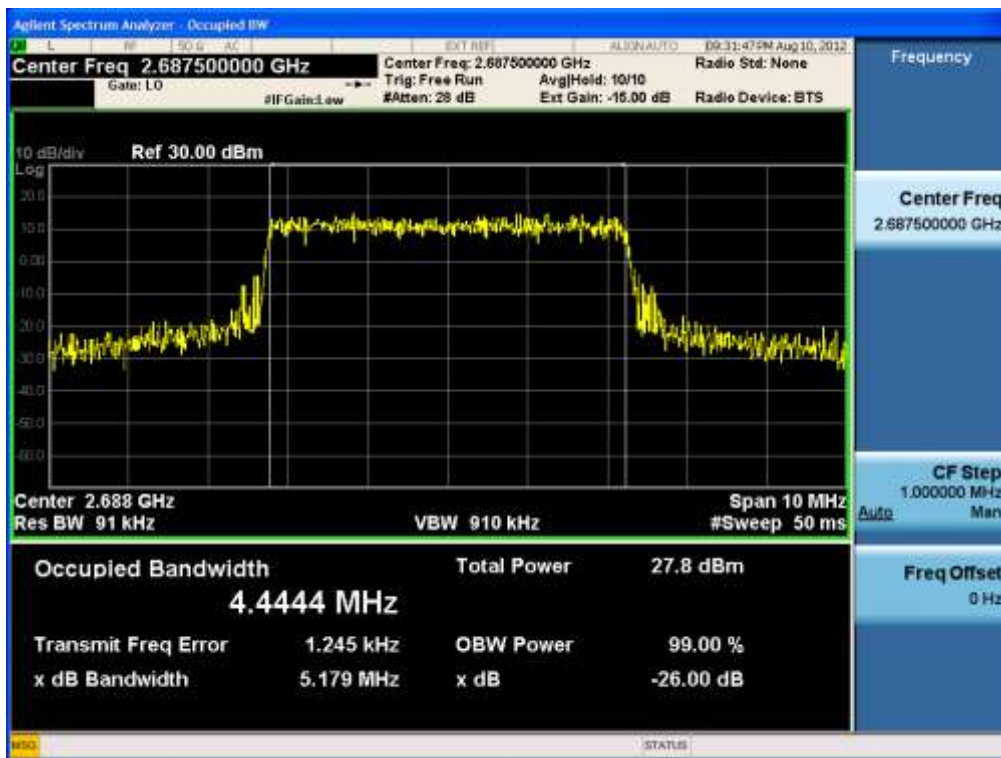
■ QPSK 3/4 MODE (2687.5 MHz) Occupied Bandwidth



■ 16QAM 1/2 MODE (2687.5 MHz) Occupied Bandwidth

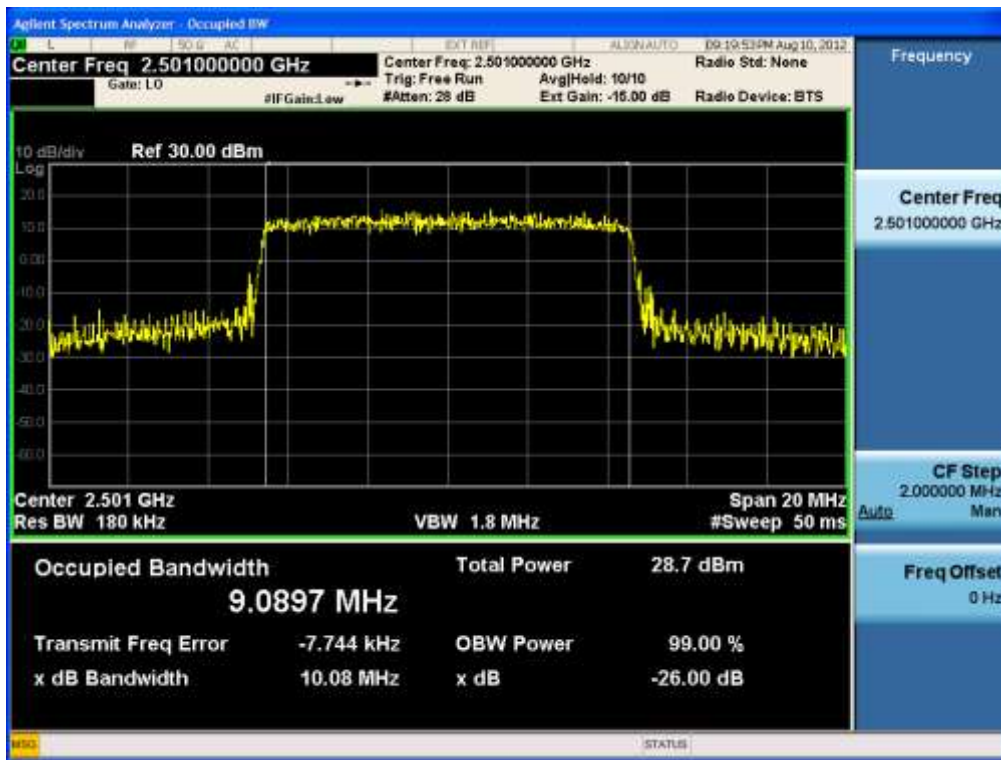


■ 16QAM 3/4 MODE (2687.5 MHz) Occupied Bandwidth

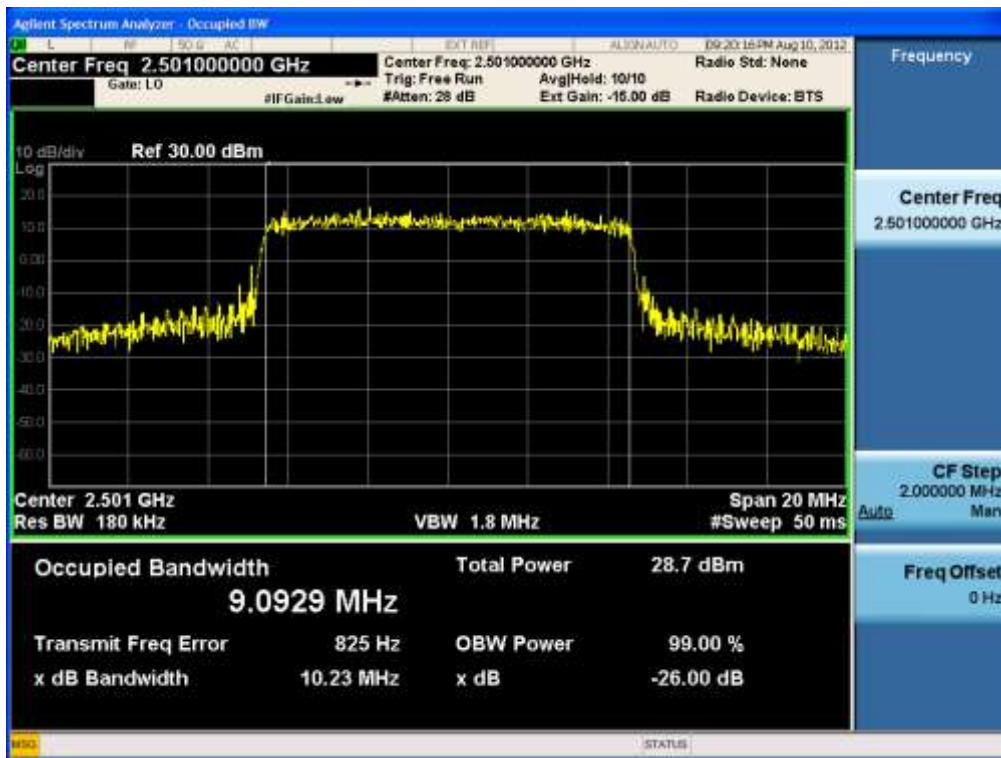


10 MHz

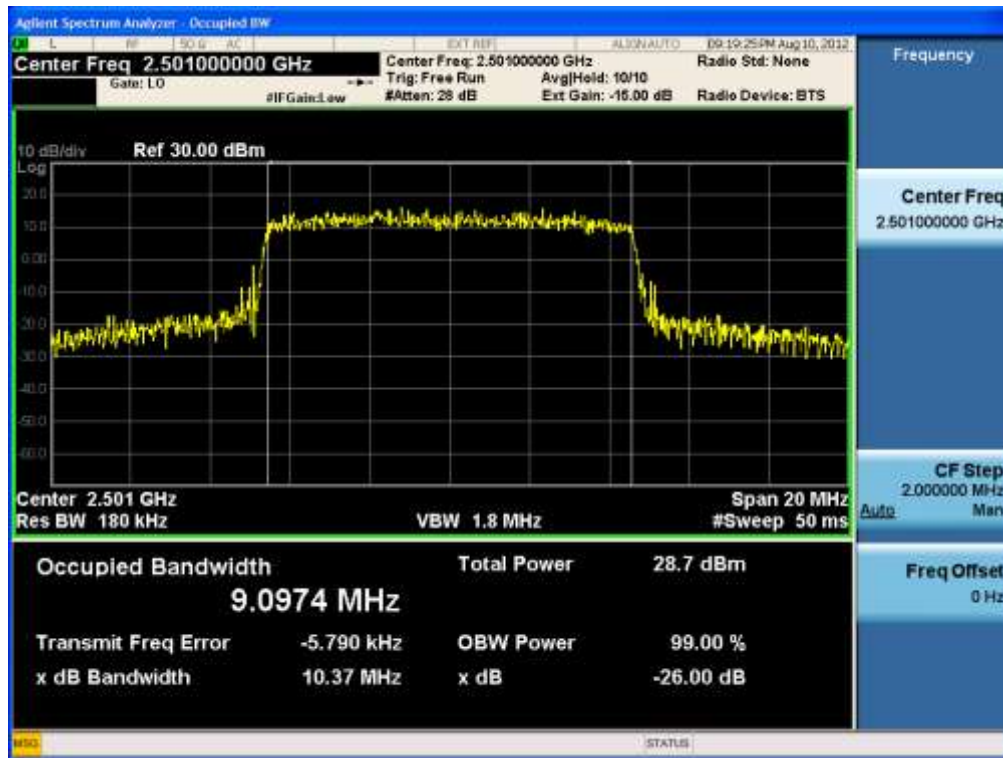
■ QPSK 1/2 MODE (2501.0 MHz) Occupied Bandwidth



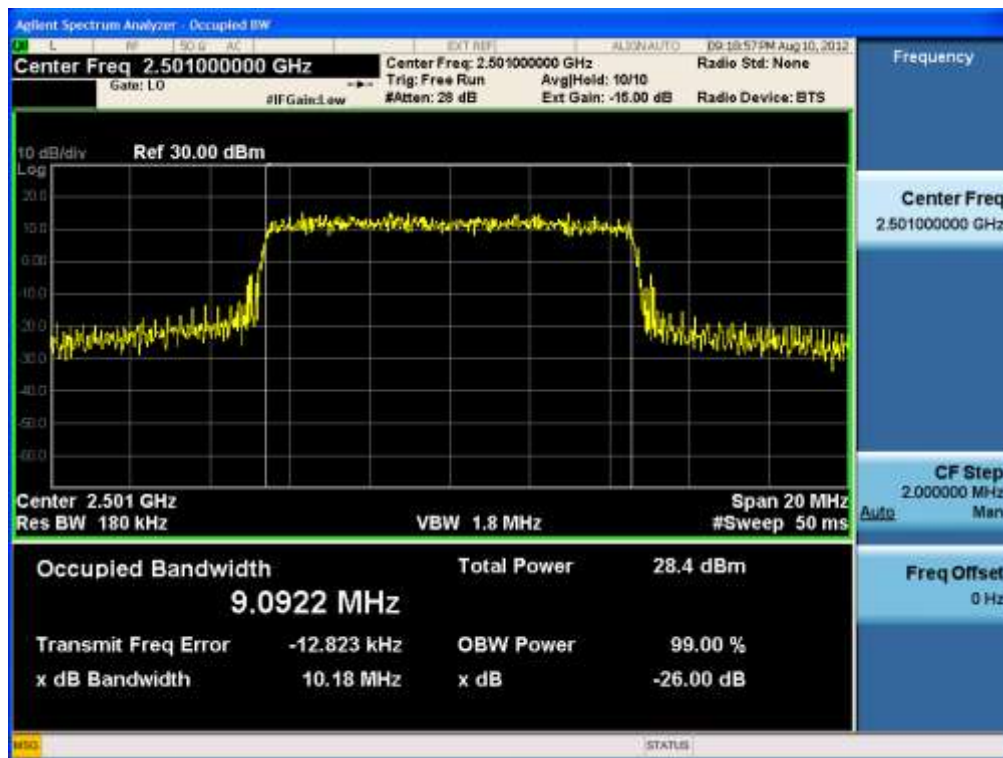
■ QPSK 3/4 MODE (2501.0 MHz) Occupied Bandwidth



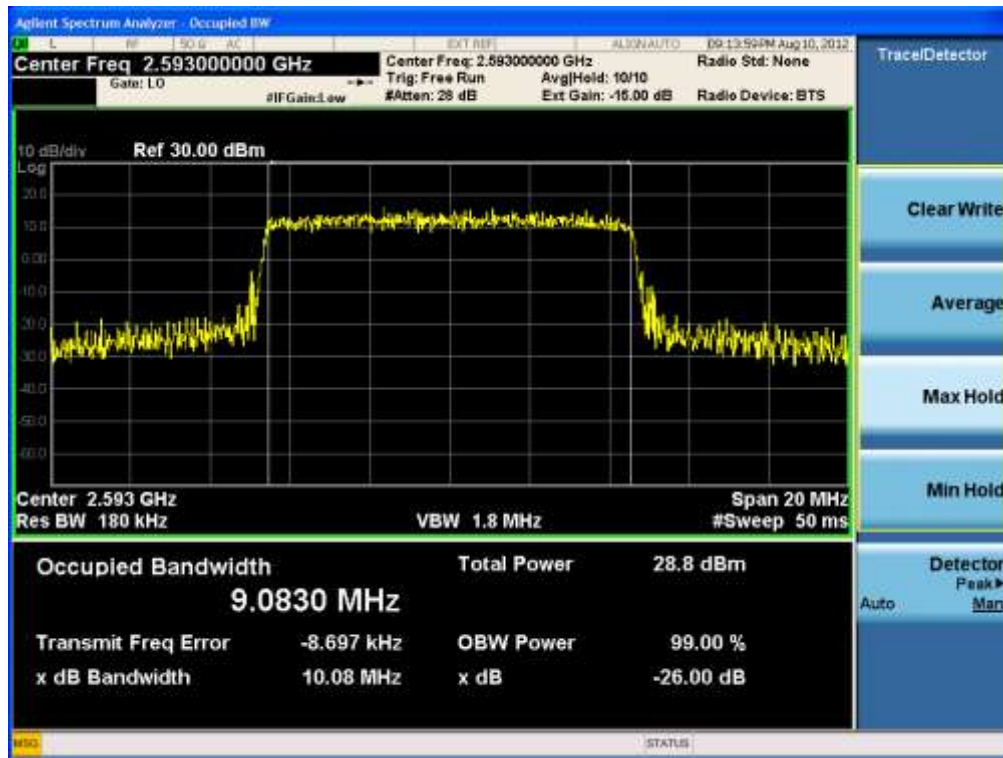
■ 16QAM 1/2 MODE (2501.0 MHz) Occupied Bandwidth



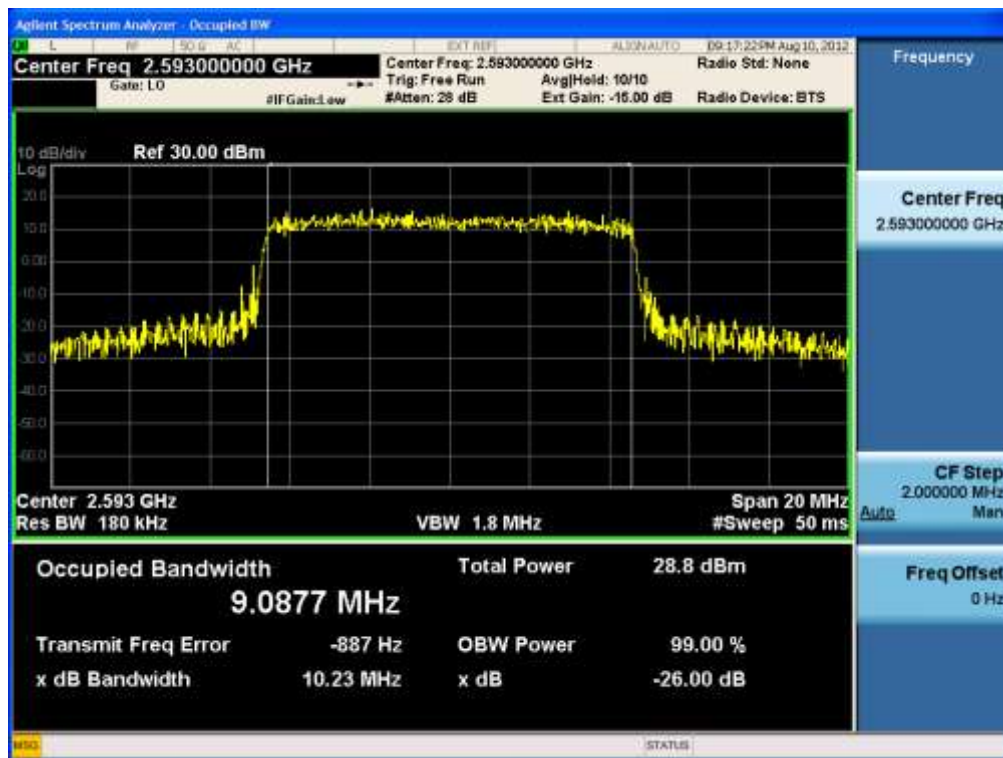
■ 16QAM 3/4 MODE (2501.0 MHz) Occupied Bandwidth



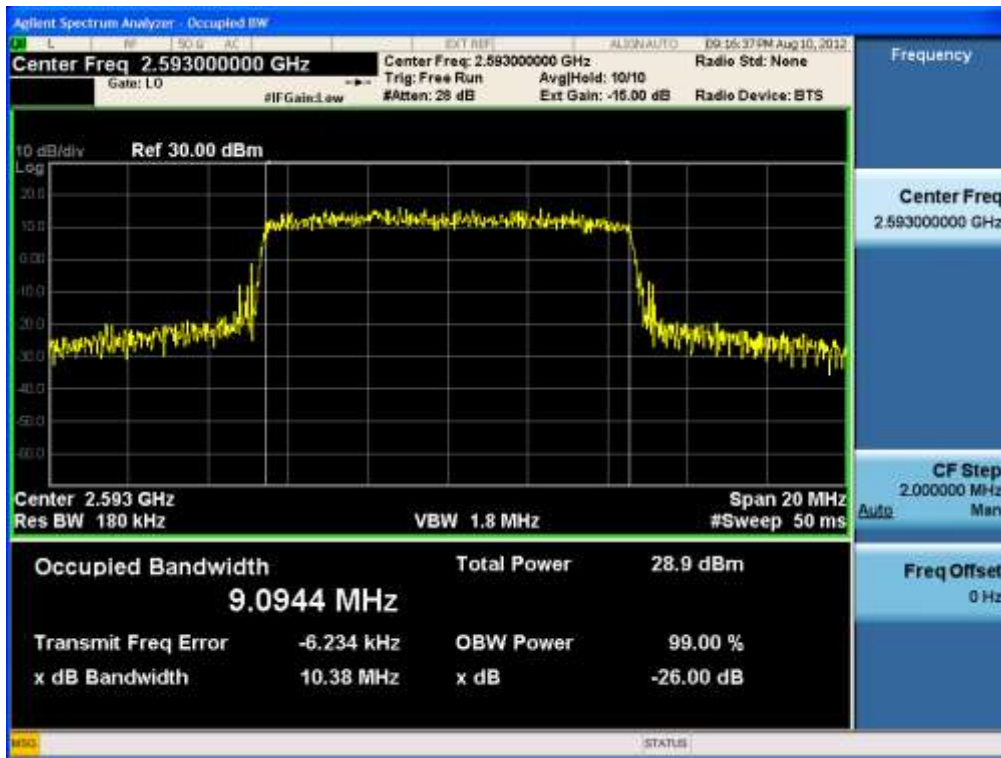
■ QPSK 1/2 MODE (2593.0 MHz) Occupied Bandwidth



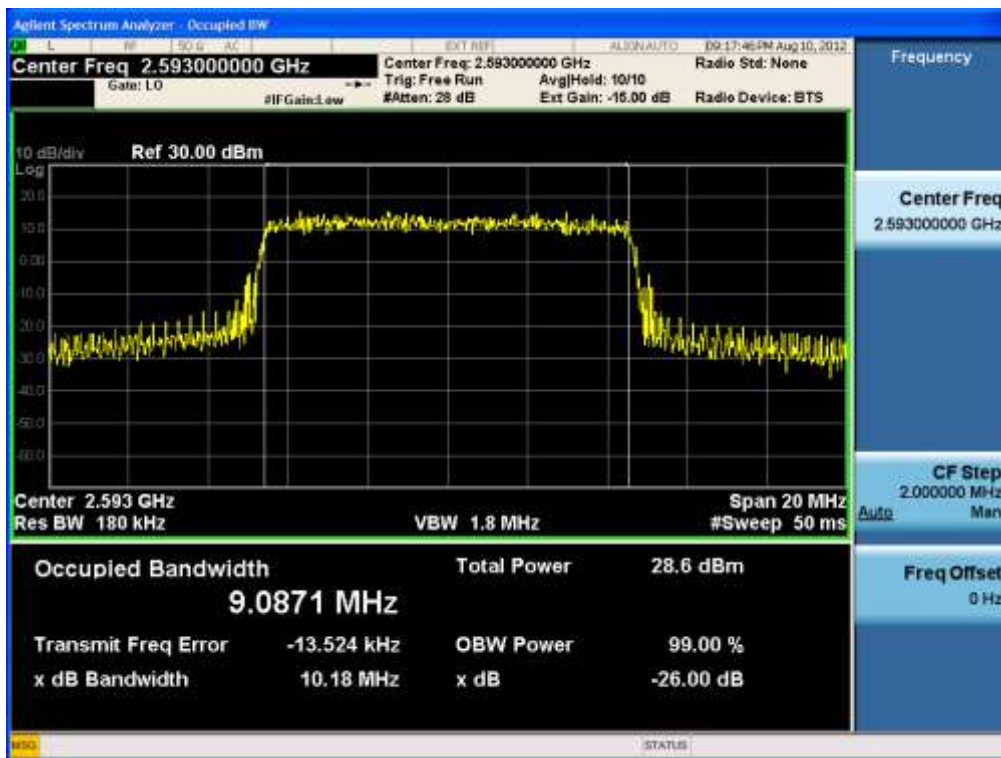
■ QPSK 3/4 MODE (2593.0 MHz) Occupied Bandwidth



■ 16QAM 1/2 MODE (2593.0 MHz) Occupied Bandwidth



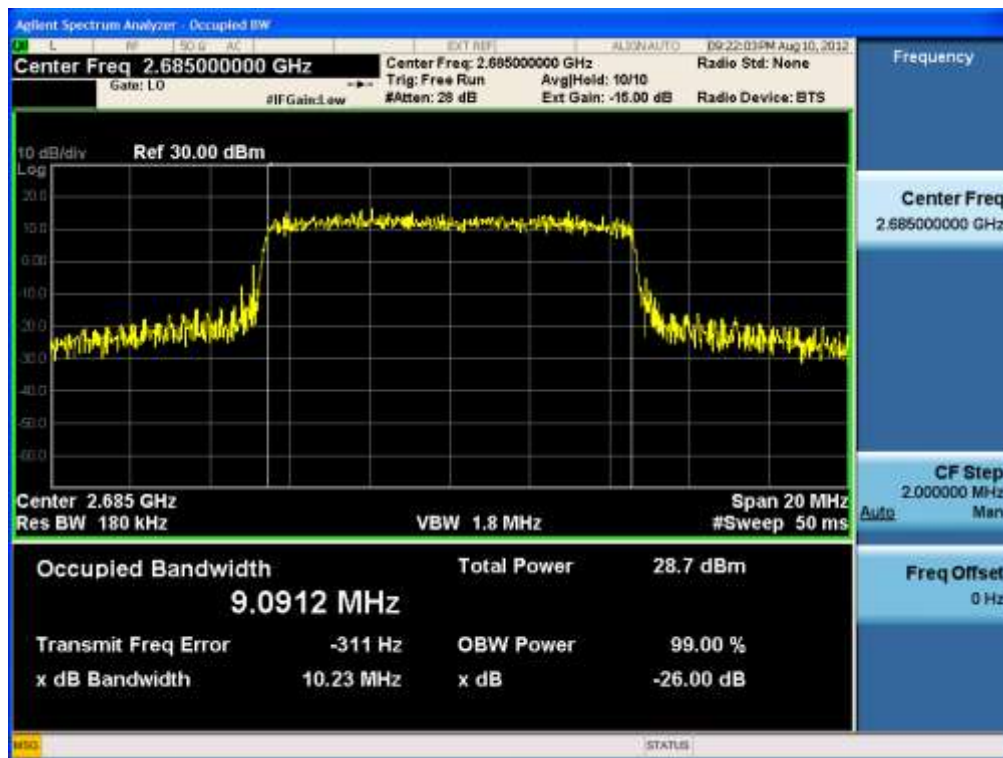
■ 16QAM 3/4 MODE (2593.0 MHz) Occupied Bandwidth



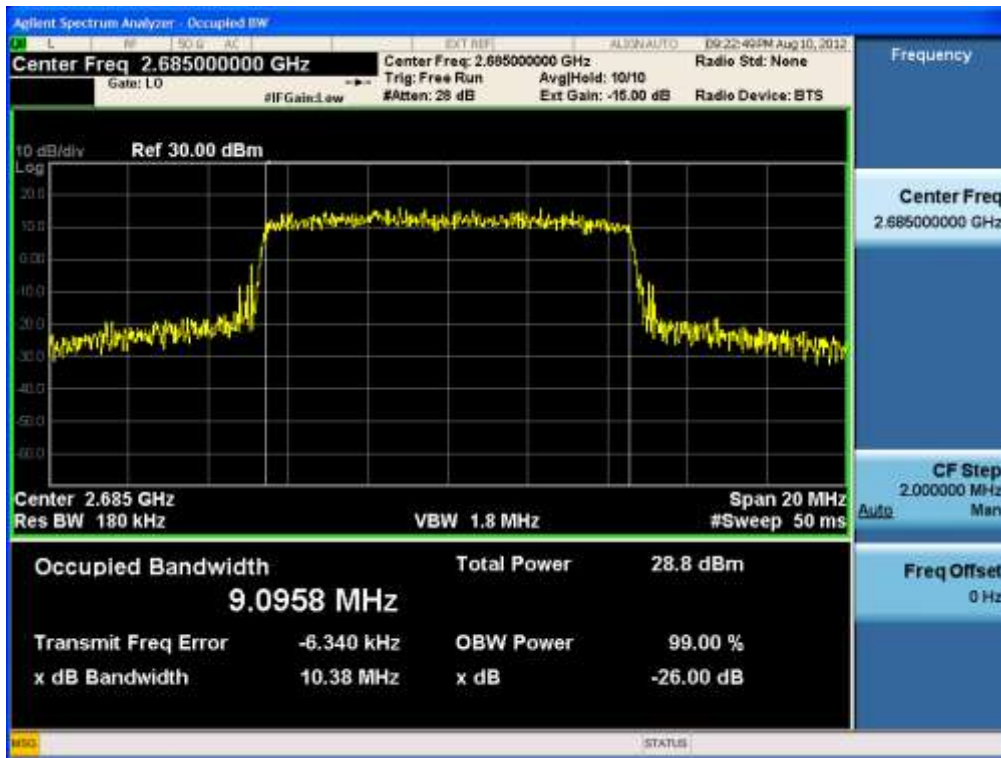
■ QPSK 1/2 MODE (2685.0 MHz) Occupied Bandwidth



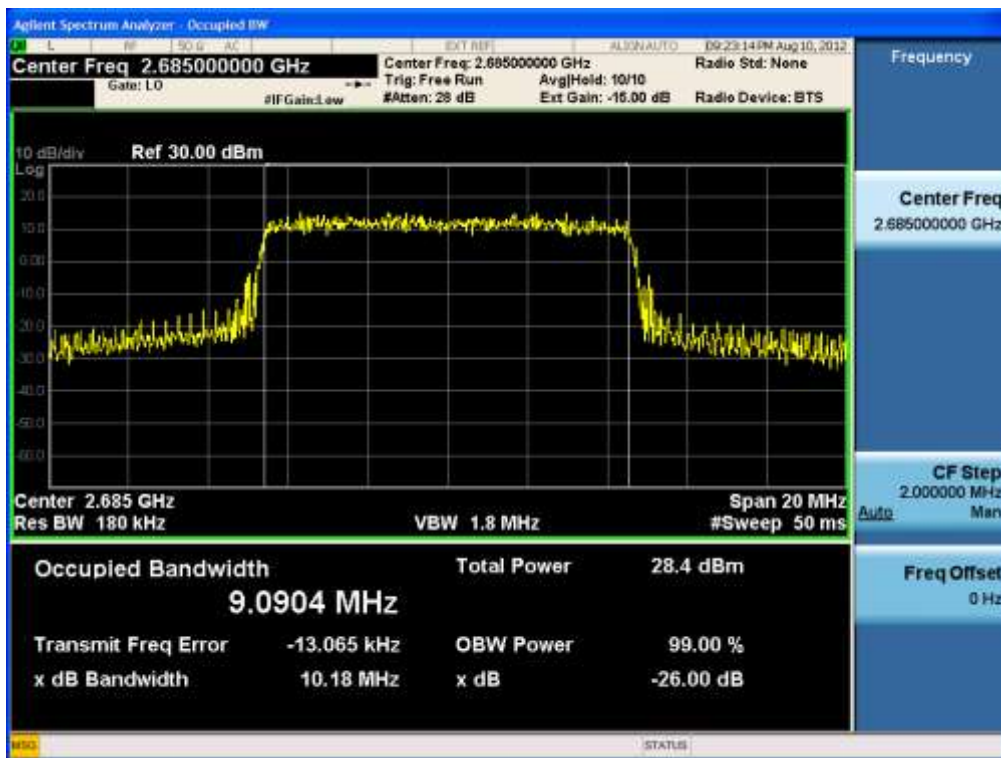
■ QPSK 3/4 MODE (2685.0 MHz) Occupied Bandwidth



■ 16QAM 1/2 MODE (2685.0 MHz) Occupied Bandwidth

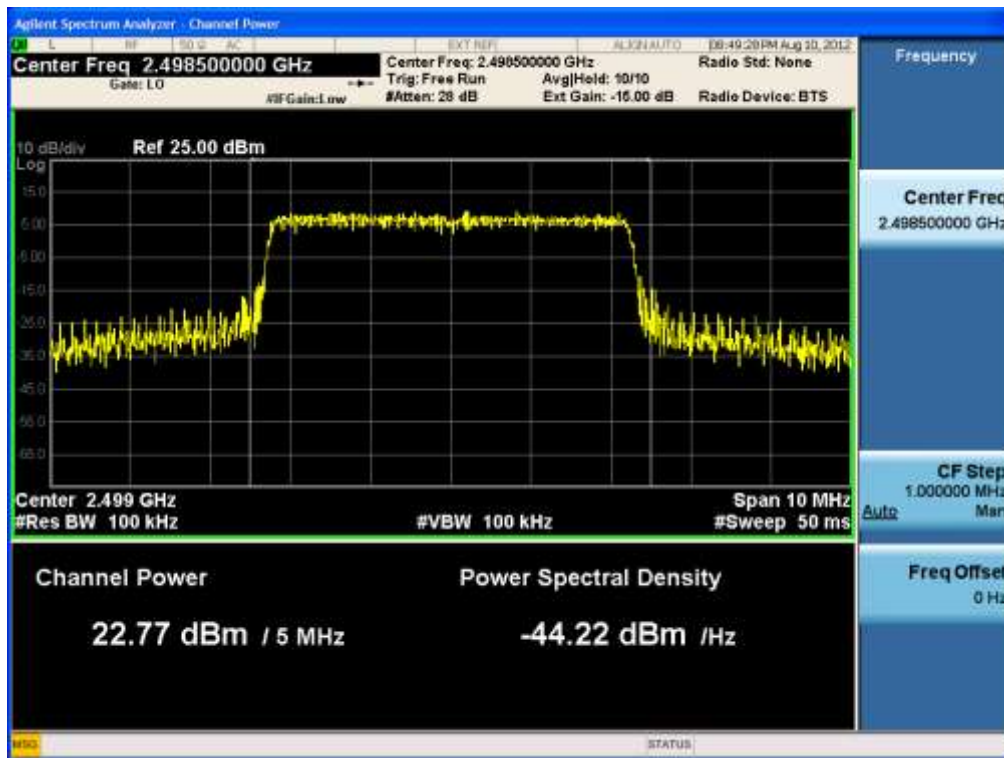


■ 16QAM 3/4 MODE (2685.0 MHz) Occupied Bandwidth



TX1: 5 MHz

■ QPSK 1/2 MODE (2498.5 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2498.5 MHz) Conducted Output Power



■ 16QAM 1/2 MODE (2498.5 MHz) Conducted Output Power

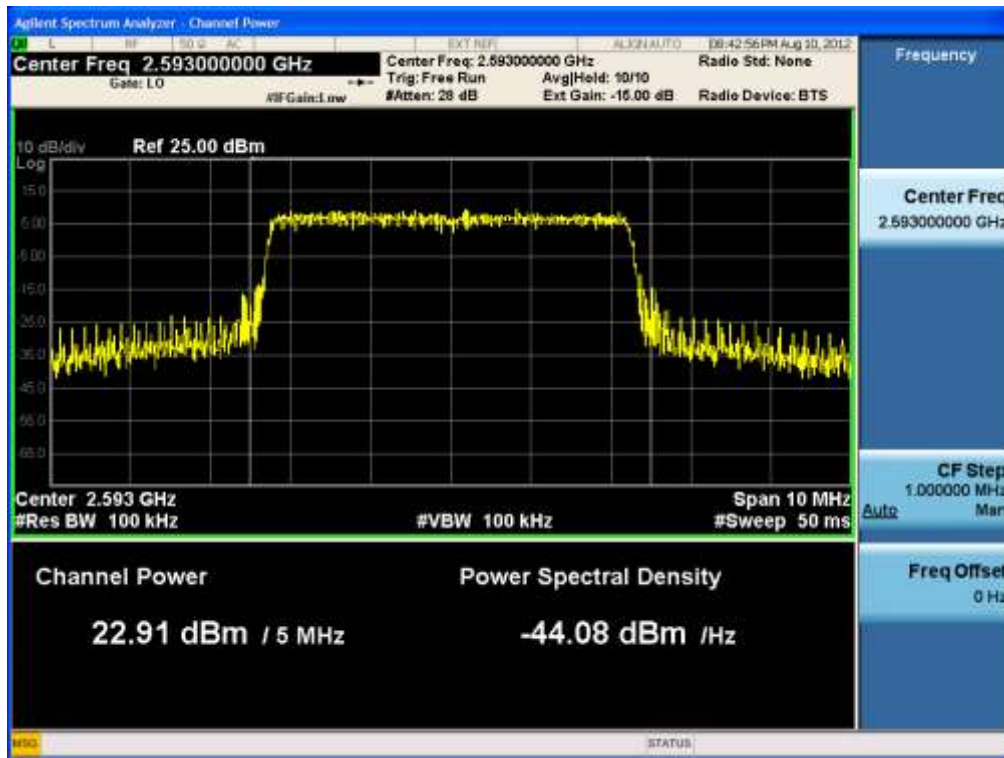


■ 16QAM 3/4 MODE (2498.5 MHz) Conducted Output Power



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■ QPSK 1/2 MODE (2593.0 MHz) Conducted Output Power



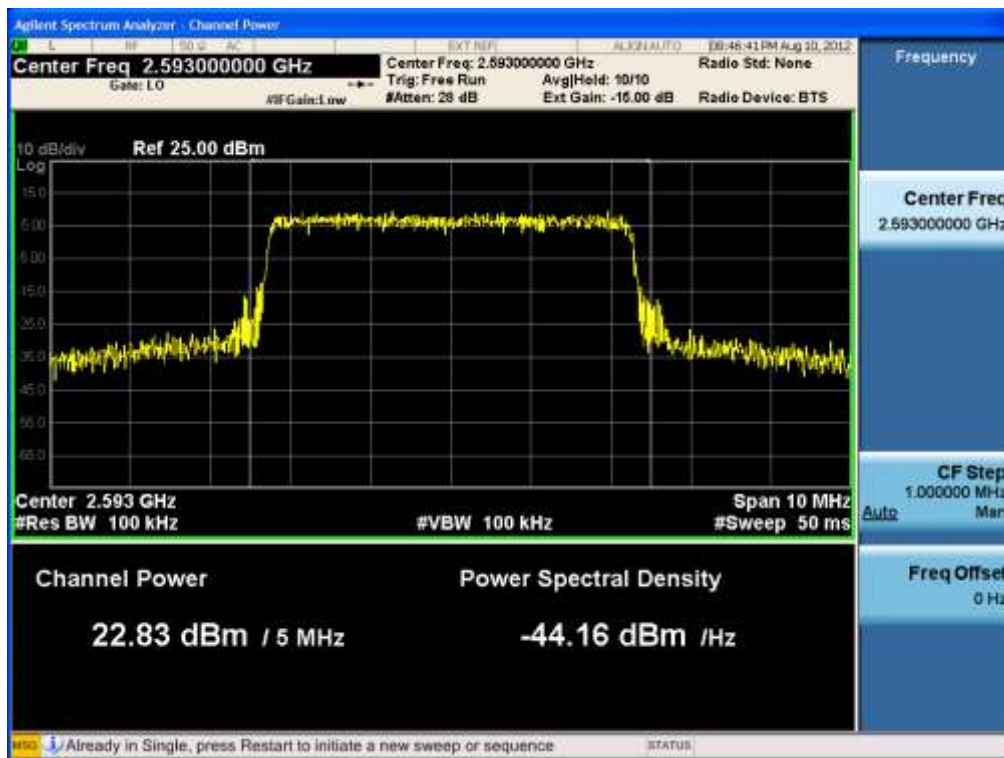
■ QPSK 3/4 MODE (2593.0 MHz) Conducted Output Power



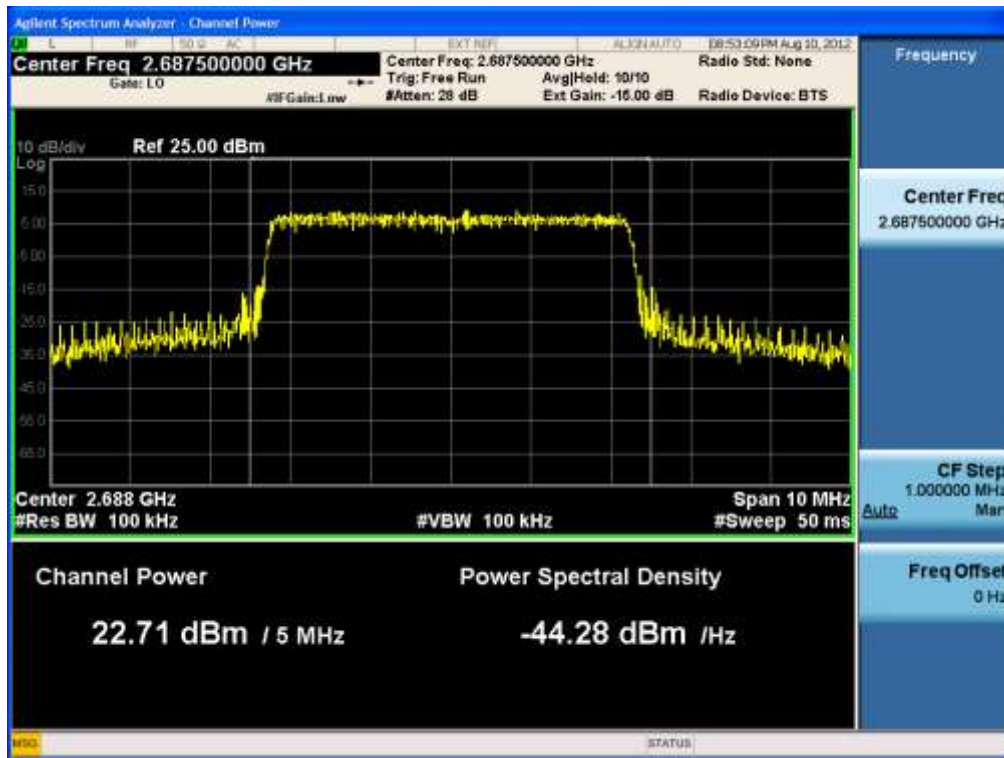
■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Output Power



■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Output Power



■ QPSK 1/2 MODE (2687.5 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2687.5 MHz) Conducted Output Power



■ 16QAM 1/2 MODE (2687.5 MHz) Conducted Output Power

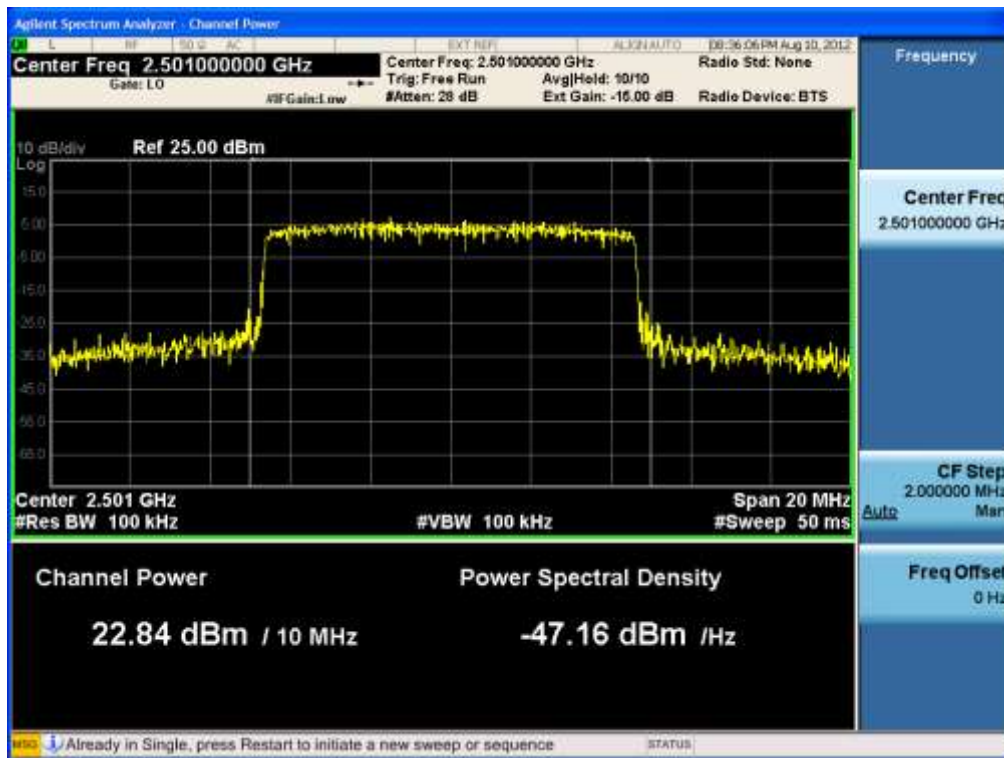


■ 16QAM 3/4 MODE (2687.5 MHz) Conducted Output Power



TX1: 10 MHz

■ QPSK 1/2 MODE (2501.0 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2501.0 MHz) Conducted Output Power



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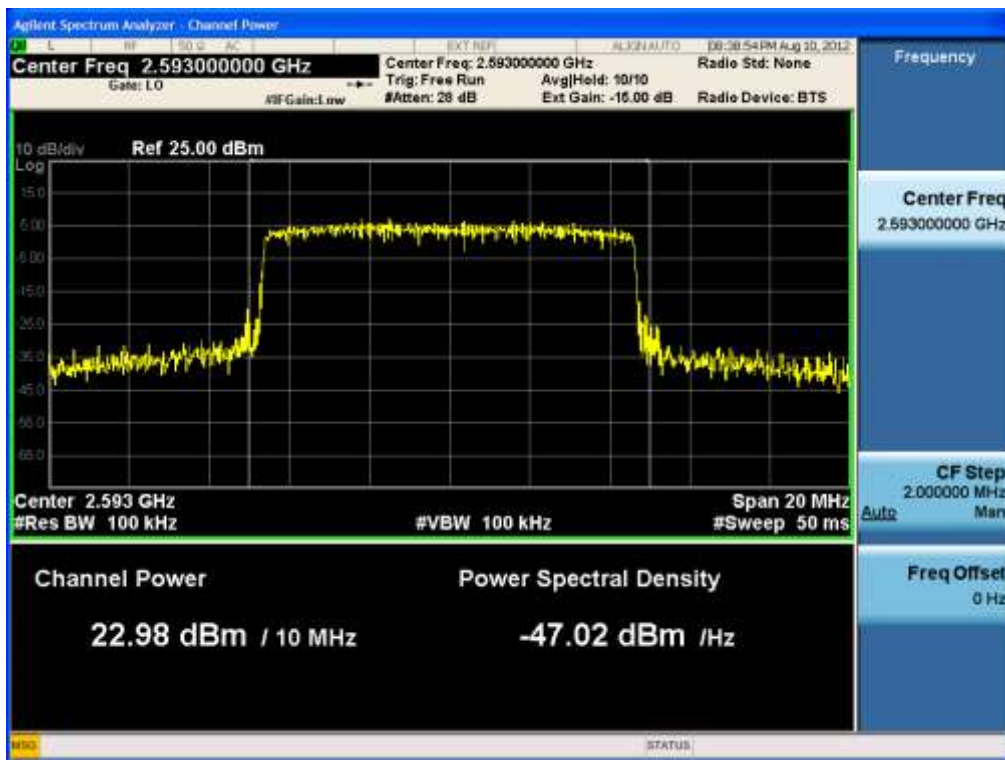
■ 16QAM 1/2 MODE (2501.0 MHz) Conducted Output Power



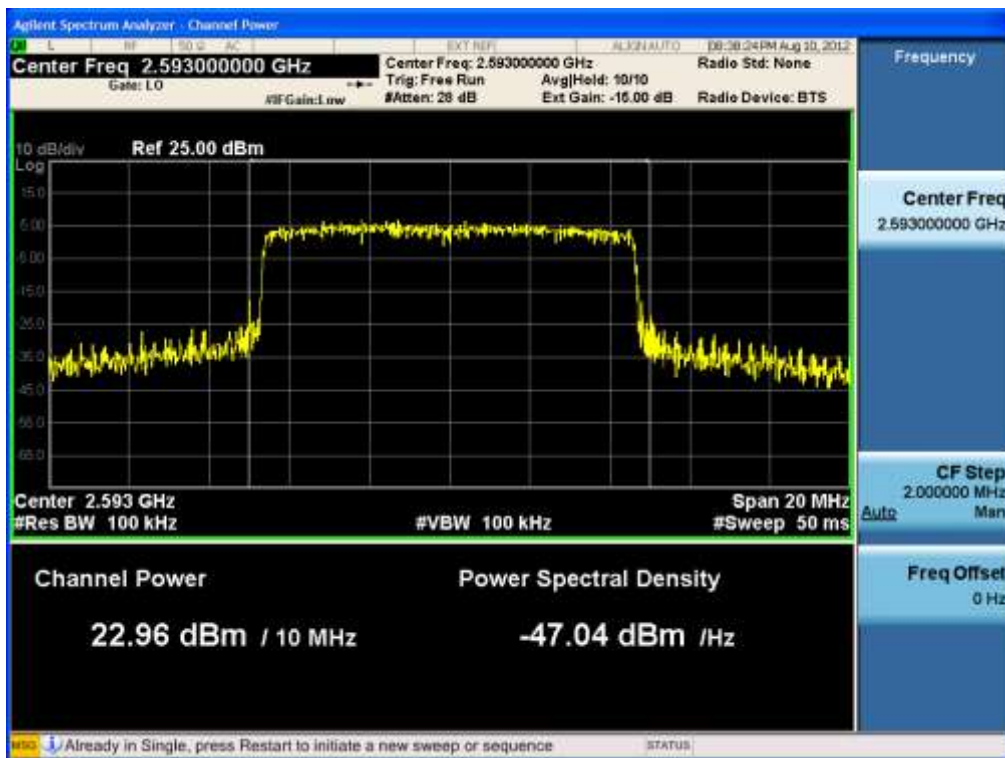
■ 16QAM 3/4 MODE (2501.0 MHz) Conducted Output Power



■ QPSK 1/2 MODE (2593.0 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2593.0 MHz) Conducted Output Power



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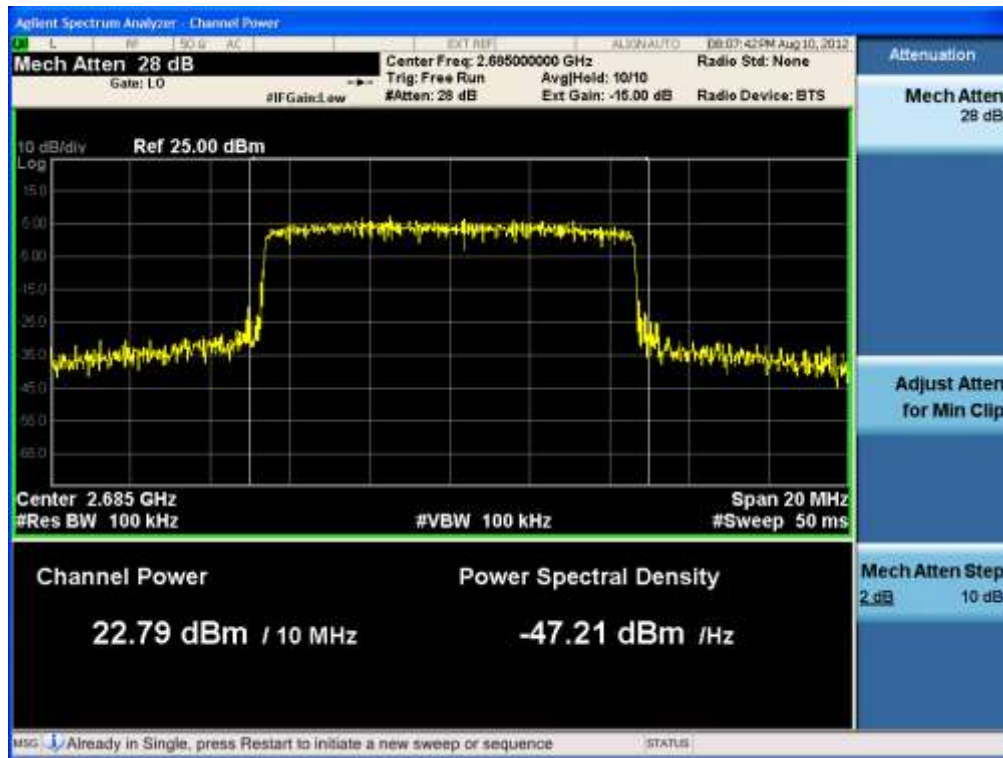
■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Output Power



■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Output Power



■ QPSK 1/2 MODE (2685.0 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2685.0 MHz) Conducted Output Power



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■ 16QAM 1/2 MODE (2685.0 MHz) Conducted Output Power

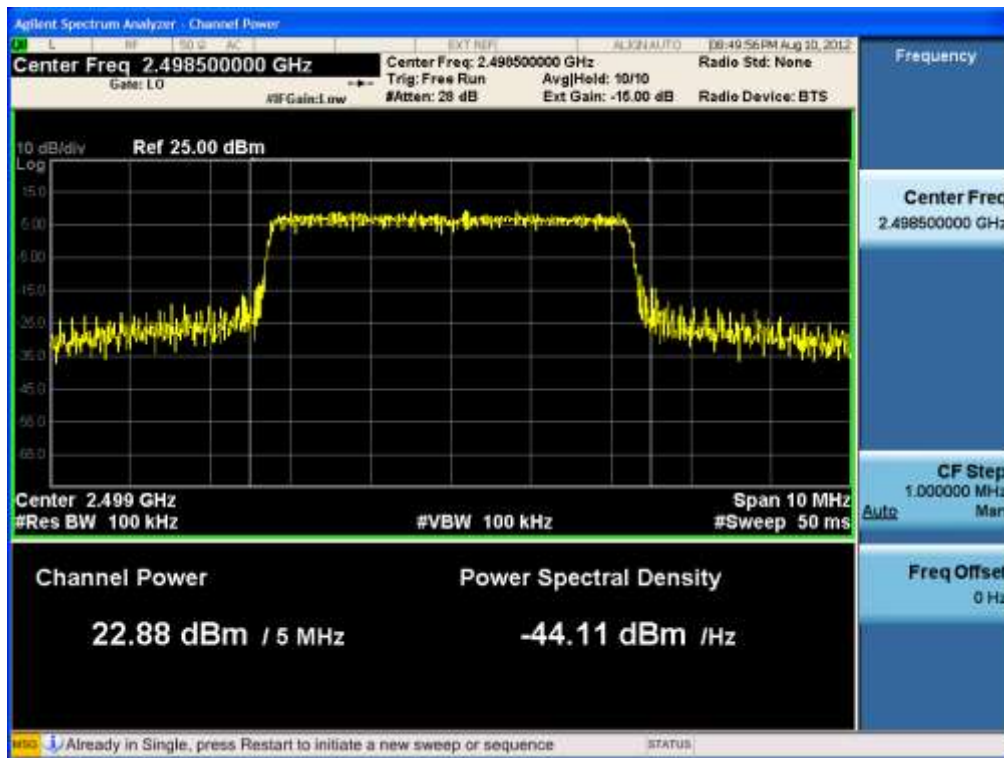


■ 16QAM 3/4 MODE (2685.0 MHz) Conducted Output Power



TX2: 5 MHz

■ QPSK 1/2 MODE (2498.5 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2498.5 MHz) Conducted Output Power



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■ 16QAM 1/2 MODE (2498.5 MHz) Conducted Output Power

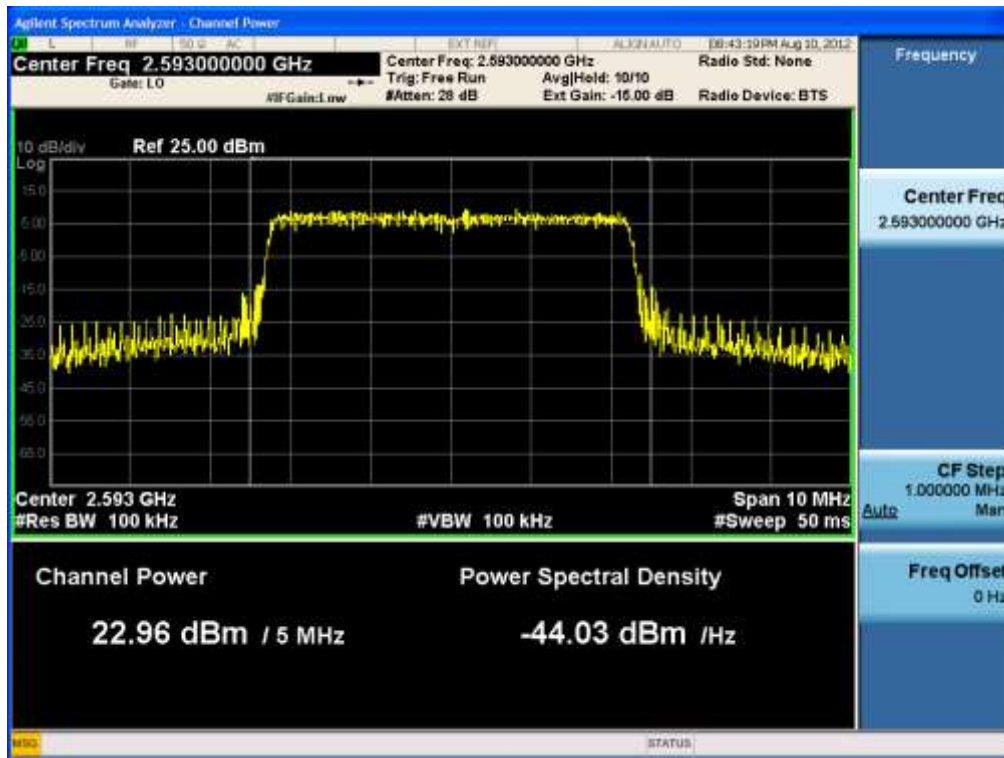


■ 16QAM 3/4 MODE (2498.5 MHz) Conducted Output Power



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■ QPSK 1/2 MODE (2593.0 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2593.0 MHz) Conducted Output Power



■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Output Power

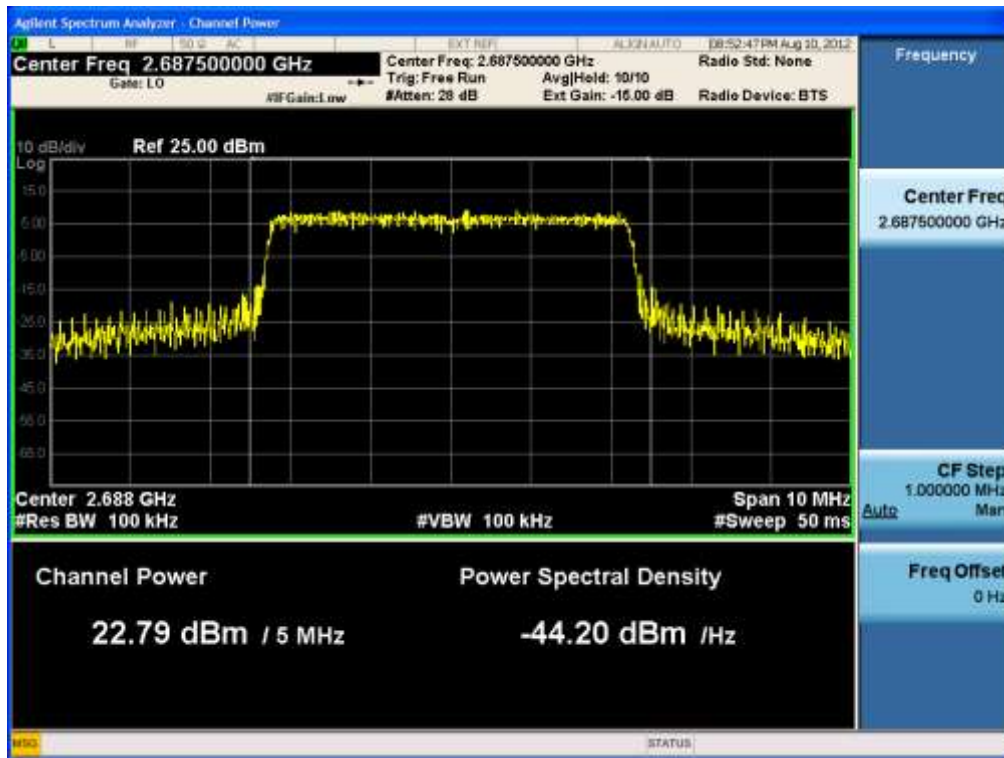


■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Output Power



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■ QPSK 1/2 MODE (2687.5 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2687.5 MHz) Conducted Output Power



■ 16QAM 1/2 MODE (2687.5 MHz) Conducted Output Power



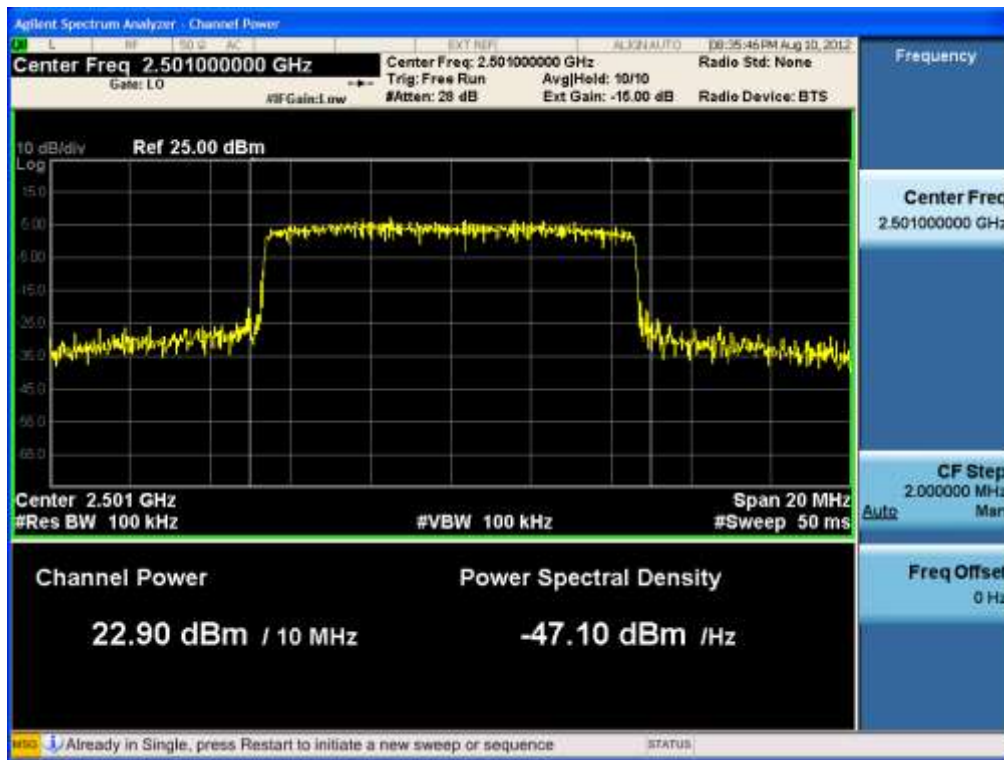
■ 16QAM 3/4 MODE (2687.5 MHz) Conducted Output Power



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TX2: 10 MHz

■ QPSK 1/2 MODE (2501.0 MHz) Conducted Output Power

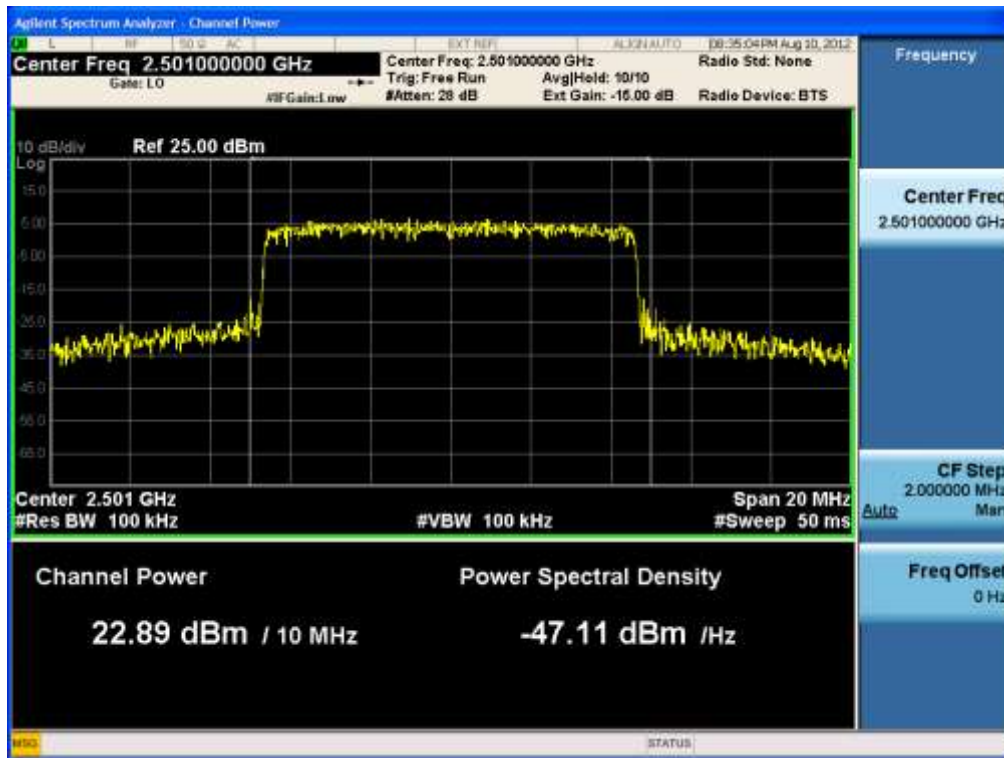


■ QPSK 3/4 MODE (2501.0 MHz) Conducted Output Power



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■ 16QAM 1/2 MODE (2501.0 MHz) Conducted Output Power



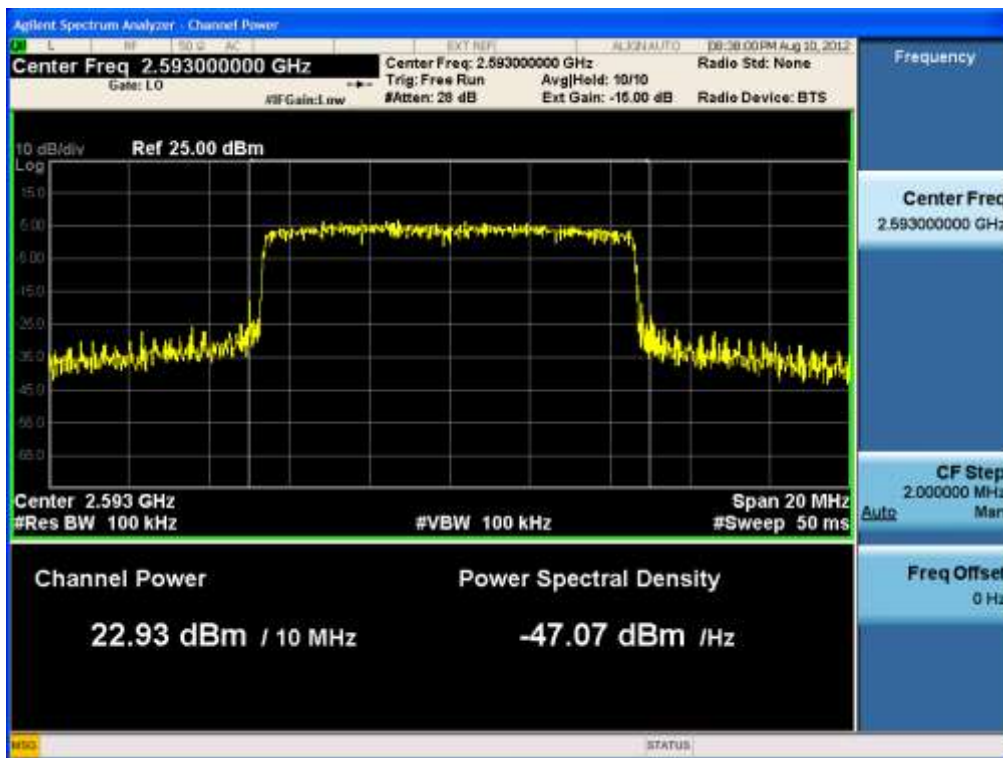
■ 16QAM 3/4 MODE (2501.0 MHz) Conducted Output Power



■ QPSK 1/2 MODE (2593.0 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2593.0 MHz) Conducted Output Power



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■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Output Power

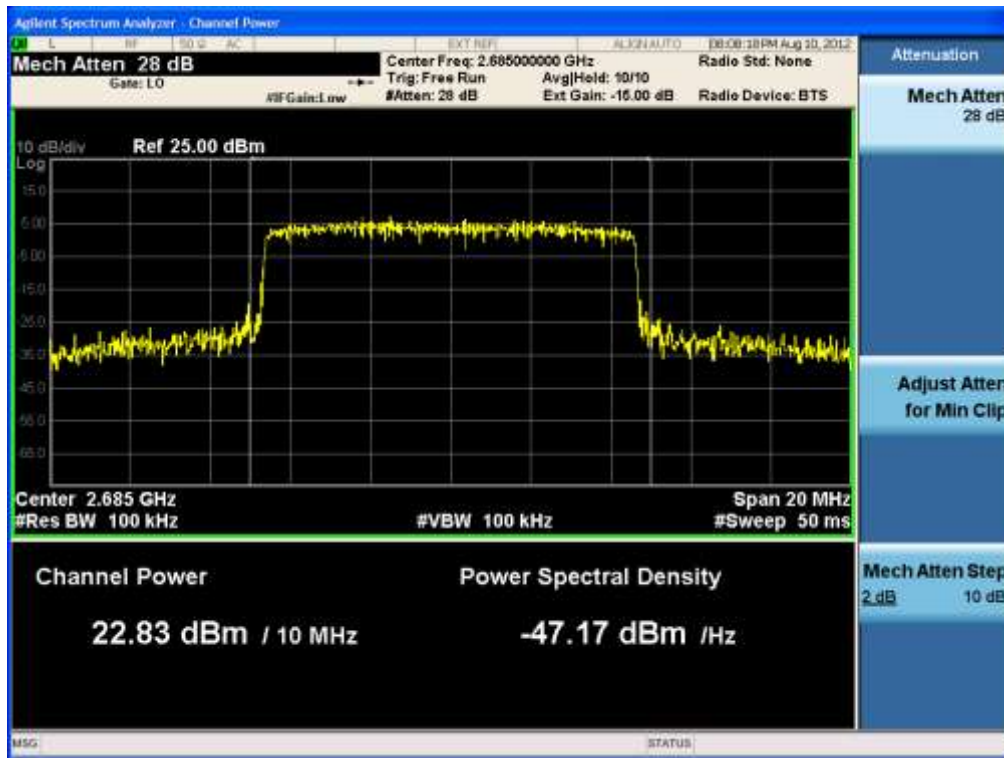


■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Output Power



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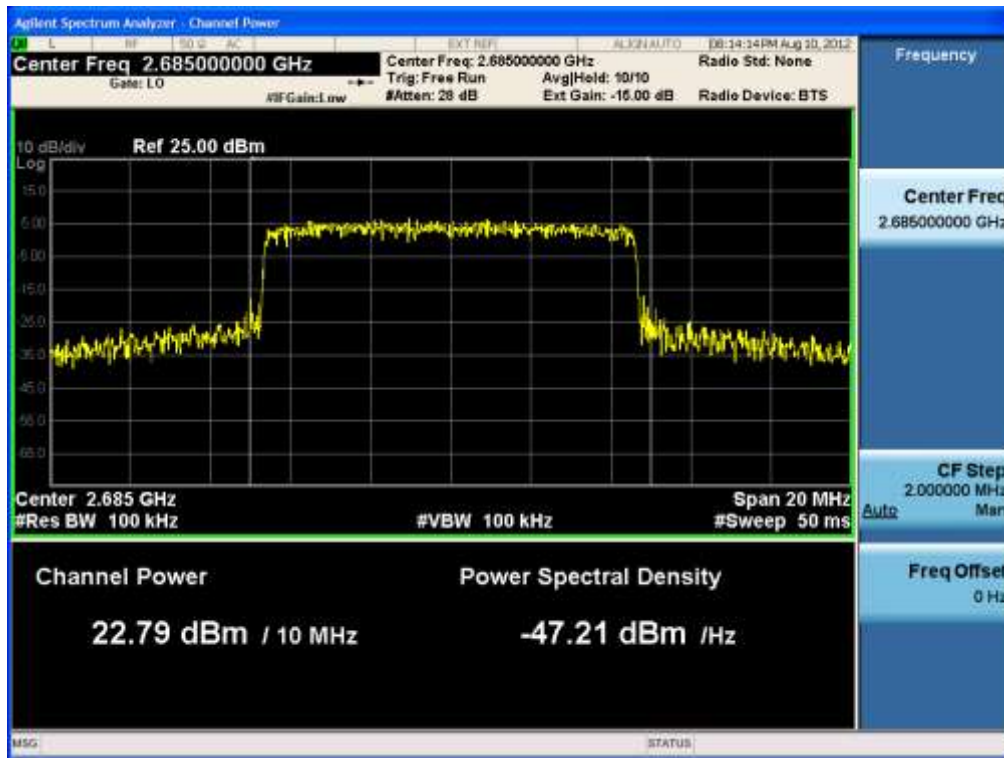
■ QPSK 1/2 MODE (2685.0 MHz) Conducted Output Power



■ QPSK 3/4 MODE (2685.0 MHz) Conducted Output Power



■ 16QAM 1/2 MODE (2685.0 MHz) Conducted Output Power



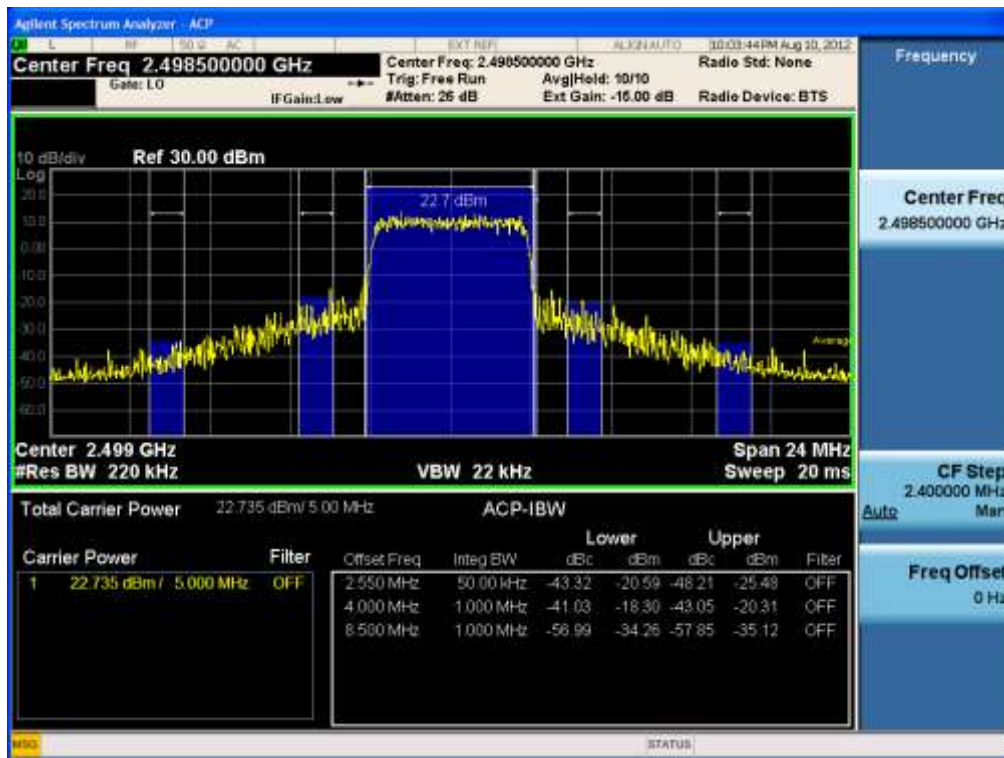
■ 16QAM 3/4 MODE (2685.0 MHz) Conducted Output Power



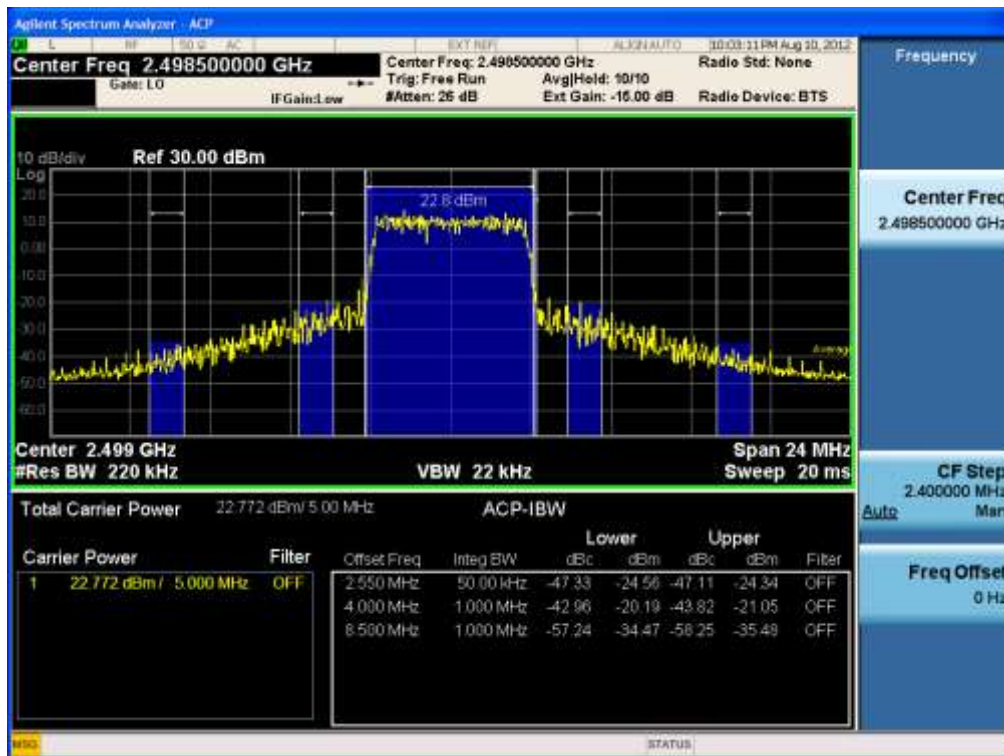
FCC CERTIFICATION REPORT				www.hct.co.kr
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5 MHz

■ QPSK 1/2 MODE (2498.5 MHz) Channel Edge



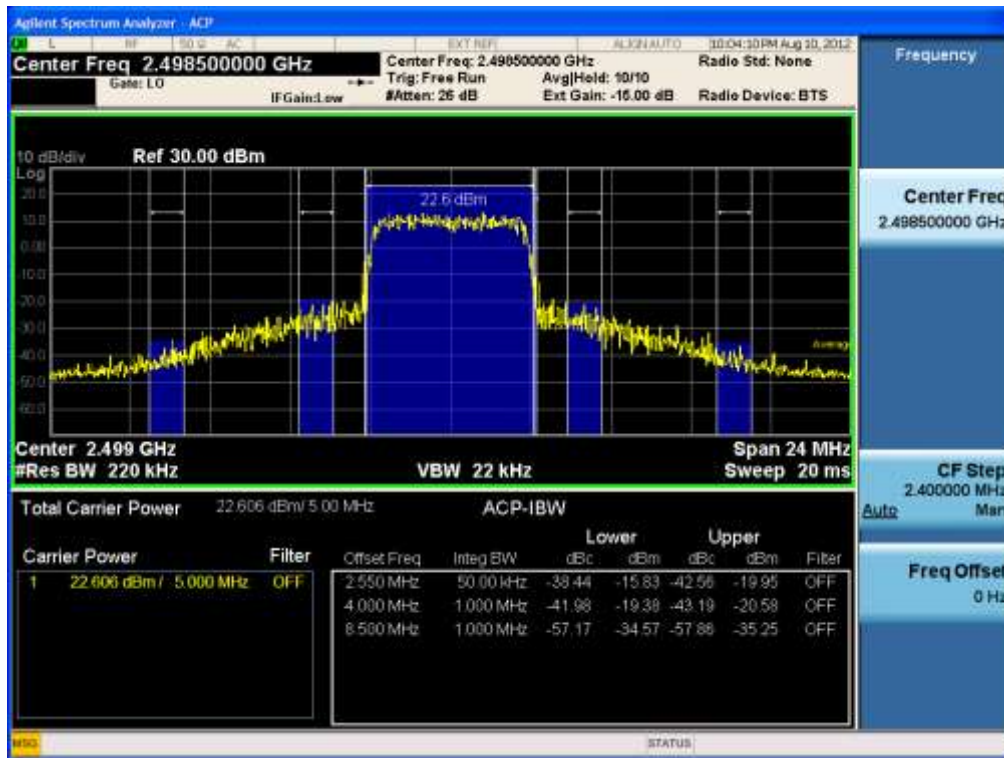
■ QPSK 3/4 MODE (2498.5 MHz) Channel Edge



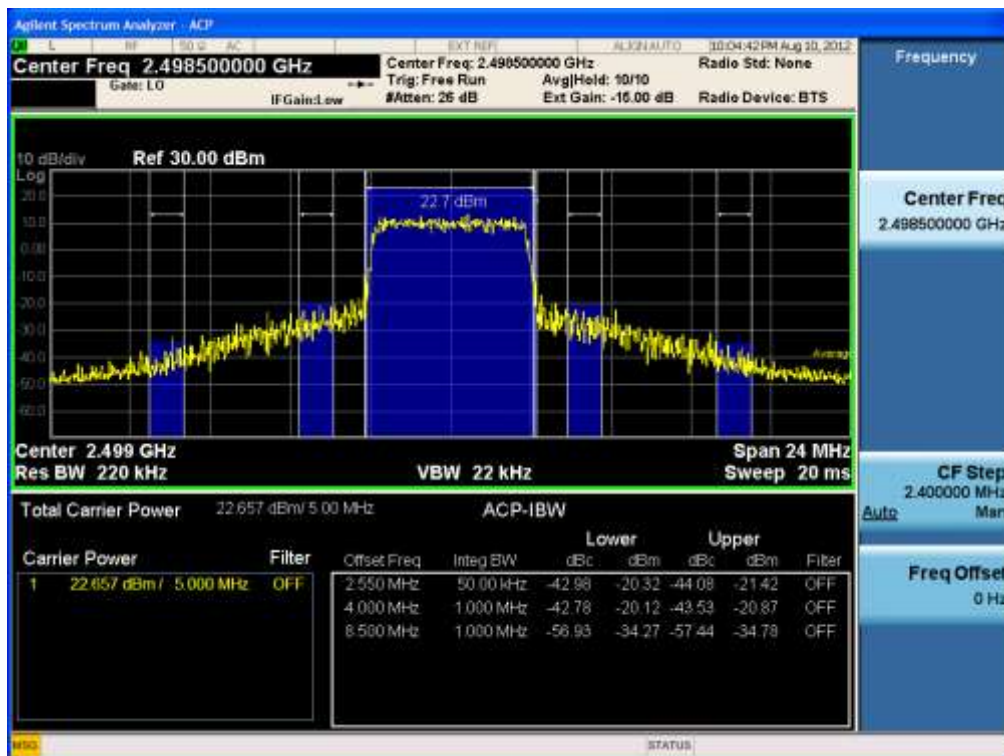
FCC CERTIFICATION REPORT

Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	www.hct.co.kr FCC ID: RB2-U770
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■ 16QAM 1/2 MODE (2498.5 MHz) Channel Edge



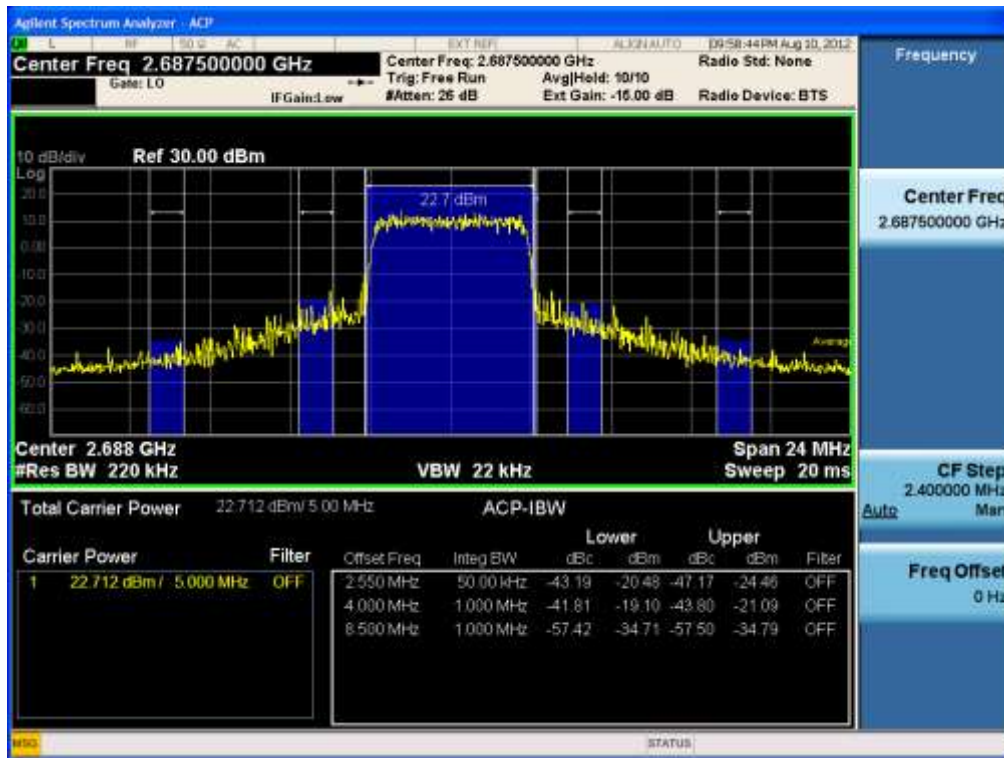
■ 16QAM 3/4 MODE (2498.5 MHz) Channel Edge



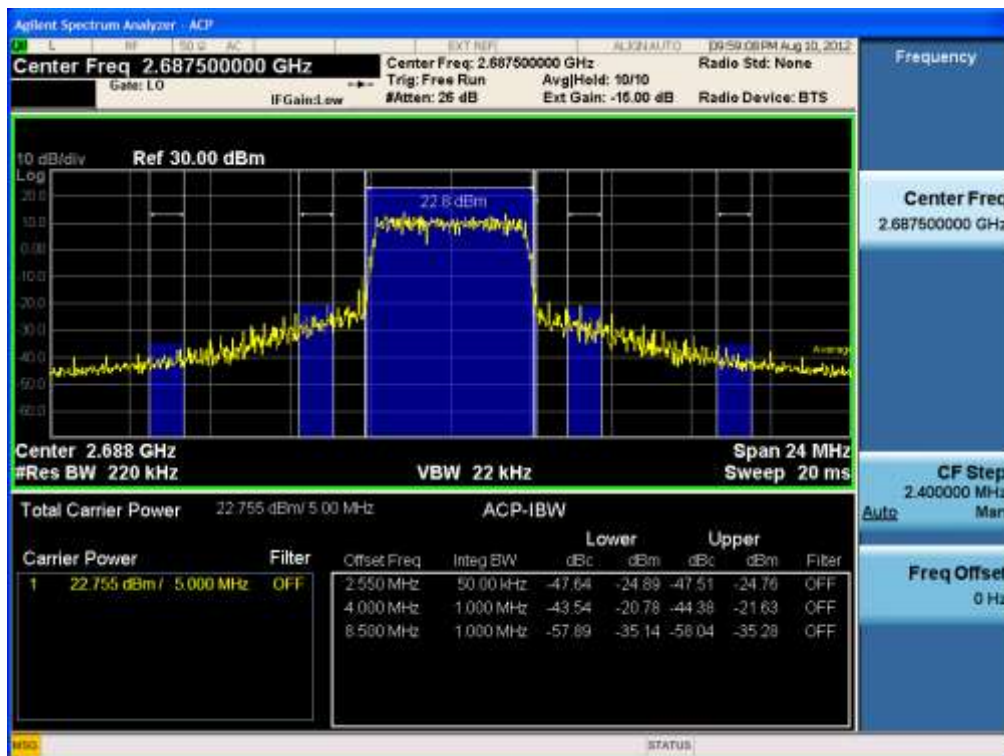
FCC CERTIFICATION REPORT

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■ QPSK 1/2 MODE (2687.5 MHz) Channel Edge



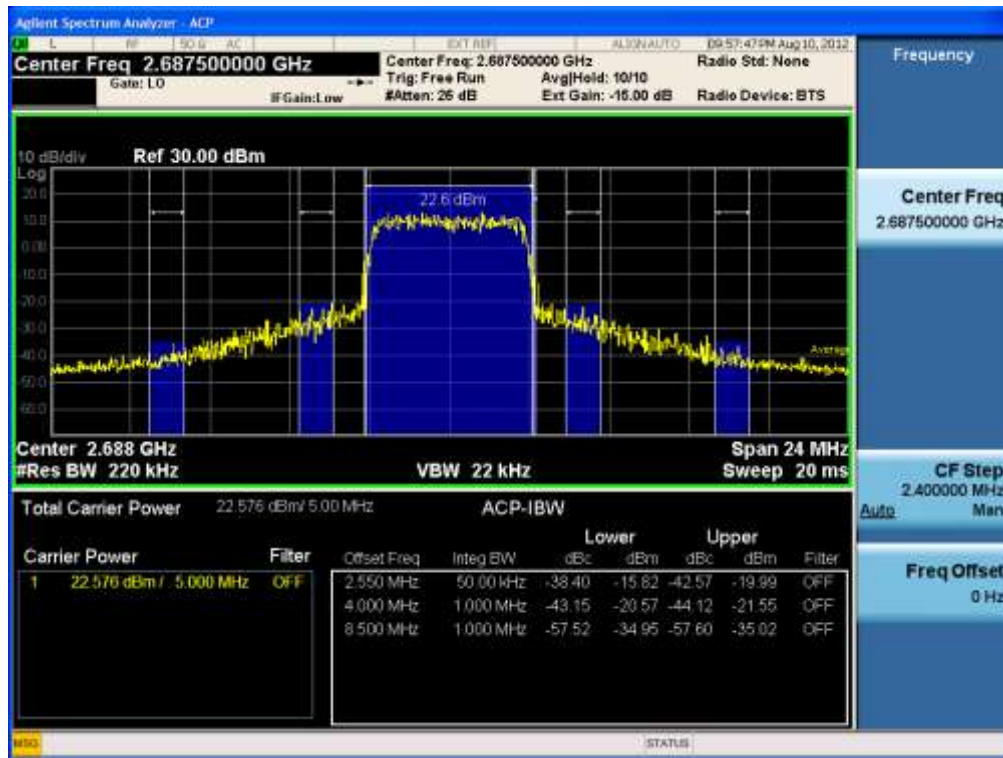
■ QPSK 3/4 MODE (2687.5 MHz) Channel Edge



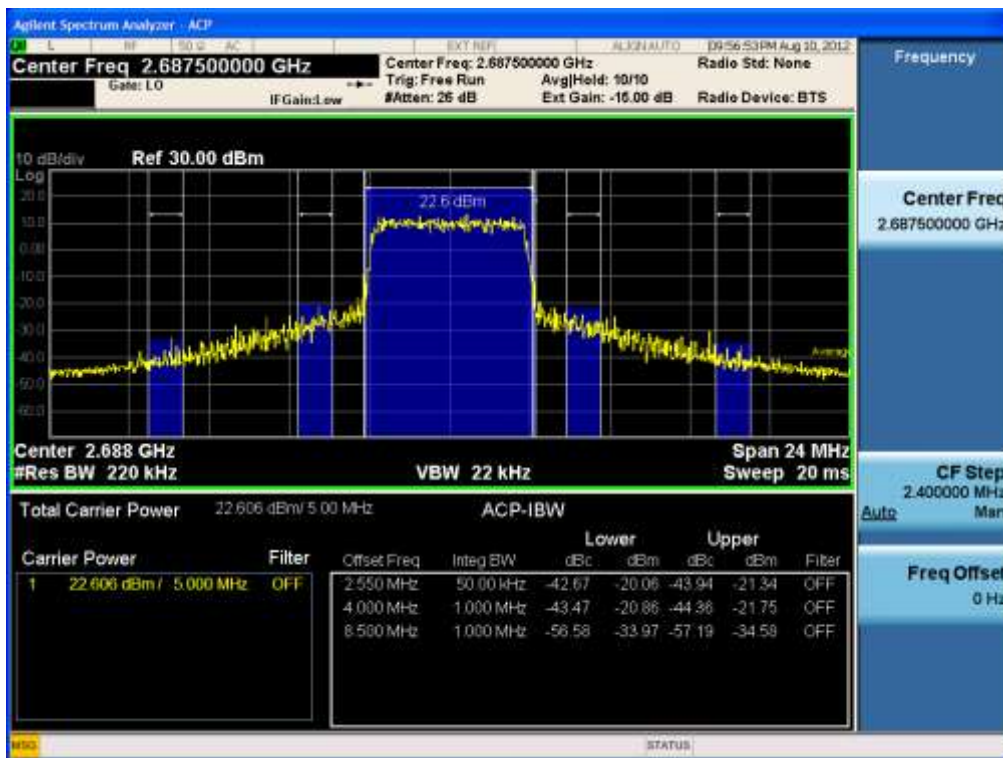
FCC CERTIFICATION REPORT

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■ 16QAM 1/2 MODE (2687.5 MHz) Channel Edge



■ 16QAM 3/4 MODE (2687.5 MHz) Channel Edge



FCC CERTIFICATION REPORT

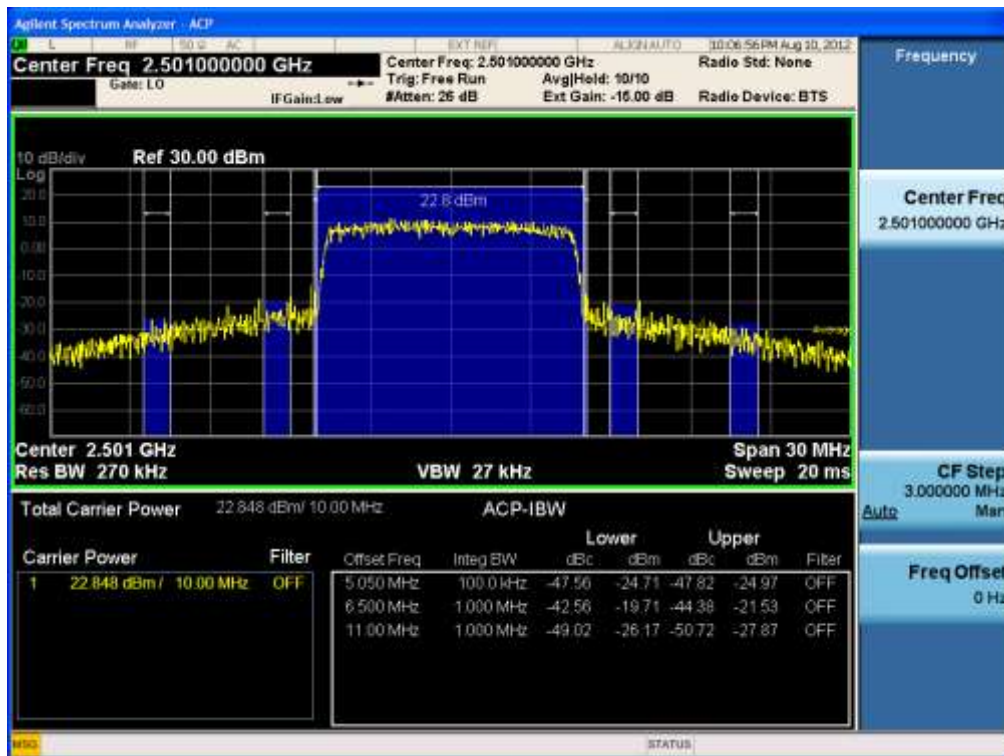
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	www.hct.co.kr FCC ID: RB2-U770
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10 MHz

■ QPSK 1/2 MODE (2501.0 MHz) Channel Edge



■ QPSK 3/4 MODE (2501.0 MHz) Channel Edge



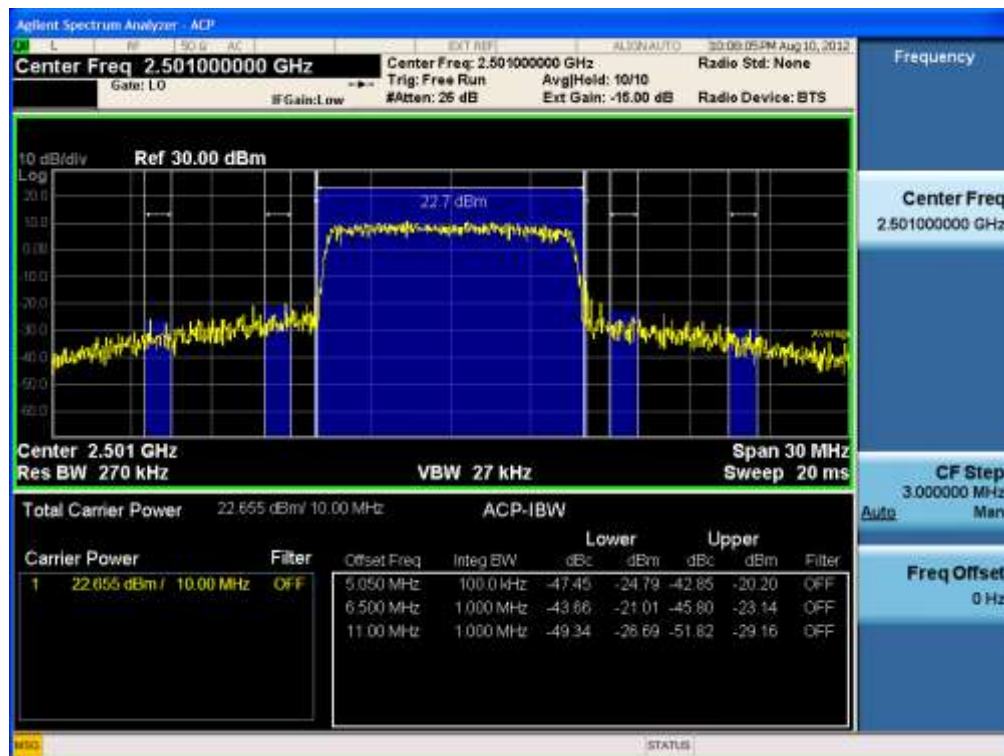
FCC CERTIFICATION REPORT

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■ 16QAM 1/2 MODE (2501.0 MHz) Channel Edge



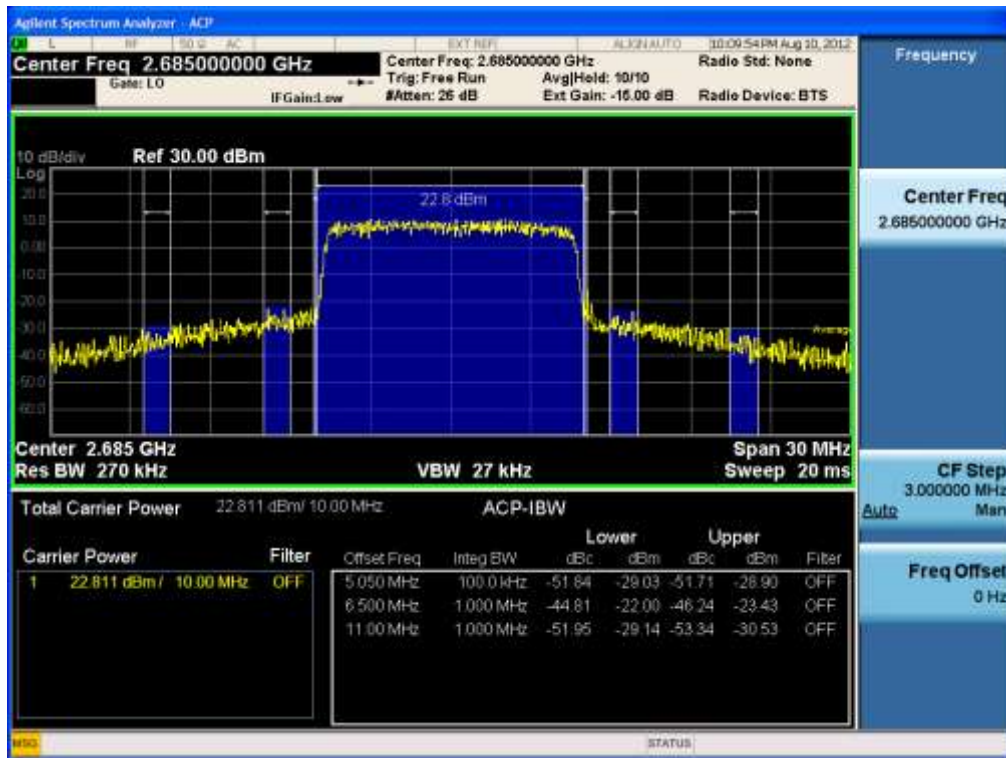
■ 16QAM 3/4 MODE (2501.0 MHz) Channel Edge



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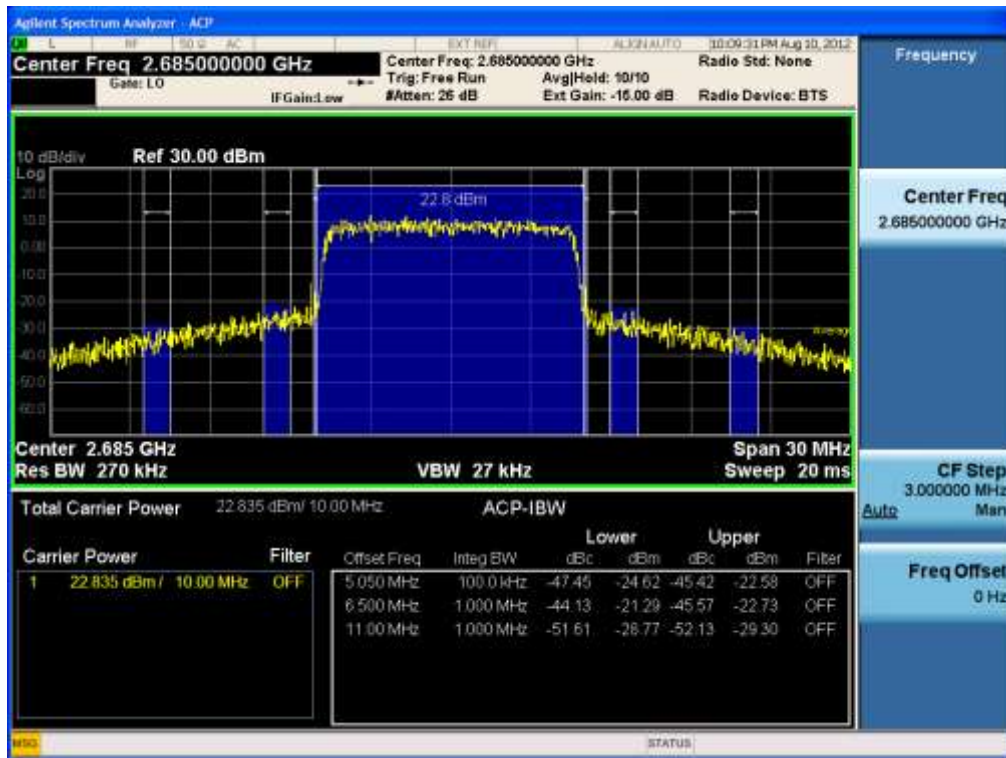
■ QPSK 1/2 MODE (2685.0 MHz) Channel Edge



■ QPSK 3/4 MODE (2685.0 MHz) Channel Edge



■ 16QAM 1/2 MODE (2685.0 MHz) Channel Edge



■ 16QAM 3/4 MODE (2685.0 MHz) Channel Edge

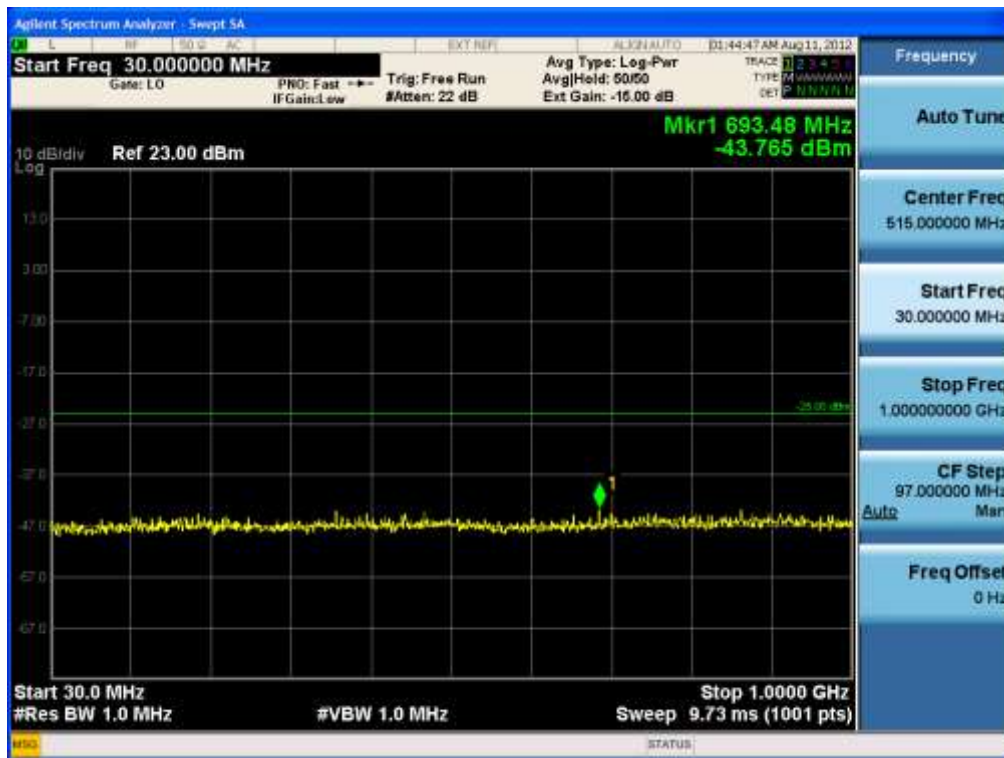


FCC CERTIFICATION REPORT

Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	www.hct.co.kr FCC ID: RB2-U770
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5 MHz

■ QPSK 1/2 MODE (2498.5 MHz) Conducted Spurious Emissions1

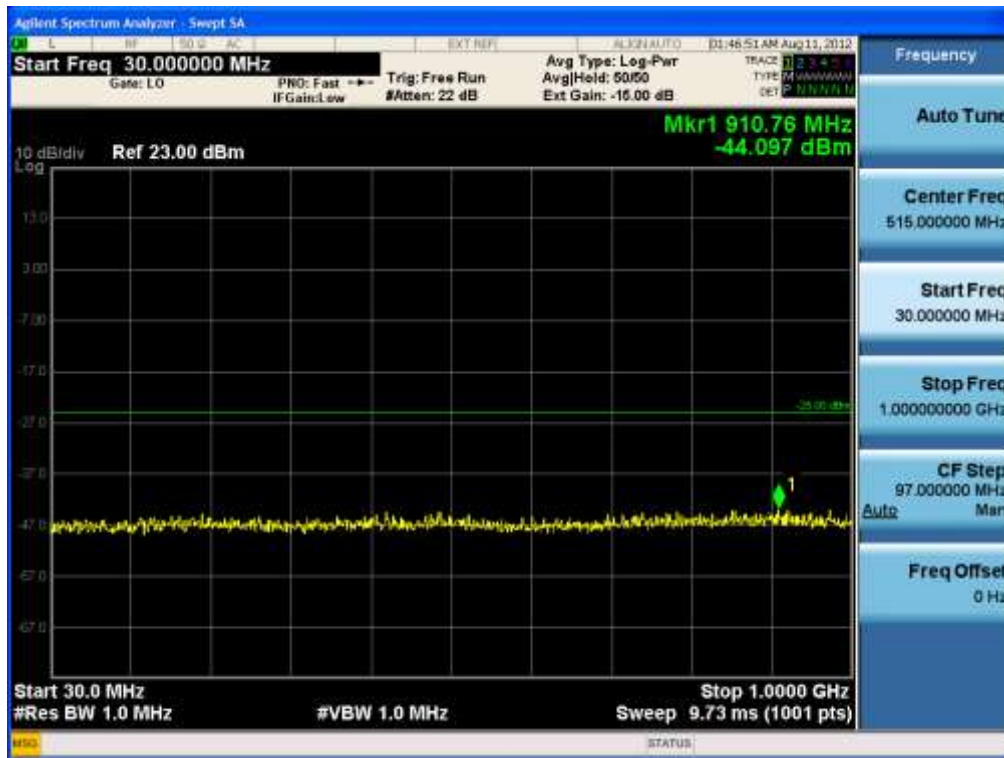


■ QPSK 1/2 MODE (2498.5 MHz) Conducted Spurious Emissions2



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■ QPSK 3/4 MODE (2498.5 MHz) Conducted Spurious Emissions1



■ QPSK 3/4 MODE (2498.5 MHz) Conducted Spurious Emissions2



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Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 1/2 MODE (2498.5 MHz) Conducted Spurious Emissions1



■ 16QAM 1/2 MODE (2498.5 MHz) Conducted Spurious Emissions2



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Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 3/4 MODE (2498.5 MHz) Conducted Spurious Emissions1



■ 16QAM 3/4 MODE (2498.5 MHz) Conducted Spurious Emissions2



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■ QPSK 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions1



■ QPSK 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions1

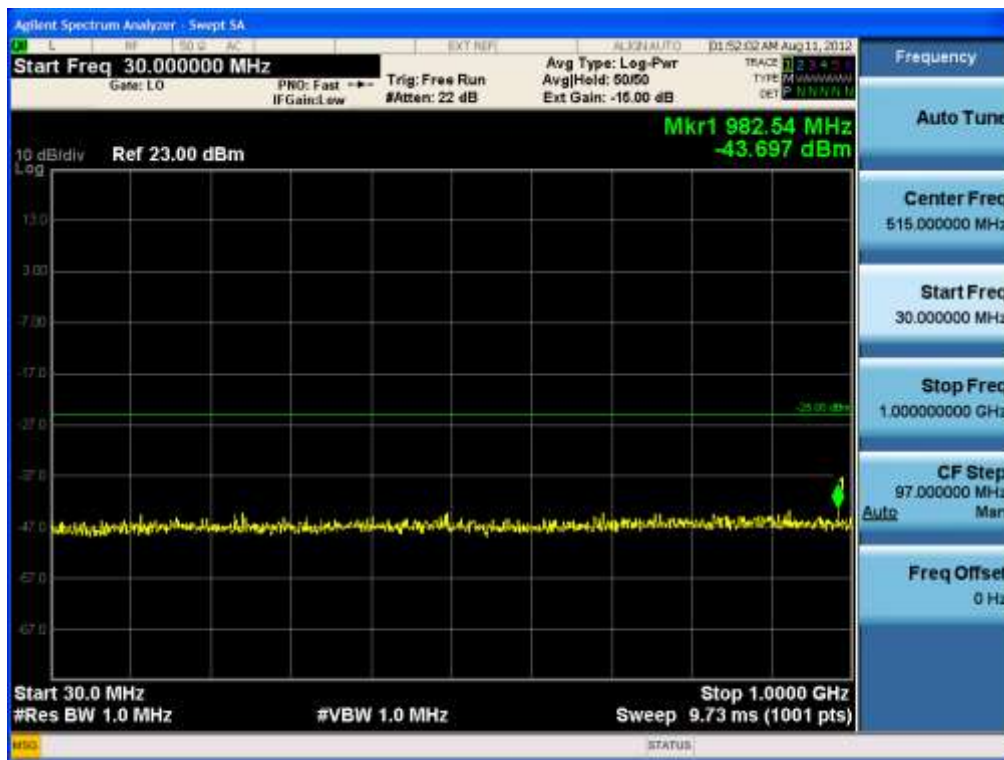


■ QPSK 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

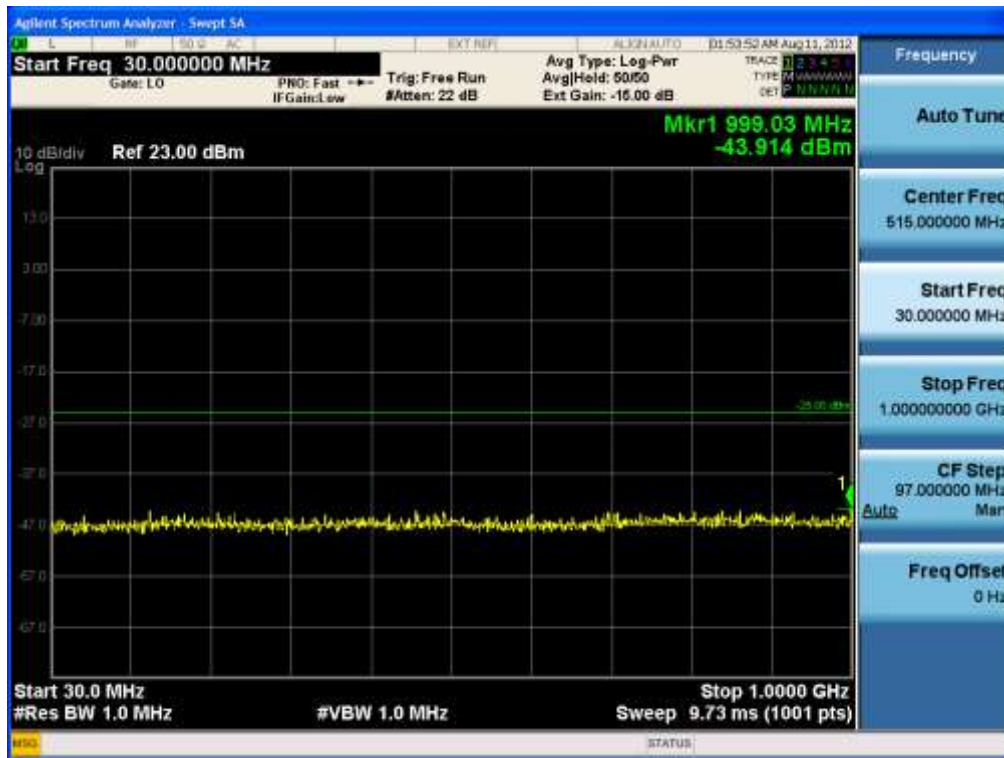
■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions1



■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions2



■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions1

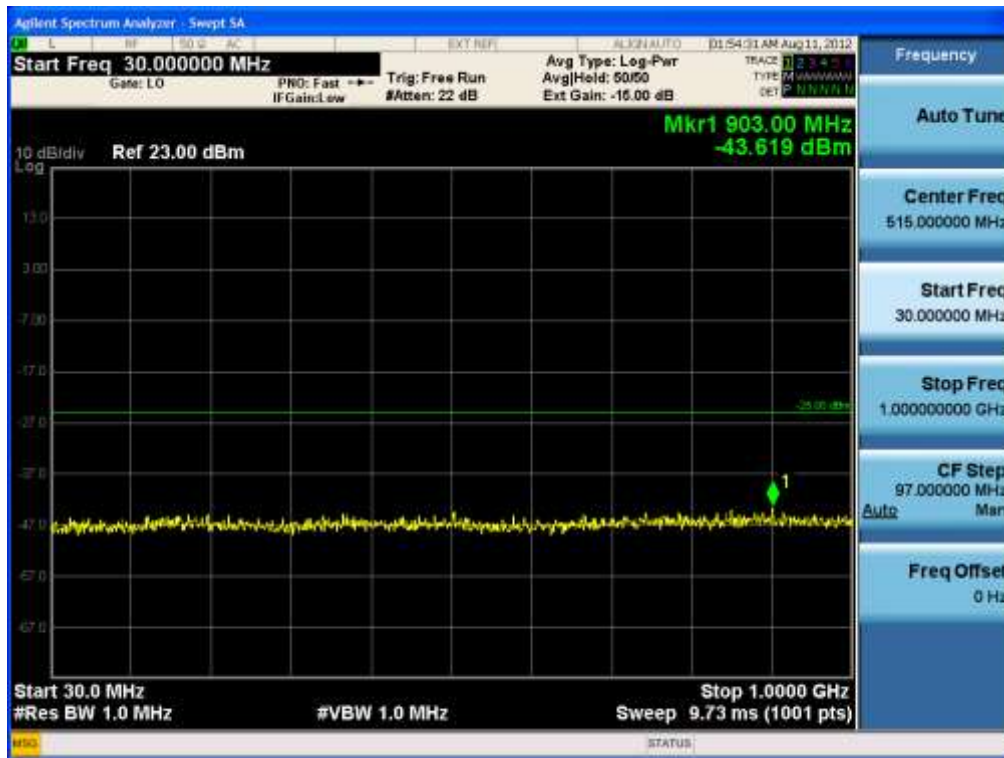


■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 1/2 MODE (2687.5 MHz) Conducted Spurious Emissions1

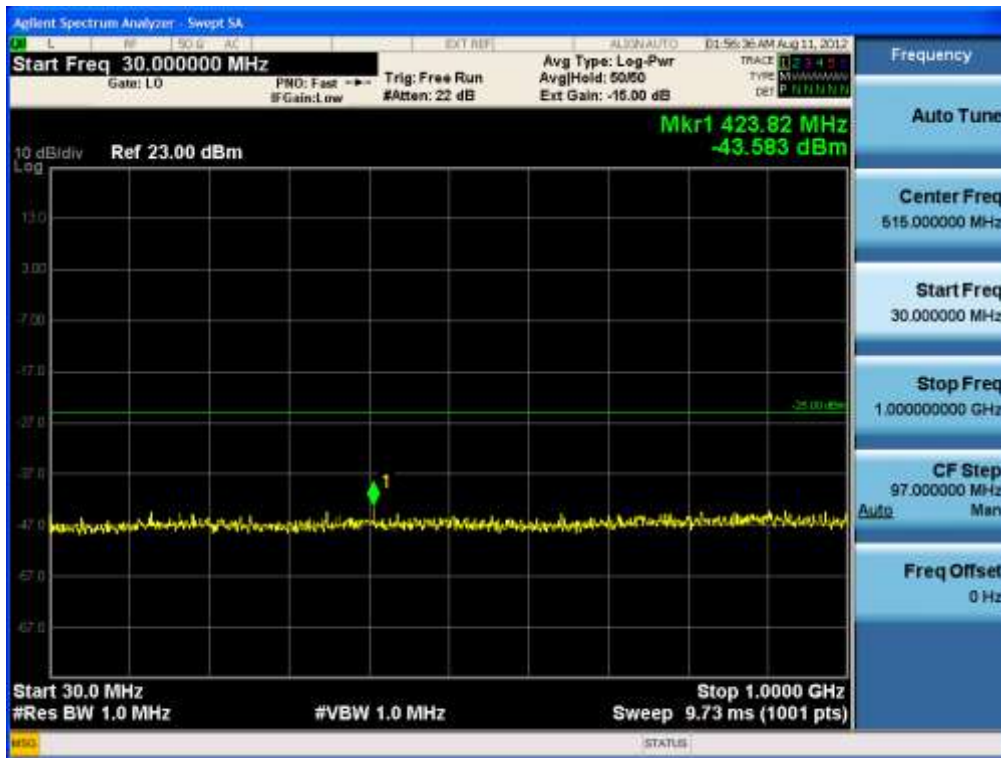


■ QPSK 1/2 MODE (2687.5 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 3/4 MODE (2687.5 MHz) Conducted Spurious Emissions1



■ QPSK 3/4 MODE (2687.5 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT				www.hct.co.kr
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■ 16QAM 1/2 MODE (2687.5 MHz) Conducted Spurious Emissions1



■ 16QAM 1/2 MODE (2687.5 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 3/4 MODE (2687.5 MHz) Conducted Spurious Emissions1



■ 16QAM 3/4 MODE (2687.5 MHz) Conducted Spurious Emissions2



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10 MHz

■ QPSK 1/2 MODE (2501.0 MHz) Conducted Spurious Emissions1



■ QPSK 1/2 MODE (2501.0 MHz) Conducted Spurious Emissions2



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■ QPSK 3/4 MODE (2501.0 MHz) Conducted Spurious Emissions1



■ QPSK 3/4 MODE (2501.0 MHz) Conducted Spurious Emissions2



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Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 1/2 MODE (2501.0 MHz) Conducted Spurious Emissions1



■ 16QAM 1/2 MODE (2501.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 3/4 MODE (2501.0 MHz) Conducted Spurious Emissions1



■ 16QAM 3/4 MODE (2501.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions1



■ QPSK 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions1



■ QPSK 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions1



■ 16QAM 1/2 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions1

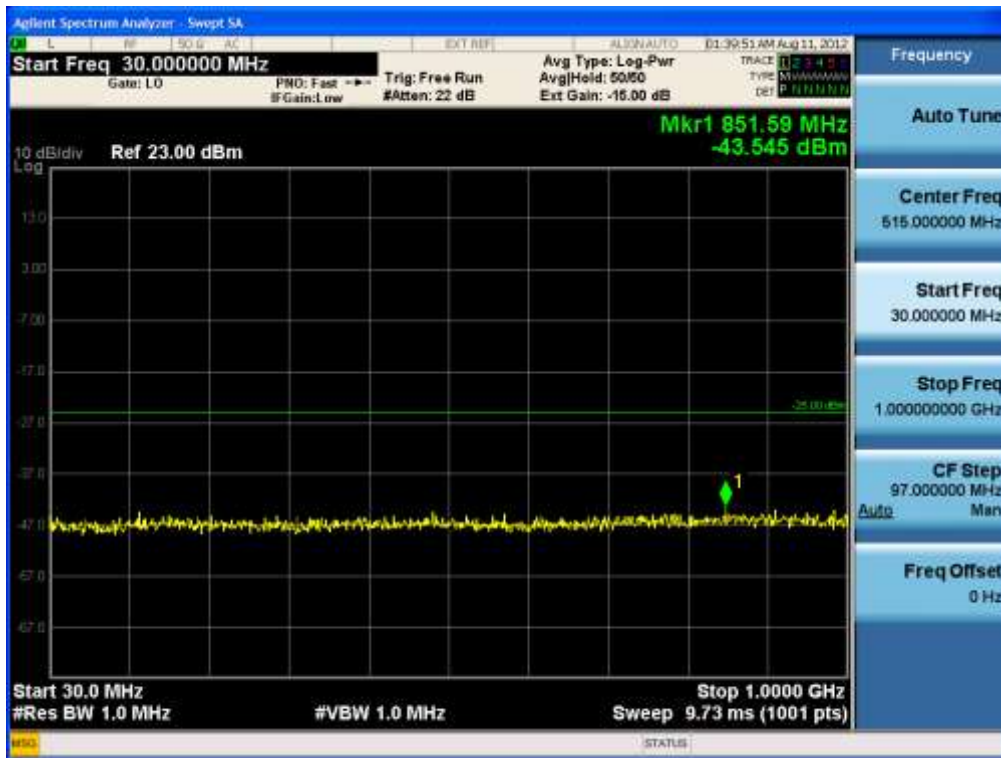


■ 16QAM 3/4 MODE (2593.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 1/2 MODE (2685.0 MHz) Conducted Spurious Emissions1



■ QPSK 1/2 MODE (2685.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ QPSK 3/4 MODE (2685.0 MHz) Conducted Spurious Emissions1



■ QPSK 3/4 MODE (2685.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 1/2 MODE (2685.0 MHz) Conducted Spurious Emissions1



■ 16QAM 1/2 MODE (2685.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770

■ 16QAM 3/4 MODE (2685.0 MHz) Conducted Spurious Emissions1



■ 16QAM 3/4 MODE (2685.0 MHz) Conducted Spurious Emissions2



FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1208FR50	Date of Issue: August 29, 2012	EUT Type: CDMA/LTE/WiMax USB Dongle	FCC ID: RB2-U770