



HCT CO., LTD.

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CERTIFICATE OF COMPLIANCE FCC PART 27 Certification

Applicant Name: 416, Maetan-3dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea	Date of Issue: December 18, 2012 Test Site/Location: HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Gyeonggi-Do, Korea Test Report No.: HCTR1212FR01
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FCC ID	:	A3LSLS-BD104Q1
APPLICANT	:	SAMSUNG Electronics Co., Ltd.

EUT Type	:	WiMAX/TD-LTE Remote Radio Head
Manufacturer	:	SAMSUNG Electronics Co., Ltd.
Model name	:	SLS-BD104Q1
Frequency of Operation	:	2 506 MHz ~ 2 680 MHz
TX Output Power	:	40 W (10 W * 4 ports)
FCC Rule Part(s)	:	FCC Part 27 Subpart (c).
Emission Designator	:	17M8G7W(QPSK), 17M9W7W(16QAM/64QAM)
Test Procedure(s)	:	ANSI/TIA-603C-2004
Application Type	:	Class II Permissive Change
Data of issue	:	December 18, 2012

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of FCC Part 27 of the FCC Rules under normal use and maintenance.

Report prepared by
: Chang Seok Choi
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

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Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1212FR01	December 21, 2012	First Approval Report

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1. GENERAL INFORMATION

1.1. Client Information

Company	Samsung Electronics Co., Ltd.
Contact Point	416, Maetan-3dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Contact person	Name: JOON-HO LEE / Senior Research Engineer E-mail : joonho@samsung.com Tel: +82-31-279-3552 Fax: +82-31-279-7576

1.2. Product Information

EUT TYPE	WiMAX/TD-LTE Remote Radio Head
EMISSION DESIGNATOR	17M8G7W(QPSK), 17M9W7W(16QAM/64QAM)
OPERATING FREQUENCY	2 506 MHz ~ 2 680 MHz
TX OUTPUT POWER	TD-LTE 20 MHz: 10W/Carrier/Path
CHANNEL BANDWIDTH	TD-LTE : 20 MHz
MODULATION TYPE	OFDMA (QPSK, 16QAM, 64QAM)
MAXIMUM NUMBER OF CARRIERS/SECTORS	1Carrier/3Sector TD-LTE + 4 Subcell WiMAX
SYSTEM INPUT VOLTAGE	DC - 48 V

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1.3. Introduction of EUT

The RRH is a remote RF device with simultaneous supports the Mobile WiMAX and TD-LTE services. Main functions of RRH are as follows:

- High-power amplification of RF transmission signal
- Interfaces optically with the channel card(MRA-F/MRA-L) of the DU using 'Digital I/Q and C M' and carries out interfacing for traffic, alarms, control signals, and clock information.
- Upconversion/downconversion of frequency
- Gain control of RF Rx/Tx signal
- Rx/Tx RF signal from/to an antenna
- Suppression of out-of-band spurious wave emitted from RF Rx/Tx signal
- Low noise amplification of band-pass filtered RF Rx signal (Low Noise Amplifier, LNA)
- TDD switching function for Tx/Rx path
- Includes the filter part connected to the antenna

The RRH-2WB is the RF unit of the TD-LTE Flexible system. It supports transmission RF path of WiMAX and TD-LTE. This RF unit integrates the transceiver, power amplifier, TDD switch and filter in one module.

This test report has been published to add 4x4 MIMO for TD-LTE to the existing grant wherein the device had been only certified for 2x2 MIMO for TD-LTE. Test results for Maximum Output Power and Spurious Emissions have been calculated in summation of 4 ports

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2. TEST SUMMARY

2.1. Standards

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance With **FCC Part 27**

SECTION	TEST ITEMS	RESULTS
2.1046, 27.50(h)	Conducted Output Power	Compliant
2.1049, 27.53(m)	Occupied Bandwidth	Compliant
2.1051, 27.53(m)	Spurious Emissions at Antenna Terminals	Compliant
2.1051, 27.53(m)	Band edge	Compliant
2.1053, 27.53(m)	Spurious Radiated Emissions.	Compliant
2.1055(a)(1), 27.54	Frequency Stability over Temperature variation	Compliant
2.1055(d), 27.54	Frequency stability over Voltage variation	Compliant

2.2. Sample Calculation

1) Conducted Data

Output Power = Reading Value + Attenuator Value + Cable loss

Spectrum reading values are not plot data. The power results in each plot are already including the actual values of loss for the attenuator and cable combination.

Frequency (GHz)	Correction (dB)	Frequency (GHz)	Correction (dB)	Frequency (GHz)	Correction (dB)
0.5	40.249	8	43.780	19	47.149
1	40.607	9	43.762	20	46.107
2	41.217	10	44.496	21	45.085
2.506	41.414	11	44.417	22	45.361
2.592	41.390	12	44.668	23	44.965
2.680	41.414	13	45.343	24	48.397
3	41.535	14	45.367	25	47.302
4	42.142	15	45.417	26	46.859
5	42.541	16	45.338	26.5	47.655
6	42.735	17	46.300		
7	43.149	18	46.967		

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2) Radiated Data

$$\text{EIRP} = \text{SigGen LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

Ex) $-39.2 = -42.09 + 12.46 - 9.57$

- 1) The EUT mounted on a table on 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 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 (**EIRP**).

3. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature :	+ 15 to + 35
Relative humidity:	30 % to 60 %
Air pressure	860 mbar to 1060 mbar

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4. TEST EQUIPMENT

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	937	10/17/2013
Schwarzbeck	VULB 9168 / TRILOG Antenna	9168-200	02/19/2013
HD	MA240 / Antenna Position Tower	556	N/A
EMCO	1050 / Turn Table	114	N/A
HD GmbH	HD 100 / Controller	13	N/A
HD GmbH	KMS 560 / SlideBar	12	N/A
MITEQ	AMF-6D-001180-35-20P/ POWER AMP	990893	07/30/2013
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Rohde & Schwarz	FSP / Spectrum Analyzer	839117/011	02/09/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
HP	8498A / Attenuator	51161	12/26/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2013
Nang-Yeoul	NY-THR18750 / Temperature Chamber	NY-2009012201A	11/07/2013

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5. CONDUCTED OUTPUT POWER

5.1. Applicable Standard

According to FCC §2.1046 & 27.50(h)

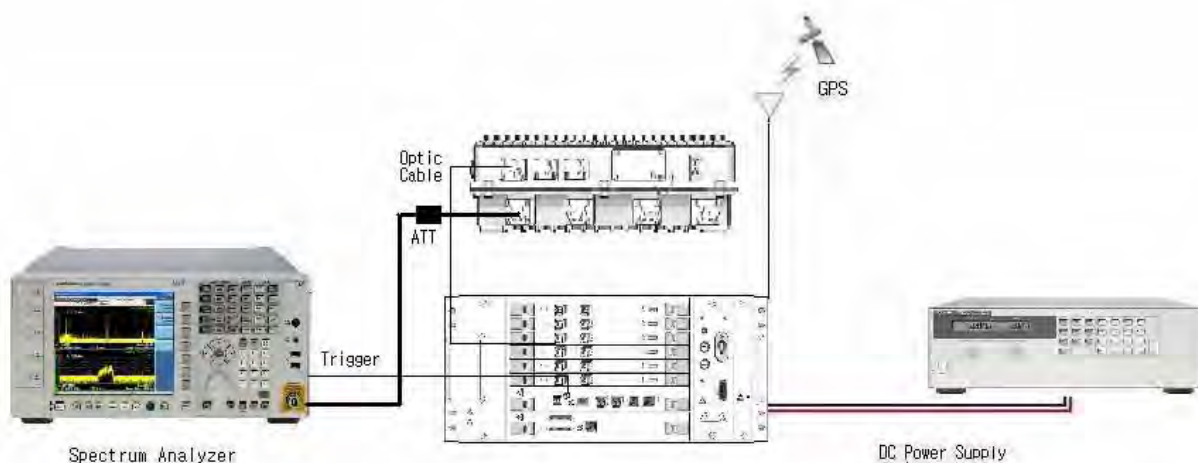
1) *Main, booster and base stations.* (i) The maximum EIRP of a main, booster or base station shall not exceed $33 \text{ dBW} + 10\log(X/Y) \text{ dBW}$, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

5.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
HP	8498A / Attenuator	51161	12/26/2012
WEINSCHTEL	AF9003-69-31 / Attenuator	11787	11/07/2013

5.3. Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.



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According to FCC §2.1046 (a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

- 1) The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The loss of the cables in the test system is calibrated to correct the reading.
- 2) The spectrum analyzer was set to RMS Detector function and Average mode.
- 3) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.

5.4. Test Result

: PASS

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5.4.1. Test Data at Output Port 1

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2506	39.92	9.8175	39.83	9.6161	39.76	9.4624
2592	39.93	9.8401	39.87	9.7051	39.95	9.8855
2680	39.89	9.7499	39.88	9.7275	39.85	9.6605

5.4.2. Test Data at Output Port 2

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2506	39.54	8.9950	39.59	9.0991	39.61	9.1411
2592	39.91	9.7949	39.95	9.8855	39.93	9.8401
2680	39.84	9.6383	39.80	9.5499	39.82	9.5940

5.4.3. Test Data at Output Port 3

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2506	39.80	9.5499	39.89	9.7499	39.94	9.8628
2592	40.23	10.5439	40.29	10.6906	40.20	10.4713
2680	40.12	10.2802	40.13	10.3039	40.26	10.6170

5.4.4. Test Data at Output Port 4

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2506	39.69	9.3111	39.75	9.4406	39.80	9.5499
2592	39.98	9.9541	40.03	10.0693	40.01	10.0231
2680	39.91	9.7949	39.87	9.7051	39.97	9.9312

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5.4.5. Measure and sum data (4 Ports)

Frequency (MHz)	Output Power (W)		
	QPSK	16QAM	64QAM
2506	37.6735	37.9057	38.0162
2592	40.1330	40.3505	40.2200
2680	39.4633	39.2864	39.8027

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5.4.6. Plot Data for Output Port 1 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)

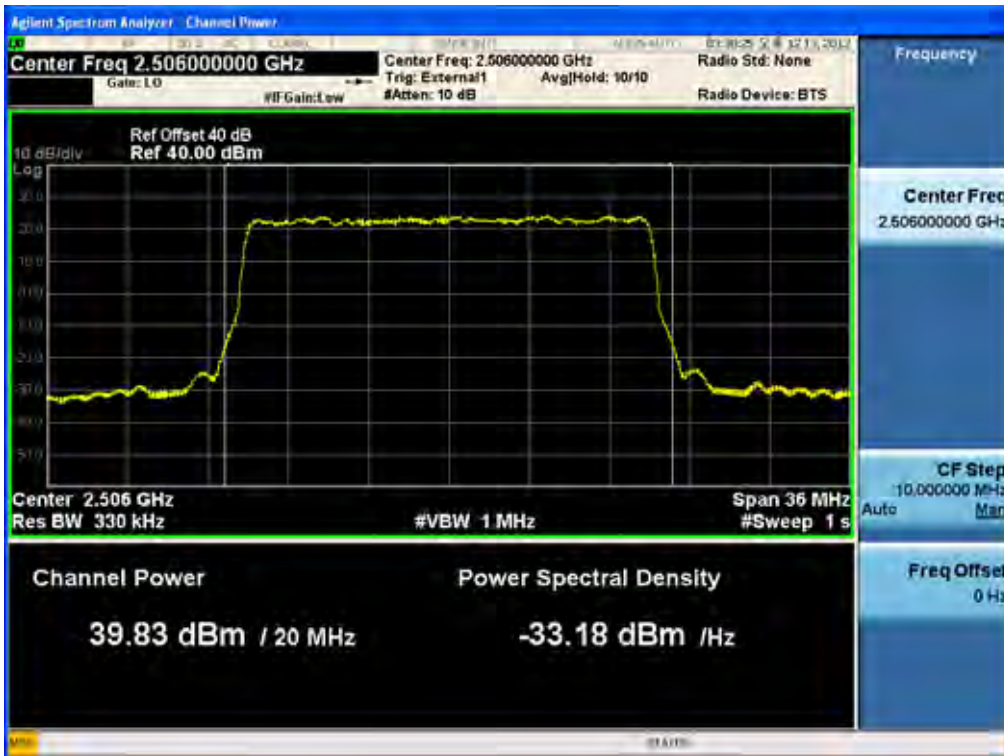


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(QPSK High Channel)



(16QAM Low Channel)



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(16QAM Middle Channel)

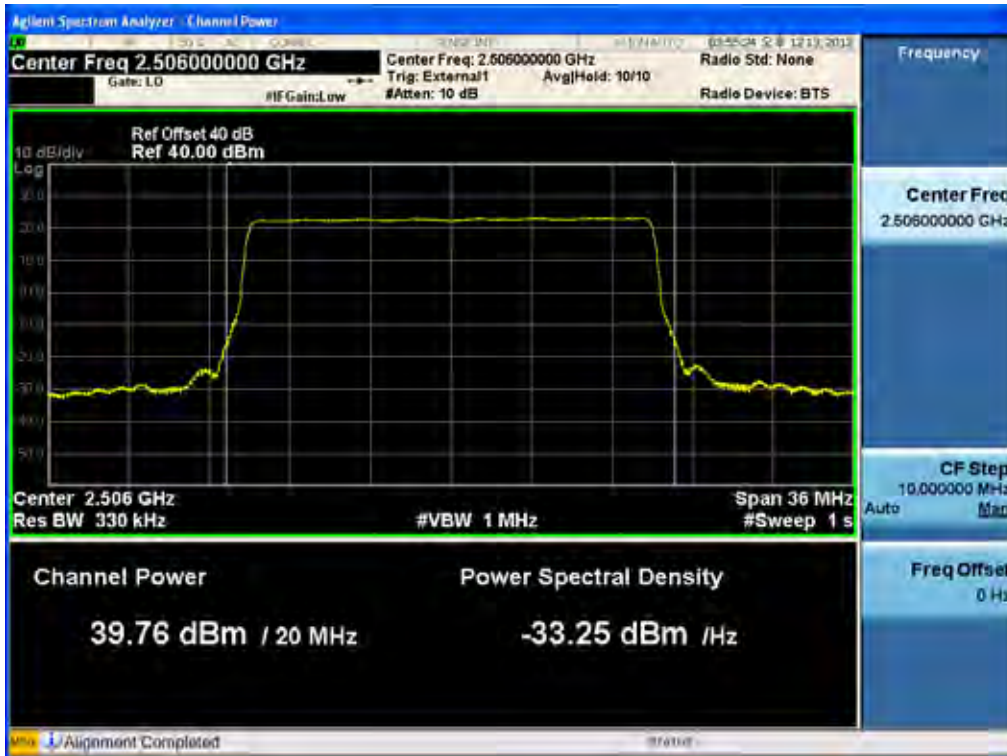


(16QAM High Channel)

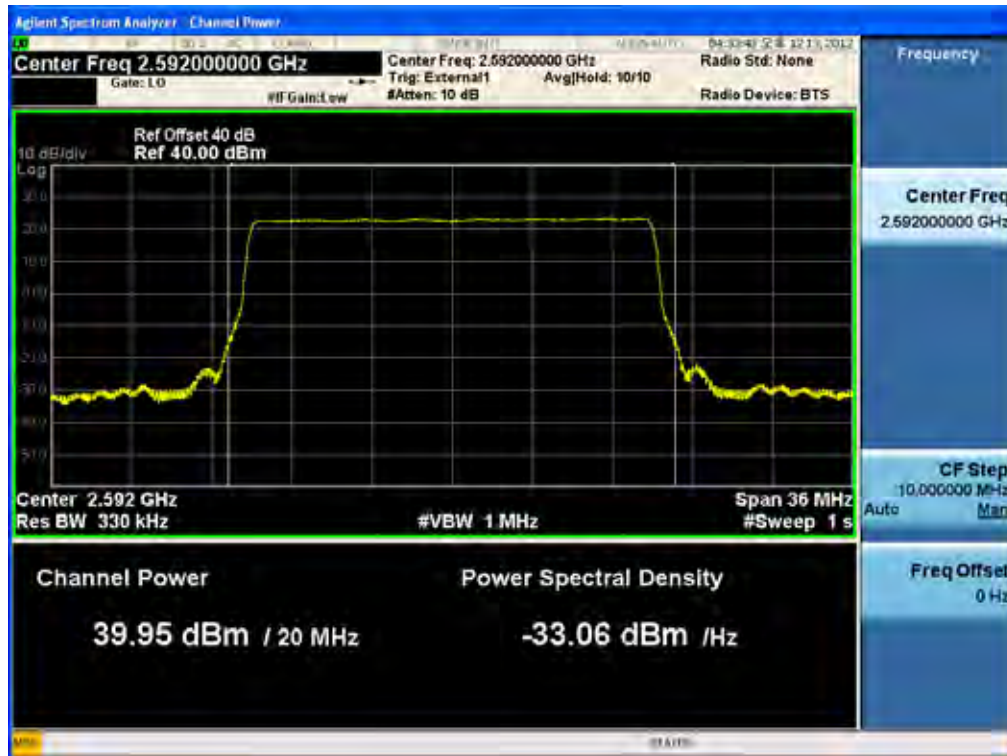


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(64QAM Low Channel)

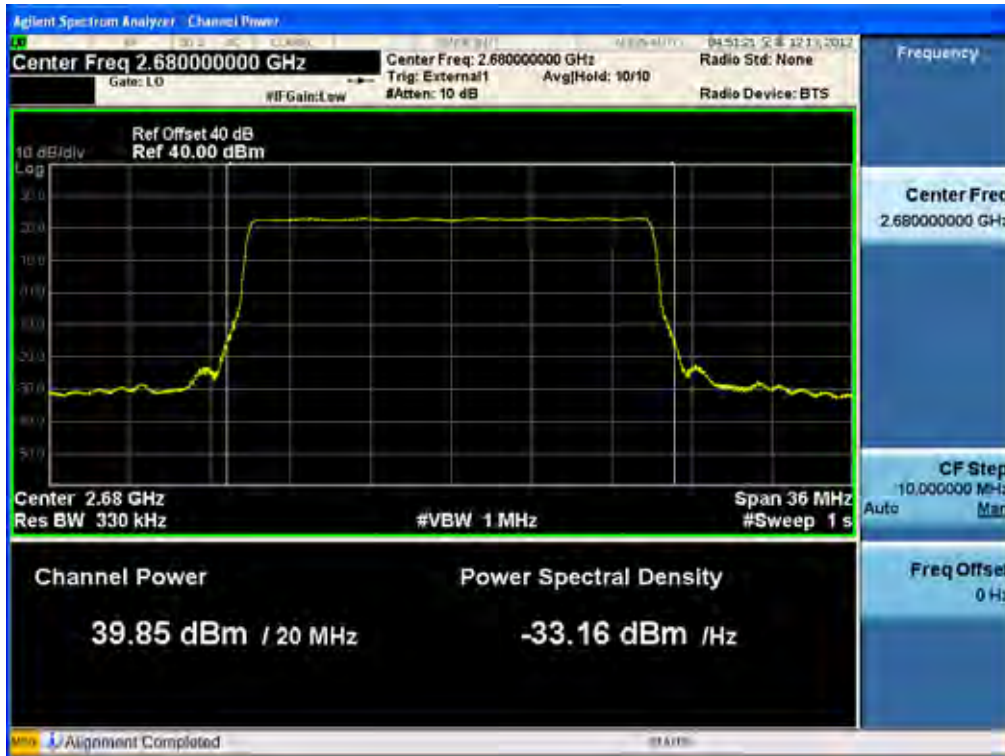


(64QAM Middle Channel)



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(64QAM High Channel)



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5.4.7. Plot Data for Output Port 2 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)



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(QPSK High Channel)



(16QAM Low Channel)



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(16QAM Middle Channel)



(16QAM High Channel)



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(64QAM Low Channel)

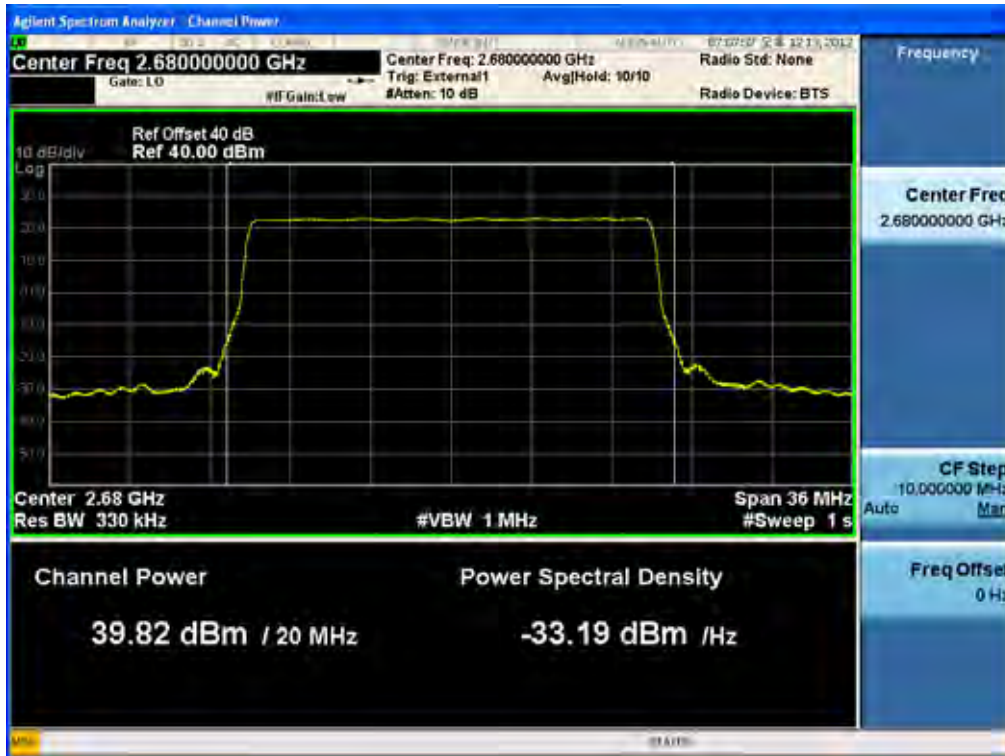


(64QAM Middle Channel)



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(64QAM High Channel)



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5.4.8. Plot Data for Output Port 3 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)



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(QPSK High Channel)

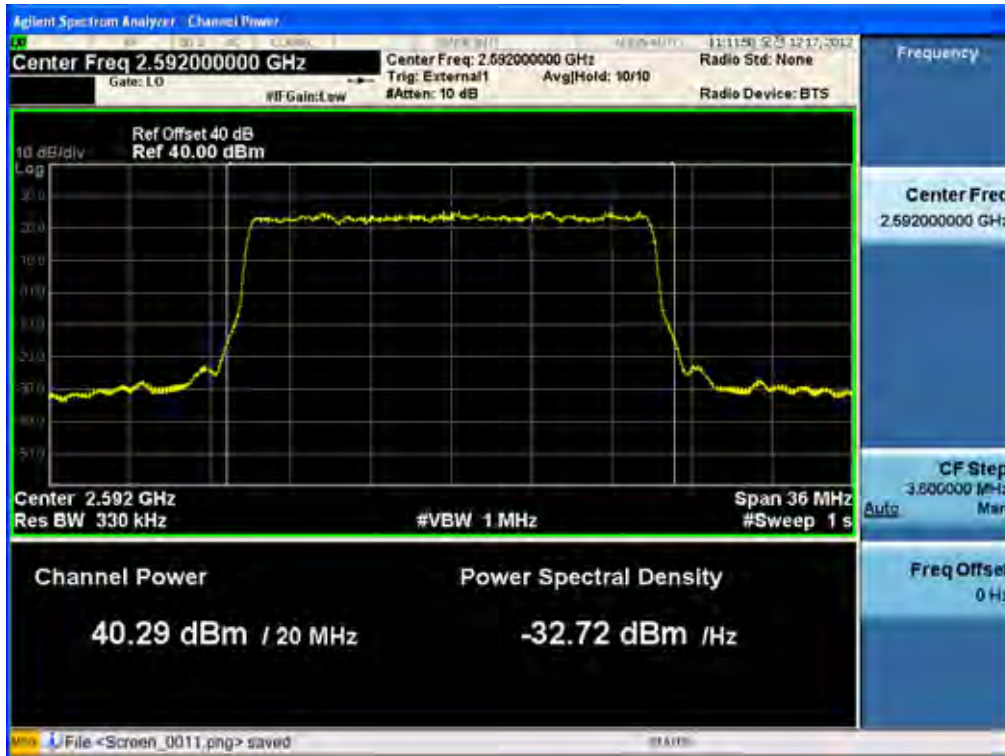


(16QAM Low Channel)



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(16QAM Middle Channel)

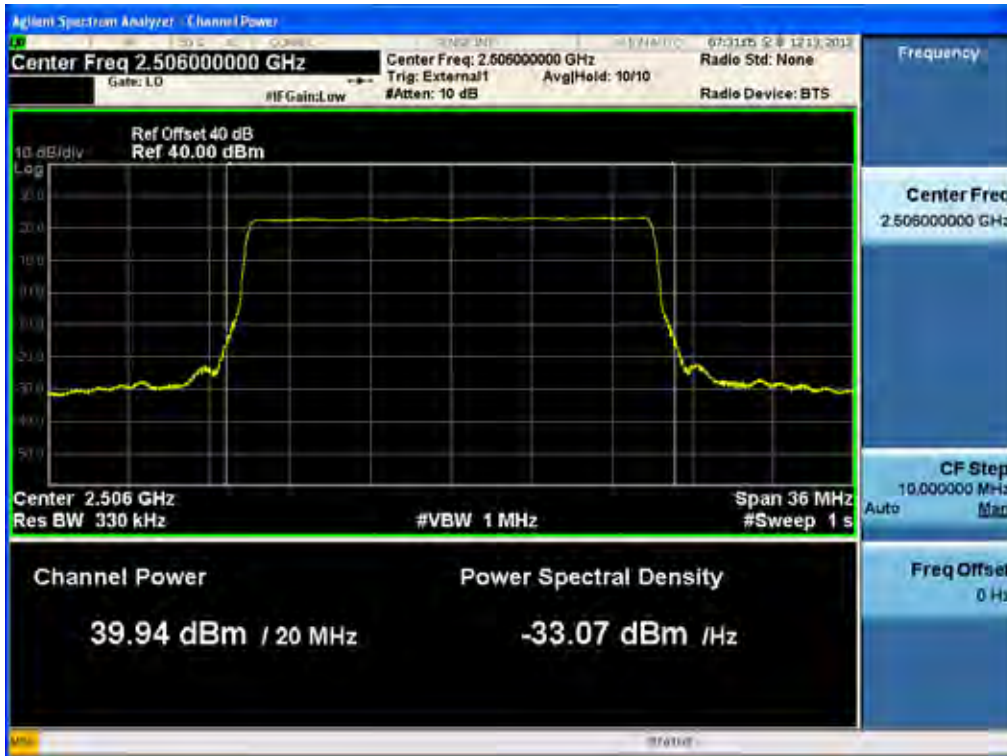


(16QAM High Channel)

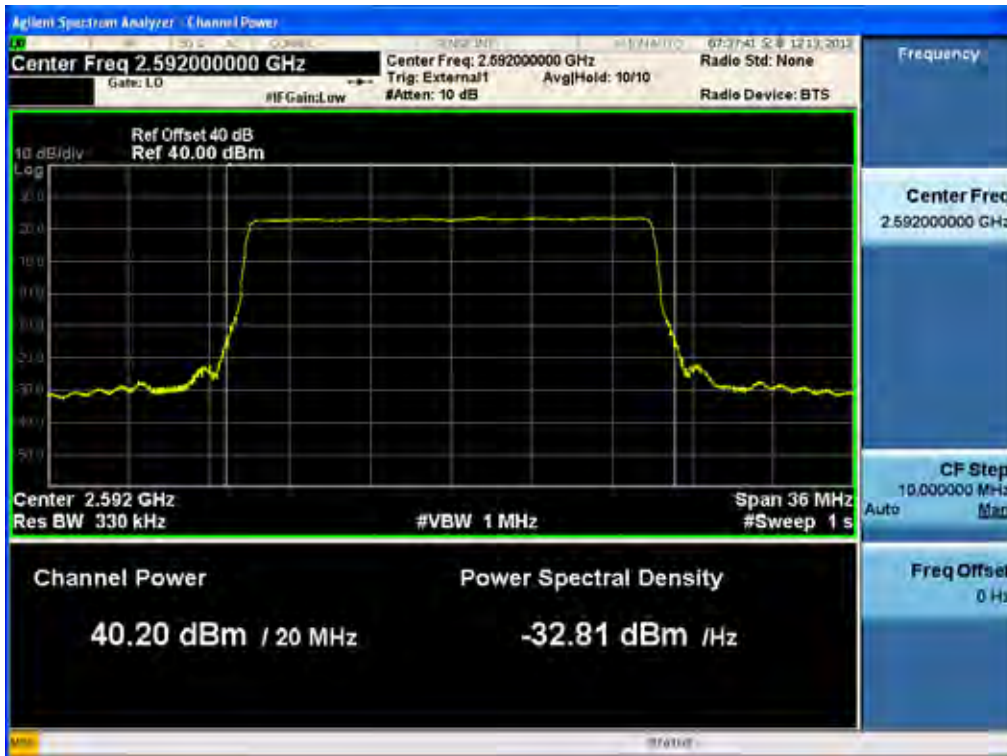


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(64QAM Low Channel)

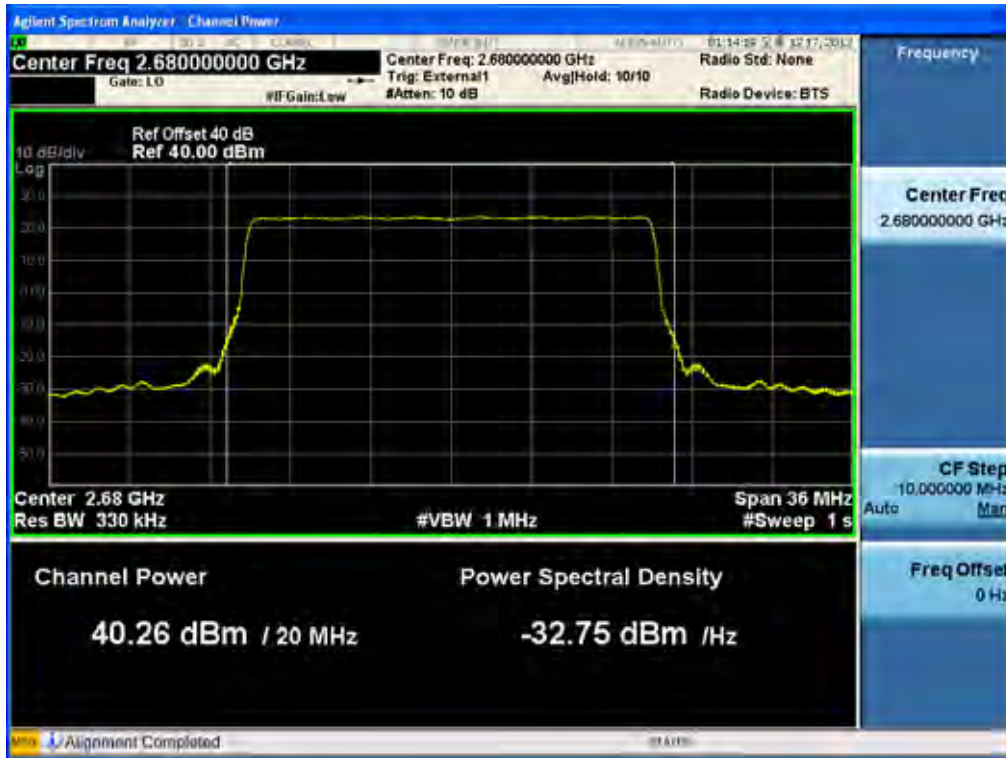


(64QAM Middle Channel)



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5.4.9. Plot Data for Output Port 4 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)



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(QPSK High Channel)

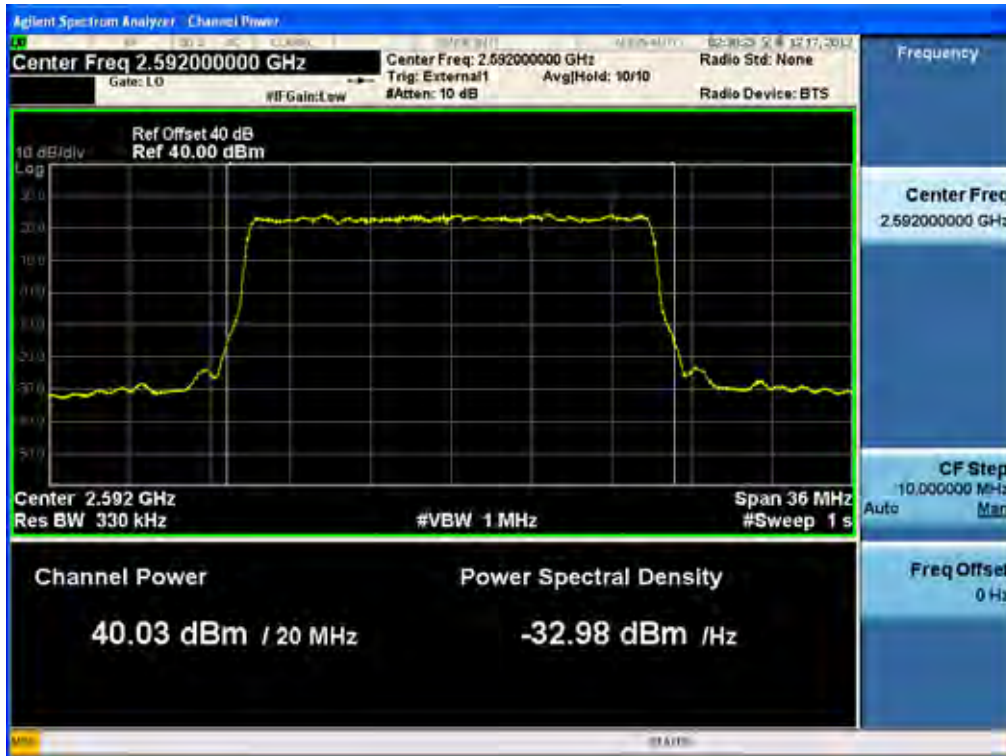


(16QAM Low Channel)



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(16QAM Middle Channel)



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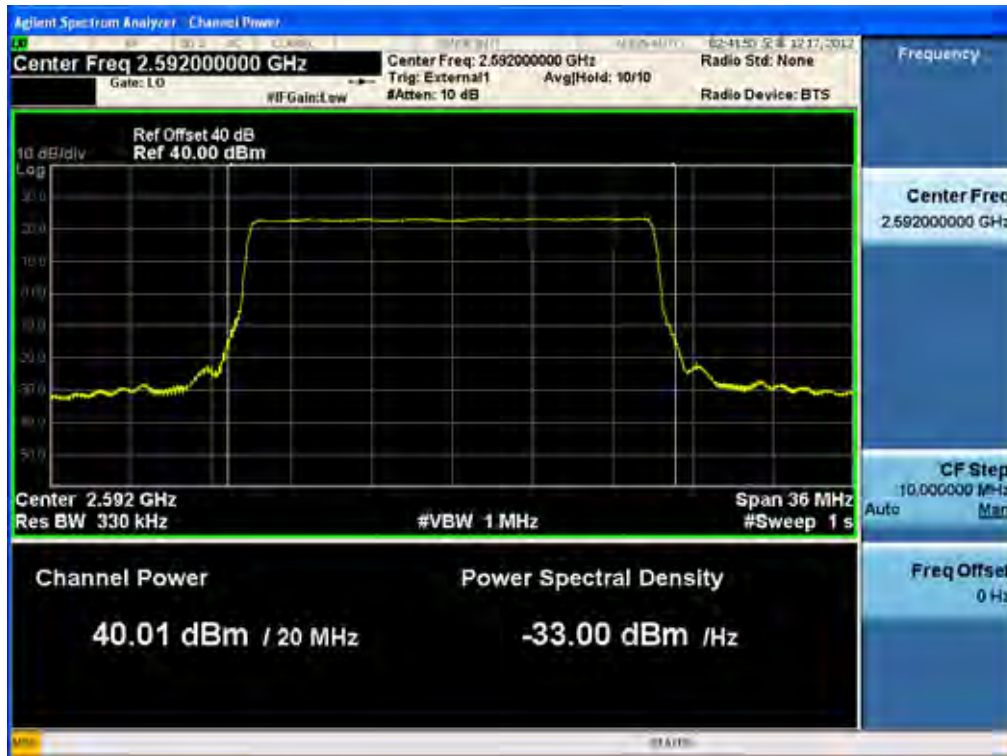


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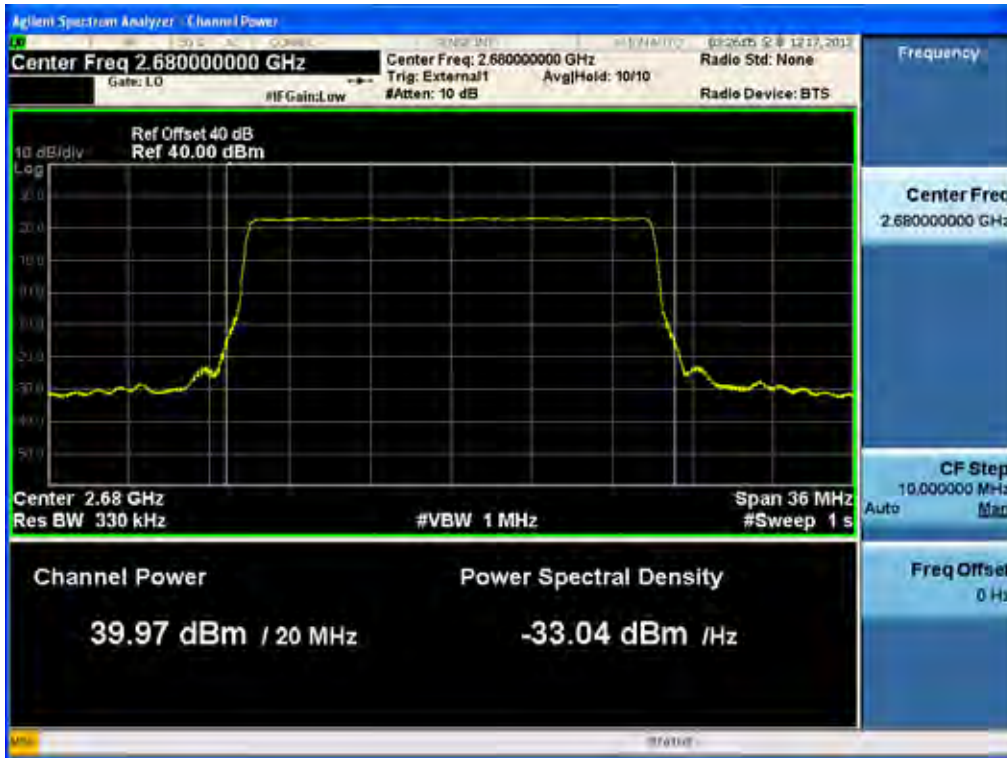


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(64QAM High Channel)



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6. OCCUPIED BANDWIDTH

6.1. Applicable Standard

Requirements: CFR 47, Section 27.53(m)(6) Measurement procedure. Compliance with these rules 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

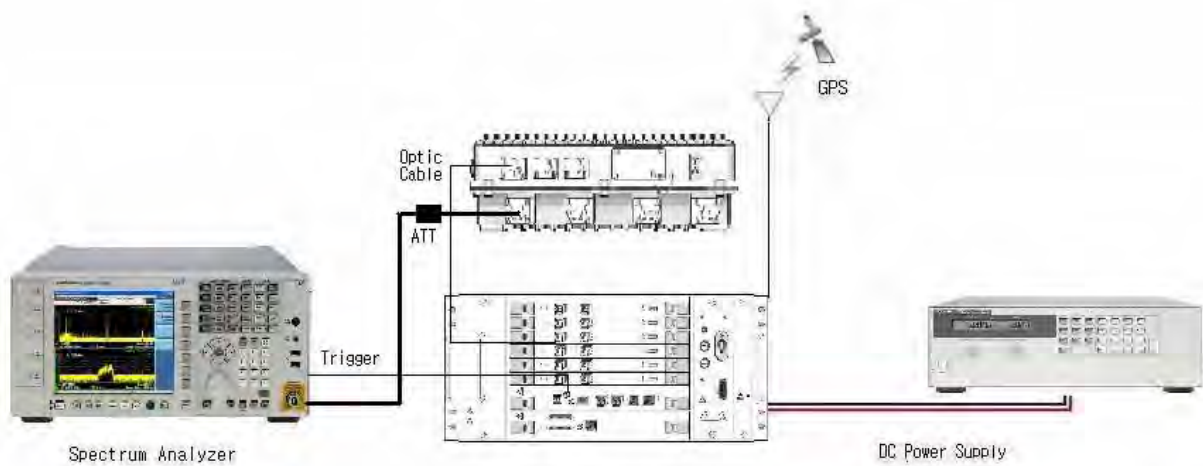
6.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
HP	8498A / Attenuator	51161	12/26/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2013

6.3. Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. The EUT was connected to a spectrum analyzer enabled with an occupied bandwidth function via its antenna port. Measurements were performed to determine the occupied bandwidth in accordance with FCC Part 2.1049. The occupied bandwidth was measured from the fundamental emission at the bottom, middle and top channels. The occupied bandwidth was measured using the built in occupied bandwidth function of the spectrum analyzer. It was set to measure the bandwidth where 99% of the signal power was contained. The analyzer automatically configures the measurement bandwidths to make an accurate measurement based on the channel bandwidth and channel spacing of the EUT.

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6.4. Test Result
: PASS

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6.4.1. Test Data at Output Port 1

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2506	17.786	17.776	17.905
2592	17.776	17.803	17.905
2680	17.742	17.778	17.907

6.4.2. Test Data at Output Port 2

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2506	17.800	17.803	17.907
2592	17.737	17.825	17.903
2680	17.787	17.814	17.907

6.4.3. Test Data at Output Port 3

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2506	17.661	17.814	17.902
2592	17.761	17.792	17.910
2680	17.769	17.797	17.903

6.4.4. Test Data at Output Port 4

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2506	17.831	17.877	17.935
2592	17.877	17.864	17.943
2680	17.710	17.848	17.917

6.4.5. Test Plot at Output Port 1

(QPSK Low Channel)



(QPSK Middle Channel)



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(QPSK High Channel)

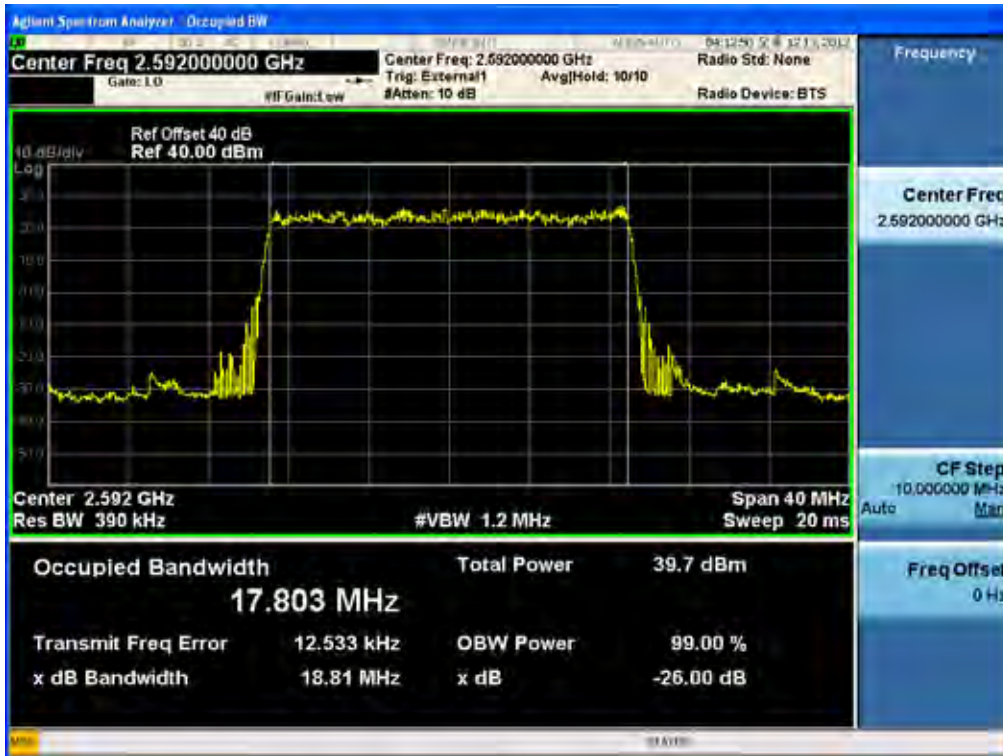


(16QAM Low Channel)

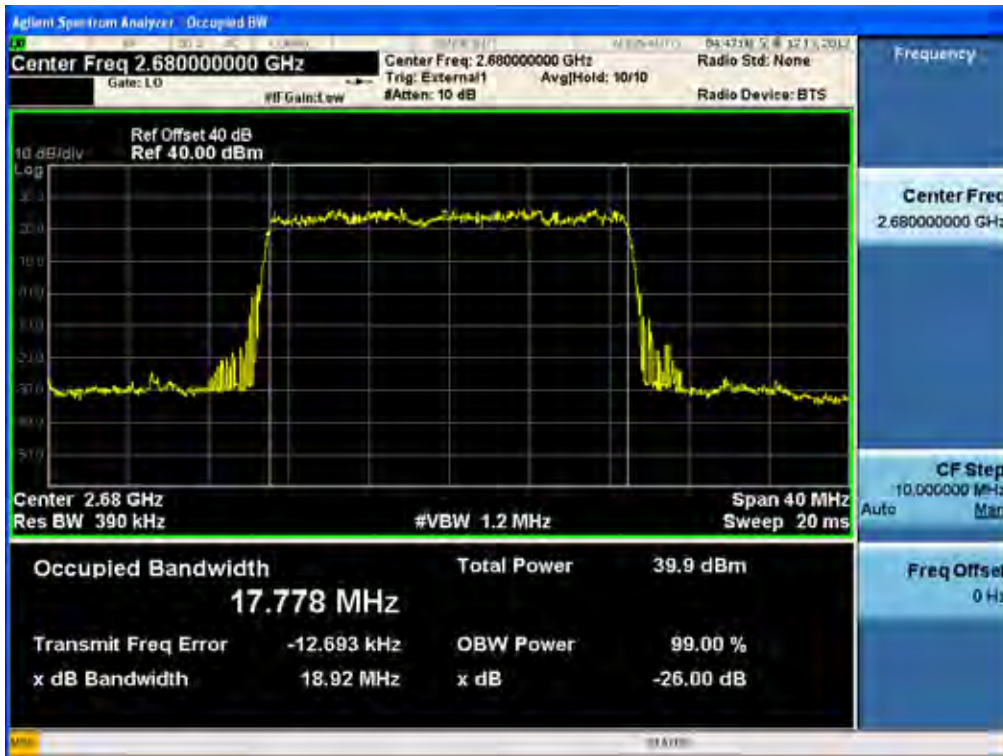


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(16QAM Middle Channel)

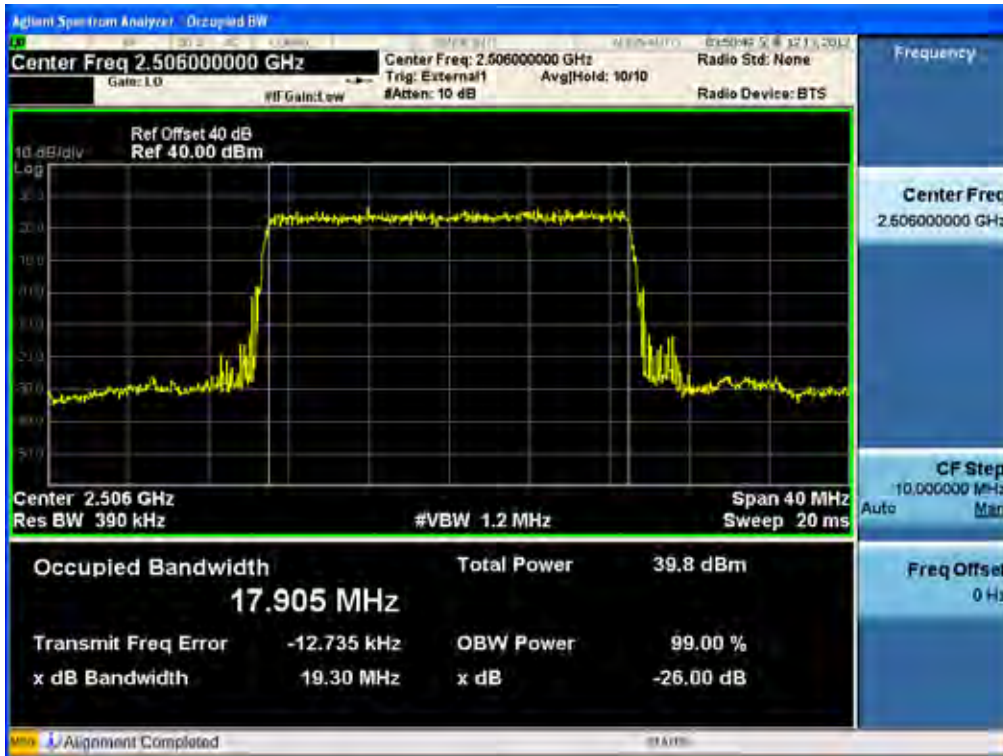


(16QAM High Channel)

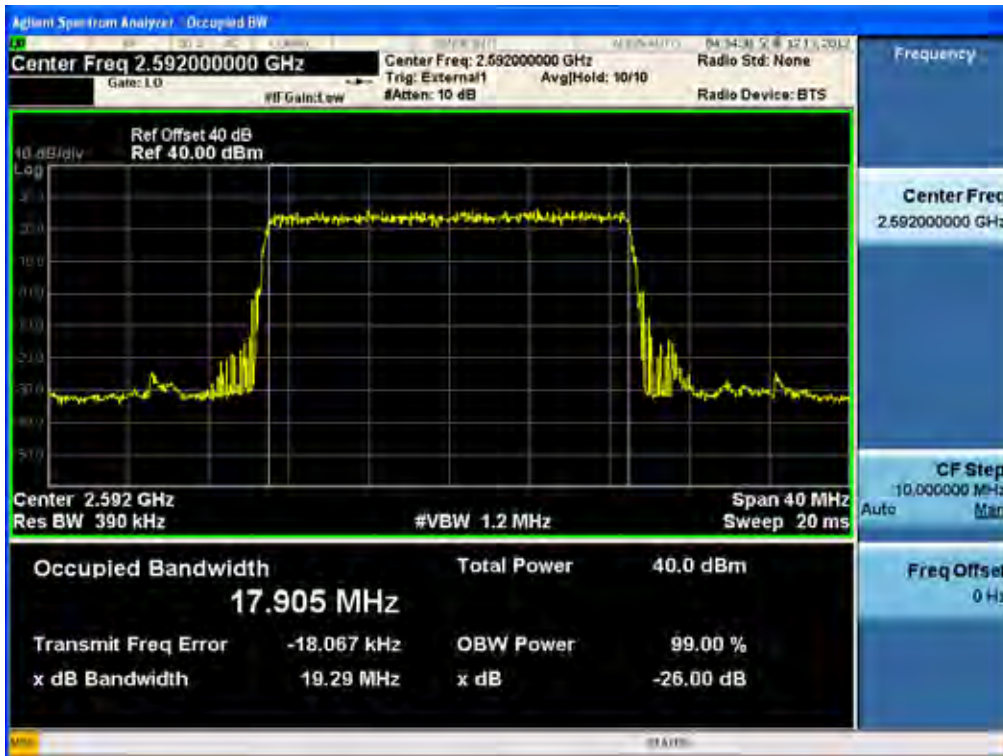


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 39 of 116

(64QAM Low Channel)

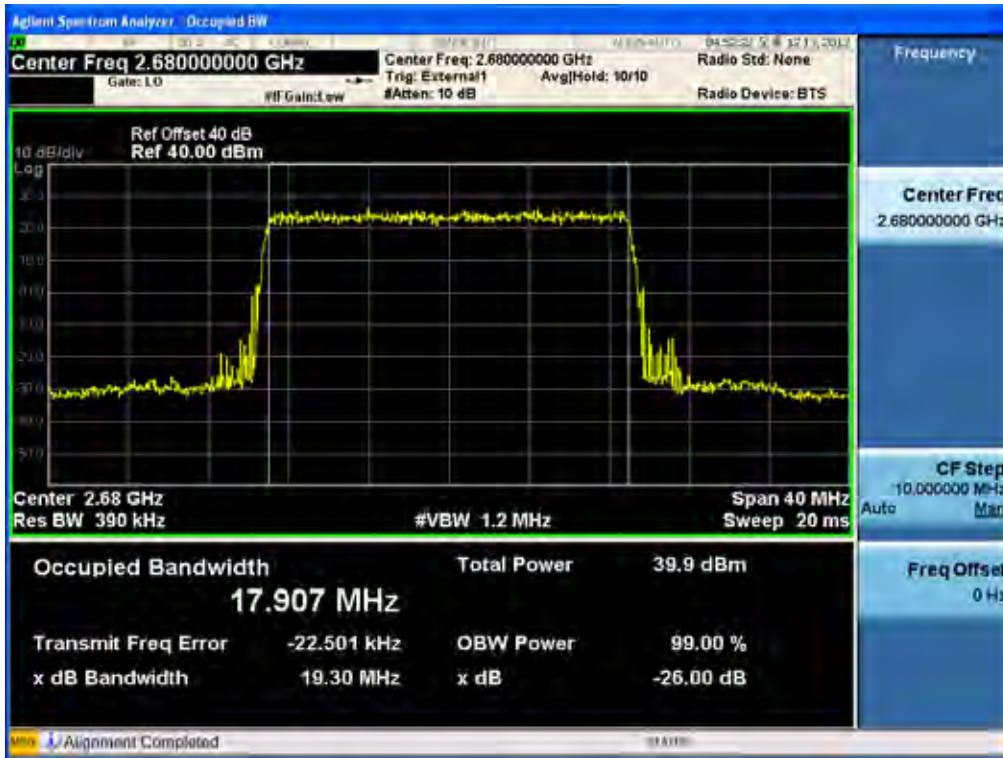


(64QAM Middle Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(64QAM High Channel)



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6.4.6. Test Plot at Output Port 2

(QPSK Low Channel)

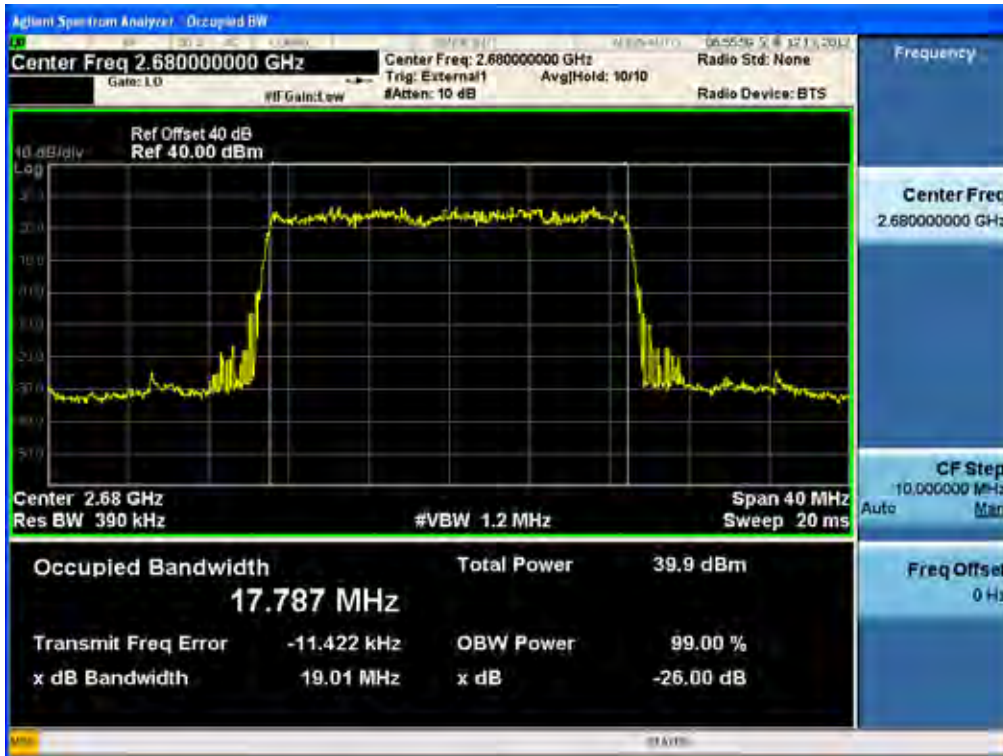


(QPSK Middle Channel)

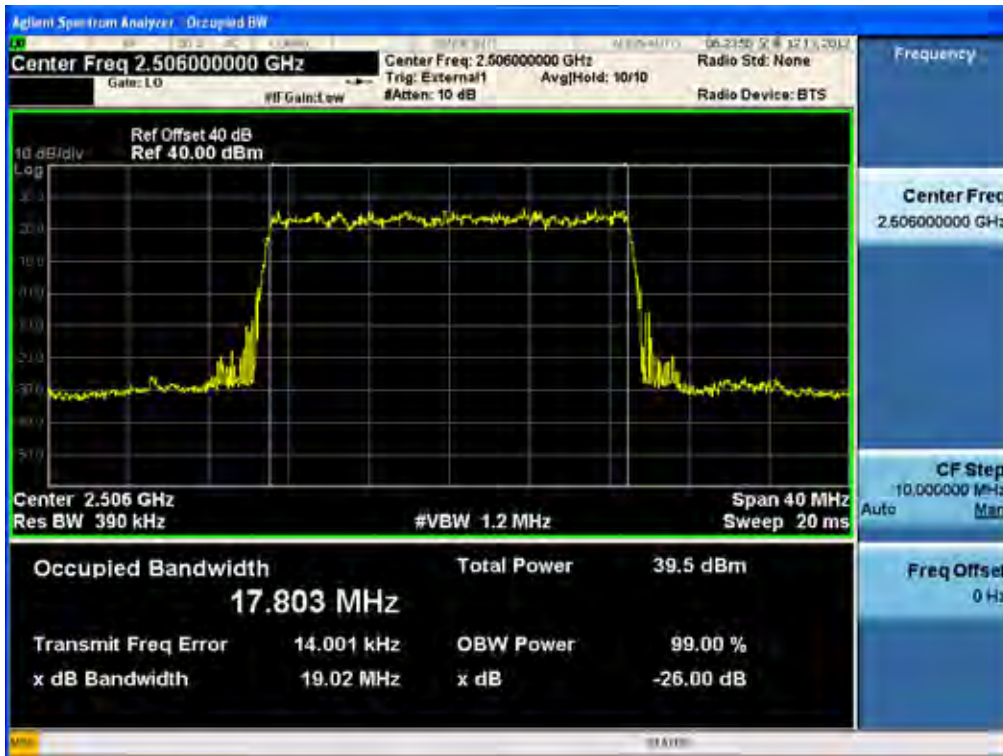


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 42 of 116

(QPSK High Channel)

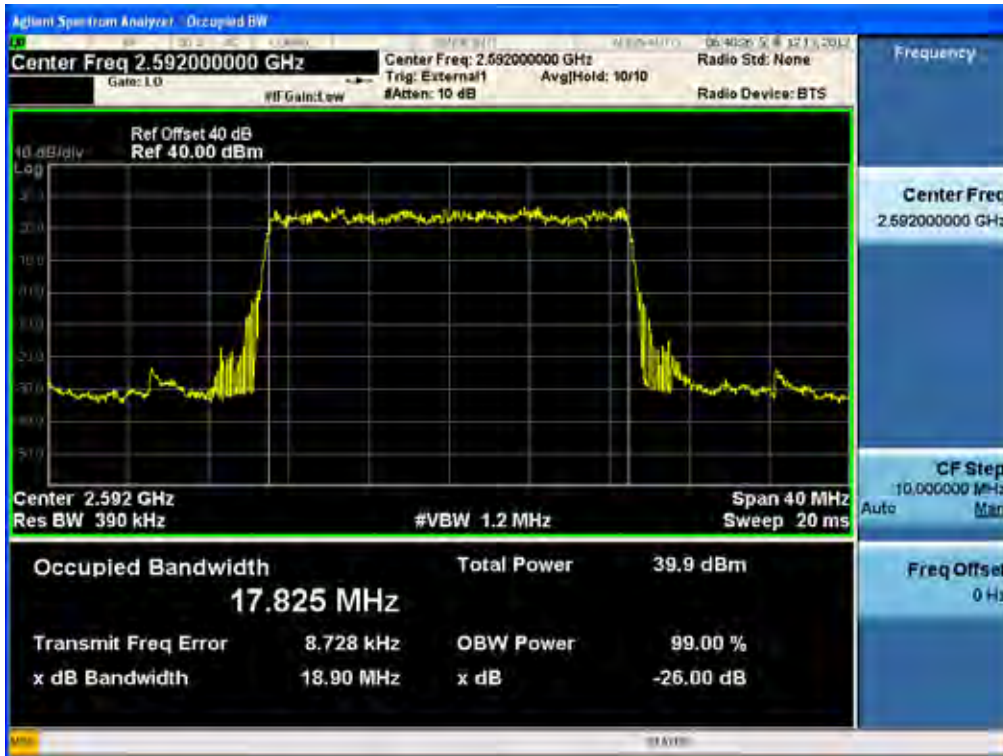


(16QAM Low Channel)

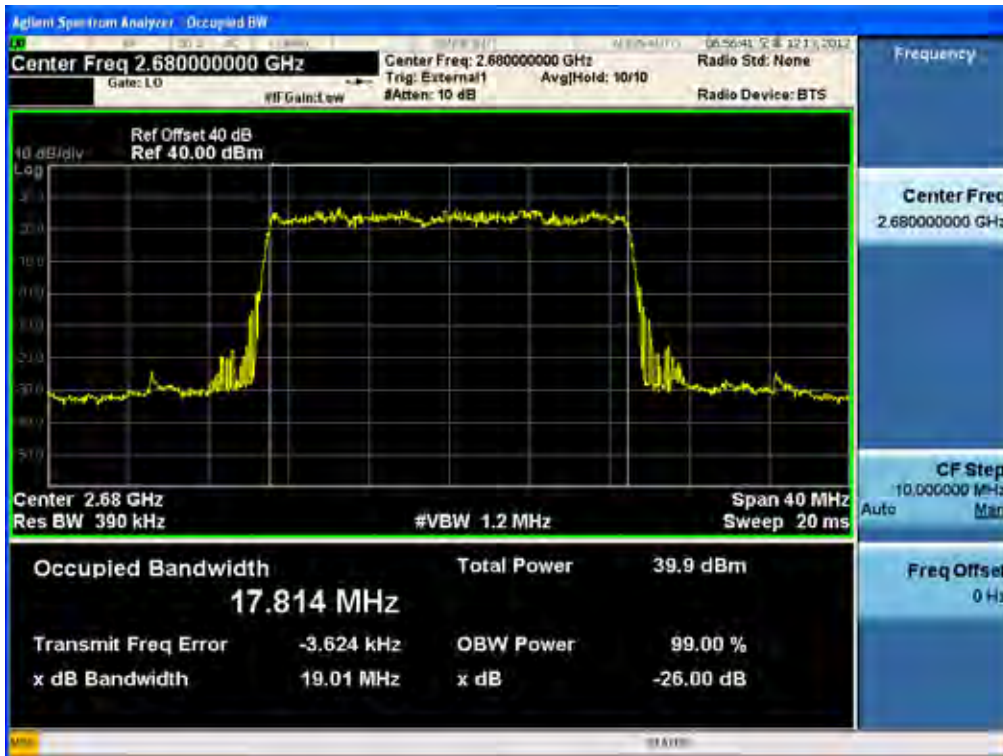


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 43 of 116

(16QAM Middle Channel)

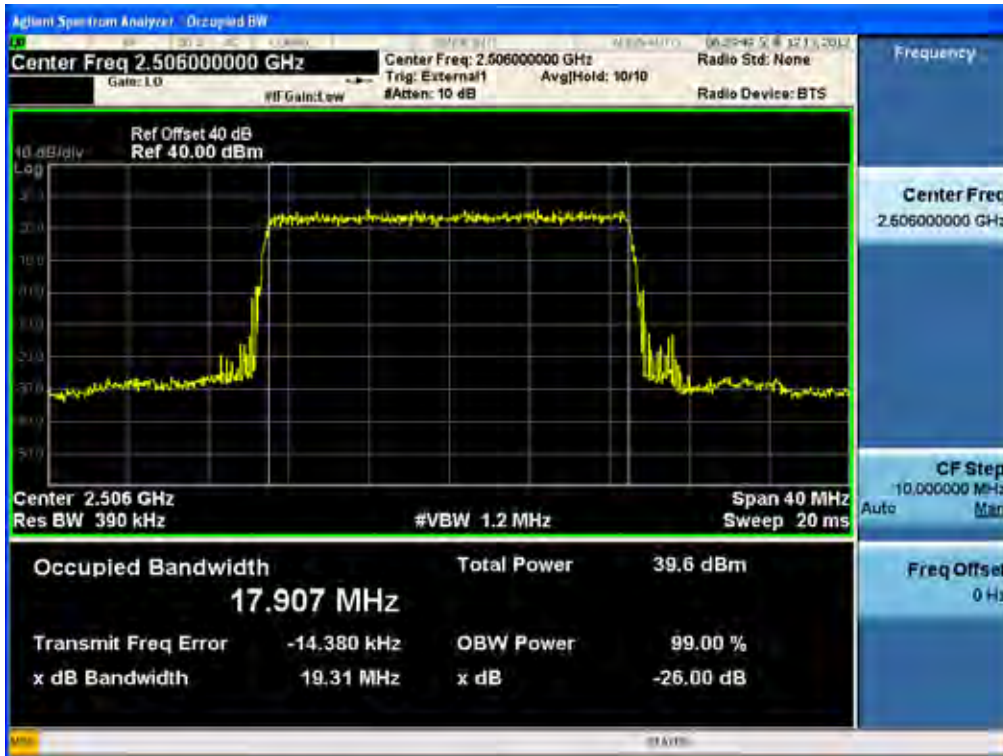


(16QAM High Channel)

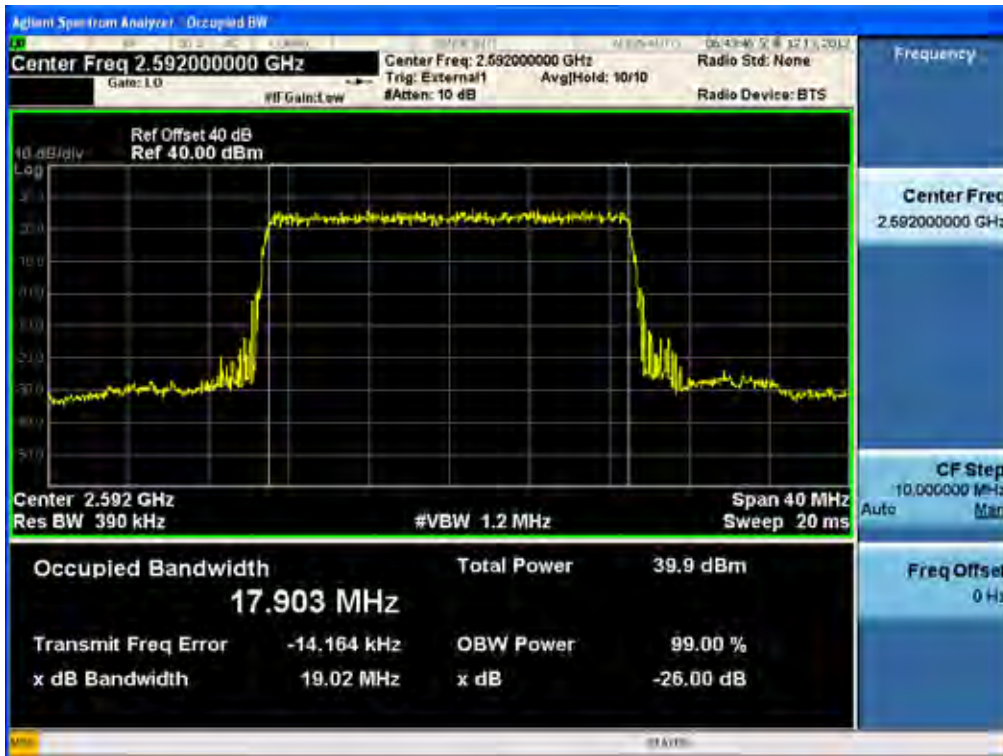


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 44 of 116

(64QAM Low Channel)

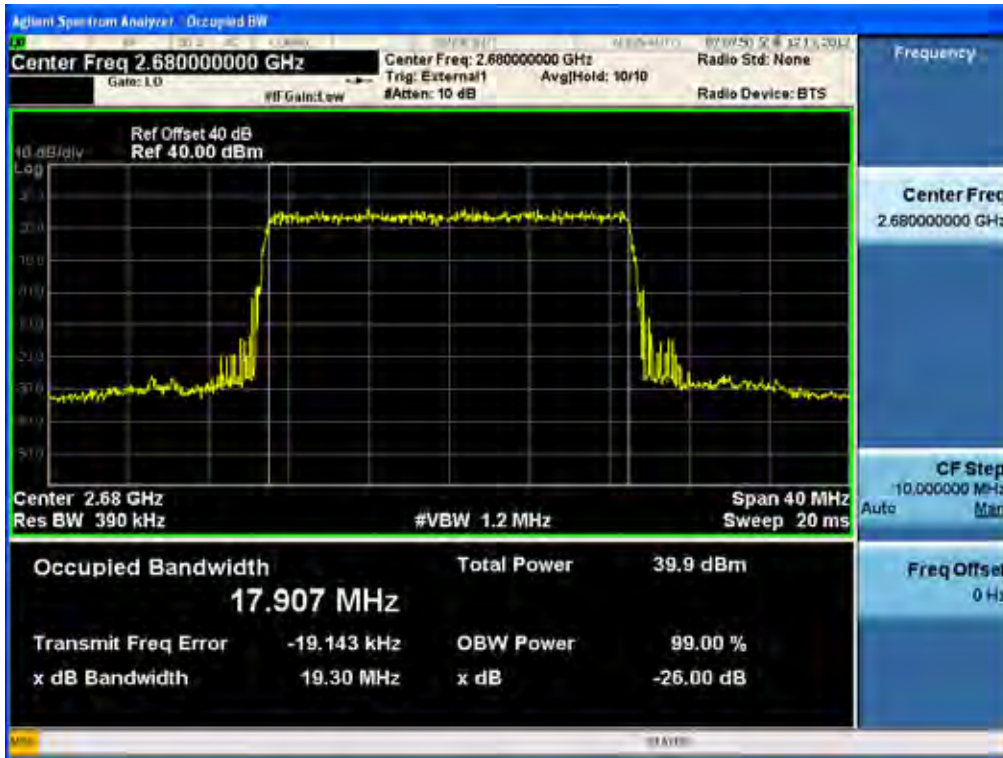


(64QAM Middle Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(64QAM High Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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6.4.7. Test Plot at Output Port 3

(QPSK Low Channel)

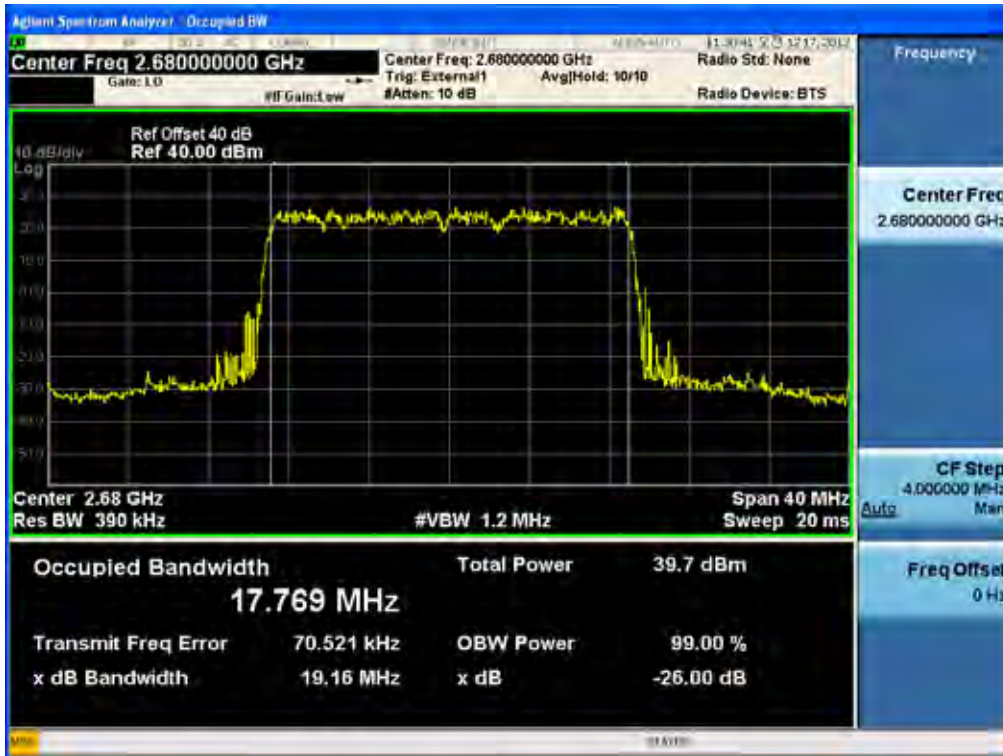


(QPSK Middle Channel)

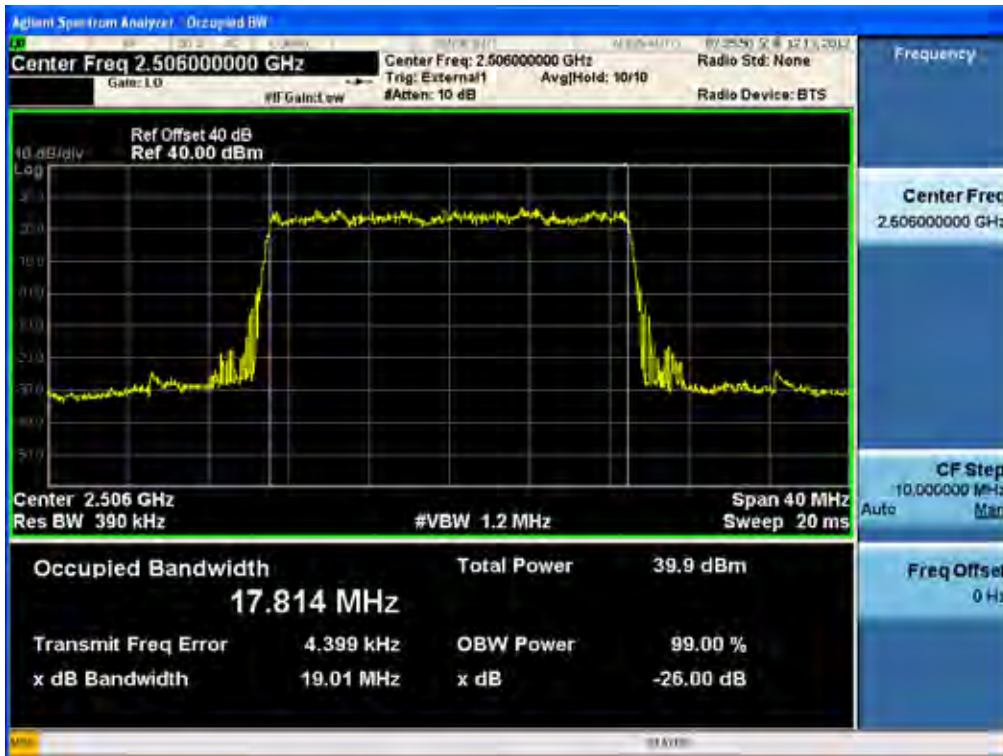


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 47 of 116

(QPSK High Channel)

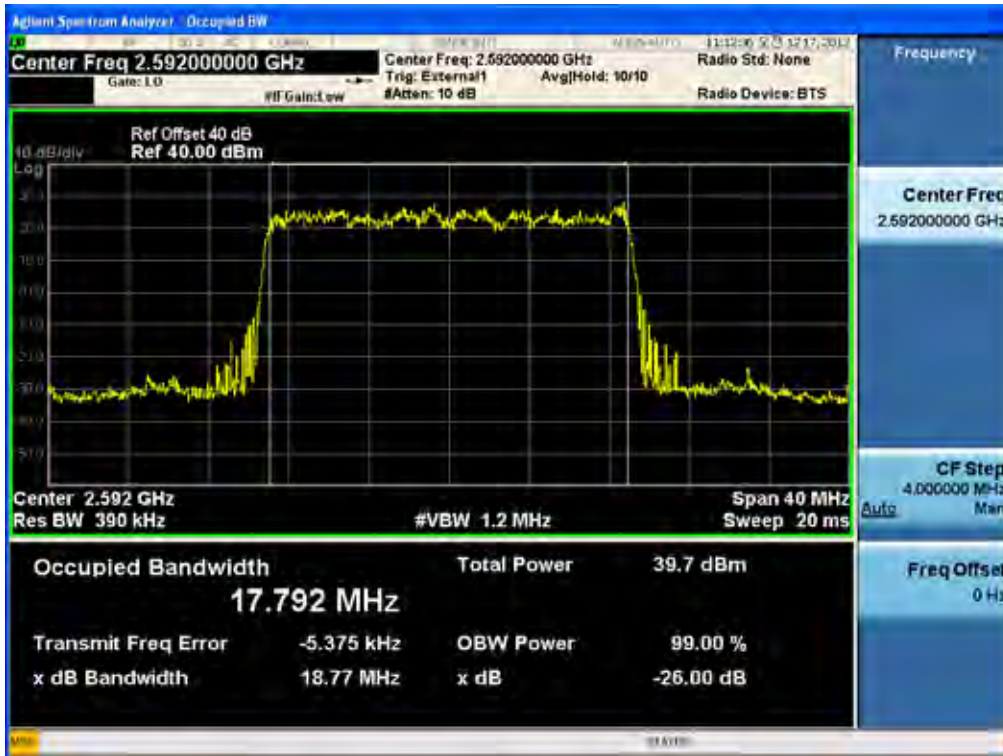


(16QAM Low Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(16QAM Middle Channel)

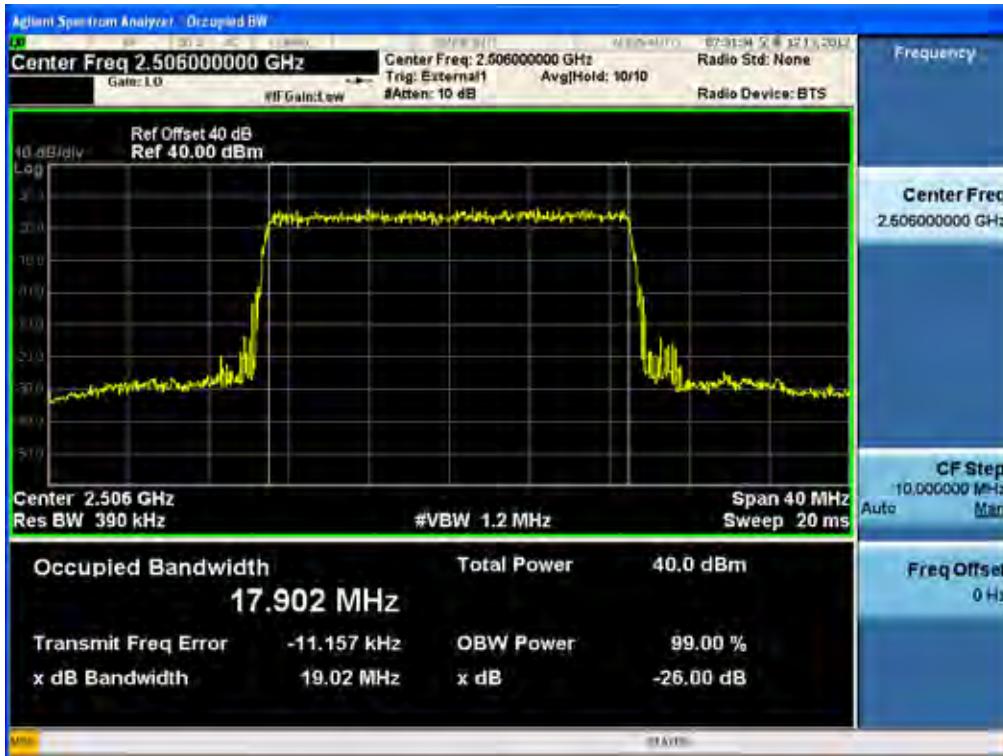


(16QAM High Channel)

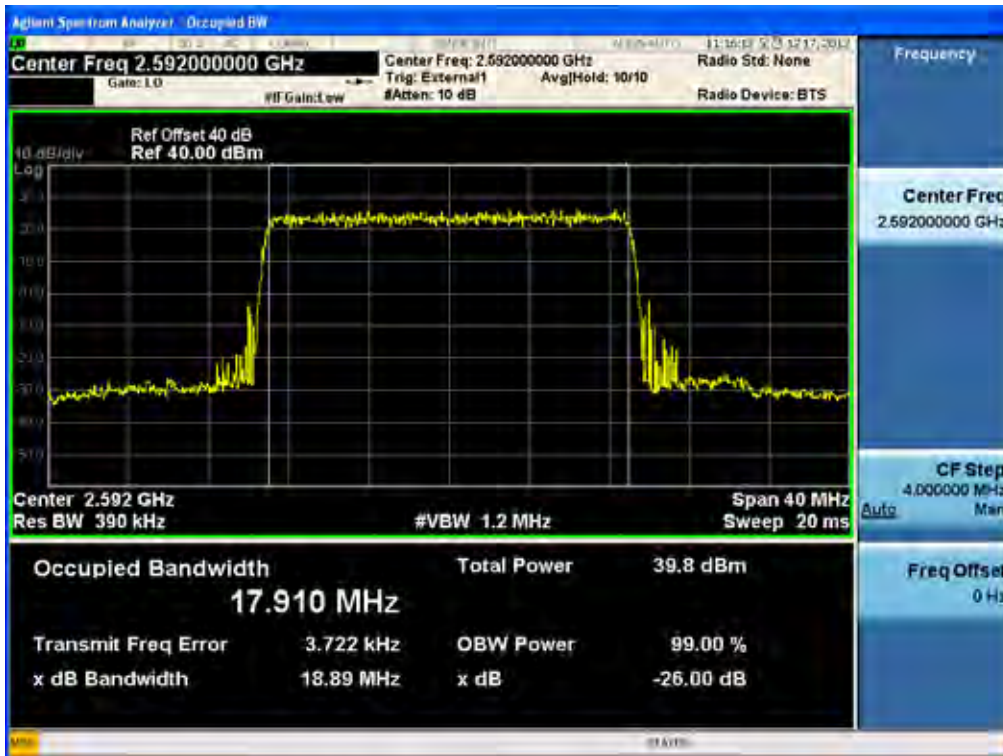


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 49 of 116

(64QAM Low Channel)

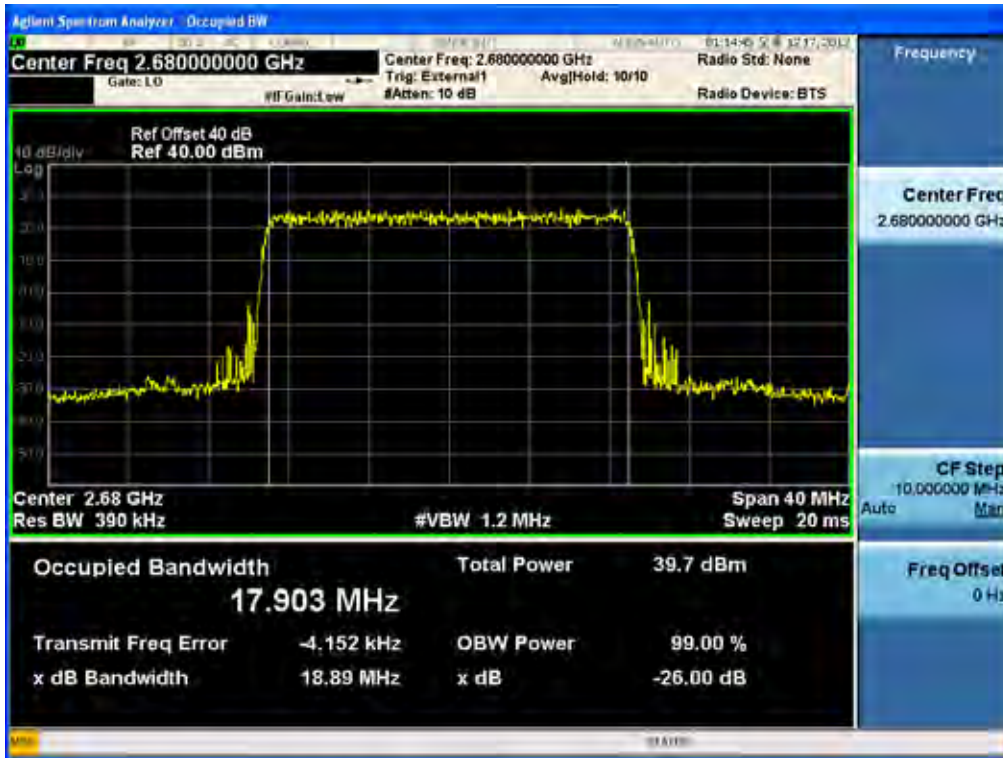


(64QAM Middle Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 50 of 116

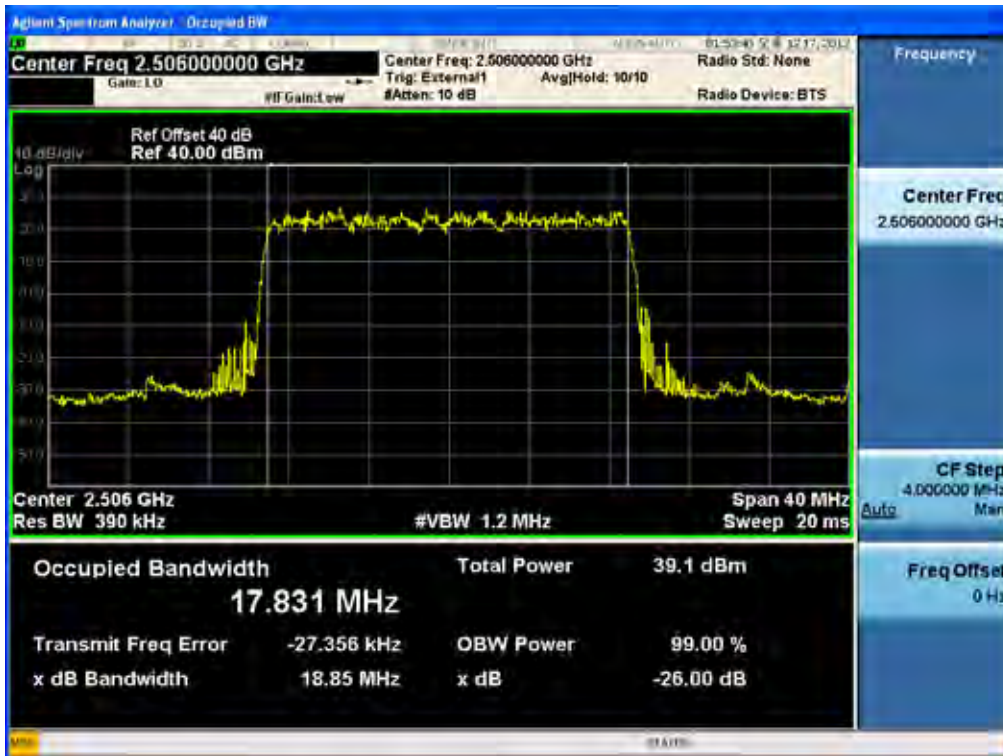
(64QAM High Channel)



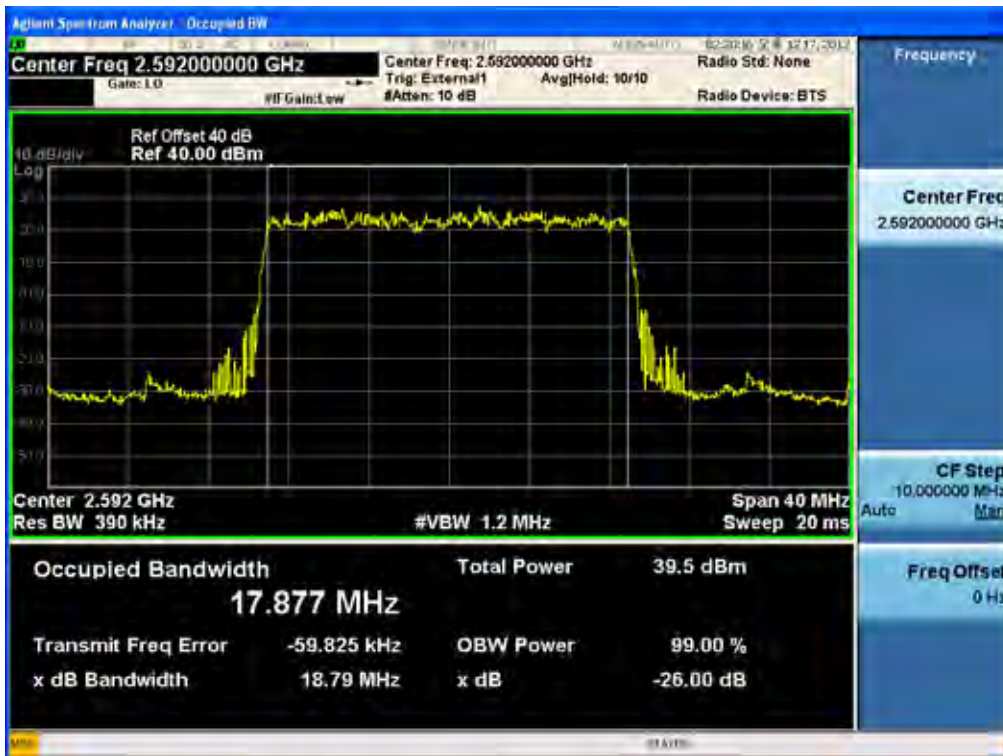
FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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6.4.8. Test Plot at Output Port 4

(QPSK Low Channel)

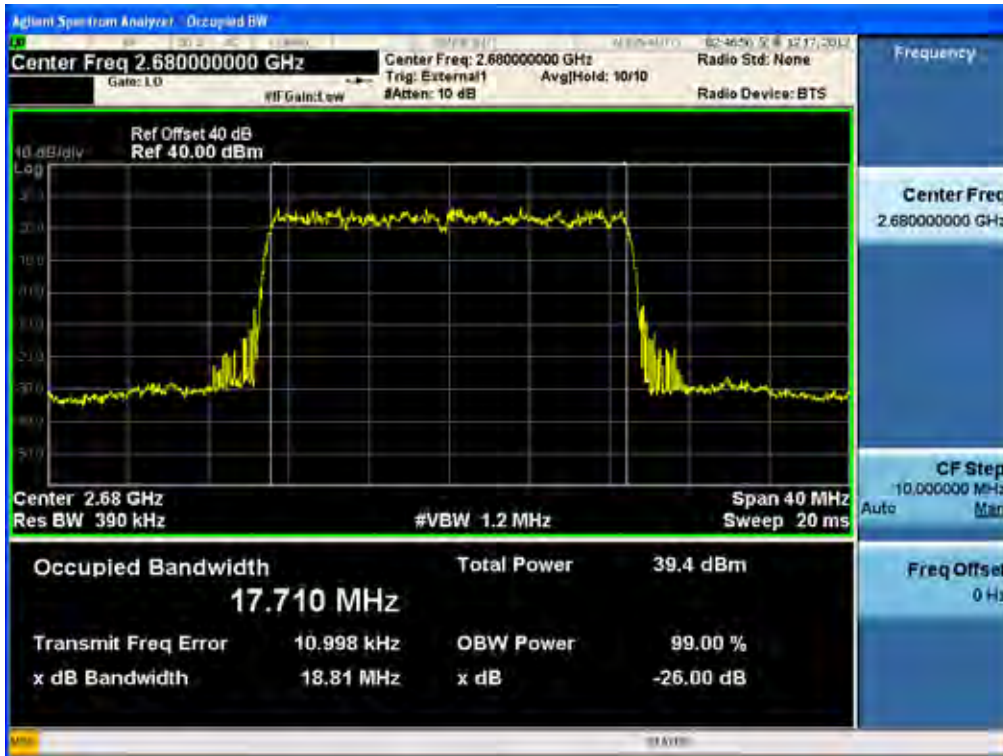


(QPSK Middle Channel)

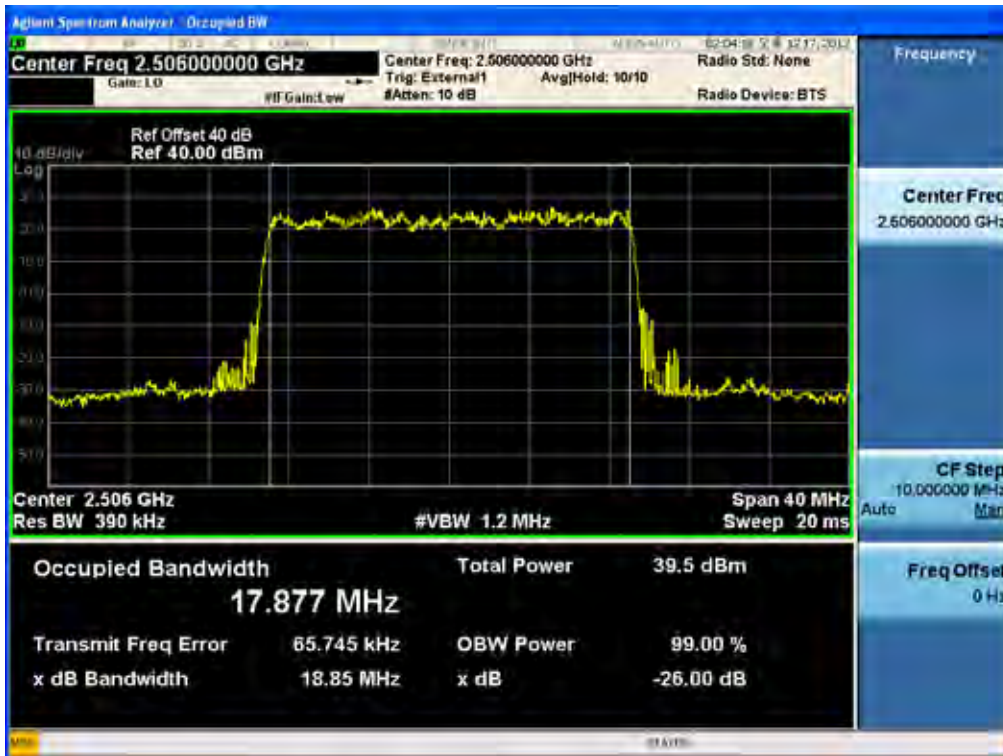


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(QPSK High Channel)

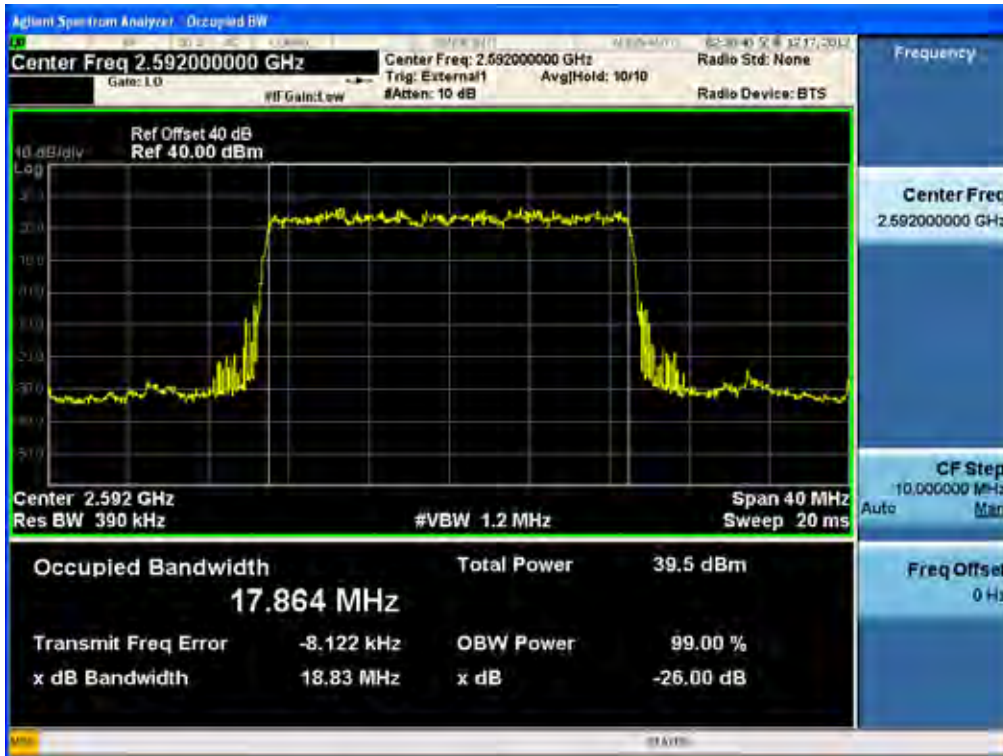


(16QAM Low Channel)

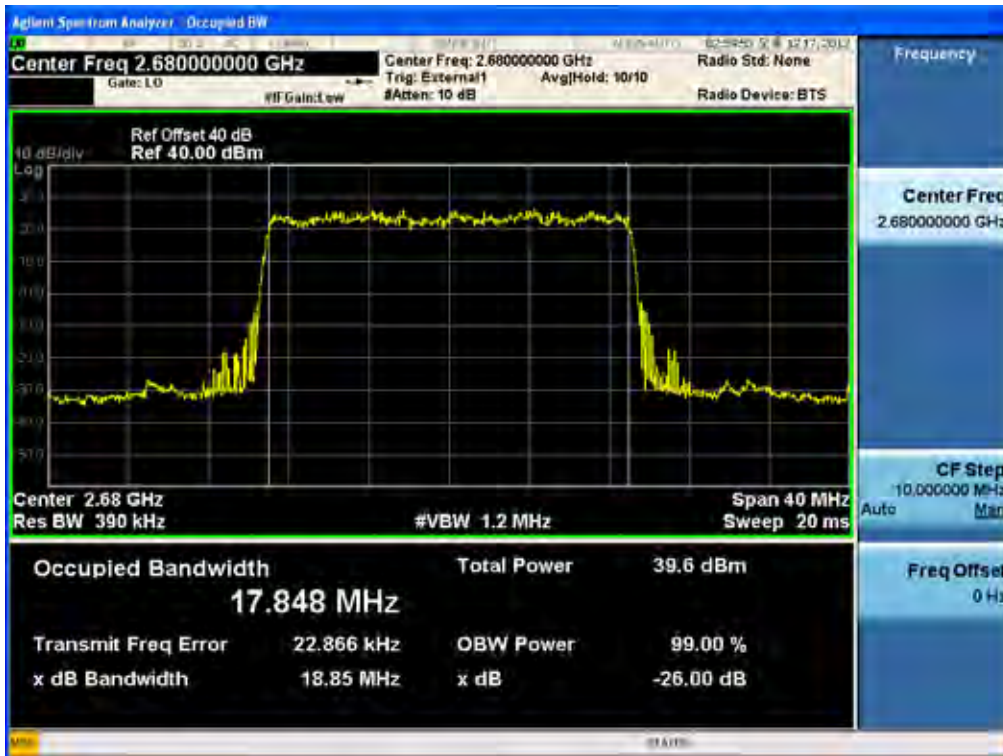


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(16QAM Middle Channel)

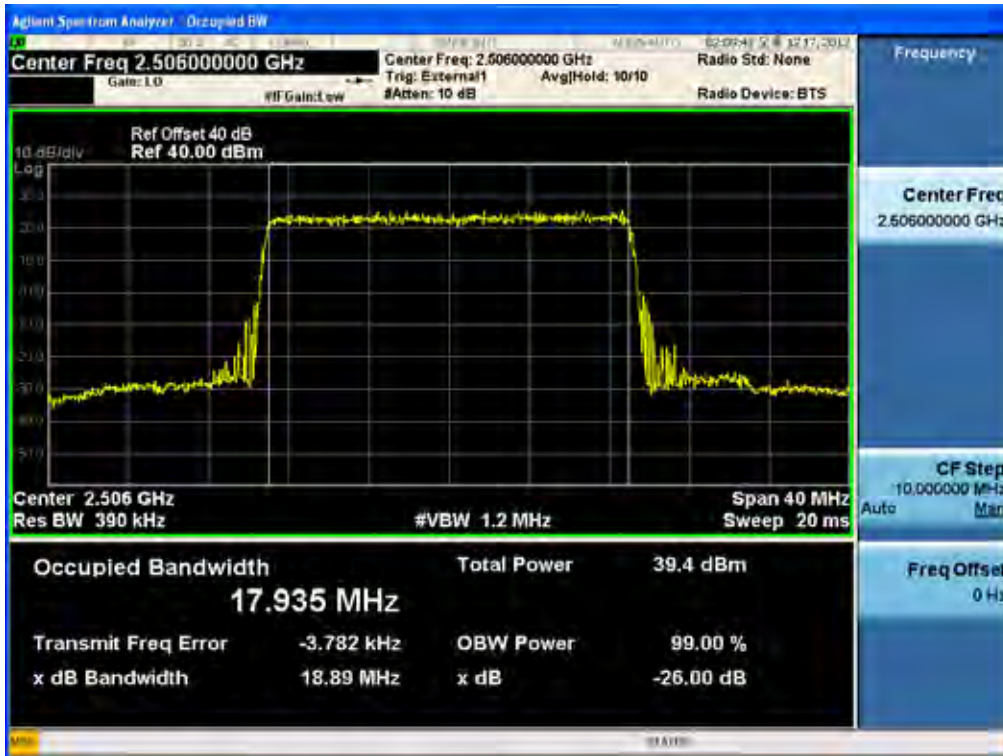


(16QAM High Channel)

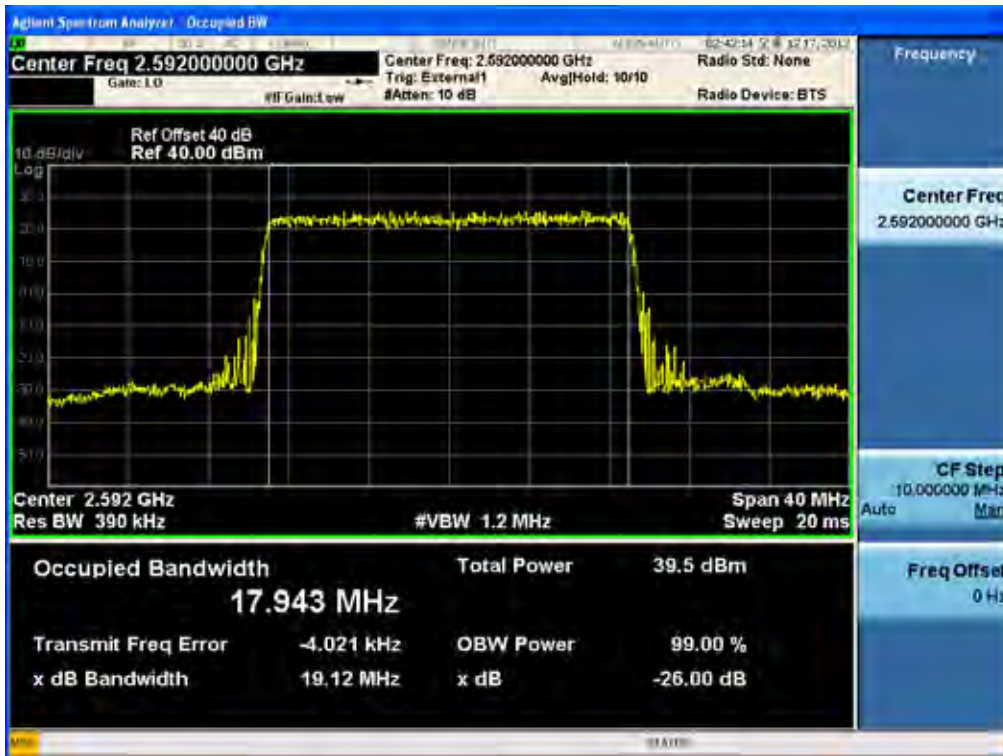


FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(64QAM Low Channel)

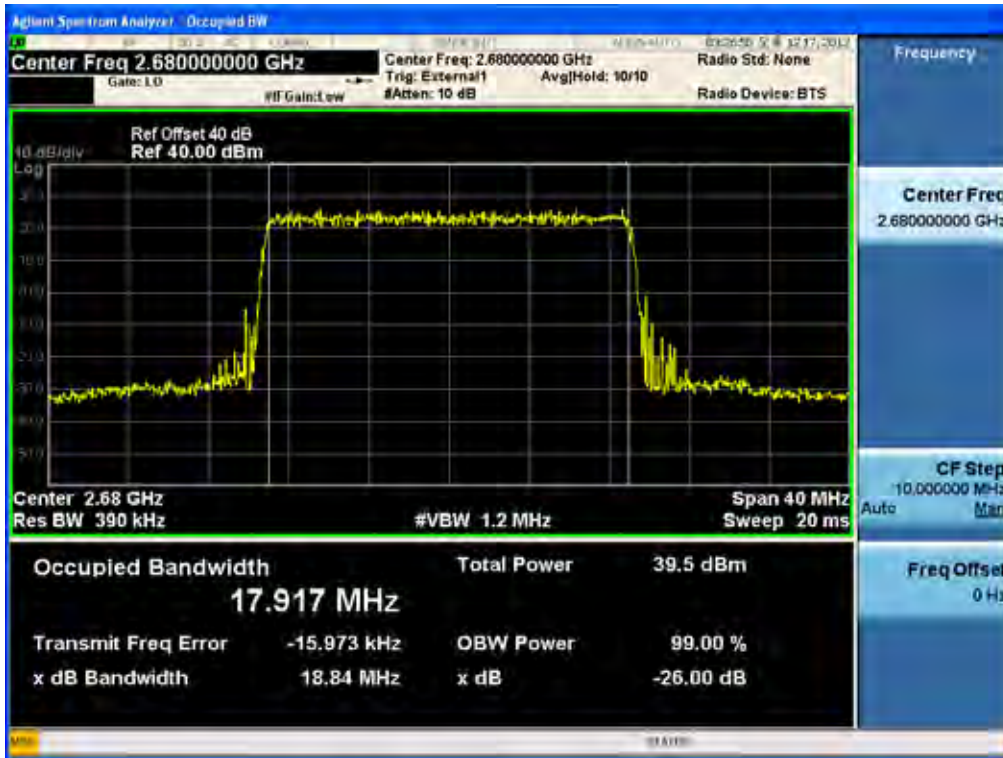


(64QAM Middle Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(64QAM High Channel)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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7. SPURIOUS EMISSION AT ANTENNA TERMINAL

7.1. Applicable Standard

CFR 47§2.1051, §27.53

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

§27.53(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(2) For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Provided that a documented interference complaint cannot be mutually resolved between the parties prior to the applicable deadline, then the following additional attenuation requirements shall apply:

7.2. Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
HP	8498A / Attenuator	51161	12/26/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2013

7.3. Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

7.4. Test Result

: Pass

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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7.4.1. Test Data at Output Port 1

30 MHz ~ 1 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-49.008	-48.670	-49.253
2592	-49.175	-49.015	-48.902
2680	-48.979	-49.048	-48.975

1 GHz ~ 26.5 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-22.455	-22.628	-22.873
2592	-22.908	-22.776	-22.722
2680	-22.665	-22.669	-22.655

Frequency (MHz)	Band edge (dBm)		
	QPSK	16QAM	64QAM
2506	-21.118	-21.600	-21.401
2680	-21.374	-21.280	-21.179

7.4.2. Test Data at Output Port 2

30 MHz ~ 1 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-48.942	-49.017	-48.945
2592	-48.966	-48.861	-48.960
2680	-48.957	-48.816	-48.939

1 GHz ~ 26.5 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-22.506	-22.497	-22.474
2592	-22.585	-22.606	-22.703
2680	-22.635	-22.587	-22.672

Frequency (MHz)	Band edge (dBm)		
	QPSK	16QAM	64QAM
2506	-21.228	-22.196	-21.294
2680	-19.900	-21.498	-20.339

7.4.3. Test Data at Output Port 1

30 MHz ~ 1 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-48.911	-48.883	-48.986
2592	-48.903	-49.520	-49.689
2680	-49.687	-49.544	-49.723

1 GHz ~ 26.5 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-22.526	-22.532	-22.555
2592	-22.452	-23.081	-23.034
2680	-22.886	-23.024	-23.235

Frequency (MHz)	Band edge (dBm)		
	QPSK	16QAM	64QAM
2506	-20.704	-21.370	-20.900
2680	-21.932	-21.174	-20.961

7.4.4. Test Data at Output Port 1

30 MHz ~ 1 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-49.860	-49.559	-49.647
2592	-49.843	-49.640	-49.521
2680	-49.769	-49.447	-49.718

1 GHz ~ 26.5 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-23.378	-23.410	-23.470
2592	-23.451	-23.334	-23.385
2680	-23.306	-23.203	-23.218

Frequency (MHz)	Band edge (dBm)		
	QPSK	16QAM	64QAM
2506	-21.475	-21.233	-22.118
2680	-21.702	-19.673	-21.748

7.4.5. Measure and sum data (4 ports)

30 MHz ~ 1 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-43.142	-42.999	-43.178
2592	-43.186	-43.226	-43.234
2680	-43.311	-43.183	-43.301

1 GHz ~ 26.5 GHz

Frequency (MHz)	Spurious emission (dBm)		
	QPSK	16QAM	64QAM
2506	-16.679	-16.731	-16.805
2592	-16.812	-16.920	-16.932
2680	-16.844	-16.843	-16.915

Frequency (MHz)	Band edge (dBm)		
	QPSK	16QAM	64QAM
2506	-15.102	-15.564	-15.386
2680	-15.130	-14.822	-15.007

7.4.6. Plot Data at Output Port 1
(QPSK Low Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(Band Edge Low)



(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

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(QPSK Middle Channel)



(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(QPSK High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
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(16QAM Low Channel)



(30 MHz ~ 1 GHz)

(16QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 67 of 116

(Band Edge Low)



(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

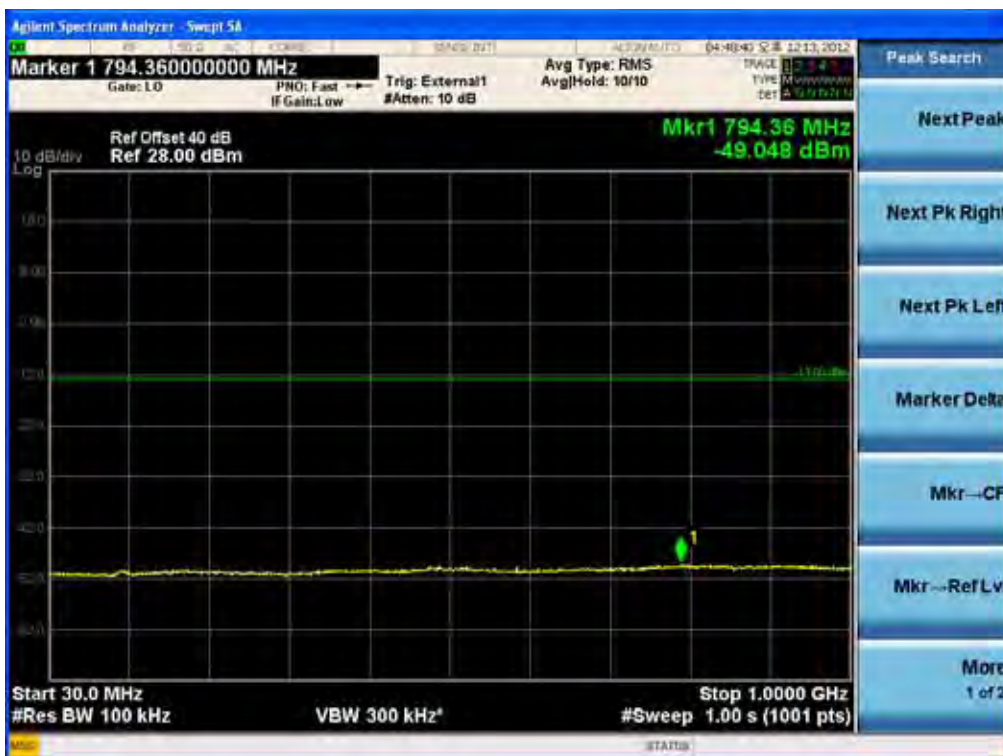
FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 68 of 116

(16QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 69 of 116

(16QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 70 of 116

(64QAM Low Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 71 of 116

(Band Edge Low)



(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 72 of 116

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 73 of 116

(64QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 74 of 116

7.4.6. Plot Data at Output Port 2
(QPSK Low Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 75 of 116

(Band Edge Low)



(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 76 of 116

(QPSK Middle Channel)



(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 77 of 116

(QPSK High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 78 of 116

(16QAM Low Channel)



(30 MHz ~ 1 GHz)

(16QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 79 of 116

(Band Edge Low)



(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 80 of 116

(16QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 81 of 116

(16QAM High Channel)



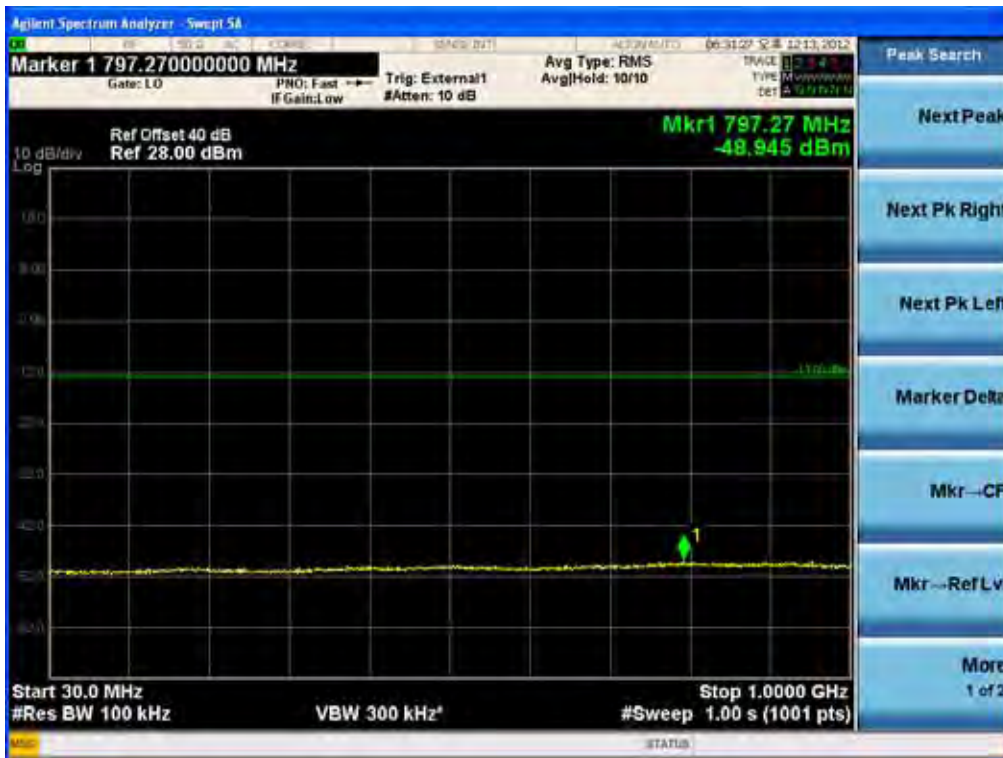
(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 82 of 116

(64QAM Low Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 83 of 116

(Band Edge Low)



(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

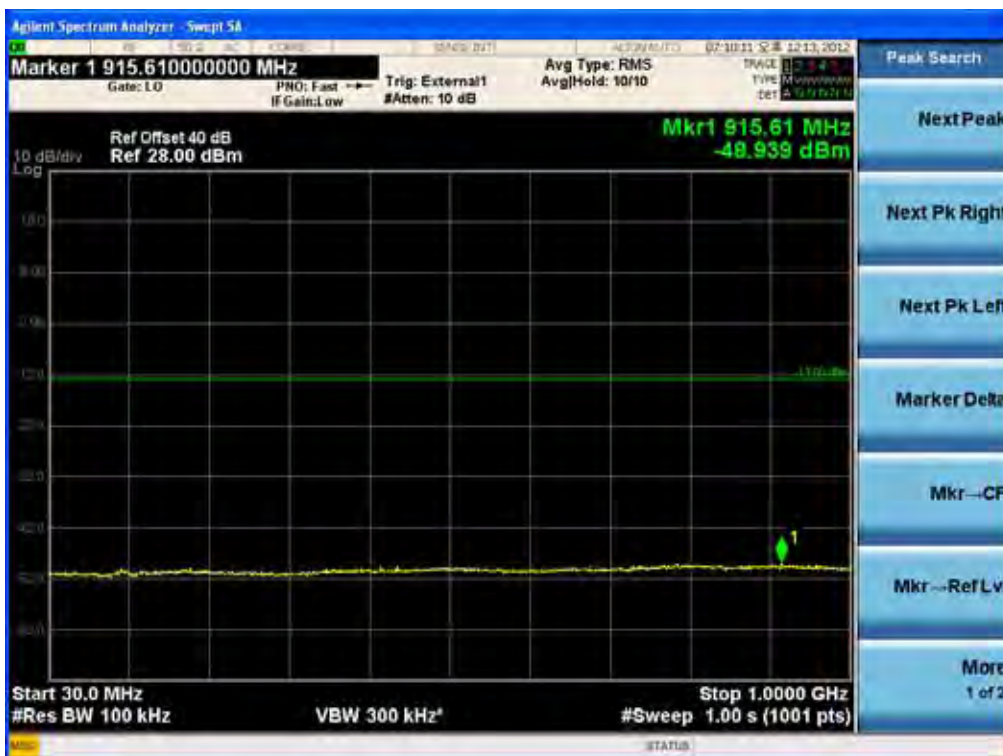
FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 84 of 116

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 85 of 116

(64QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 86 of 116

7.4.3. Plot Data at Output Port 3
(QPSK Low Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 87 of 116

(Band Edge Low)



(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 88 of 116

(QPSK Middle Channel)



(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 89 of 116

(QPSK High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 90 of 116

(16QAM Low Channel)



(30 MHz ~ 1 GHz)

(16QAM Low Channel)



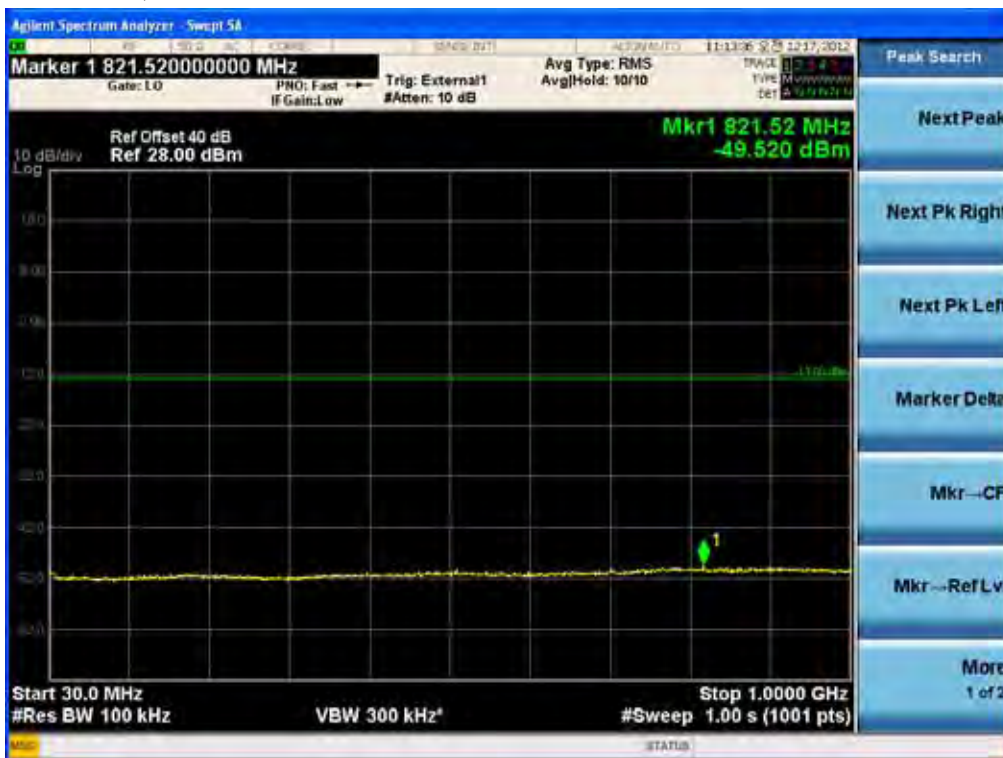
(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 91 of 116

(Band Edge Low)



(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 92 of 116

(16QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 93 of 116

(16QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 94 of 116

(64QAM Low Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 95 of 116

(Band Edge Low)



(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 96 of 116

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 97 of 116

(64QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 98 of 116

7.4.4. Plot Data at Output Port 4
(QPSK Low Channel)



(30 MHz ~ 1 GHz)

(QPSK Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 99 of 116

(Band Edge Low)



(QPSK Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 100 of 116

(QPSK Middle Channel)



(1 GHz ~ 26.5 GHz)

(QPSK High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 101 of 116

(QPSK High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 102 of 116

(16QAM Low Channel)



(30 MHz ~ 1 GHz)

(16QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 103 of 116

(Band Edge Low)



(16QAM Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 104 of 116

(16QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(16QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 105 of 116

(16QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 106 of 116

(64QAM Low Channel)



(30 MHz ~ 1 GHz)

(64QAM Low Channel)



(1 GHz ~ 26.5 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 107 of 116

(Band Edge Low)



(64QAM Middle Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 108 of 116

(64QAM Middle Channel)



(1 GHz ~ 26.5 GHz)

(64QAM High Channel)



(30 MHz ~ 1 GHz)

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 109 of 116

(64QAM High Channel)



(1 GHz ~ 26.5 GHz)

(Band Edge High)



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 110 of 116

8. RADIATED SPURIOUS EMISSION

8.1 Applicable Standard

(1) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts. (2) For fixed and temporary fixed digital stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee. Provided that the complaint cannot be mutually resolved between the parties, both licensees of existing and new systems shall reduce their out-of-band emissions by at least $67 + 10 \log (P)$ dB measured at 3 MHz from their channel's edges for distances between stations exceeding 1.5 km.

8.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D / Double Ridged Horn Antenna	937	10/17/2013
Schwarzbeck	VULB 9168 / TRILOG Antenna	9168-200	02/19/2013
HD	MA240 / Antenna Position Tower	556	N/A
EMCO	1050 / Turn Table	114	N/A
HD GmbH	HD 100 / Controller	13	N/A
HD GmbH	KMS 560 / SlideBar	12	N/A
MITEQ	AMF-6D-001180-35-20P/ POWER AMP	990893	07/30/2013
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
Rohde & Schwarz	FSP / Spectrum Analyzer	839117/011	02/09/2013
HP	83640B / Signal Generator	3614A00105	11/07/2013
HP	8498A / Attenuator	51161	12/26/2012
WEINSCHTEL	AF9003-69-31 / Attenuator	11787	11/07/2013

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 111 of 116

8.3 Test Procedure

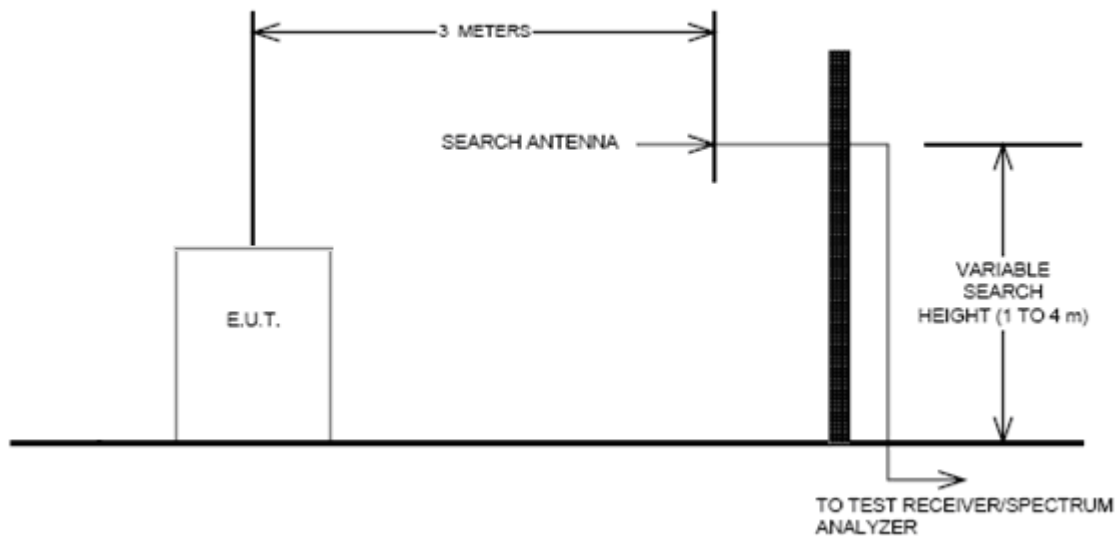
Radiated emission measurements were performed at an semi-anechoic chamber.

The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission.

A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated.

The maximum EIRP of the emission 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. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

8.3.1 Radiated Spurious Emissions Test Setup



FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 112 of 116

8.4 Test Result

: PASS

Mode	Test Frequency	Freq.(MHz)	Measured	Ant. Gain (dBi)	C.L	SigGen	Pol.	EIRP (dBm)	Margin (dB)
			Level [dBm]			Level [dBm]			
TD-LTE	2506	1748	-80.57	9.6	4.99	-50.58	V	-45.97	32.97
		5012	-83.41	12.46	9.57	-42.09	H	-39.2	26.2
		7518	-81.81	10.98	12.23	-32.83	H	-34.08	21.08
	2592	5184	-82.1	12.66	9.72	-40.54	H	-37.6	24.6
		7776	-82.52	11.12	12.36	-33.26	H	-34.5	21.5
		8340	-79.63	11.41	12.89	-29.57	H	-31.05	18.05
	2680	5350	-82.34	12.85	9.86	-40.55	H	-37.56	24.56
		8040	-80.17	11.26	12.52	-30.6	H	-31.86	18.86
		10580	-79.01	11.03	15	-24.72	H	-28.69	15.69

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 113 of 116

9. FREQUENCNY STABILITY

9.1 Applicable Standard

Requirements: FCC § 2.1055 (a), Part27.54 following: The frequency stability shall be sufficient to ensure that the fundamental emissions stay

9.2 Test Equipment List and Details

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Agilent	N9020A /Signal Analyzer	US46220219	05/02/2013
Agilent	6674A / DC Power Supply	3501A00901	05/02/2013
HP	8498A / Attenuator	51161	12/26/2012
WEINSCHEL	AF9003-69-31 / Attenuator	11787	11/07/2013

9.3 Test Procedure

Frequency Stability over Temperature variation:

The equipment under test was connected to an external DC power supply and the RF output was connected to a Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 30 minutes, the frequency output was recorded from the VSA8960 S/W via MXA Signal Analyzer.

Frequency stability over Voltage variation: An external variable DC power supply Source. The voltage was set to 85% and 115% of the nominal value. The output frequency was recorded for each voltage.

9.4. Test Result

: Pass

FCC PT.27 TEST REPORT	FCC CERTIFICATION REPORT			HCT PT.27 TEST REPORT
Test Report No. HCTR1212FR01	Date of Issue: December 21, 2012	EUT Type: WiMAX/TD-LTE Remote Radio Head	FCC ID: A3LSLS-BD104Q1	Page 114 of 116

9.4.1. Frequency Stability over Temperature and Voltage variation

Modulation: QPSK

Reference: - 48 Vdc at 20°C Freq. = 2506,000,000 MHz

Voltage (%)	Temp. ()	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2505 999 986	-14.0	0.0	0.0000
	-30	2505 999 989	-10.5	3.5	0.0014
	-20	2505 999 986	-14.3	-0.3	-0.0001
	-10	2505 999 988	-12.5	1.5	0.0006
	0	2505 999 987	-13.5	0.5	0.0002
	+10	2505 999 987	-13.2	0.8	0.0003
	+30	2505 999 986	-14.5	-0.5	-0.0002
	+40	2505 999 988	-12.2	1.8	0.0007
	+50	2505 999 986	-13.8	0.2	0.0001
115%	+20	2505 999 987	-13.5	0.5	0.0002
85%	+20	2505 999 987	-12.9	1.1	0.0004

(Output Port 1)

Modulation: 16QAM

Reference: - 48 Vdc at 20°C Freq. = 2592,000,000 MHz

Voltage (%)	Temp. ()	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2591 999 984	-15.6	0.0	0.0000
	-30	2591 999 981	-19.3	-3.7	-0.0014
	-20	2591 999 988	-11.7	3.9	0.0015
	-10	2591 999 982	-18.4	-2.8	-0.0011
	0	2591 999 984	-16.5	-0.9	-0.0004
	+10	2591 999 982	-17.7	-2.1	-0.0008
	+30	2591 999 982	-18.2	-2.6	-0.0010
	+40	2591 999 987	-13.3	2.3	0.0009
	+50	2591 999 981	-19.2	-3.6	-0.0014
115%	+20	2591 999 984	-16.5	-0.9	-0.0004
85%	+20	2591 999 986	-14.4	1.2	0.0005

(Output Port 2)

Modulation: 64QAM

Reference: - 48 Vdc at 20°C Freq. = 2680,000,000 MHz

Voltage (%)	Temp. ()	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2679 999 990	-9.7	0.0	0.0000
	-30	2679 999 988	-11.5	-1.8	-0.0007
	-20	2679 999 988	-12.3	-2.7	-0.0010
	-10	2679 999 988	-11.7	-2.0	-0.0008
	0	2679 999 989	-10.8	-1.1	-0.0004
	+10	2679 999 990	-9.6	0.1	0.0000
	+30	2679 999 988	-12.0	-2.3	-0.0009
	+40	2679 999 989	-11.4	-1.7	-0.0006
	+50	2679 999 987	-13.2	-3.5	-0.0013
115%	+20	2679 999 989	-11.0	-1.3	-0.0005
85%	+20	2679 999 989	-10.8	-1.1	-0.0004

(Output Port 3)

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