



HCT. CO., LTD.

PRODUCT COMPLIANCE DIVISION
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CERTIFICATE OF COMPLIANCE

FCC PART 27 Certification

Applicant Name:

SAMSUNG Electronics Co.,Ltd
416, Maetan 3-dong, Yountong-gu, Suwon-si,
Gyeonggi-do, Korea

Date of Testing: February 22, 2008

Test Site/Location:

HCT, San 136-1 Ami-ri, Bubal-eup, Icheon-si,
Kyungki-do, Korea

Test Report No.: HCT-R08-012

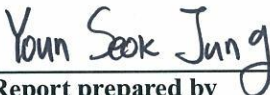
FCC ID : **A3LSPI-2331022500**

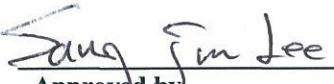
APPLICANT : **SAMSUNG Electronics Co.,Ltd**

EUT Type : Mobile WiMAX Outdoor RAS
Manufacturer : SAMSUNG Electronics Co.,Ltd
Model name : SPI-2331022500
Frequency of Operation : 2647 MHz ~ 2667 MHz
FCC Rule Part(s) : FCC Part 27.
Test Procedure(s) : ANSI C-63.4-2003, EIA/TIA 603B
Application Type : Original Equipment
Data of issue : February 22, 2008

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
: Youn Seok Jung
Test engineer of RF Part


Approved by
: Sang Jun Lee
Manager of RF Part

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1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

Company	Samsung Electronics Co., Ltd.
Contact Point	416, Maetan 3-dong, Yountong-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

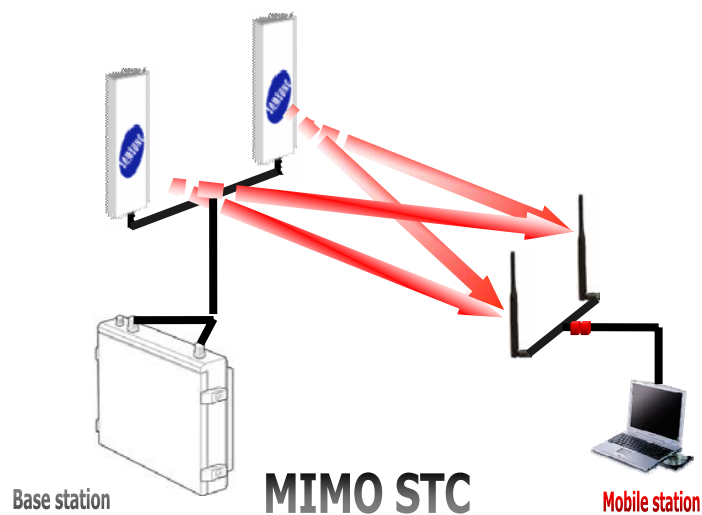
1.2. PRODUCT INFORMATION

EUT TYPE	Mobile WiMAX Outdoor RAS
EMISSION DESIGNATOR	9M16G7W
OPERATING FREQUENCY	2647 ~ 2667 MHz
TX OUTPUT POWER	0.1 W (20 dBm)
CHANNEL BANDWIDTH	10MHz
MODULATION TYPE	OFDMA(QPSK, 16QAM, 64QAM)
NUMBER OF CARRIERS/SECTORS	3 Carriers / 3 Sectors
CHANNEL CARD CAPACITY	1 Carrier / 1 Sector
SYSTEM INPUT VOLTAGE	DC -48V

1.3. OPERATING DESCRIPTION OF EUT

The outdoor SPI-2211 provides the MIMO function and using Matrix A (STC).

Explanation of STC is below.



Matrix A(Space-Time Coding)

Transmission ratio of the Matrix A or Space-Time Coding(STC) is 1 and equal to that of Single Input Single Output(SISO). However The Matrix A or the STC reduces the error of the signal received from the MS by raising the stability of the signal received from the MS by means of the Tx diversity. This technology is, also, effective in Signal to Noise Ratio(SNR) and provides excellent performance even when the MS moves in high speed.

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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(l)	Occupied Bandwidth	Compliant
2.1051, 27.53(l)	Spurious Emissions at Antenna Terminals	Compliant
2.1051, 27.53(l)	Band edge	Compliant
2.1053, 27.53(l)	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. MODE OF OPERATION DURING THE TEST

The EUT was operated in a manner representative of the typical usage of the equipment.

During all testing, system components were manipulated within the confines of typical usage to maximize each emission. All Modulation (QPSK, 16QAM, and 64QAM) modes and different data rates were tested, and the worst data was recorded in this test report.

The device does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports for radiated spurious emission testing.

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3. STANDARDS ENVIRONMENTAL TEST CONDITIONS

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

4. TEST EQUIPMENT

Manufacturer	Model / Equipment	Serial No.	Calibration Due
Schwarzbeck	BBHA 9120D /Double Ridged Horn Antenna	296	05/02/2008
Schwarzbeck	BBHA 9120D /Double Ridged Horn Antenna	147	03/30/2008
Schwarzbeck	VULB 9160/ TRILOG Antenna	9160-3150	04/20/2008
Schwarzbeck	VULB 9160/ TRILOG Antenna	3125	04/20/2008
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
Rohde & Schwarz	FSP30 / Spectrum Analyzer	839117/011	06/28/2008
MITEQ	AMF-60-0010 1800-35-20P	1200937	01/15/2009
MITEQ	AMF-6D-0010 1800-35-20P	990893	02/24/2008
Schwarzbeck	BBHA9170/ SHF-EHF Horn Antenna	BBHA9170342	03/20/2008
ADVANTEST	R3273/Spectrum Analyzer	J004821	05/02/2008
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	1	06/28/2008
WEINSCHL	67-30-33/Attenuator	BR0530	01/11/2009
Agilent	E4440A /PSA Spectrum Analyzer	MY46186519	07/31/2008

5. CONDUCTED OUTPUT POWER

5.1. Applicable Standard

According to FCC §2.1046&27.5(h)

5.2. Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP30	839117/011	06/28/ 2008

5.3. Test Procedure

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

5.3.1. Environmental Conditions:

Temperature:	25 °C
Relative Humidity:	57 %

5.4. Test Result

: PASS

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5.4.1. Test Data at Output Port

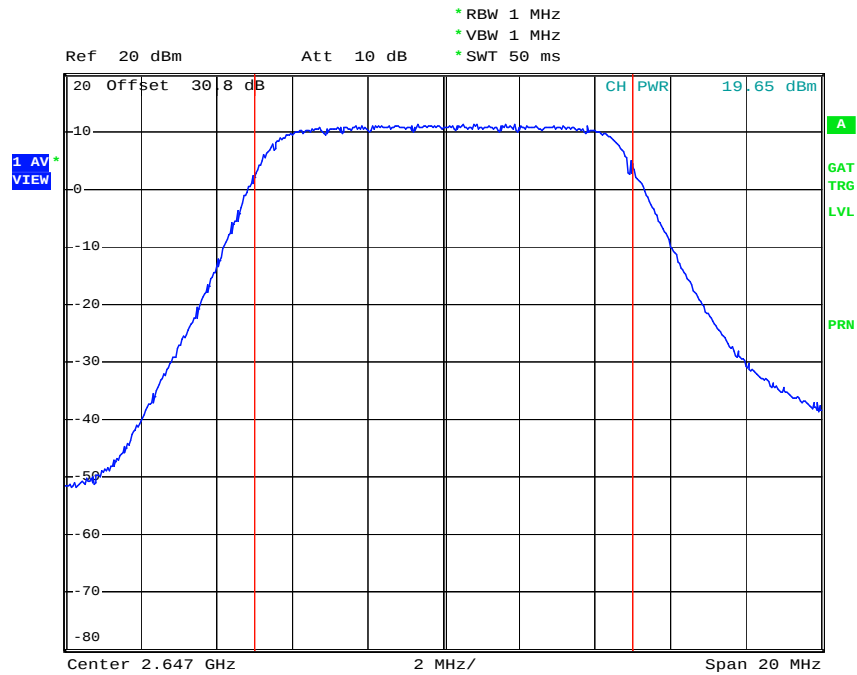
Modulation	Channel	Frequency	Measured Output Power	
			dBm	mW
QPSK	Low	2647.00	19.65	92.6
	Middle	2657.00	19.76	94.6
	High	2667.00	19.72	93.8
16QAM	Low	2647.00	19.69	93.1
	Middle	2657.00	19.75	94.4
	High	2667.00	19.74	94.2
64QAM	Low	2647.00	19.67	92.7
	Middle	2657.00	19.73	94.0
	High	2667.00	19.74	94.2

5.4.2. Test Data at Output Port 1

Modulation	Channel	Frequency	Measured Output Power	
			dBm	mW
QPSK	Low	2647.00	19.68	92.9
	Middle	2657.00	20.03	100.7
	High	2667.00	20.09	102.1
16QAM	Low	2647.00	19.69	93.1
	Middle	2657.00	20.04	100.9
	High	2667.00	20.10	102.3
64QAM	Low	2647.00	19.70	93.3
	Middle	2657.00	20.06	101.4
	High	2667.00	20.08	101.6

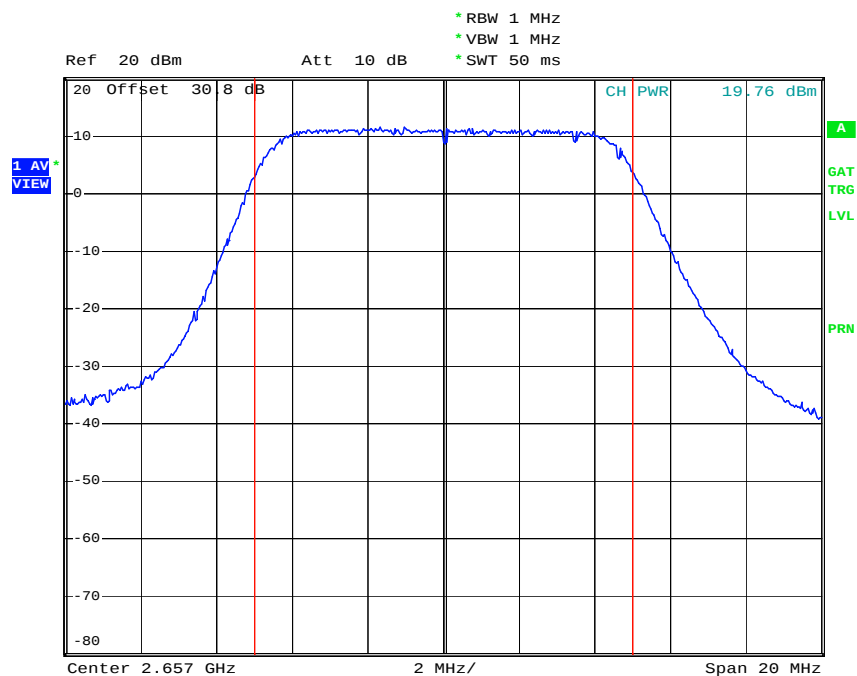
5.4.3. Plot Data for Output 0

(QPSK Low Channel)



Date: 11.FEB.2008 14:47:19

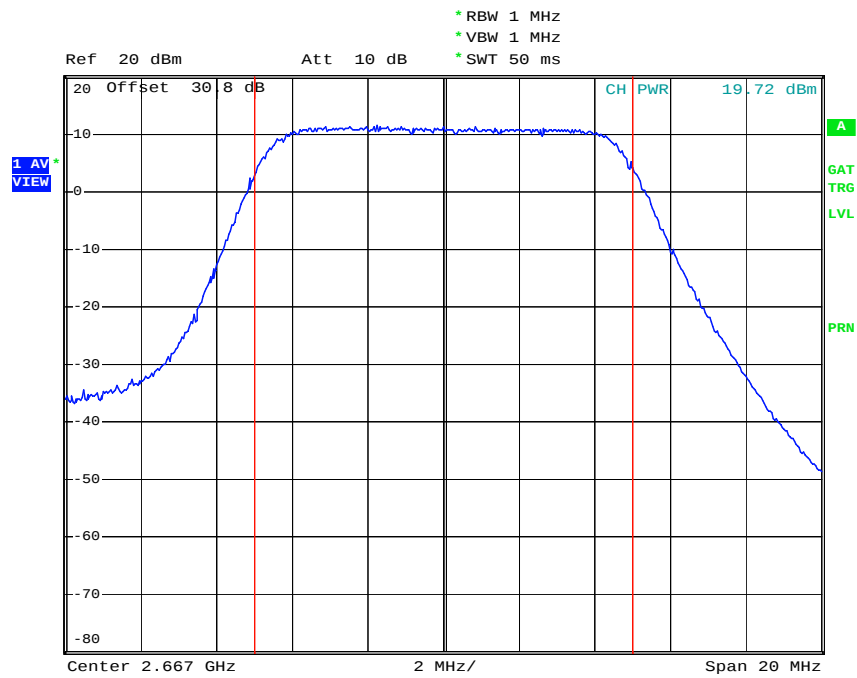
(QPSK Middle Channel)



Date: 11.FEB.2008 14:32:51

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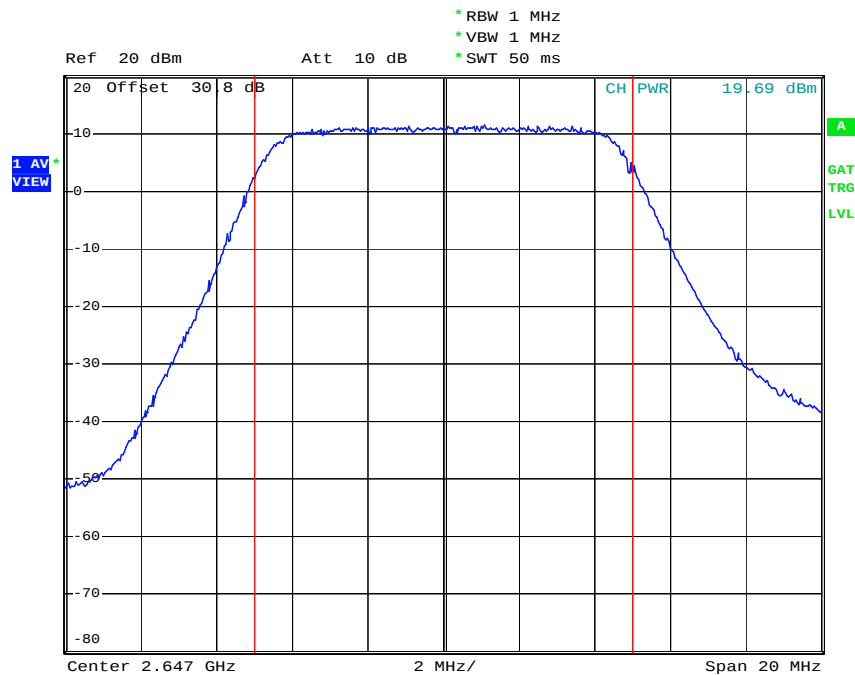
(QPSK High Channel)



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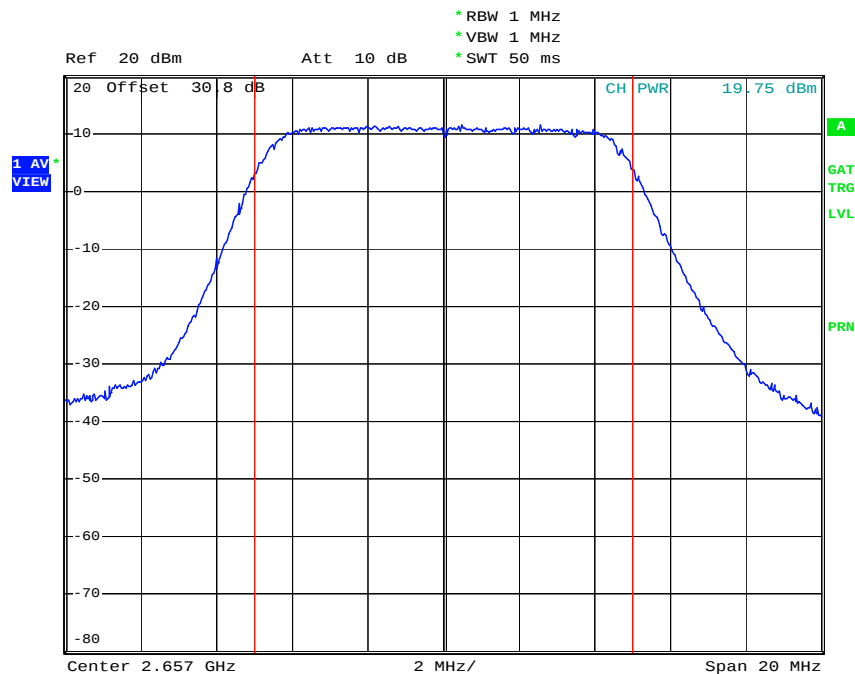
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(16QAM Low Channel)



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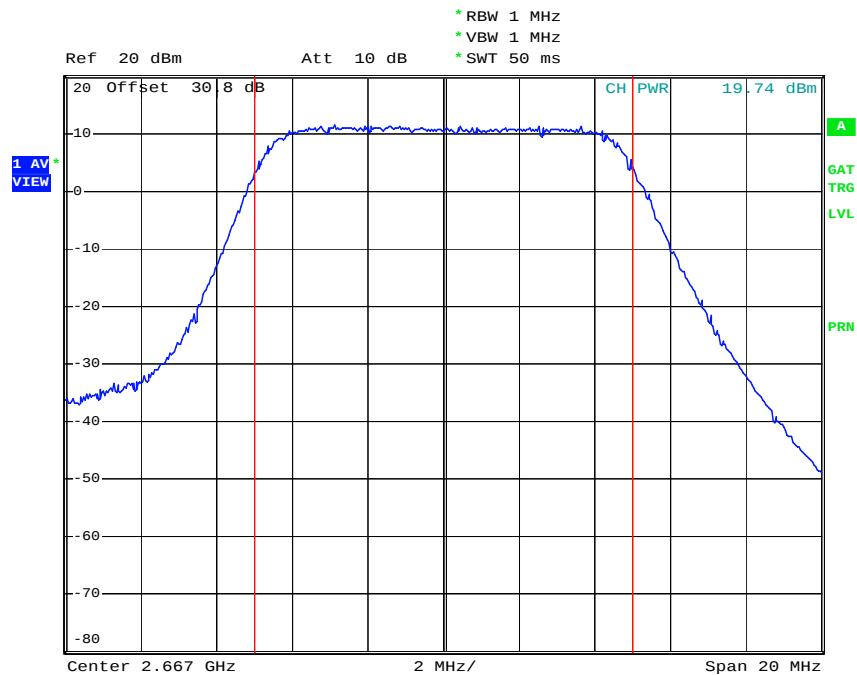
(16QAM Middle Channel)



Date: 11.FEB.2008 14:33:39

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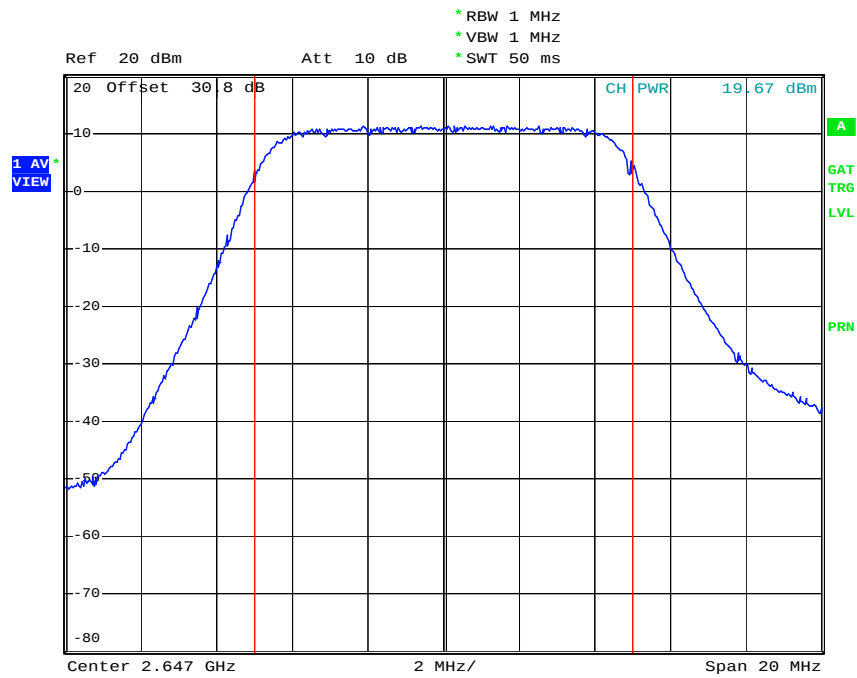
(16QAM High Channel)



Date: 11.FEB.2008 14:28:15

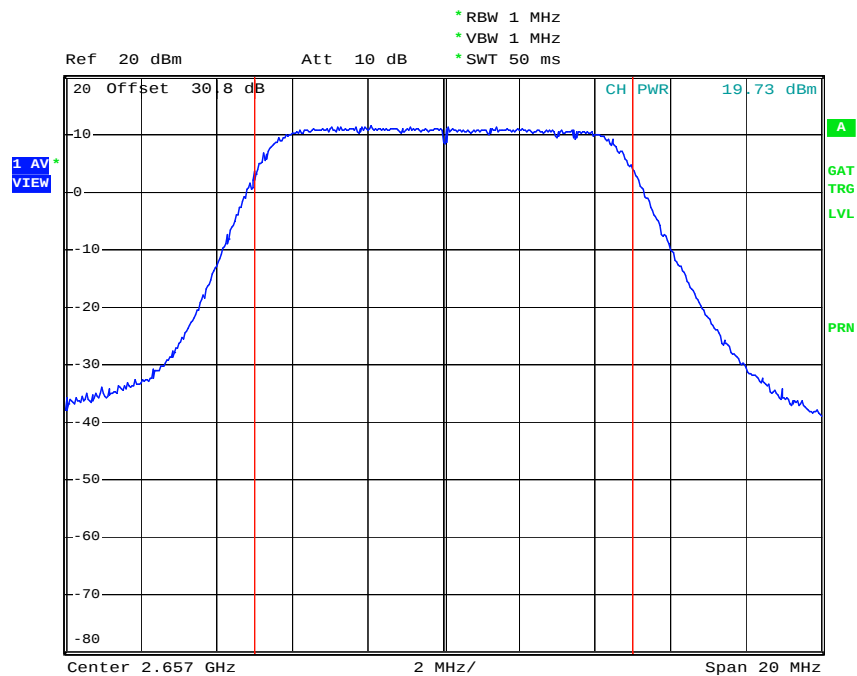
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(64QAM Low Channel)



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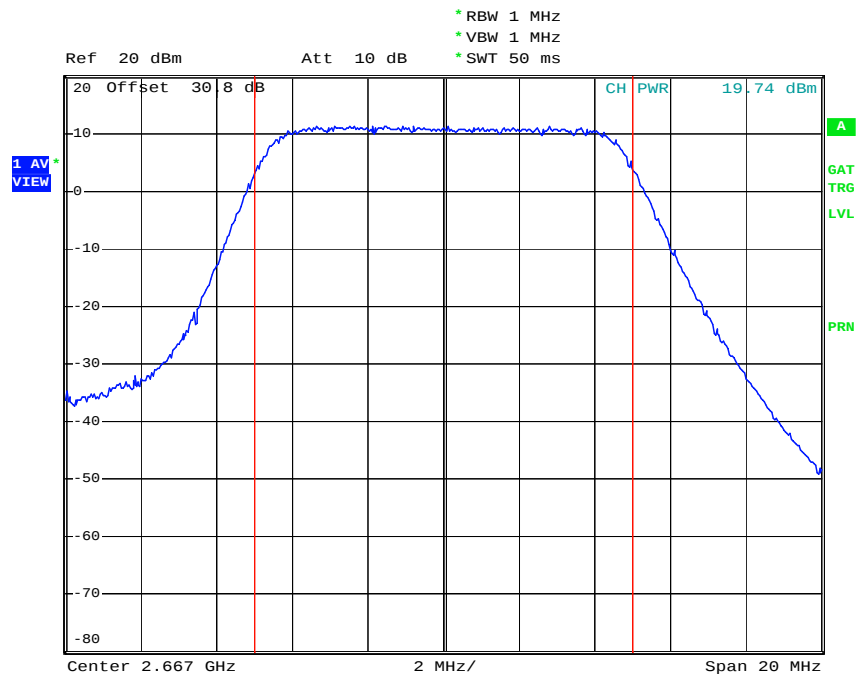
(16QAM Middle Channel)



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(64QAM High Channel)

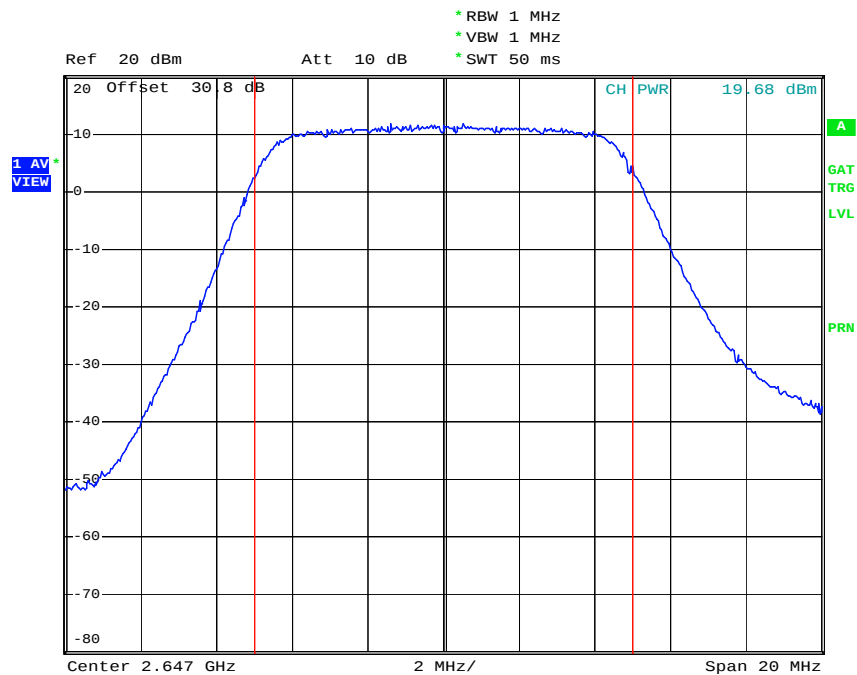


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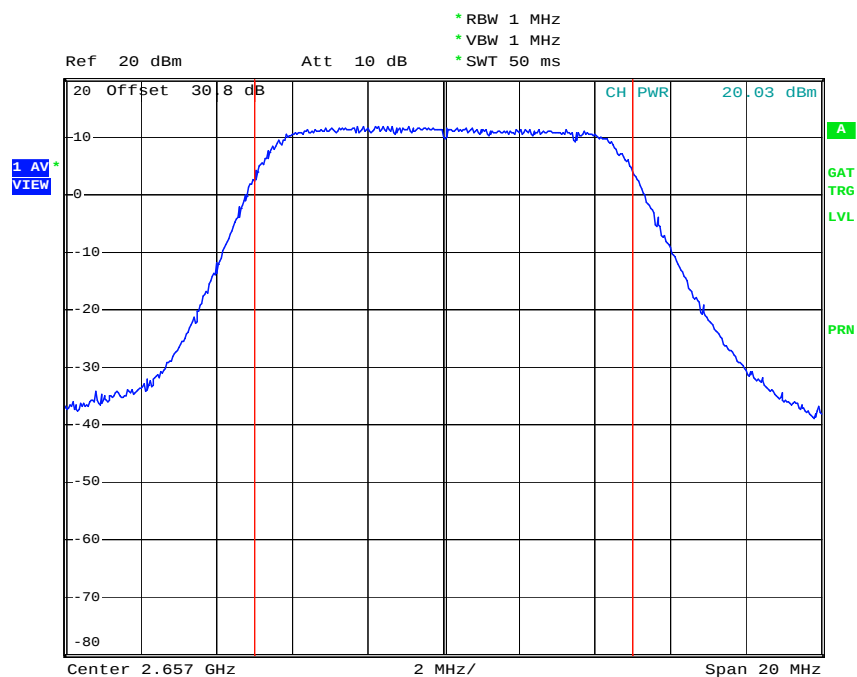
5.4.4. Plot Data for Output 1.

(QPSK Low Channel)



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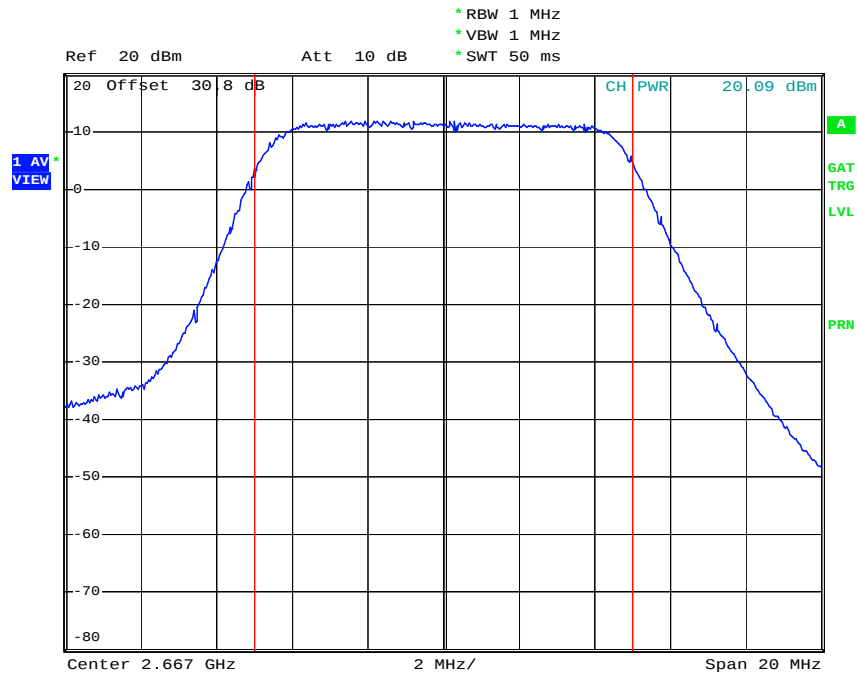
(QPSK Middle Channel)



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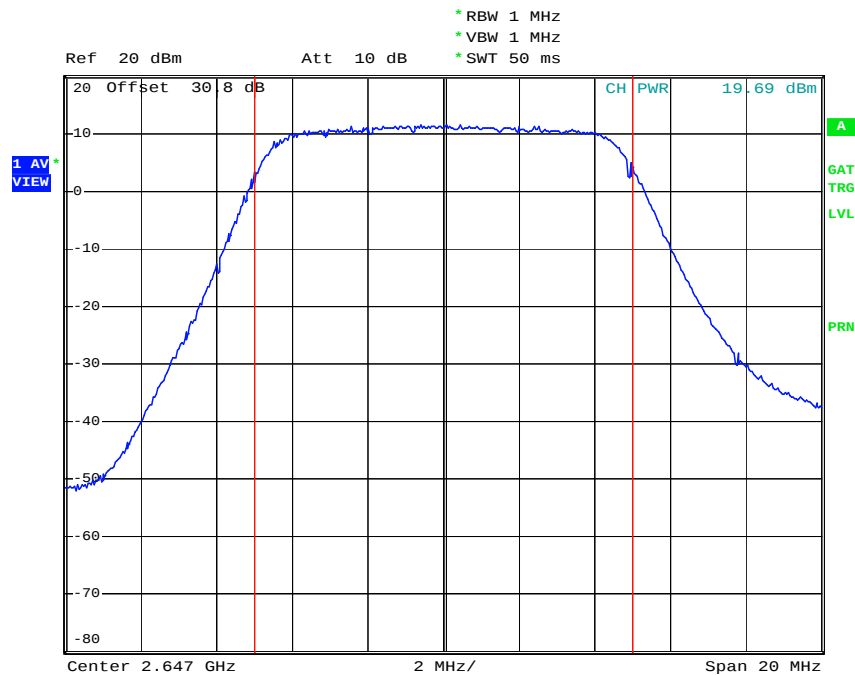
(QPSK High Channel)



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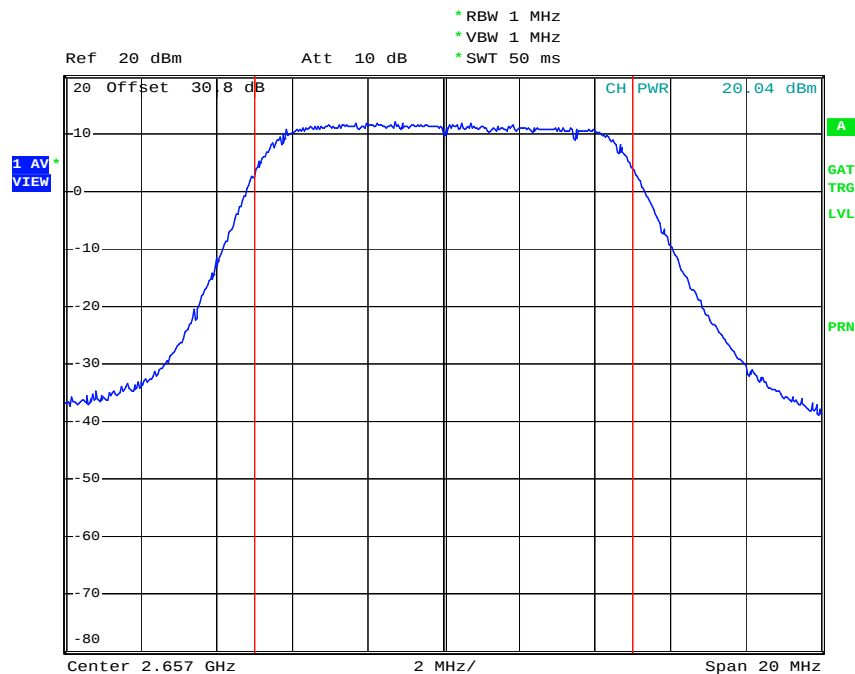
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(16QAM Low Channel)



Date: 11.FEB.2008 14:39:06

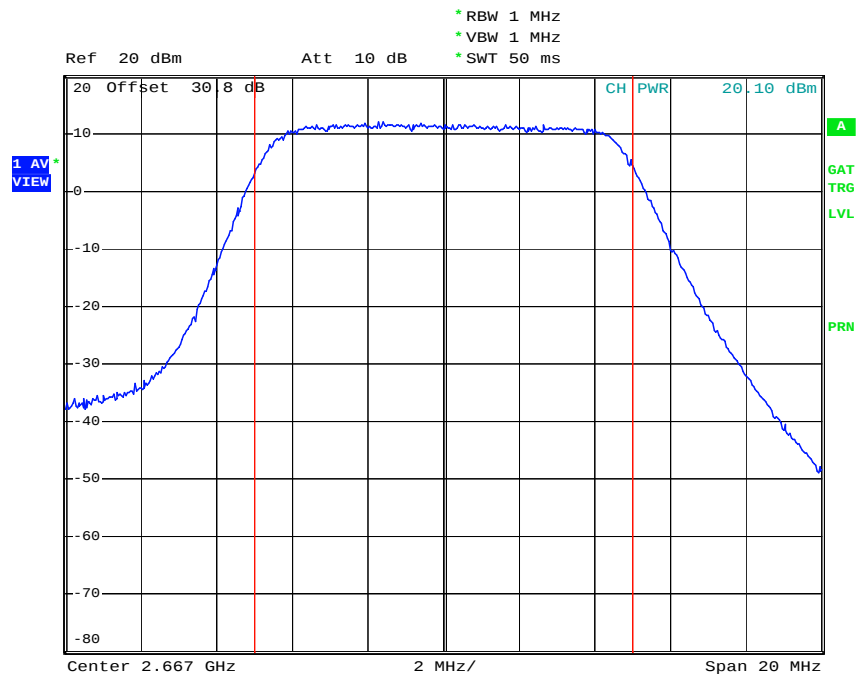
(16QAM Middle Channel)



Date: 11.FEB.2008 14:31:37

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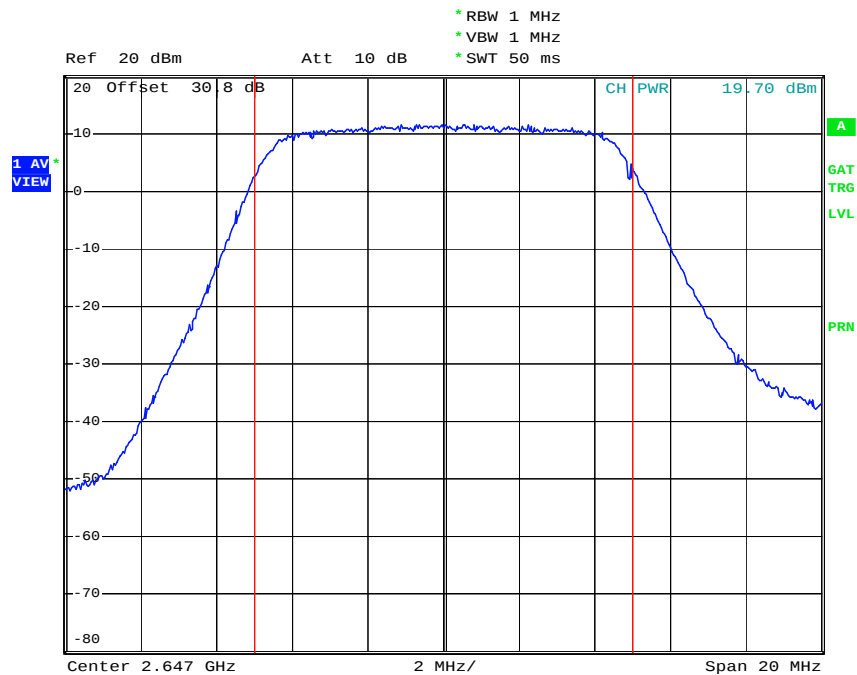
(16QAM High Channel)



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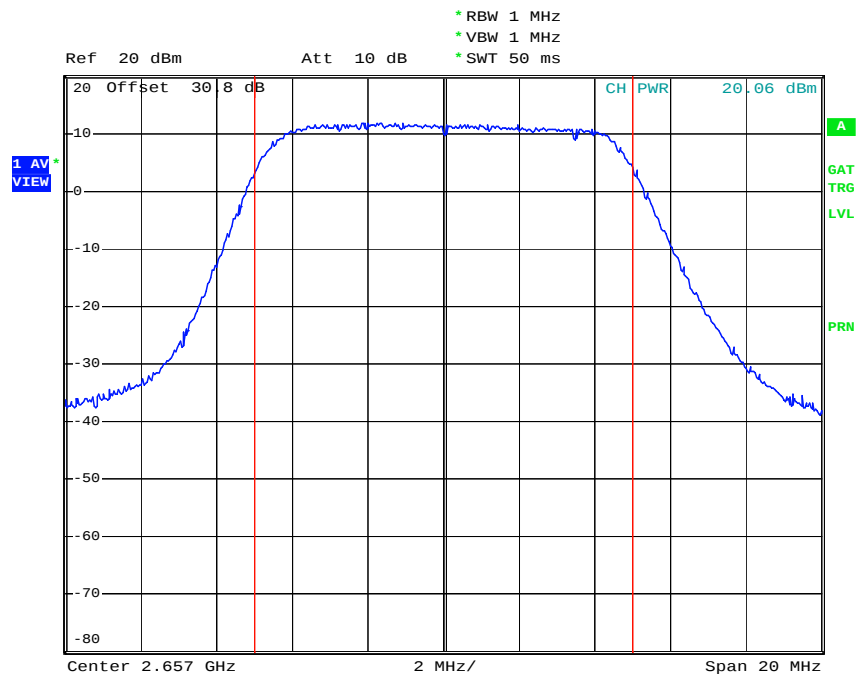
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(64QAM Low Channel)



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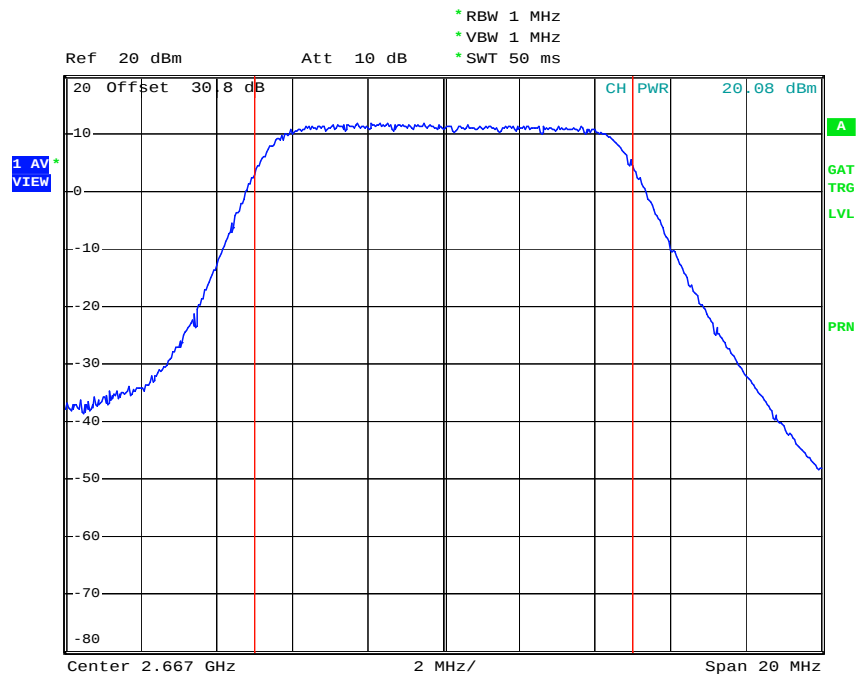
(64QAM Middle Channel)



Date: 11.FEB.2008 14:30:56

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(64QAM High Channel)



Date: 11.FEB.2008 14:29:55

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6. OCCUPIED BANDWIDTH

6.1. Applicable Standard

Requirements: CFR 47, Section 2.1049

6.2. Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP30	839117/011	06/28/ 2008

6.3. Test Procedure

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

6.3.1. Environmental Conditions:

Temperature:	25 °C
Relative Humidity:	58 %

6.4. Test Result

: PASS

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6.4.1. Test Data at Output Port 0

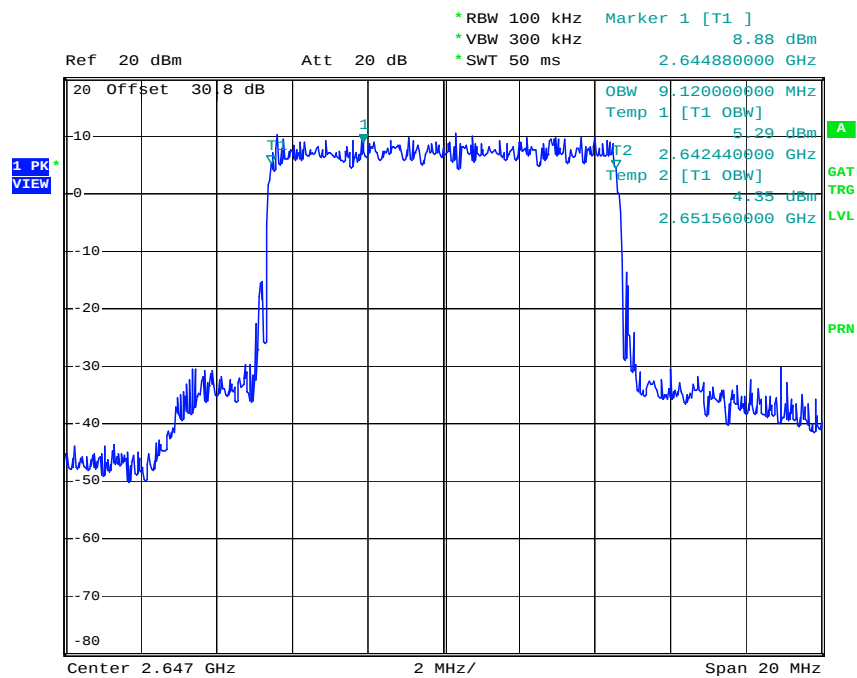
Modulation	Channel	Frequency	Measured Bandwidth
			99 %
QPSK	Low	2647.00	9.12
	Middle	2657.00	9.16
	High	2667.00	9.16
16QAM	Low	2647.00	9.12
	Middle	2657.00	9.16
	High	2667.00	9.16
64QAM	Low	2647.00	9.12
	Middle	2657.00	9.12
	High	2667.00	9.16

6.4.2. Test Data at Output Port 1

Modulation	Channel	Frequency	Measured Bandwidth
			99 %
QPSK	Low	2647.00	9.12
	Middle	2657.00	9.12
	High	2667.00	9.12
16QAM	Low	2647.00	9.12
	Middle	2657.00	9.12
	High	2667.00	9.16
64QAM	Low	2647.00	9.12
	Middle	2657.00	9.12
	High	2667.00	9.16

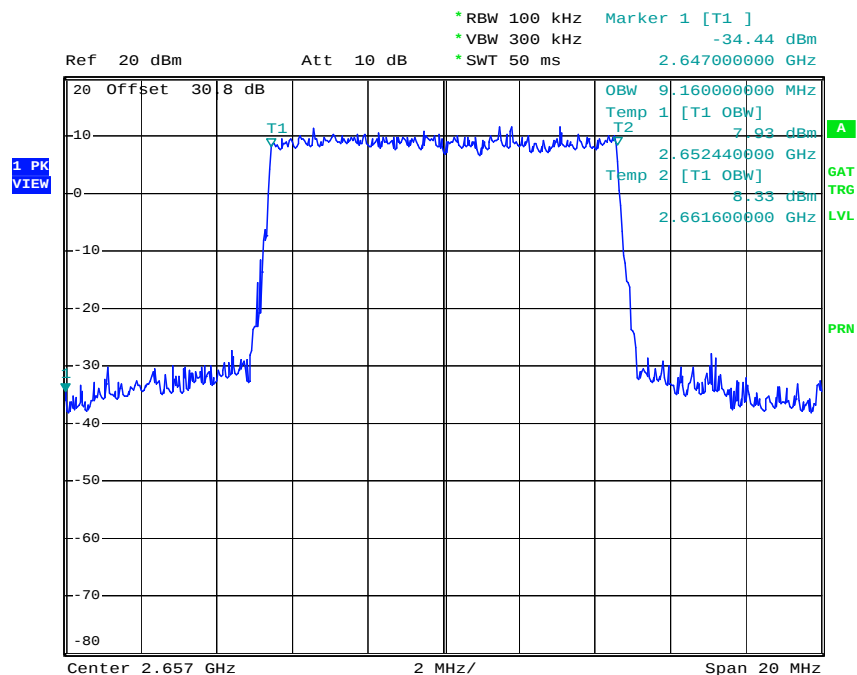
6.4.3. Test Data Plot at Output Port 0

(QPSK Low Channel)



Date: 11.FEB.2008 14:49:55

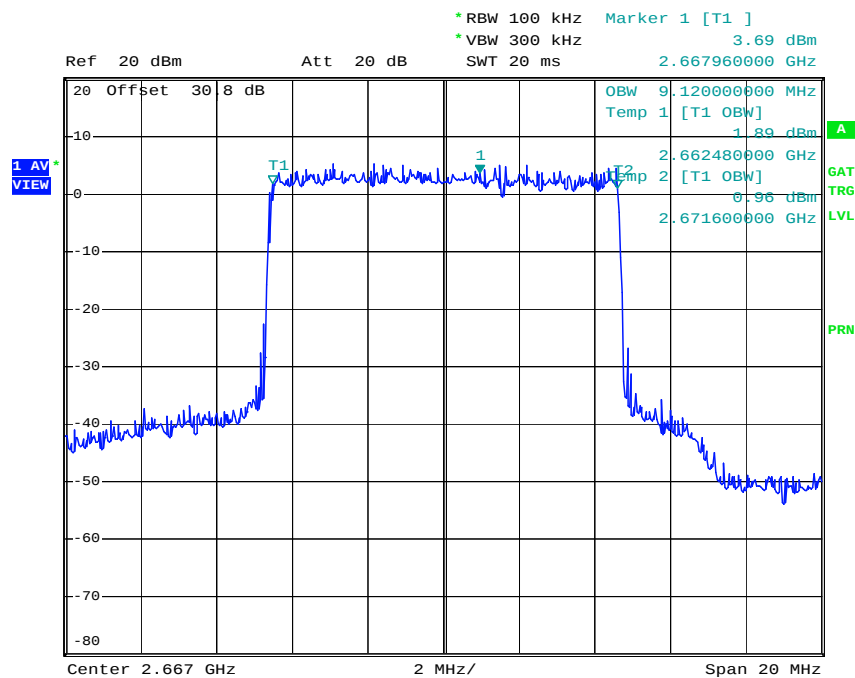
(QPSK Middle Channel)



Date: 11.FEB.2008 15:00:11

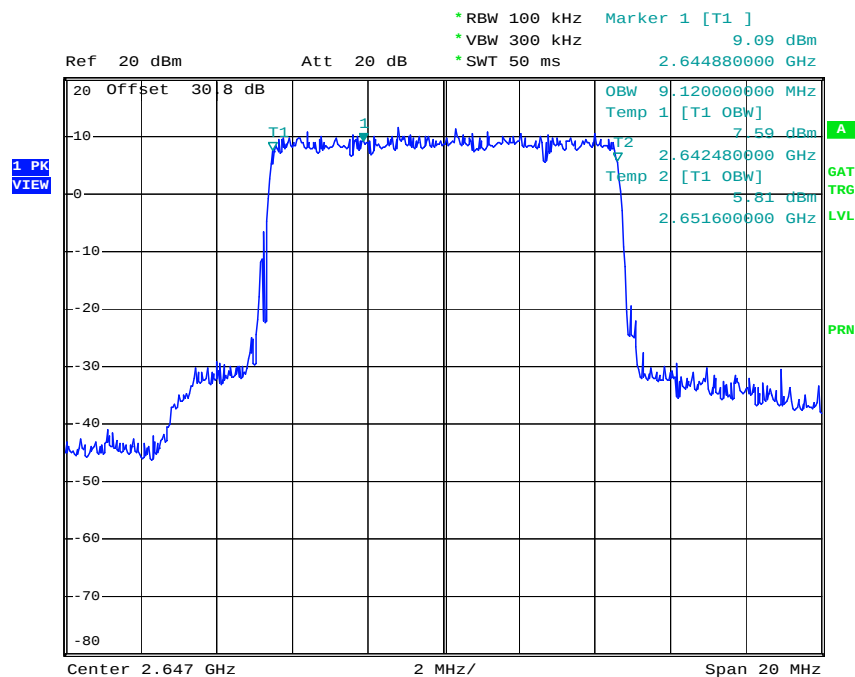
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(QPSK High Channel)



Date: 11.FEB.2008 16:02:15

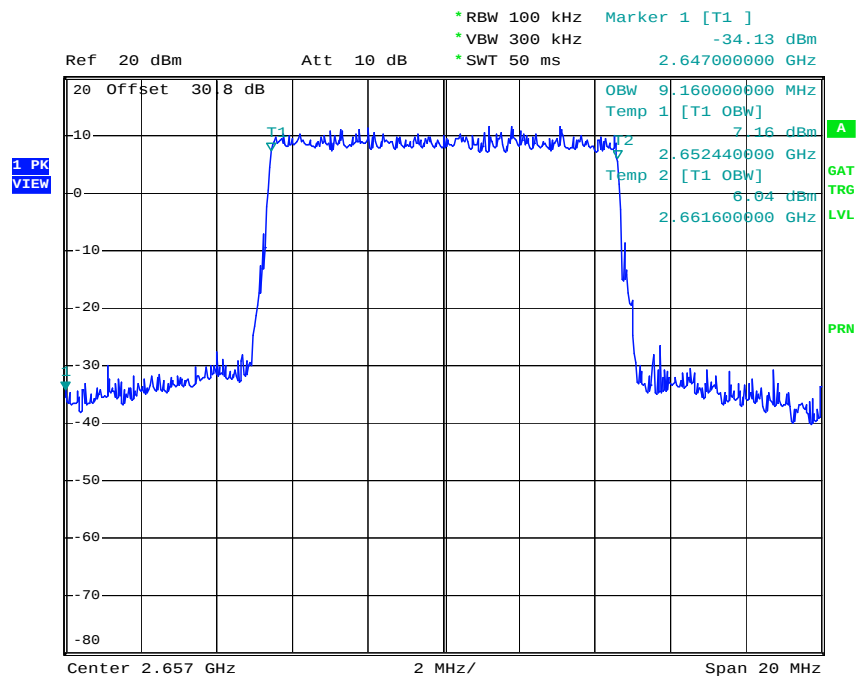
(16QAM Low Channel)



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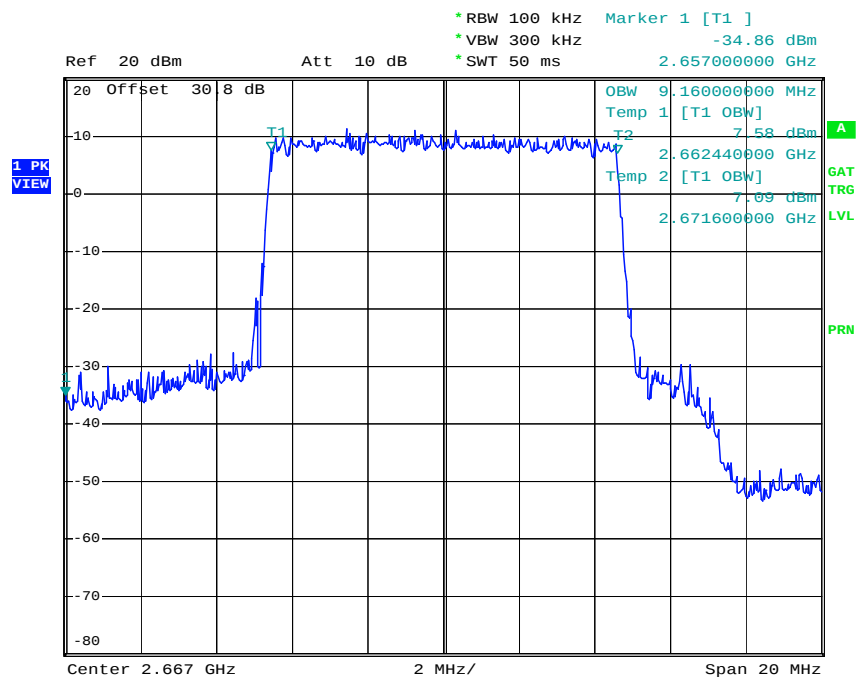
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(16QAM Middle Channel)



Date: 11.FEB.2008 15:00:35

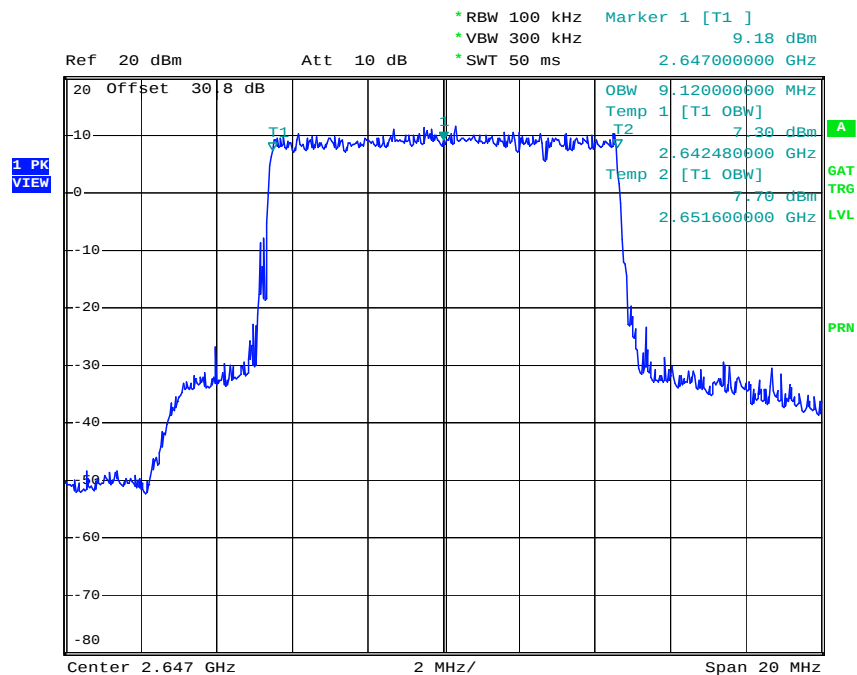
(16QAM High Channel)



Date: 11.FEB.2008 15:06:37

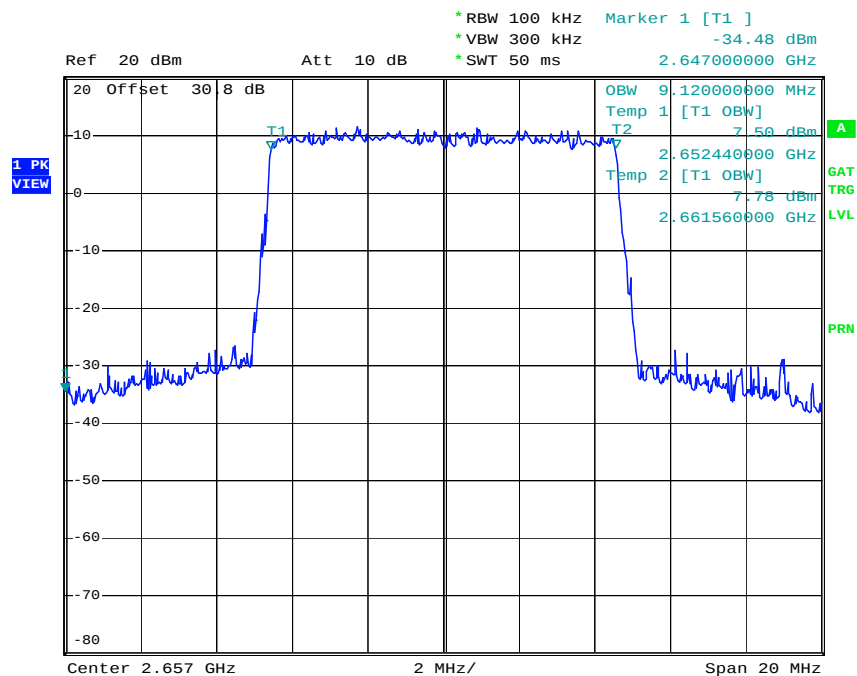
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 27 of 67

(64QAM Low Channel)



Date: 11.FEB.2008 14:58:15

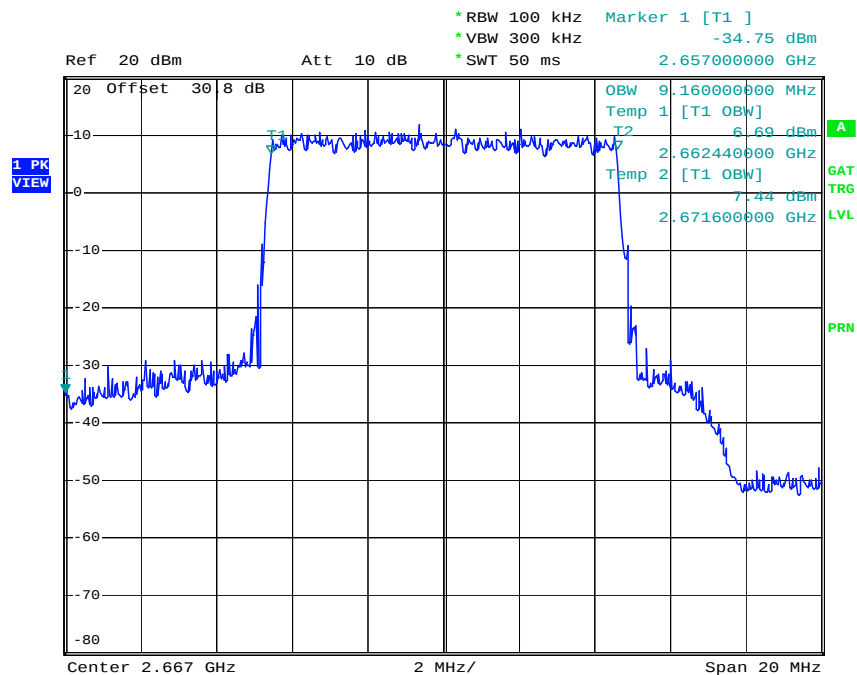
(64QAM Middle Channel)



Date: 11.FEB.2008 15:02:10

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 28 of 67

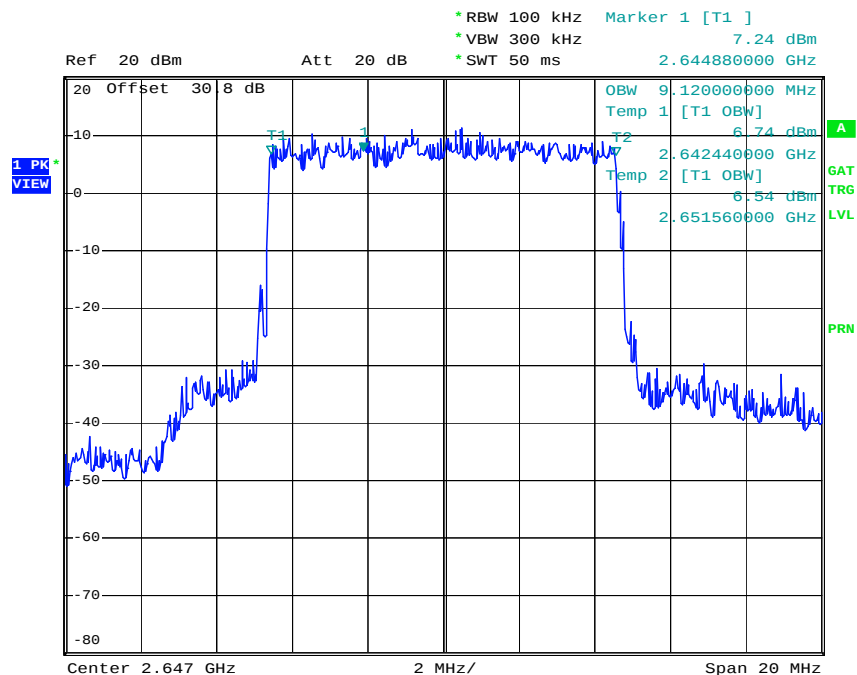
(64QAM High Channel)



Date: 11.FEB.2008 15:04:20

6.4.4. Test Data at Output Port 1

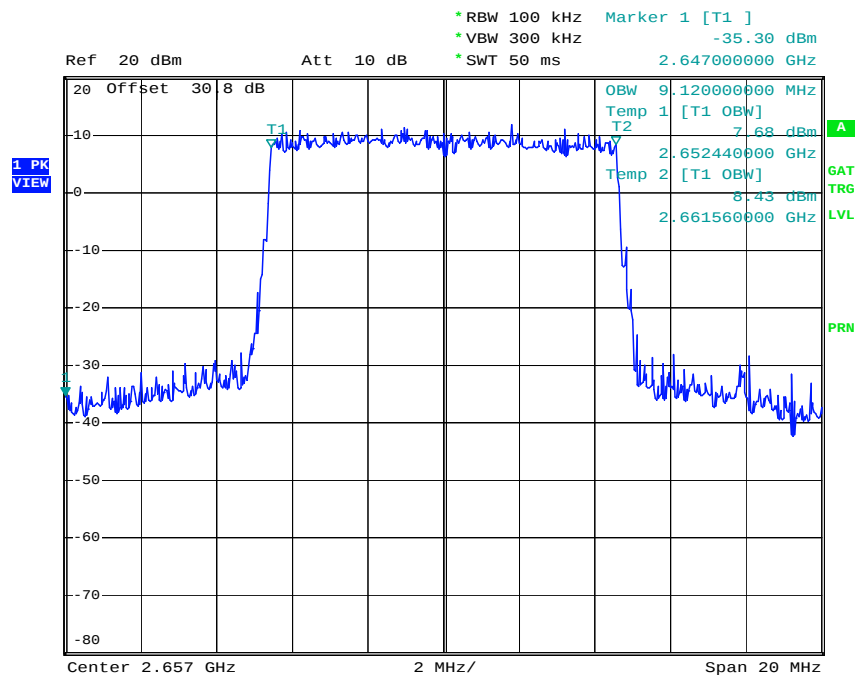
(QPSK Low Channel)



Date: 11.FEB.2008 14:51:20

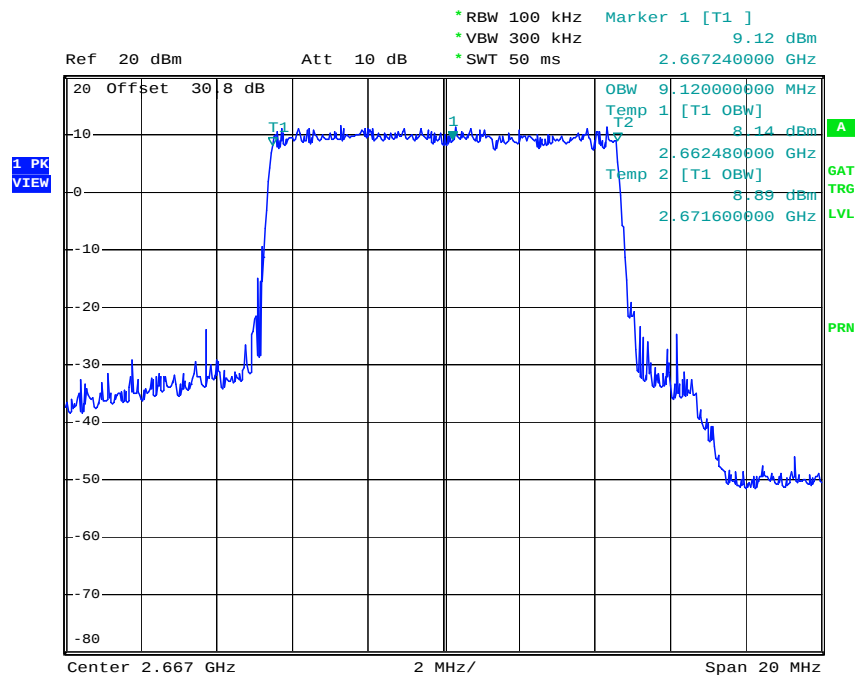
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 29 of 67

(QPSK Middle Channel)



Date: 11.FEB.2008 14:59:11

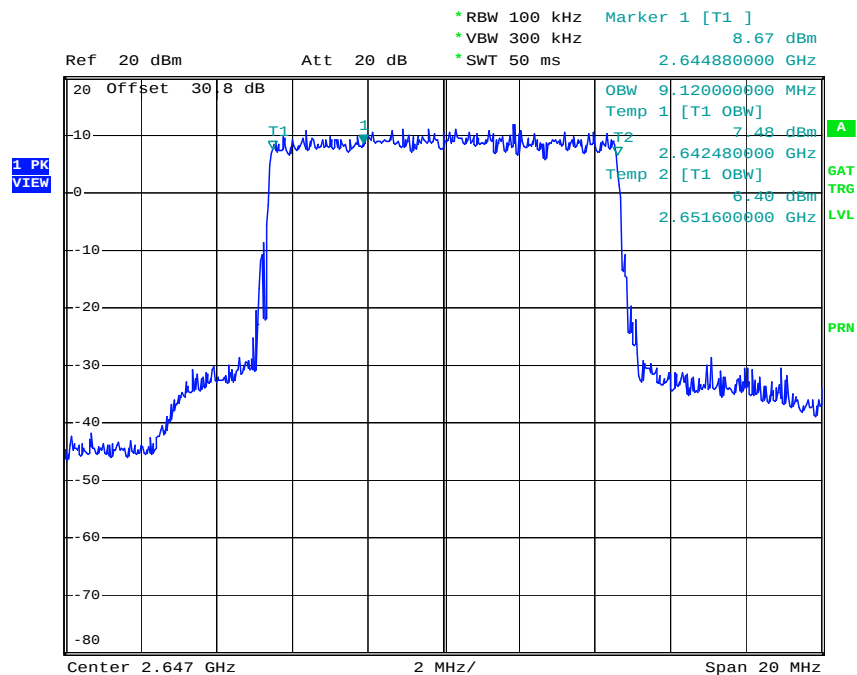
(QPSK High Channel)



Date: 11.FEB.2008 15:07:39

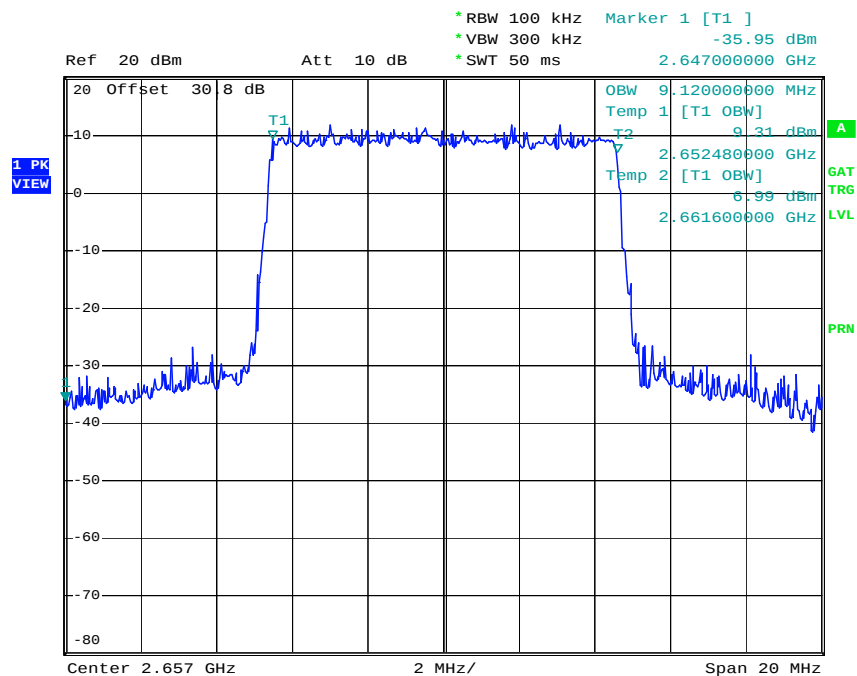
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 30 of 67

(16QAM Low Channel)



Date: 11.FEB.2008 14:51:54

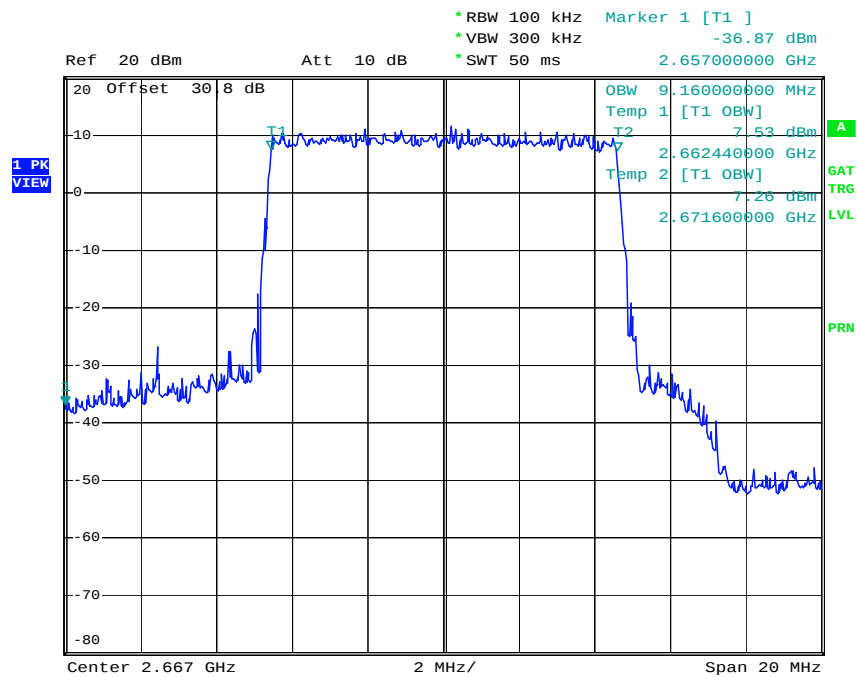
(16QAM Middle Channel)



Date: 11.FEB.2008 15:01:14

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 31 of 67

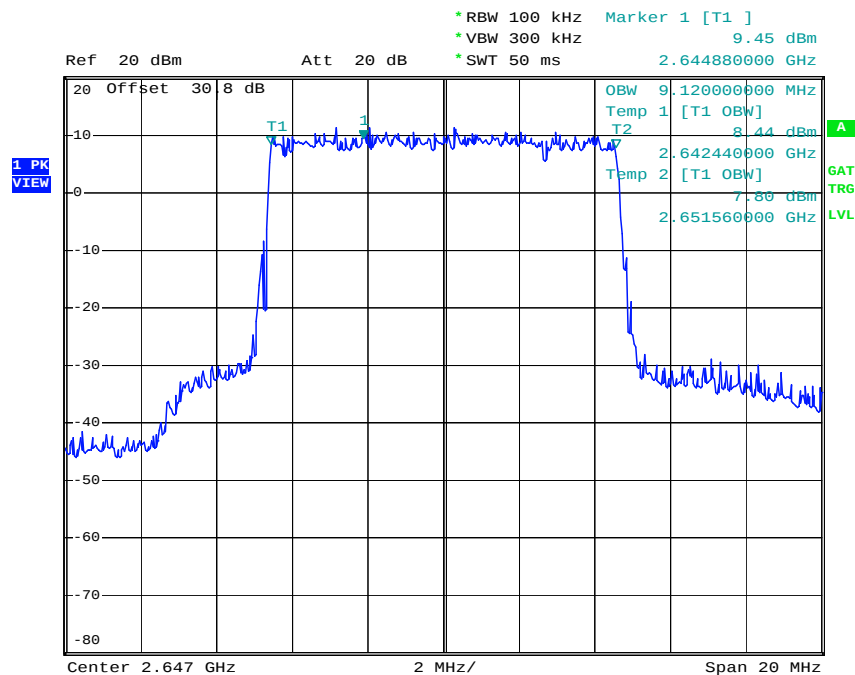
(16QAM High Channel)



Date: 11.FEB.2008 15:06:04

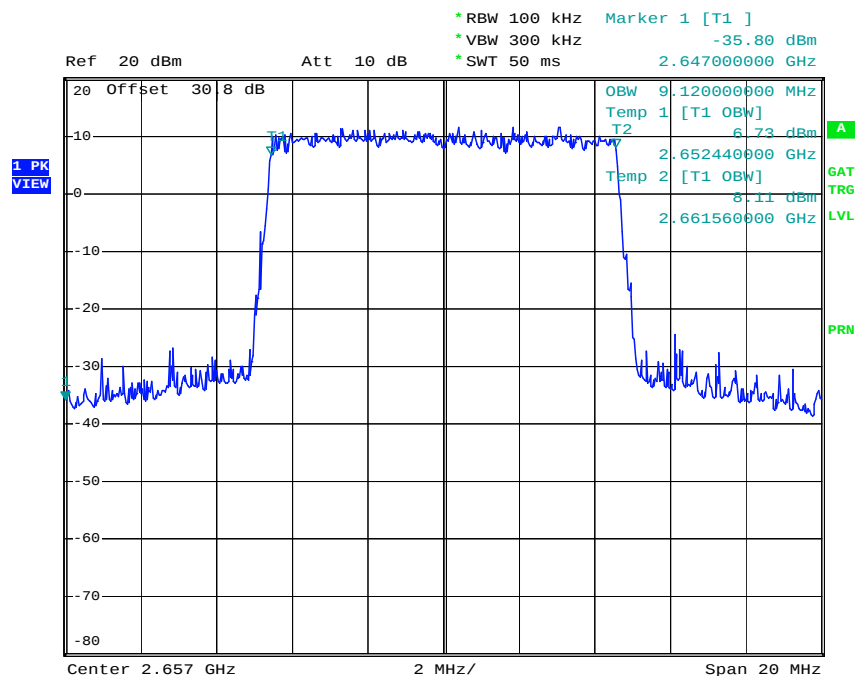
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 32 of 67

(64QAM Low Channel)



Date: 11.FEB.2008 14:53:46

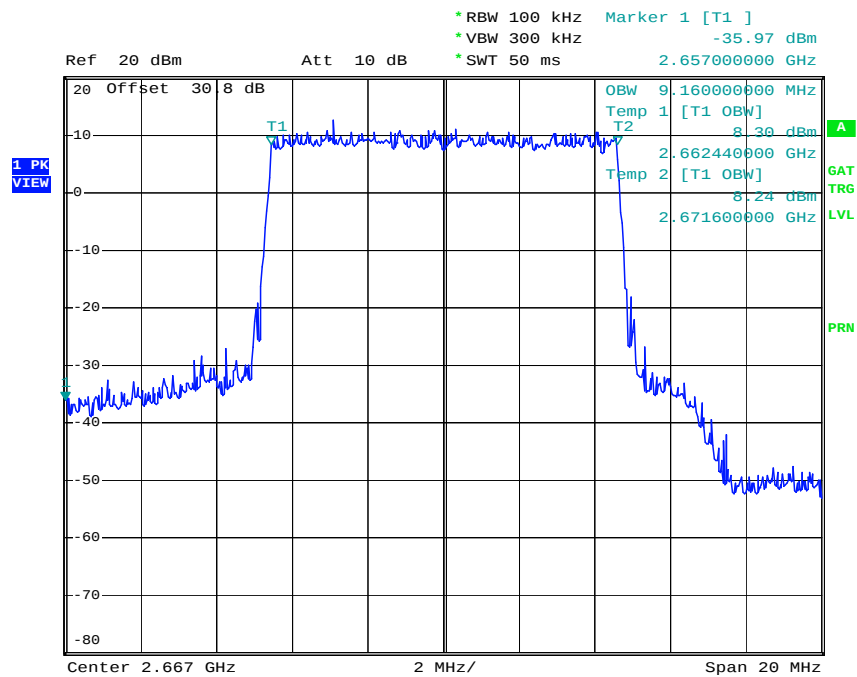
(64QAM Middle Channel)



Date: 11.FEB.2008 15:01:37

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 33 of 67

(64QAM High Channel)



Date: 11.FEB.2008 15:05:17

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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7. BAND EDGES

7.1. Applicable Standard

According to §22.917, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of at least $43 + 10 \log(p)$ dB.

7.2. Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP30	839117/011	06/28/ 2008

7.3. Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency.

The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

7.3.1. Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %

7.4. Test Result

: PASS

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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7.4.1. Test data at Output 0

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2642.00	-38.25	-13.0
	High	2672.00	-39.10	
16QAM	Low	2642.00	-38.46	
	High	2672.00	-38.47	
64QAM	Low	2642.00	-38.26	
	High	2672.00	-38.79	

7.4.2. Test data at Output 1

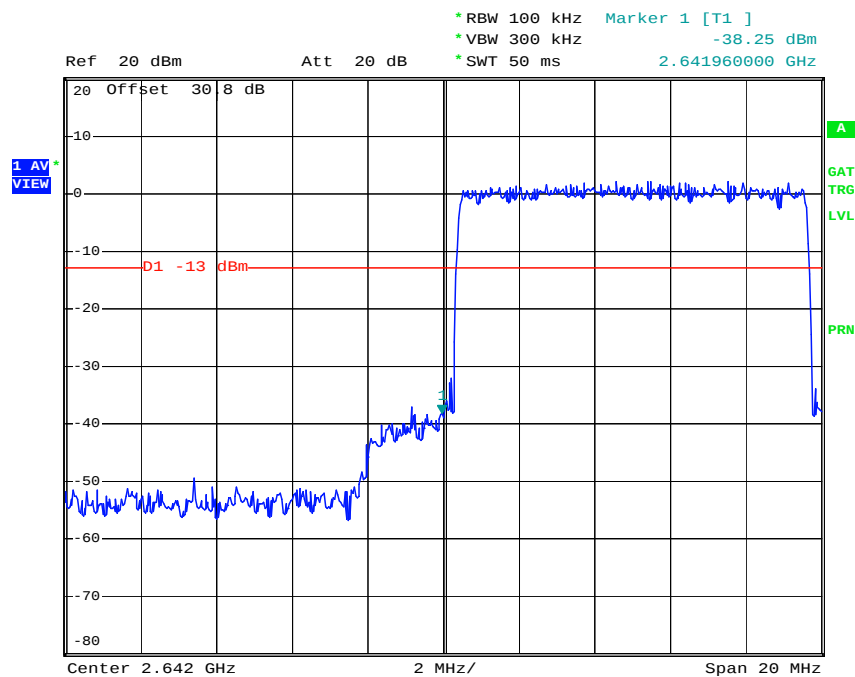
Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2642.00	-37.23	-13.0
	High	2672.00	-39.21	
16QAM	Low	2642.00	-36.99	
	High	2672.00	-39.64	
64QAM	Low	2642.00	-35.14	
	High	2672.00	-38.21	

Combined Test data at Output

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2642.00	-30.36	-13.0
	High	2672.00	-28.29	
16QAM	Low	2642.00	-30.55	
	High	2672.00	-28.79	
64QAM	Low	2642.00	-30.17	
	High	2672.00	-33.32	

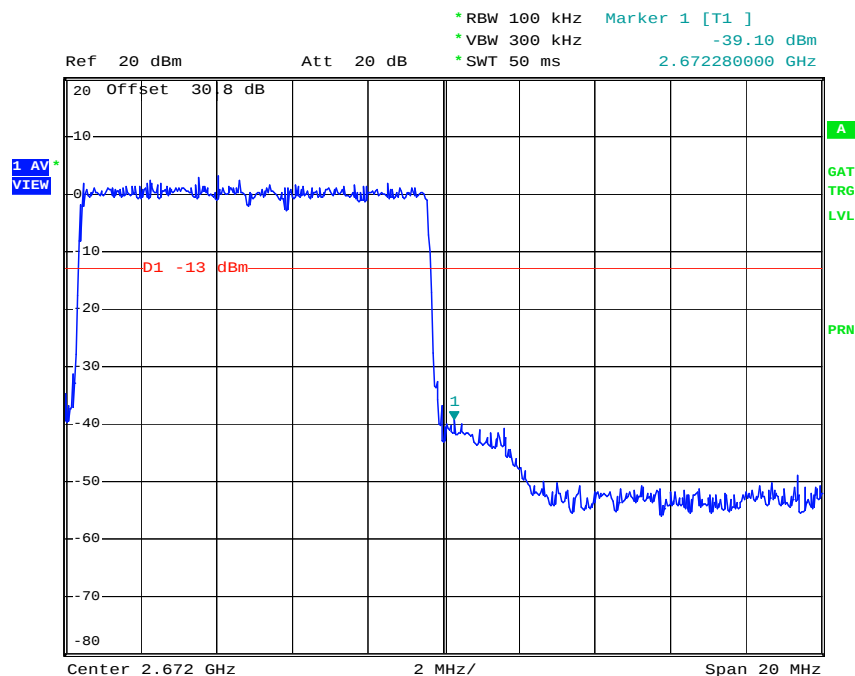
7.4.3. Plot Data at Output 0

(QPSK Low Channel)



Date: 11.FEB.2008 15:23:03

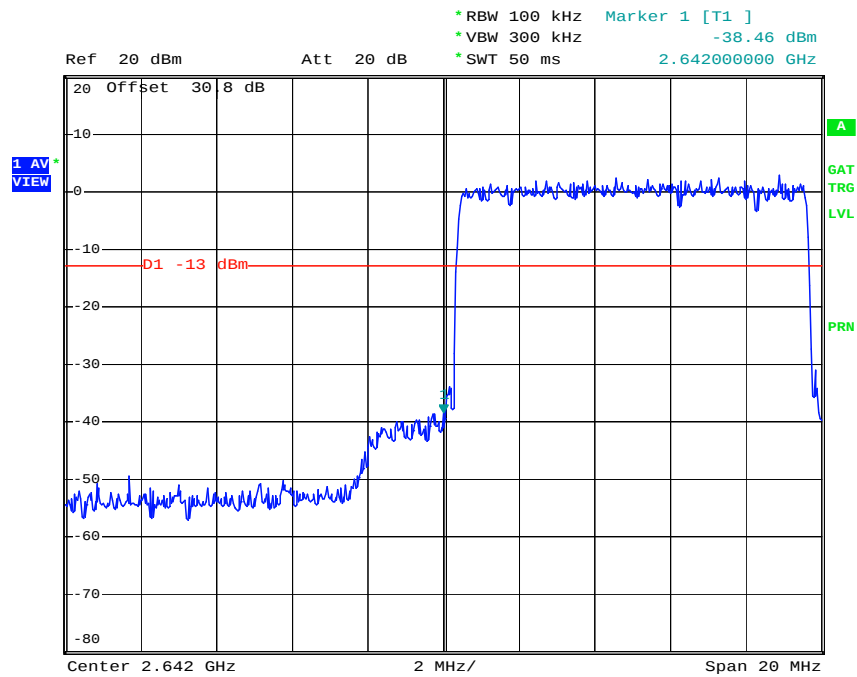
(QPSK High Channel)



Date: 11.FEB.2008 15:14:15

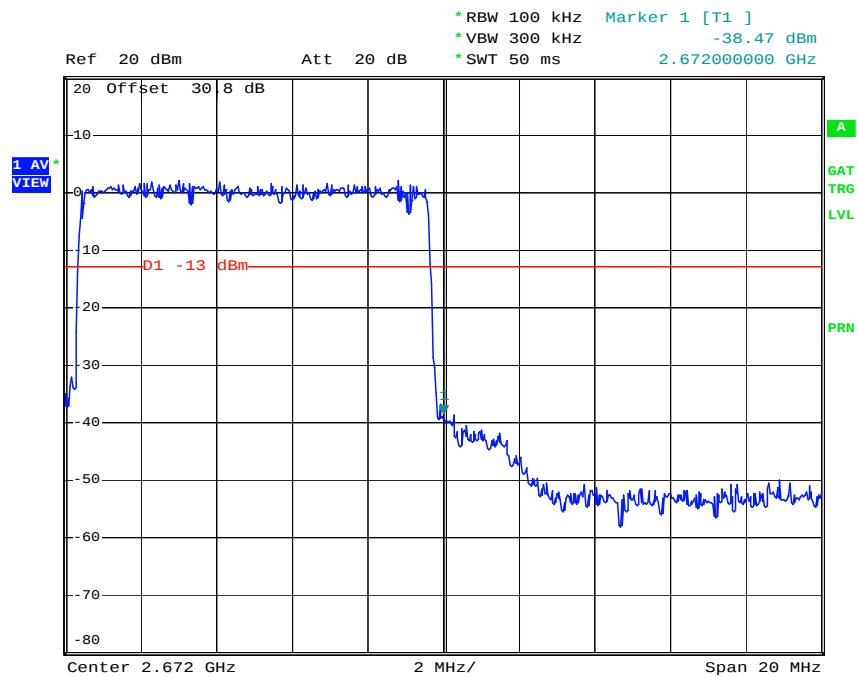
(16QAM Low Channel)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 37 of 67



Date: 11.FEB.2008 15:21:55

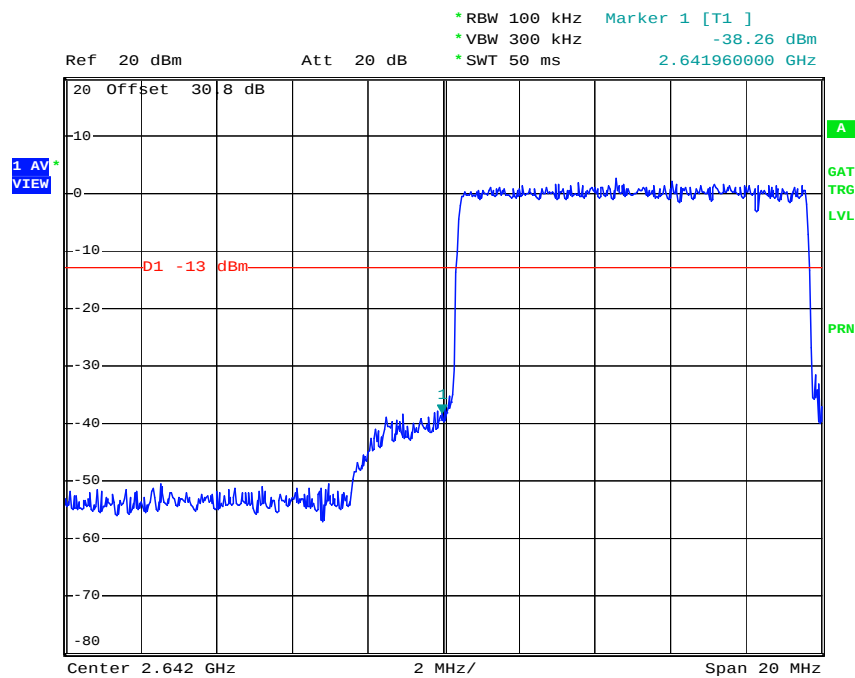
(16QAM High Channel)



Date: 11.FEB.2008 15:18:36

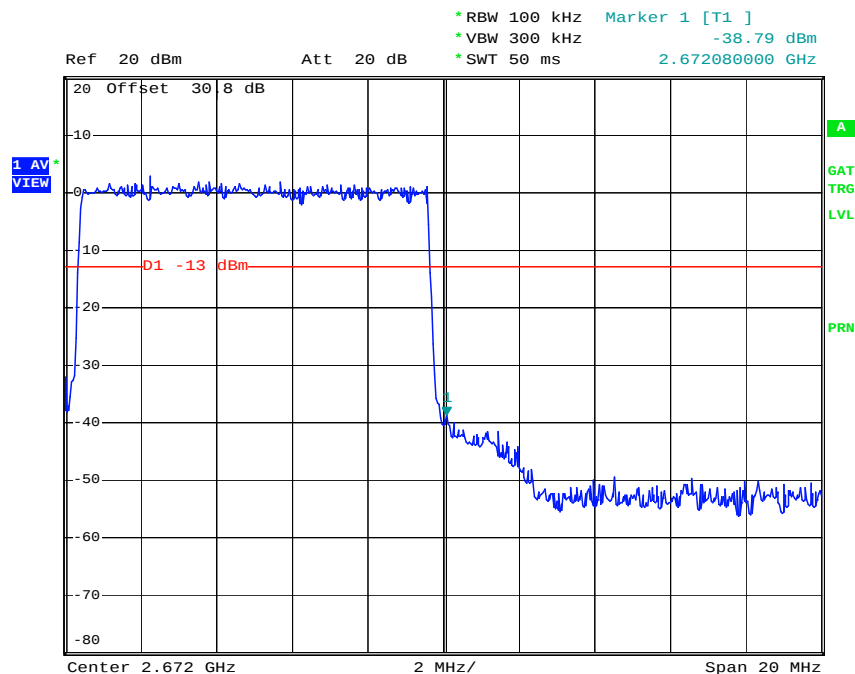
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)



Date: 11.FEB.2008 15:23:35

(64QAM High Channel)

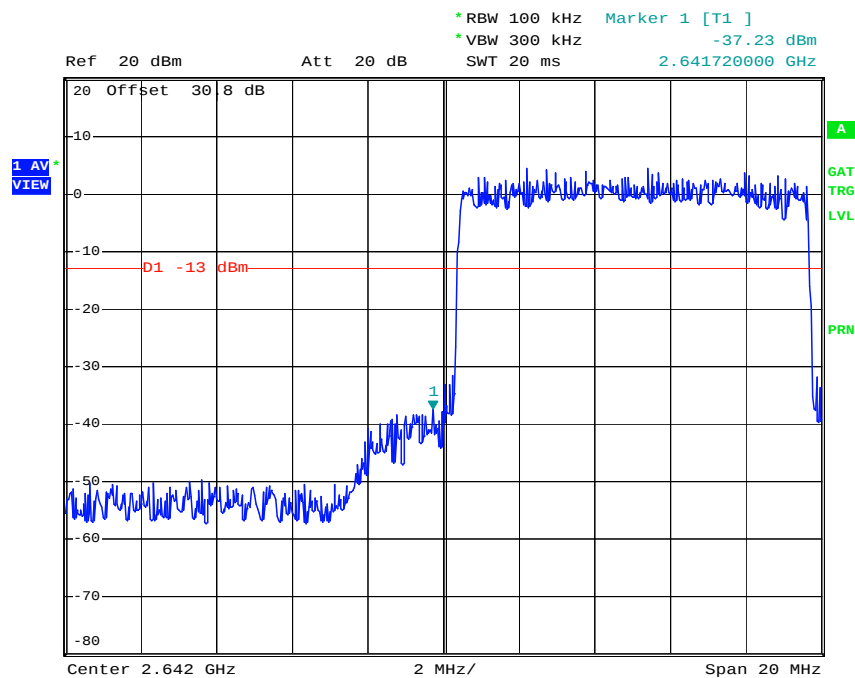


Date: 11.FEB.2008 15:17:46

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 39 of 67

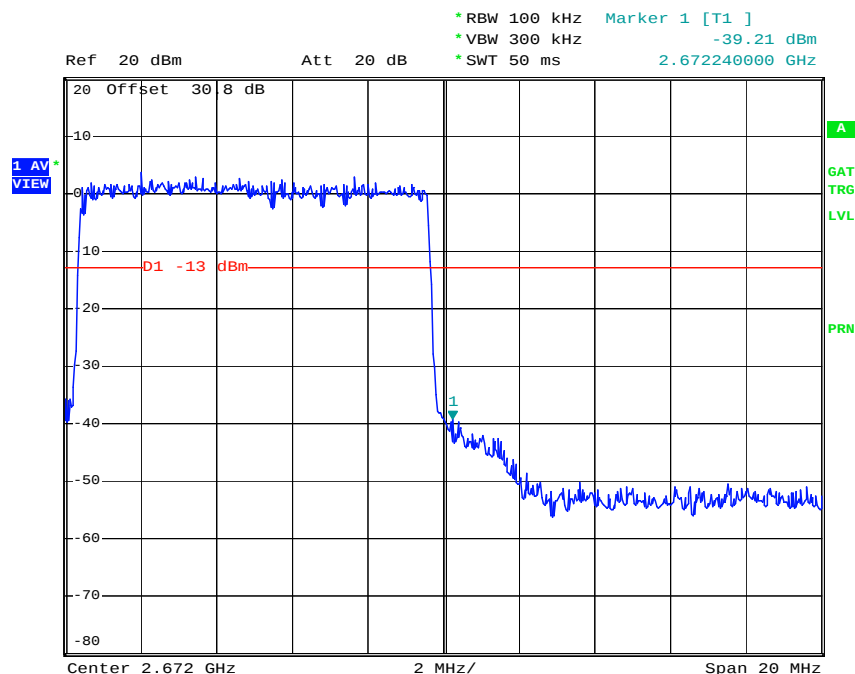
7.4.4. Plot Data at Output 1

(QPSK Low Channel)



Date: 11.FEB.2008 16:01:09

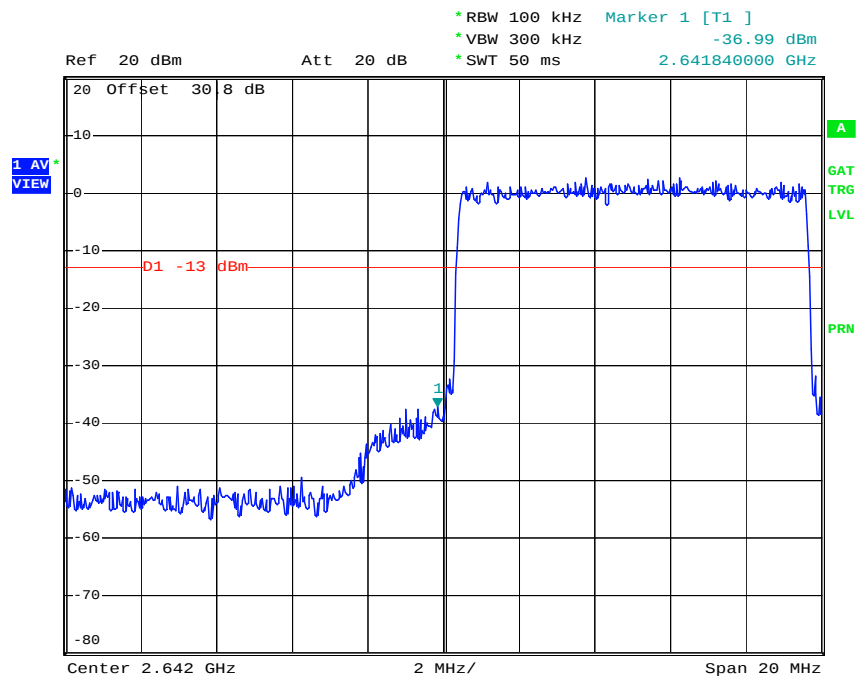
(QPSK High Channel)



Date: 11.FEB.2008 15:15:35

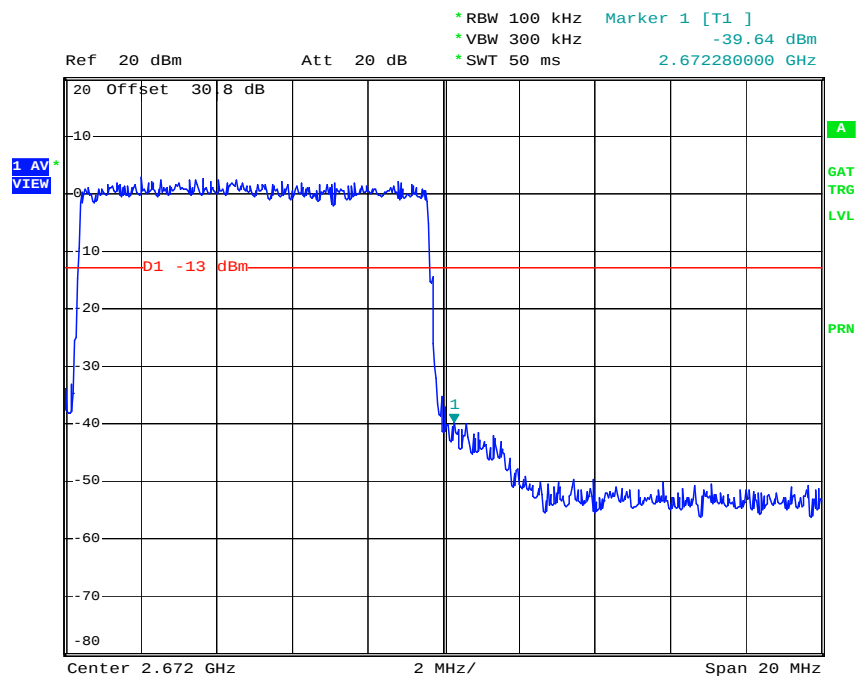
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 40 of 67

(16QAM Low Channel)



Date: 11.FEB.2008 15:25:01

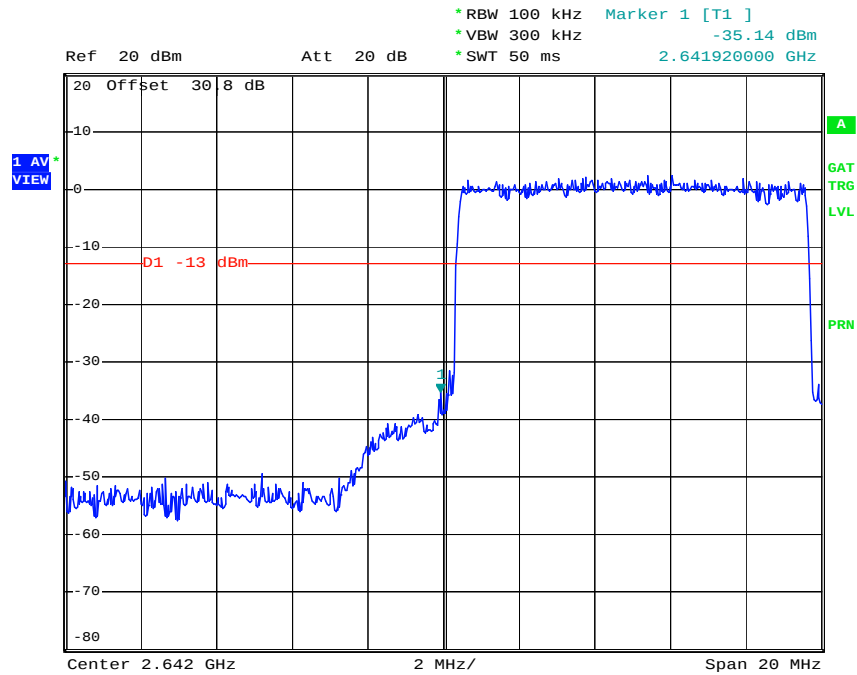
(16QAM High Channel)



Date: 11.FEB.2008 15:16:16

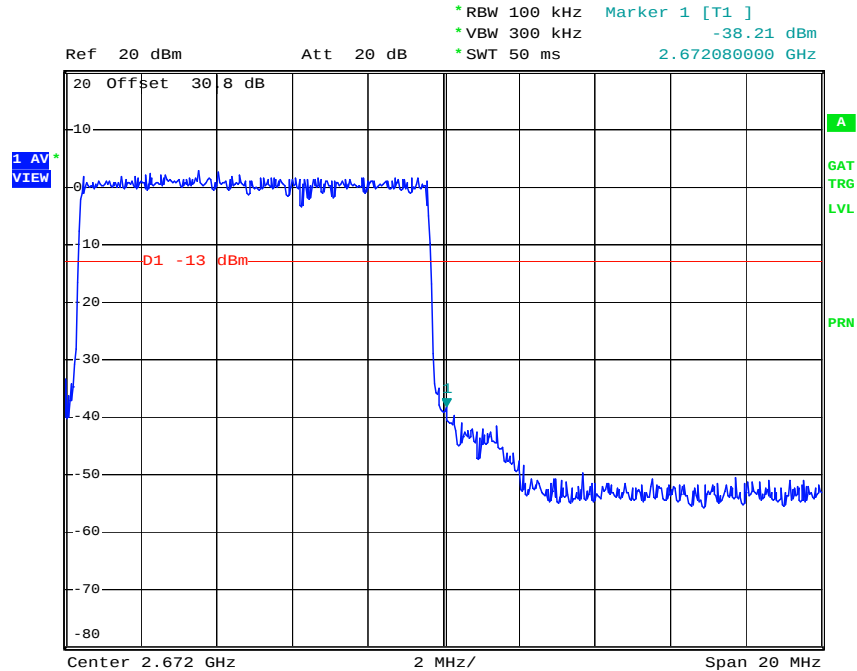
(64QAM Low Channel)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 41 of 67



Date: 11.FEB.2008 15:24:33

(64QAM High Channel)

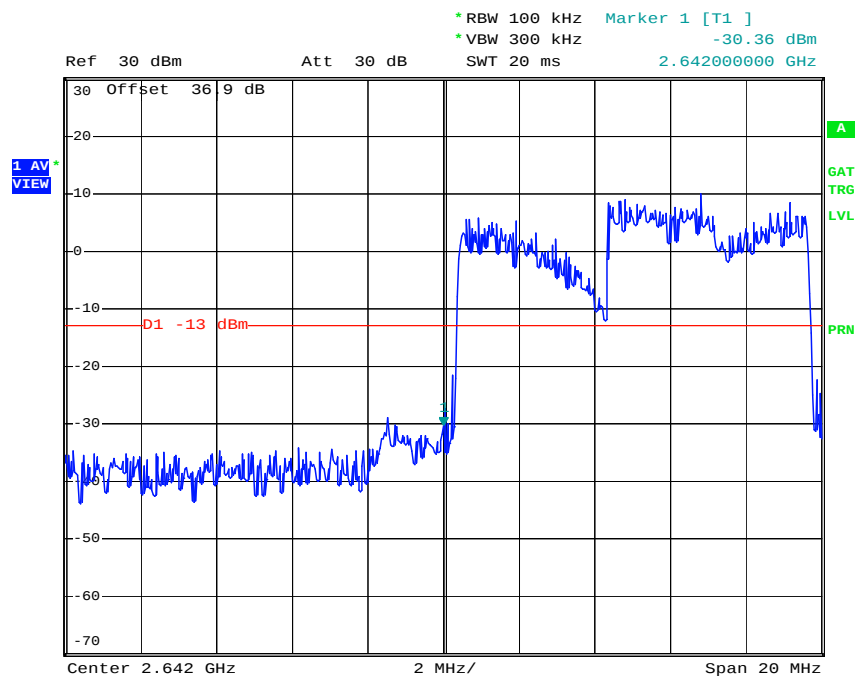


Date: 11.FEB.2008 15:16:48

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 42 of 67

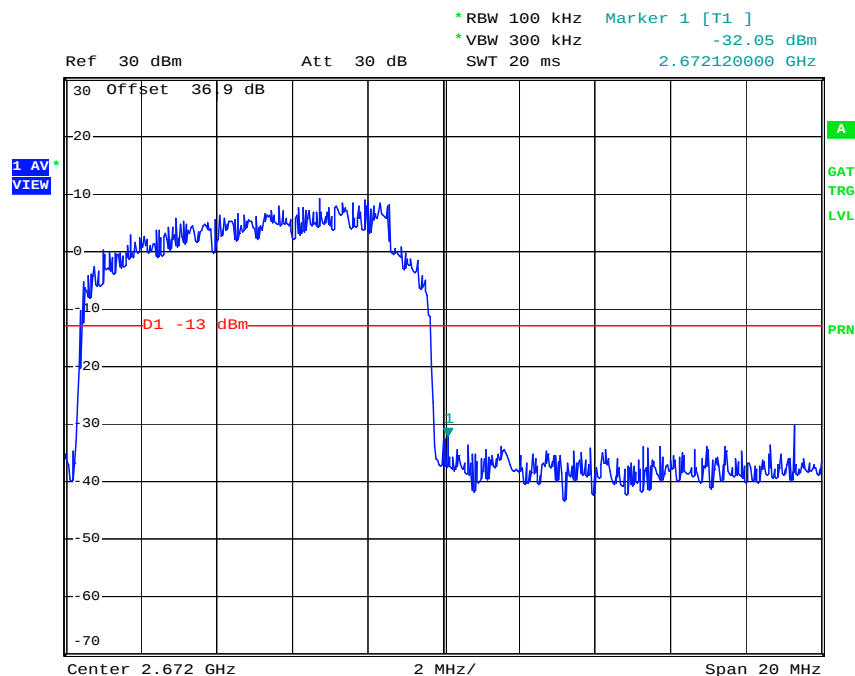
7.4.4. Plot Data at Combined Output

(QPSK Low Channel)



Date: 11.FEB.2008 15:46:56

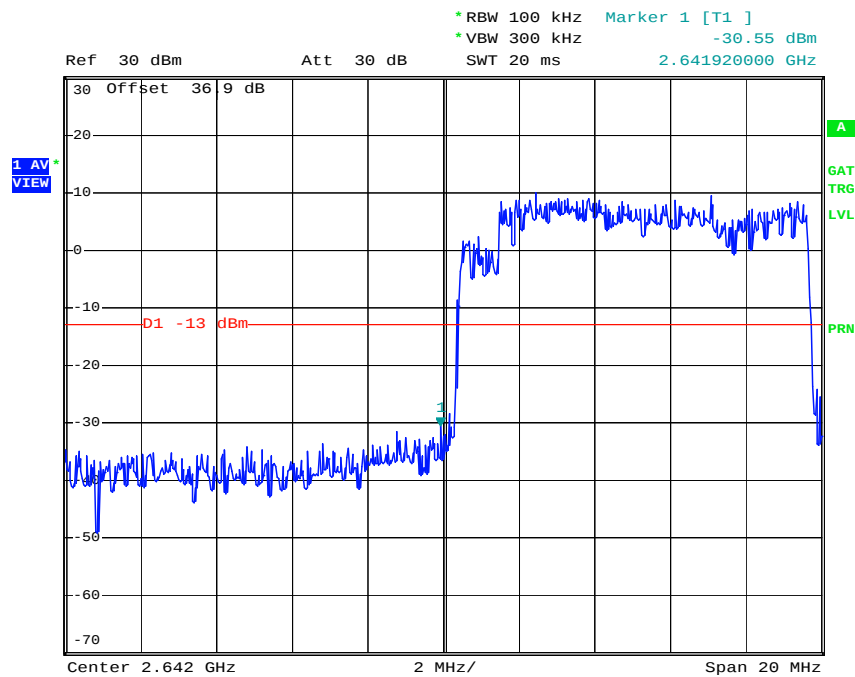
(QPSK High Channel)



Date: 11.FEB.2008 17:37:41

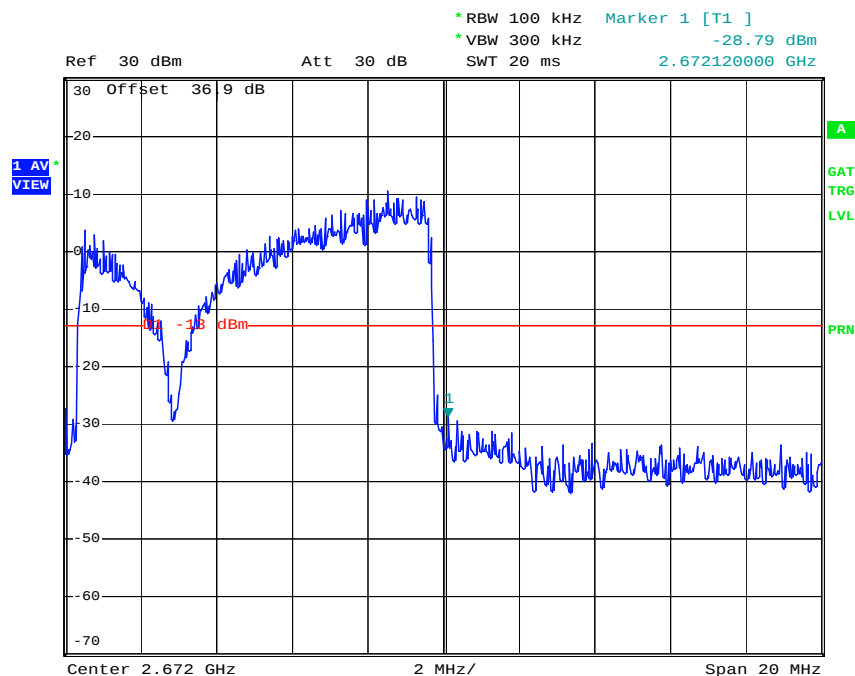
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(16QAM Low Channel)



Date: 11.FEB.2008 17:31:40

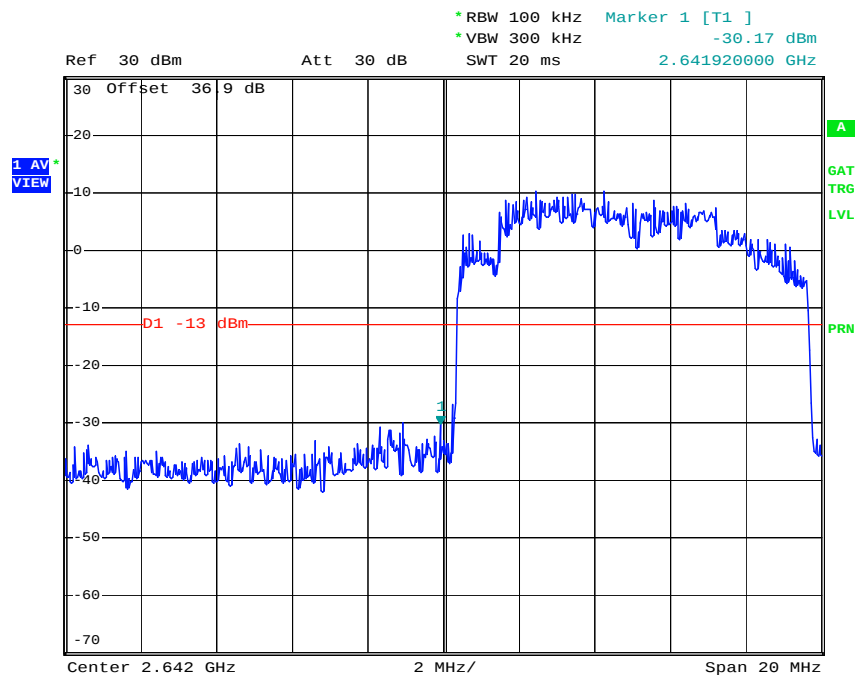
(16QAM High Channel)



Date: 11.FEB.2008 17:27:44

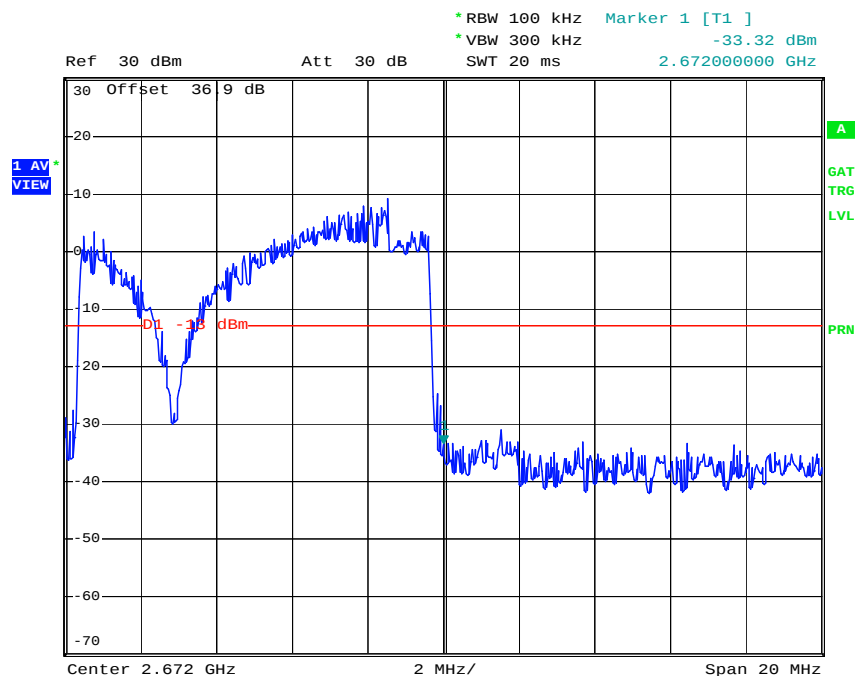
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM Low Channel)



Date: 11.FEB.2008 17:30:02

(64QAM High Channel)



Date: 11.FEB.2008 17:28:52

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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8. SPURIOUS EMISSION AT ANTENNA TERMINAL

8.1. Applicable Standard Requirements:

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

8.2. Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
ADVANTEST	Spectrum Analyzer	R3273	J004821	05/02/2008
WEINSCHL	Attenuator	67-30-33	BR0530	01/22/2008

8.3. 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.

The EUT provides the MIMO function which is able to transmit on the same channel with same data simultaneously therefore a combiner is used to sum the individual transmitter output power.

The test data is shown as a combined output in the report.

8.3.1 Environmental Conditions:

Temperature:	25 °C
Relative Humidity:	59 %

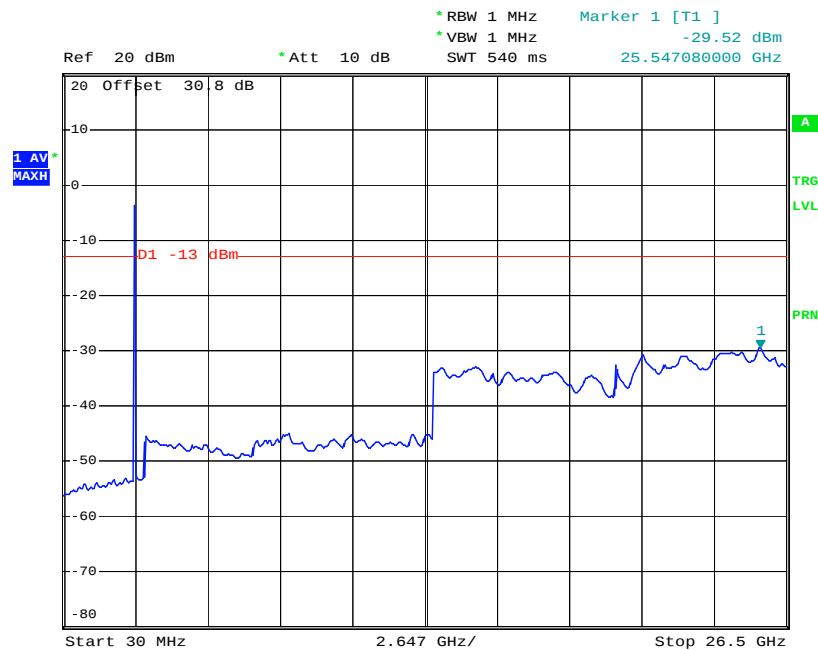
8.4. Test Result

: Pass

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 46 of 67

8.4.1. Plot Data at Output 0

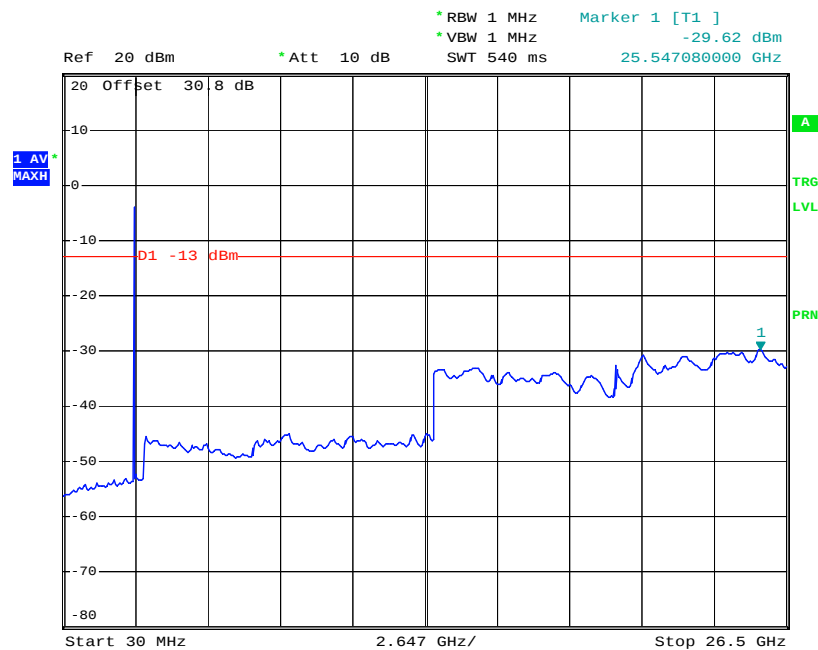
(QPSK Low Channel)



Date: 11.FEB.2008 18:05:54

(30 MHz~26.5 GHz)

(QPSK Middle Channel)

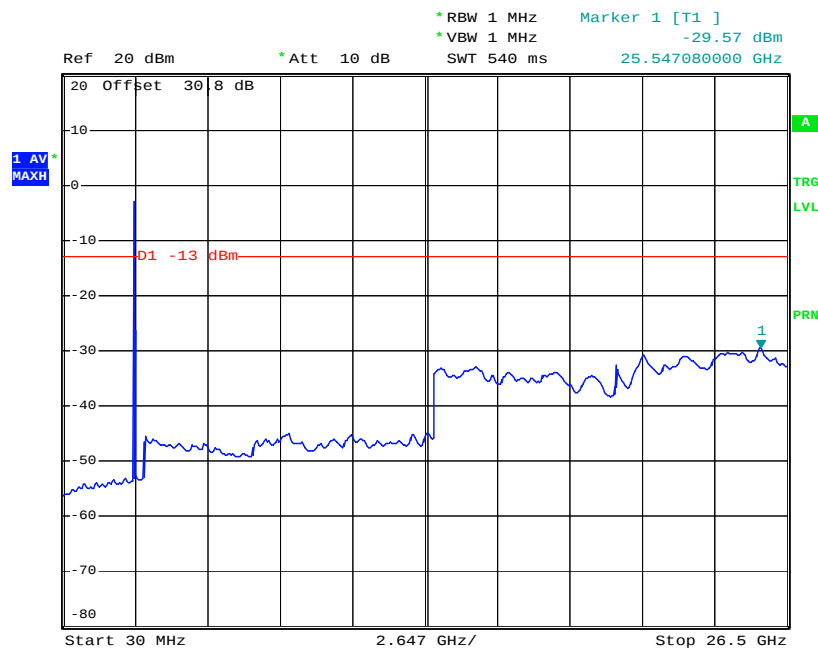


Date: 11.FEB.2008 18:15:09

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 47 of 67

(30 MHz ~ 26.5 GHz)

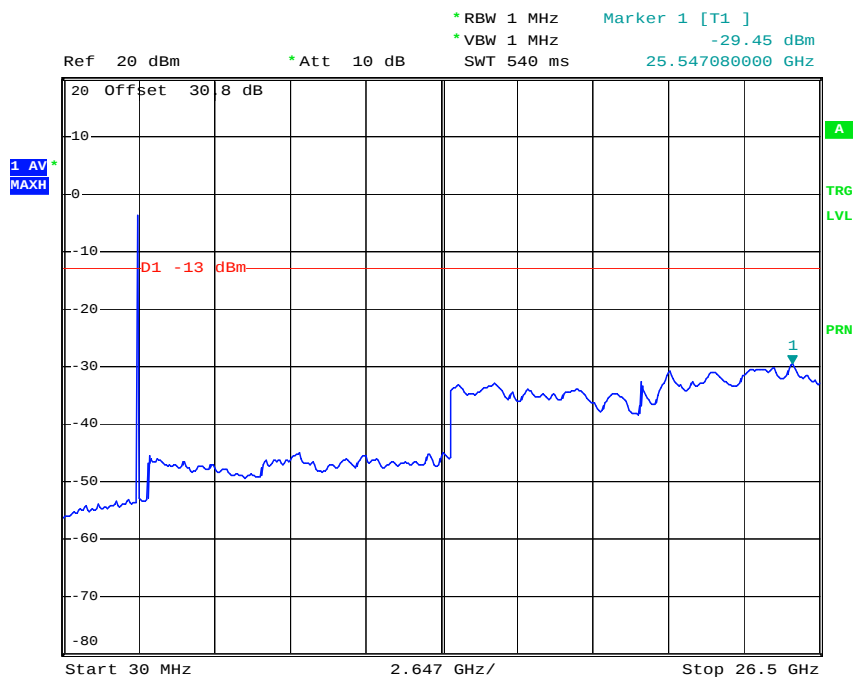
(QPSK High Channel)



Date: 11.FEB.2008 18:18:08

(30 MHz~26.5 GHz)

16QAM LOW Channel)

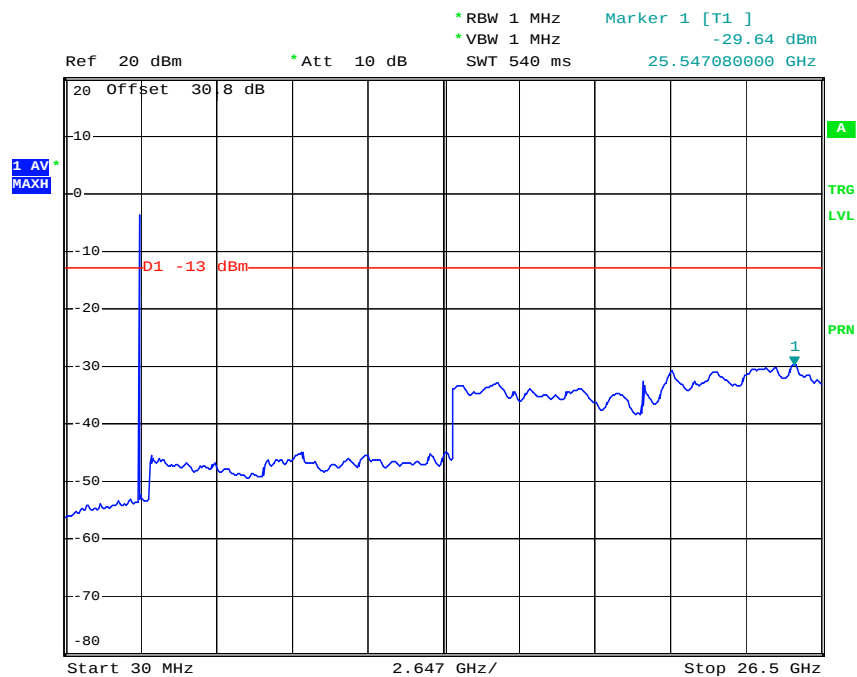


Date: 11.FEB.2008 18:06:27

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 48 of 67

(30 MHz~26.5 GHz)

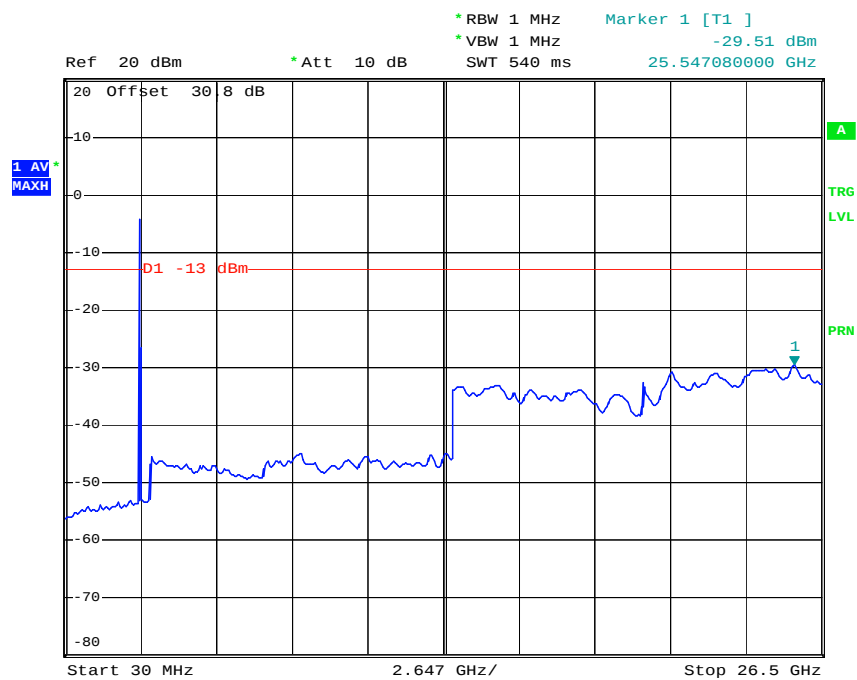
(16QAM Middle Channel)



Date: 11.FEB.2008 18:13:21

(30 MHz ~ 26.5 GHz)

(16QAM High Channel)

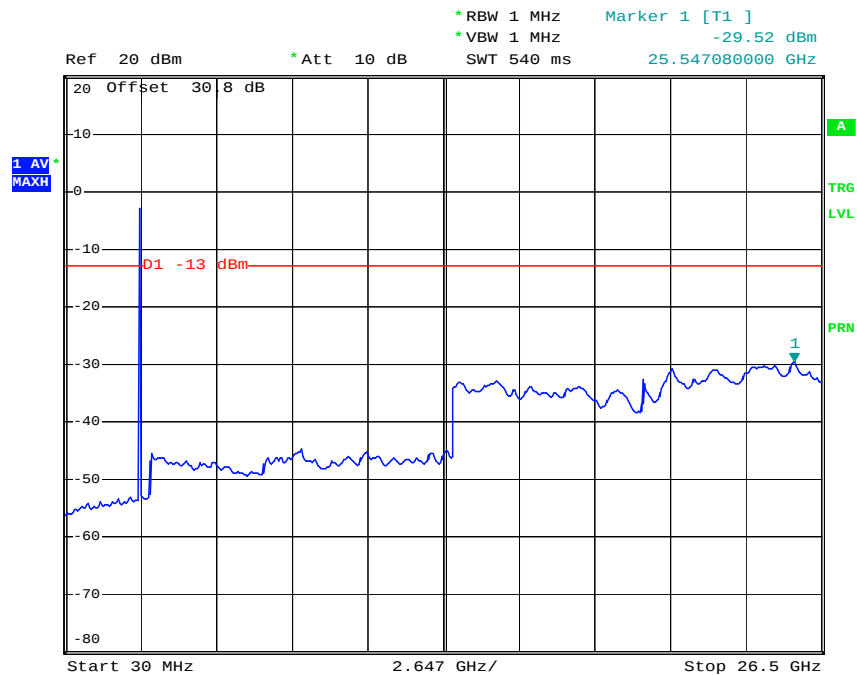


Date: 11.FEB.2008 18:18:53

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 49 of 67

(30 MHz ~ 26.5 GHz)

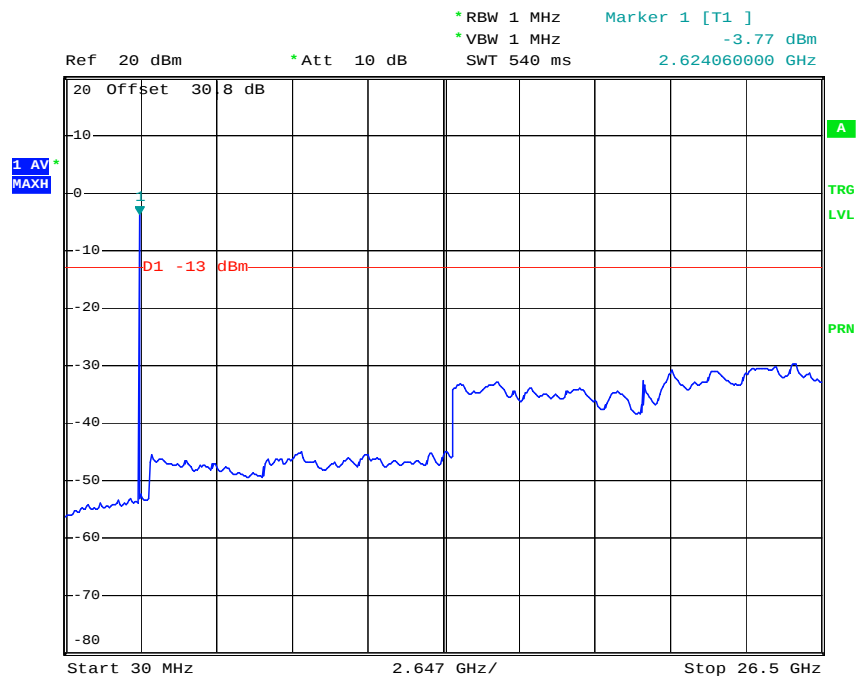
(64QAM Low Channel)



Date: 11.FEB.2008 18:07:07

(30 MHz ~ 26.5 GHz)

(64QAM Middle Channel)

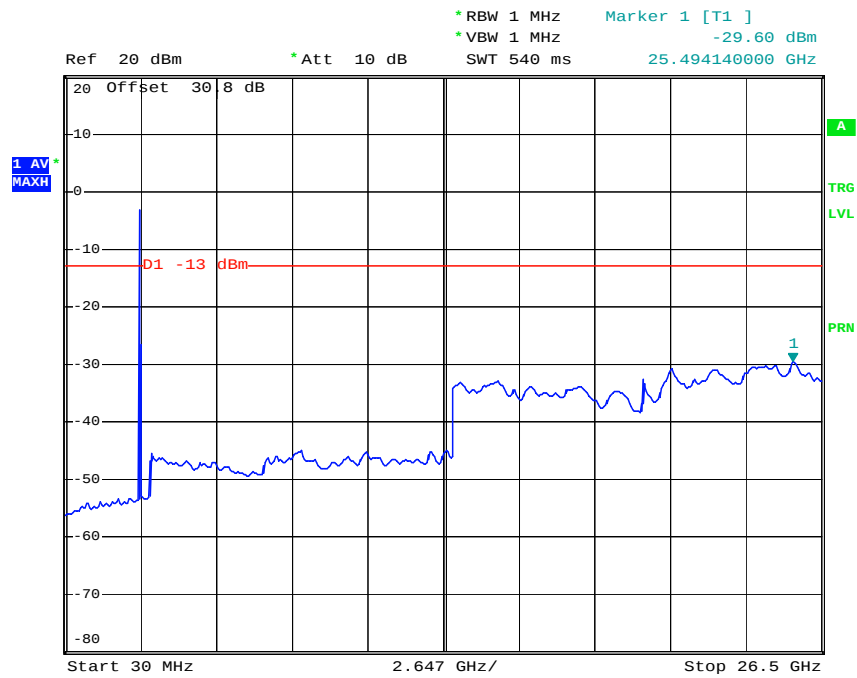


Date: 11.FEB.2008 18:12:43

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(30 MHz ~ 26.5 GHz)

(64QAM High Channel)



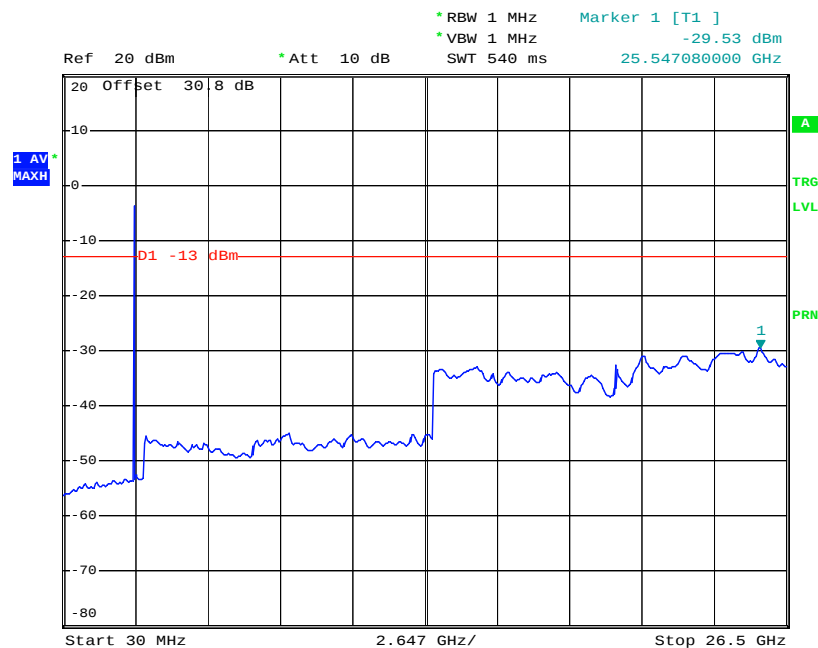
Date: 11.FEB.2008 18:19:50

(30 MHz ~ 26.5 GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 51 of 67

8.4.2. Plot Data at Output 1

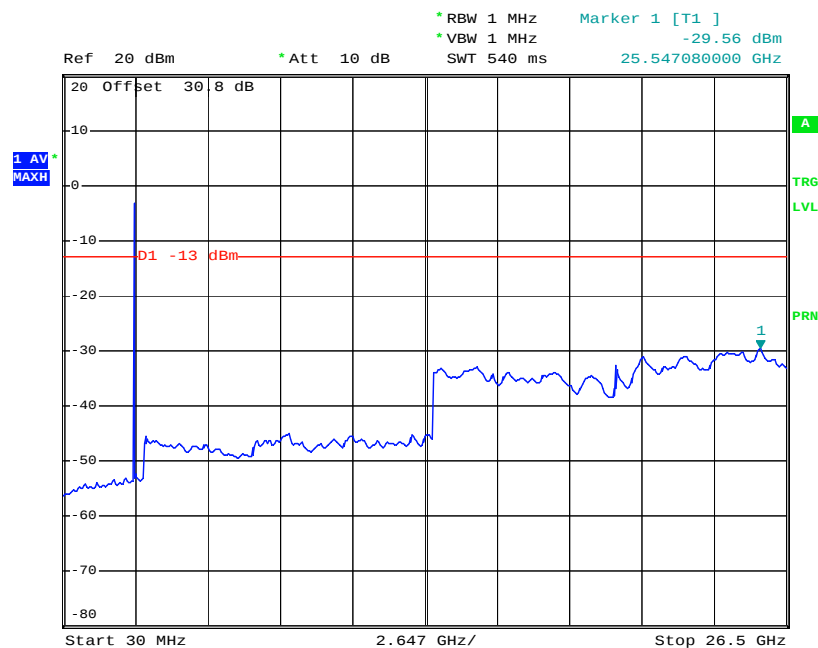
(QPSK Low Channel)



Date: 11.FEB.2008 18:04:42

(30 MHz ~ 26.5 GHz)

(QPSK Middle Channel)

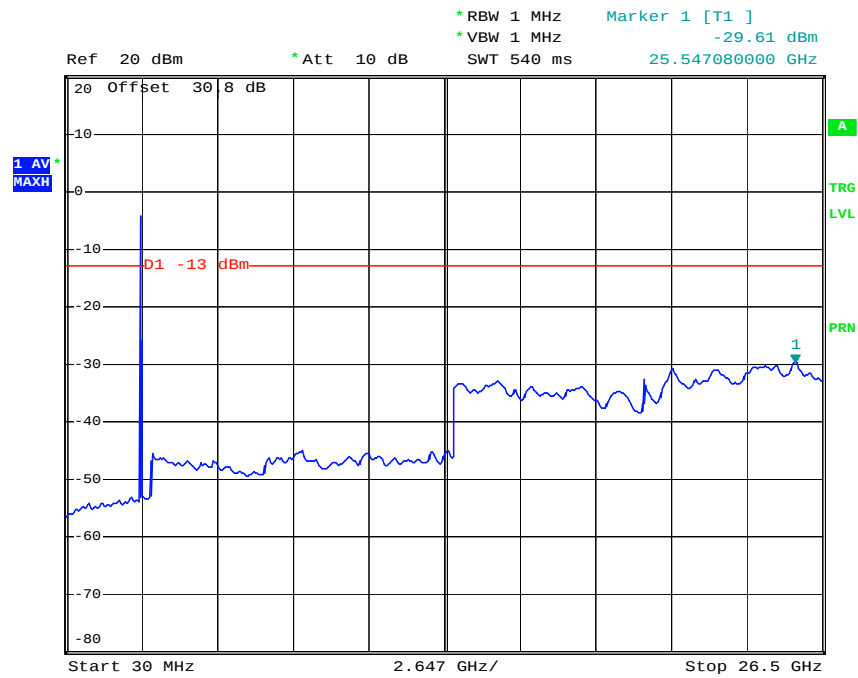


Date: 11.FEB.2008 18:09:55

(30 MHz ~ 26.5 GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 52 of 67

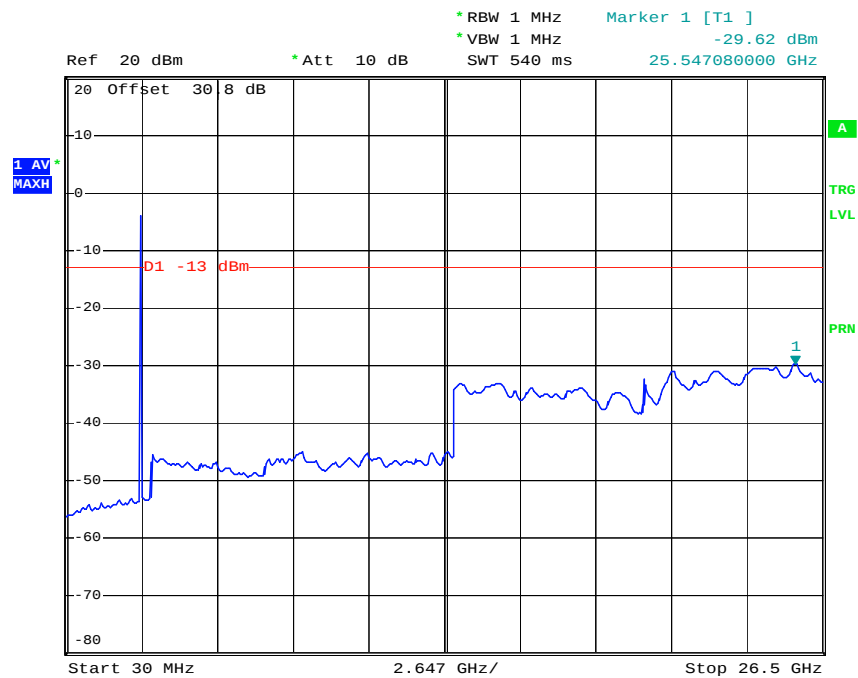
(QPSK High Channel)



Date: 11.FEB.2008 18:22:07

(30MHz ~ 26.5GHz)

(16QAM Low Channel)

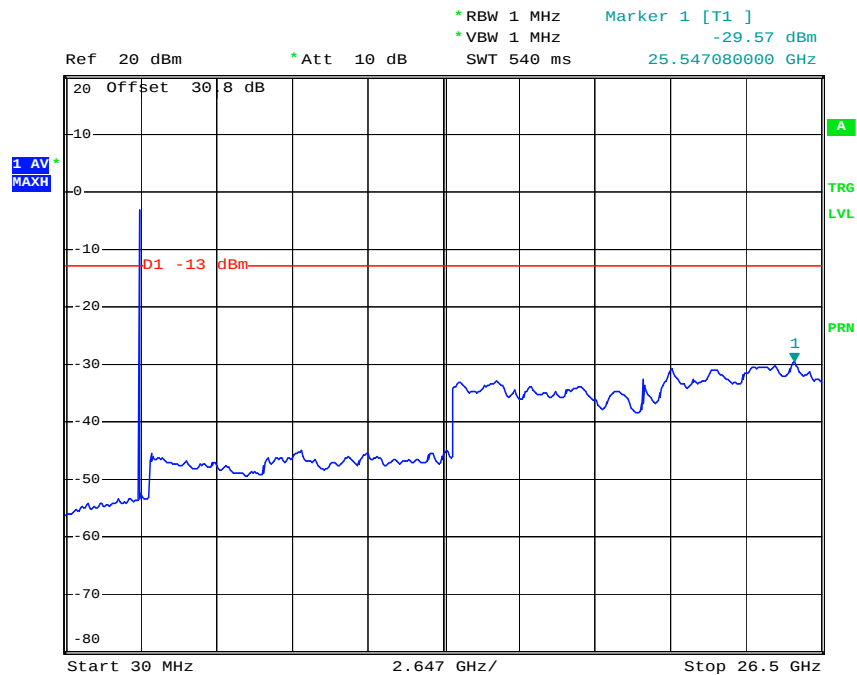


Date: 11.FEB.2008 18:08:49

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R08-012	Test Dates: February 22, 2008	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2331022500	Page 53 of 67

(30MHz ~ 26.5GHz)

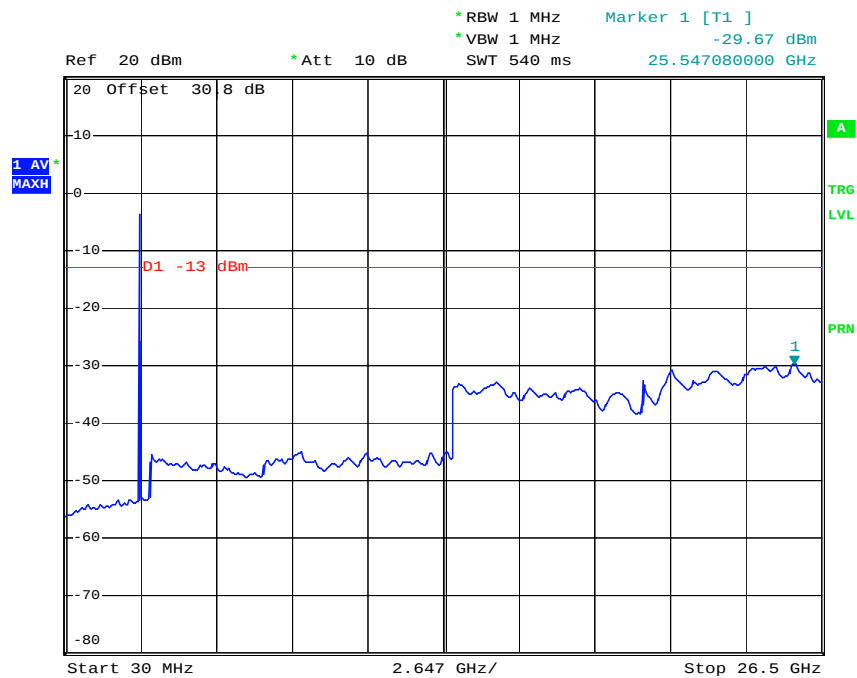
(16QAM Middle Channel)



Date: 11.FEB.2008 18:10:32

(30MHz ~ 26.5GHz)

(16QAM High Channel)

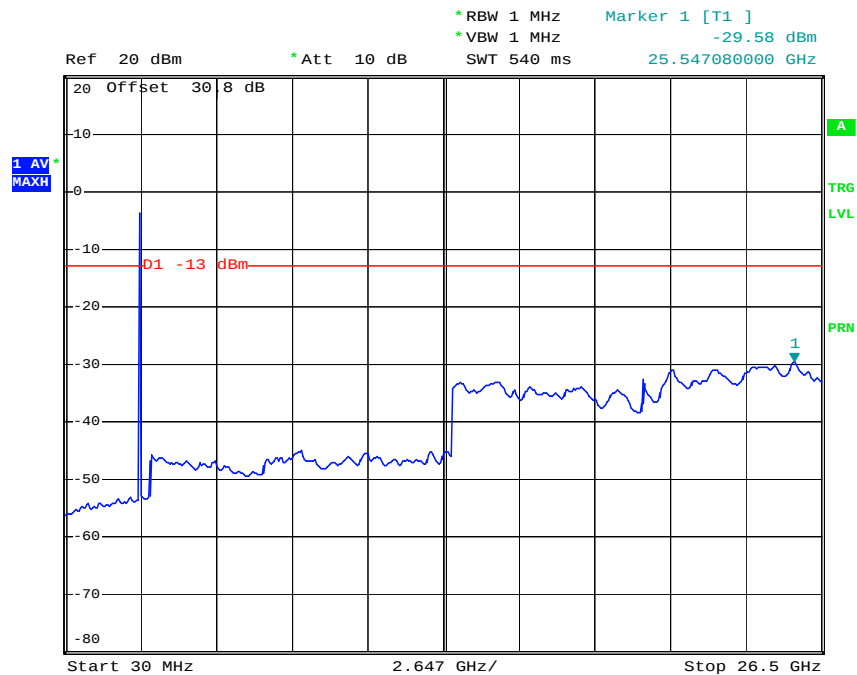


Date: 11.FEB.2008 18:21:25

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(30MHz ~ 26.5GHz)

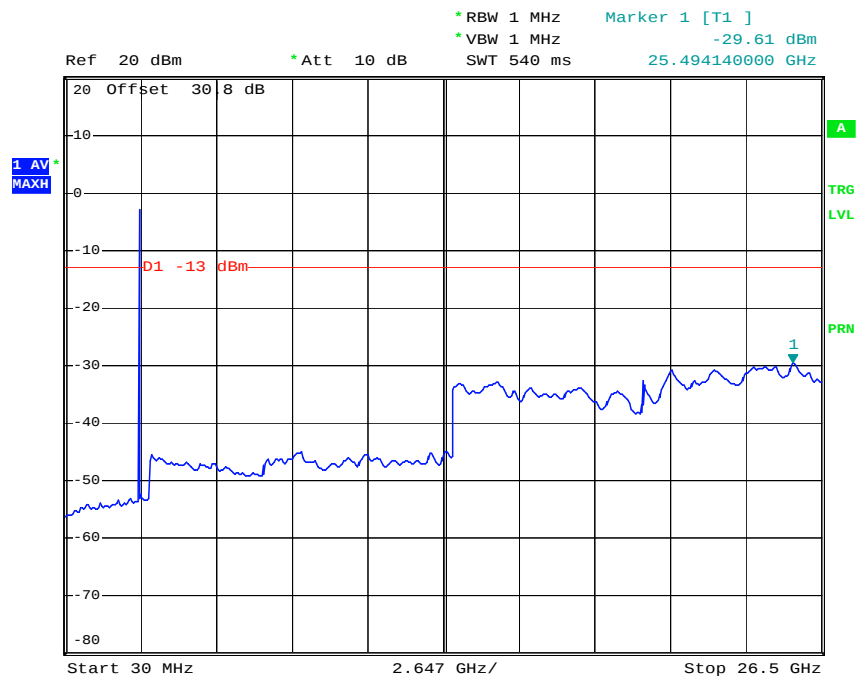
(64QAM Low Channel)



Date: 11.FEB.2008 18:07:47

(30MHz~26.5GHz)

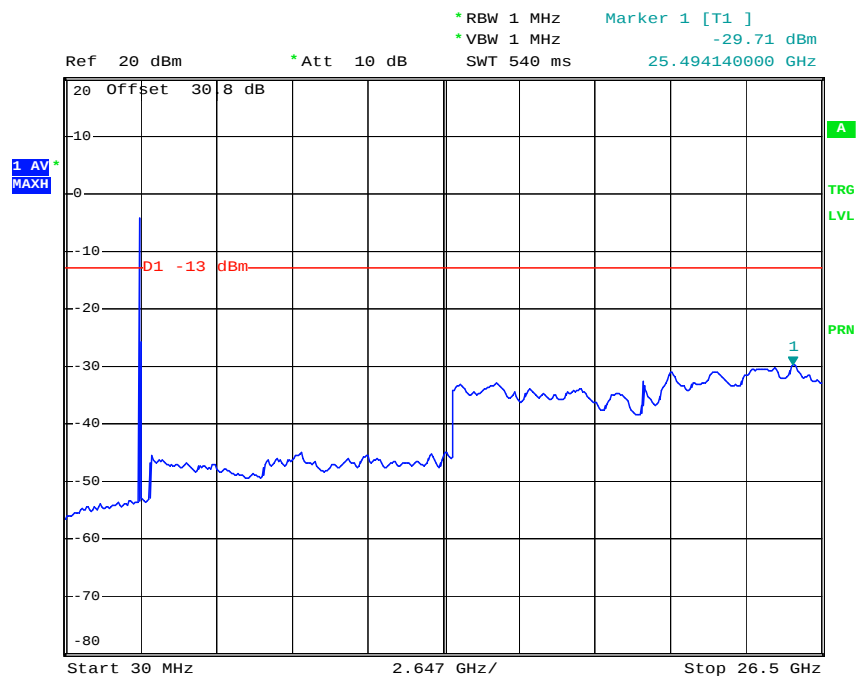
(64QAM Middle Channel)



Date: 11.FEB.2008 18:11:55

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(64QAM High Channel)

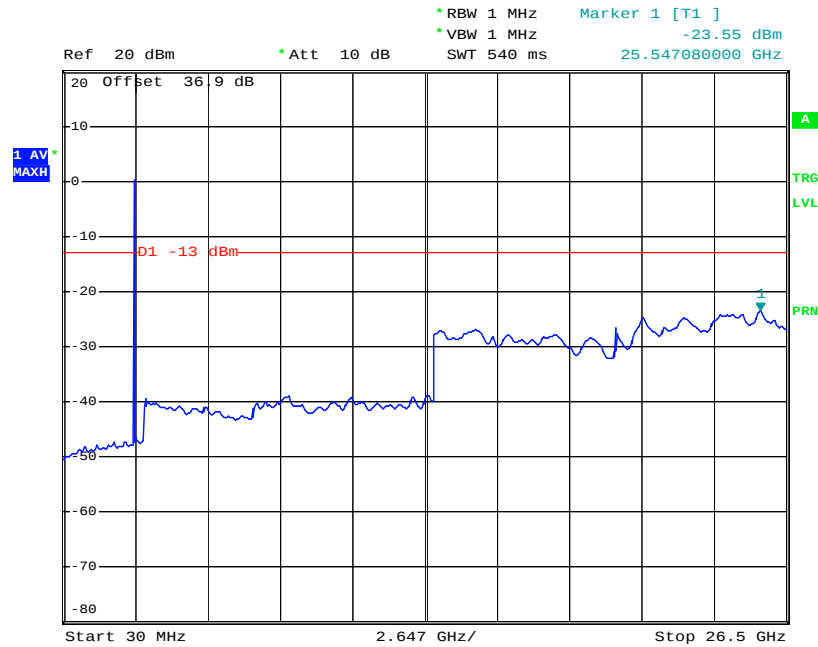


Date: 11.FEB.2008 18:20:34

(30MHz~26.50GHz)

8.4.3 Plot Data at Combined Output

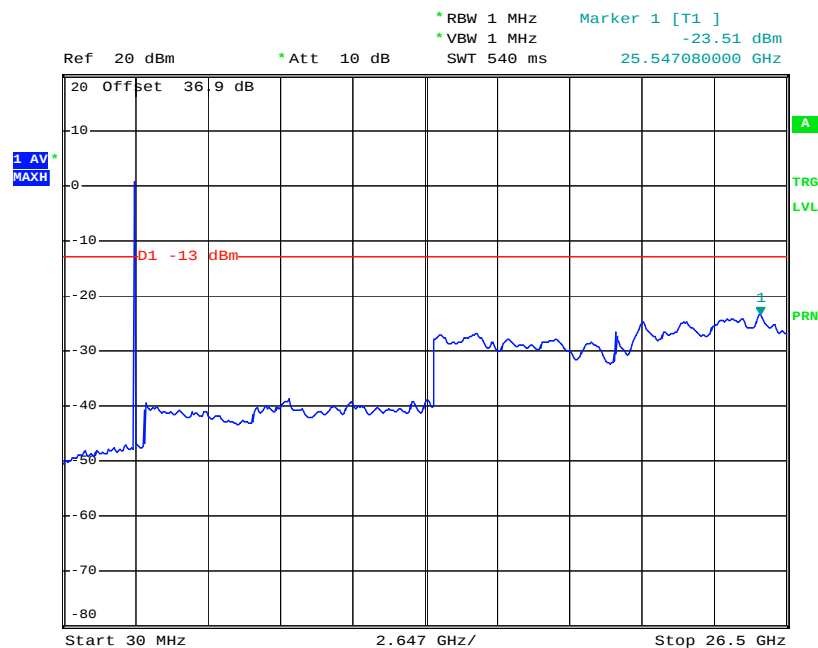
(QPSK Low Channel)



Date: 11.FEB.2008 18:00:58

(30MHz~26.5GHz)

(QPSK Middle Channel)

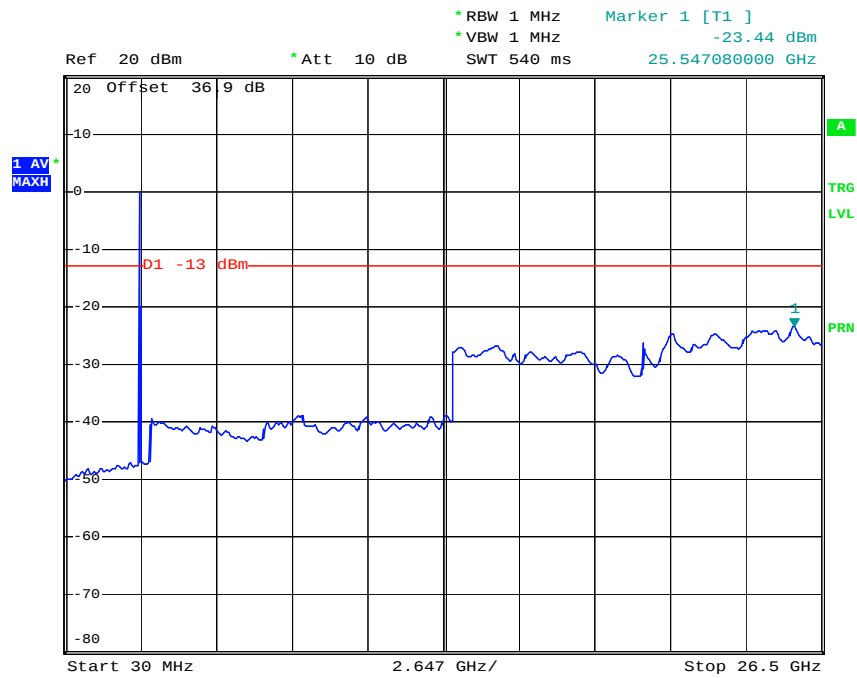


Date: 11.FEB.2008 17:53:44

(30MHz~26.5GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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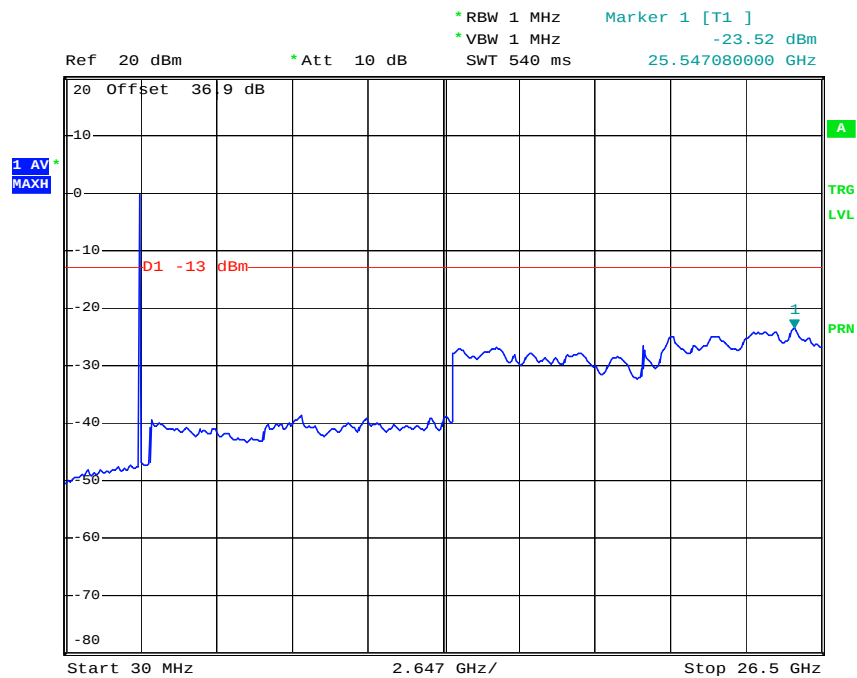
(QPSK High Channel)



Date: 11.FEB.2008 17:48:39

(30MHz~26.5GHz)

(16QAM Low Channel)

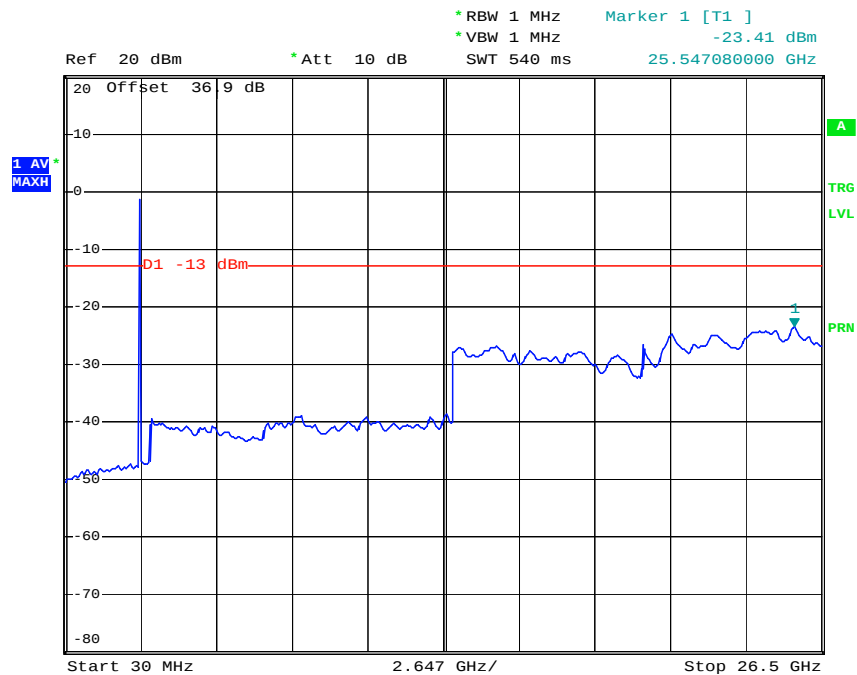


Date: 11.FEB.2008 17:56:36

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(3.00MHz~26.5GHz)

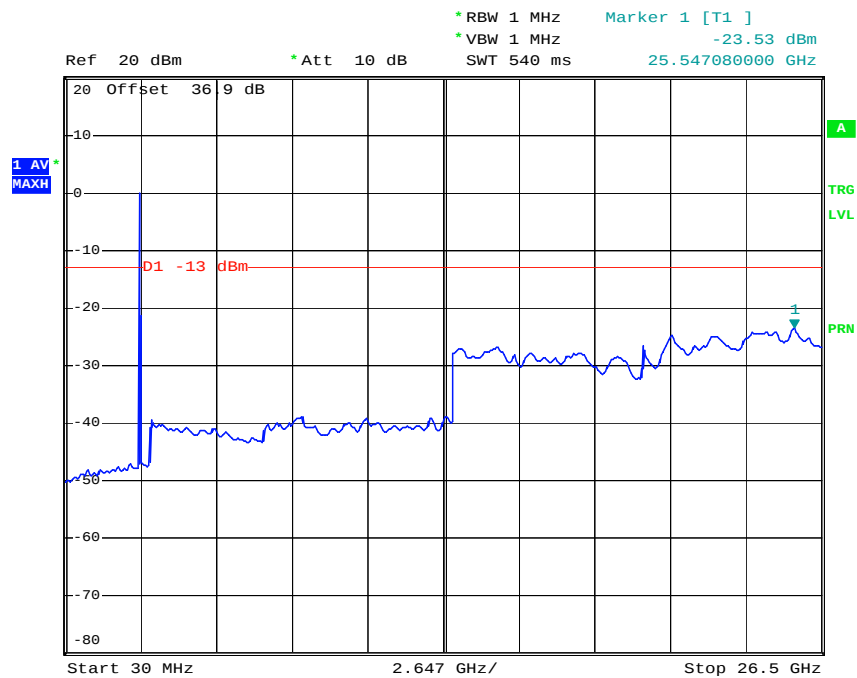
(16QAM Middle Channel)



Date: 11.FEB.2008 17:54:22

(30MHz~26.5GHz)

(16QAM High Channel)

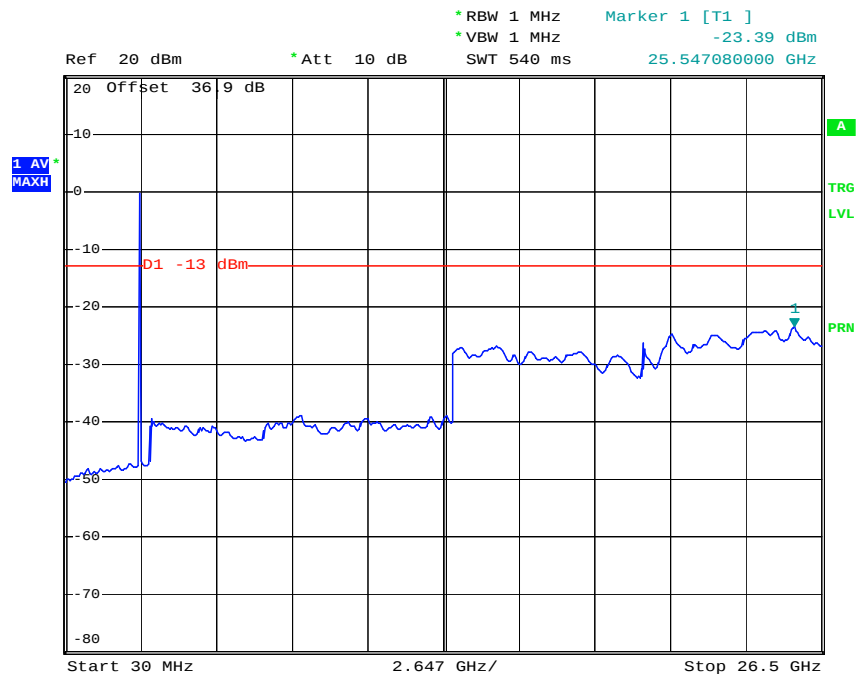


Date: 11.FEB.2008 17:51:52

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(30MHz~26.5GHz)

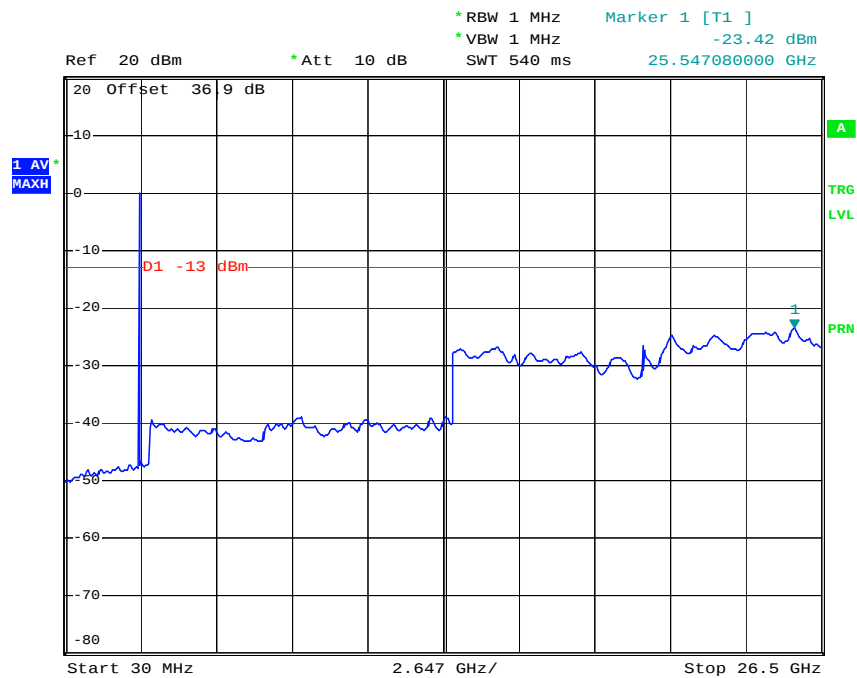
(64QAM Low Channel)



Date: 11.FEB.2008 17:57:07

(30MHz~26.5GHz)

(64QAM Middle Channel)

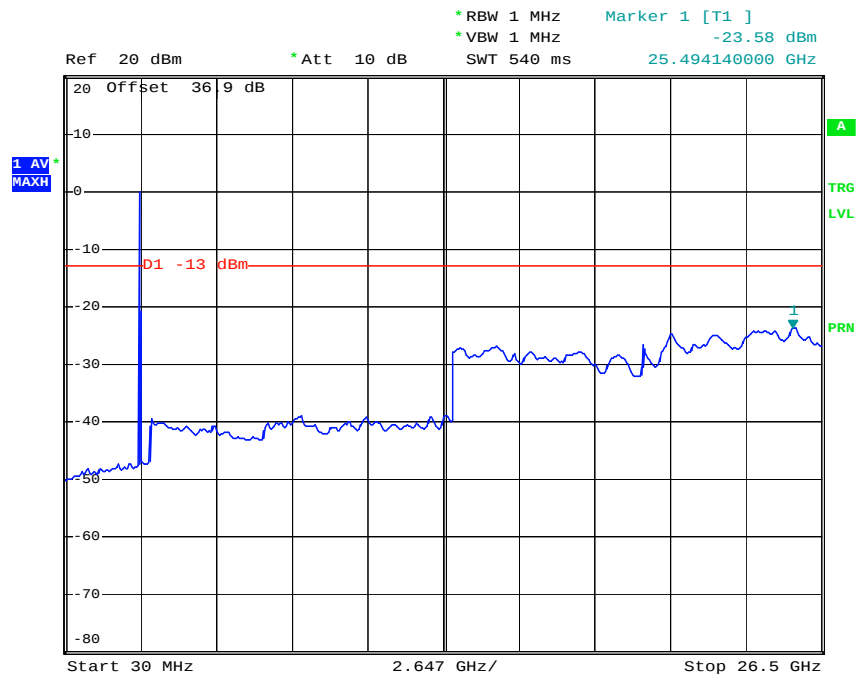


Date: 11.FEB.2008 17:54:53

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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(30MHz~26.5GHz)

(64QAM High Channel)



Date: 11.FEB.2008 17:52:29

(30MHz~26.5GHz)

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9. RADIATED SPURIOUS EMISSION

9.1 Applicable Standard:

Requirements: CFR 47, §2.1053

9.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
Schwarzbeck	Double Ridged Horn Antenna	BBHA 9120D	296	05/02/2008
Schwarzbeck	Double Ridged Horn Antenna	BBHA 9120D	147	03/30/2008
Schwarzbeck	TRILOG Antenna	VULB 9160	9160-3150	04/20/2008
Schwarzbeck	TRILOG Antenna	VULB 9160	3125	04/20/2008
HD	Antenna Position Tower	MA240	556	N/A
EMCO	Turn Table	1050	114	N/A
HD GmbH	Controller	HD 100	13	N/A
HD GmbH	SlideBar	KMS 560	12	N/A
Rohde & Schwarz	Spectrum Analyzer	FSP30	839117/011	06/28/ 2008
MITEQ	Pre-amplifier	AMF-60-0010 1800-35-20P	1200937	01/15/2009
MITEQ	Pre-amplifier	AMF-6D-0010 1800-35-20P	990893	02/24/2008
Schwarzbeck	SHF-EHF Horn Antenna	BBHA9170	BBHA9170342	03/20/2008

9.3 Test Procedure

Radiated emission measurements were performed at an open Site.

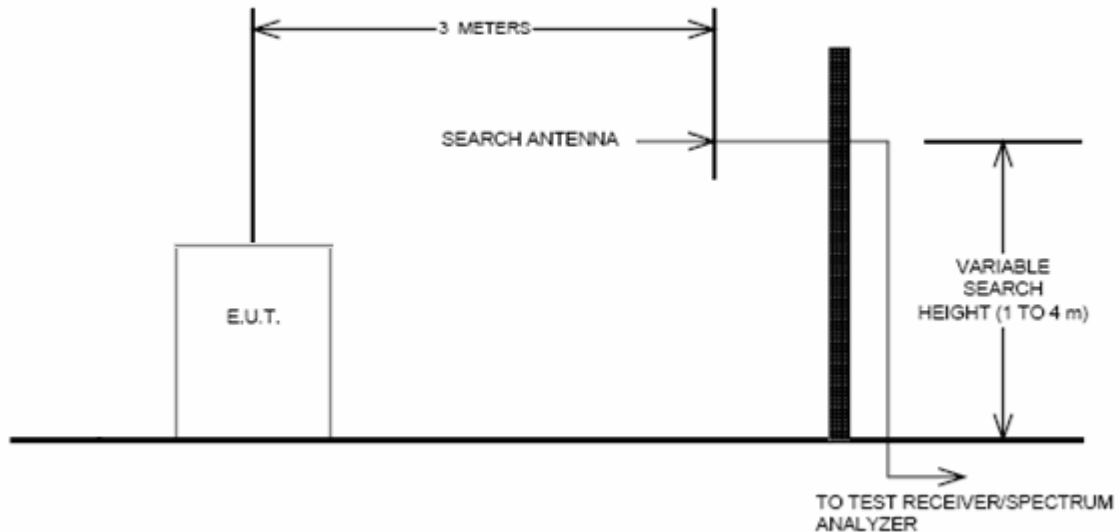
The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360° and the receiving antenna scanned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

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9.3.1 Radiated Spurious Emissions Test Setup



9.3.2 Environmental Conditions:

Temperature:	23 °C
Relative Humidity:	59 %

9.4 Test Result

: PASS (There were no emissions detected above the noise floor which was at least 20 dB below the limit.)

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10. FREQUENCY STABILITY

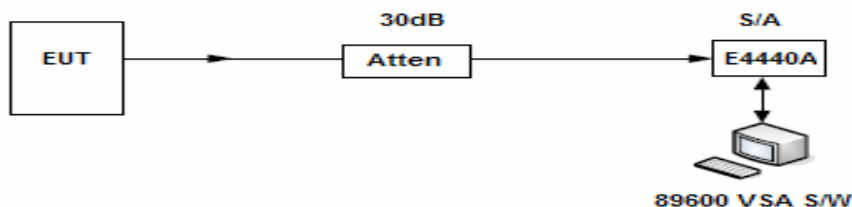
10.1 Applicable Standard

Requirements: FCC § 2.1055 (a), Part 27.54 following: The frequency stability shall be sufficient to ensure that the fundamental emissions stay

10.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
Agilent	PSA Spectrum Analyzer	E4440A	MY46186519	08.07.31
Agilent	VSA Software	VSA89600		

10.3 Test Procedure



Frequency Stability over Temperature variation:

The equipment under test was connected to an external AC-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 VSA89600 S/W via PSA Spectrum Analyzer.

Frequency stability over Voltage variation:

An external variable AC-DC power supply Source. The voltage was set to 85% and 115% of the nominal value.

The output frequency was recorded for each voltage.

10.3.1. Environmental conditions

Temperature:	25° C
Relative Humidity:	57 %

10.4. Test Result

: Pass

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10.4.1. Frequency Stability over Temperature and Voltage variation

Modulation: QPSK**Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz**

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2,657,000,056	0.021076
40	2,657,000,043	0.016184
30	2,657,000,039	0.014678
20	Reference	
10	2,657,000,049	0.018442
0	2,657,000,051	0.019195
-10	2,657,000,075	0.028227
-20	2,657,000,073	0.027475
-30	2,657,000,051	0.019195

Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2,657,000,053	0.019947
55.2	2,657,000,068	0.025593

(Output Port0 Middle CH)**Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz**

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2,657,000,063	0.023711
40	2,657,000,052	0.019571
30	2,657,000,033	0.012420
20	Reference	
10	2,657,000,045	0.016936
0	2,657,000,067	0.025216
-10	2,657,000,071	0.026722
-20	2,657,000,069	0.025969
-30	2,657,000,059	0.022205

Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2,657,000,041	0.015431
55.2	2,657,000,058	0.021829

(Output Port1 Middle CH)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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Modulation: 16QAM
Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2,657,000,055	0.020700
40	2,657,000,043	0.016184
30	2,657,000,039	0.014678
20	Reference	
10	2,657,000,048	0.018065
0	2,657,000,049	0.018442
-10	2,657,000,054	0.020324
-20	2,657,000,061	0.022958
-30	2,657,000,058	0.021829

Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2,657,000,045	0.016936
55.2	2,657,000,039	0.014678

(Output Port0 Middle CH)
Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2,657,000,035	0.013173
40	2,657,000,047	0.017689
30	2,657,000,032	0.012044
20	Reference	
10	2,657,000,053	0.019947
0	2,657,000,045	0.016936
-10	2,657,000,068	0.025593
-20	2,657,000,057	0.021453
-30	2,657,000,049	0.018442

Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2,657,000,028	0.010538
55.2	2,657,000,037	0.013925

(Output Port1 Middle CH)

Modulation: 64QAM**Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz**

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2,657,000,029	0.010915
40	2,657,000,036	0.013549
30	2,657,000,031	0.011667
20	Reference	
10	2,657,000,047	0.017689
0	2,657,000,030	0.011291
-10	2,657,000,059	0.022205
-20	2,657,000,045	0.016936
-30	2,657,000,067	0.025216

Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2,657,000,077	0.028980
55.2	2,657,000,063	0.023711

(Output Port0 Middle CH)**Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz**

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2,657,000,033	0.012420
40	2,657,000,065	0.024464
30	2,657,000,084	0.031615
20	Reference	
10	2,657,000,078	0.029356
0	2,657,000,061	0.022958
-10	2,657,000,069	0.025969
-20	2,657,000,070	0.026346
-30	2,657,000,055	0.020700

Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2,657,000,035	0.013173
55.2	2,657,000,047	0.017689

(Output Port1 Middle CH)