

HYUNDAI CALIBRATION & CERTIFICATION TECH. 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: October 16, 2007

Test Site/Location:

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

Test Report No.: HCT-R07-035

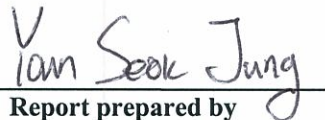
FCC ID : **A3LSPI-2210022500**

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

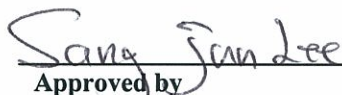
EUT Type : Mobile WiMAX Outdoor RAS
Manufacturer : SAMSUNG Electronics Co.,Ltd
Model name : SPI-2210022500
Frequency of Operation : 2647 MHz ~ 2667 MHz
FCC Rule Part(s) : FCC Part 27
Test Procedure(s) : ANSI C-63.4-2003, EIA/TIA 603B
Application Type : Original Equipment
Data of issue : October 16, 2007

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

HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 1 of 81

CONTENTS

1. GENERAL INFORMATION.....	4
1.1. CLIENT INFORMATION	4
1.2. PRODUCT INFORMATION	4
1.3. OPERATING DESCRIPTION OF EUT	5
2. TEST SUMMARY	6
2.1. STANDARDS	6
2.2. MODE OF OPERATION DURING THE TEST	6
3. STANDARDS ENVIRONMENTAL TEST CONDITIONS	7
4. TEST EQUIPMENT	8
5. CONDUCTED OUTPUT POWER.....	9
5.1. Applicable Standard	9
5.2. Test Equipment List and Details	9
5.3. Test Procedure.....	9
5.3.1. Environmental Conditions:	9
5.4. Test Result	9
5.4.1. Test Data at Output Port 0	10
5.4.2. Test Data at Output Port 1	10
5.4.3. Plot Data for Output 0	11
5.4.4. Plot Data for Output 1.	17
6. OCCUPIED BANDWIDTH	23
6.1. Applicable Standard	23
6.2. Test Equipment List and Details	23
6.3. Test Procedure.....	23
6.4. Test Result	23
6.4.1. Test Data at Output Port 0	24
6.4.2. Test Data at Output Port 1	24
6.4.3. Test Data Plot at Output Port 0	25
6.4.4. Test Data at Output Port 1	31
7. BAND EDGES	37
7.1. Applicable Standard	37
7.2. Test Equipment List and Details	37
7.3. Test Procedure.....	37

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 2 of 81

7.3.1. Test Data Environmental Conditions	37
7.4. Test Result	37
7.4.1. Test data at Output 0	38
7.4.2. Test data at Output 1	38
7.4.3. Plot Data at Output 0	39
7.4.4. Plot Data at Output 1	42
7.4.4. Plot Data at Combined Output	45
8. SPURIOUS EMISSION AT ANTENNA TERMINAL	48
8.1. Applicable Standard Requirements:	48
8.2. Test Equipment List and Details Test Procedure	48
8.3. Environmental Conditions:	48
8.4. Test Result	48
8.4.1. Plot Data at Output 0	49
8.4.2. Plot Data at Output 1	58
8.4.3 Plot Data at Combined Output	67
9. RADIATED SPURIOUS EMISSION	76
9.1 Applicable Standard:	76
9.2 Test Equipment List and Details	76
9.3 Test Procedure.....	76
9.3.1 Radiated Spurious Emissions Test Setup	77
9.3.2 Environmental Conditions:	77
9.4 Test Result	77
10. FREQUECNY STABILITY	78
10.1 Applicable Standard	78
10.2 Test Equipment List and Details	78
10.3 Test Procedure.....	78
10.3.1. Environmental conditions	78
10.4. Test Result	78
10.4.1. Frequency Stability over Temperature and Voltage variation.....	79

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 3 of 81

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

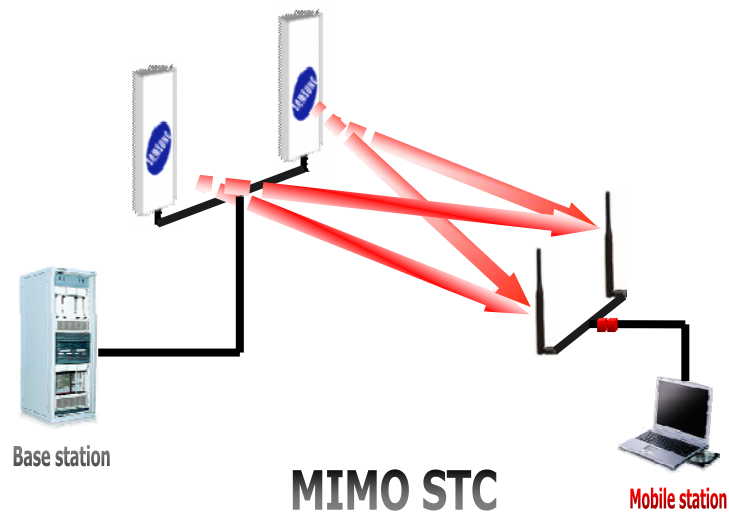
1.2. PRODUCT INFORMATION

EUT TYPE	Mobile WiMAX Outdoor RAS
EMISSION DESIGNATOR	9M28G7W
OPERATING FREQUENCY	2647 ~ 2667 MHz
TX OUTPUT POWER	10 W
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-2210 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.

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 5 of 81

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.

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 6 of 81

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
Rohde & Schwarz	ES140/ EMI Test Receiver	831564103	11/06/2007
Rohde & Schwarz	ESCI/ EMI Test Receiver	100033	08/24/ 2008
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	01/24/2008
Schwarzbeck	BBHA9170/ SHF-EHF Horn Antenna	BBHA9170342	03/20/2008
ADVANTEST	R3273/Spectrum Analyzer	J004821	05/02/2008
Agilent	E7405A	US40240209	10/02/2008
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	1	06/28/2008
Rohde & Schwarz	Spectrum Analyzer	839117/011	06/28/ 2008
WEINSCHL	67-30-33/Attenuator	BR0530	01/22/2008
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:	23 °C
Relative Humidity:	53 %

5.4. Test Result

: PASS

5.4.1. Test Data at Output Port 0

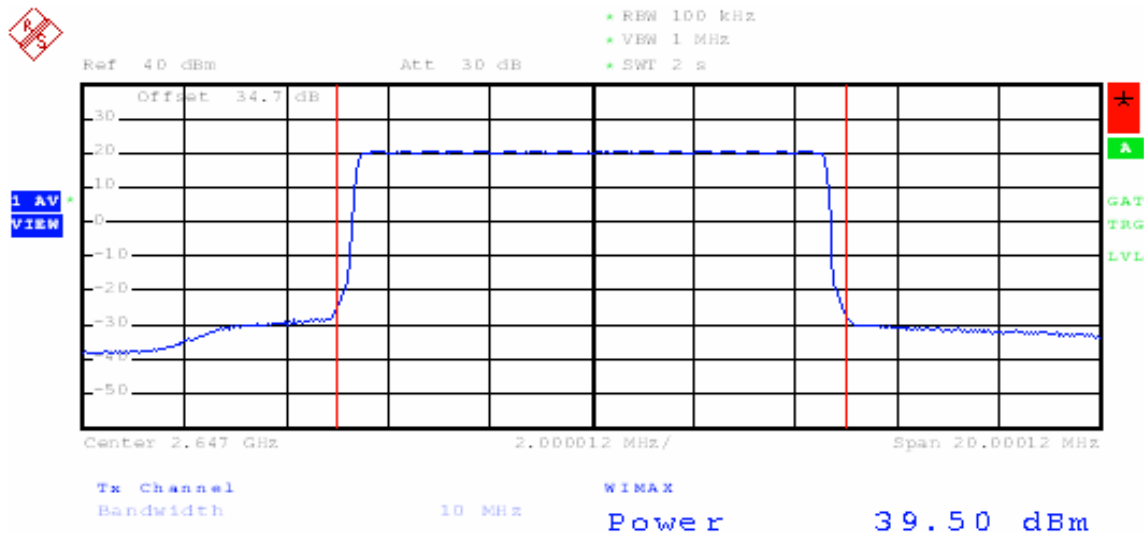
Modulation	Channel	Frequency	Measured Output Power		Limit (dBW)
			dBm	W	
QPSK	Low	2647.00	39.50	8.91	35.51
	Middle	2657.00	39.59	9.10	35.11
	High	2667.00	39.45	8.81	35.49
16QAM	Low	2647.00	39.59	9.10	35.53
	Middle	2657.00	39.58	9.08	35.11
	High	2667.00	39.41	8.72	35.49
64QAM	Low	2647.00	39.54	8.99	35.51
	Middle	2657.00	39.56	9.04	35.11
	High	2667.00	39.45	8.81	35.49

5.4.2. Test Data at Output Port 1

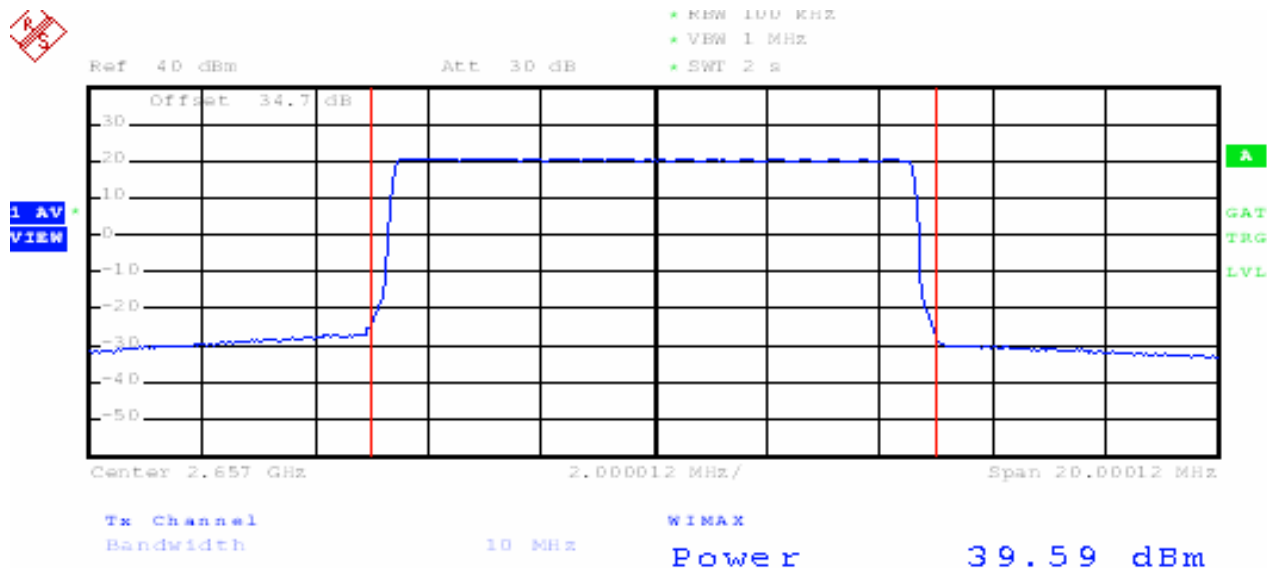
Modulation	Channel	Frequency	Measured Output Power		Limit (dBW)
			dBm	W	
QPSK	Low	2647.00	39.56	9.04	35.51
	Middle	2657.00	39.74	9.42	35.11
	High	2667.00	39.47	8.85	35.49
16QAM	Low	2647.00	39.60	9.12	35.53
	Middle	2657.00	39.73	9.40	35.11
	High	2667.00	39.71	9.35	35.49
64QAM	Low	2647.00	39.61	9.14	35.51
	Middle	2657.00	39.71	9.35	35.11
	High	2667.00	39.57	9.06	35.49

5.4.3. Plot Data for Output 0

(QPSK Low Channel)

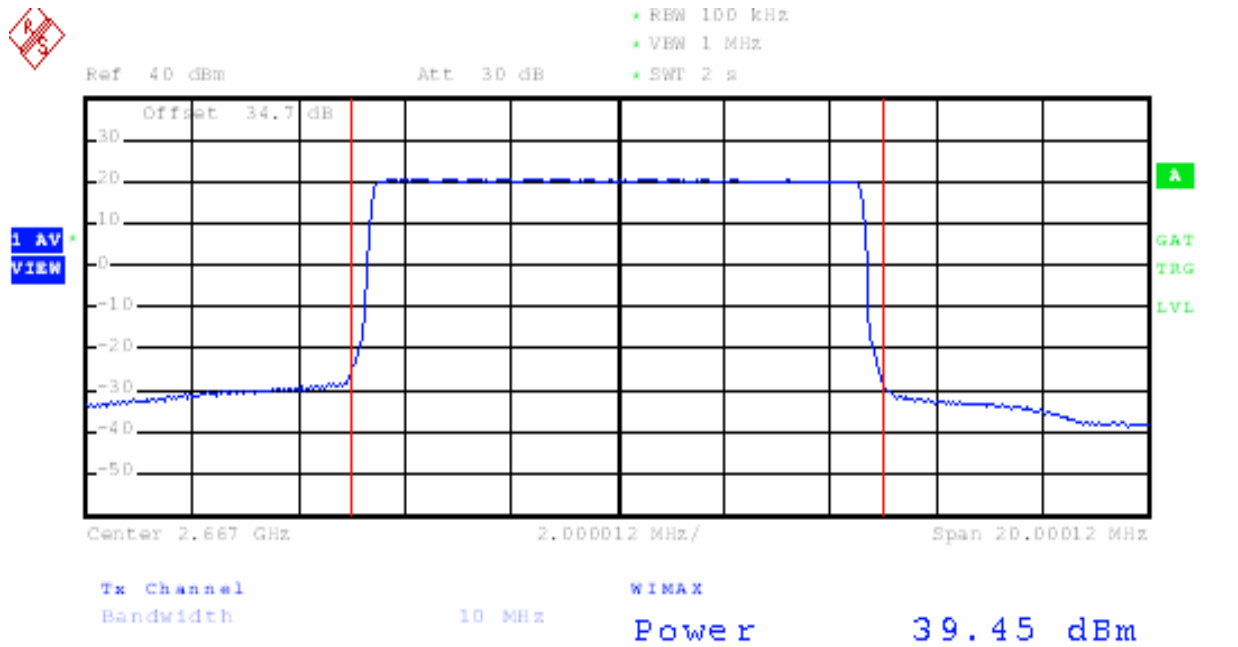


(QPSK Middle Channel)



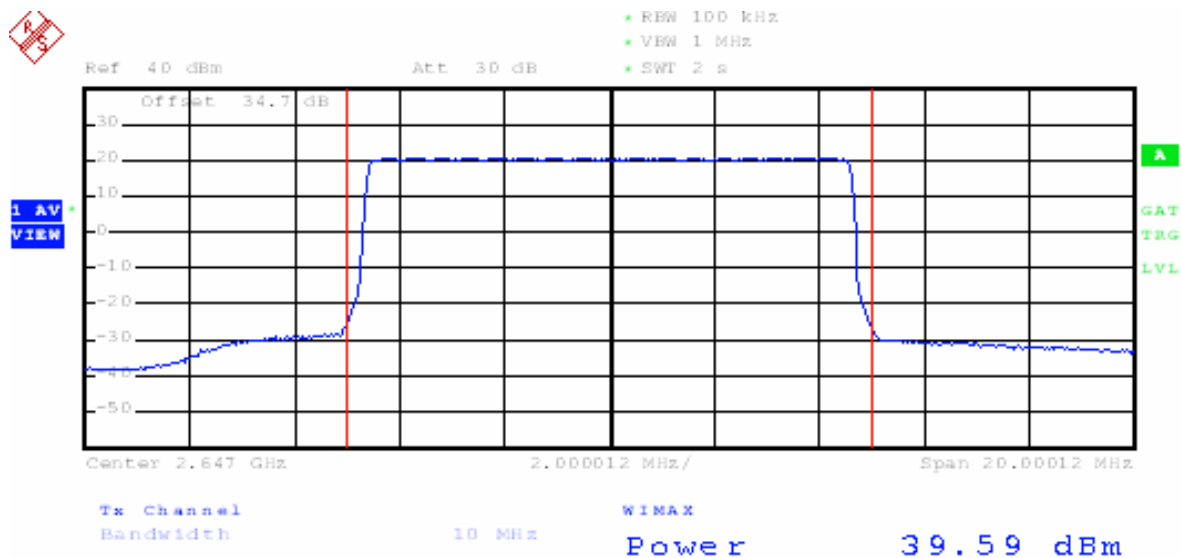
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 11 of 81

(QPSK High Channel)

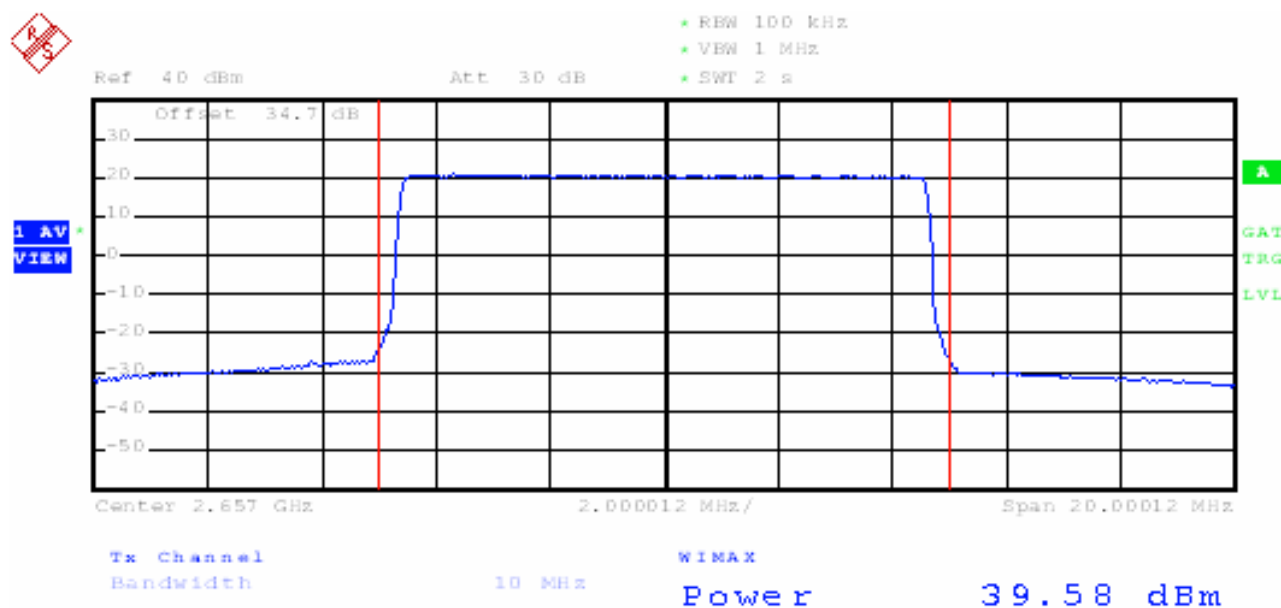


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 12 of 81

(16QAM Low Channel)

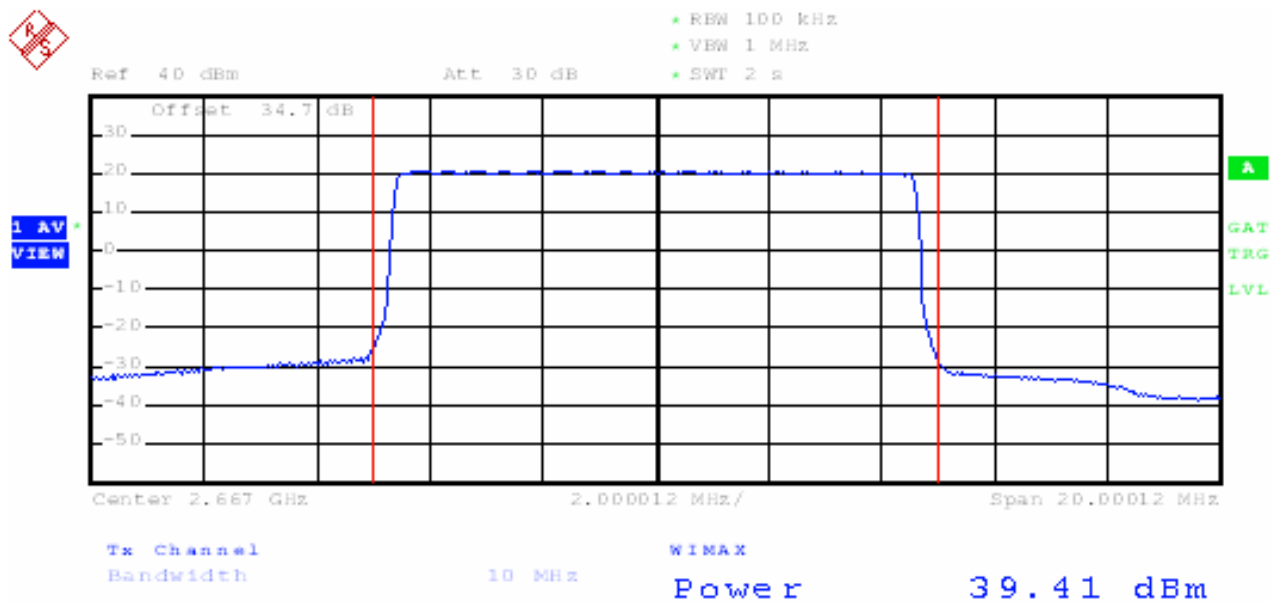


(16QAM Middle Channel)



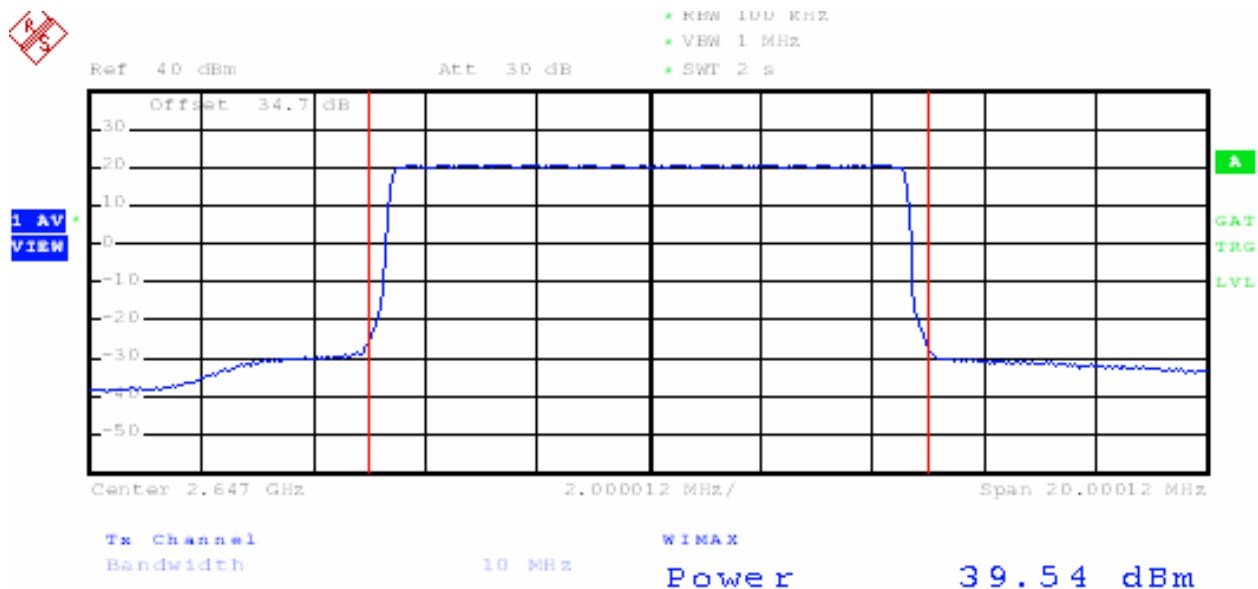
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 13 of 81

(16QAM High Channel)

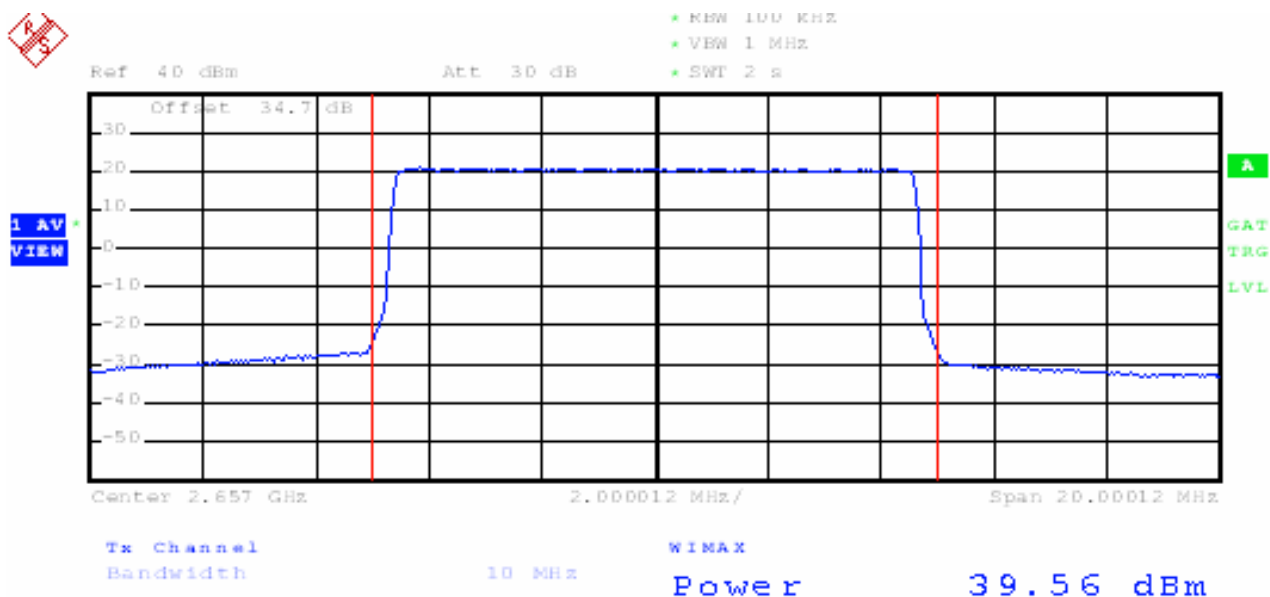


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 14 of 81

(64QAM Low Channel)

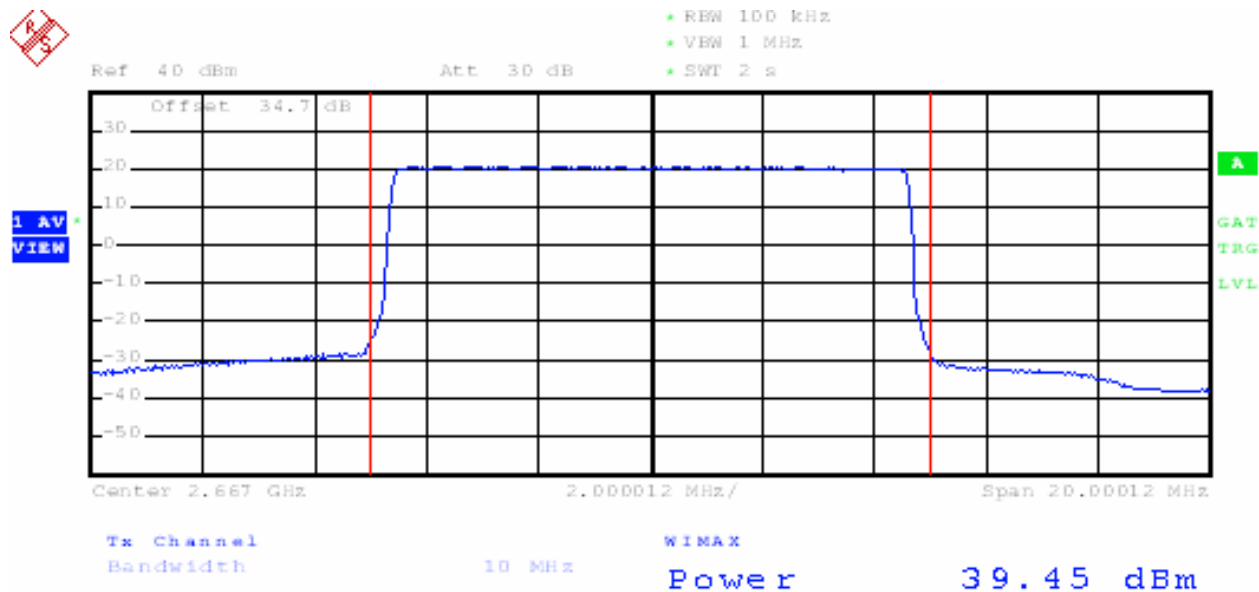


(16QAM Middle Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 15 of 81

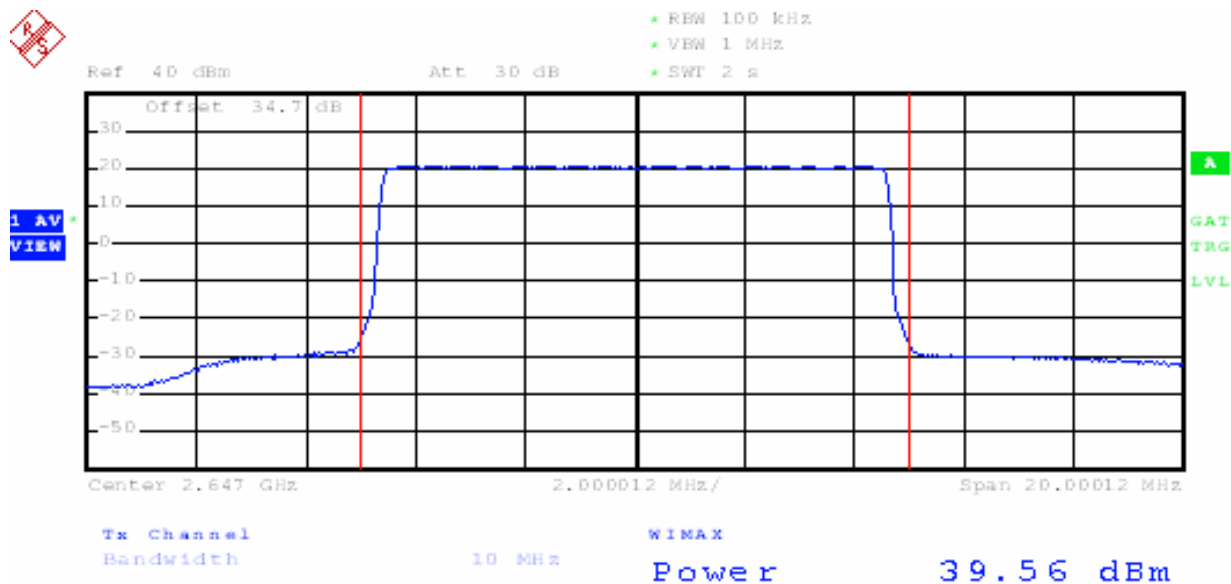
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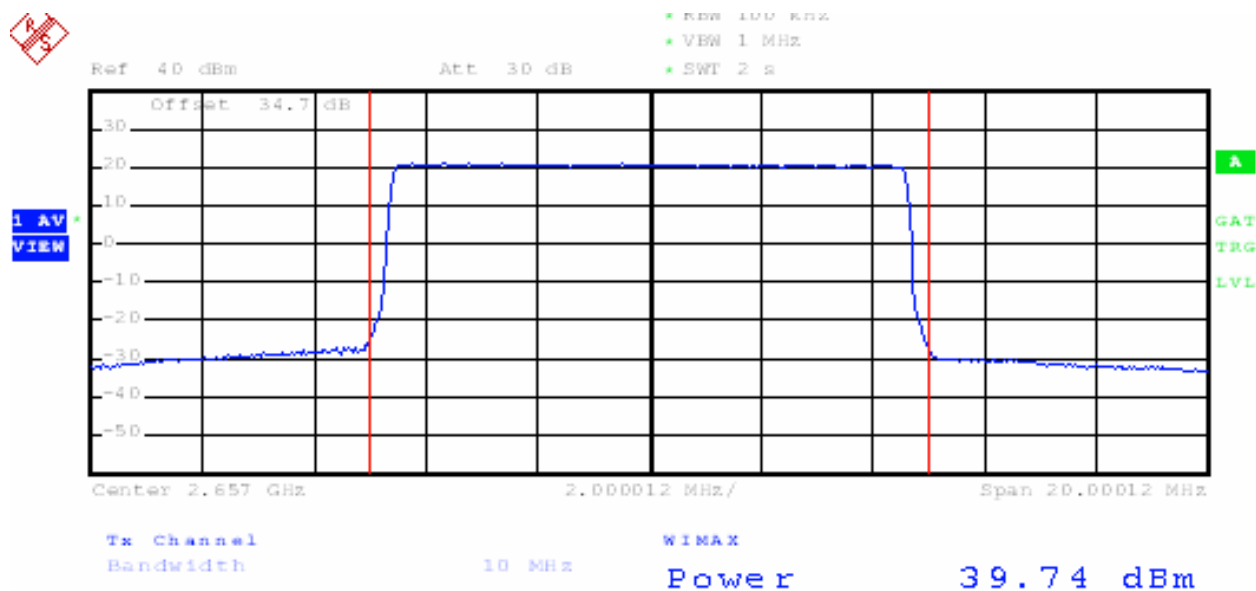
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Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 16 of 81

5.4.4. Plot Data for Output 1.

(QPSK Low Channel)

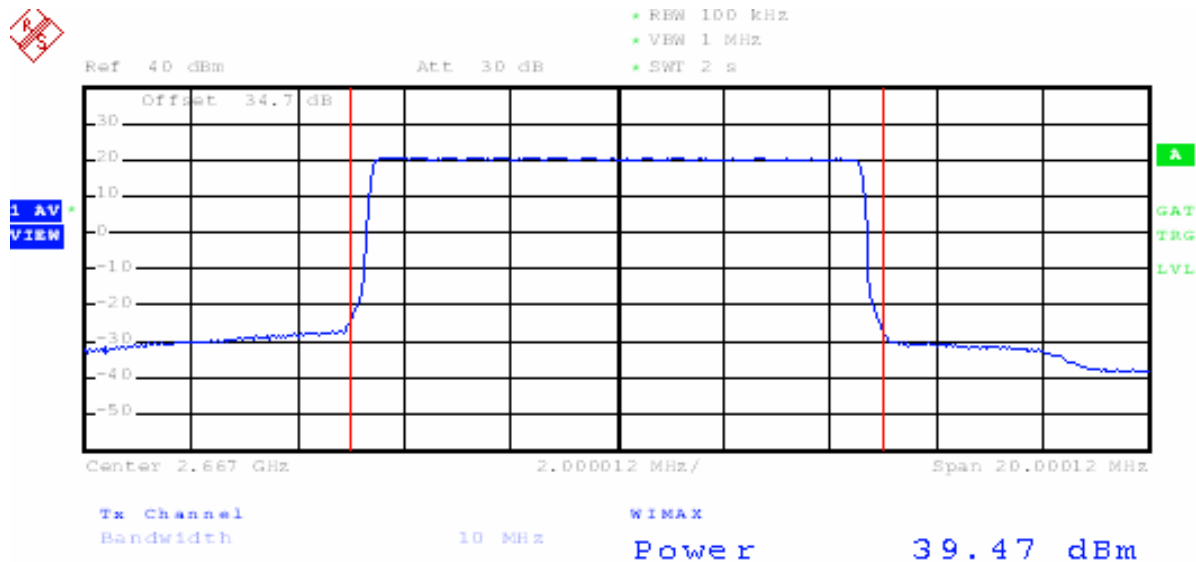


(QPSK Middle Channel)



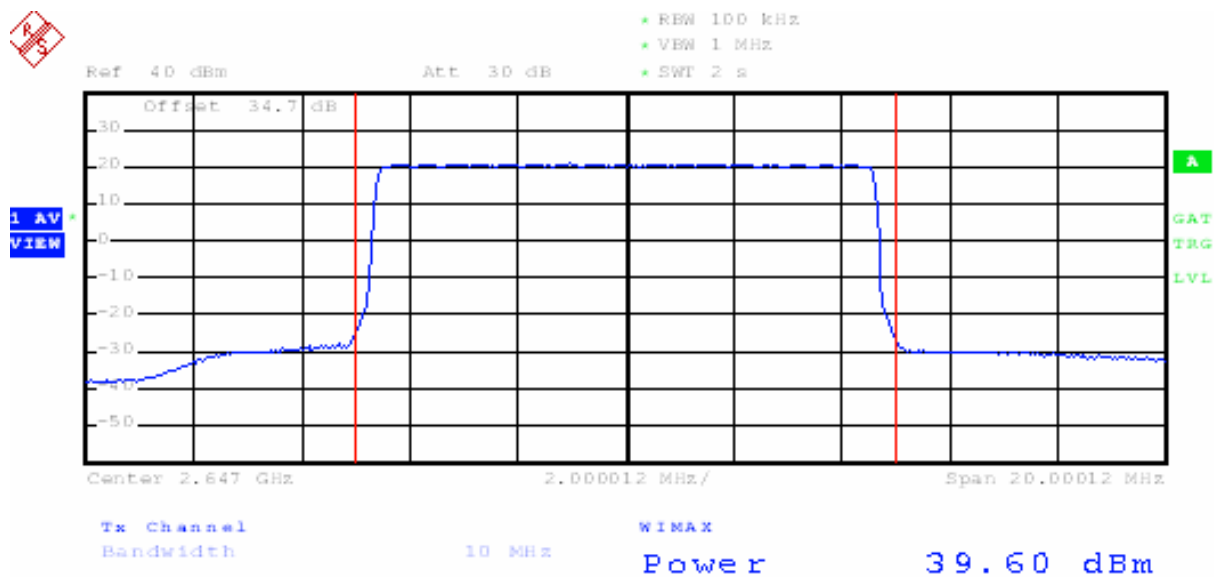
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 17 of 81

(QPSK High Channel)

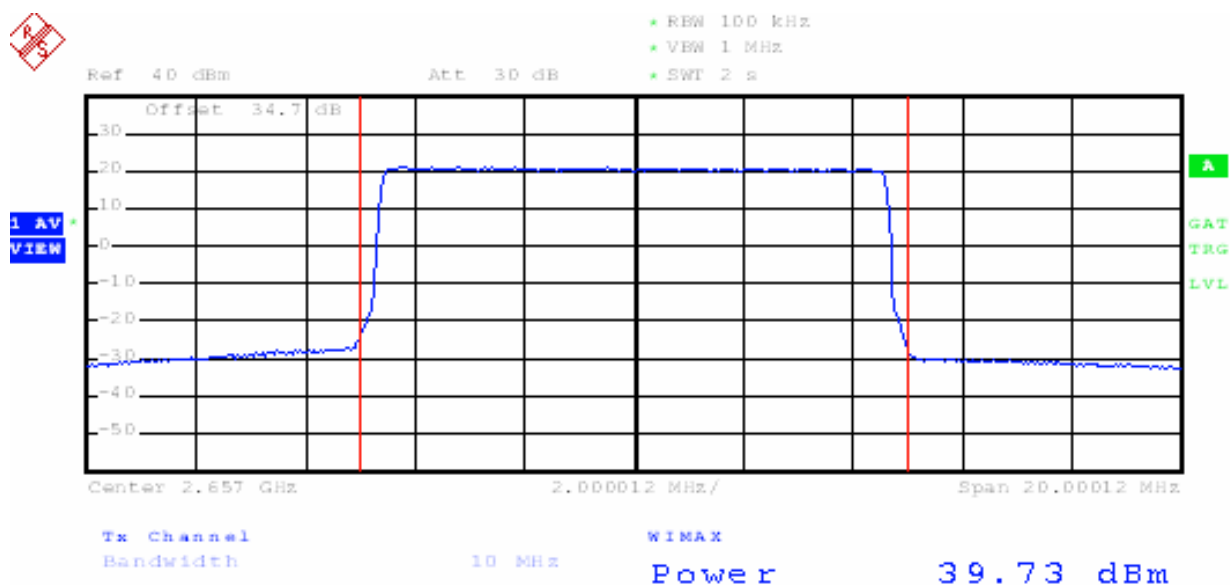


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 18 of 81

(16QAM Low Channel)



(16QAM Middle Channel)

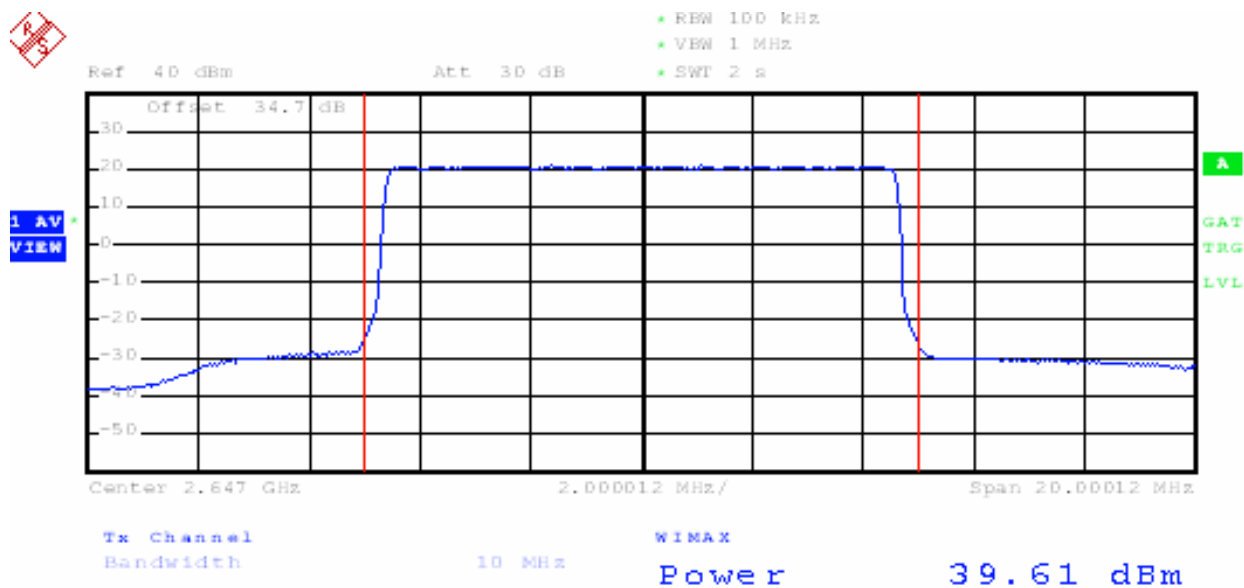


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 19 of 81

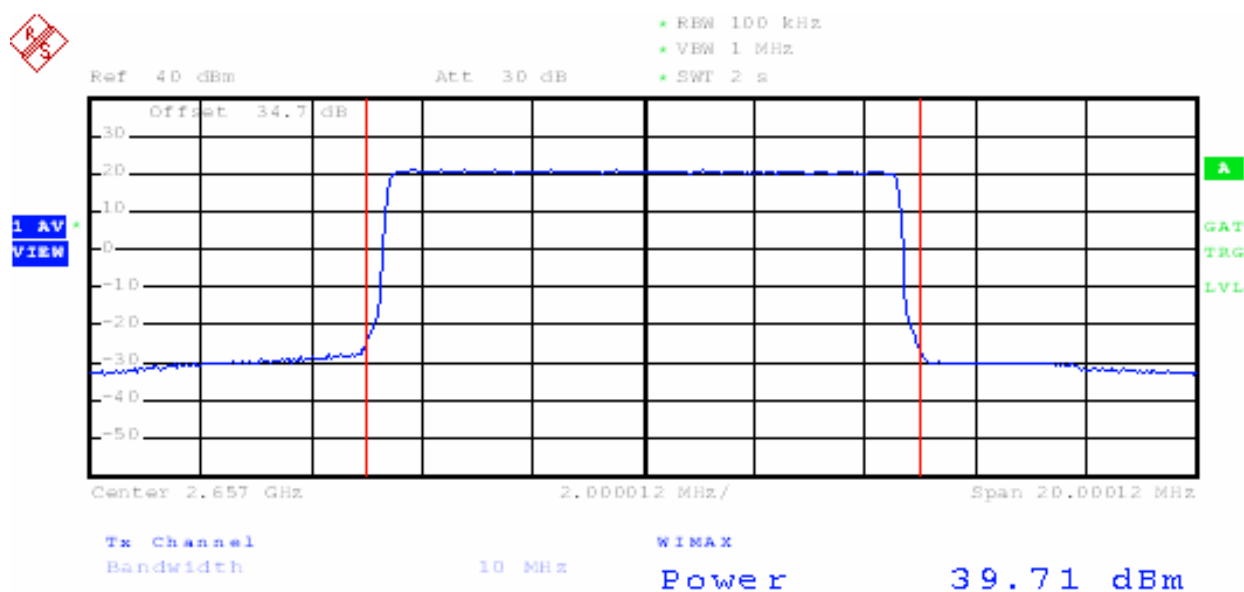
39.44 dBm

Page 20 of 81

(64QAM Low Channel)

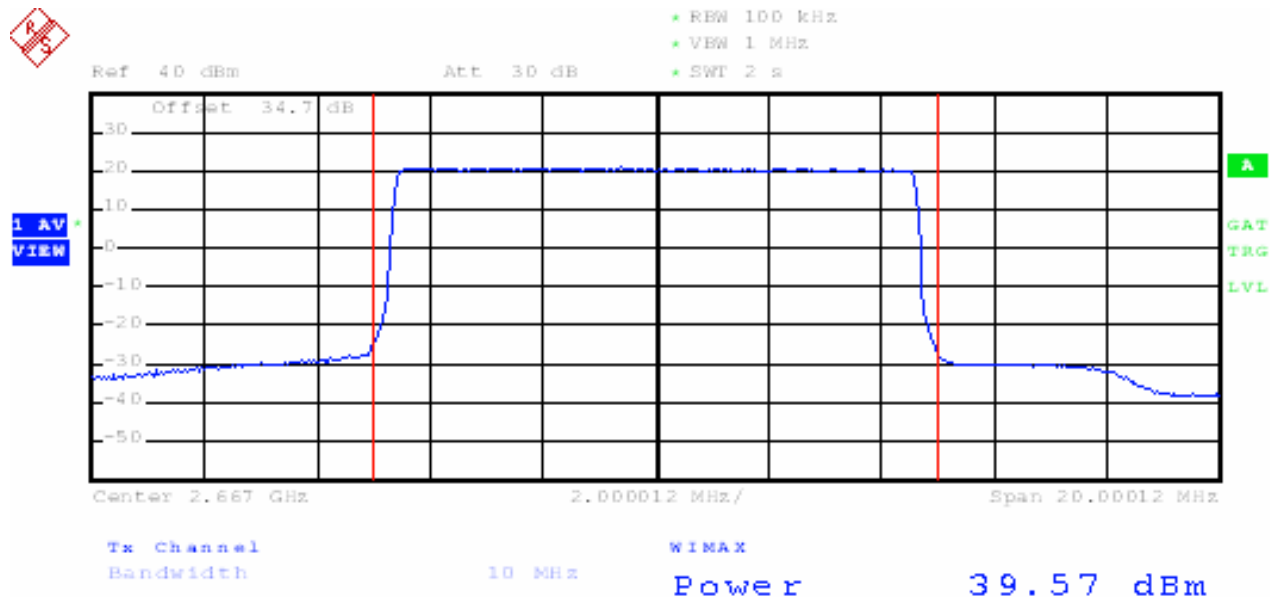


(64QAM Middle Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 21 of 81

(64QAM High Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 22 of 81

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

Temperature:	25 ° C
Relative Humidity:	50%

6.4. Test Result

: PASS

6.4.1. Test Data at Output Port 0

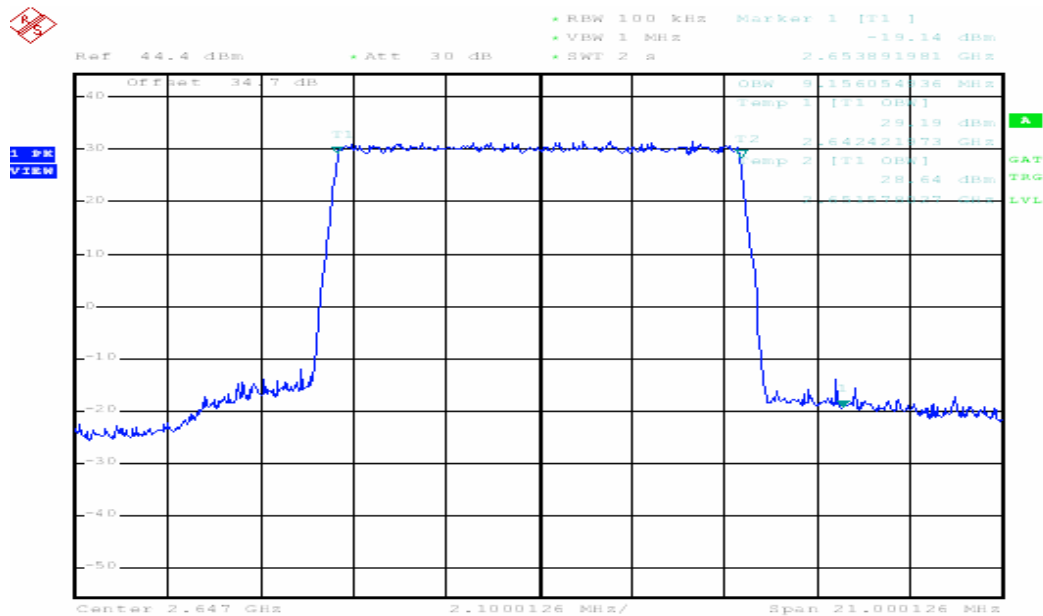
Modulation	Channel	Frequency	Measured Bandwidth
			99 %
QPSK	Low	2647.00	9.240
	Middle	2657.00	9.240
	High	2667.00	9.240
16QAM	Low	2647.00	9.280
	Middle	2657.00	9.240
	High	2667.00	9.240
64QAM	Low	2647.00	9.240
	Middle	2657.00	9.240
	High	2667.00	9.240

6.4.2. Test Data at Output Port 1

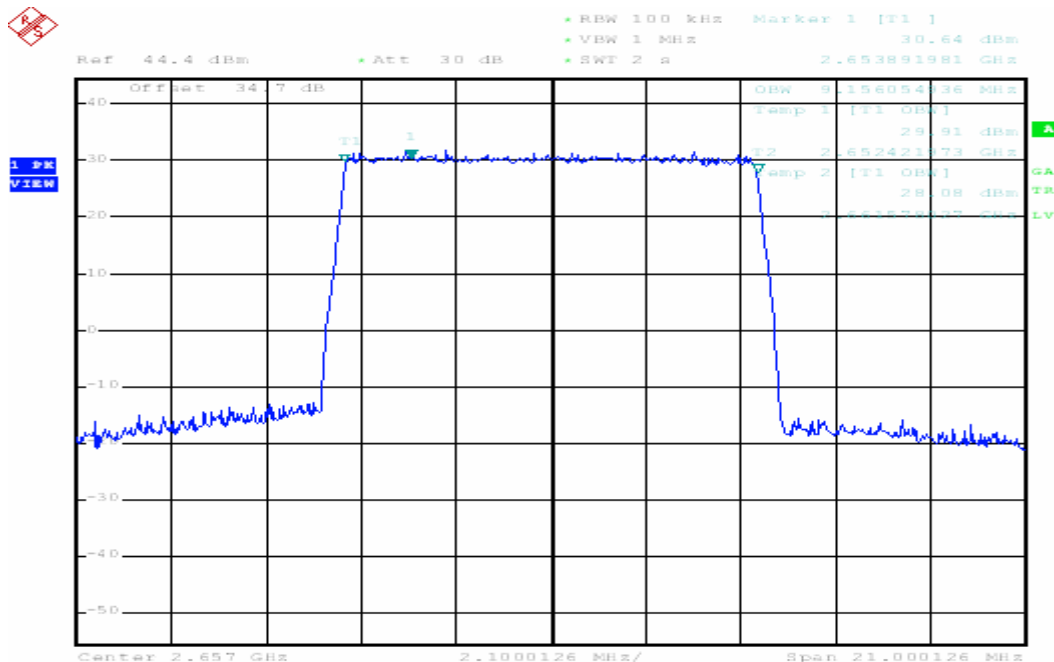
Modulation	Channel	Frequency	Measured Bandwidth
			99 %
QPSK	Low	2647.00	9.280
	Middle	2657.00	9.240
	High	2667.00	9.240
16QAM	Low	2647.00	9.280
	Middle	2657.00	9.240
	High	2667.00	9.240
64QAM	Low	2647.00	9.240
	Middle	2657.00	9.240
	High	2667.00	9.240

6.4.3. Test Data Plot at Output Port 0

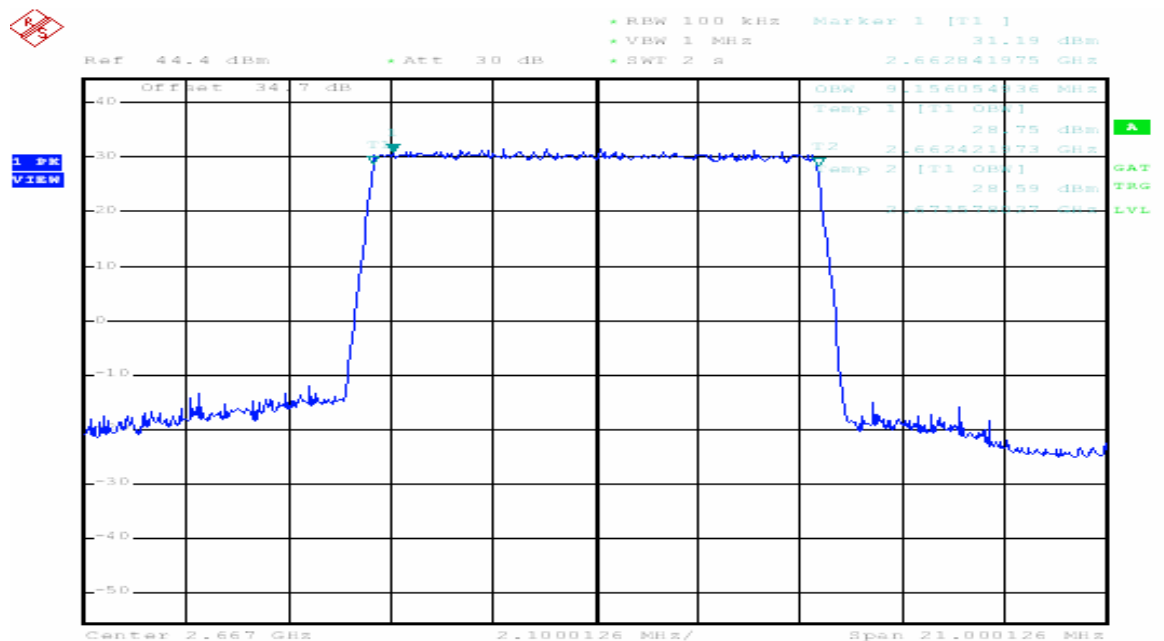
(QPSK Low Channel)



(QPSK Middle Channel)

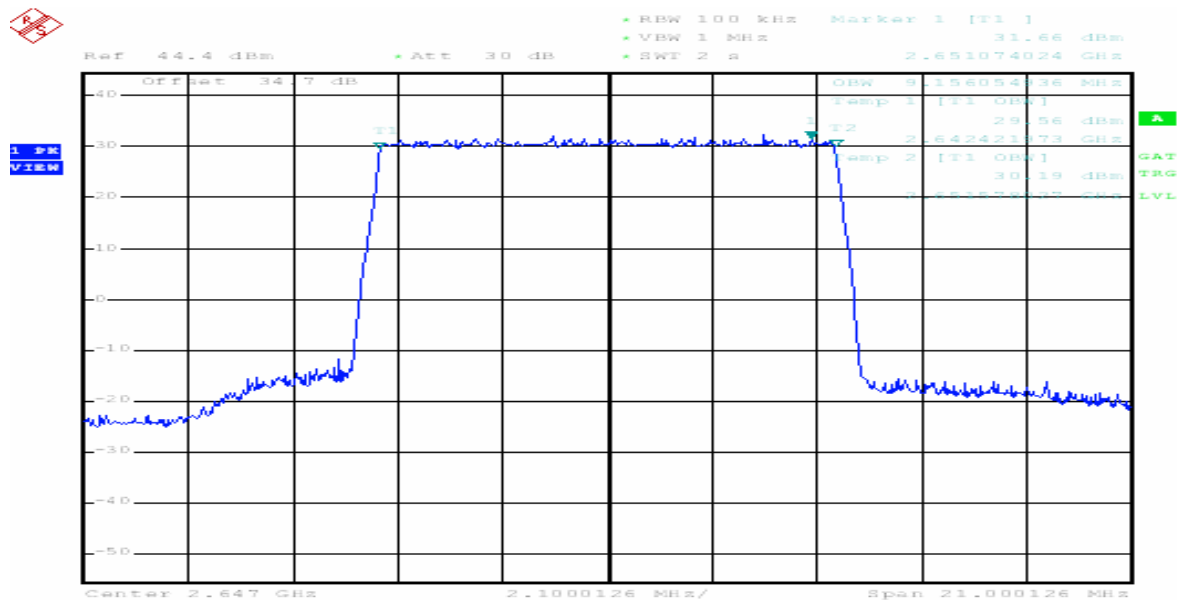


(QPSK High Channel)

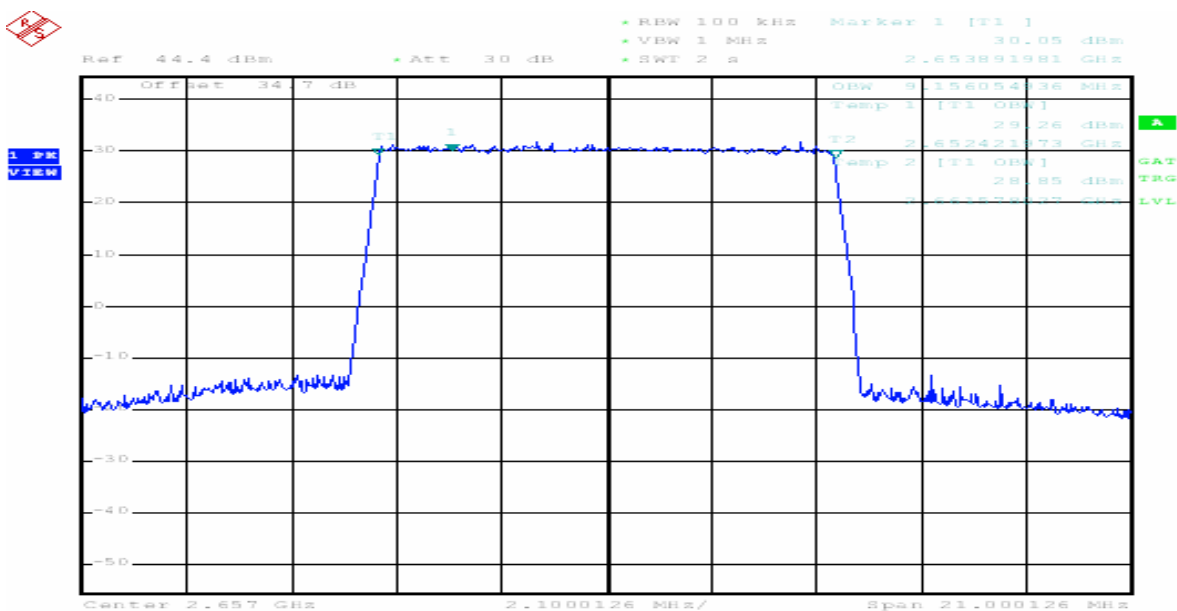


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 26 of 81

(16QAM Low Channel)

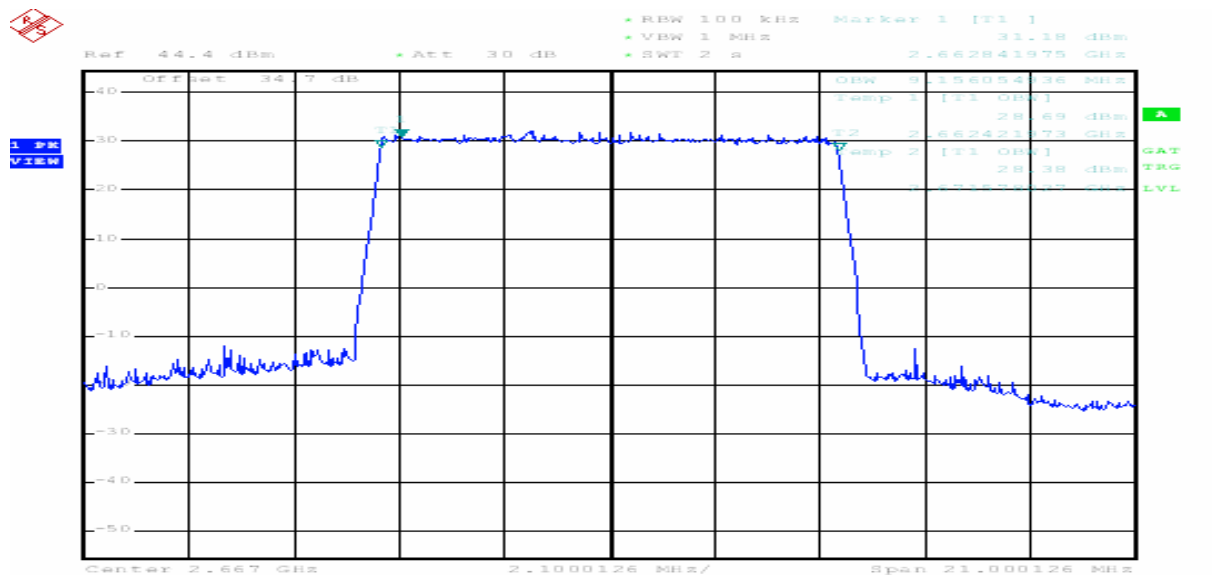


(16QAM Middle Channel)



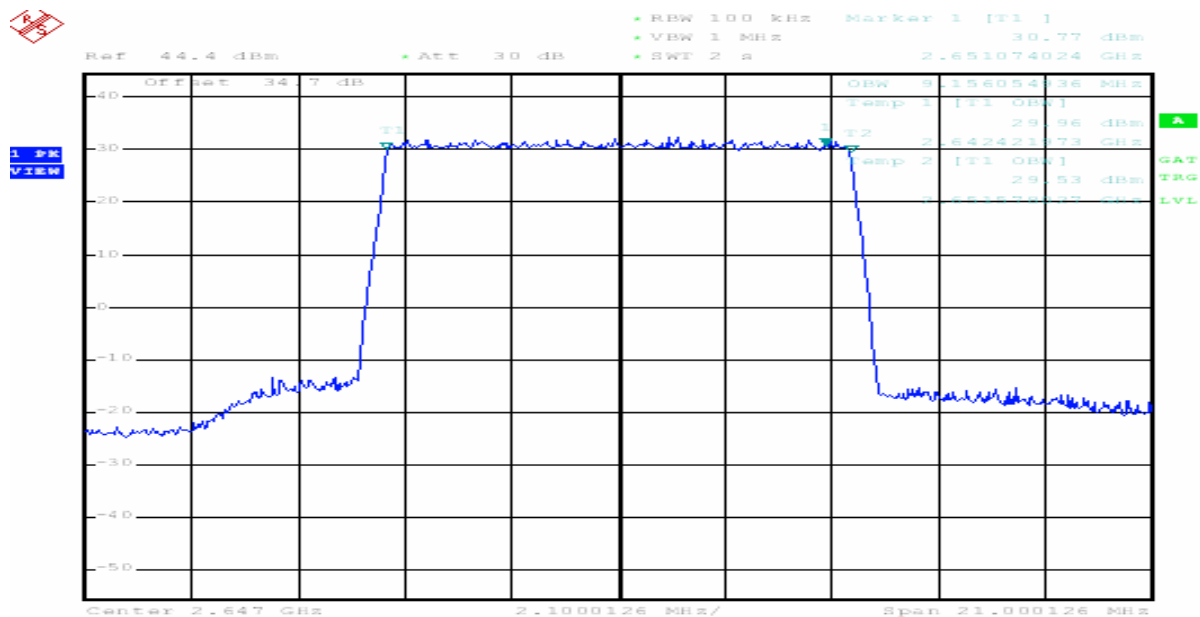
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Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 27 of 81

(16QAM High Channel)

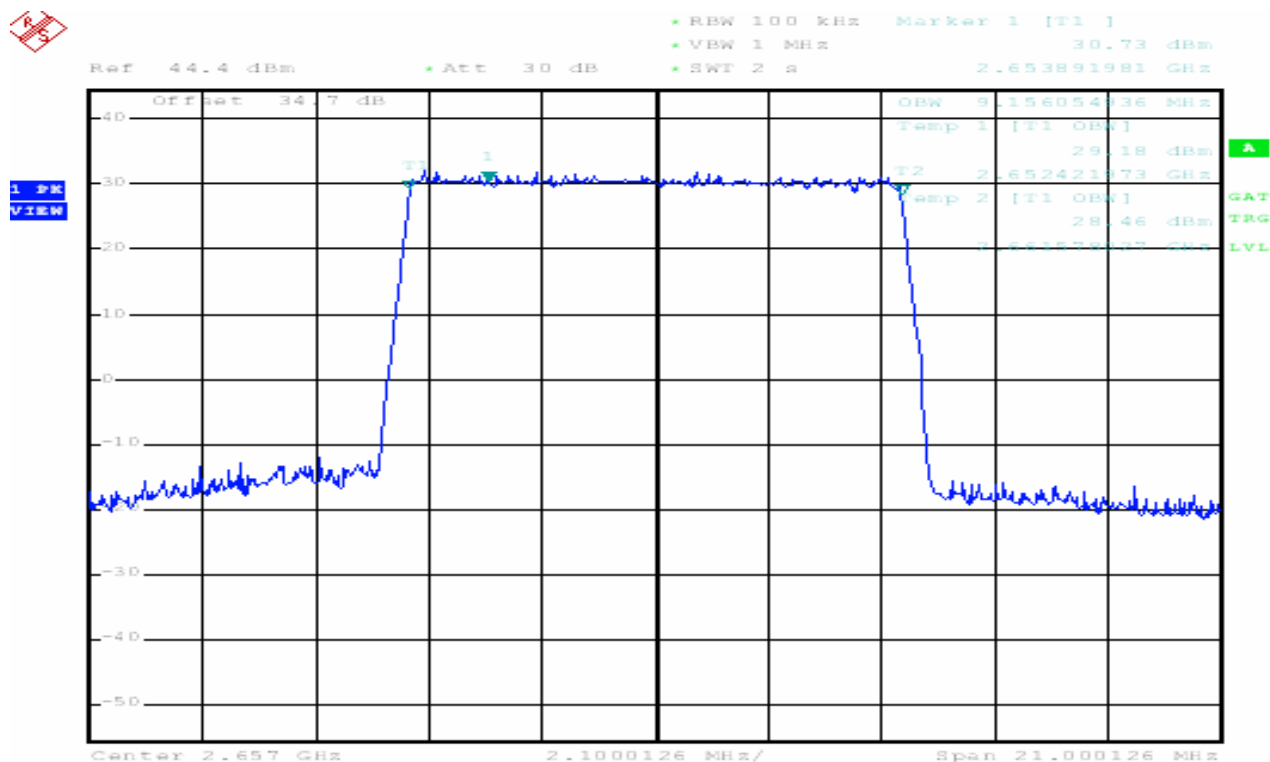


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 28 of 81

(64QAM Low Channel)

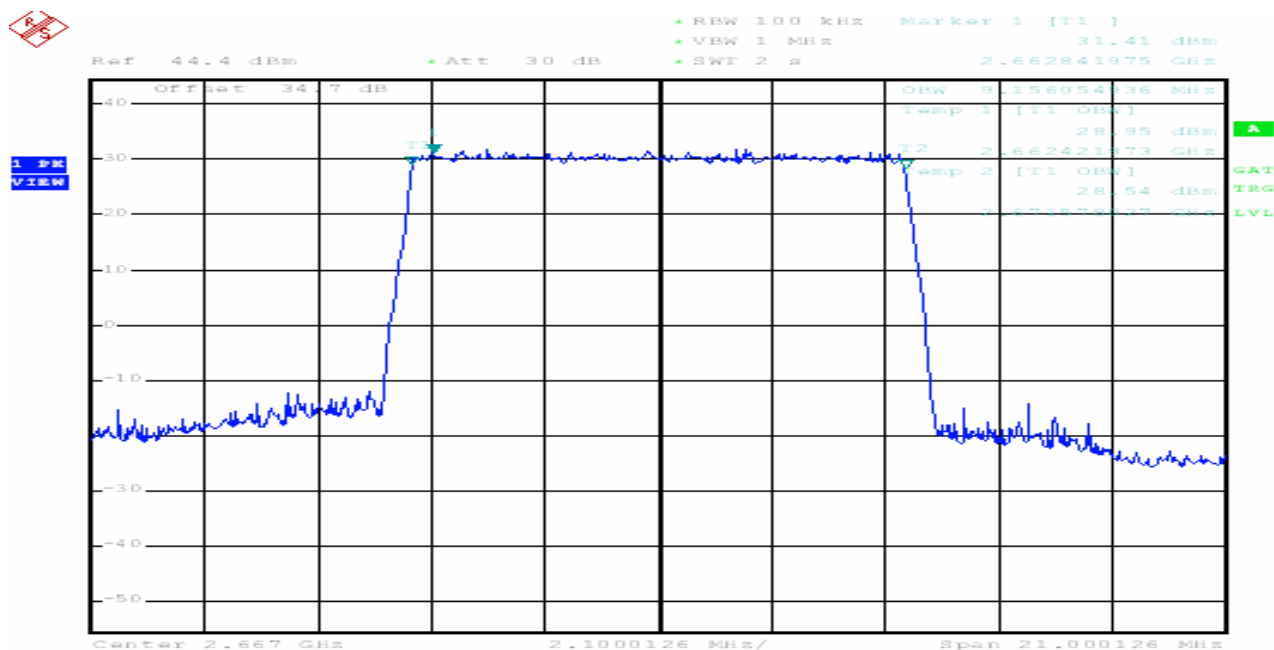


(64QAM Middle Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 29 of 81

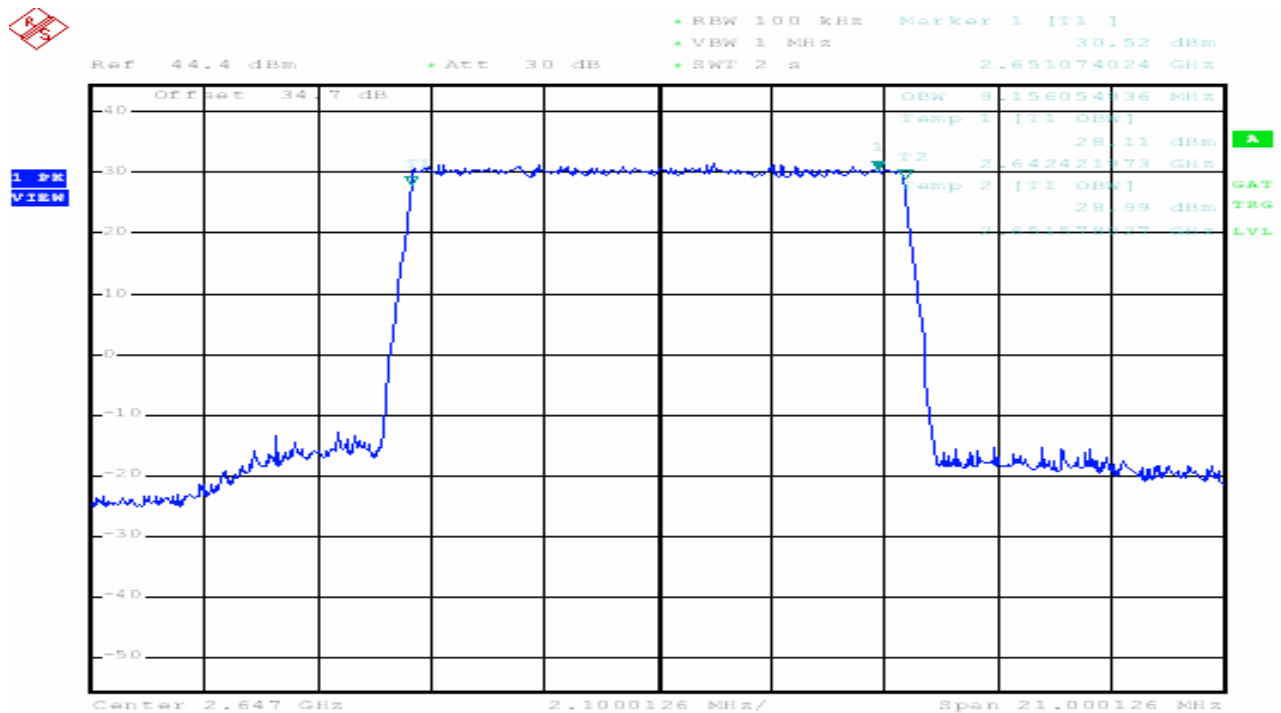
(64QAM High Channel)



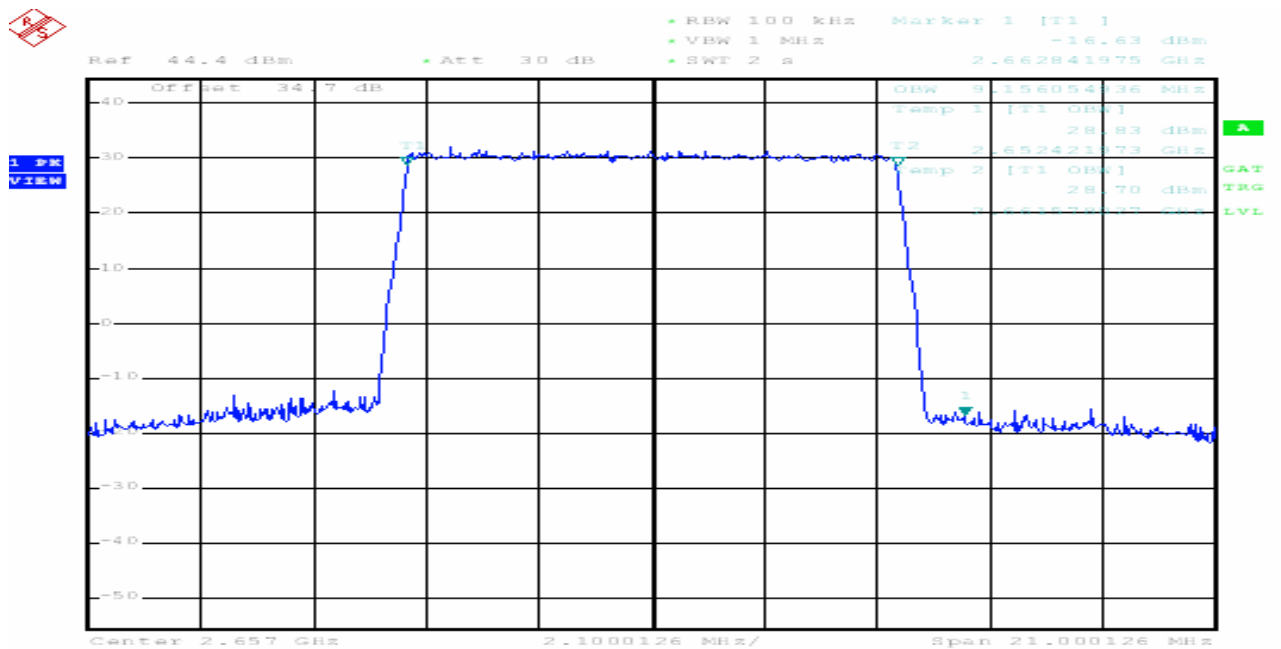
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 30 of 81

6.4.4. Test Data at Output Port 1

(QPSK Low Channel)

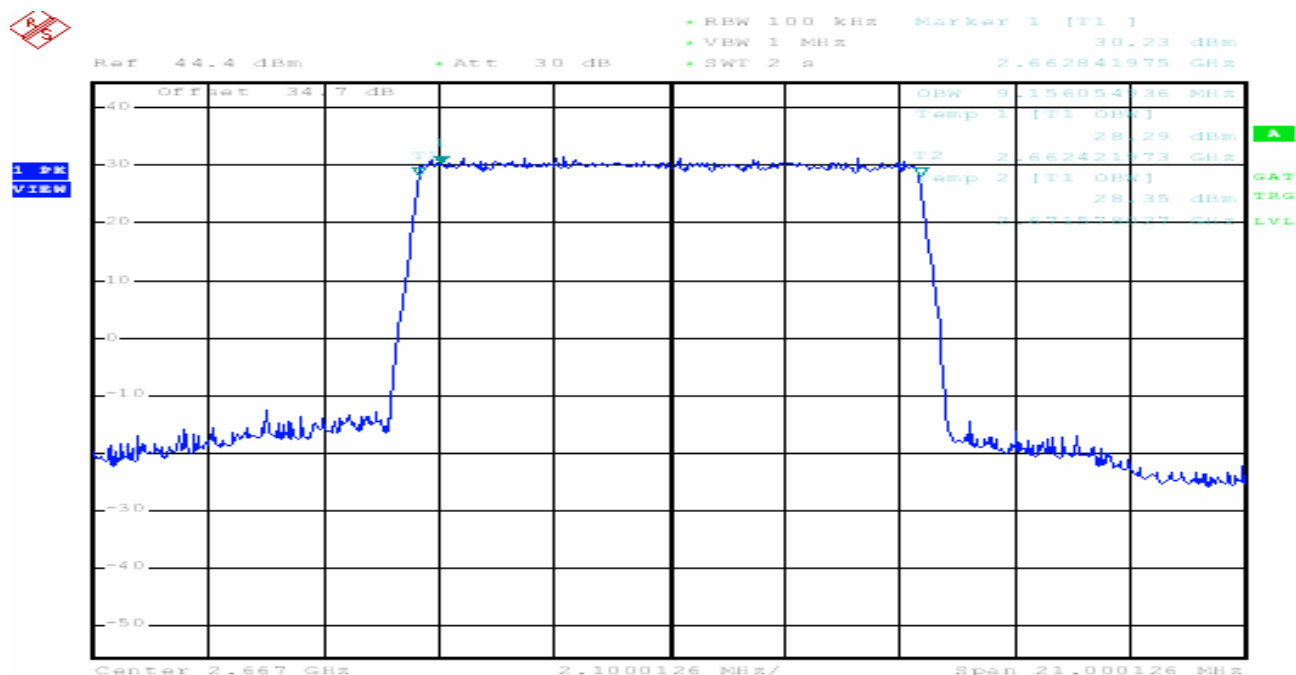


(QPSK Middle Channel)

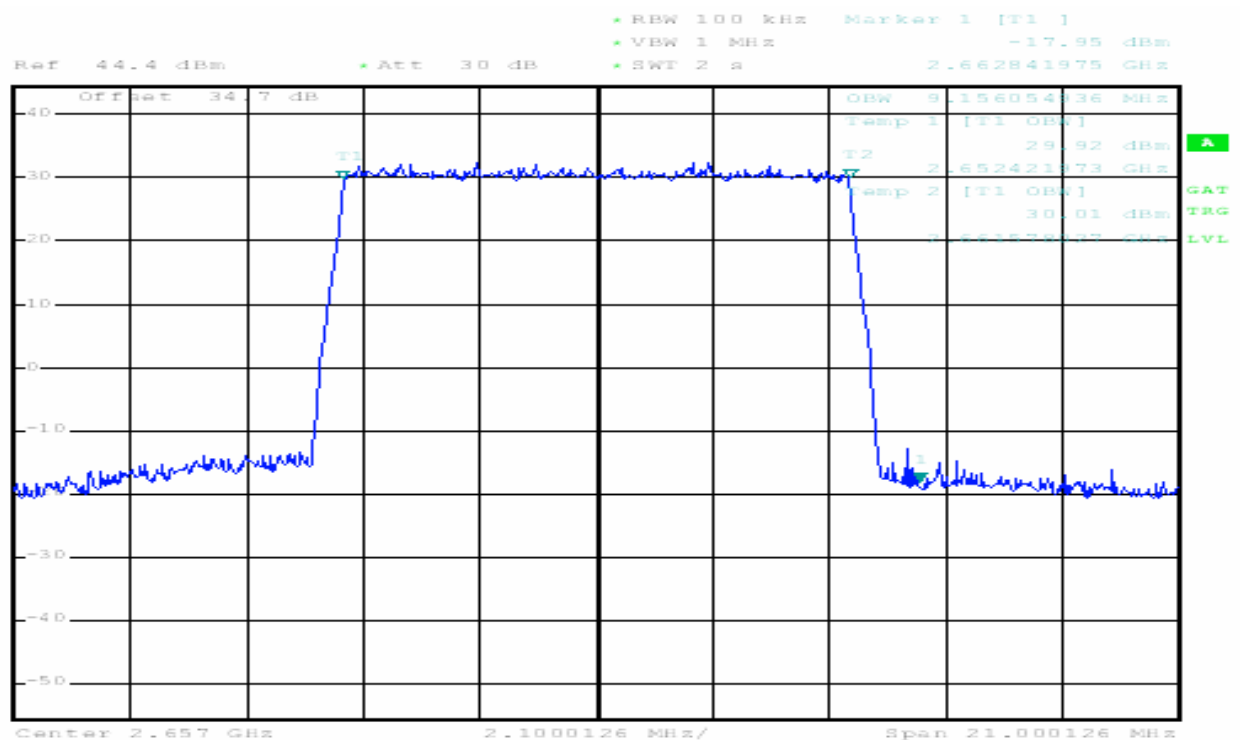
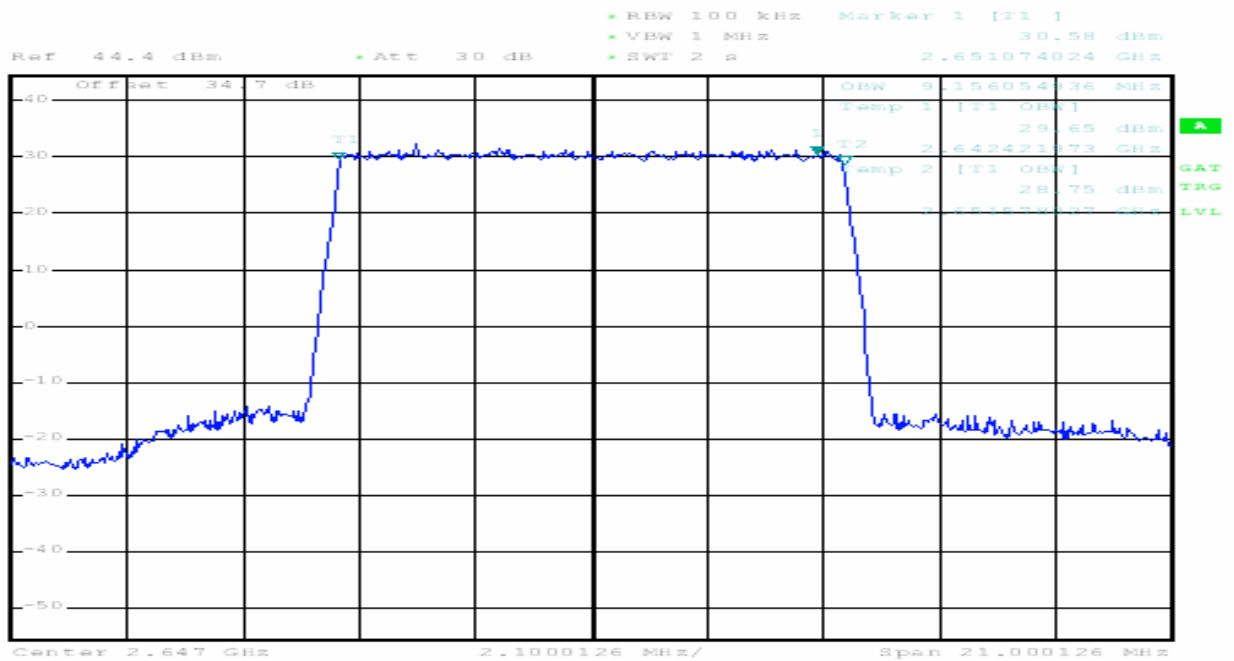


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 31 of 81

(QPSK High Channel)

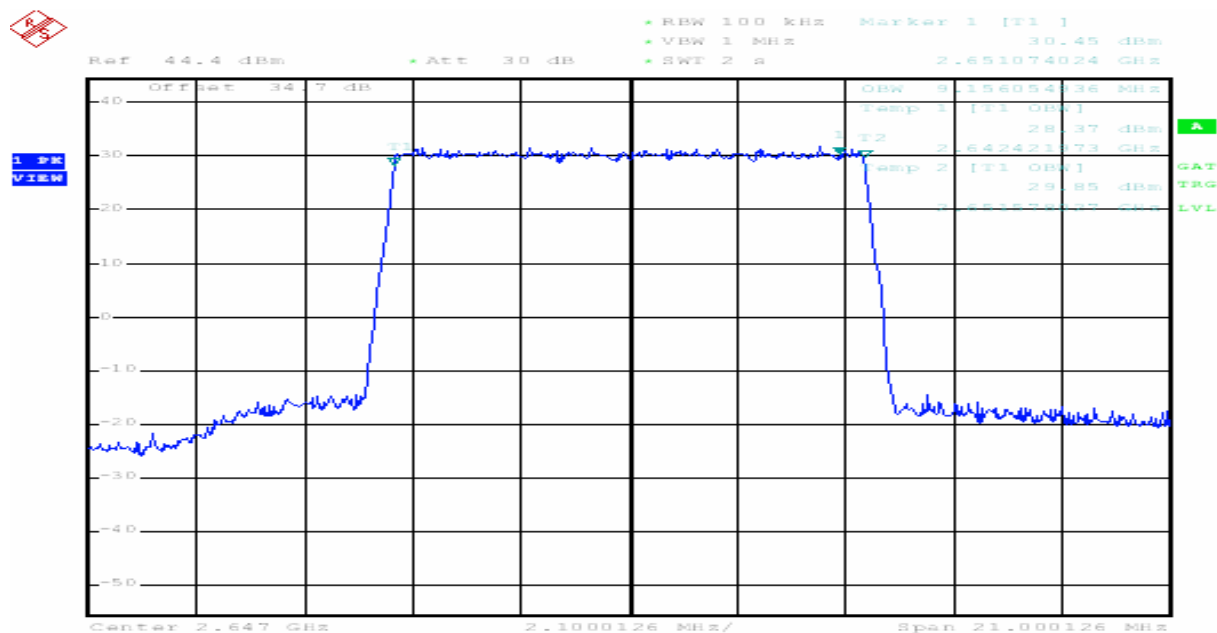


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 32 of 81

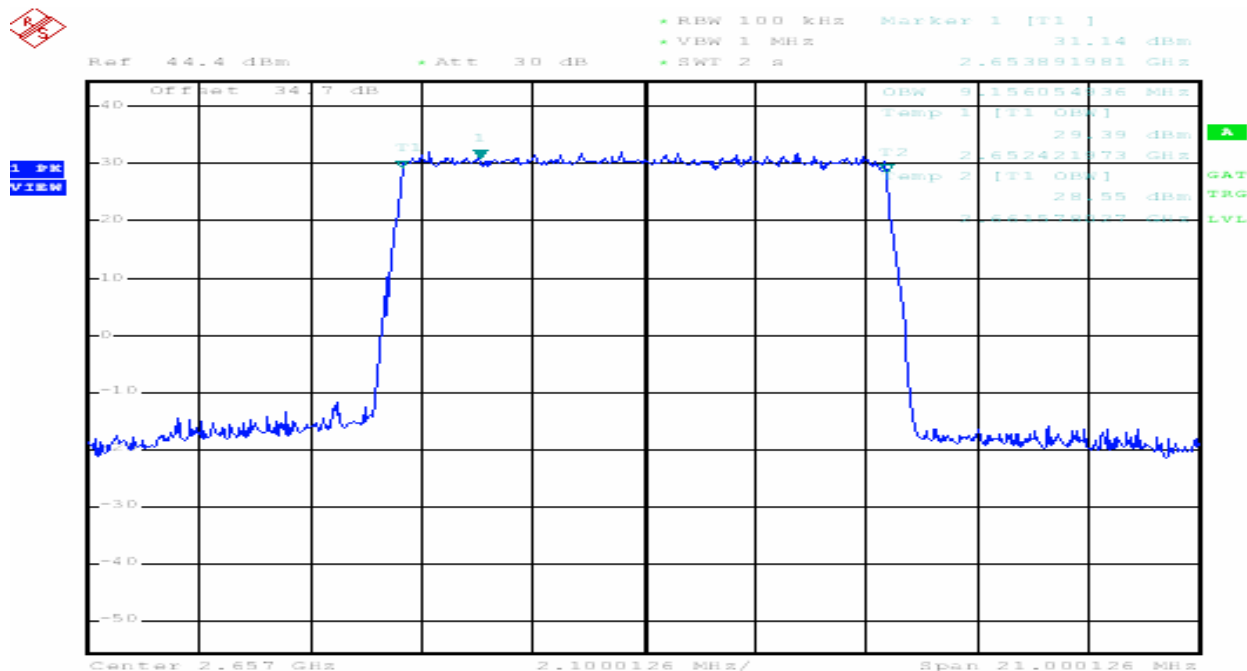


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 34 of 81

(64QAM Low Channel)

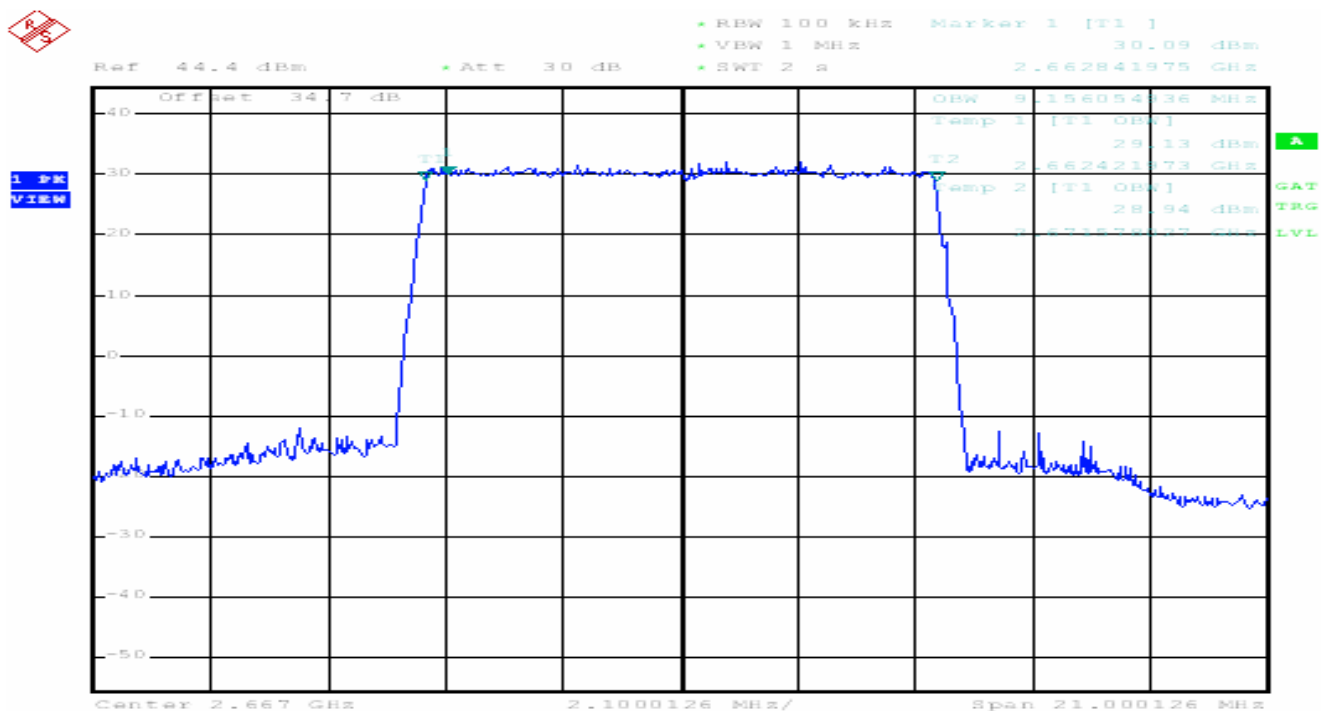


(64QAM Middle Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 35 of 81

(64QAM High Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 36 of 81

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. Test Data Environmental Conditions

Temperature:	24 °C
Relative Humidity:	59%

7.4. Test Result

: PASS

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 37 of 81

7.4.1. Test data at Output 0

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2642.00	-26.20	-13.0
	High	2672.00	-26.71	
16QAM	Low	2642.00	-26.35	
	High	2672.00	-26.87	
64QAM	Low	2642.00	-26.85	
	High	2672.00	-27.00	

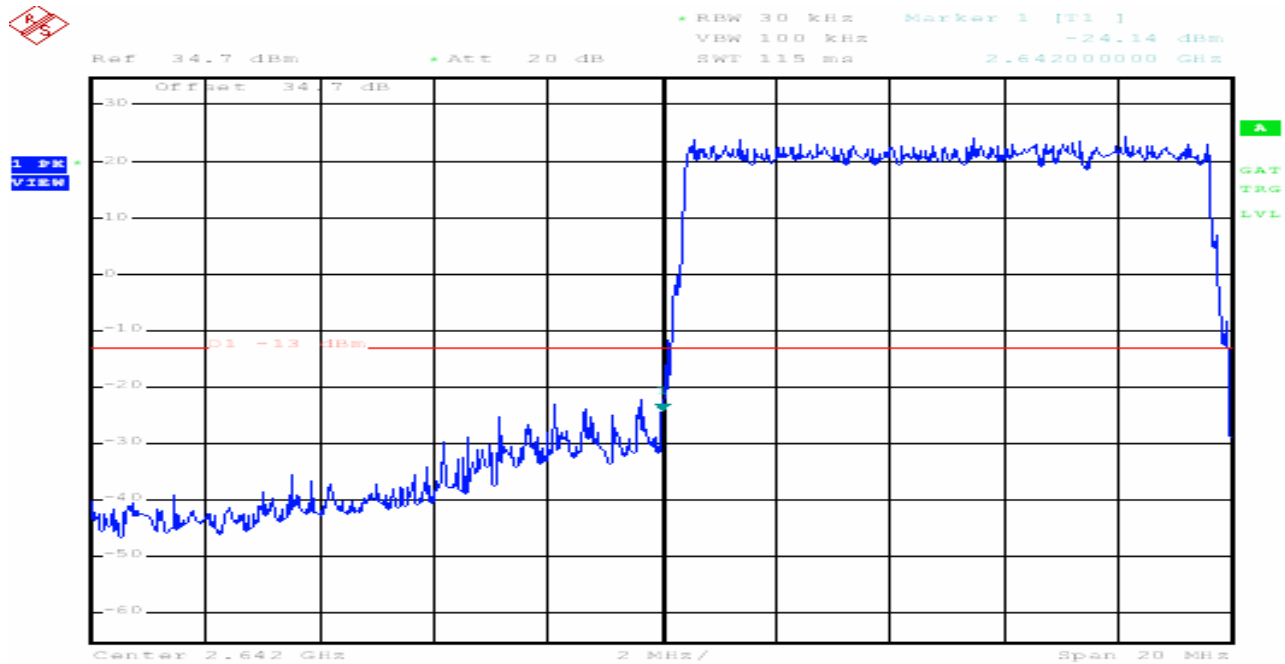
7.4.2. Test data at Output 1

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)
QPSK	Low	2642.00	-26.48	-13.0
	High	2672.00	-27.53	
16QAM	Low	2642.00	-26.58	
	High	2672.00	-27.17	
64QAM	Low	2642.00	-26.55	
	High	2672.00	-27.12	

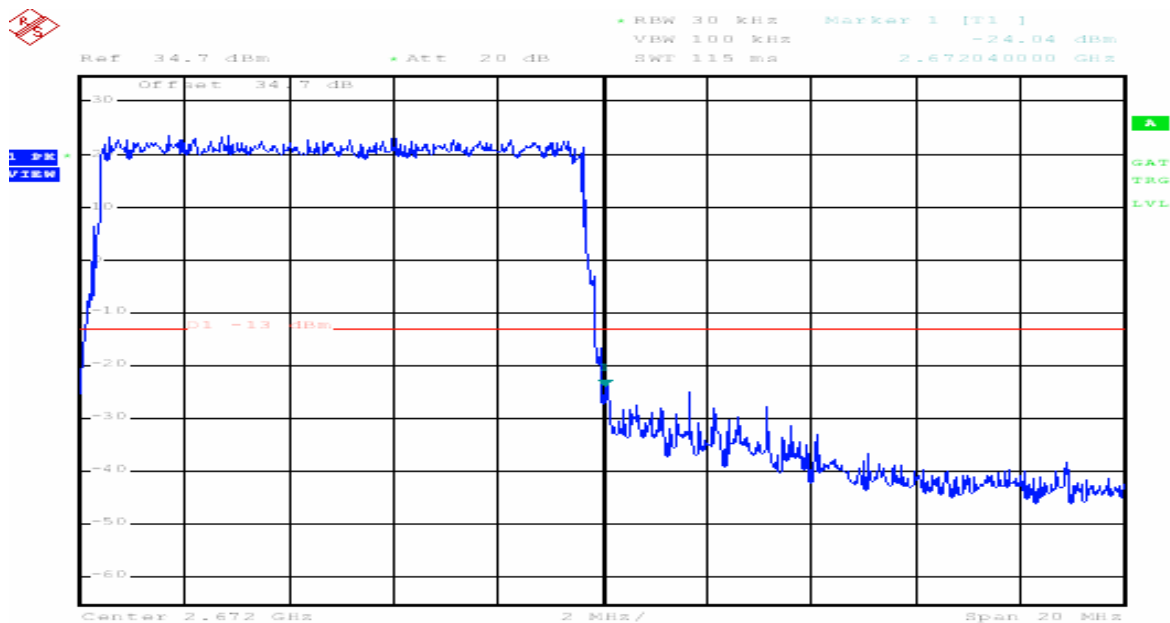
According to the rule, out of band emission shall be attenuated by $43 + 10 \log (P)$ dBc, equates to -13.0dBm.

7.4.3. Plot Data at Output 0

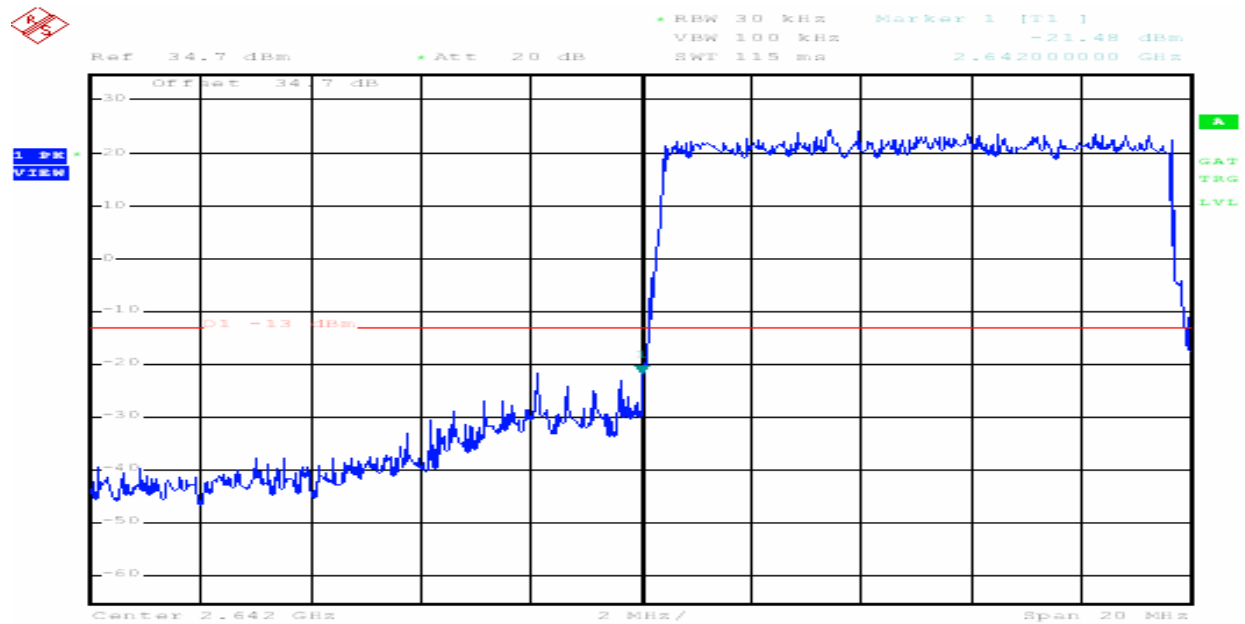
(QPSK Low Channel)



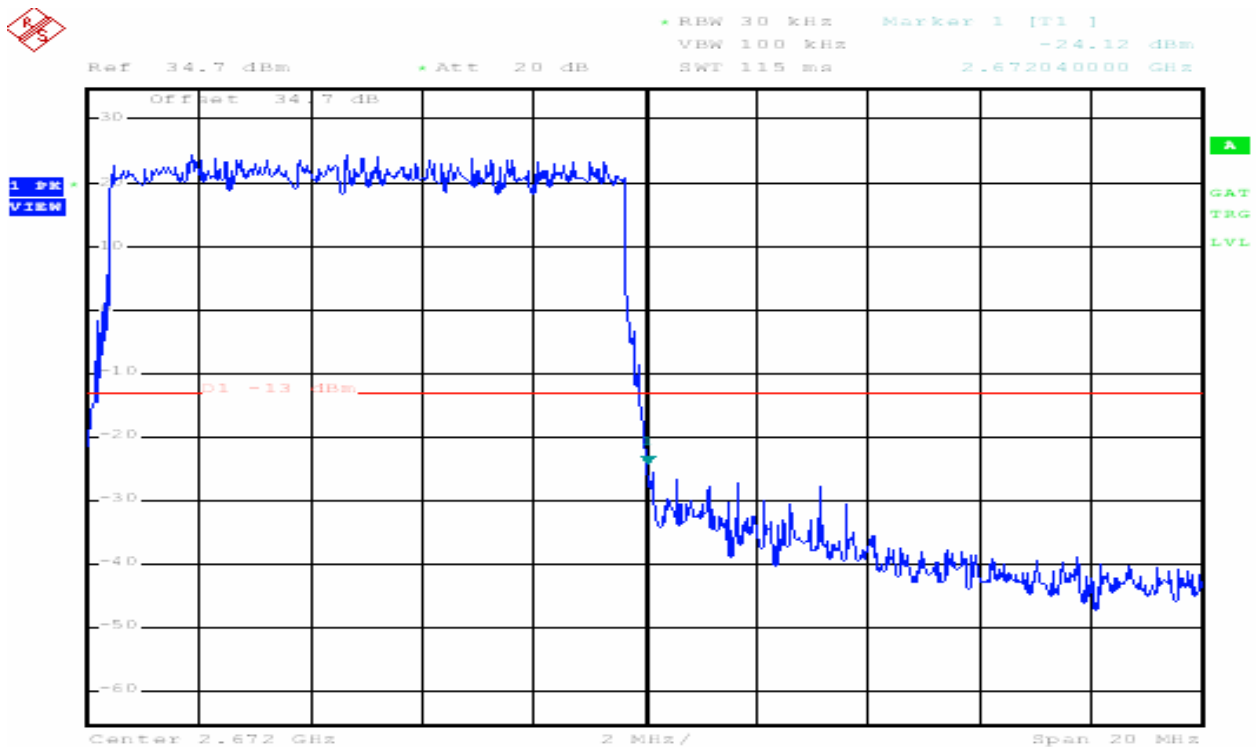
(QPSK High Channel)



(16QAM Low Channel)

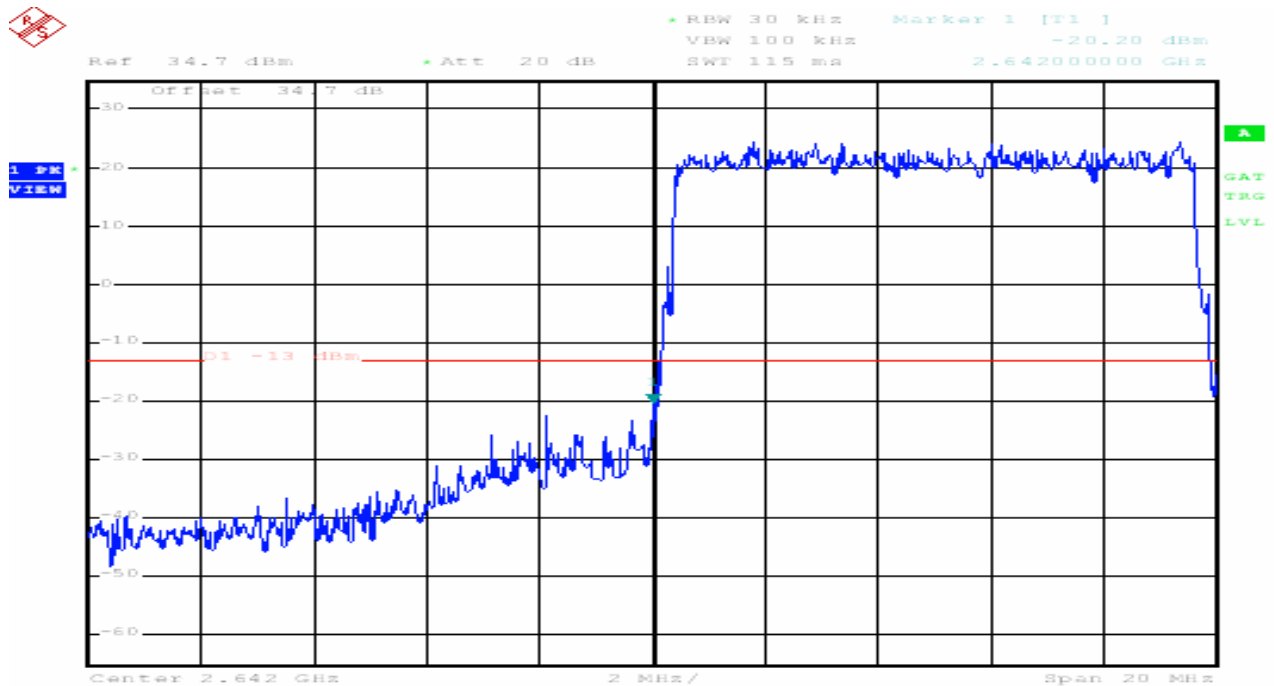


(16QAM High Channel)

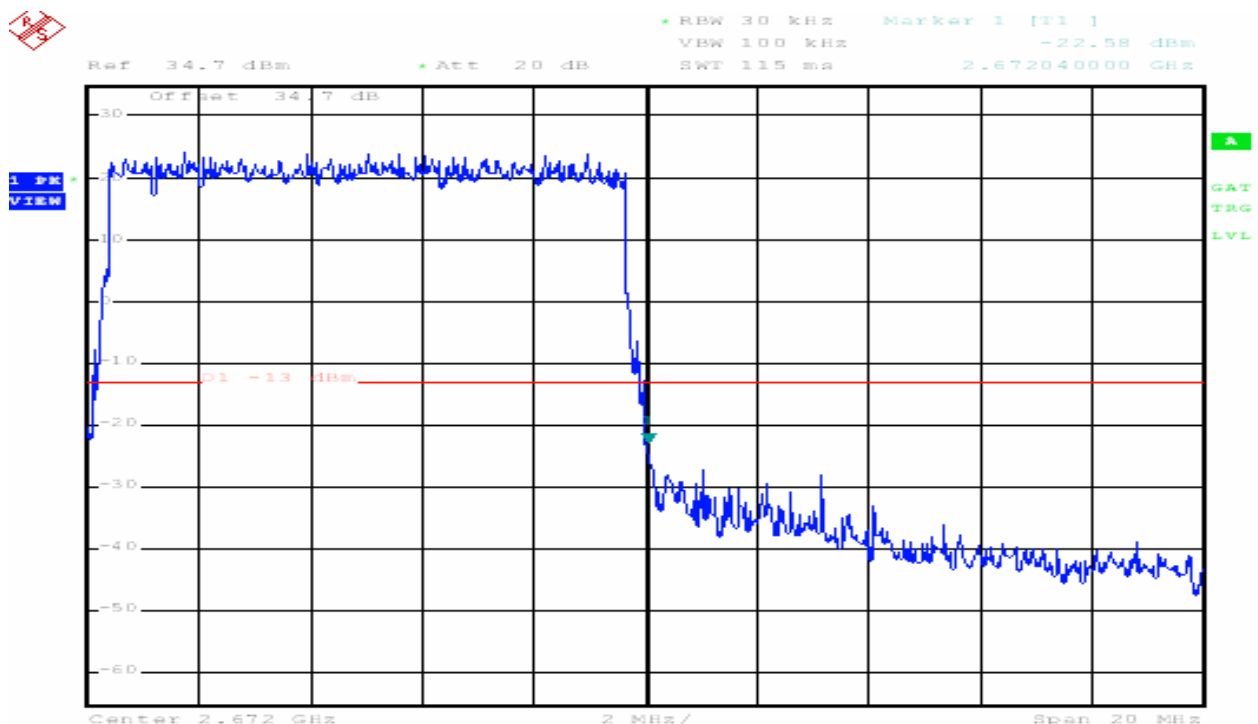


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 40 of 81

(64QAM Low Channel)



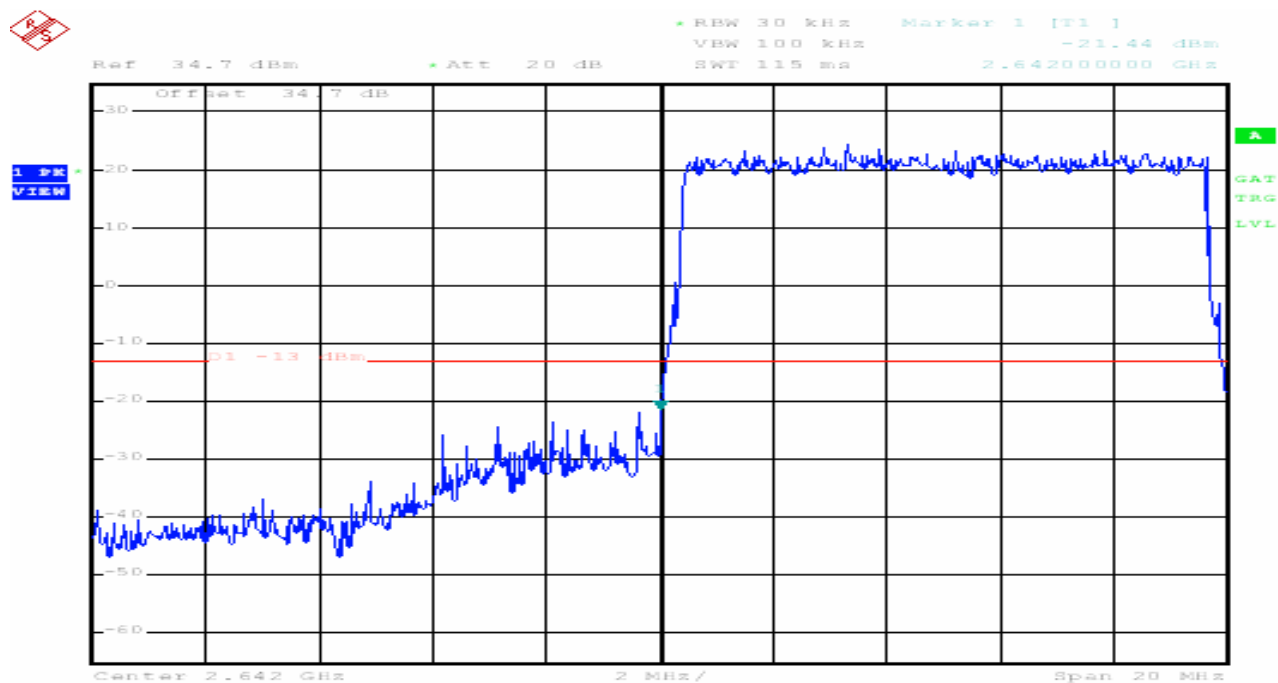
(64QAM High Channel)



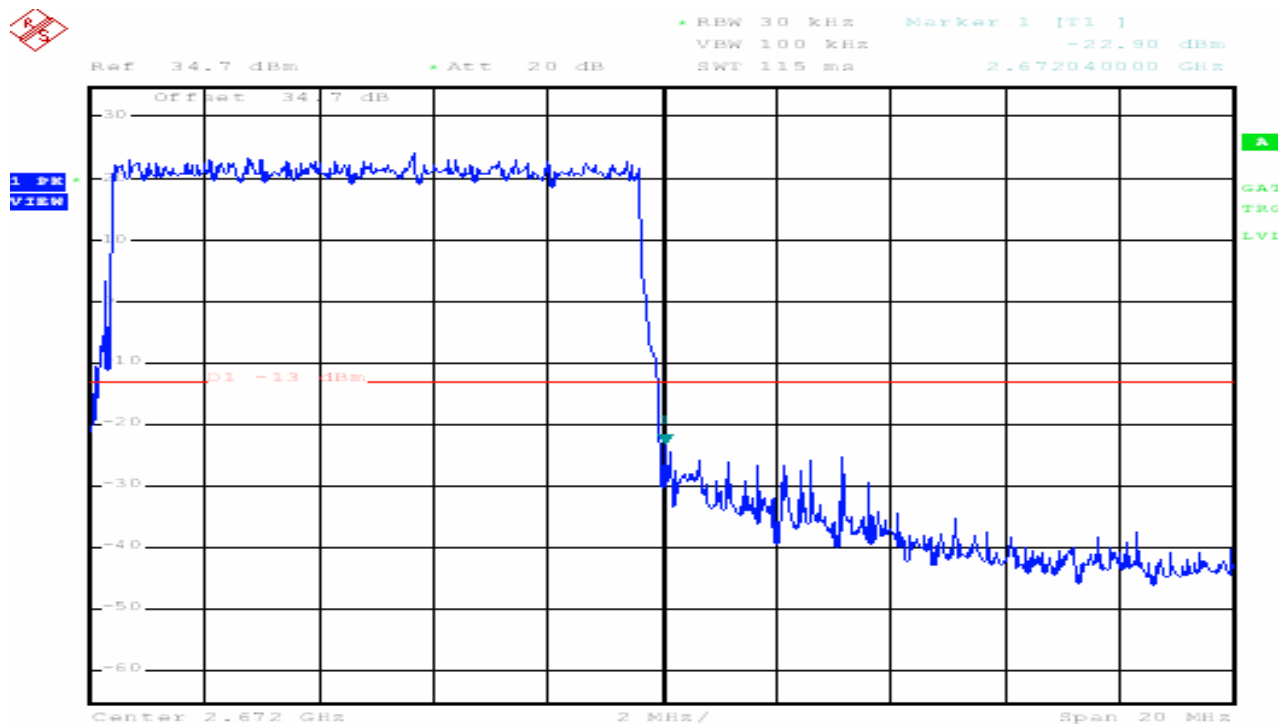
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 41 of 81

7.4.4. Plot Data at Output 1

(QPSK Low Channel)

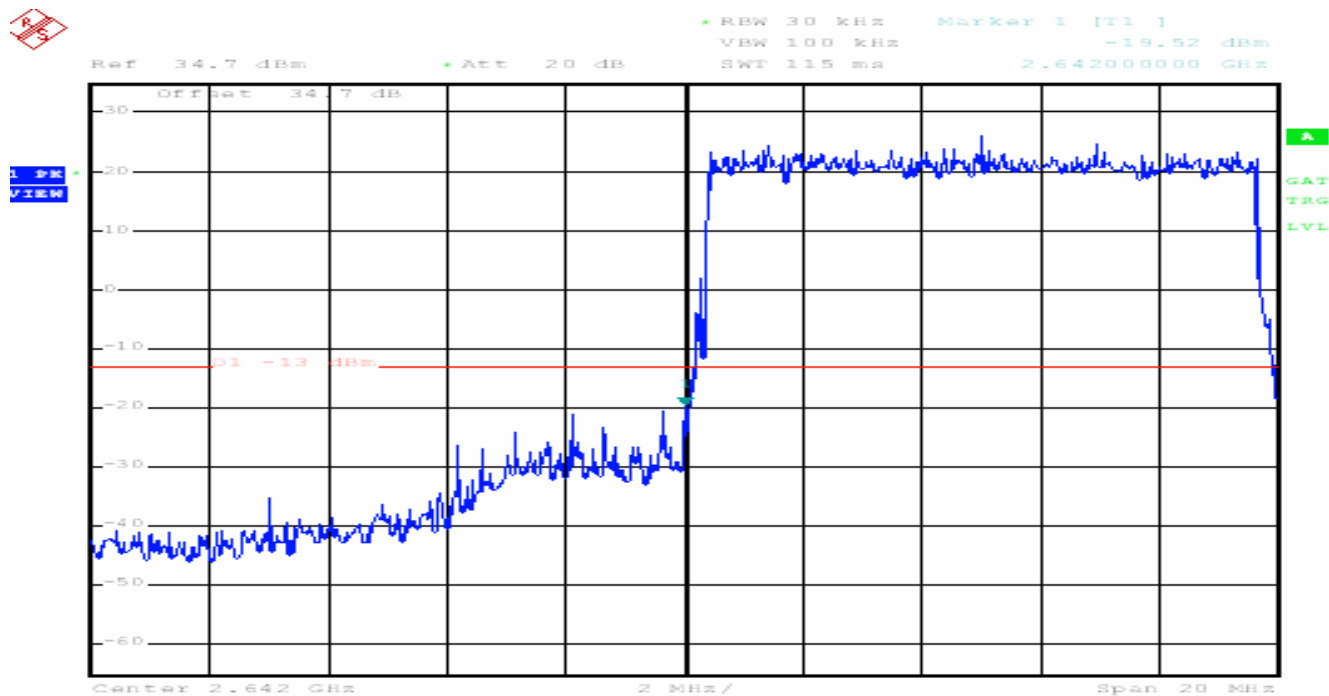


(QPSK High Channel)

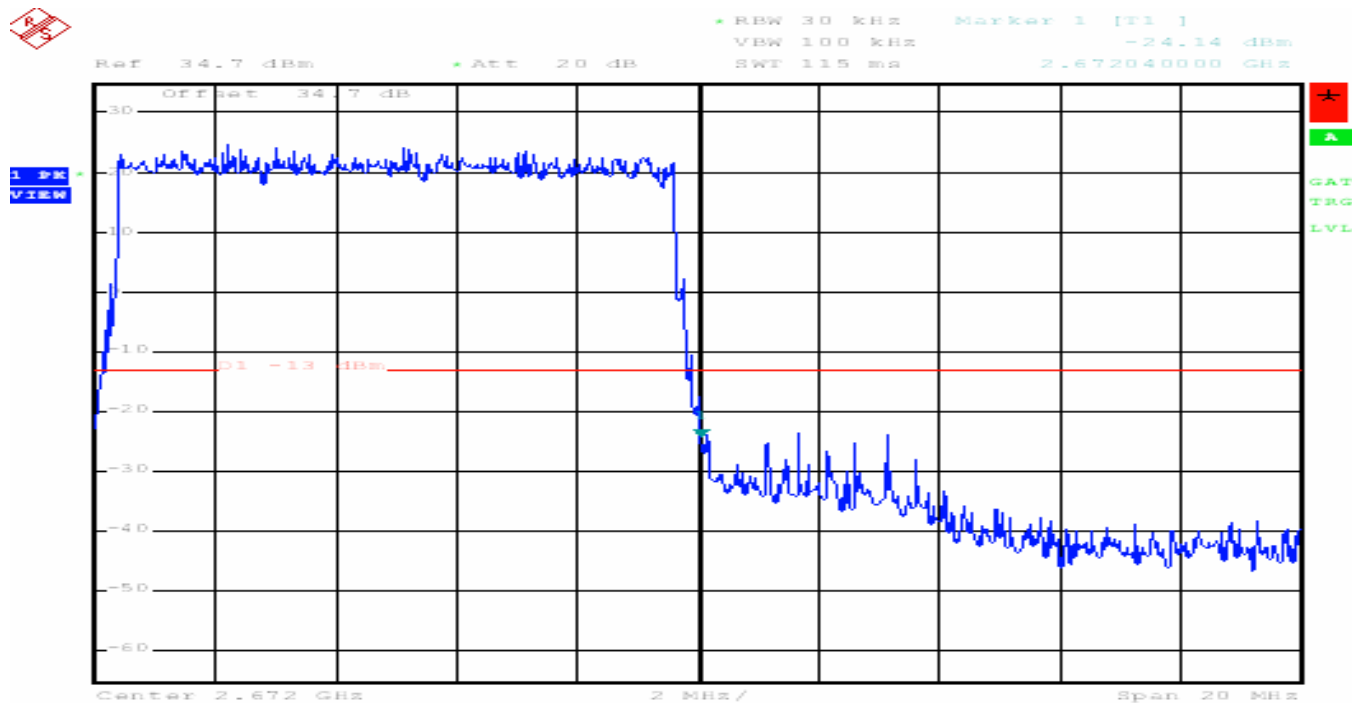


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 42 of 81

(16QAM Low Channel)

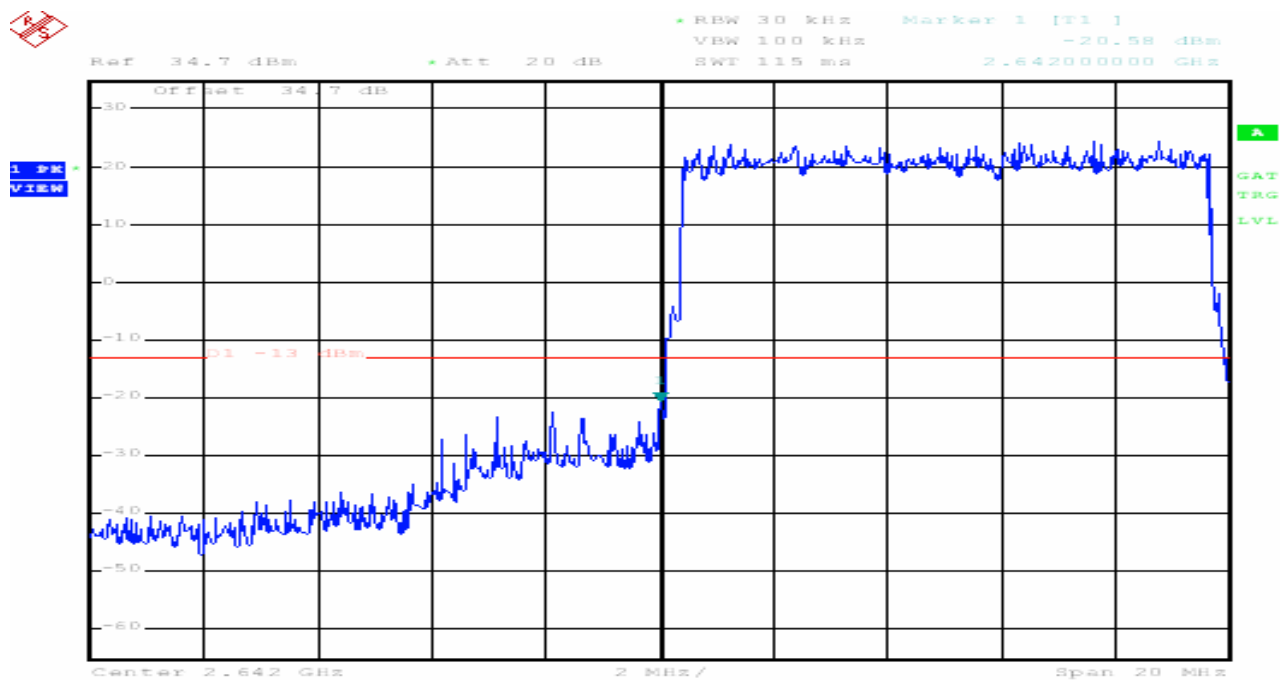


(16QAM High Channel)

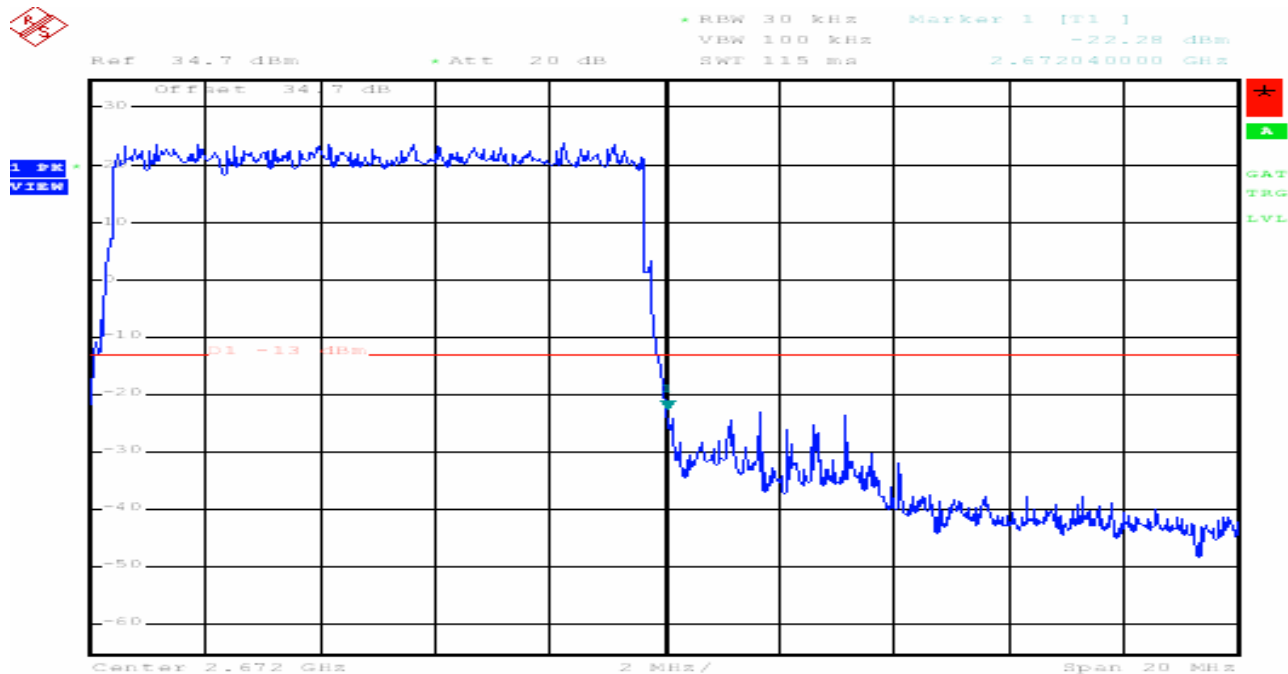


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 43 of 81

(64QAM Low Channel)

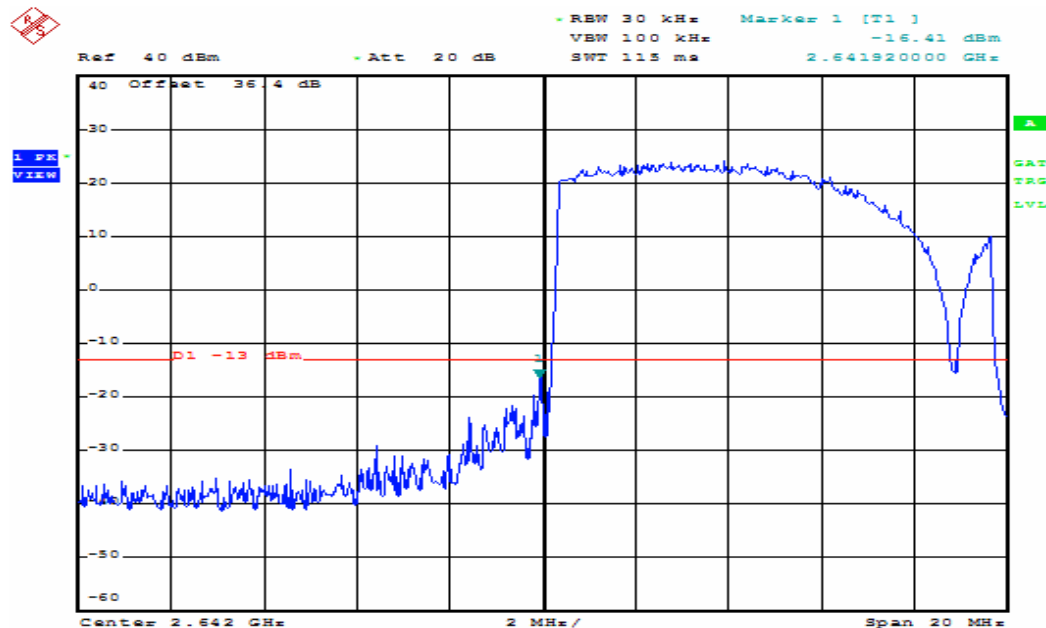


(64QAM High Channel)

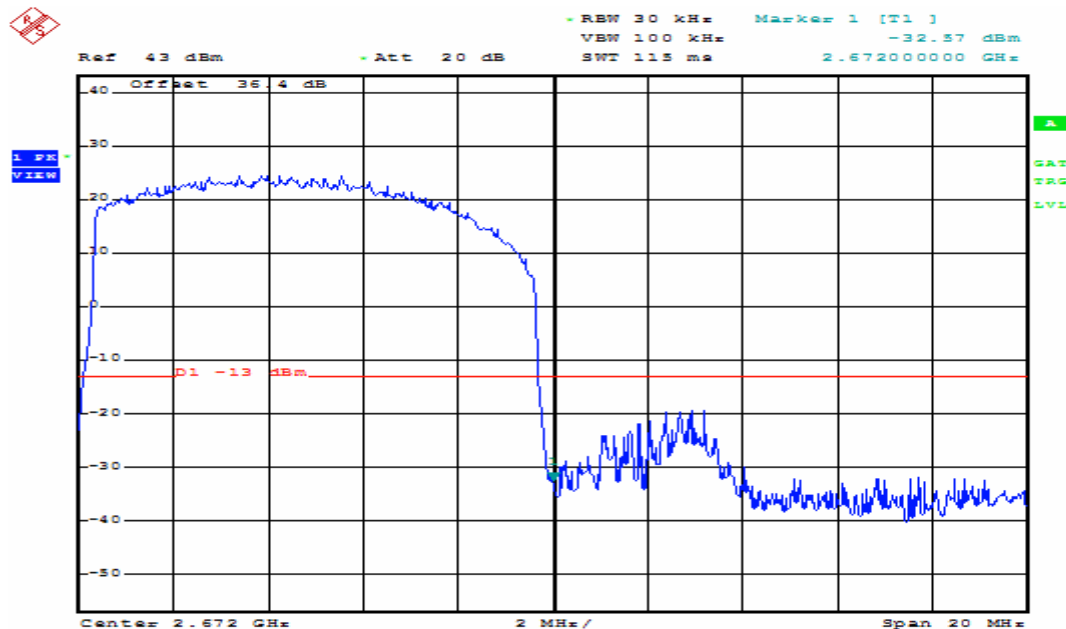


7.4.4. Plot Data at Combined Output

(QPSK Low Channel)

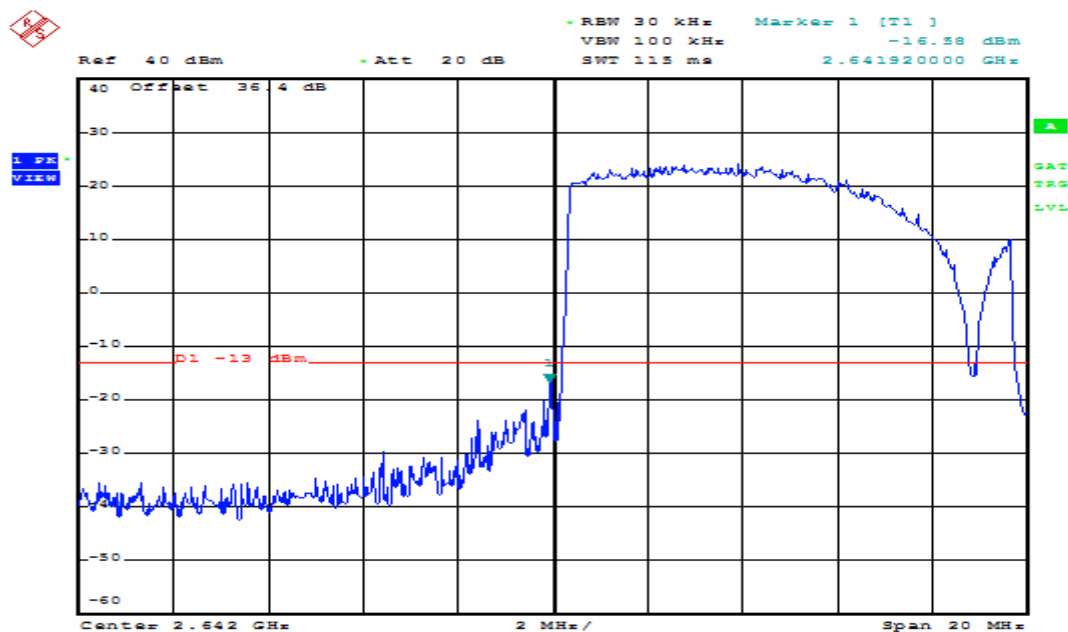


(QPSK High Channel)

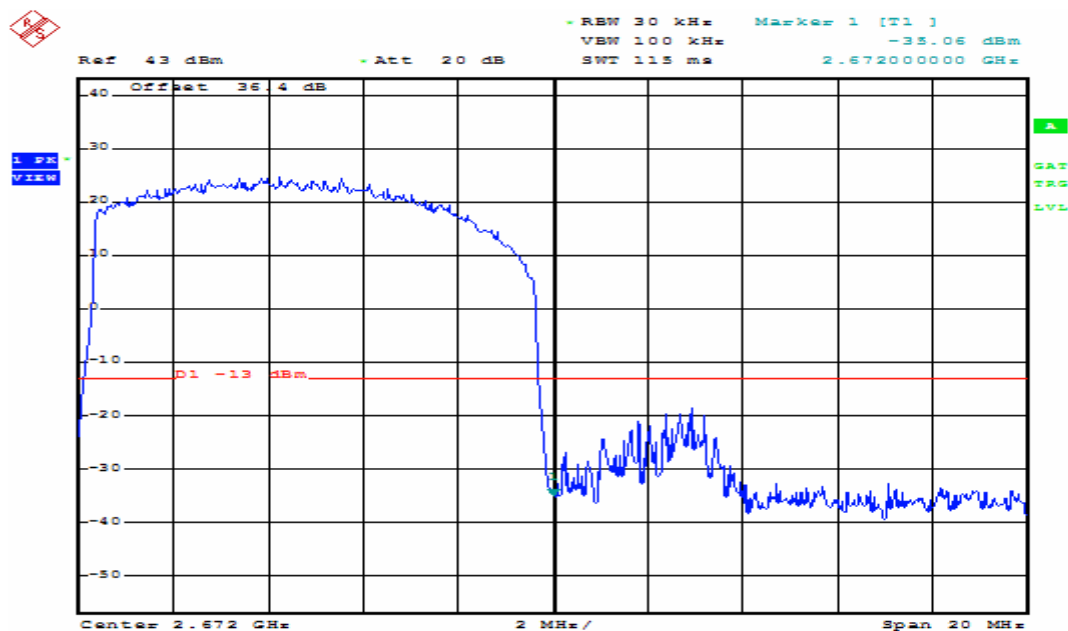


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 45 of 81

(16QAM Low Channel)

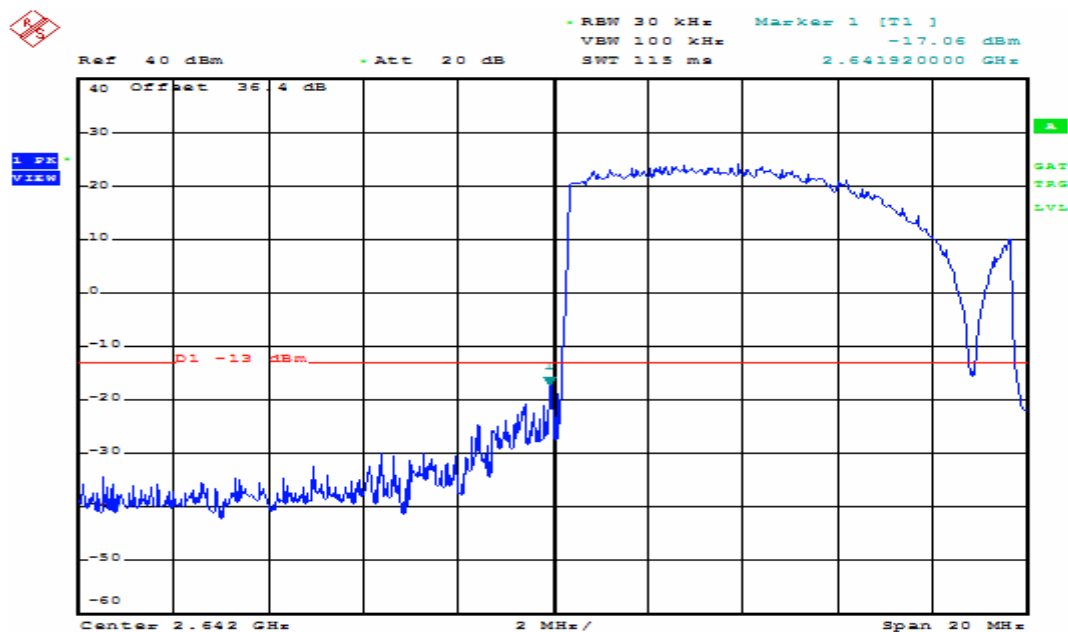


(16QAM High Channel)

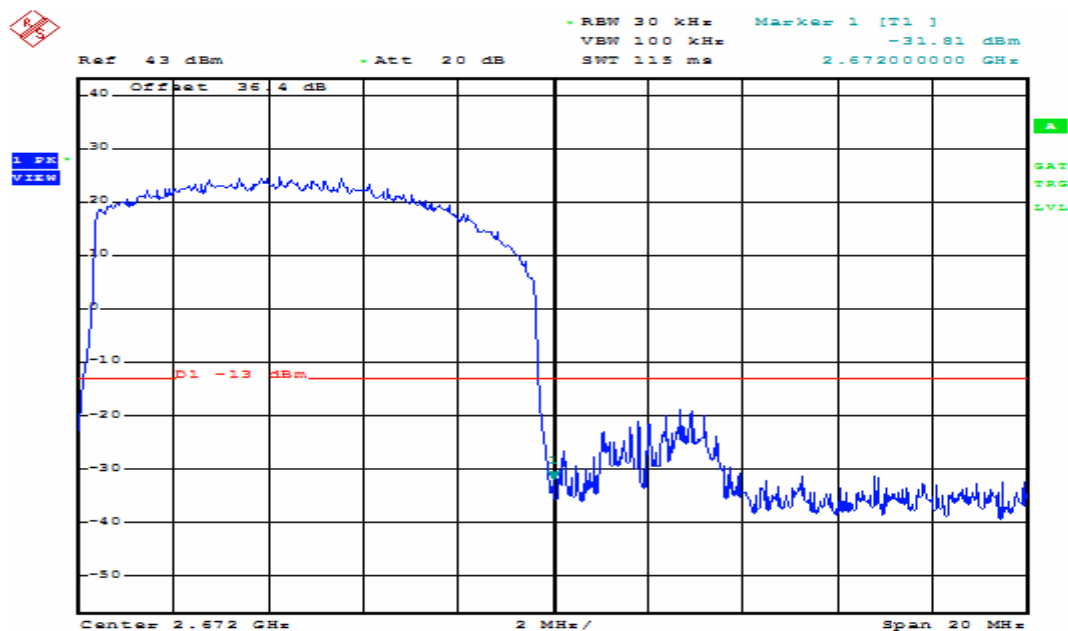


HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 46 of 81

(64QAM Low Channel)



(64QAM High Channel)



HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 47 of 81

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 Test Procedure

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

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. Environmental Conditions:

Temperature:	23 °C
Relative Humidity:	53 %

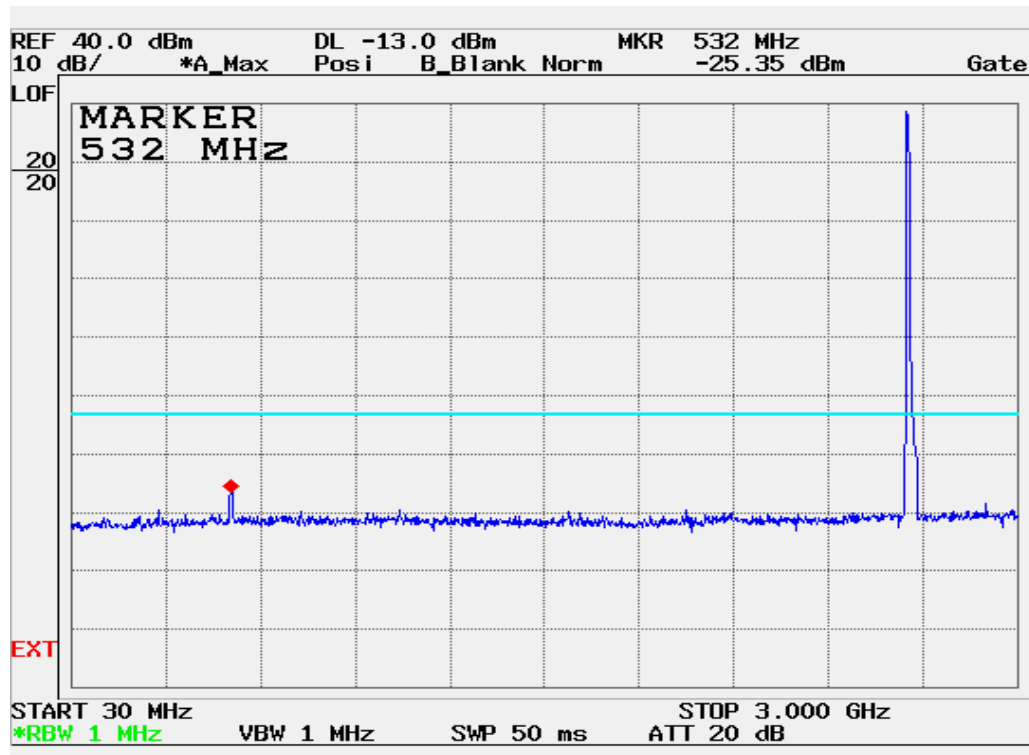
8.4. Test Result

: Pass

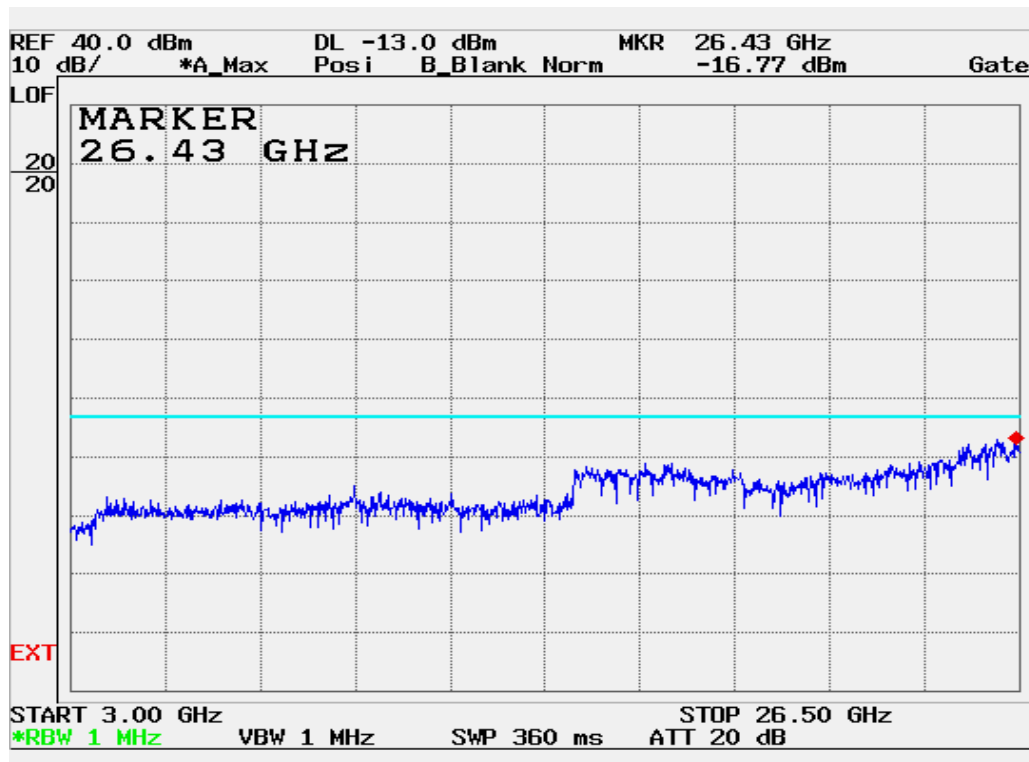
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 48 of 81

8.4.1. Plot Data at Output 0

(QPSK Low Channel)



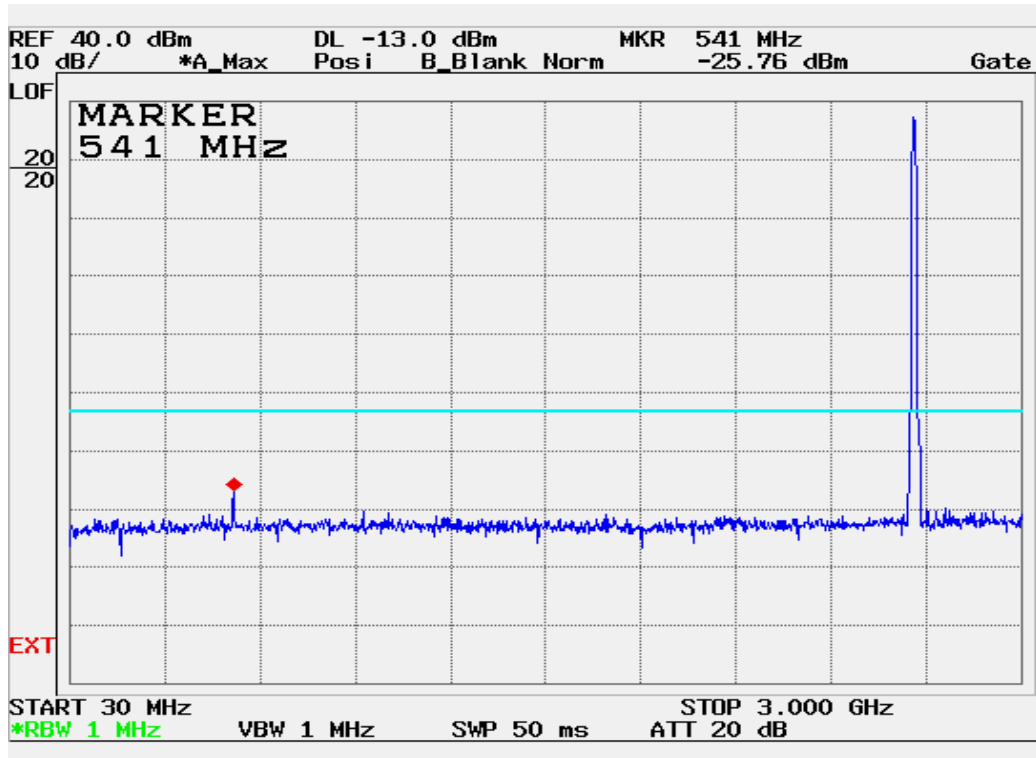
(30MHz~3.000 GHz)



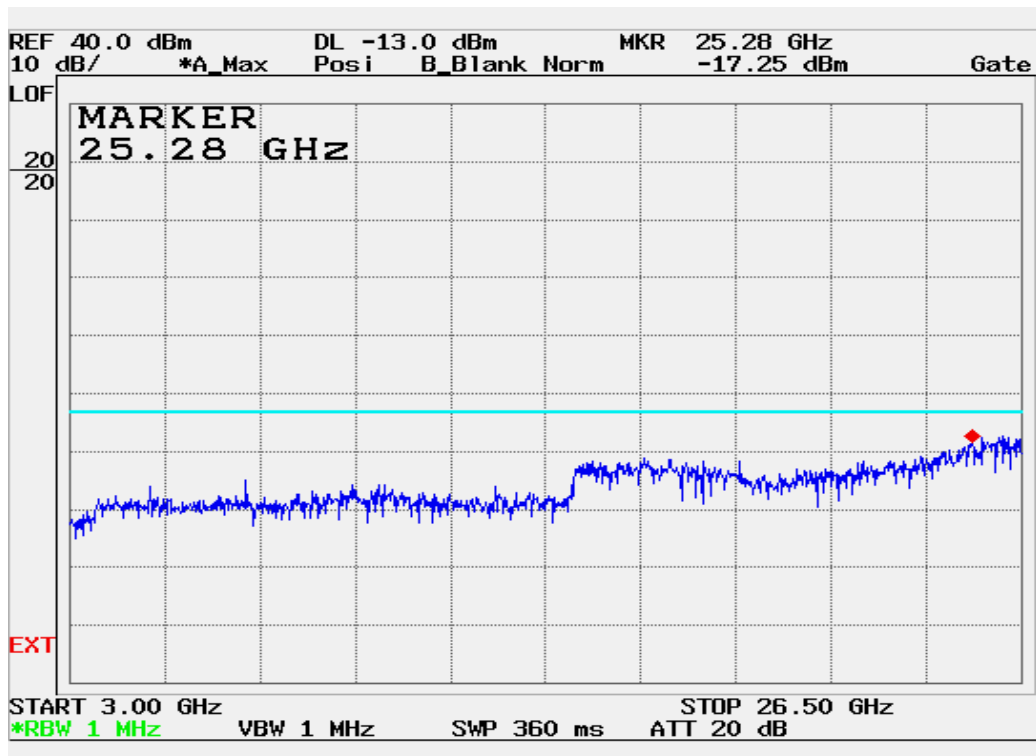
(3.00 GHz~ 26.50 GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 49 of 81

(QPSK Middle Channel)



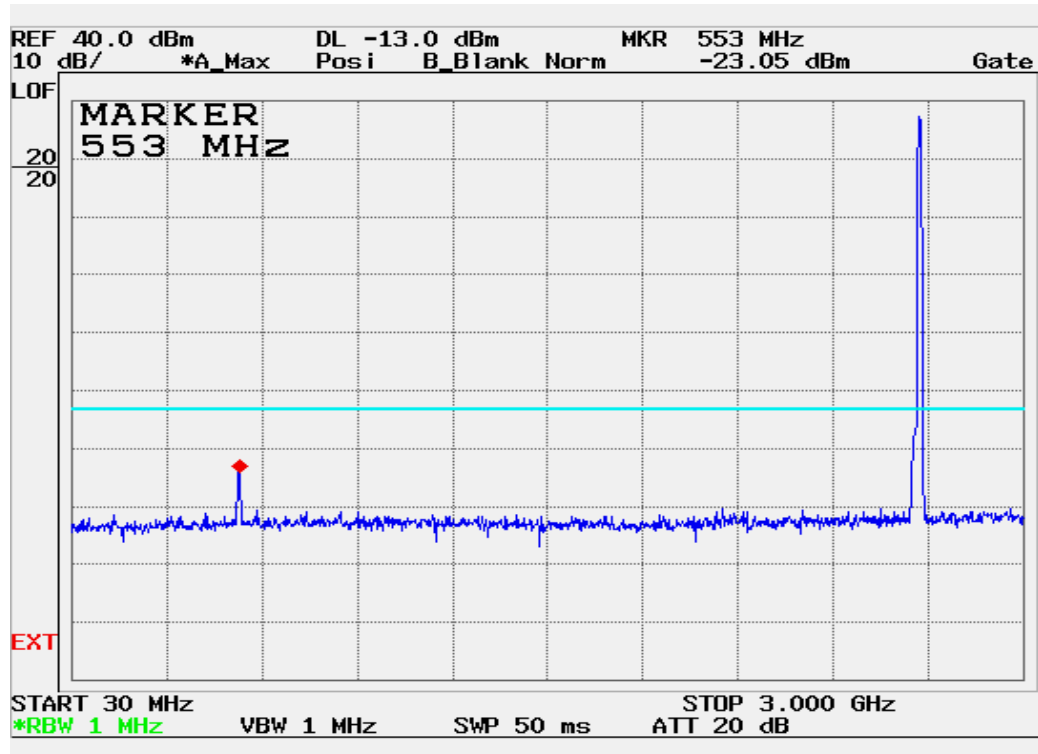
(30MHz~3.000GHz)



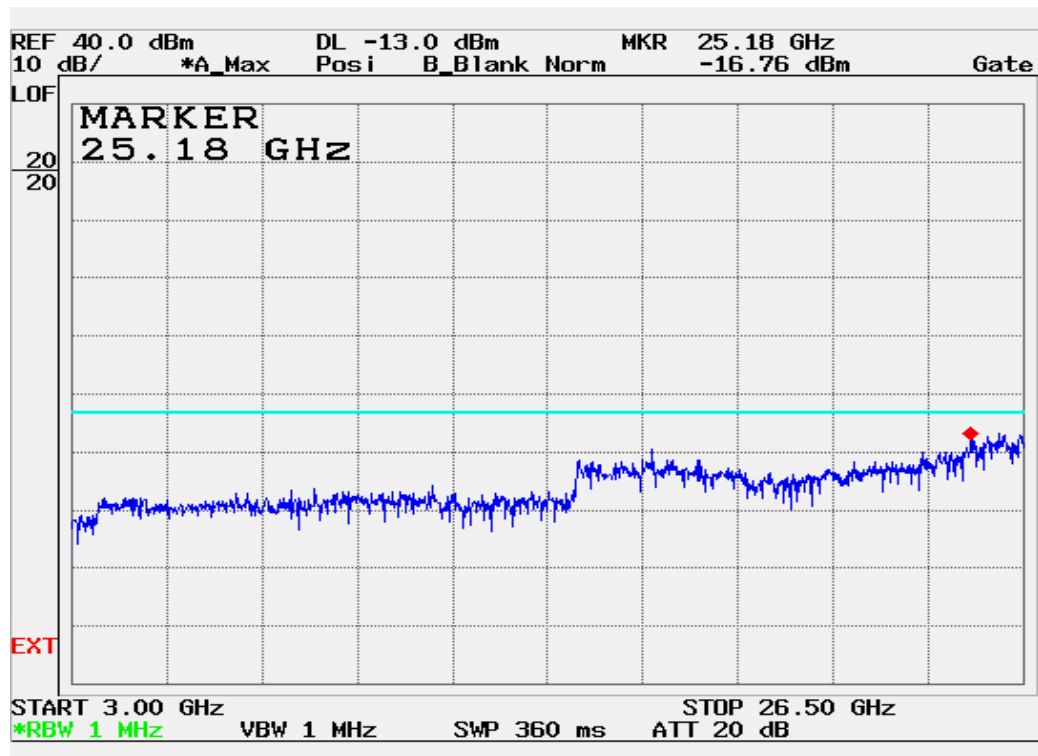
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 50 of 81

(QPSK High Channel)



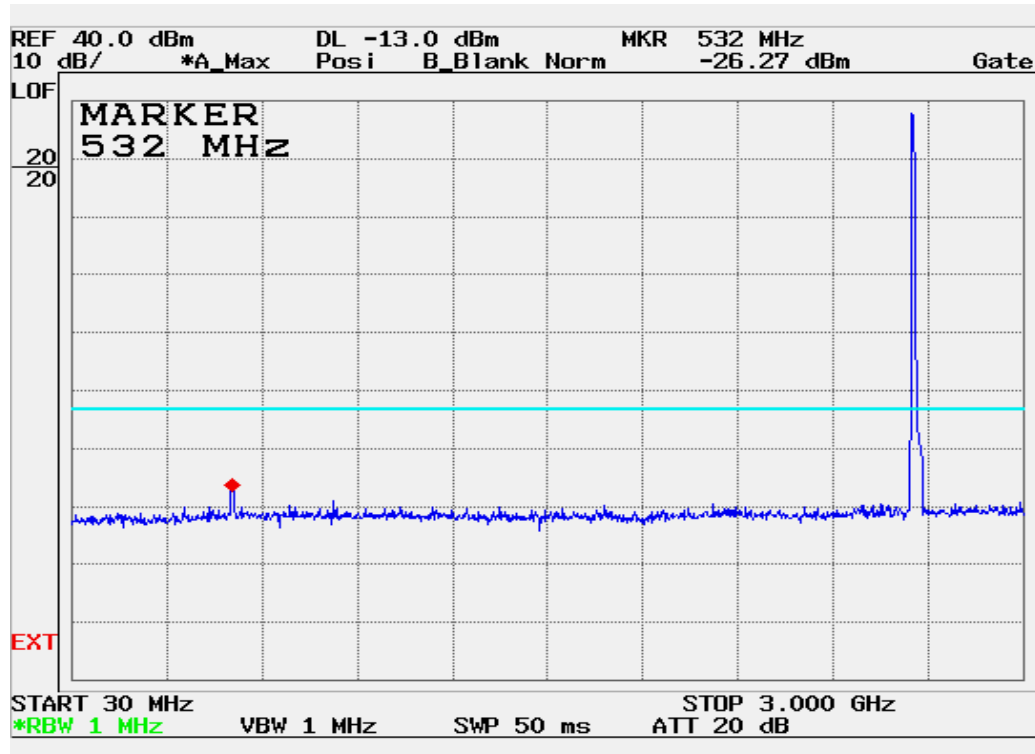
(30MHz~3.000GHz)



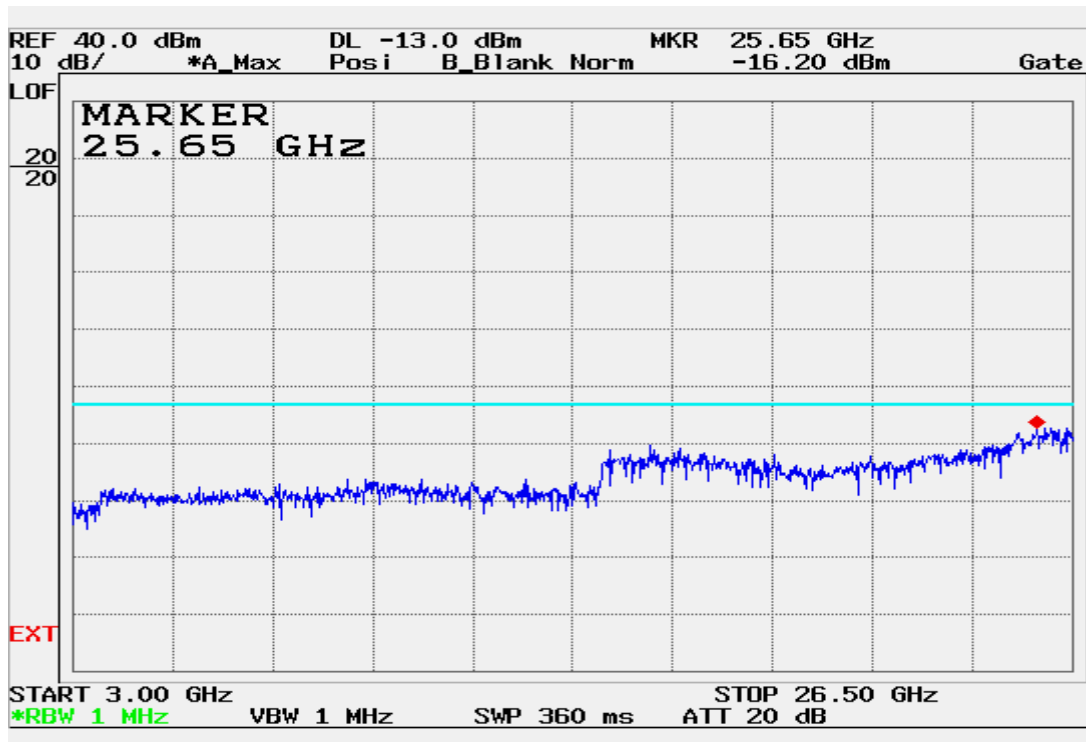
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 51 of 81

(16QAM LOW Channel)



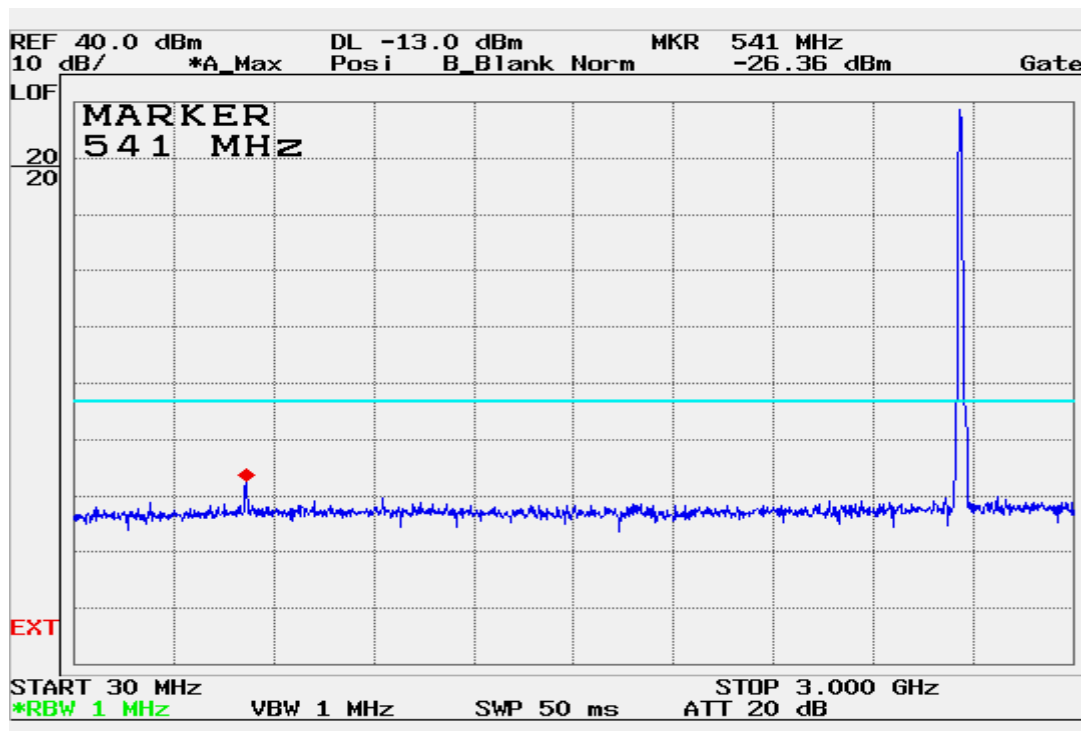
(30MHz~3.000GHz)



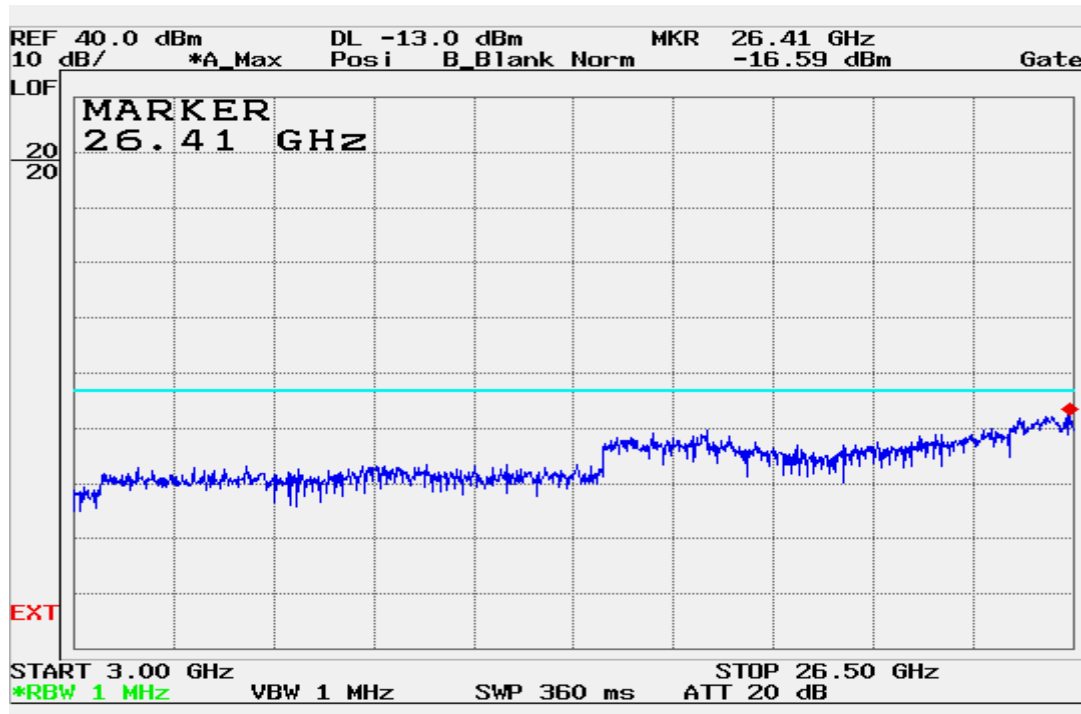
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 52 of 81

(16QAM Middle Channel)



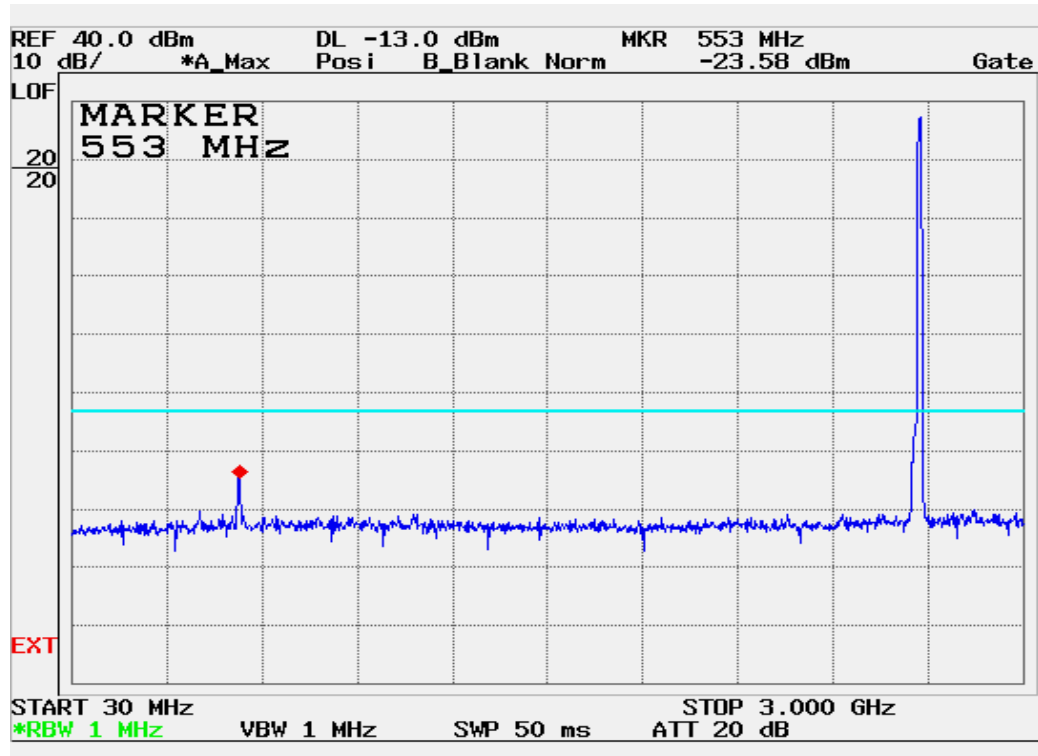
(30MHz~3.000GHz)



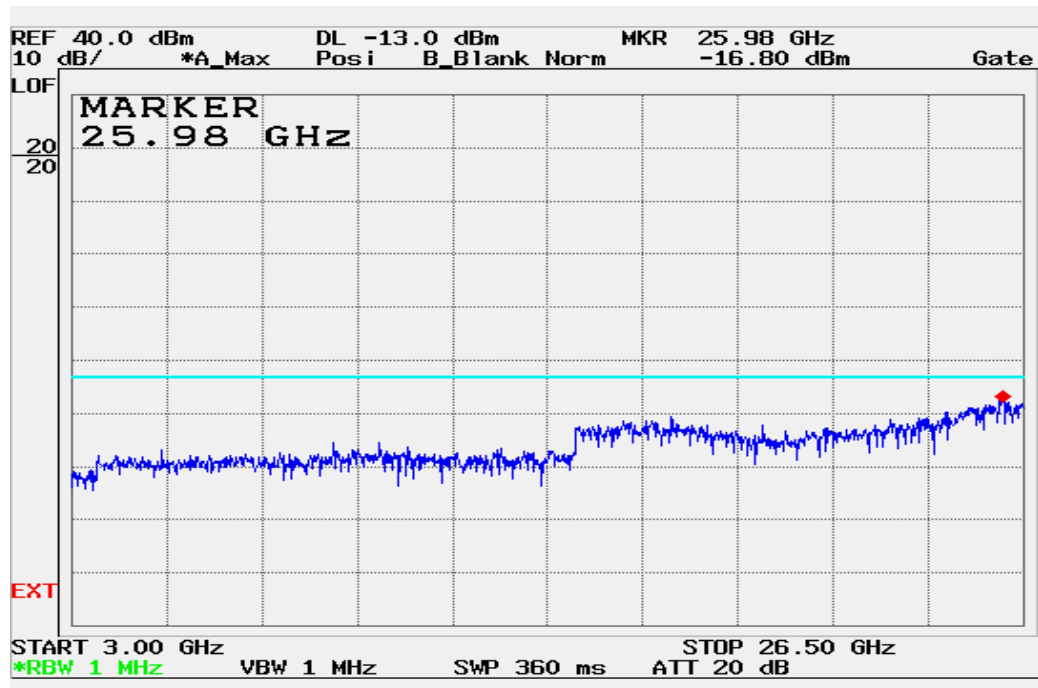
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 53 of 81

(16QAM High Channel)



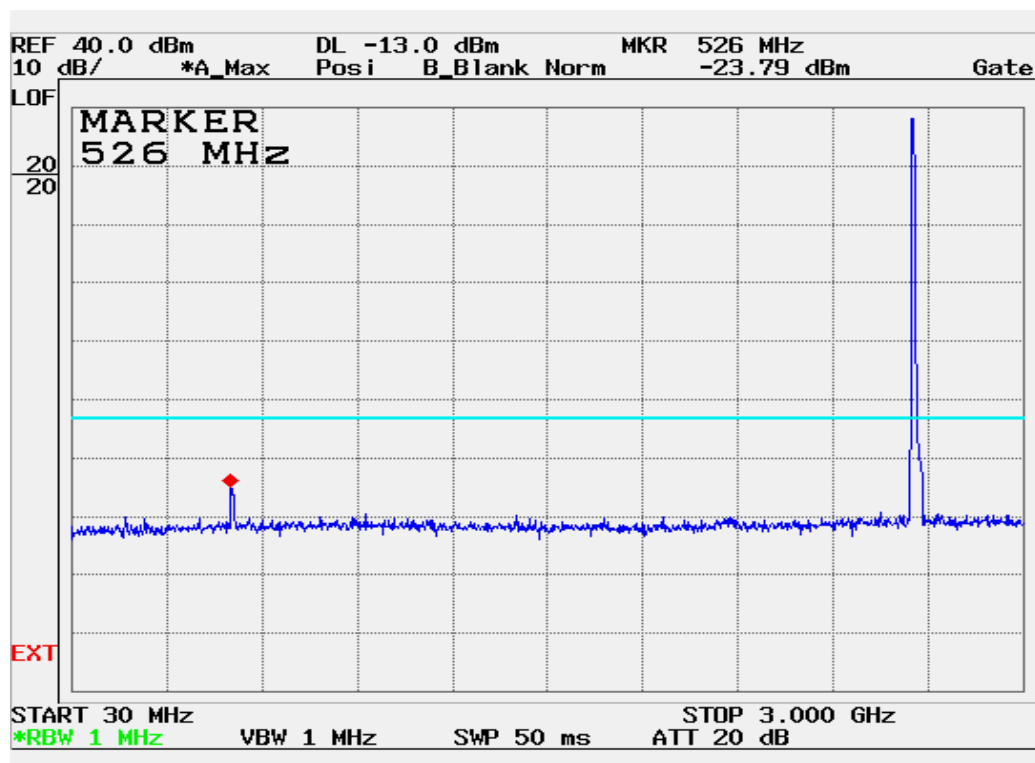
(30MHz~3.000 GHz)



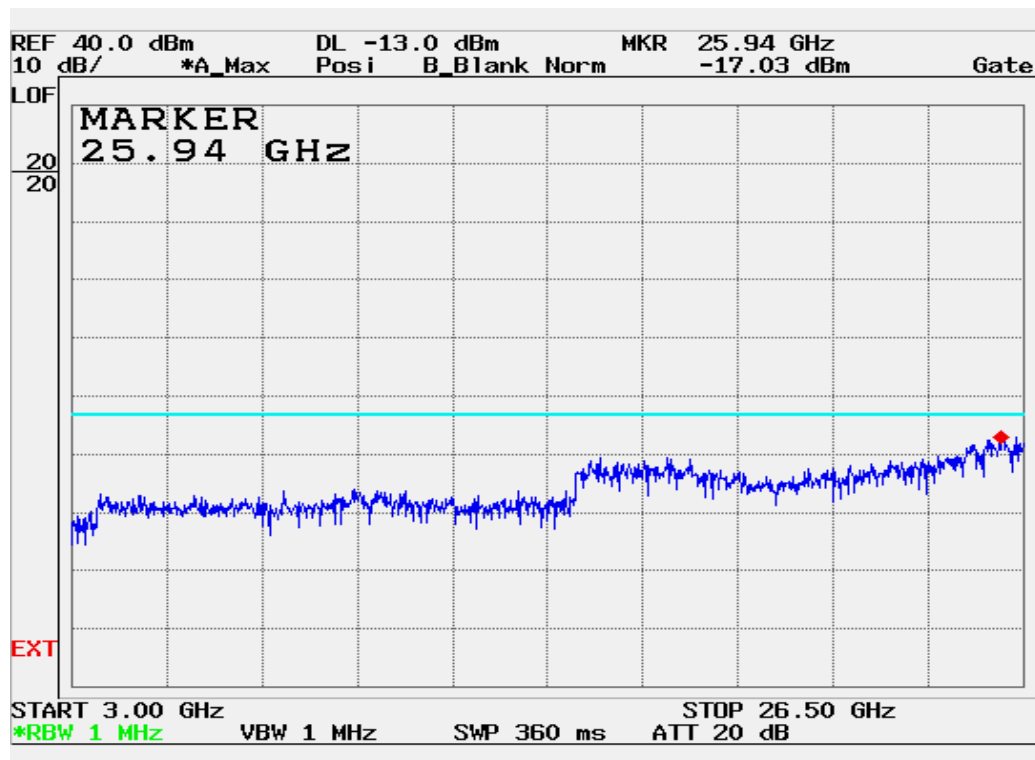
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 54 of 81

(64QAM Low Channel)



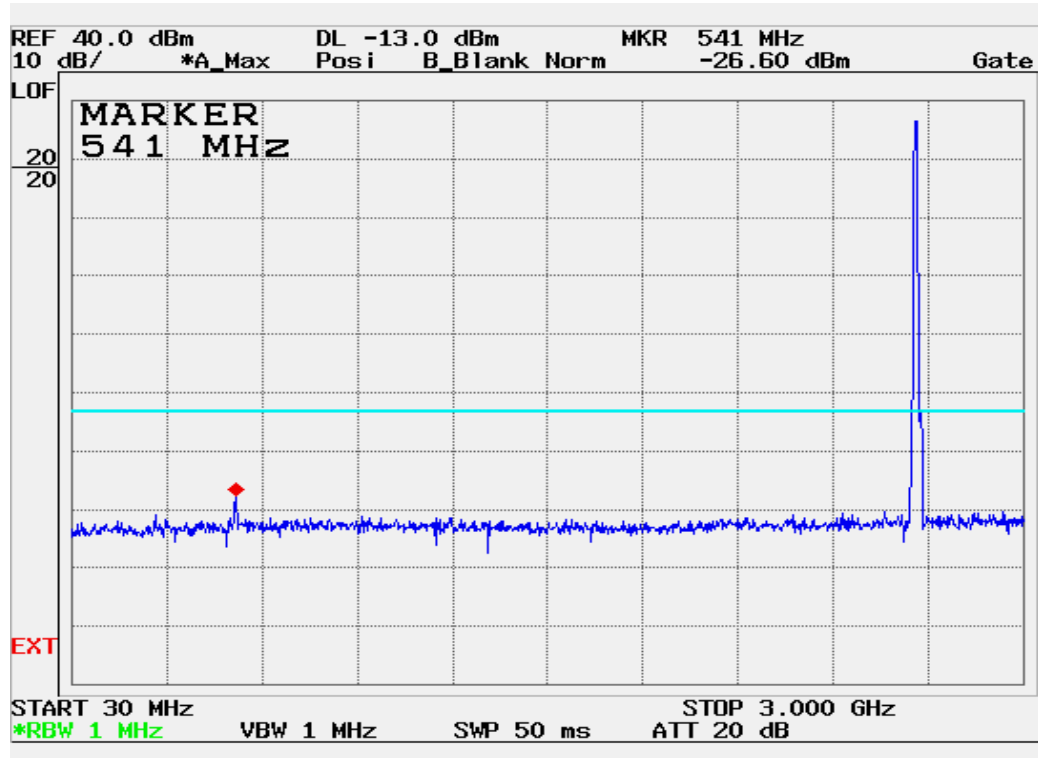
(30MHz~3.000GHz)



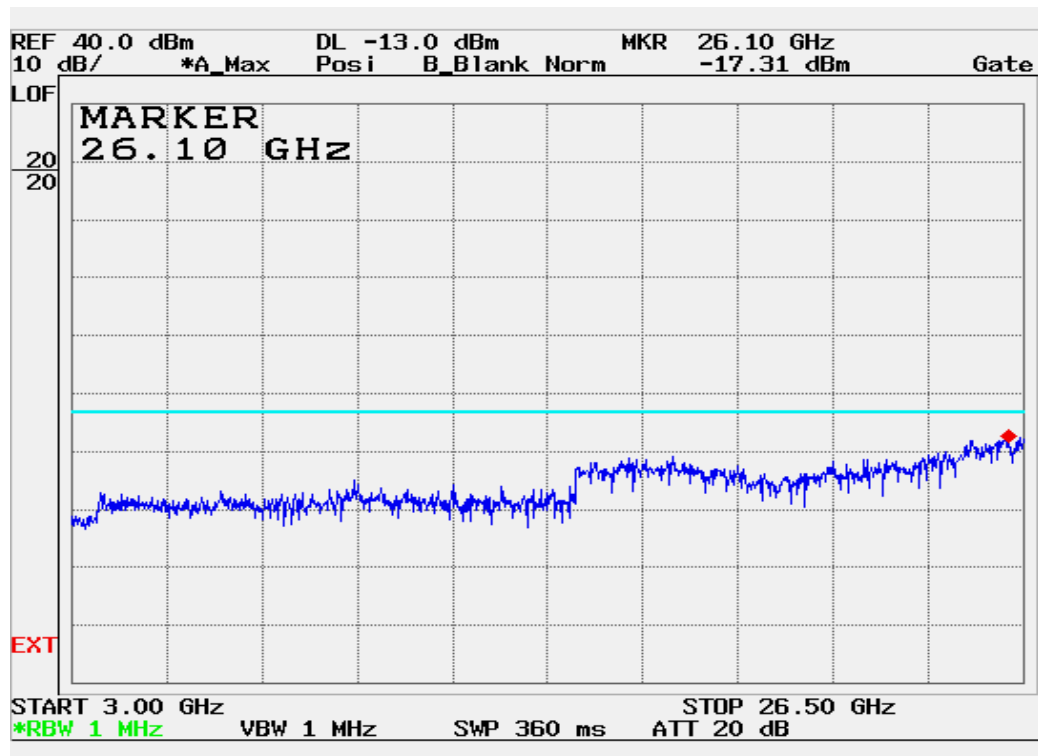
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 55 of 81

(64QAM Middle Channel)



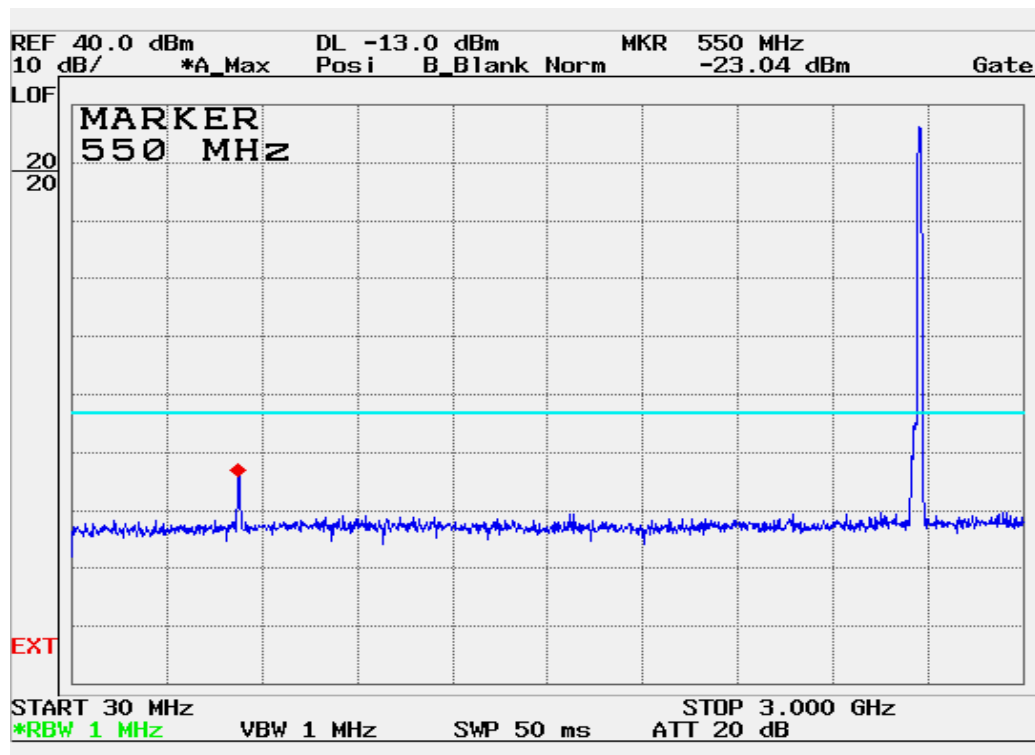
(30MHz~3.000GHz)



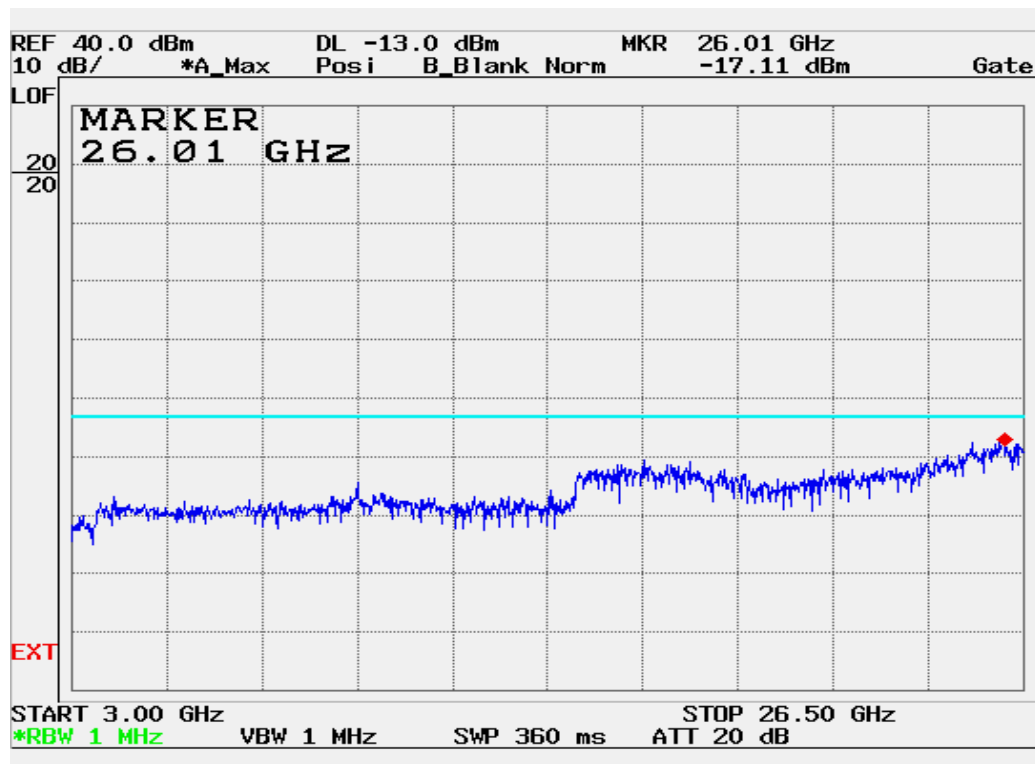
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 56 of 81

(64QAM High Channel)



(3.00GHz~3.000GHz)

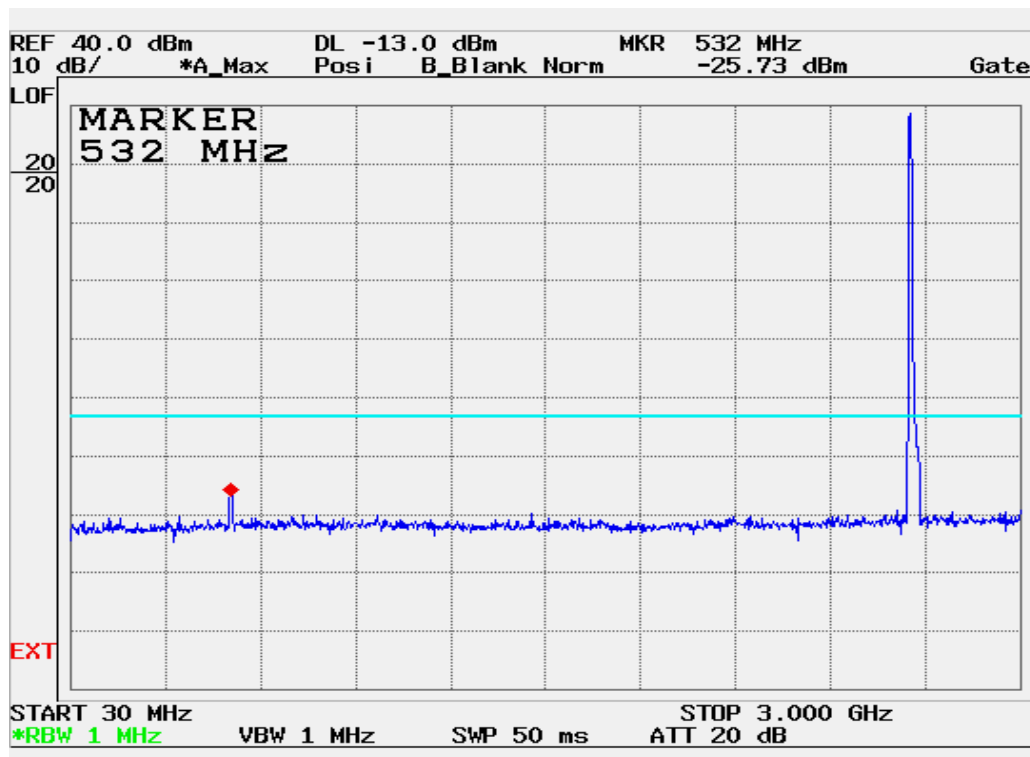


(3.00GHz~26.50GHz)

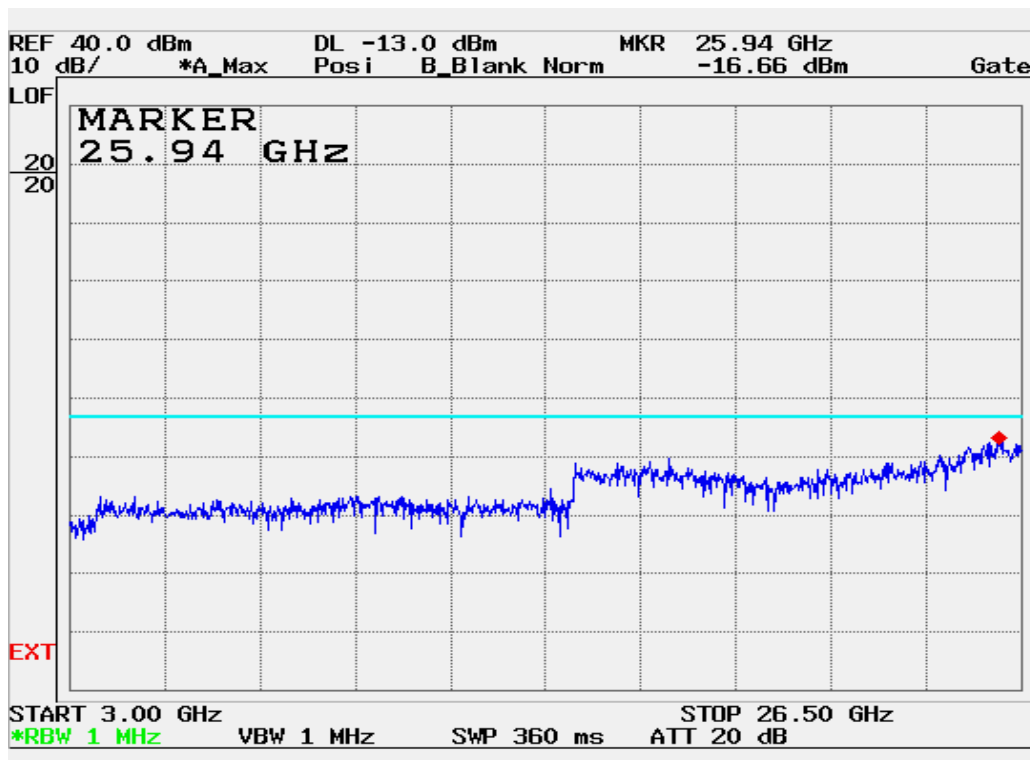
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 57 of 81

8.4.2. Plot Data at Output 1

(QPSK Low Channel)



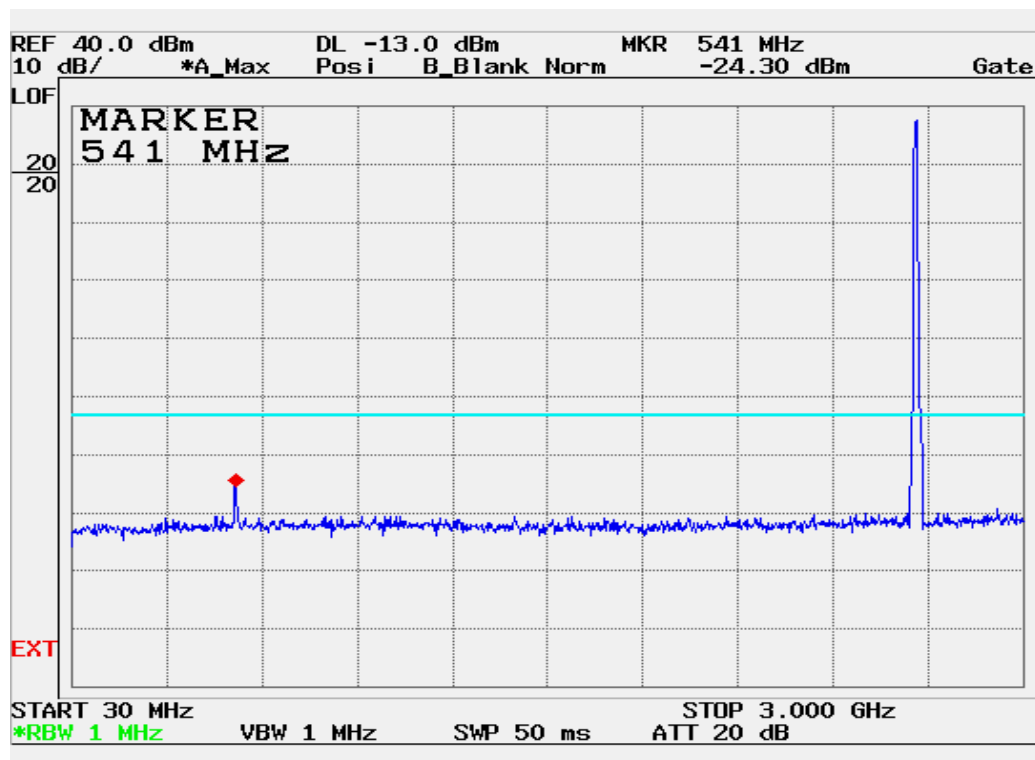
(30MHz~3.000GHz)



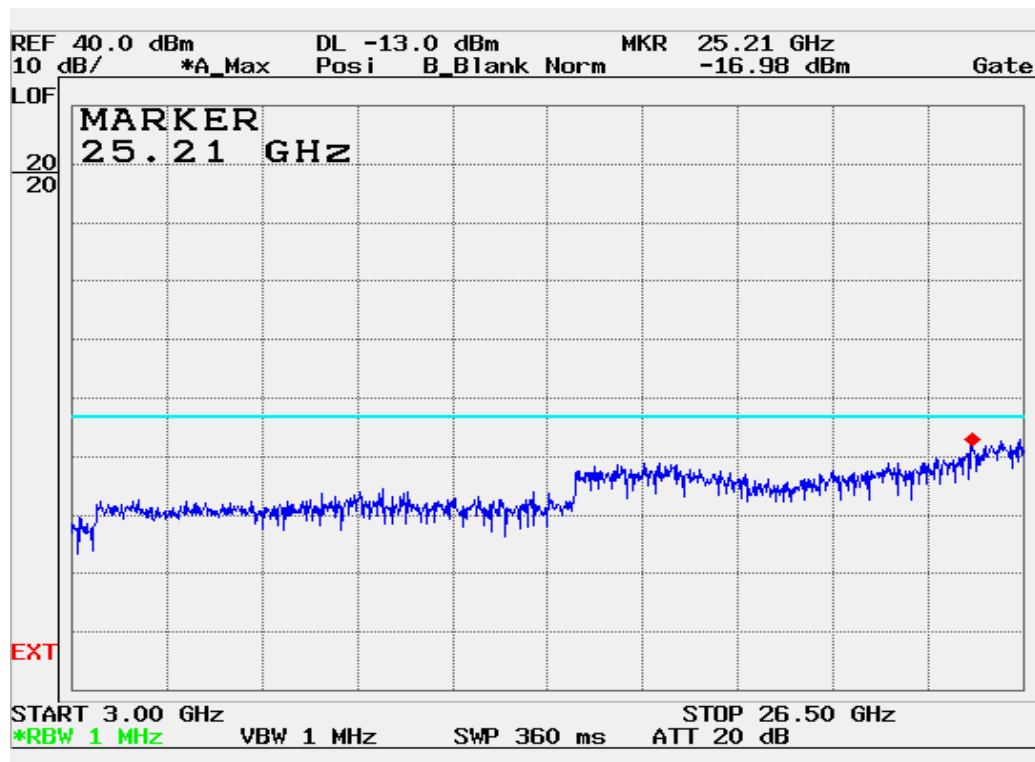
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 58 of 81

(QPSK Middle Channel)



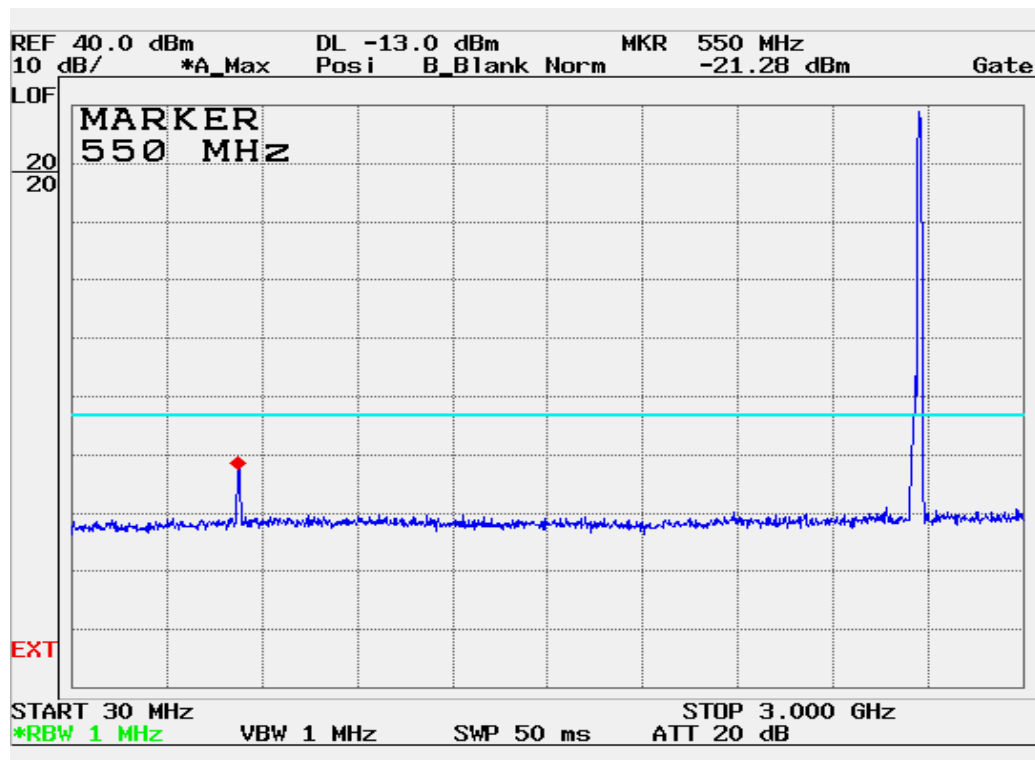
(30MHz~3.000GHz)



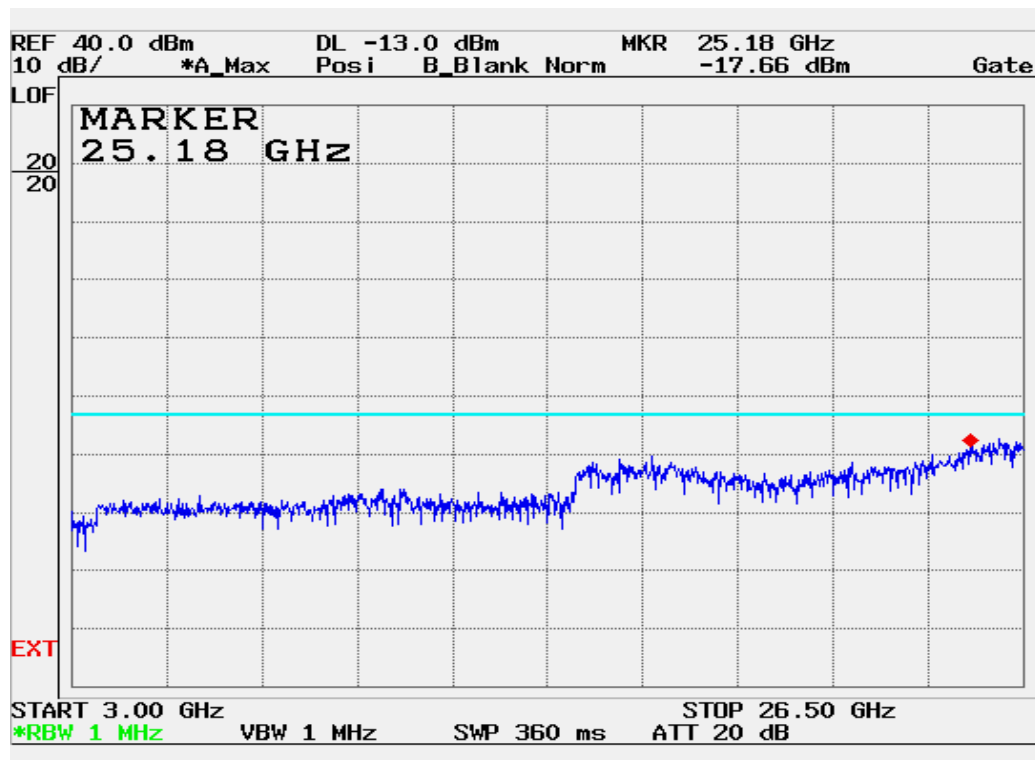
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 59 of 81

(QPSK High Channel)



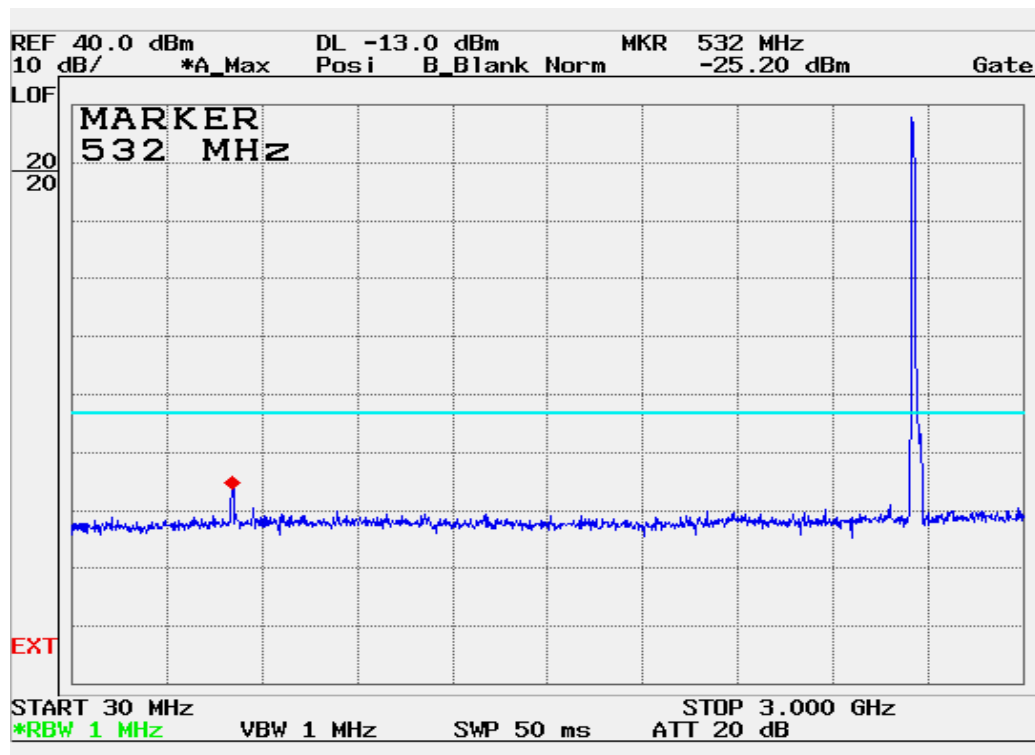
(30MHz~3.000GHz)



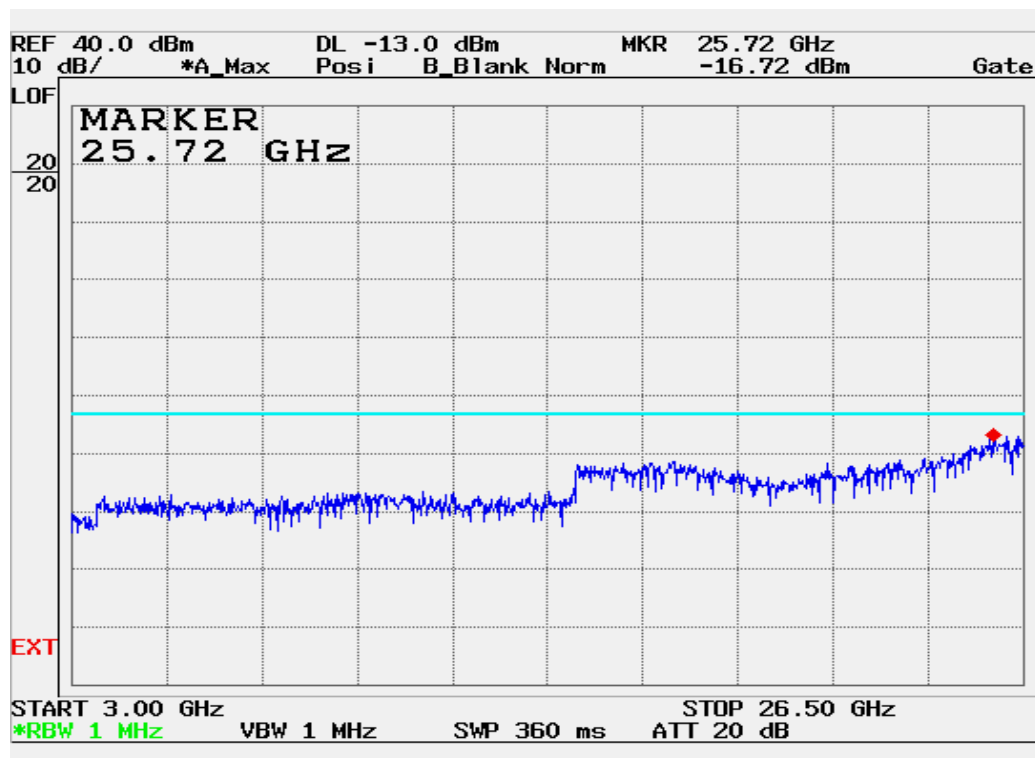
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 60 of 81

(16QAM Low Channel)



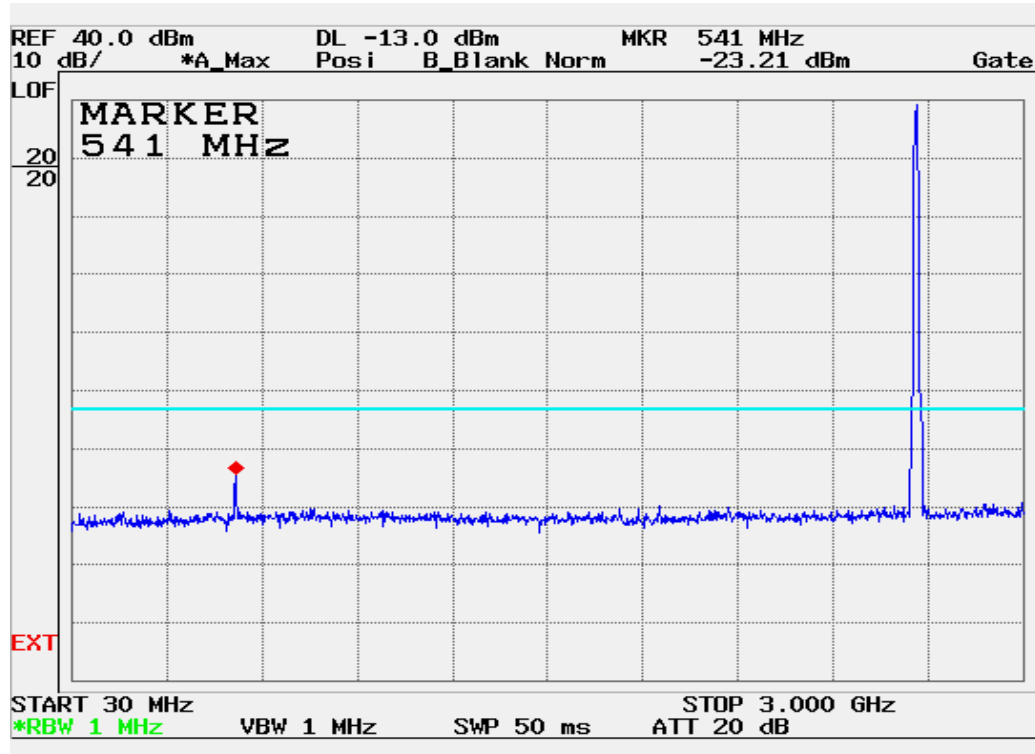
(30MHz~3.000GHz)



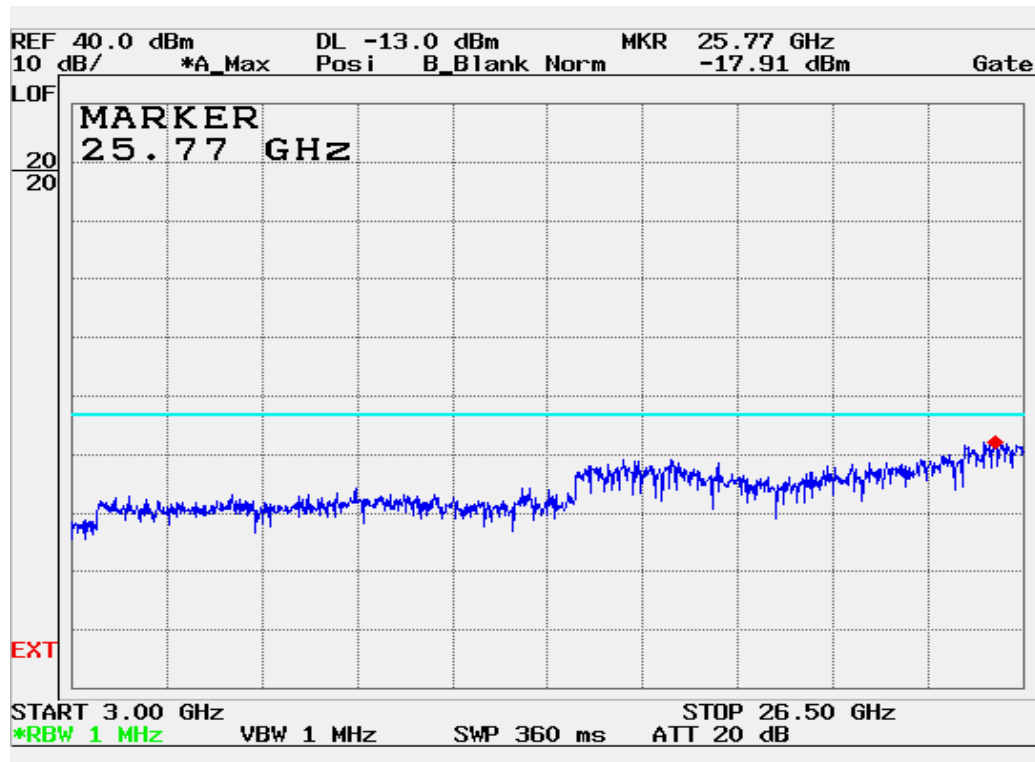
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 61 of 81

(16QAM Middle Channel)



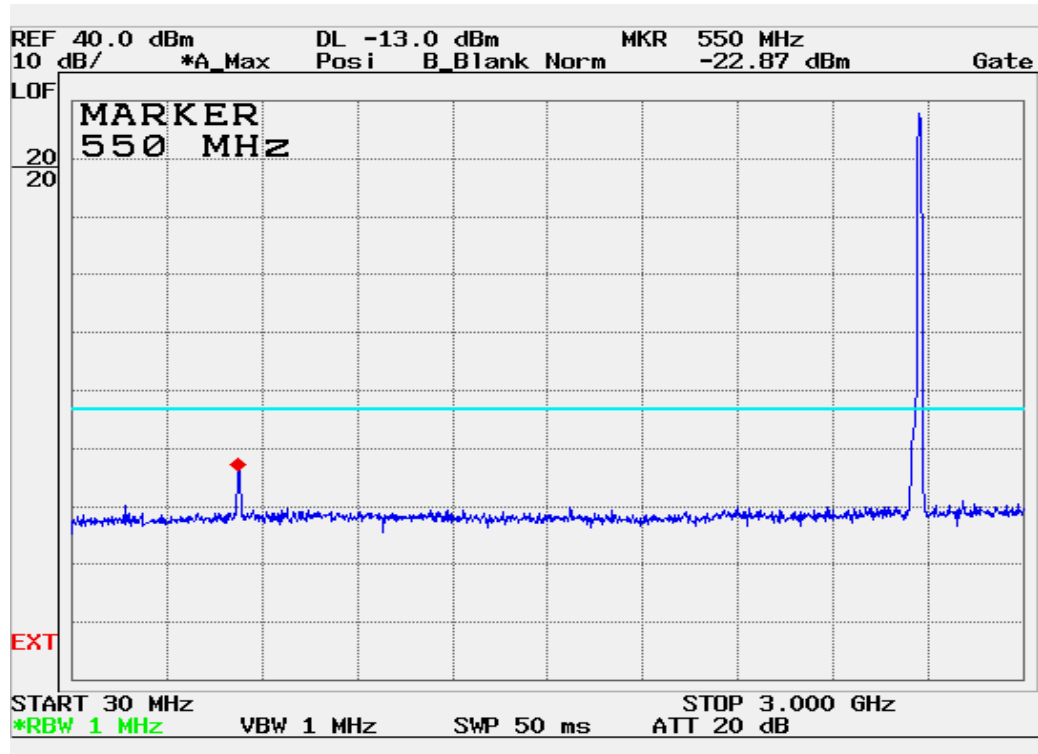
(30MHz~3.000GHz)



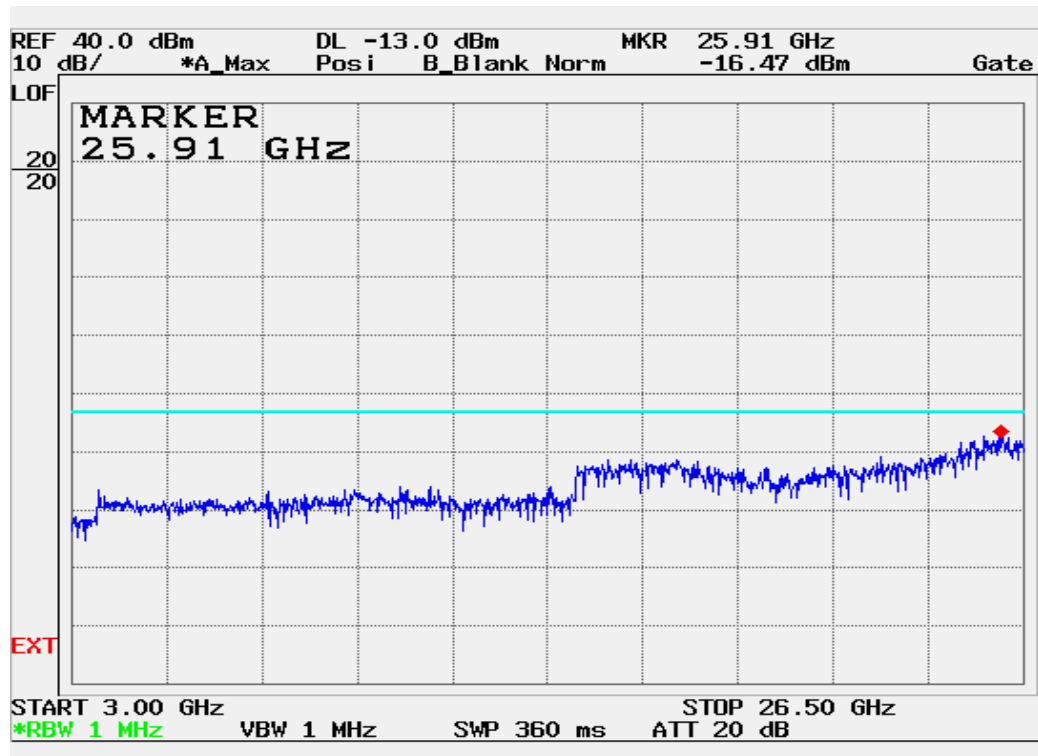
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 62 of 81

(16QAM High Channel)



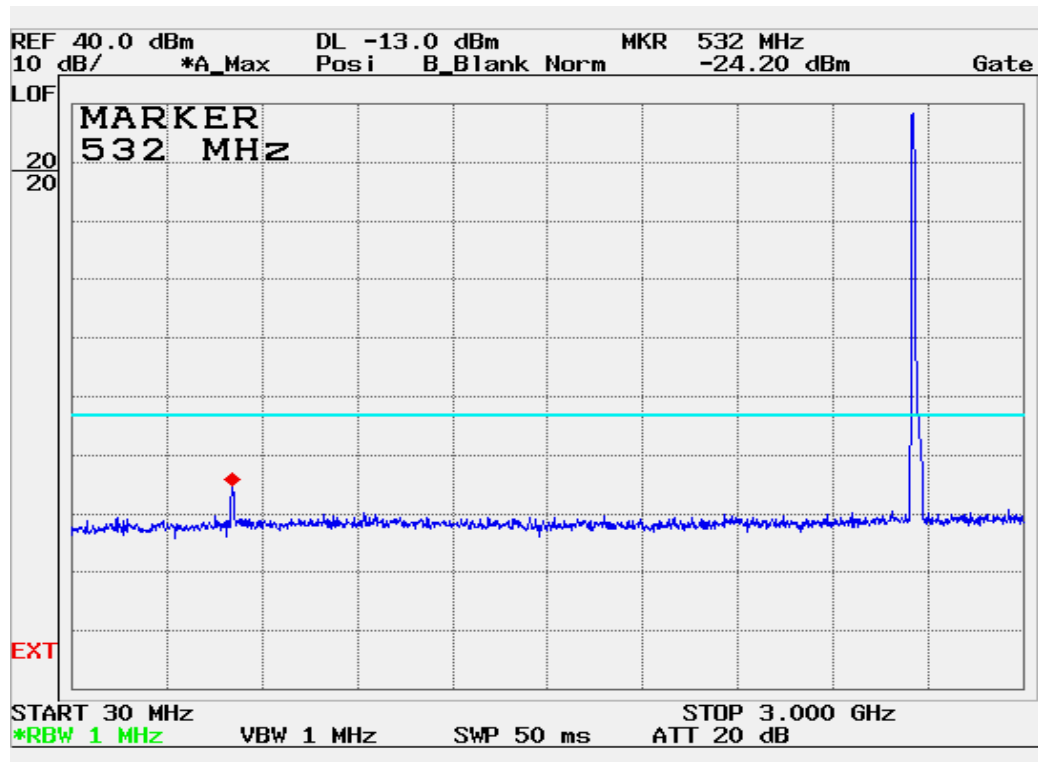
(30MHz~3.000GHz)



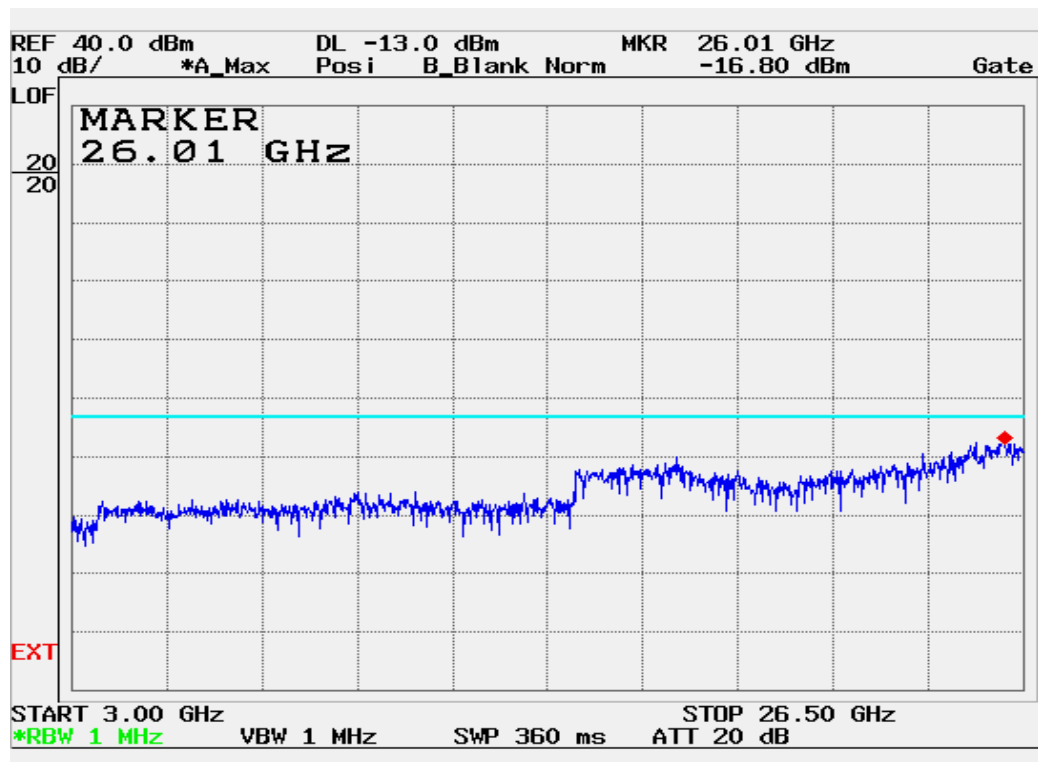
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 63 of 81

(64QAM Low Channel)



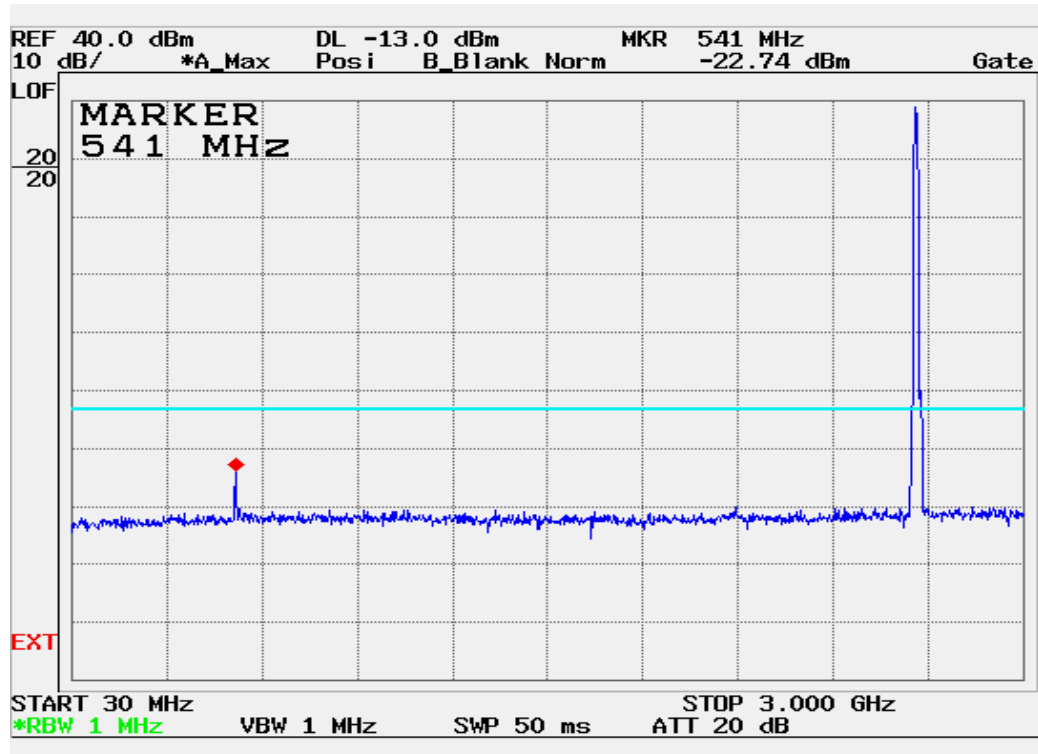
(30MHz~3.000GHz)



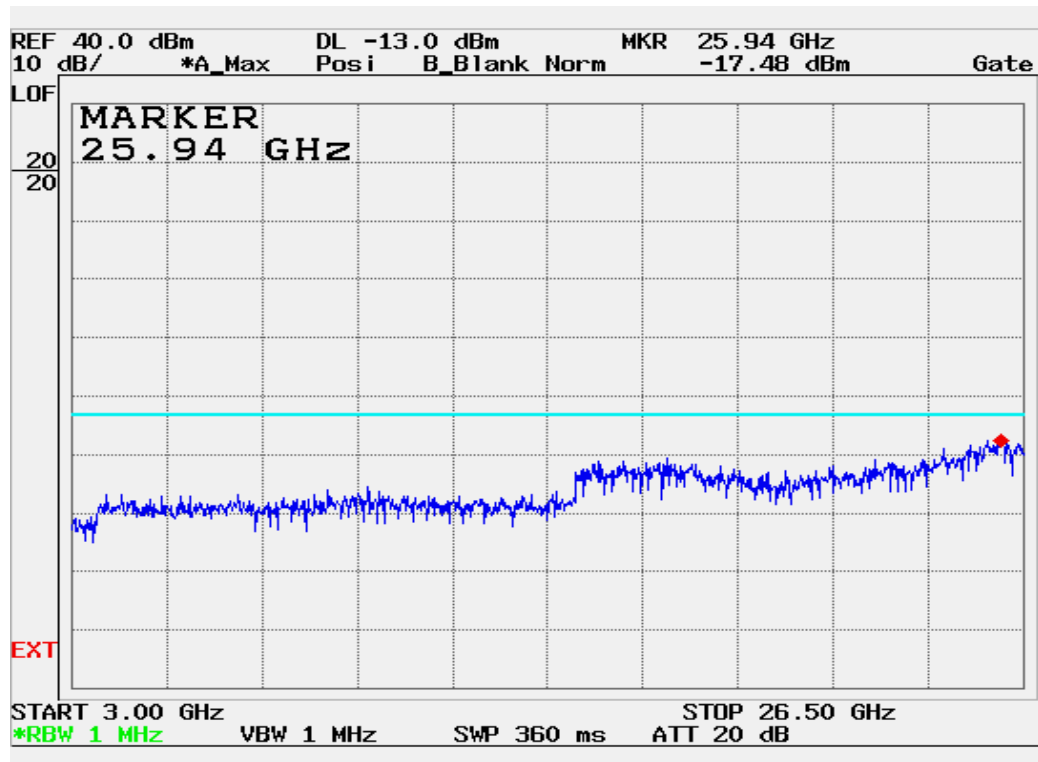
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 64 of 81

(64QAM Middle Channel)



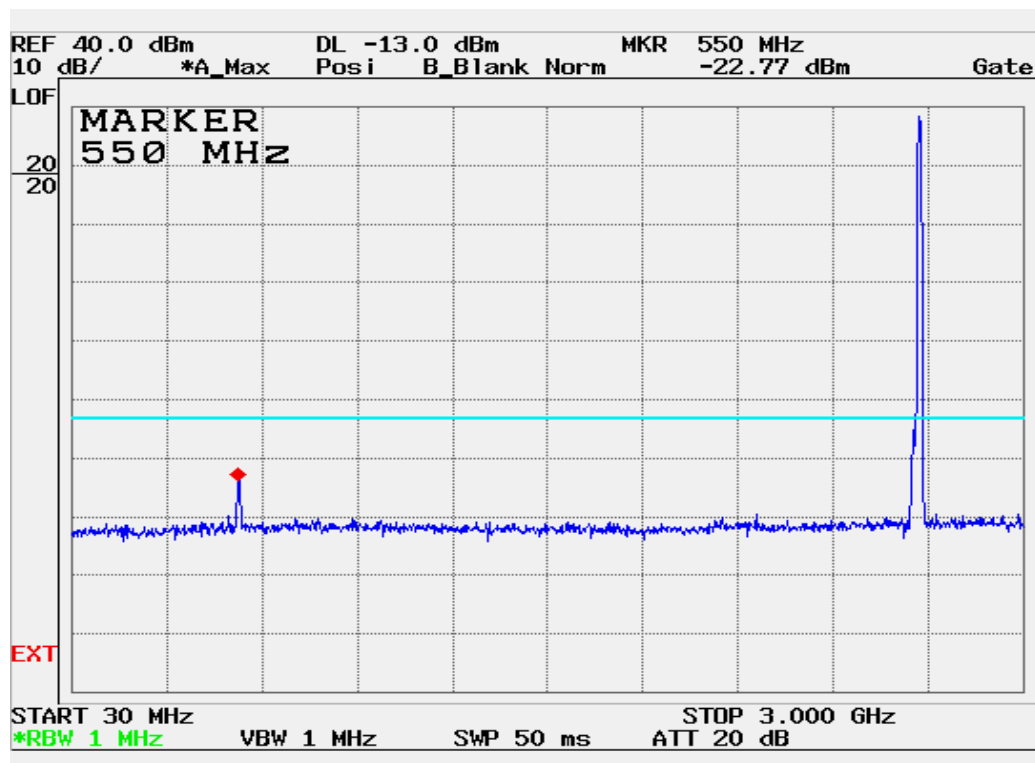
(30MHz~3.000GHz)



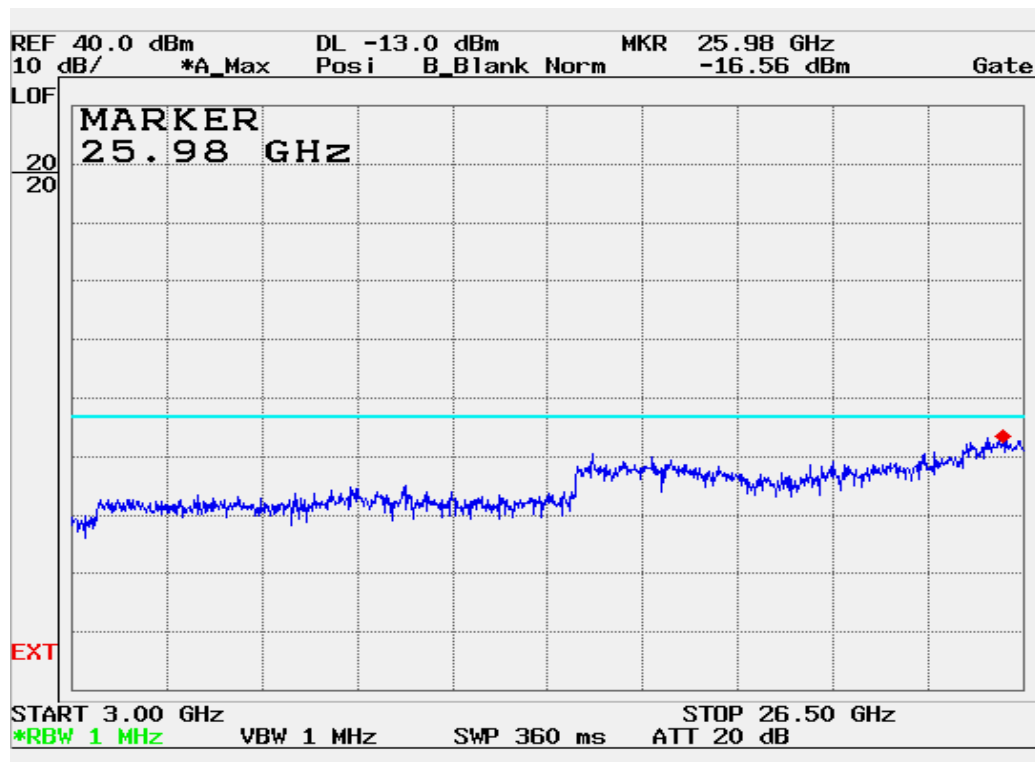
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 65 of 81

(64QAM High Channel)



(30MHz~3.000GHz)

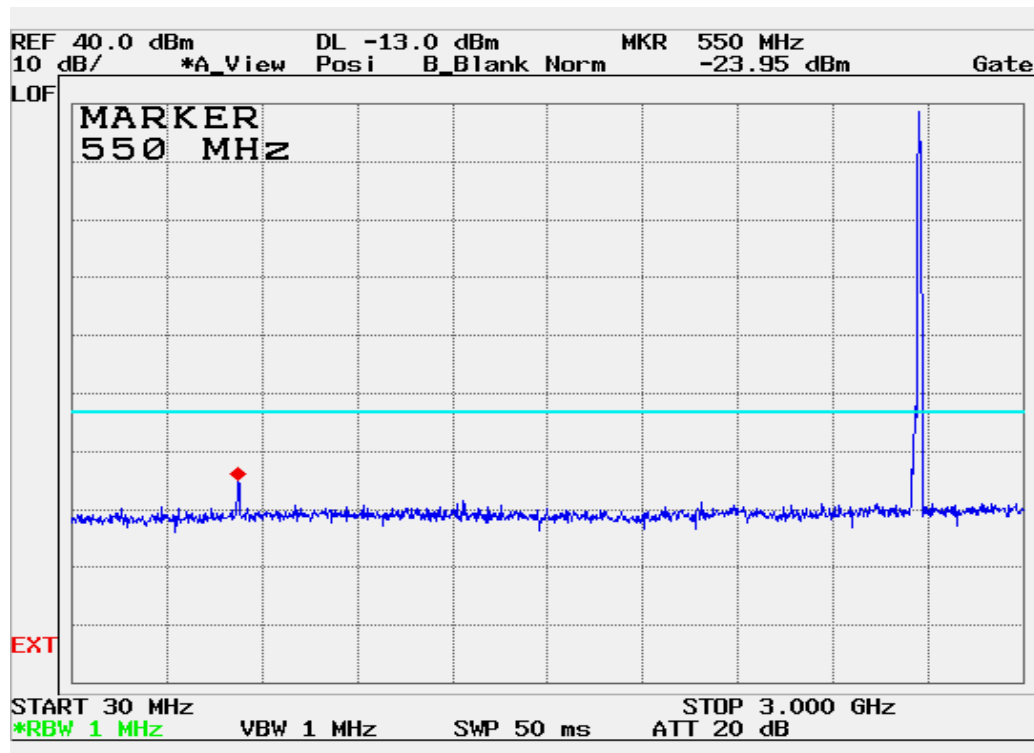


(3.00GHz~26.50GHz)

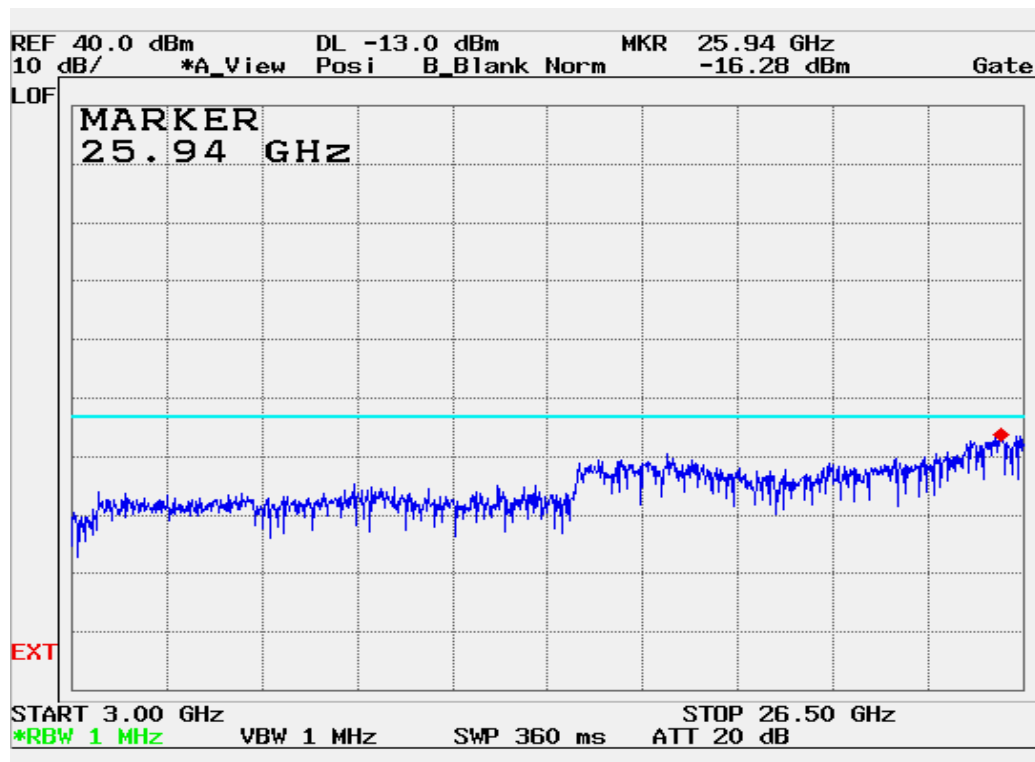
HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 66 of 81

8.4.3 Plot Data at Combined Output

(QPSK Low Channel)



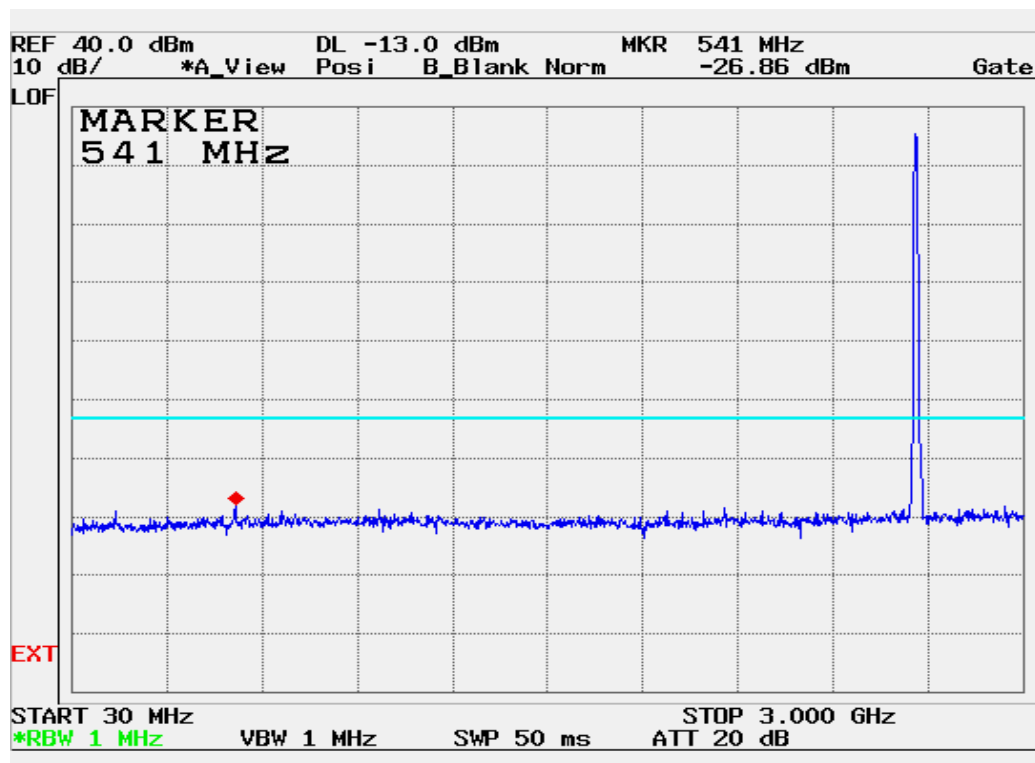
(30MHz~3.000GHz)



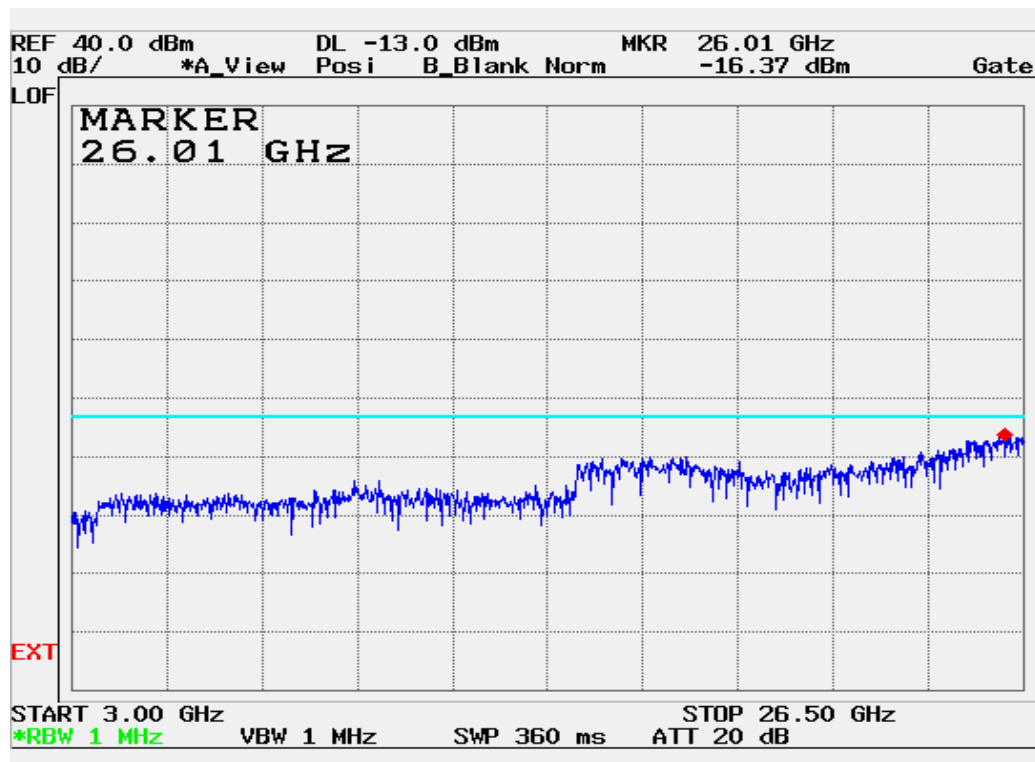
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 67 of 81

(QPSK Middle Channel)



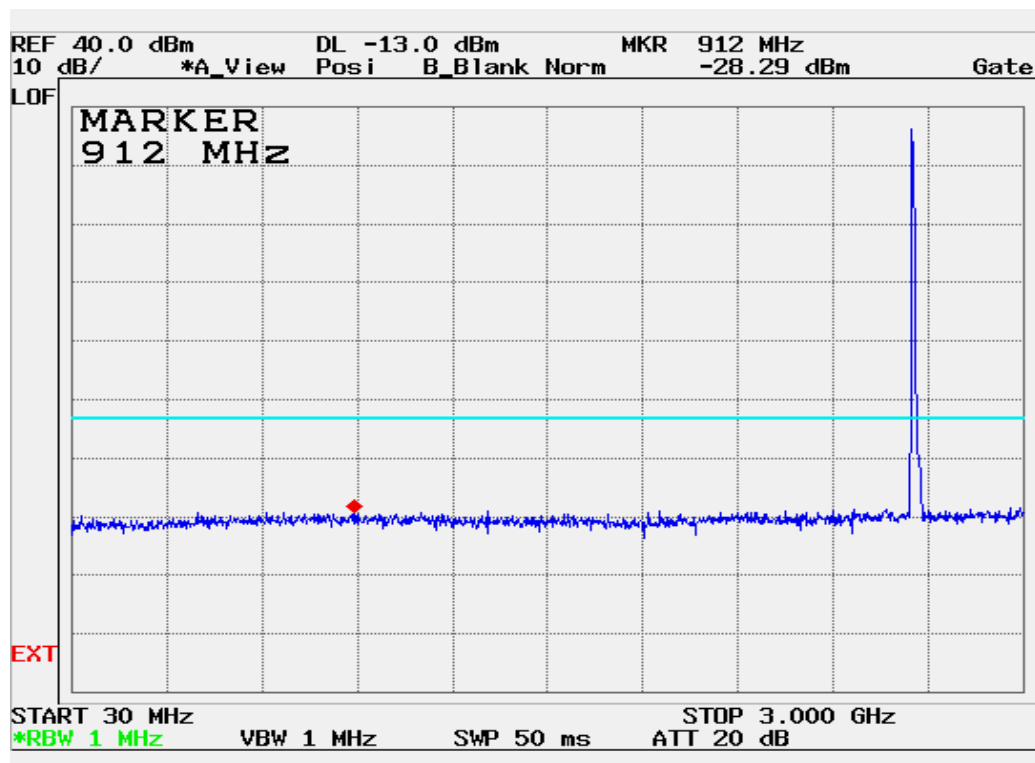
(30MHz~3.000GHz)



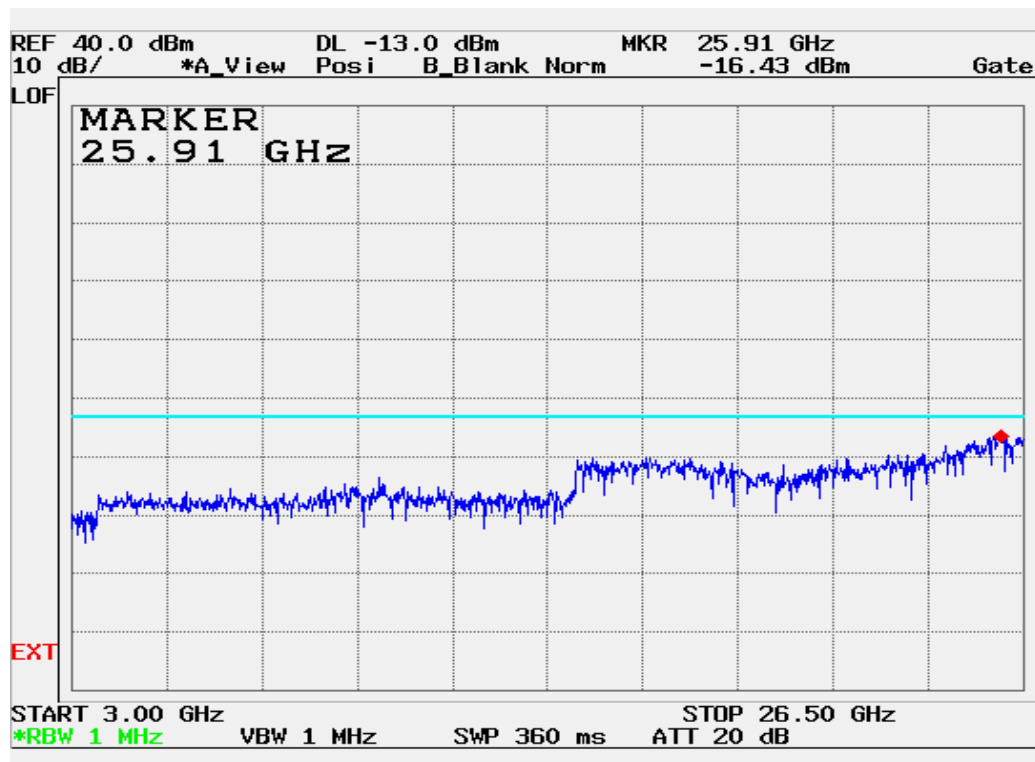
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 68 of 81

(QPSK High Channel)



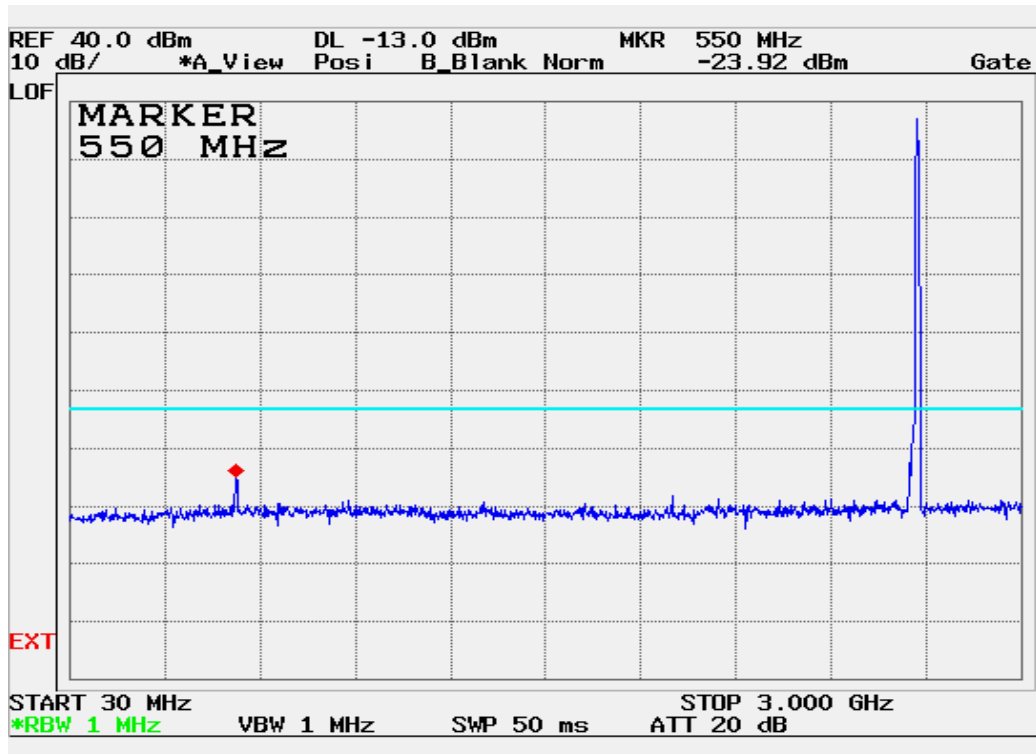
(30MHz~3.000GHz)



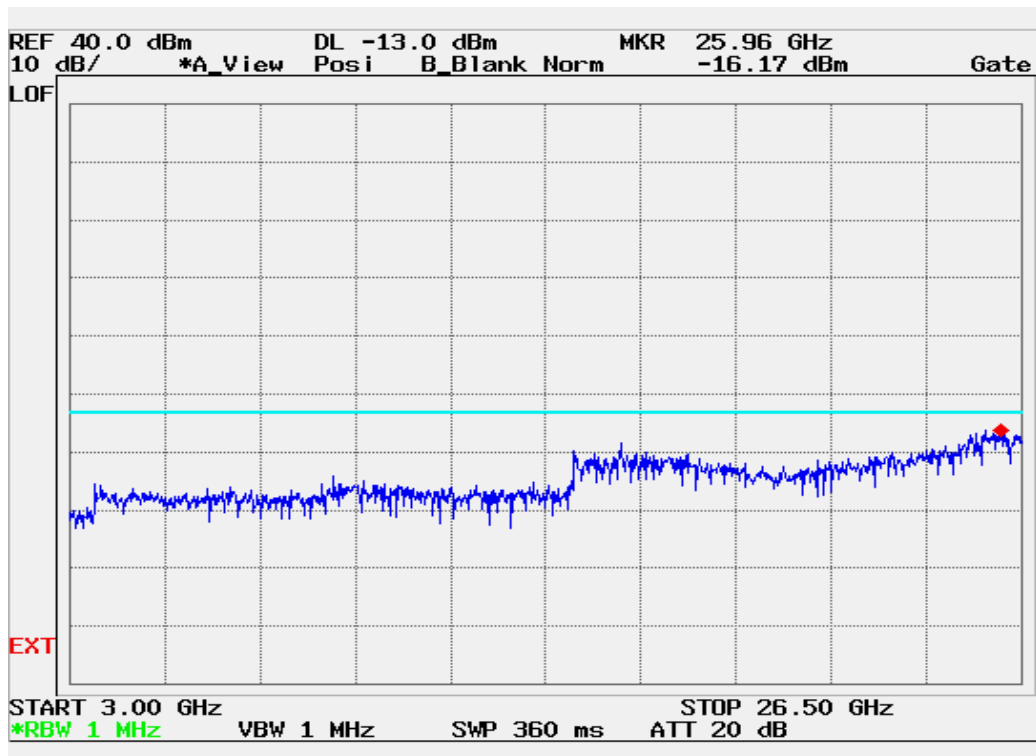
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 69 of 81

(16QAM Low Channel)



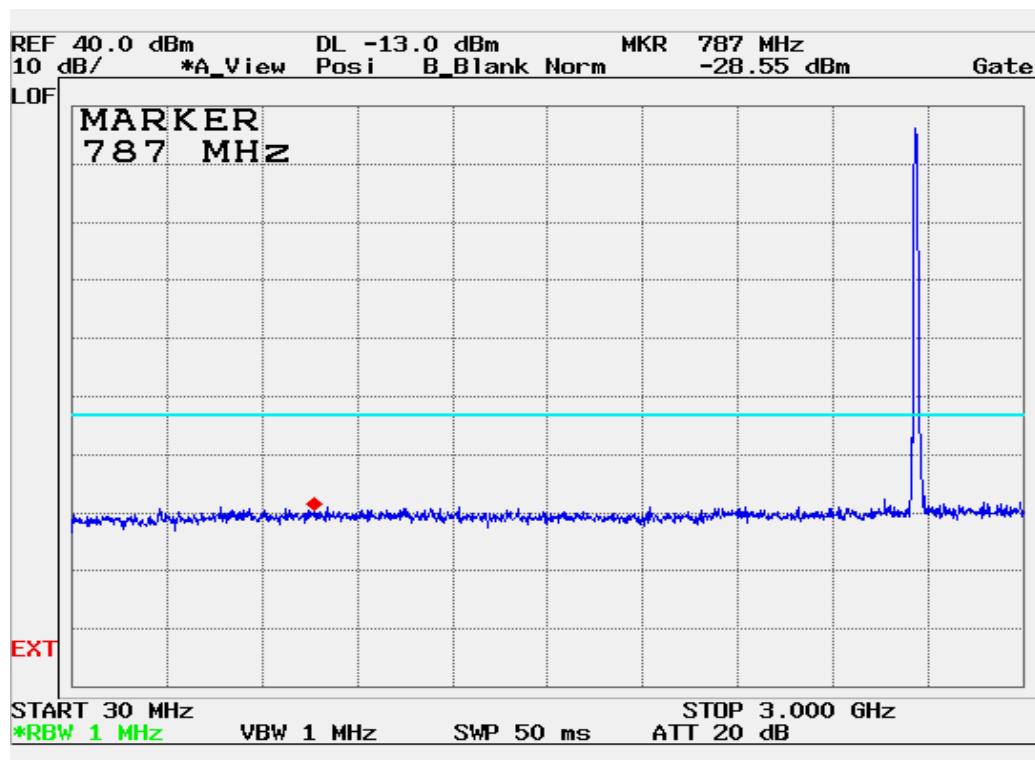
(3.00GHz~3.000GHz)



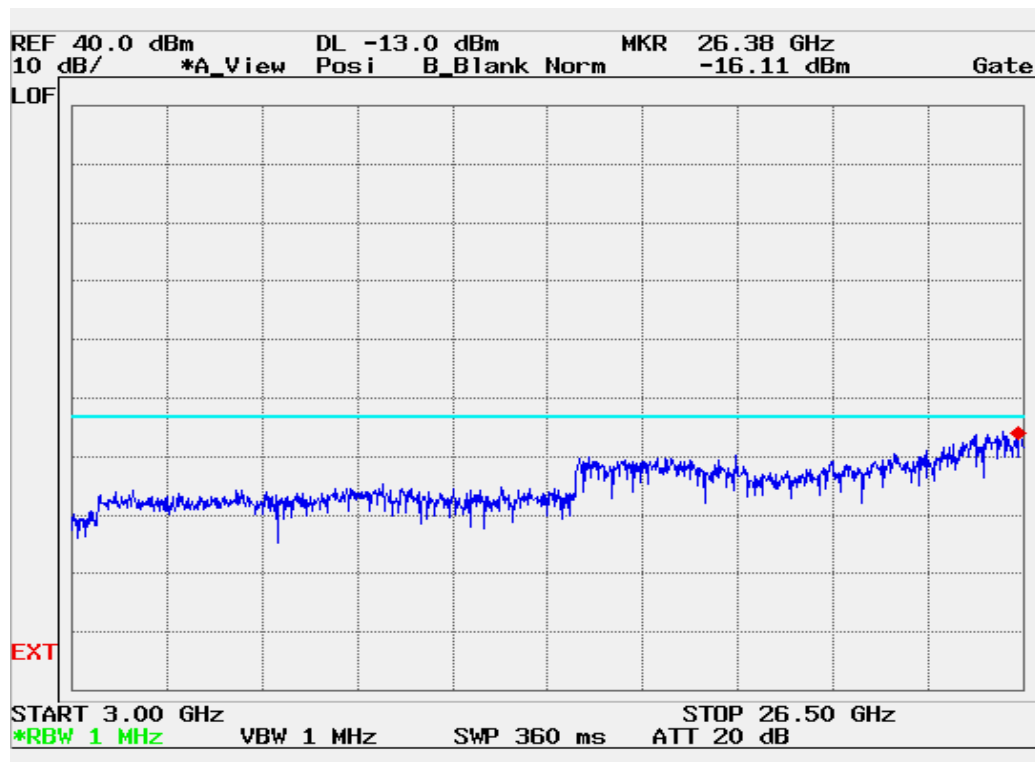
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 70 of 81

(16QAM Middle Channel)



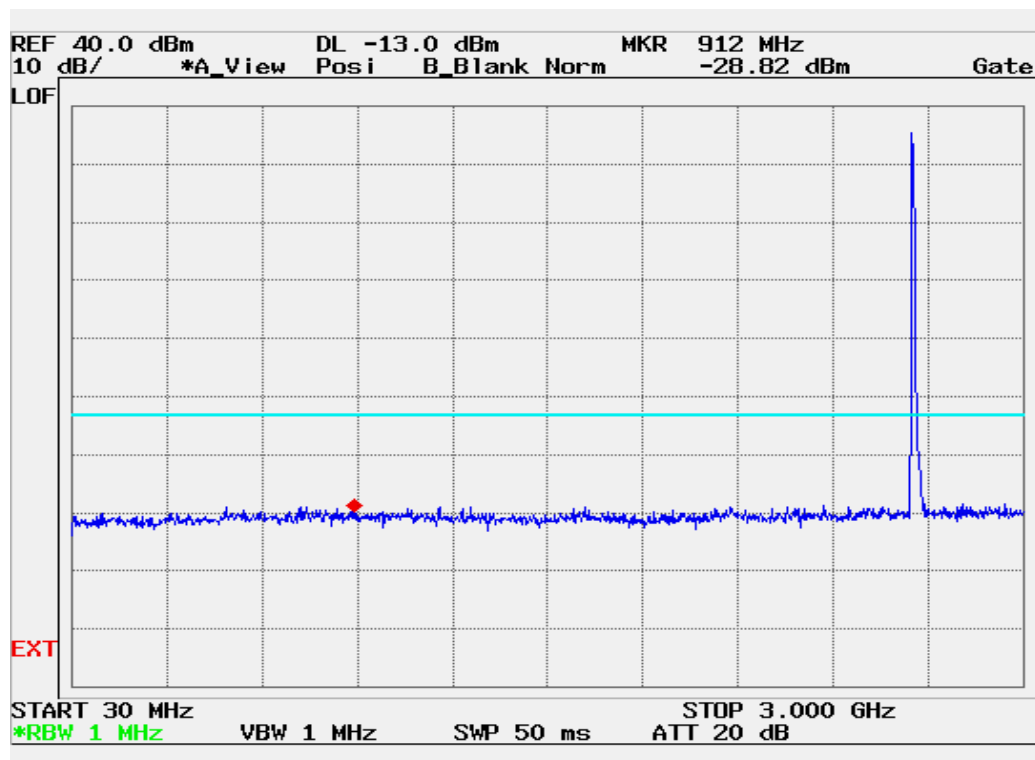
(30MHz~3.000GHz)



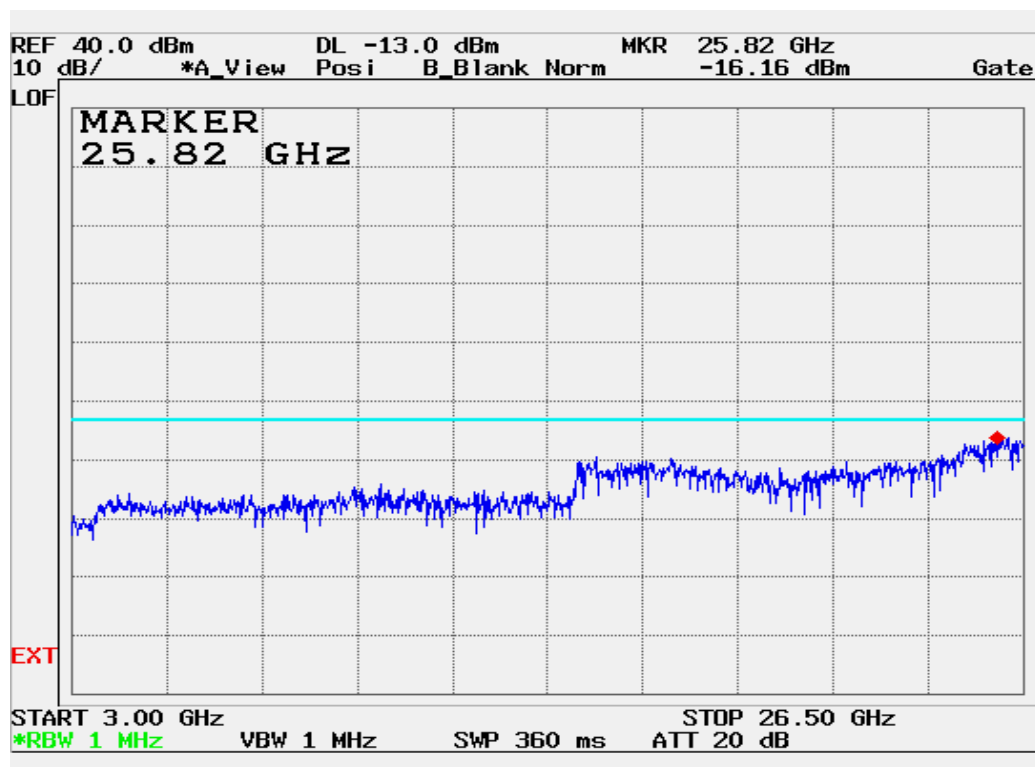
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 71 of 81

(16QAM High Channel)



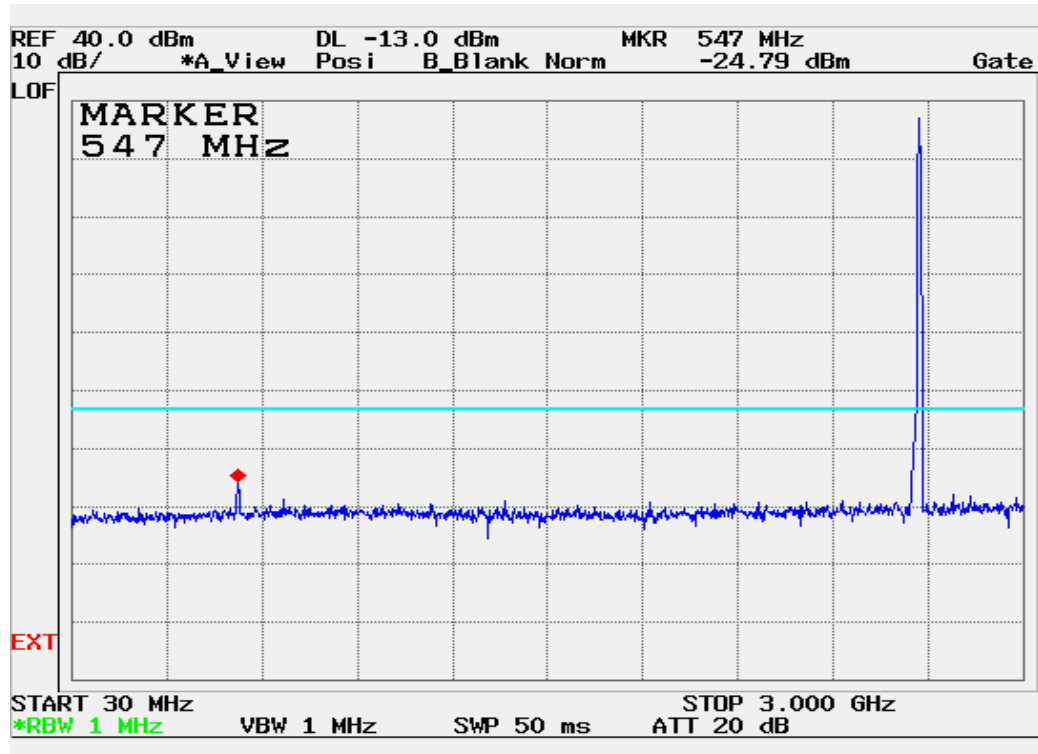
(30MHz~3.000GHz)



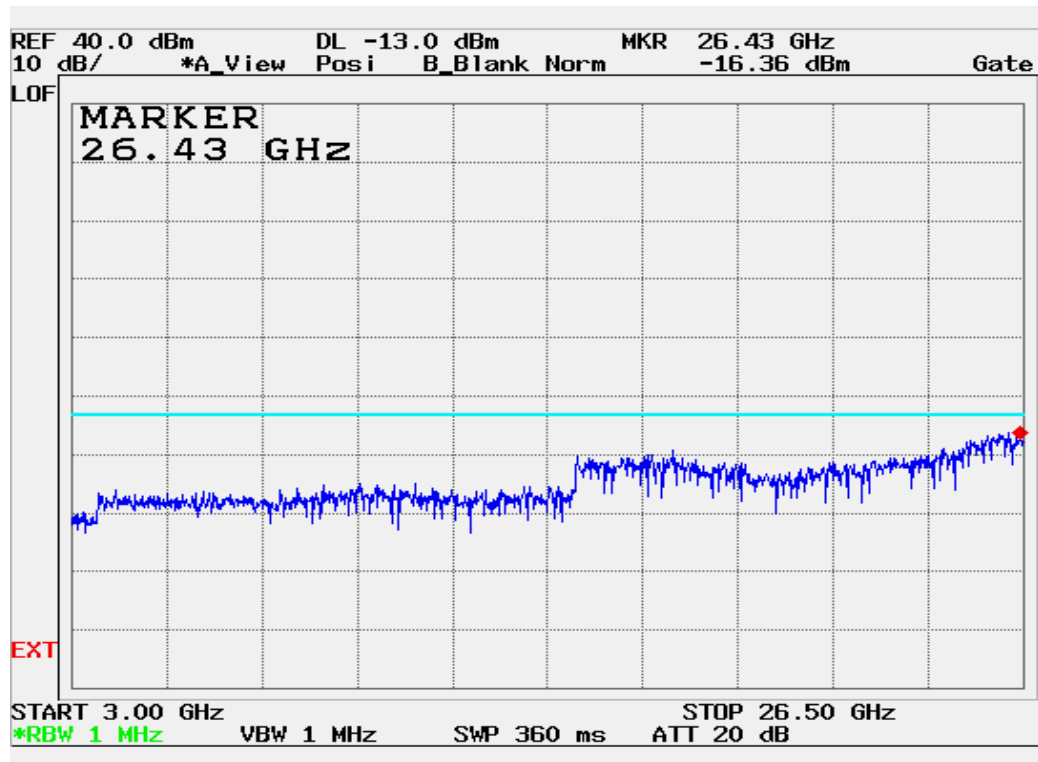
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 72 of 81

(64QAM Low Channel)



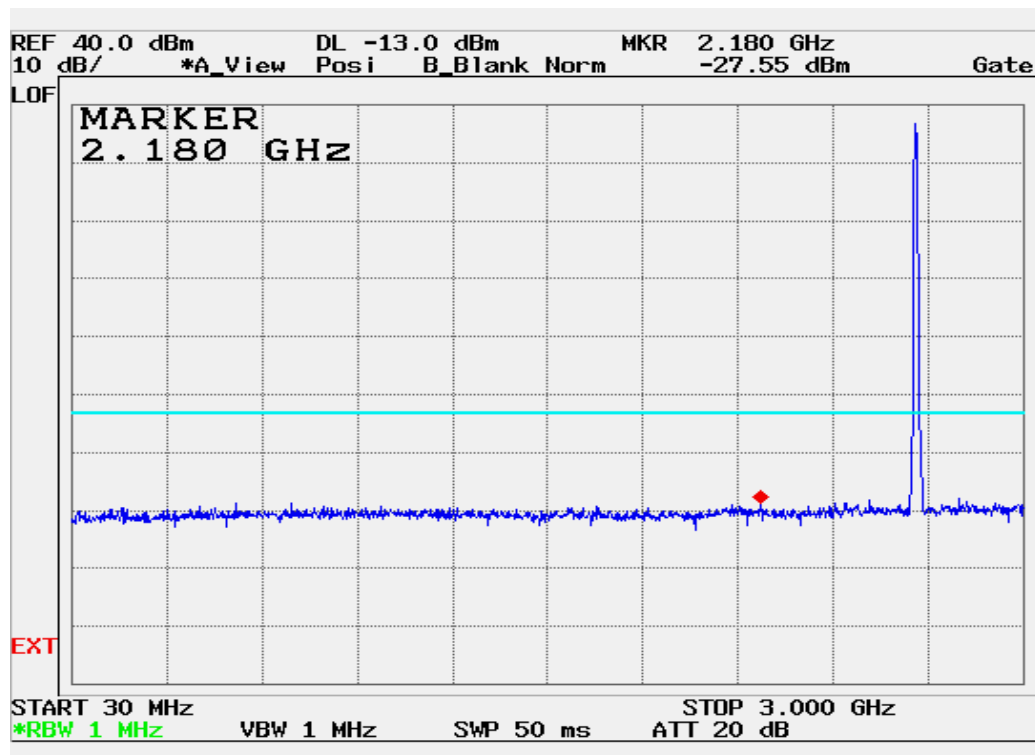
(30MHz~3.000GHz)



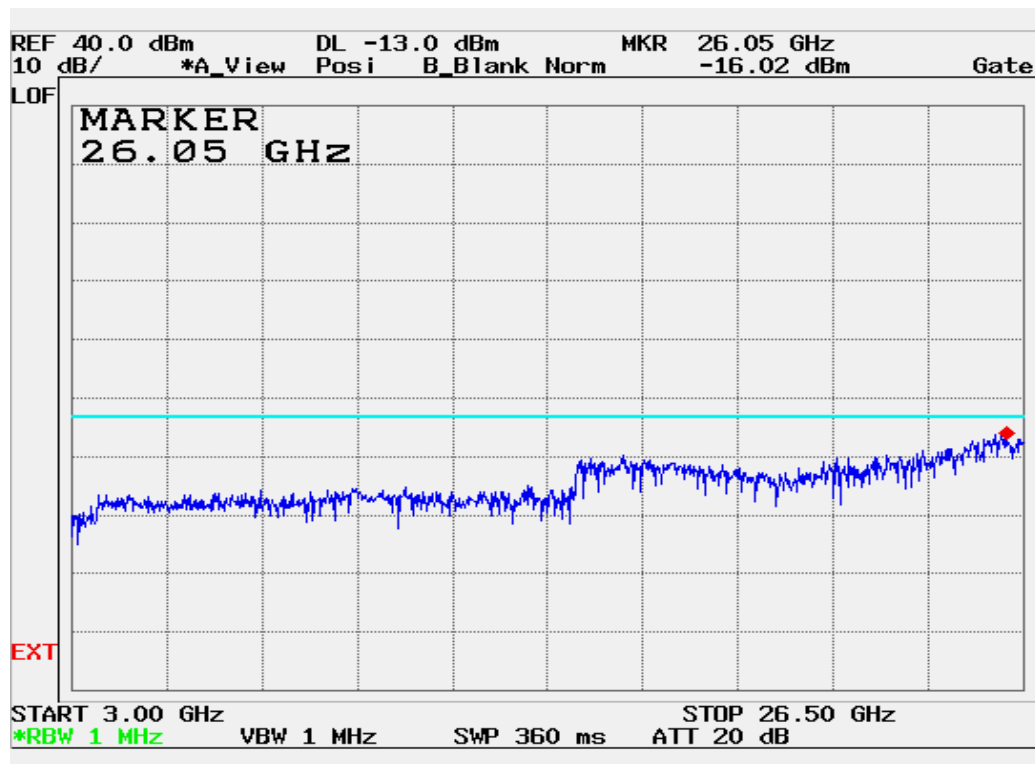
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 73 of 81

(64QAM Middle Channel)



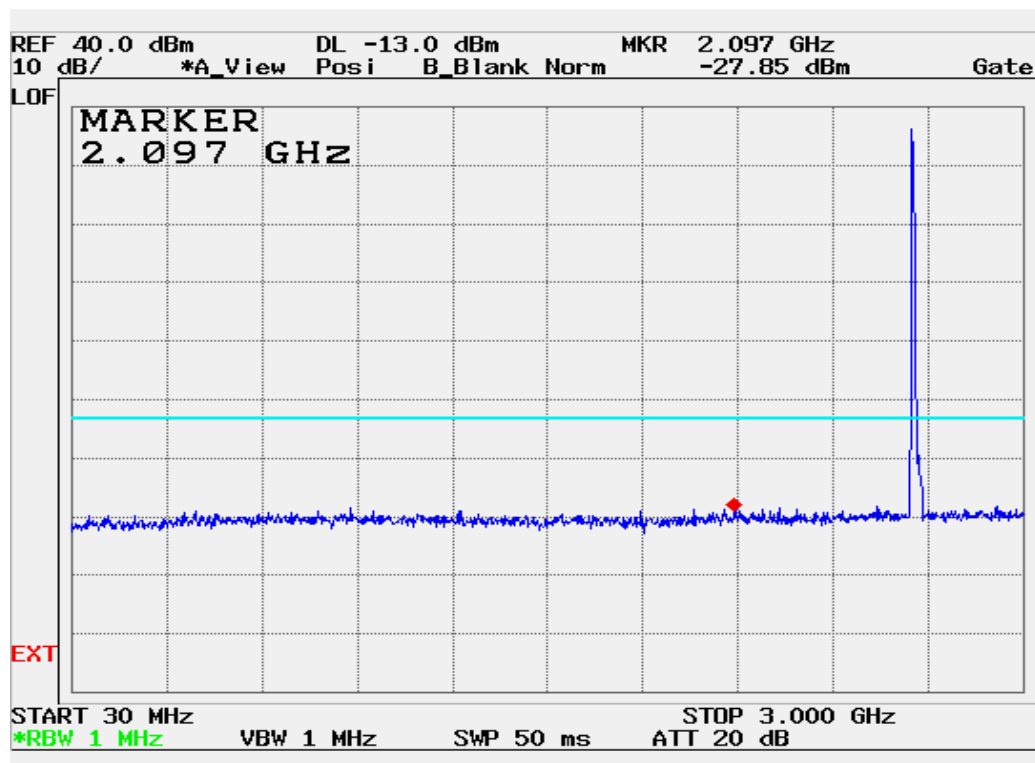
(30MHz~3.000GHz)



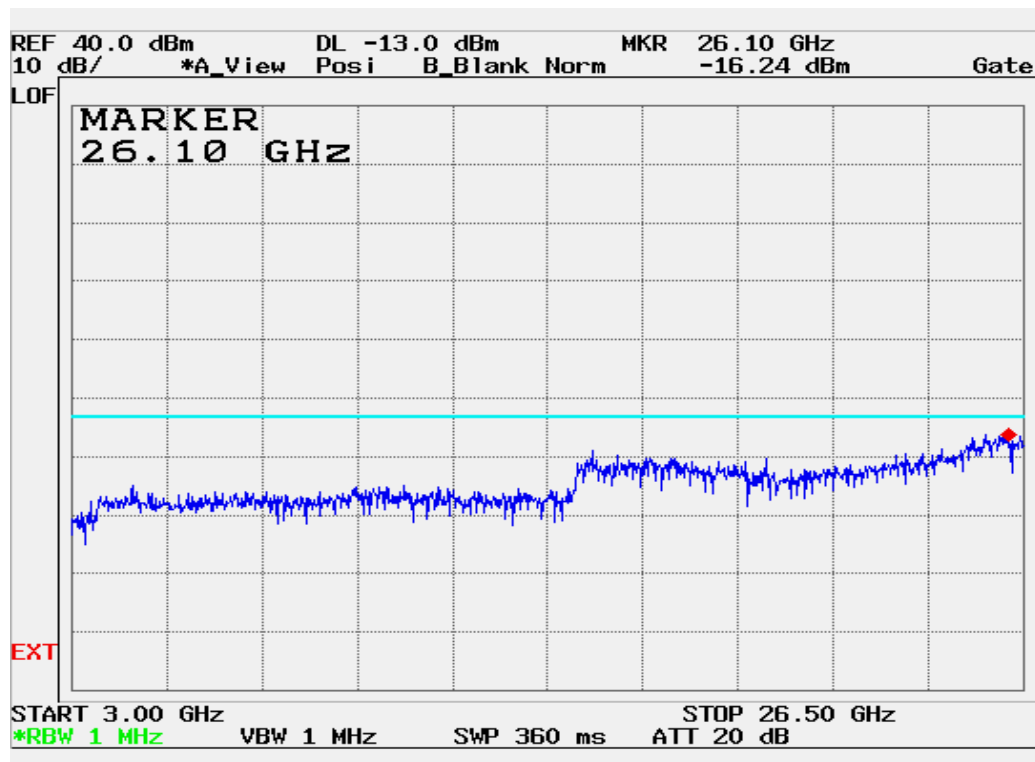
(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 74 of 81

(64QAM High Channel)



(30MHz~3.000GHz)



(3.00GHz~26.50GHz)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 75 of 81

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	EMI Test Receiver	ESI40	831564103	11/06/2007
MITEQ	Pre-amplifier	AMF-60-0010 1800-35-20P	1200937	01/24/2008
MITEQ	Pre-amplifier	AMF-6D-01180-35-20P	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.

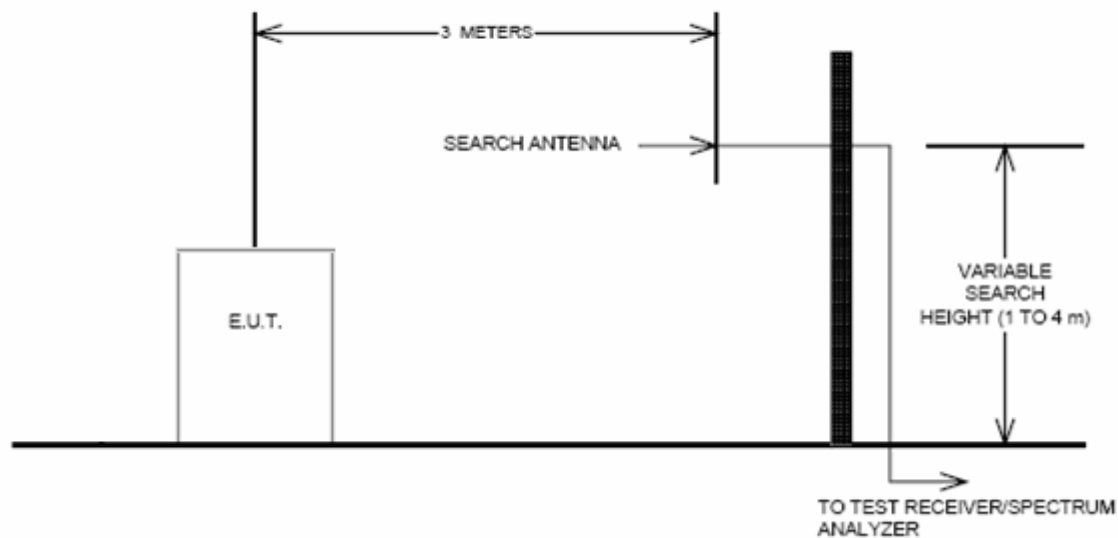
The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360° and the receiving antenna scanned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

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 76 of 81

9.3.1 Radiated Spurious Emissions Test Setup



9.3.2 Environmental Conditions:

Temperature:	23 °C
Relative Humidity:	53 %

9.4 Test Result

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

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 77 of 81

10. FREQUENCY STABILITY

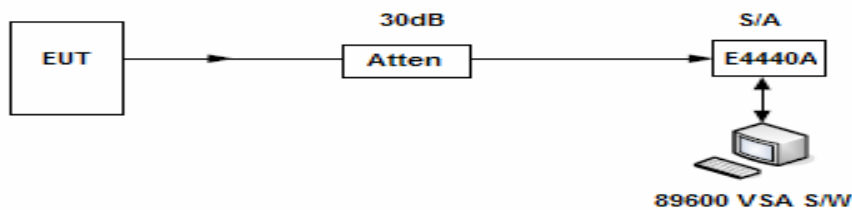
10.1 Applicable Standard

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:	52%

10.4. Test Result

: Pass

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 78 of 81

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	2657,000,046	0.017313
40	2657,000,047	0.017689
30	2657,000,051	0.019195
20	Reference	
10	2657,000,045	0.016936
0	2657,000,049	0.018442
-10	2657,000,032	0.012044
-20	2657,000,036	0.013549
-30	2657,000,026	0.009785
-40	2656,999,953	- 0.0176890

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

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2656,999,971	-0.014680
55.2	2657,000,050	0.018818

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

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2657,000,045	0.016936
40	2657,000,049	0.018442
30	2657,000,045	0.016936
20	Reference	
10	2657,000,041	0.015431
0	2657,000,047	0.017689
-10	2657,000,033	0.01242
-20	2657,000,037	0.013925
-30	2656,999,949	-0.019190
-40	2657,000,047	0.017689

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

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2656,999,965	-0.013170
55.2	2657,000,031	0.011667

(Output Port1 Middle CH)

HCT PT.27 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-R07-035	Test Dates: October 16, 2007	EUT Type: Mobile WiMAX Outdoor RAS	FCC ID: A3LSPI-2210022500	Page 79 of 81

Modulation: 16QAM
Reference: - 48 Vdc at 20°C Freq. = 2657,000,000 MHz

Temperature (Celsius)	Measured Freq (MHz)	Drift (ppm)
50	2657,000,048	0.018065
40	2657,000,048	0.018065
30	2657,000,042	0.015807
20	Reference	
10	2657,000,045	0.016936
0	2657,000,041	0.015431
-10	2657,000,040	0.015055
-20	2657,000,038	0.014302
-30	2657,000,032	0.012044
-40	2656,999,961	-0.01468

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

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2656,999,952	-0.018070
55.2	2657,000,038	0.014302

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

Temperature (Celsius)	Measured Freq (MHz)	Drift (Hz)
50	2657,000,038	0.014302
40	2657,000,041	0.015431
30	2657,000,050	0.018818
20	Reference	
10	2657,000,041	0.015431
0	2657,000,044	0.01656
-10	2657,000,040	0.015055
-20	2657,000,036	0.013549
-30	2657,000,046	0.017313
-40	2657,000,048	0.018065

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

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2657,000,032	0.012044
55.2	2657,000,045	0.016936

(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	2657,000,041	0.015431
40	2657,000,048	0.018065
30	2657,000.039	0.014678
20	Reference	
10	2657,000,045	0.016936
0	2657,000,038	0.014302
-10	2657,000,044	0.016560
-20	2657,000,038	0.014302
-30	2657,000,031	0.011667
-40	2657,000,028	0.010538

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

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2657,000,039	0.014678
55.2	2657,000,027	0.010162

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

Temperature (Celsius)	Measured Freq (MHz)	Drift (Hz)
50	2657,000,045	0.016936
40	2657,000,041	0.015431
30	2657,000,049	0.018442
20	Reference	
10	2657,000,044	0.016560
0	2657,000,046	0.017313
-10	2657,000,048	0.018065
-20	2657,000,037	0.013925
-30	2656,999,949	-0.019190
-40	2657,000,047	0.017689

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

Voltage(dc) +/-15% Ref	Measured Freq (MHz)	Drift (ppm)
40.8	2656,999,957	-0.016180
55.2	2657,000,034	0.012796

(Output Port1 Middle CH)