 <b>LGC WIRELESS</b>	Document Title: WiMAX Gen 1 Spécification	
	REV	Page
	<b>Rev 3</b>	1 of 4

## 1 Purpose

Purpose of this document is to list WiMAX Gen1 System Specifications.

## 2 Scope

This specification establishes the performance requirements for the WiMAX distributed antenna system (DAS).

## 3 Responsibility

LGC Wireless is responsible for maintaining this document.

## 4 System Level Specification

### 4.1 Operating Frequencies

WiMAX Gen1 will have two frequency bands. This will allow customer to run Band 1 as main band and Band 2 as MIMO. Second, it allows customer to run two independent bands for example one could be sector 1 and other could be sector 2 with same or different frequency.

#### 4.1.1 WiMAX Frequency Band 1:

WiMAX Band 1 has four sub bands that cover Complete WiMAX band from 2496-2690MHz in 60MHz sub bands.


These tables might change based on marketing requirements.

Band	Downlink	Uplink
	RF Passband (MHz)	RF Passband (MHz)
WiMAX B1	2496 - 2556	2496 - 2556
WiMAX B2	2546 - 2606	2546 - 2606
WiMAX B3	2596 - 2656	2596 - 2656
WiMAX B4	2630 - 2690	2630 - 2690

#### 4.1.2 WiMAX Frequency Band 2:

WiMAX Band 2 has four sub bands that cover Complete WiMAX band from 2496-2690MHz in 60MHz sub bands.

Band	Downlink	Uplink
	RF Passband (MHz)	RF Passband (MHz)
WiMAX B1	2496 - 2556	2496 - 2556
WiMAX B2	2546 - 2606	2546 - 2606

	Document Title: WiMAX Gen 1 Spécification	
	REV	Page
	Rev 3	2 of 4

WiMAX B3	2596 - 2656	2596 - 2656
WiMAX B4	2630 - 2690	2630 - 2690

## 4.2 RF Specifications


RF End-to-End Performance							
Parameter	Units	Downlink			Uplink		
		Min	Typ	Max	Min	Typ	Max
Average System Gain	dB		15			15	
System Gain Ripple	dB		3.0	4.5		3.0	4.5
Output IP3 (SMF)	dBm	33	38				
Input IP3 (SMF)	dBm				-10	-5	
Output P1dB	dBm	25	28				
NF 1-1	dB					11	16
NF 1-8	dB					17	21
NF 1- 4 – 32	dB					23	28
Output Noise Floor (SMF)	dBm/Hz		-100				
UL Limiter Level (referenced to input)	dBm					-33	
DL Limiter Level (referenced to output) for EPCS	dBm		27				
Out-of-Band Spurious Output Levels (Non LO)	dBm			-13			-13
Passband Spurious Output Levels (Non LO)	dBm			-36		-85	-75

### 4.2.1 System Phase Noise Performance

Phase Noise Performance Above 1GHz		
Offset (kHz)	Typ (dBc/Hz)	Max (dBc/Hz)
0.1	60	57
1	73	68.5
10	83	78
30	96.5	92
100	108	104

## 5 Environmental Specifications:

Parameter	Main Hub and Expansion Hub	Remote Access Unit
Operating Temperature	0° to +45°C (+32° to +113°F)	-25° to +45°C (-13° to +113°F)
Non-operating Temperature	-20° to +85°C (-4° to +185°F)	-25° to +85°C (-13° to +185°F)

	Document Title: WiMAX Gen 1 Spécification	
	REV	Page
	Rev 3	3 of 4


Operating Humidity; non-condensing	5% to 95%	5% to 95%
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## 6 Cabling Specifications:

Parameter	Specifications
Optical Fiber	These specifications assume that the fiber optic cable, single-mode, is Corning with SC/APC connectors.
Optical Power Budget	Uplink and Downlink Maximum: 3 dB Optical power budget between Main Hub and Expansion Hub
CATV	The specifications in this document assume that CATV RG-59 cable is CommScope 2065V, CATV RG-6 cable is CommScope 2279V, and CATV RG-11 cable in CommScope 2293K or equivalent, with 75 ohm F connectors.
CATV Lengths	<a href="#">Minimum: 135 meters</a> <a href="#">Maximum with RG-59</a> <a href="#">Maximum: 140 meters</a> <a href="#">Maximum with RG-6</a> <a href="#">Maximum: 235 meters</a> <a href="#">Maximum with RG-11</a>

## 7 Physical Specifications:

Parameter	Main Hub	Expansion Hub	Remote Access Unit
IF/RF Connectors	4 N, female (50 ohms), 1 Downlink / Uplink pair per MIMO Channel	8 F, female (CATV -75 ohms)	1 F, female (CATV - 75 ohms) 1 N, female (antenna - 50 ohms)
External Alarm Connector (contact closure)	1 9-pin D-sub, female	—	—
ADMIN/LAN Interface Connector	1 RJ-45, female 1 9-pin D-sub, male for optional modem	1 RJ-45, female 1 9-pin D-sub, male	—
Fiber Connectors	4 Pair, SC/APC	1 Pair, SC/APC	—
AC Power (Volts)	Rating: 100-240V AC, 1A, 50-60 Hz	Rating: 100-240V AC, 6A, 50-60 Hz	54V DC (from the E Hub)
	Operating Range: 90-132V AC/170-250V AC auto-ranging	Operating Range: 90-132V AC/170-250V AC auto-ranging	
DC Power (Volts)	Rating/Operating Range: 38-64V DC, 2.5A	Rating/Operating Range: 38-64V DC, 14A	—
Power Consumption (W)	30	4 RAUs: 240 typical, 310 max. 8 RAUs: 400 typical, 530 max.	—
Enclosure Dimensions (height xwidth xdepth)	89 mm x 438 mm x 381 mm (3.5 in. x 17.25 in. x 15 in.) 2U	89 mm x 438 mm x 381 mm (3.5 in. x 17.25 in. x 15 in.) 2U	54 mm x 286 mm x 281 mm (2.13 in. x 11.25 in. x 11.13 in.)
Weight	< 5.5 kg (< 12 lb)	< 6.6 kg (< 14.5 lb)	< 2.1 kg (< 4.6 lb)

 LGC WIRELESS®	Document Title: WiMAX Gen 1 Spécification	
	REV	Page
	Rev 3	4 of 4

Note Section 8 and 9 are for internal use only. They are for ATE configuration.

## 8 Main Hub TDD Requirements:

TDD Duplex port or Simplex ports will be configured in manufacturing based on customer requirements.

### 8.1 MH TDD threshold configuration:

Main Hub threshold is configured at ATE. Each band and each Sub Band have different threshold and memory location.

MH will switch to Downlink at input power of -10dBm. This is configured at ATE with 0dB System gain. After setting MH gain and calibration threshold, ATE will inject -10dBm signal into MH and measure detector threshold through A/D and program it into assigned memory location. ATE will measure and program this value into each sub band it tests.

These steps are repeated for both bands.

## 9 RAU TDD Threshold Requirements:

### 9.1 RAU Threshold Configuration

RAU Threshold is set after RAU configuration is done. Each band have different threshold, and each sub band has different threshold.

Band 1 setup: RAU Output power is set to -10dBm and Band 1 Downlink Burst Detector output is measured through A/D and programmed in assigned memory location. Firmware uses this location for Comparator threshold. These steps are repeated for Band 2.

## 10 RAU and MH Unit

RAU need to be configured to calibrated Pout of 5dBm from RAU.

MH need to be configured to +5dBm input Power with 0dB system gain.

## 11 Change History:

Rev	ECO NO.	Date	Description of Change	Change By
2		1/3/08	Add Section 8 and 9 TDD Threshold.	Baljit Singh
3		2/14/08	Added section 10	Baljit Singh