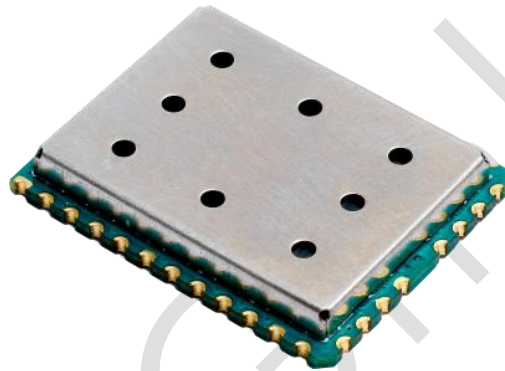


WiMOD - iM282A

Application Note AN023 / Version 1.0

Range Test



Document ID: 4100/40140/0134

IMST GmbH

Carl-Friedrich-Gauss-Str. 2-4

D-47475 Kamp-Lintfort



Document Information

File name	iM282A_AN023_RangeTest.docx
Created	2018-04-11
Total pages	12

Revision History

Version	Description
1.0	Released

IMST GmbH

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1 Overview

Aim of this document is to give an overview about the result of various range tests made with the iM282A Starter Kit SK-iM282A, see <https://wireless-solutions.de>.

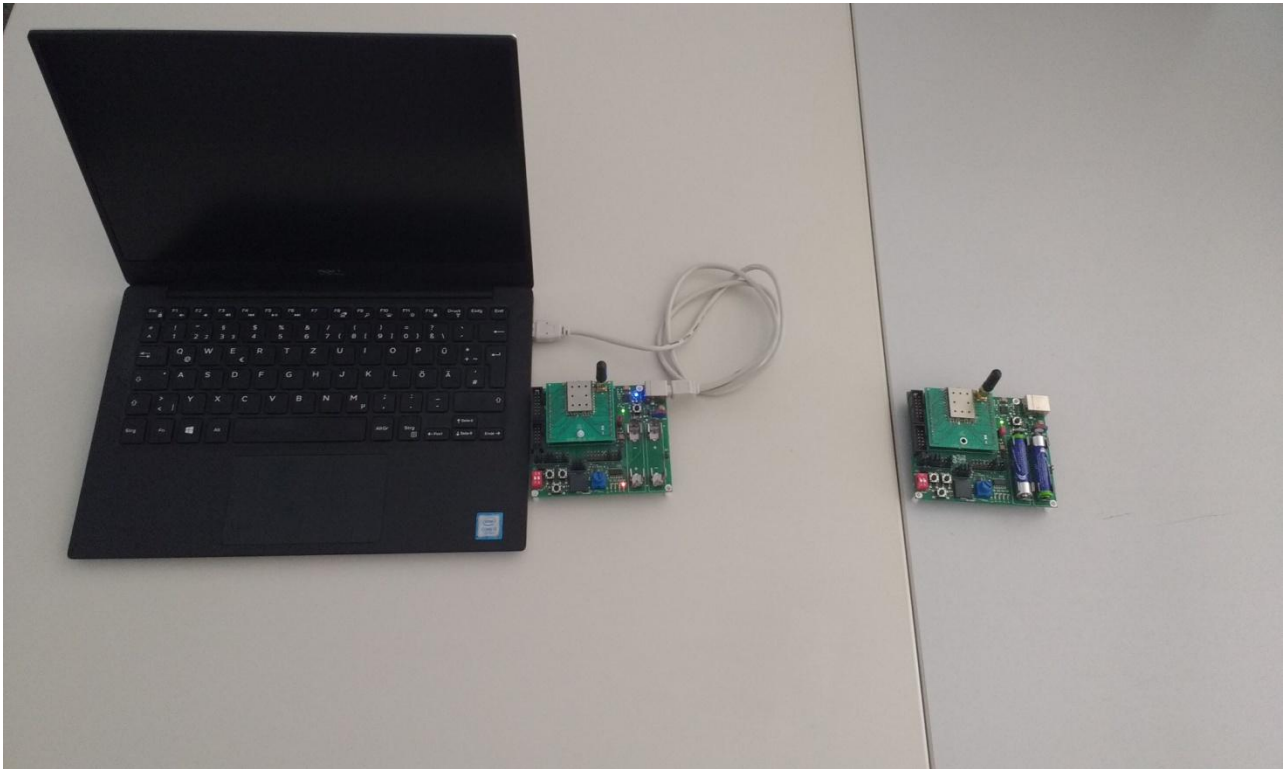


Figure 1-1: iM282A Starter Kit SK-iM282A

IMST

2 Range Tests

The locations of the measurements are sites with Line-of-Sight (LoS) conditions. No vegetation or other obstacles have been between stationary and mobile device.

The following Figure 2-1 shows the measurement setup for the stationary position (Demoboard with iM282A and CTA 2450/0/WS/SM/W1 antenna connected to a laptop). The Demoboard is mounted on a wooden pole so it is 1.5 m above ground.



Figure 2-1: Stationary position (near Moers), Measurement in 1.5 m height.

The measurement setup for the mobile position is shown in Figure 2-2. Like the stationary device the mobile Demoboard with iM282A and CTA 2450/0/WS/SM/W1 antenna are mounted in 1.5 m height on a wooden pole. This device is used battery operated without a connection to a laptop.

The location of the stationary device is marked with the red circle.



Figure 2-2: Mobile position (near Duisburg), Measurement in 1.5 m height

2.1 LoRa Test 12,135 m

This range test was performed at a distance of 12,135 m near the cities Moers and Voerde.

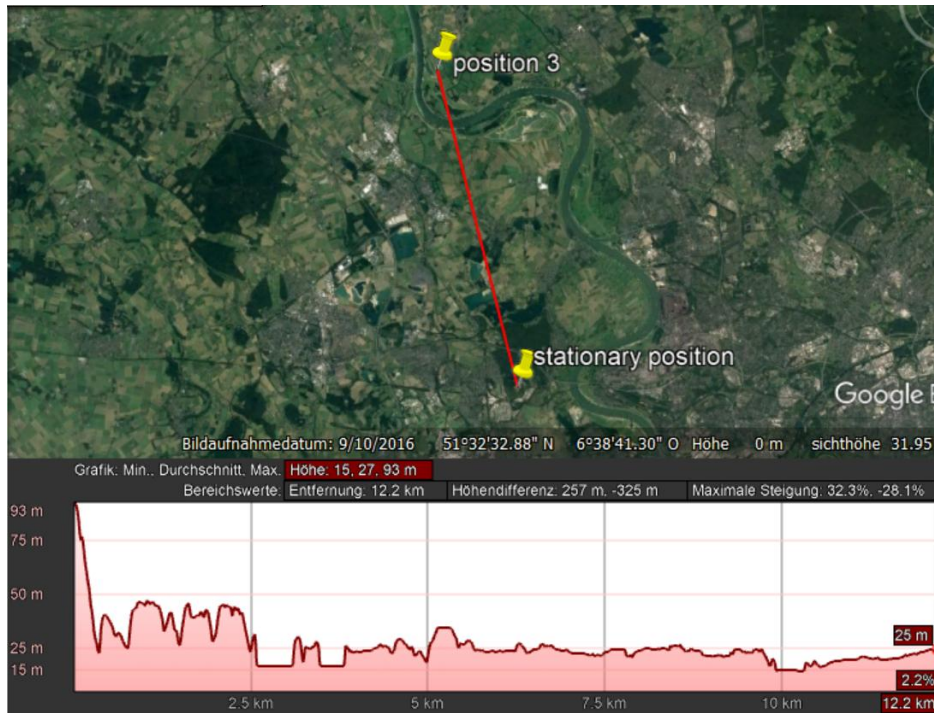


Figure 2-3: Distance and elevation profile between stationary position and position 3 (near Voerde) from Google Earth

2.1.1 Settings

Devices: iM282A_B2-01_Nr.67 @ stationary position; iM282A_B2-01_Nr.68 @ position 3

Distance: 12,135 m

Frequency Band: 2,450 MHz

Payload: 15 Byte

2.1.2 Results

RF Power	Cyclic Coding Rate	Bandwidth [kHz]	Spreading Factor	Effective Data Rate [kb/s] ¹	Link Budget [dB] ¹	Number of Packets	PER [%]
+8 dBm	4/5	200	12	0.476	138	100	1.00 %
+8 dBm	4/5	200	12	0.476	138	100	3.00 %

2-1: Results PER of the Range Test 12,135 m with +8 dBm

¹ From Semtech SX1280 Calculator Tool

2.2 LoRa Test 5,744 m

This range test was performed at a distance of 5,744 m near the cities Moers and Duisburg.

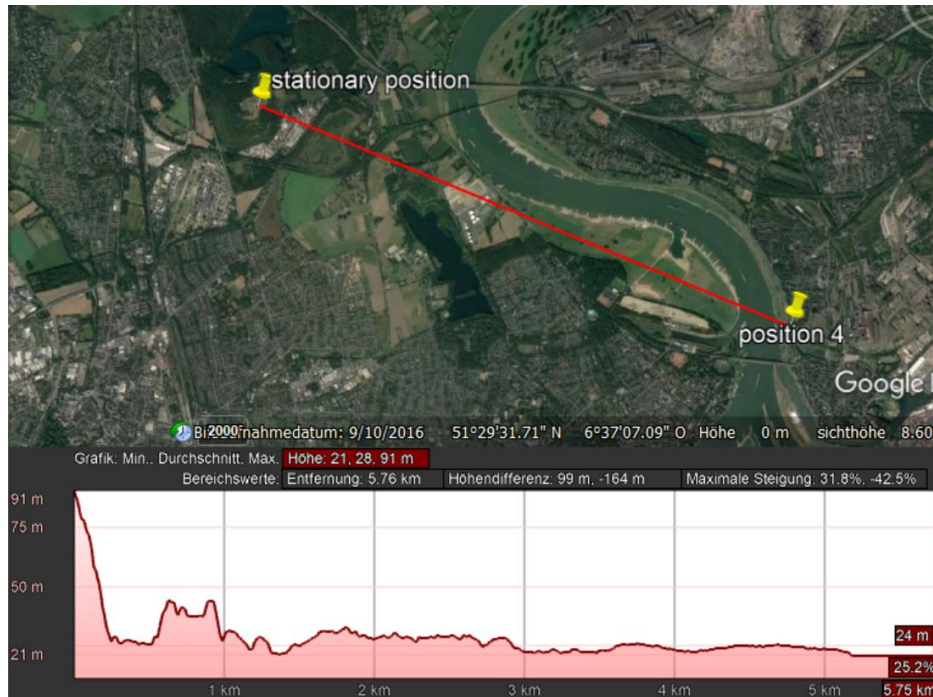


Figure 2-4: Distance and elevation profile between stationary position and position 4 (near Duisburg) from Google Earth

2.2.1 Settings

Devices: iM282A_B2-01_Nr.67 @ stationary position; iM282A_B2-01_Nr.68 @ position 4

Distance: 5,744 m

Frequency Band: 2,450 MHz

Payload: 15 Byte

2.2.2 Results

RF Power	Cyclic Coding Rate	Bandwidth [kHz]	Spreading Factor	Effective Data Rate [kb/s] ²	Link Budget [dB] ²	Number of Packets	PER [%]
+8 dBm	4/5	200	12	0.476	138	100	0.00 %
+8 dBm	4/5	200	10	1.59	132	100	0.00 %
+8 dBm	4/5	400	10	3.17	130	100	0.00 %
+8 dBm	4/5	200	8	5.08	126	100	0.00 %
+8 dBm	4/5	200	7	8.88	123	100	1.00 %
+8 dBm	4/5	800	8	20.30	123	100	2.00 %

2-2: Results PER of the Range Test 5,744 m with +8 dBm

² From Semtech SX1280 Calculator Tool

2.3 FLRC Test 1,284 m

This range test was performed at a distance of 1,284 m near the city Rheinberg.



Figure 2-5: Distance and elevation profile between POS0 and POS9 from Google Earth

2.3.1 Settings

Devices: iM282A_B2-01_Nr.67 @ POS0; iM282A_B2-01_Nr.68 @ POS9

Distance: 1,284 m

Frequency Band: 2,450 MHz

Payload: 15 Byte

2.3.2 Results

RF Power	Cyclic Coding Rate	Bandwidth [kHz]	Raw Bit Rate [kb/s]	Effective Data Rate [kb/s] ³	Link Budget [dB] ³	Number of Packets	PER [%]
+8 dBm	1/2	300	260	130	114	100	5.00 %

2-3: Results PER of the Range Test 1,284 m with +8 dBm

³ From Semtech SX1280 Calculator Tool

2.4 FLRC Test 684 m

This range test was performed at a distance of 684 m near the city Rheinberg.



Figure 2-6: Distance and elevation profile between POS0 and POS10 from Google Earth.

2.4.1 Settings

Devices: iM282A_B2-01_Nr.67 @ POS0; iM282A_B2-01_Nr.68 @ POS10

Distance: 684 m

Frequency Band: 2,450 MHz

Payload: 15 Byte

2.4.2 Results

RF Power	Cyclic Coding Rate	Bandwidth [kHz]	Raw Bit Rate [kb/s]	Effective Data Rate [kb/s] ⁴	Link Budget [dB] ⁴	Number of Packets	PER [%]
+8 dBm	1/2	300	260	130	114	100	0.00 %
+8 dBm	1	1200	1300	1300	104	100	0.00 %

2-4: Results PER of the Range Test 684 m with +8 dBm

⁴ From Semtech SX1280 Calculator Tool

3 Appendix

3.1 List of Abbreviations

FLRC Fast Long Range Communication

LoRa Long Range

PER Packet Error Rate

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4 Important Notice

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4.2 Contact Information

IMST GmbH

Carl-Friedrich-Gauss-Str. 2-4
47475 Kamp-Lintfort
Germany

T +49 2842 981 0

F +49 2842 981 299

E sales@imst.de

I www.wireless-solutions.de