EDMI Standard 420 ITCH (CS-12) User Guide

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Document Classification: Public

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Preface

Revision history

Name	Description of Change	Date	Version
EDMI	First Version	02/03/2020	1.0
EDMI	Detail on cables added / environmental protection amendments	16/03/2020	1.1

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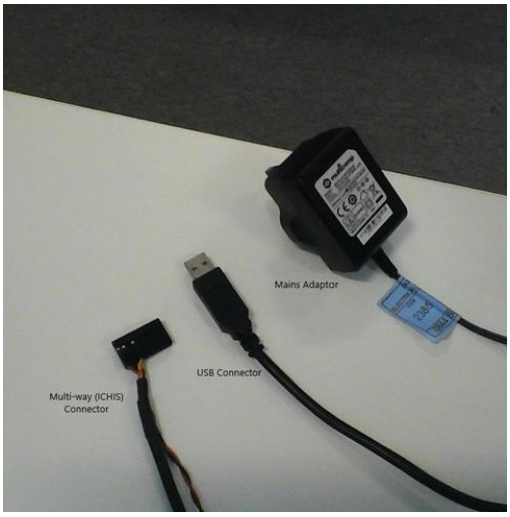
1 EDMI Standard 420 ITCH

1.1 Overview / Photographs

The Standard 420 ITCH consists of:

- Communications hub (ITCH)
- Cable assembly providing a mains plug, USB connector and a multi-way connector for the hub

ITCH Communications hub



ITCH Connection Cable

The complete Standard 420 ITCH assembly is CE marked.

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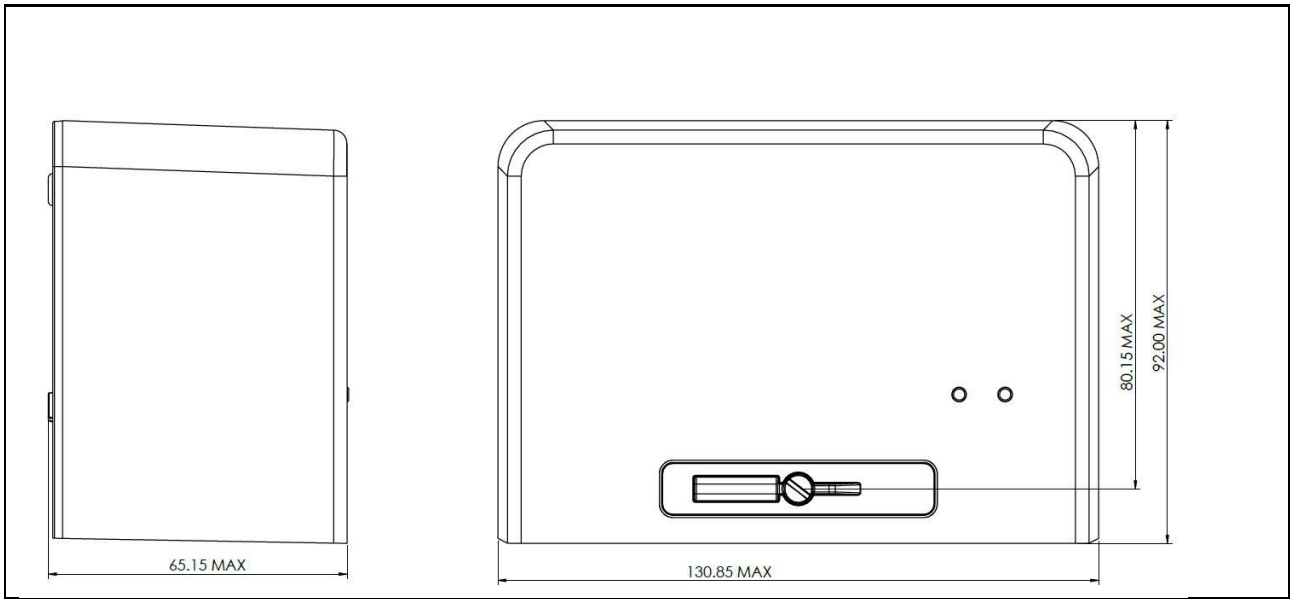
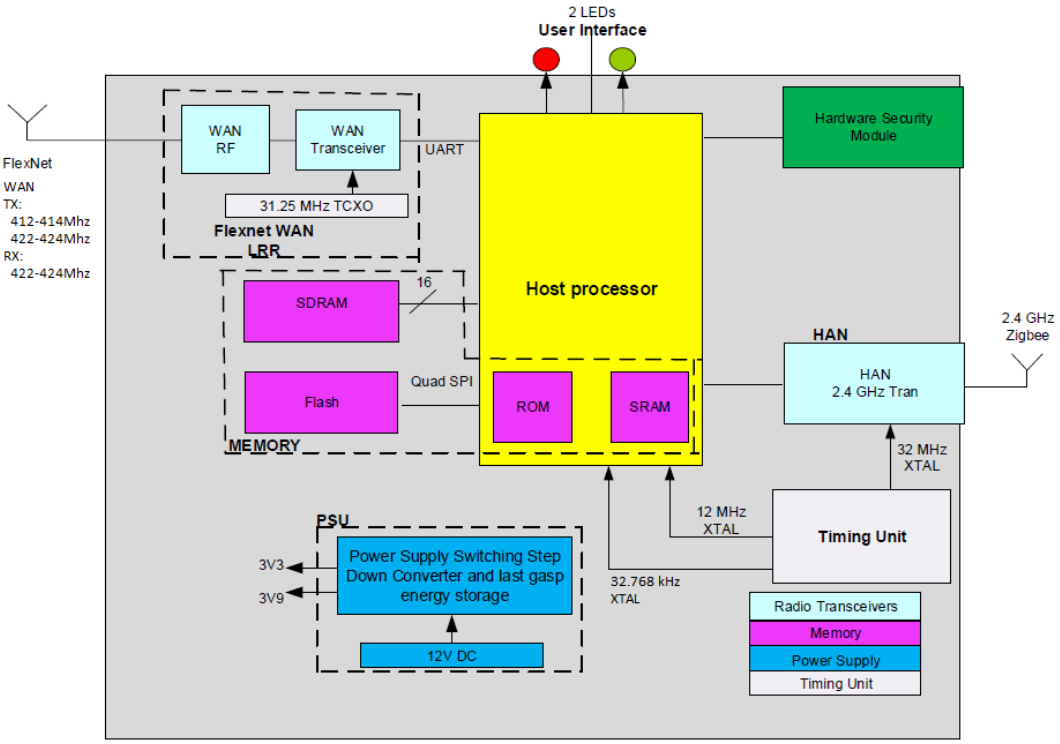
1.2 Communications Hub Enclosure Engineering Drawing



1.3 Communications Hub Block Diagram

Communications Hub Block Diagram



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1.4 General Specification

For terms and abbreviations used in this document please see the DCC document: Joint HAN Radio Testing Methodology (JTM v3.2).

Specification	Description
Dimensions (mm)	*Height from bottom face:* 92mm *Height from ICHIS datum: 80mm* *Depth: 65mm* *Width: 131mm*
Weight (g)	*200g*
Environment Protection	IP Rating: IP53 Indoor without suction Ambient temperature limits: -20°C to 55°C Relative Humidity: Non-condensing / Annual mean < 75% Mechanical Class: M1 (according to MID 2014/32/EU) Electromagnetic Class: E1 (according to MID 2014/32/EU)
SM WAN specification	*Standard : ETSI EN300 113-1 V1.7(2011-11)* *Frequency Range:* *Transmit: 412-414 and 422-424 MHz* *Receive: 422-424 MHz* *TRP: 1W Maximum.* Modulation: *Transmit: 2SFSK, 4SFSK, 4SFSK-HB* *Receive: mPass2, m4Pass2*

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HAN Specification

Transceiver	
TRP: 2.405 – 2.480GHz	*>6.5dBM*
TRS: 2.405 – 2.480GHz	*<-91.5dBm*
MAPL : 2.405 – 2.480GHz	*>99dB*
Directivity	*Omni*
Maximum Output Power	*13dBm EIRP for 2.4Ghz*
Modulation	OQPSK

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Power Consumption (W)	*6W maximum* *1W typical*

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Visual Indicator	*SM WAN_LED (Left)* *SM HAN_LED (Right)*

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ICHIS Connections	*Pins 1, 2: DC input* *Pins 3, 4: COM* *Pin 5: CH_PR (Communications Hub Present)* *Pin 6: MT_PR (Meter Present)*

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Labelling	See section 1.6

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Packing	*See section 1.7 to 1.9*

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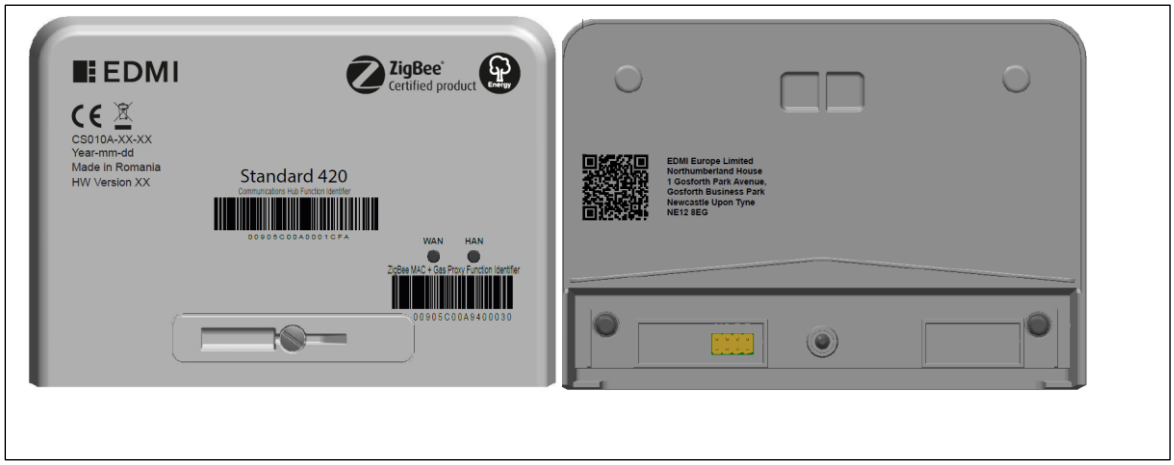
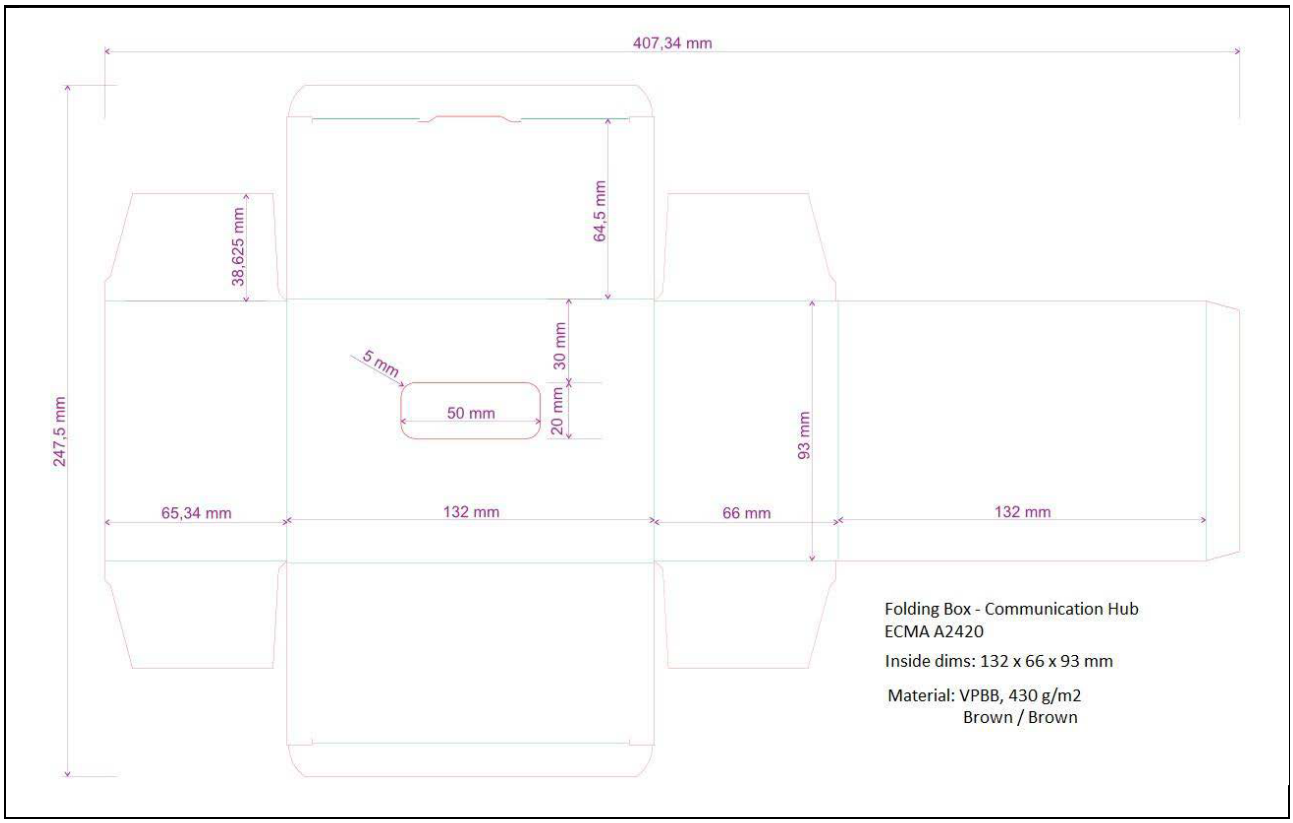
1.5 JTM

The Communications Hub has met the MAPL criteria for 2.4 GHz band as defined in JTM v3.2 document

1.6 Communications Hub Labelling / Artwork Engineering Drawing



1.7 Packaging Drawing (Box)



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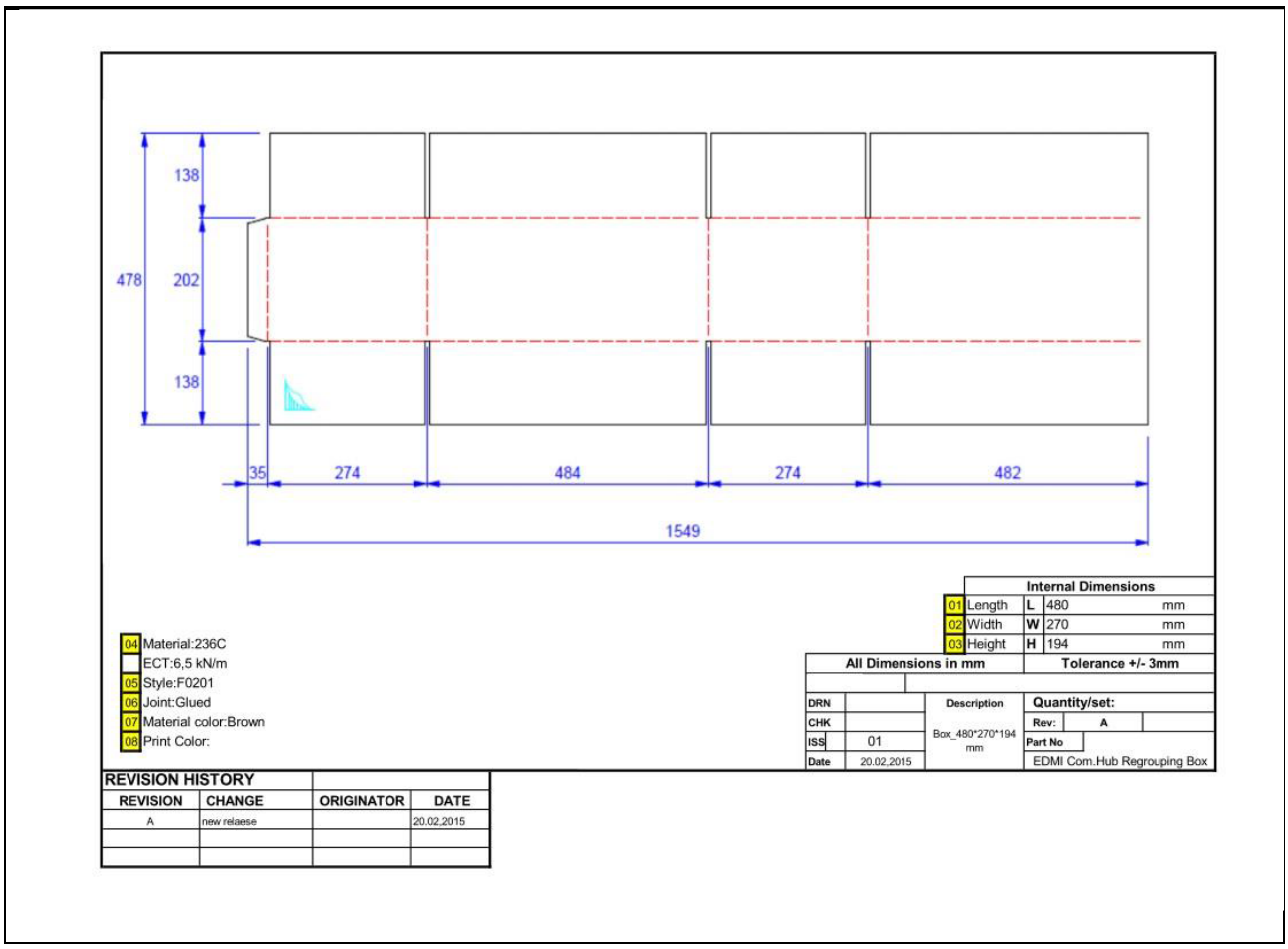
1.8 Packaging Drawing (Carton)



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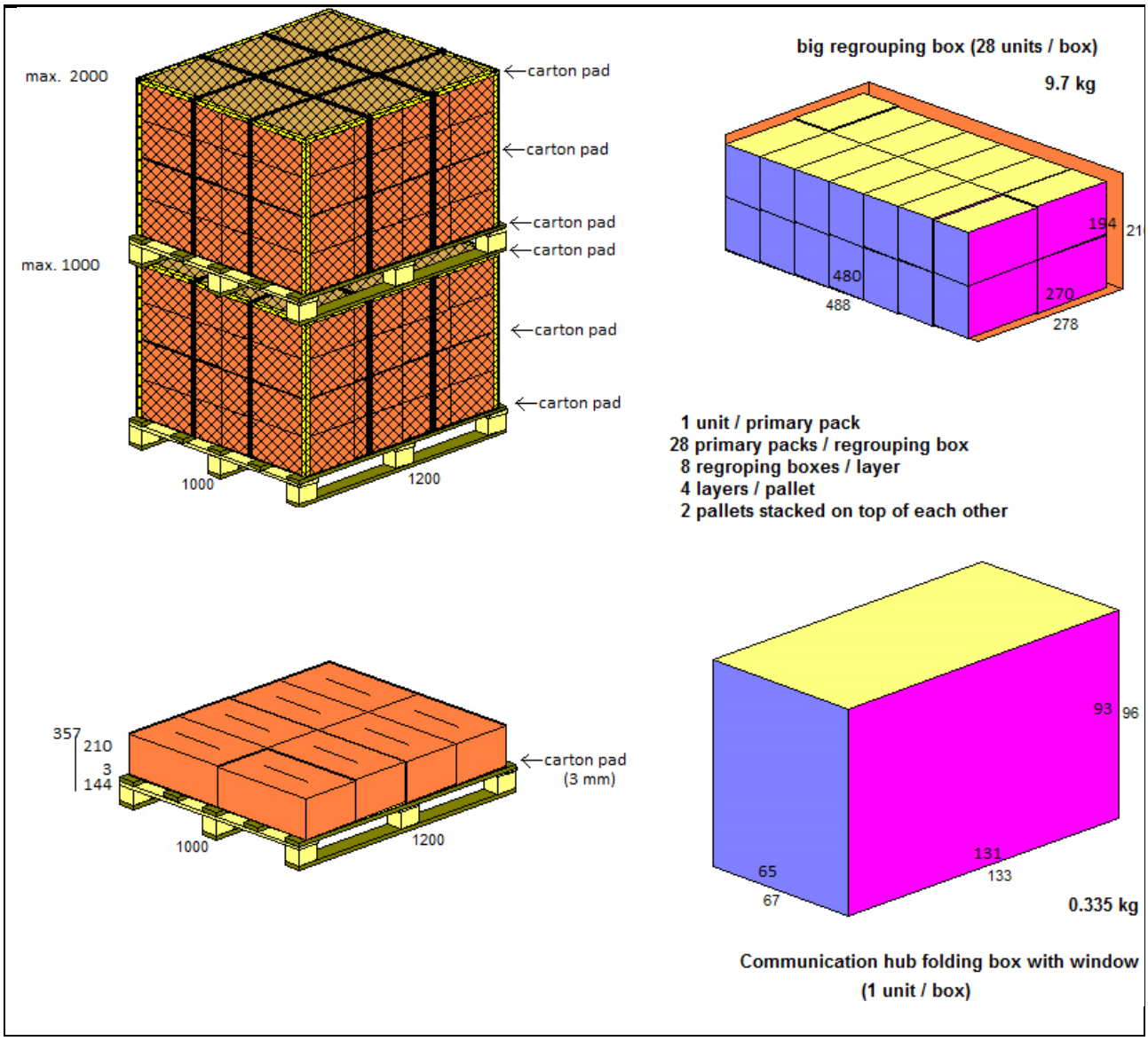
1.9 Packaging Drawing (Pallet Loading)



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2 Appendix - Noise

2.1 Noise Limit

Noise limits for hosts as referred to in ICHIS (Intimate Communications Hub Interface Specification):

WAN

Permissible noise floor rise above thermal noise: ≤7 dB between 422 MHz and 424 MHz

HAN

Permissible noise floor rise above thermal noise: ≤ 3.5 dB between 2.405 GHz and 2.480 GHz

2.2 Noise Calculations

2.2.1 WAN

From fundamental theory, thermal noise floor in a 20 kHz bandwidth (at room temperature of 296 K) is: -173.87 + 10*log (20 kHz) = -130.86 dBm

The required minimum carrier to noise ratio of the communication scheme and the noise figure of the Communications Hub internal design is used to find the minimum WAN TRS.

To maintain the WAN link budget the noise contribution from the ICHIS host has been set to 7 dB above thermal in the 20 kHz bandwidth. This equates to: -130.86 + 7 dBm = -123.86 dBm

2.2.2 HAN 2.4GHz

From fundamental theory, thermal noise floor in a 2 MHz bandwidth (at room temperature of 296 K) is: -173.87 + 10*log (2 MHz) dBm = -110.86 dBm

Adding the required minimum carrier to noise ratio of the communication scheme and the noise figure of the Communications Hub internal design gives a minimum TRS of -91.5 dBm (see General Specification above).

To maintain the HAN link budget the noise contribution from the ICHIS host has been set to 3.5 dB above thermal in the 2 MHz bandwidth. This equates to: -110.86 + 3.5 dBm = -107.36 dBm

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2.3 Spectrum Analyser Guide Settings

The following are guide sets for measurement equipment settings. These settings are refined by ICHIS test methodology. Please see the test methodology documentation for a step by step guide and safe working methods.

2.3.1 WAN

centre frequency	423	MHz
span	2	MHz
RBW	20	kHz
VBW	100	kHz
detector	RMS	
Average	off	
sweep speed	30	sec
ref level	-55	dBm
Attenuator	0	dB
Pre Amp	on	
Units	dBm	

2.3.2 HAN 2.4 GHz

centre frequency	2445	MHz
span	100	MHz
RBW	2000	kHz
VBW	5000	kHz
detector	RMS	
Average	off	
sweep speed	30	sec
ref level	-55	dBm
Attenuator	0	dB
Pre Amp	on	
Units	dBm	

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