EDMI Standard 420 Communications Hub Variant (CS-10)

Author: EDMI

Approver: Rajan Bhandari

Date: 16/03/2019

Version / Status: 4.2

Document Classification: Public

Distribution and approvals are maintained in Share Point, distribution to the public via EDMI webpage.

It is the responsibility of the user of this document to verify that it is the most current edition.

Preface

Privacy information

This document is public information and is shared on EDMI's webpage.

Revision history

Name	Description of Change	Date	Version
EDMI	First Version	30/04/2019	1.0
EDMI	Updated Artwork	17/07/2019	2.0
EDMI	Updated Block Diagram	25/09/2019	3.0
EDMI	Added full range of HAN frequency and modulation types to WAN and HAN	26/09/2019	4.0
EDMI	Change of EDMI address on artwork / remove ITCH SKU references	26/11/2019	4.1
EDMI	Add environmental conditions	16/03/2019	4.2

Approval

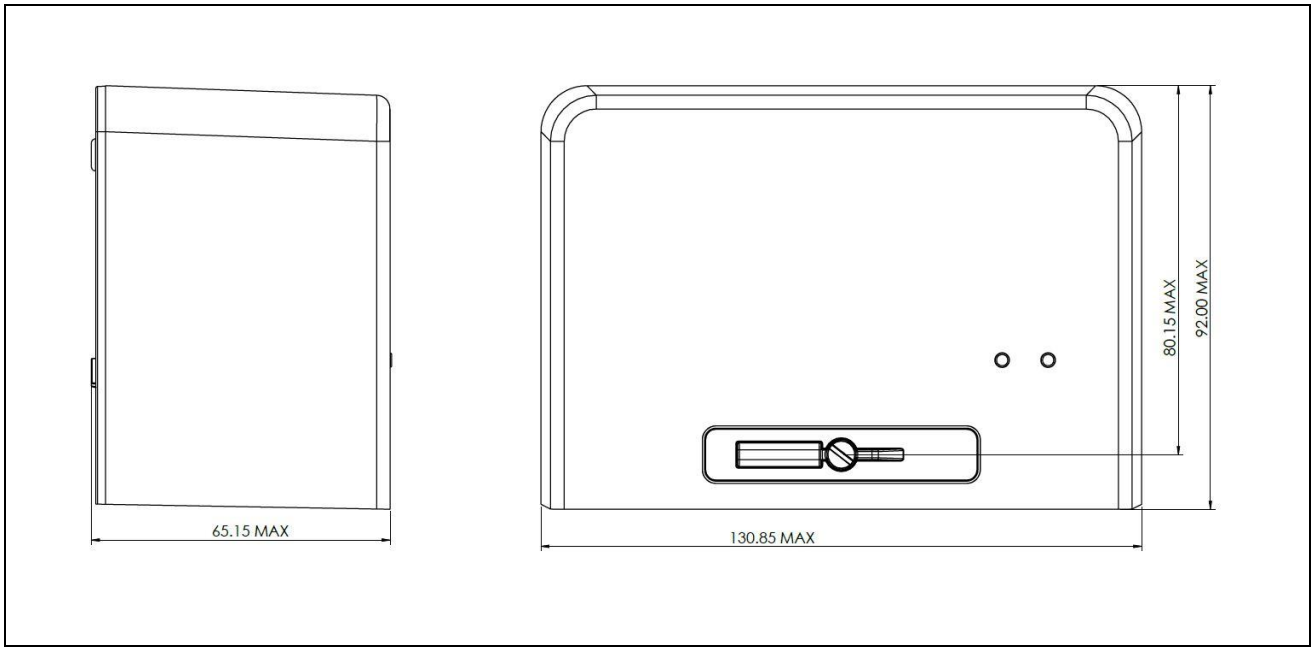
Name	Position	Signature	Date
Rajan Bhandari	Technical Director	Email	

Table of Contents

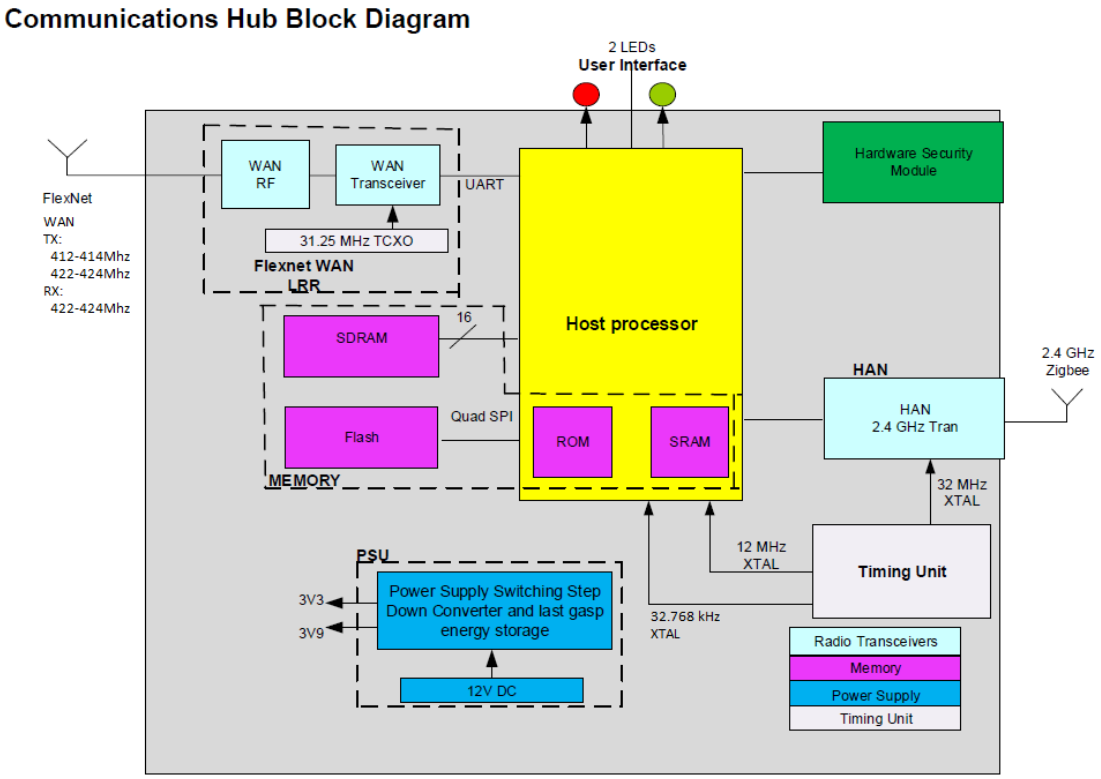
1 EDMI Standard 420 Communications Hub

1.1 Photograph

1.2 Communications Hub Enclosure Engineering Drawing



1.3 Communications Hub Block Diagram



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* *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*

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* 2.405 – 2.480GHz
Modulation	*OQPSK*

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

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

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

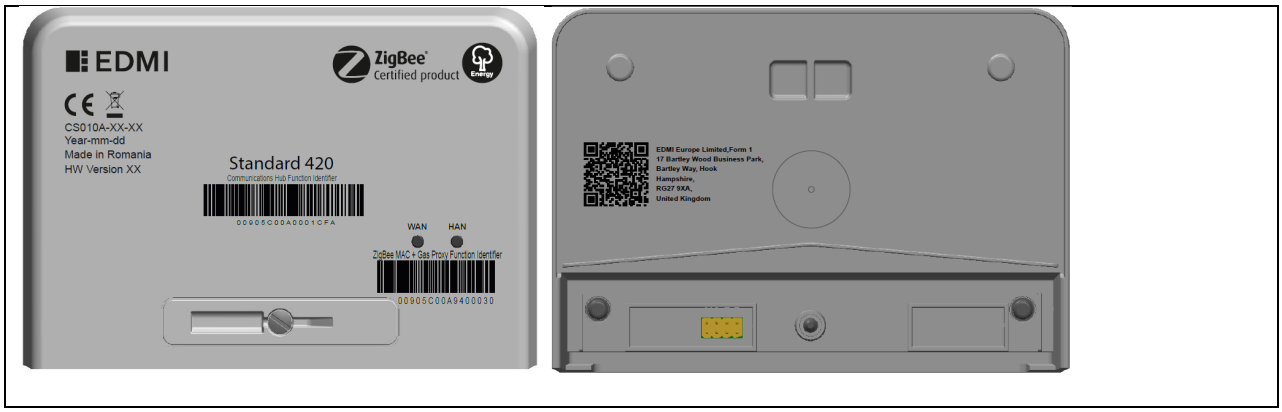
Labelling	See section 1.6

Packing	*See section 1.8 to 1.10*

1.5 JTM

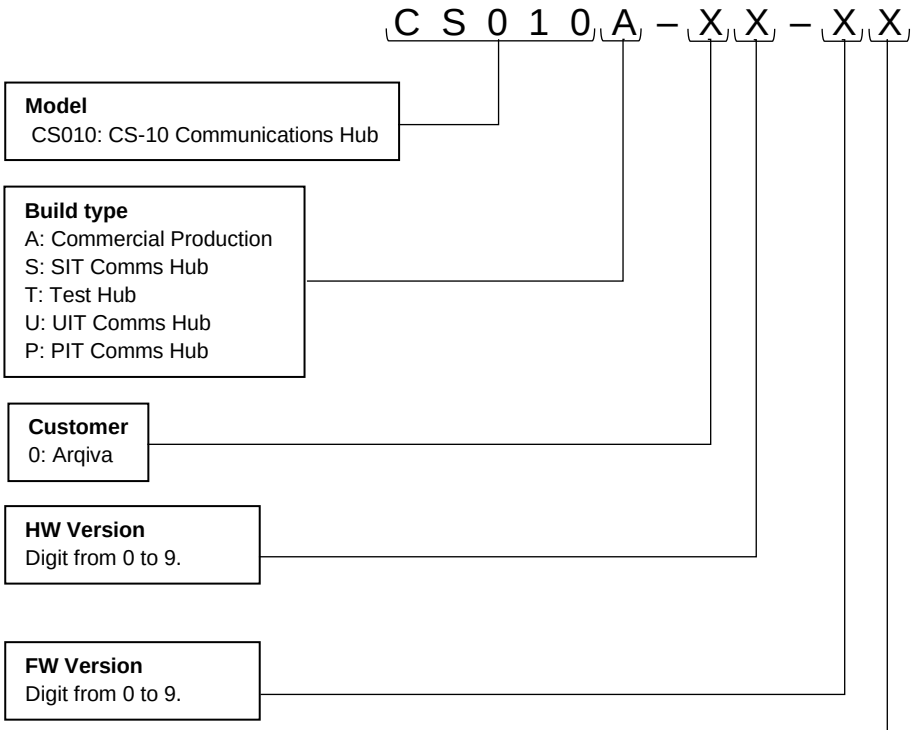
The Communications Hub has met the MAPL criteria for 2.4 GHz band as defined in JTM v3.2 document

1.6 Communications Hub Labelling / Artwork Engineering Drawing



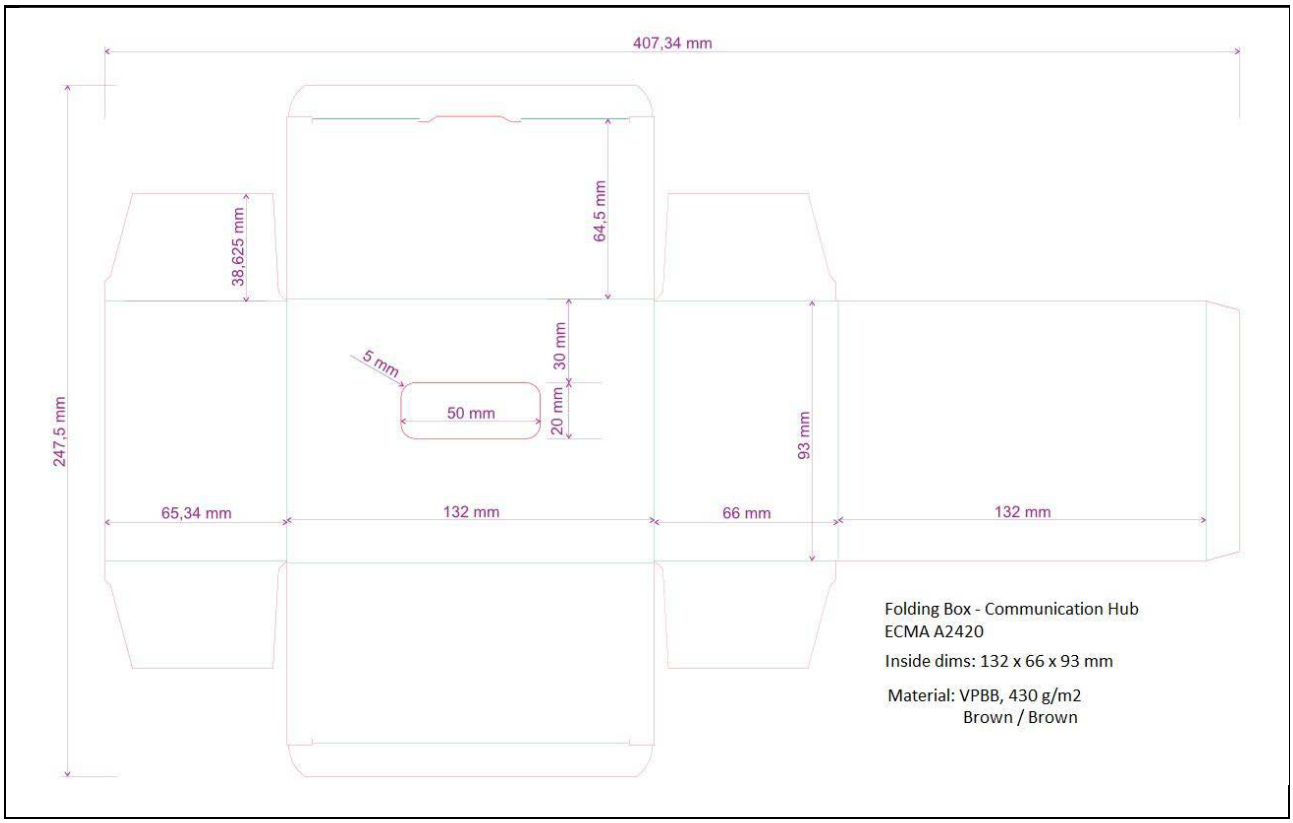
1.7 Product SKU Naming Convention

The product SKU is a 10-character code label printed on top left side front face of the Communications Hub. The string of characters relates to the following product information:

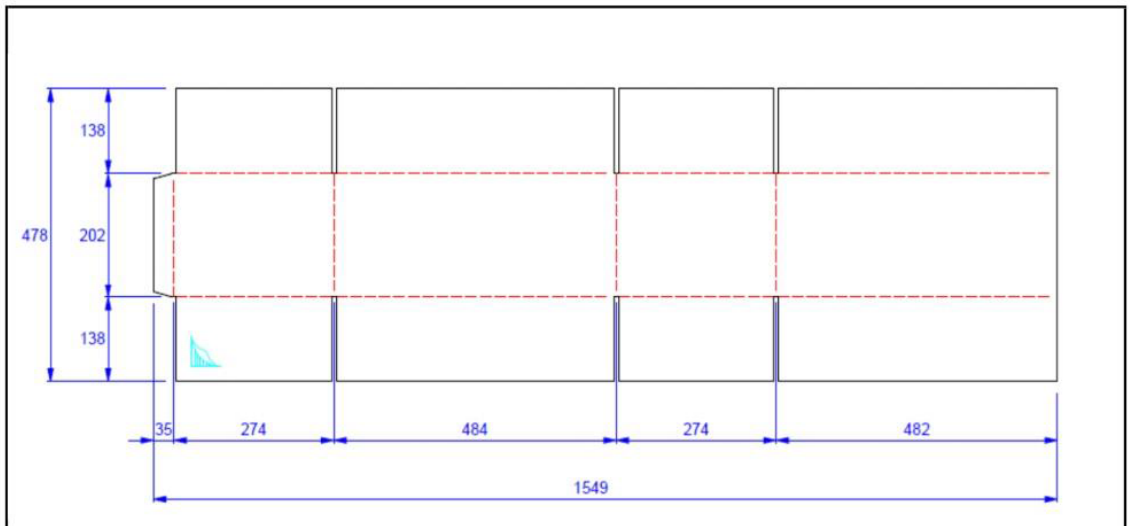


Configuration Identifier – Build Options				
Identifier	**FW**	**Certifications**	**JTAG**	**Environment**
2	Non-Debug	Production	Disabled	Production
3	Non-Debug	Production	Disabled	UIT-A
4	Debug	Production	Disabled	UIT-A
5	Non-Debug	Production	Disabled	UIT-B
6	Debug	Production	Disabled	UIT-B
D	Debug	ZigBee Test	Enabled	SIT-B
F	Debug	ZigBee Test	Enabled	PIT-A

1.8 Packaging Drawing (Box)



1.9 Packaging Drawing (Carton)



Internal Dimensions			
01 Length	L	480	mm
02 Width	W	270	mm
03 Height	H	194	mm

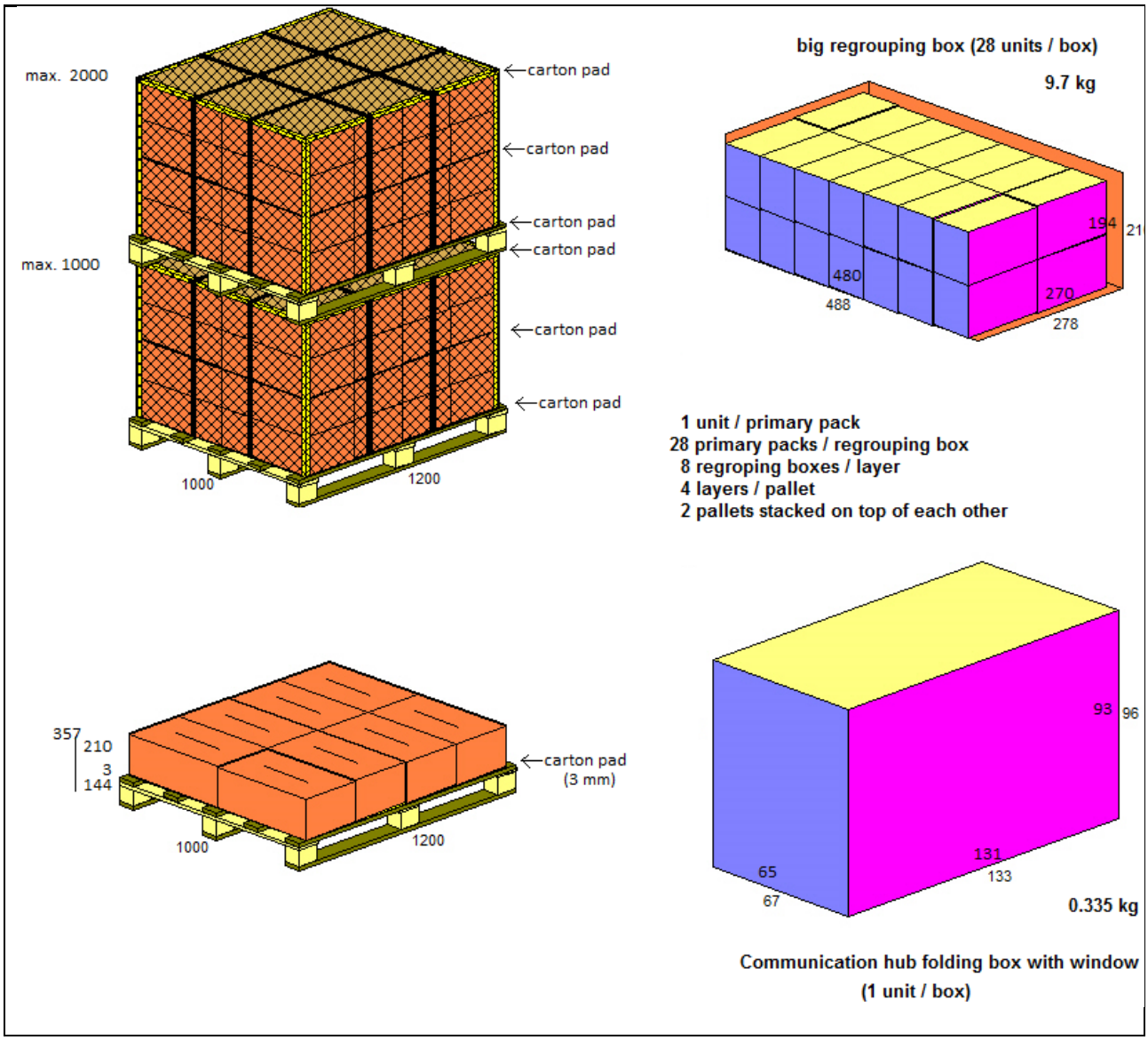
All Dimensions in mm — Tolerance +/- 3mm

04 Material:236C
ECT:6,5 kN/m
05 Style:F0201
06 Joint:Glued
07 Material color:Brown
08 Print Color:

DRN		Description	Quantity/set:
CHK		Box_480*270*194 mm	Rev: A
ISS	01		Part No
Date	20.02.2015		EDMI Com.Hub Regrouping Box

REVISION HISTORY			
REVISION	CHANGE	ORIGINATOR	DATE
A	new relaese		20.02.2015

1.10 Packaging Drawing (Pallet Loading)



1.11 Compliance Declaration

Hereby, *EDMI Europe Ltd* declares that this Standard *420 (CS-10) Communications Hub equipment* is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

2 Expected Normal Use and Warnings

2.1 Home User

This equipment contains no end user serviceable parts and as such end users should not be directly operating or touching this equipment.

Note! Only qualified Smart Meter Installers should install / remove this equipment.

2.2 Exclusions

The installation, maintenance and decommissioning of the equipment is covered in documentation available to authorized professional engineering companies.

2.3 Restrictions

This equipment is intended for use in the United Kingdom only, specifically in the northern CSP zone.

3 Appendix - Noise

3.1 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

3.2 Noise Calculations

3.2.1 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

3.2.2 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

3.3 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.

3.3.1 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	

3.3.2 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	

3.3.3 ICHIS Interface Specification

https://www.smartdcc.co.uk/document-centre/communications-hubs/intimate-communications-hub-interface-specification/