

<i>Document type:</i> MISC		<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -
<i>Project:</i> HomeMonitor	<i>Department:</i> ASIC	<i>Reserved to the assistant filing the document</i> <i>Filed in IntraELA by: on</i> <i>Original in: Meylan</i>	
<i>Title: RF+ Quick updates</i>			

Abstract: This document summarizes the modifications done between the first version of the SmartView Monitor (HM V1) and the second one (RF+ Quick) version.

	Name	Function	Signature	Date
prepared by	Pierrick Calvet	RF Engineer		
reviewed by	.	.		
reviewed by	.	.		
reviewed by	.	.		
approved by	Fabio Belletti	HM Project Leader		

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 1/12
-------------------	---	--	----------------------------

REVISION HISTORY

Rev.	Sect.	Change	Author	Release Date	
A	1	-	Creation	P. Calvet	Jan. 9th, 2012

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 2/12
-------------------	---	---------------------------------	---------------------

Contents

1.1	Introduction	6
1.1.1	Scope	6
1.1.2	References	6
1.1.3	Expected improvements	6
1.2	List of modifications	7
1.2.1	Shields introduction	7
1.2.2	RSSI chain update : Filter bandwidth and low pass filter	7
1.2.3	New GPRS antenna position	7
1.3	Conclusion	10
1.4	Acronyms	11

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 3/12
-------------------	---	---------------------------------	---------------------

List of Figures

1.1	Shields mounted over the main board	7
1.2	Clip that are used to maintain the shields. These clips are SMD mounted over the main board	8
1.3	The GPRS antenna is originally placed on the On-Demand button HM side.	9
1.4	RF Solution antenna (Position 2)	9

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 4/12
-------------------	---	---------------------------------	---------------------

List of Tables

- 1.1 The filter passives components have to be updated to increase its bandwidth 8
- 1.2 The additional LPF involves changing three passives components 8

	<i>Document reference</i>	<i>Dept. internal ref.</i>	<i>Page</i>
RF+ Quick updates	MISC1262A	-	5/12

1.1 Introduction

1.1.1 Scope

This document summarizes the modifications done between the first version of the SmartView Monitor (HM V1) and the second one (RF+ Quick) version.

It only presents updates linked to a RF point of view. It does not presents updates of mechanical, digital electronic and software.

1.1.2 References

The followings documents are referenced in this one:

Reference	Rev.	Description
MISC943	A	Shielding introduction
MISC1051	A	RSSI chain update
MISC1052	A	GPRS Antenna positioning

1.1.3 Expected improvements

Shielding introduction

The use of the shields shall provide significant improvement on the system in terms of FUP duration. This improvement is possible since the shield will reduce the visible noise within the MICS band on the HM. The overall applicative of the system shall be improved but its limits might be more abrupt since it will rely on the RS and CRC algorithm of the RF chipset.

→ **The RF transmission used to perform the FUP shall be closer to their nominal value of 30 seconds.**

RSSI chain update

The review of the RSSI chain is intended to comply with the regulations and to reduce the noise seen by the chain in the MICS band.

The filter bandwidth is increased in order to be wider than the emission bandwidth of the Zarlink ZL70101. Furthermore, the central frequency is aligned with the channel center.

An additional low pass filter is added at the logarithmic amplifier output to decrease the signal at two times the Intermediate Frequency (900kHz) generates by the IC itself during the down-conversion process. The RSSI chain accuracy will be improved and there will be no impact on response time imposed by regulations constraints.

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 6/12
-------------------	---	---------------------------------	---------------------

GPRS antenna positioning

The GPRS antenna positioning is intended to improve the performances of the SmartView monitor from a GPRS point of view and shall not degrade MICS band performances. This improvement can be in terms of SWR or radiated gain for the GPRS antenna and in terms of ERP for the MICS band.

1.2 List of modifications

1.2.1 Shields introduction

Two shields are mounted on HM board as shown on figure 1.1. The mounting of such shields over the main PCB is performed by the use of clips, shown on figure 1.2, that are SMD mounted over the PCB using a regular SMD soldering process.

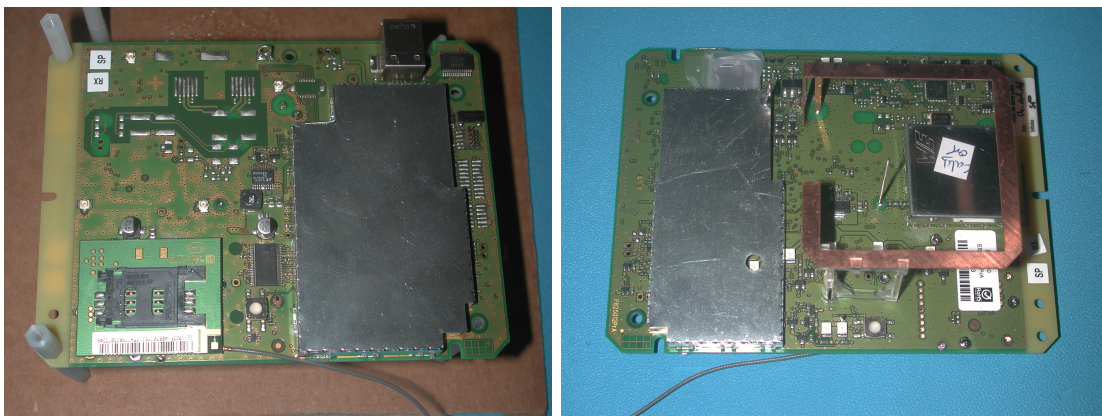


Figure 1.1: Shields mounted over the main board

1.2.2 RSSI chain update : Filter bandwidth and low pass filter

The table 1.1 shows the passives components values updated to align the filter center frequency and to increase its bandwidth.

The table 1.2 shows the passives components values updated by the addition of the low pass filter.

1.2.3 New GPRS antenna position

The GPRS antenna position in the first version of SmartView Monitor (V1) is shown on figure 1.3.

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 7/12
-------------------	---	---------------------------------	---------------------

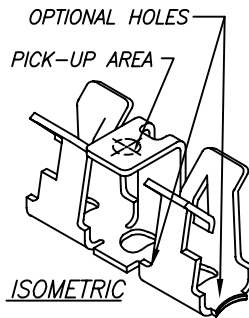


Figure 1.2: Clip that are used to maintain the shields. These clips are SMD mounted over the main board

Reference	Old value	New value	New reference
R27	2.49k	1.96k	Yes
R28	40.2	80.6	Yes
R29	12.4k	7.87k	Yes
R30	1.91k	1.4k	Yes
R31	30.1	56.2	Yes
R32	9.53k	5.62k	Yes
R33	2.94k	1.62k	Yes
R34	68.1	64.9	Yes
R35	5.49k	6.49k	Yes

Table 1.1: The filter passives components have to be updated to increase its bandwidth

The new GPRS antenna position in the RF+ Quick version is shown on figure 1.4.

Reference	Old value	New value	New reference
R36	0R	220R	Yes
R37	NP	10nF	No
R38	NP	0R	No

Table 1.2: The additional LPF involves changing three passives components

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 8/12
-------------------	---	---------------------------------	---------------------



Figure 1.3: The GPRS antenna is originally placed on the On-Demand button HM side.

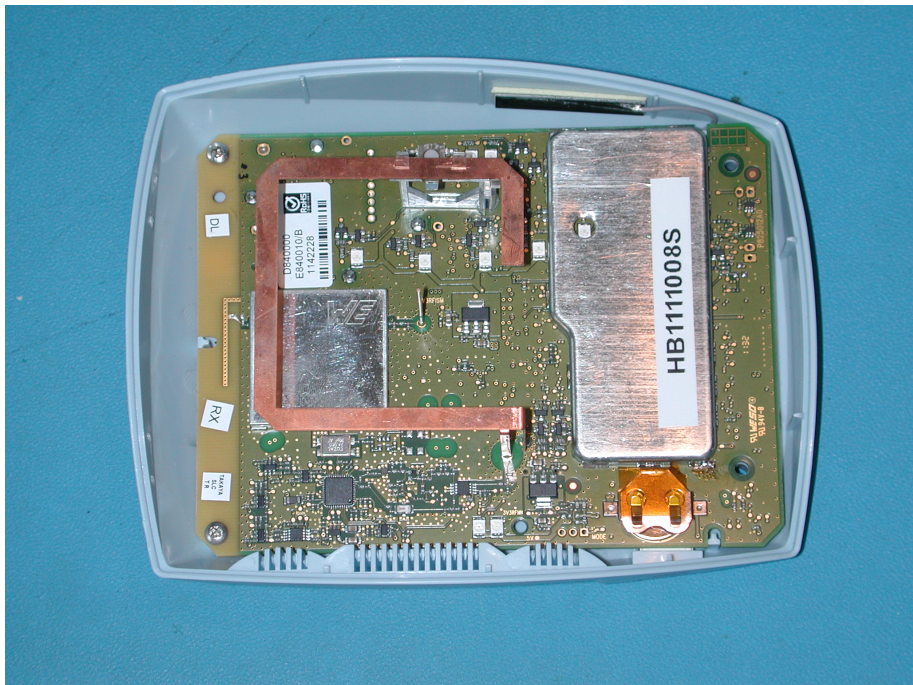


Figure 1.4: RF Solution antenna (Position 2)

RF+ Quick updates	Document reference MISC1262A	Dept. internal ref. -	Page 9/12
-------------------	--	--------------------------	--------------

1.3 Conclusion

The use of shields over the CPU and the power supply on both sides of the PCB reduces the FUP transmission time and stabilize it closer to its nominal value of 30 seconds.

The RSSI chain filter evolution allows to the Home Monitor to comply with regulations. They does not change product functionalities.

The new GPRS antenna position named **RF Position 2** allows to the Home Monitor to improve performances from a GPRS point of view and as a secondary effect, the performances in the MICS band.

No risk for the patient has been evidenced due to these updates.

RF+ Quick updates	<i>Document reference</i> MISC1262A	<i>Dept. internal ref.</i> -	<i>Page</i> 10/12
-------------------	---	---------------------------------	----------------------

1.4 Acronyms

ADC chipset function, analog digital converter

ATE automatic test equipment used to test the integrated chipset

BOM bill of material for a given printed board circuit

BS base station of a radio system

CAS Channel assessment. This process is intended to be used for allocating or reserving the correct channel for the RF transmission

CW carrier wave, used in radio frequency transmission

CPW coplanar waveguide for a transmission line

CPWG coplanar grounded waveguide for a transmission line

DAC chipset function, digital analog converter

dBc unit description, decibel relative to the carrier maximum power

dBm unit description, decibel relative to milliwatt

EMC electromagnetic compliance

EIRP Effective isotropic radiated power

ERP Effective radiated power

FM frequency modulation used in radio frequency transmission

FHSS frequency hopping spread spectrum used in radio frequency transmission

FUP follow-up, describe the application phase where the HM is retrieving all the information from the ICD

GHz unit description, gigahertz

Hz unit description, hertz

HV high voltage, expressed the side of PCB, flex that is being used for ICD as high voltage substrate

ICD Implantable Cardiac Defibrillator

IMD Implantable Medical Device

IF radio frequency term as intermediate frequency, used to describe the frequency used in up or down conversion system

IFA inverted F antenna : an antenna that looks like an inverted F letter

ISM industrial, scientific and medical frequency band as described in the *ERC70 - 3*

kHz unit description, kilo hertz

LBT listen before talk. Process that obliges a device to listen the RF channel before using it, in order to ensure that this channel is not occupied

LIC Least Interferer Channel. A type of LBT process

LPF Low Pass Filter. Electronic function where high frequencies are attenuated whereas low frequencies stay unchanged.

LV low voltage, expressed the side of PCB, flex that is being used for ICD as low voltage substrate

mA unit description, milliampere

MHz unit description, mega hertz

MICS medical implantable communication service

MWS microwave studio for CST, name of a company that provides an electromagnetic modeling software. see www.cst.com

OOB out of band, describe the spurious that do not belong to the wanted emission spectrum, and outside the authorized band in usage

PIFA plate inverted F antenna describe an antenna that looks like a plate that has a F letter shape seen from the side

PSU power supply unit

RBW resolution bandwidth

RF radio frequency

RM applicative term : remote monitoring

RSSI receiving signal strength indicator used in radio frequency system

Rx receiver

SPDT single path dual through, describe the type of switch only a single is connected at a given time.

SPI serial peripheral interface used to connect different chip with a reduced number of signals

SWR Standing Wave Ratio. A measurement to express the matching efficiency of an impedance

Tx transmitter

UFL U.FL miniature microwave connector

VBW video bandwidth

XO crystal oscillator

Ω Ohms

END OF DOCUMENT

MISC - MISC1262A: filed on

RF+ Quick updates	Document reference MISC1262A	Dept. internal ref. -	Page 12/12
-------------------	--	--------------------------	---------------