●Applications of NFC Tag
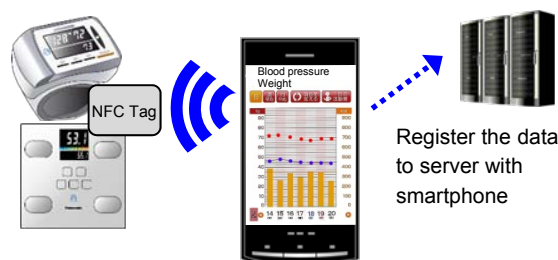
・By touching mobile phone with NFC tag, possible to communicate each other

・By embedding NFC tag LSI, an apparatus can be connected to the internet via mobile phone

NFC Tag

Blood pressure
Weight

Register the data to server with smartphone

・Easy paring of Bluetooth or Wi-Fi devices with just one touch

One touch set up by NFC Transfer data from Smart phone at high speed

Wi-Fi   Touch   Bluetooth

Hand Over: By touching with smart phone, enable to connect with Wi-Fi or Bluetooth, and transfer large data from smart phone at high speed
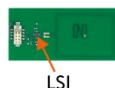
・As NFC tag communicate with no battery, it can be applied various usages i.e. the smart poster

NFC タグ LSI

●Evaluation board

・Evaluation boards implementing NFC tag LSI, antenna, and the interface connecter to MCU are provided.

MN63Y1208 Evaluation board with the antenna	LSI
MN63Y1210A Evaluation board with the antenna	
MN63Y1212/13 Evaluation board with the antenna	LSI

・An MCU board that can be connected to the NFC tag evaluation board is provided.

MN101EF63G MCU board

●NFC Tag Module

・We provide the NFC Tag Module embedded with NFC Tag LSI, antenna and peripheral parts. You can build an RF system by putting the NFC Tag Module on an apparatus.

MN63Y3208N1   MN63Y3212N1   MN63Y3212*1   MN63Y3213N1

*1 The part number is subject to change without notice since it is under development.

・Wi-Fi is a registered trademark of the Wi-Fi Alliance.
・Bluetooth is a registered trademark of the Bluetooth SIC, Inc.
・FeliCa is a trademark of Sony Corporation.
・FeliCa is the contactless IC card technology developed by Sony Corporation.
・'taspo' is a registered trademark of the Tobacco Institute of Japan.
・Suica is a registered trademark of East Japan Railway Company.
・Edy is a registered trademark of Rakuten Edy, Inc.
・All other trademarks are the property of their respective owners.

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NFC Tag

●What's NFC

Apply RFID technology (Contactless IC Card / RF tag) to Near Field Communication

・Communication Distance: 10cm or less
・Communication Speed: 106/ 212 /424 kbps
・Carrier Frequency : 13.56 MHz
 NFC supports short distance and low speed, so the communication is established with by holding near, by touching or by tapping.

Contactless IC Card Standard:

ISO14443 TypeA — London/Korea/China subway, Credit card, TASPO etc
ISO14443 TypeB — License card, Social ID card, Credit card, Paris subway, Passport etc
FeliCa — Electronic Ticket in Japan (Suica etc), Electronic Money (Edy etc) etc

Communication system →
・NFC IP-1 (ISO/IEC18092)
・NFC IP-2 (ISO/IEC21481)

RFID Communication system Standard:
ISO15693

NFC is the standard of transport layer, so upper layer to execute application of each IC card such as Credit card, Electronic Ticket is defined individually.
It is need to prepare the devices (SE : Secure Element) additionally to execute applications.

●NFC Tag LSIs

●Features
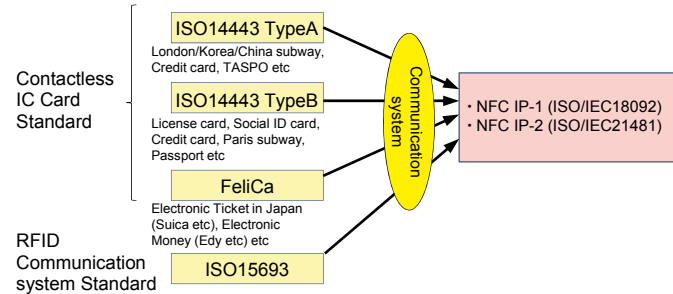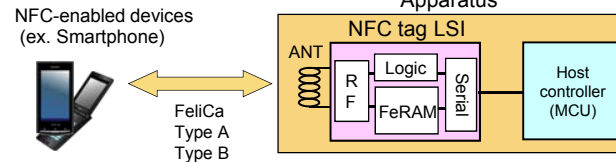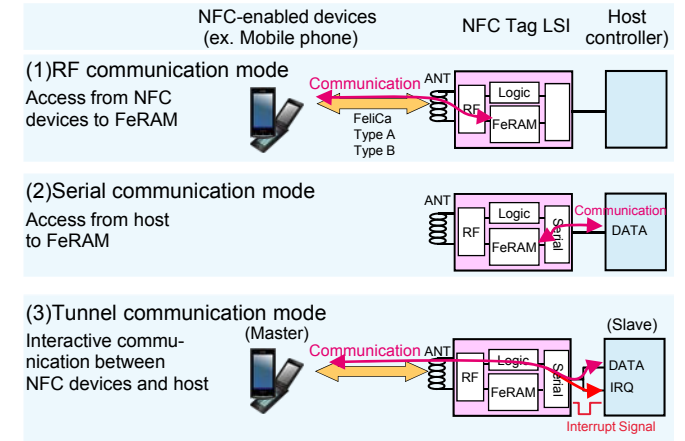・Panasonic NFC Tag LSIs achieve high reliability data communication, because the LSIs use FRAM (Ferroelectric RAM) which has the features of high-speed writing, low-power consumption and high endurance.

・RF interface compliant with JISX6319-4 (FeliCa) , ISO/IEC14443 Type B and ISO/IEC14443 Type A of the 13.56-MHz contactless IC. It enables stable communication with NFC terminals of the world.

・The NFC Tags can be mounted anywhere, because battery-off mode (powered by field) enables battery-less RF communication. You can check the information in NFC Tag of the Equipment also in the case of failure.

・Three communication modes of RF, serial, and tunnel mode are available. Tunnel mode, one of the features of our NFC Tag LSIs, allows communications between reader/writer and host MCU via the LSIs. It enables transfer large data exceeds FeRAM capacity to MCUs directly.

NFC-enabled devices (ex. Smartphone) — FeliCa Type A Type B — Apparatus: NFC tag LSI (ANT, RF, Logic, FeRAM, Serial) — Host controller (MCU)

●3 mode of Basic Functions

NFC-enabled devices (ex. Mobile phone) | NFC Tag LSI | Host controller)

(1)RF communication mode — Access from NFC devices to FeRAM — Communication ANT (RF, Logic, FeRAM; FeliCa Type A Type B)

(2)Serial communication mode — Access from host to FeRAM — ANT (RF, Logic, FeRAM, Serial) Communication DATA

(3)Tunnel communication mode — Interactive communication between NFC devices and host — (Master) Communication ANT (RF, Logic, FeRAM, Serial) (Slave) DATA IRQ / Interrupt Signal

●Handover Function

Only by touching with mobile phone, establish pairing with apparatus having high-speed radio connection like as Wi-Fi, Bluetooth

1. Require high-speed radio connection → NFC tag LSI (ANT, RF, Logic, FeRAM, Serial)
2. Send ID/Key-code for connection
3. Establish high-speed radio connection

●Specification Overview

Type	ICs						Modules			
Parts No	MN63Y1210A	MN63Y1208	MN63Y1212	MN63Y1213	MN63Y1214	MN63Y1217	MN63Y3208N1	MN63Y3212N1	MN63Y3212 *1	MN63Y3213N1
Operation Voltage	1.8V to 3.6V or 4.5V to 5.5V	1.7V to 3.6V	–	1.7V to 3.6V			3.3V ± 5%	∗ON using IRQ, connect VSS	–	1.7V to 3.6V *1
Operating temperature	-20 to 85°C						TBD			
Storage Temperature	-40 to 85°C						TBD			
FeRAM (Non-volatile Memory)	Total Storage : 4K bit, User Data Area (432 Byte)				Total Storage : 8K bit, User Data Area (960 Byte)		Total Storage : 4K bit, User Data Area (432 Byte)			
	Endurance : 100 000 000 times, Data Retention : 10 years									
RF Interface (Automatic protocol detection) — Type-A *2					✔	✔				
Type-B *3	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Type-F *4	✔	✔	✔	✔	✔		✔	✔	✔	✔
NFC Forum Tag	Type3	Type4B, Type3			Type4A,Type4B, Type3	Type4A,Type4B	Type4B, Type3			
Power by field	Available									
Security Function	N/A	AES128 Encryption			Password Protection		AES128 Encryption			
Serial Interface	UART (to 38.4kbps), Synchronized serial (to 1Mbps)	I^{2}C (to 100kbps)	N/A (only IRQ)	I^{2}C (to 100kbps)	I^{2}C (to 400kbps)		I^{2}C (to 100kbps)	N/A (only IRQ)	N/A	I^{2}C (to 100kbps)
Power consumption on RF Communication	to 1mW		–	to 1mW			TBD	-		TBD
Operating Current	to 500uA		–	to 500uA			TBD	-		TBD
Package Type	SSOP 16pin 5.0×6.4×1.3mm	QFN 16pin 3.2×4.2×0.77mm	SON (8pin) 2×2×0.45mm				-	-	-	-
Module Size	–	–	–	–	–	–	40 × 30 mm	11.5 × 25 mm	Φ 30mm	9 × 30 mm

*1: The specifications are subject to change without notice since it is under development. *2: ISO/IEC14443 TypeA ［106kbps］
*3: ISO/IEC14443 TypeB ［106kbps, 212kbps, 424kbps（MN63Y1214/1217）］ *4: JIS X 6319-4 FeliCa ［212kbps, 424kbps］