

Audio Data Transceiver RF Module's Manual

VWM-1G01A

Audio Data Transceiver RF Module's Manual

1. Product Introduction

The Wireless LAN is a transceiver, which installed in the speaker system receiving and transmitting the Audio sound, can catch the Amp sound through the wireless.

This product composed of the total 40 pins, can transmit and receive the data in the air through one unit module with an antenna.

The antenna has the 2dBi(peak) gain. And also, the installed oscillator frequency is operated as 44MHz and 3.3V and is able to get the data maximizing 11Mbps.

The channel use the 1~13CH and also automatically scan the best optimized channel without noise.

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2. Using Method.

This module is the developed digital transmission system to catch the audio sound through the wireless method from the transmitting and the receiving device, which transfer the inputted analog signal from the Amp to the digital signal.

Link +3.3V to the 37/39 pin# of the module and the GND to the 36/38/40 pin#, thus, supply the power.

When inputting the initial power, this Channel will be shifted to the best optimized condition to receive and transmit the high qualified sound between the transmitting module and receiving module.

This module can add the amp part and the other sound circuits in the receiving speaker system.

※ Remark

Please refer the pin description of the module, the block diagram, the interface and the

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mechanical dimension.

Attachment 1. Pin Configuration

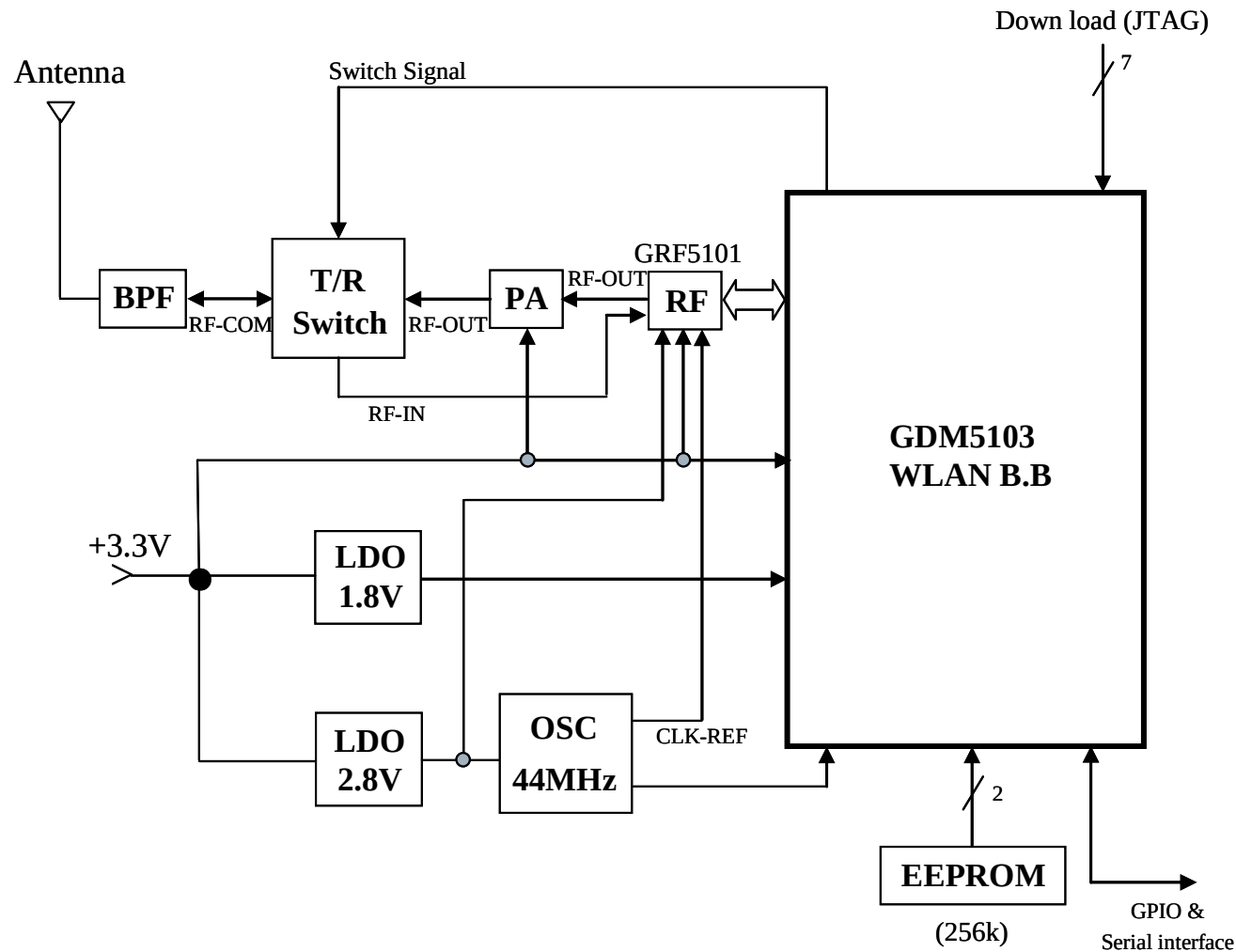
NO	PIN NAME	DESCRIPTION
1	EEPROM_ENB	EEPROM enable control input
2	EXT_UXTALIN	USB clock crystal input (48MHz)
3	DGND	Digital Ground
4	N.C	NO CONNECTION
5	GPA8	GPIO
6	USBDPLUS	USB D+
7	USBDMINUS	USB D-
8	SDA	Serial Data
9	SCL	Serial Clock Input
10	DGND	Digital Ground
11	GPB11	Host interface address/data multiplexed GPIO
12	GPB10	Host interface address/data multiplexed GPIO
13	GPB9	Host interface address/data multiplexed GPIO
14	GPB8	Host interface address/data multiplexed GPIO
15	GPB7	Host interface address/data multiplexed GPIO
16	GPB6	Host interface address/data multiplexed GPIO
17	GPB5	Host interface address/data multiplexed GPIO
18	GPB4	Host interface address/data multiplexed GPIO
19	GPB3	Host interface address/data multiplexed GPIO
20	GPB2	Host interface address/data multiplexed GPIO
21	GPB1	Host interface address/data multiplexed GPIO
22	GPB0	Host interface address/data multiplexed GPIO
23	GPA3	MCLK
24	GPA2	SDATA
25	GPA1	LRCLK
26	GPA0	SCLK
27	DGND	Digital Ground
28	GPA7	SPDIF OUT
29	GPA6	SPDIF IN
30	TDO	JTAG serial output data
31	TCK	JTAG clock signal, Active low
32	TMS	JTAG test mode signal, Active low
33	JTAG_RST	JTAG reset signal, Active low
34	TDI	JTAG serial input data, Active low
35	RESET	Reset signal for internal registers, Active low
36	AGND	Analog Ground
37	VCC33	Supply for digital peripheral blocks (3.3V)
38	AGND	Analog Ground
39	VCC33	Supply for digital peripheral blocks (3.3V)
40	AGND	Analog Ground

* N.C : NO CONNECTION

* GPIO : GENERAL PURPOSE IN/OUT PORT

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Attachment 2. Block Diagram



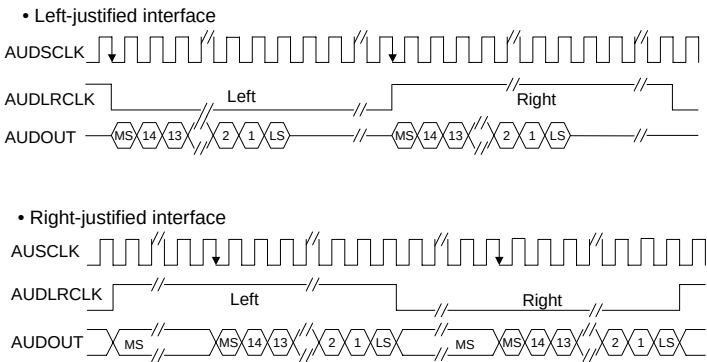
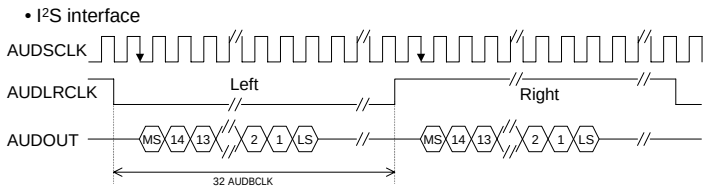
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Attachment 3-1. External Audio ADC/DAC Interface

Audio ADC/DAC interface provides a high quality multi resolution(16/18/20/24-bit) digital audio connection to external audio devices. ADI interface supports I2S audio format as well as optional left-justified or right-justified audio format.

ADI interface produces one 64-bit frame at the audio sample frequency using a bit clock and frame sync signal. ADI interface supports 32KHz, 44.1KHz or 48KHz audio sampling frequency, of which 256 or 384 times main clock can be generated from on-chip audio clock oscillator or external clock signal by interface mode programming.

Pin Name	I/O	Type	Description
AUD_MCLK	programmable	clock	audio oversampled clock This clock can be programmed 256 or 384 times AUDLRCLK
AUD_SCLK	programmable	clock	audio serial data bit clock This clock is fixed at 64 times AUDLRCLK
AUD_LRCLK	programmable	clock	audio frame synchronization clock This clock can be programmed 32KHz, 44.1KHz or 48KHz
AUD_DATA	programmable	serial data	audio serial data used for sending playback data to DAC and receiving data from ADC 16-bit data format with I2C, left-justified or right-justified interface



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Attachment 3-2. JTAG Interface

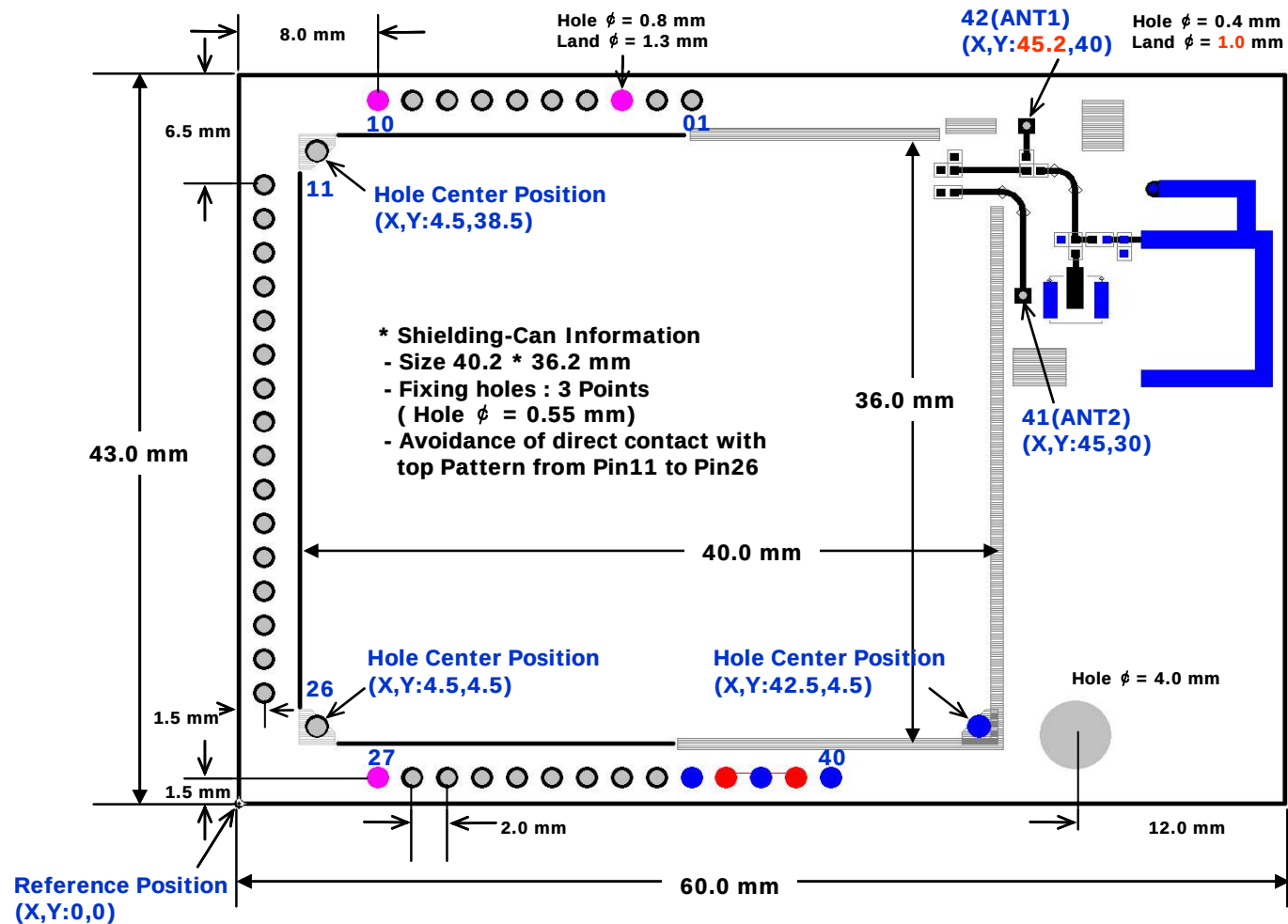
This module supports IEEE1149.1 standard specification compliant interface. This interface supports basic test commands such as EXTEST, SMAPLE, BYPASS, and IDCODE. Beside of this, JTAG interface can be used as communication channel with GCT enhanced on-chip hardware debugger controller of GDM5103 within the module. Using on-chip debugger controller, off-chip debug handler or external host can access internal peripheral device registers, internal memory and executes real-timing hardware debugging and monitoring of on-chip embedded RISC processor. Also, external host can communicate on-chip RISC processor through JTAG with on-chip hardware managed channel buffer. There are sixteen debug registers specified and these will be used in GCT own development chip manager software. The length of instruction register in JTAG interface is 6bit and that of debug data register is 32bit. Table shows the summary of TAP instructions supported in GDM5103.

Instruction	Opcode	Description
EXTEST	0x000000	EXTEST initiates testing of external circuitry, typically board-level interconnects and off chip circuitry. EXTEST connects the Boundary-Scan register between TDI and TDO in the SHIFT_DR state only. When EXTEST is selected, all output signal pin values are driven by values shifted into the Boundary-Scan register and may change only on the falling-edge of TCK in the Update_DR state. Also, when EXTEST is selected, all system input pin states must be loaded into the Boundary-Scan register on the rising-edge of TCK in the Capture_DR state. Values shifted into input latches in the Boundary-Scan register are never used by the processor's internal logic.
SAMPLE	0x000001	SAMPLE / PRELOAD performs two functions: • When the TAP controller is in the Capture-DR state, the SAMPLE instruction occurs on the rising edge of TCK and provides a snapshot of the component's normal operation without interfering with that normal operation. The instruction causes Boundary-Scan register cells associated with outputs to SAMPLE the value being driven by or to the processor. • When the TAP controller is in the Update-DR state, the PRELOAD instruction occurs on the falling edge of TCK. This instruction causes the transfer of data held in the Boundary-Scan cells to the slave register cells. Typically the slave latched data is then applied to the system outputs by means of the EXTEST instruction.

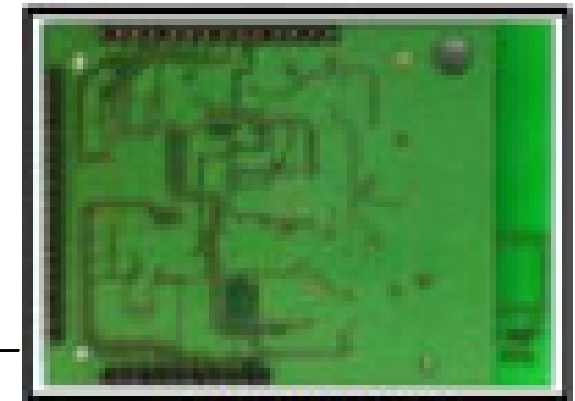
IDCODE	0x011111	IDCODE is used in conjunction with the device identification register. It connects the identification register between TDI and TDO in the Shift_DR state. When selected, IDCODE parallel-loads the hard-wired identification code (32 bits) on TDO into the identification register on the rising edge of TCK in the Capture_DR state. NOTE: The device identification register is not altered by data being shifted in on TDI.
DEBUG (Private Instruction)	0x10SSSS	DEBUG instruction select the DEBUGReg with address indicator SSSS. • When the TAP controller is in the Capture-DR state, the DEBUG instruction occurs on the rising edge of TCK and executes a snapshot of DEBUG register addressed SSSS into DEBUGReg. • When the TAP controller is in the Update-DR state, the DEBUG instruction occurs on the falling edge of TCK. This instruction causes the transfer of data held in DEBUGReg to DEBUG register addressed SSSS.
BYPASS	0x111111	BYPASS instruction selects the Bypass register between TDI and TDO pins while in SHIFT_DR state, effectively bypassing the processor's test logic. 0 is captured in the CAPTURE_DR state. While this instruction is in effect, all other test data registers have no effect on the operation of the system. Test data registers with both test and system functionality perform their system functions when this instruction is selected

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Attachment 4. Mechanical Dimension



TOP VIEW



BOTTOM VIEW

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3. Install method

Contents

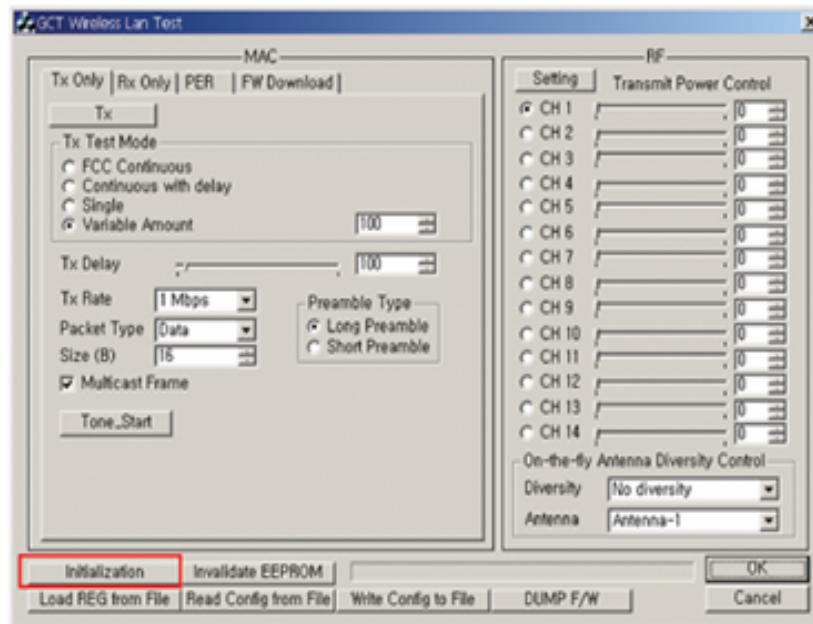
- Environment Set-up
- Initialization
- TX Test1: Modulated signal generation
- TX Test2: Non-modulated signal generation
- RX Test

Environment Set-up

1. Plug the power connector into Jig board including the module
2. Connect PC (or Notebook) with Jig board using USB cable
3. Power on Jig board
4. Make sure that PC (or NB) recognized the Jig board as a USB device
5. Initiate RF test utility on PC (or NB)
6. Start RF test

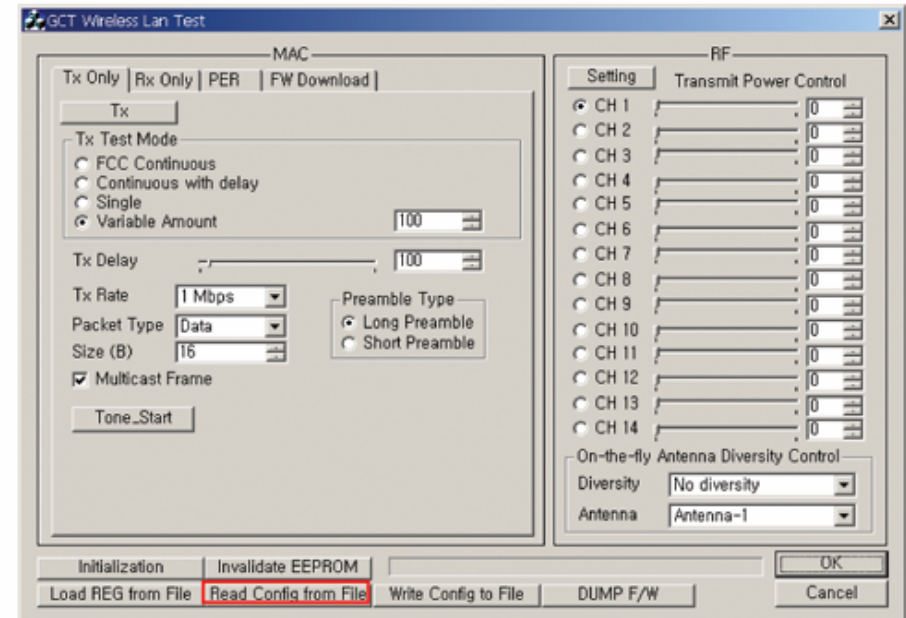
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Initialization (1)



Press the "Initialization" button

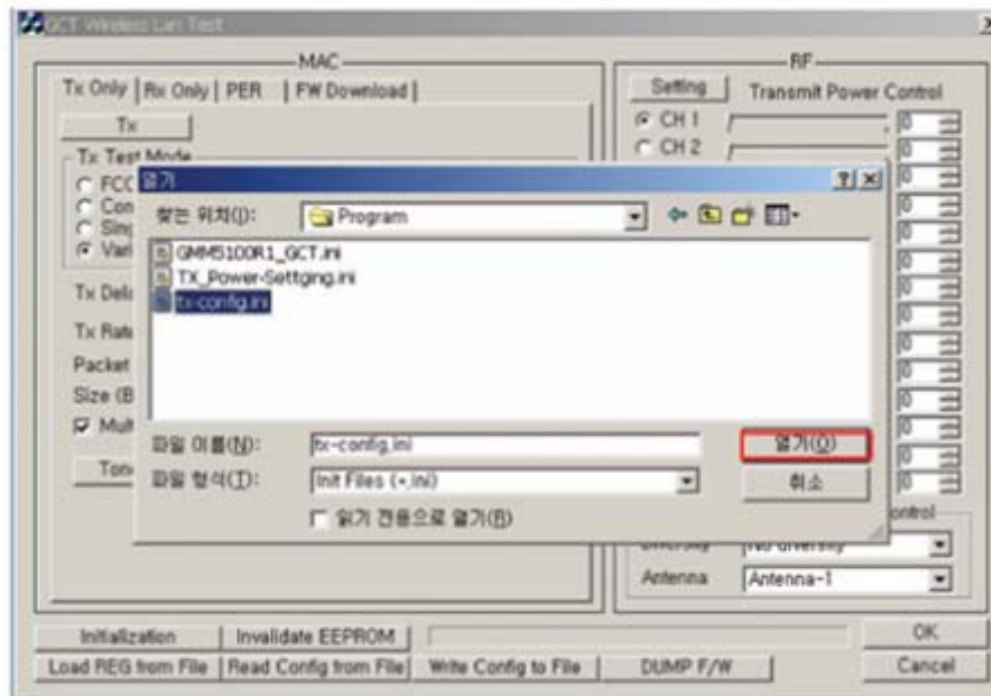
Initialization (2)



Press the "Read Config from File" button
in order to recover the basic set-up of RF test utility

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Initialization (3)



Select "tx-config.ini" and then click "Open"

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TX Test1 (1)

Select "Tx Only" tab

The screenshot shows the 'GCT Wireless Lan Test' window with the 'Tx Only' tab selected. The 'Tx Test Mode' section has 'Continuous with delay' selected. The 'Tx Delay' is set to 1. The 'Tx Rate' is 11 Mbps, 'Packet Type' is Data, and 'Size (B)' is 2048. 'Multicast Frame' is checked. The 'Preamble Type' is Long Preamble. The 'On-the-fly Antenna Diversity Control' shows 'No diversity' and 'Antenna-1'. The 'RF' section shows 'Transmit Power Control' with a list of channels (CH 1 to CH 14) and their power levels (0 to 12 dBm). The 'Setting' tab is selected, and the 'Transmit Power Control' section is active.

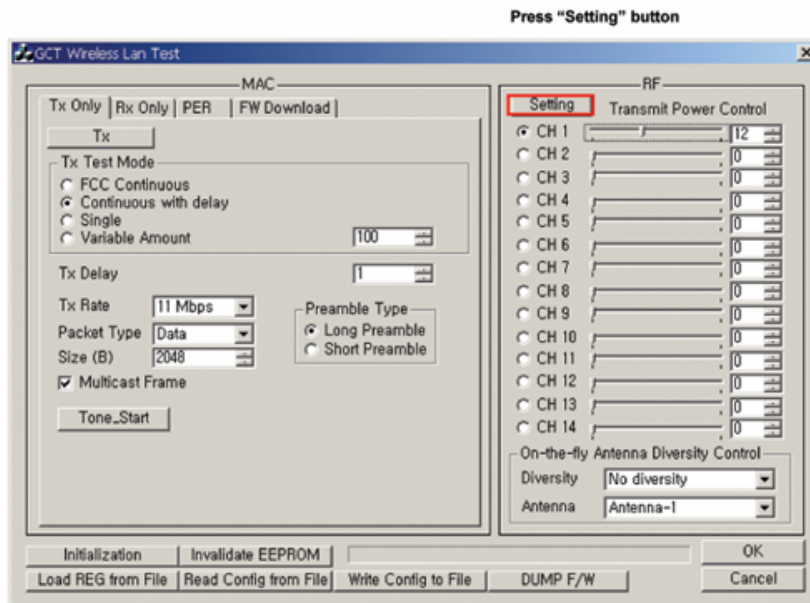
TX Test1 (2)

Select channel and Transmit Power

The screenshot shows the 'GCT Wireless Lan Test' window with the 'Tx Only' tab selected. The 'Tx Test Mode' section has 'Continuous with delay' selected. The 'Tx Delay' is set to 1. The 'Tx Rate' is 11 Mbps, 'Packet Type' is Data, and 'Size (B)' is 2048. 'Multicast Frame' is checked. The 'Preamble Type' is Long Preamble. The 'On-the-fly Antenna Diversity Control' shows 'No diversity' and 'Antenna-1'. The 'RF' section shows 'Transmit Power Control' with a list of channels (CH 1 to CH 14) and their power levels (0 to 12 dBm). The 'Setting' tab is selected, and the 'Transmit Power Control' section is active. The 'CH 1' channel is highlighted with a red box, and the power level is set to 12 dBm.

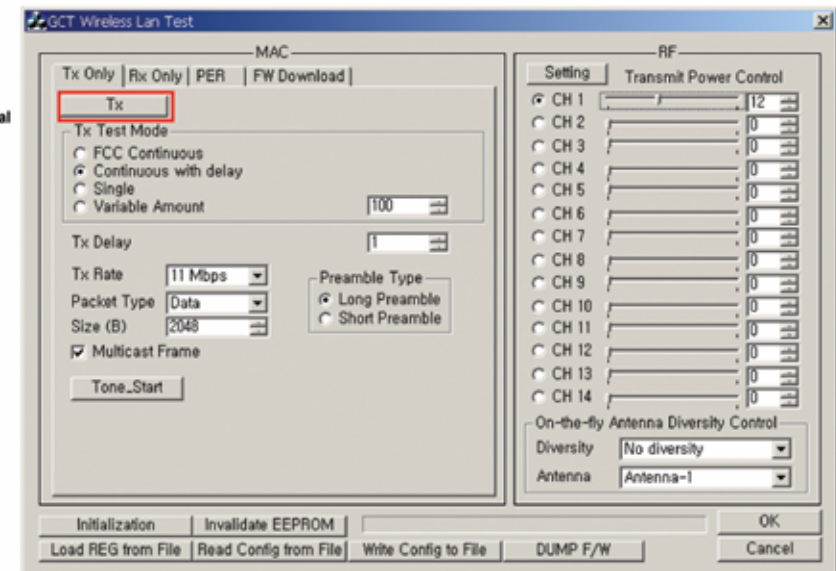
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TX Test1 (3)



Press "Tx" button
in order to generate the modulated signal

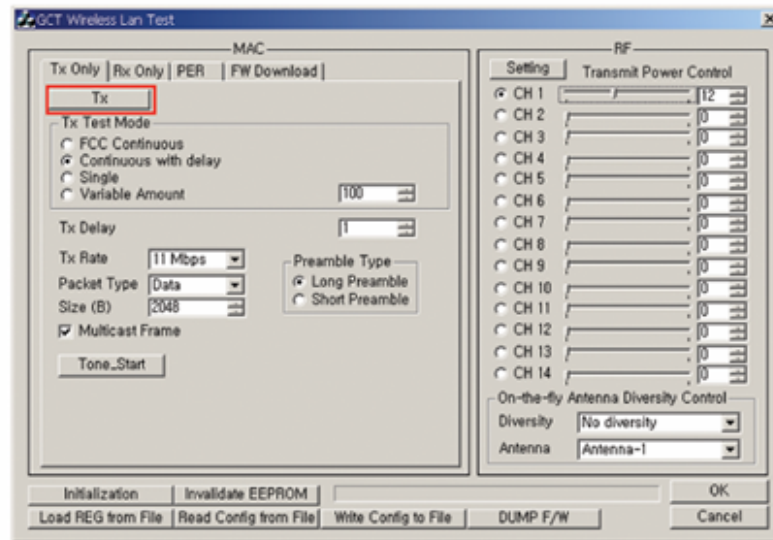
TX Test1 (4)



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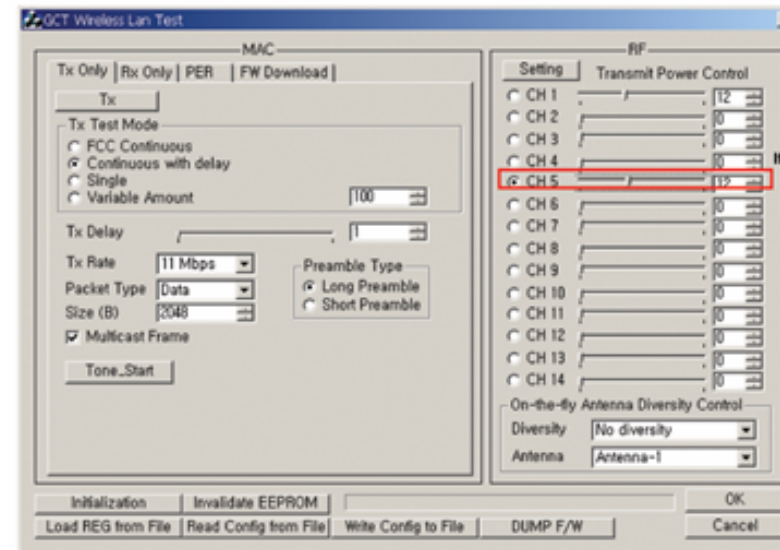
TX Test1 (5)

Press "Stop" button
in order to stop TX



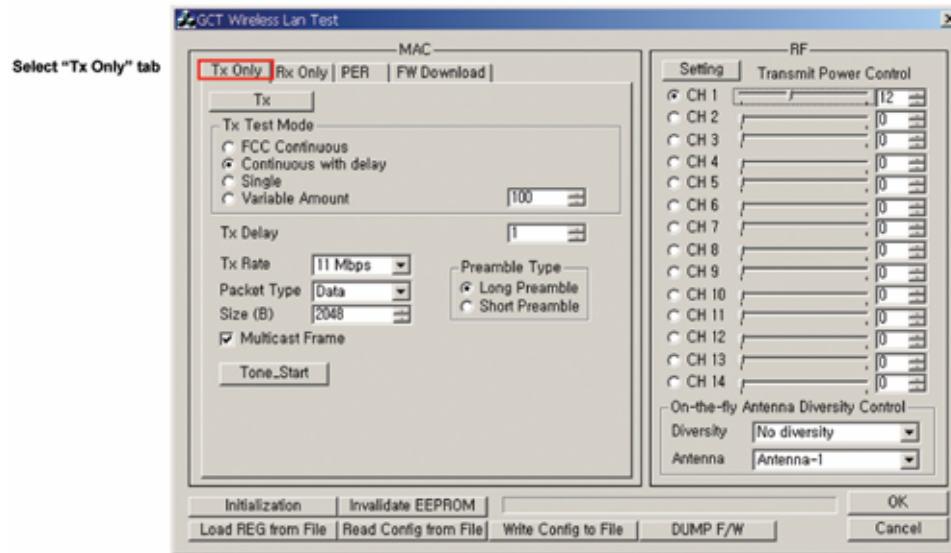
TX Test1 (6)

If user wants to change channel and test TX,
select the other channel and power
and then repeat the same procedure

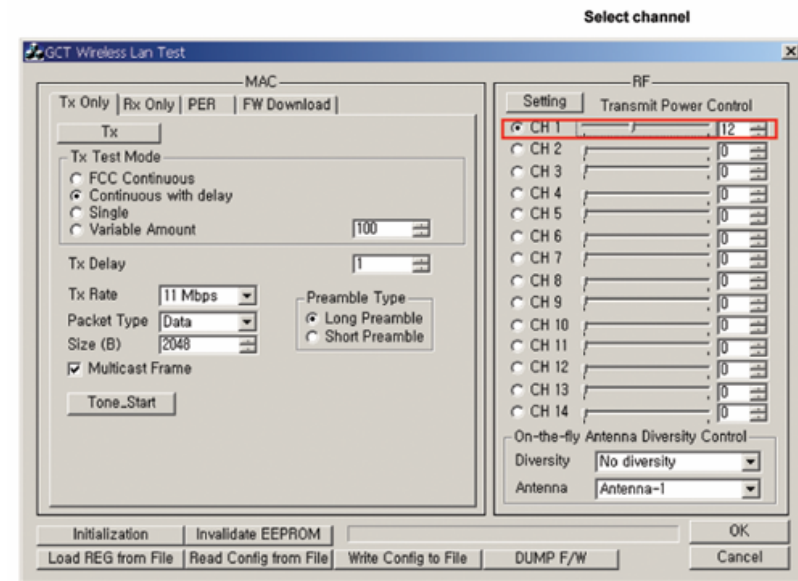


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TX Test2 (1)

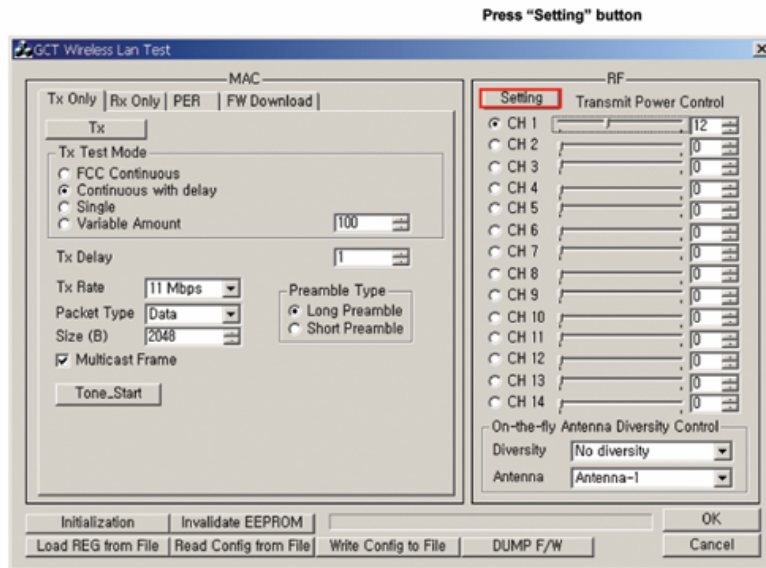


TX Test2 (2)

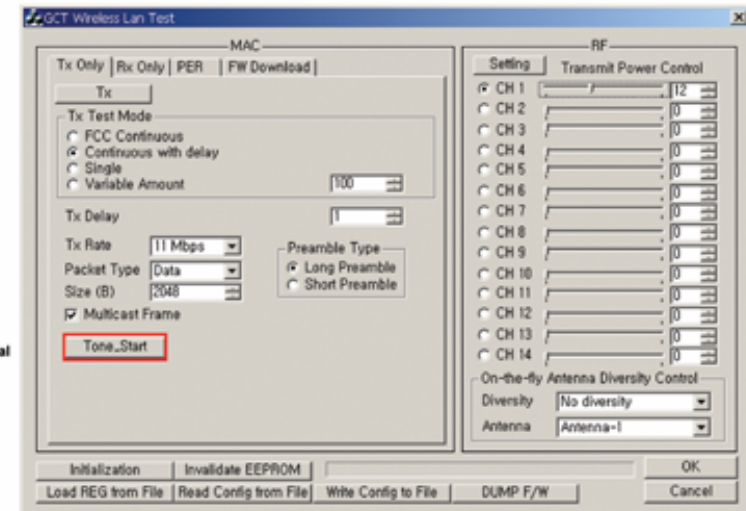


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TX Test2 (3)

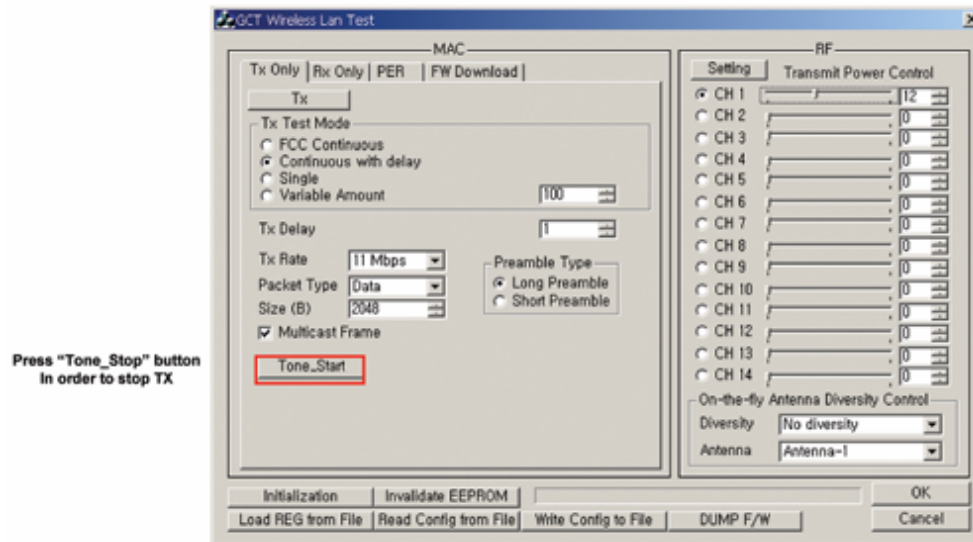


TX Test2 (4)

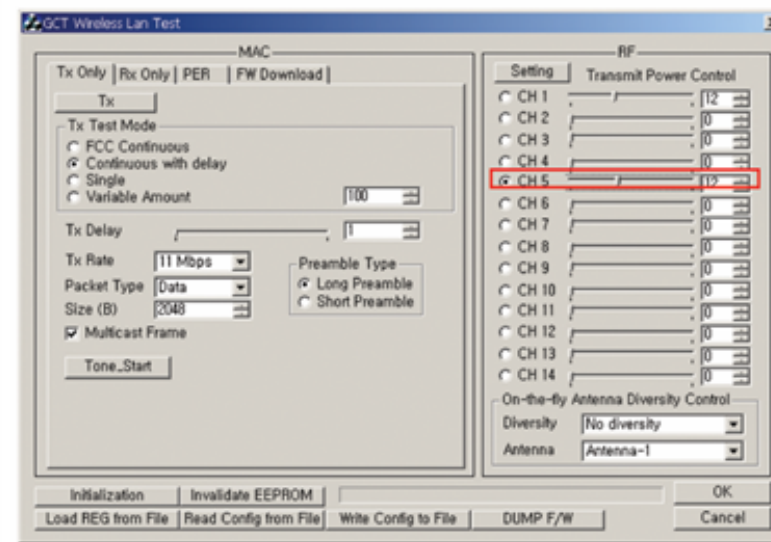


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TX Test2 (5)



TX Test2 (6)



If user wants to change channel,
select the other channel
and then repeat the same procedure

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RX Test (1)

Select "Rx Only" tab

The screenshot shows the 'GCT Wireless Lan Test' window with the 'Rx Only' tab selected. The 'MAC' section includes a 'Reset Stats' button and radio buttons for 'Update Receive Statistics' and 'Stop Updating Receive Statistics'. A table lists various MAC frame types and their values, all currently at 0. The 'RF' section includes a 'Setting' tab and a 'Transmit Power Control' section with a list of channels (CH 1 to CH 14) and their power levels, all set to 12. Below this is an 'On-the-fly Antenna Diversity Control' section with 'Diversity' set to 'No diversity' and 'Antenna' set to 'Antenna-1'. At the bottom are buttons for 'Initialization', 'Invalidate EEPROM', 'Load REG from File', 'Read Config from File', 'Write Config to File', 'DUMP F/W', 'OK', and 'Cancel'.

Name	Value
Total	0
Good	0
Bad FCS	0
Bad PLCP	0
Association Request	0
Association Response	0
Re-association Request	0
Re-association Response	0
Probe Request	0
Probe Response	0
Beacon	0
ATIM	0
Disassociation	0
Authentication	0
De-authentication	0
PS-POLL	0
RTS	0
CTS	0
ACK	0
CF-END	0
CF-END + CF-ACK	0

Setting	Transmit Power Control
CH 1	12
CH 2	0
CH 3	0
CH 4	0
CH 5	0
CH 6	0
CH 7	0
CH 8	0
CH 9	0
CH 10	0
CH 11	0
CH 12	0
CH 13	0
CH 14	0

On-the-fly Antenna Diversity Control
Diversity: No diversity
Antenna: Antenna-1

RX Test (2)

Select channel

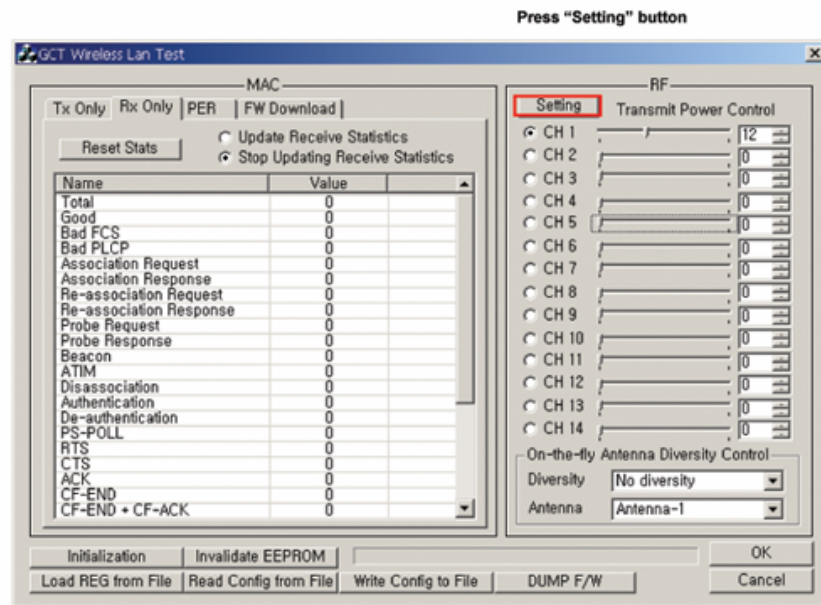
The screenshot shows the 'GCT Wireless Lan Test' window with the 'Rx Only' tab selected. The 'MAC' section is identical to the first screenshot. The 'RF' section includes a 'Setting' tab and a 'Transmit Power Control' section. In this screenshot, 'CH 1' is selected in the 'Setting' list, and its power level is set to 12. The other channels (CH 2 to CH 14) are set to 0. The 'On-the-fly Antenna Diversity Control' section is also identical to the first screenshot. At the bottom are buttons for 'Initialization', 'Invalidate EEPROM', 'Load REG from File', 'Read Config from File', 'Write Config to File', 'DUMP F/W', 'OK', and 'Cancel'.

Setting	Transmit Power Control
CH 1	12
CH 2	0
CH 3	0
CH 4	0
CH 5	0
CH 6	0
CH 7	0
CH 8	0
CH 9	0
CH 10	0
CH 11	0
CH 12	0
CH 13	0
CH 14	0

On-the-fly Antenna Diversity Control
Diversity: No diversity
Antenna: Antenna-1

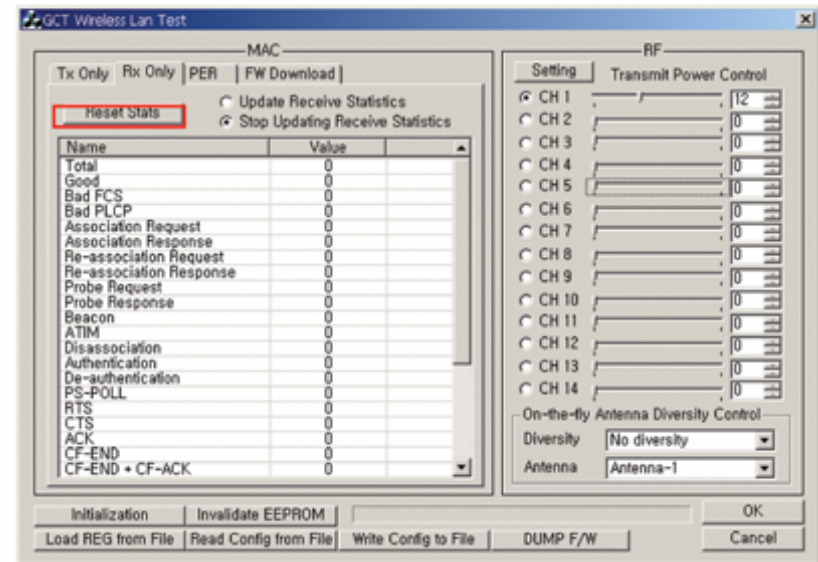
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RX Test (3)



RX Test (4)

Press "Reset Stats"



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RX Test (5)

Select "Update Receive Statistics"
And then trigger TX source like
ESG signal generator.
You can see the statistics

GCT Wireless Lan Test

MAC: Tx Only | Rx Only | PER | FW Download |

Reset Stats ☒ Update Receive Statistics ☒ Stop Updating Receive Statistics

Name	Value
Total	0
Good	0
Bad FCS	0
Bad PLCP	0
Association Request	0
Association Response	0
Re-association Request	0
Re-association Response	0
Probe Request	0
Probe Response	0
Beacon	0
ATIM	0
Disassociation	0
Authentication	0
De-authentication	0
PS-POLL	0
RTS	0
CTS	0
ACK	0
CF-END	0
CF-END + CF-ACK	0

RF: Setting Transmit Power Control

CH 1: 12 CH 2: 0 CH 3: 0 CH 4: 0 CH 5: 0 CH 6: 0 CH 7: 0 CH 8: 0 CH 9: 0 CH 10: 0 CH 11: 0 CH 12: 0 CH 13: 0 CH 14: 0

On-the-fly Antenna Diversity Control

Diversity: No diversity Antenna: Antenna-1

Initialization Invalide EEPROM Load REG from File Read Config from File Write Config to File DUMP F/W OK Cancel

RX Test (6)

Select "Stop Updating Receive Statistics"
to stop updating.

GCT Wireless Lan Test

MAC: Tx Only | Rx Only | PER | FW Download |

Reset Stats ☒ Update Receive Statistics ☒ Stop Updating Receive Statistics

Name	Value
Total	0
Good	0
Bad FCS	0
Bad PLCP	0
Association Request	0
Association Response	0
Re-association Request	0
Re-association Response	0
Probe Request	0
Probe Response	0
Beacon	0
ATIM	0
Disassociation	0
Authentication	0
De-authentication	0
PS-POLL	0
RTS	0
CTS	0
ACK	0
CF-END	0
CF-END + CF-ACK	0

RF: Setting Transmit Power Control

CH 1: 12 CH 2: 0 CH 3: 0 CH 4: 0 CH 5: 0 CH 6: 0 CH 7: 0 CH 8: 0 CH 9: 0 CH 10: 0 CH 11: 0 CH 12: 0 CH 13: 0 CH 14: 0

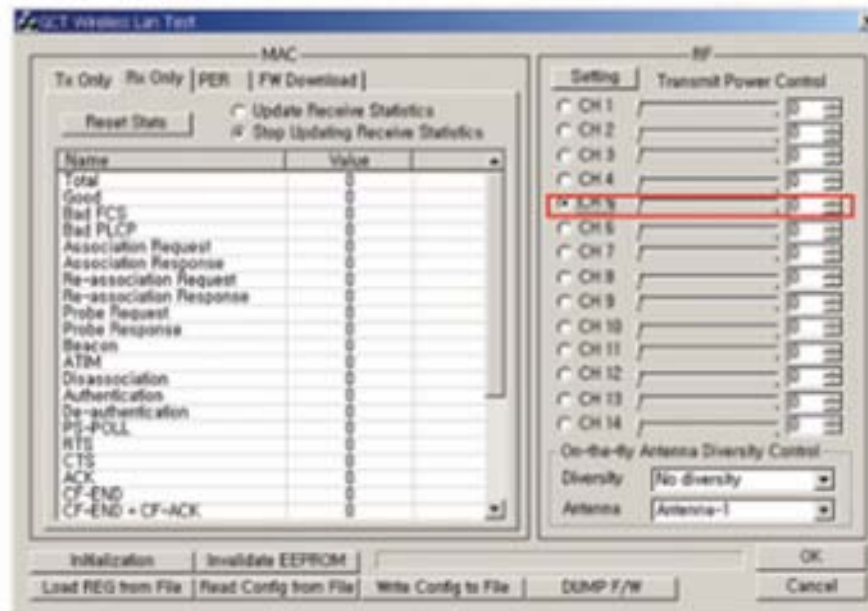
On-the-fly Antenna Diversity Control

Diversity: No diversity Antenna: Antenna-1

Initialization Invalide EEPROM Load REG from File Read Config from File Write Config to File DUMP F/W OK Cancel

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RX Test (7)



If user wants to change channel and test RX,
select the other channel
and then repeat the same procedure

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4. Product specification

Transmit frequency : 2400 ~ 2483.5 MHz

Antenna Power : 9.5dBm(W/Ant.Gain & Cable Loss)

Channel : 13 Ch

Supply voltage : DC +3.3V

Size : 43 x 10 x 60 (W x H x D)

Weight : 13 g

Operating temperature : 0 ~ +35 °C

Modulation system : DSSS (CCK, DQPSK, DBPSK)

Oscillation System : Synthesizer operation

Type of emission : G1D

Communication method : Semiduplex operation

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RF Exposure value at distance 20cm

MODE: CCK

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
1	2412	0.007	0.00229	1.0
6	2437	0.008	0.00261	1.0
11	2462	0.008	0.00261	1.0

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5. LABEL

<Size>

	RF MODULE LABEL RX	34X20mm 05.05.06		RF MODULE LABEL TX	34X20mm 05.05.06																						
	<table><tr><td>MODULE NO.: VWM-1 G01A</td><td rowspan="2"></td></tr><tr><td>INPUT : 3.3V </td></tr><tr><td colspan="2">MADE BY VISION TECHNICS Co., Ltd.</td></tr><tr><td colspan="2">FCC ID :</td></tr><tr><td colspan="2">IC: Complies with CANADIAN ICES-003 Class B</td></tr><tr><td>P/N : 3850V - RX03A</td><td>RX</td></tr></table>	MODULE NO.: VWM-1 G01A		INPUT : 3.3V 	MADE BY VISION TECHNICS Co., Ltd.		FCC ID :		IC: Complies with CANADIAN ICES-003 Class B		P/N : 3850V - RX03A	RX			<table><tr><td>MODULE NO.: VWM-1 G01A</td><td rowspan="2"></td></tr><tr><td>INPUT : 3.3V </td></tr><tr><td colspan="2">MADE BY VISION TECHNICS Co., Ltd.</td></tr><tr><td colspan="2">FCC ID :</td></tr><tr><td colspan="2">IC: Complies with CANADIAN ICES-003 Class B</td></tr><tr><td>P/N : 3850V - TX03A</td><td>TX</td></tr></table>	MODULE NO.: VWM-1 G01A		INPUT : 3.3V 	MADE BY VISION TECHNICS Co., Ltd.		FCC ID :		IC: Complies with CANADIAN ICES-003 Class B		P/N : 3850V - TX03A	TX	
MODULE NO.: VWM-1 G01A																											
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FCC ID :																											
IC: Complies with CANADIAN ICES-003 Class B																											
P/N : 3850V - TX03A	TX																										

6.Regulatory Information

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users for all installations, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna, and
- 3) The Module is approved using the FCC 'unlicensed modular transmitter approval' method. Therefore the module must only be used with the originally approved antennas.

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IMPORTANT NOTE: In the event that any of these conditions can not be met (for example certain configurations, co-location with another transmitter, or use of a different antenna), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Suggested End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ASDL modems, and similar equipment). The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: {INSERT FCC ID HERE}".

RF Exposure Statements That Must be Included in the Final Devices Users Manual

The users manual for end users must include the following information in a prominent location "IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

Additional Information That Must be Provided to OEM Integrators

The end user should NOT be provided any instructions on how to remove or install the modular TX device.

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CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment

WARNING

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.:

INFORMATION TO USER:

This equipment has been tested and found to comply with the limit of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation; if this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient / Relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help