

EMC Test Report

Project Number: 4062586

Report Number: 4062586EMC01

Revision Level: 1

Client: Murata Manufacturing Co., Ltd.

Equipment Under Test: WLAN + Bluetooth 4.0 Wireless Transceiver Module

Model Number: LBEE5ZZ1CK-982

FCC ID: VPYLB1CK982

ISED ID: 772C-LB1CK982


Applicable Standards: FCC Part 15 Subpart C, § 15.407

RSS-247, Issue 1

Report issued on: 08 December 2016

Test Result: Compliant

Tested by:



Jeremy O. Pickens, Senior EMC Engineer

Reviewed by:



David Schramm, EMC/RF/SAR/HAC Manager

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or Testing done by SGS International Electrical Approvals in connection with distribution or use of the product described in this report must be approved by SGS international Electrical Approvals in writing.

TABLE OF CONTENTS

1	SUMMARY OF TEST RESULTS.....	3
1.1	MODIFICATIONS REQUIRED TO COMPLIANCE	3
2	GENERAL INFORMATION.....	4
2.1	CLIENT INFORMATION	4
2.2	TEST LABORATORY	4
2.3	GENERAL INFORMATION OF EUT	4
2.4	DEVICE DESCRIPTION	4
2.5	EUT CONNECTION BLOCK DIAGRAM	6
2.6	SYSTEM CONFIGURATIONS	6
3	DFS REQUIREMENTS.....	7
3.1	TEST RESULT.....	7
3.2	TEST METHOD.....	7
3.3	DFS REQUIREMENTS / LIMITS.....	7
3.4	TEST SITE	7
3.5	TEST EQUIPMENT	8
3.6	TEST DATA.....	9
3.7	RADAR PULSE SAMPLE PLOTS.....	10
4	REVISION HISTORY	12

1 Summary of Test Results

Basic Standards	Test Result
FCC Part 15.407 / RSS-247 Non Occupancy Period	Compliant
FCC Part 15.407 / RSS-247 Channel Move Time	Compliant
FCC Part 15.407 / RSS-247 Channel Closing Transmission Time	Compliant

1.1 *Modifications Required to Compliance*

None

2 General Information

2.1 Client Information

Name: Murata Manufacturing Co., Ltd
Address: 10-1, Higashikotari 1-Chome
City, State, Zip, Country: Nagaokakyo-Shi, Kyoto, Japan

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

2.3 General Information of EUT

Equipment Under Test: WLAN + Bluetooth 4.0 Wireless Transceiver Module
Model Number: LBEE5ZZ1CK-982
Serial Number: Not Labeled

Rated Voltage: 5Vdc

Frequency Range: BT: 2402 – 2480 MHz,
802.11b/g/n: 2412 – 2462 MHz,
802.11a/n/ac: 5180 – 5240 MHz
5260 – 5320 MHz(DFS Band)
5500 – 5720 MHz(DFS Band)
5745 – 5825 MHz

Sample Received Date: November 11, 2016
Dates of testing: December 02, 2016

2.4 Device Description

Operating mode

The device has no radar detection capabilities and no ad-hoc capabilities in the 5GHz DFS bands.

Master device identification

The DFS compliant master device used for testing was a Cisco Dual Band Access Point Model AIR-SAP2602E-A-K9; SN FGL1648Z5HP; FCC ID: LDK102080; IC: 2461B-102080.

Channel loading messages or sequences

Channel loading was achieved using iPerf software.

Transmit Power Control

Since the device does not exceed 27dBm EIRP, TPC is not required.

User access to detected radar waveforms

The device does not utilize radar detection, this requirement is not applicable

Time required for master or client device to complete its power on cycle

The master device took 1 minute 11 seconds to complete its power on cycle.

The client device does not have radar detection. Its power on time is not applicable.

System Architecture

The EUT utilizes IP based system architecture

Uniform Channel Spreading

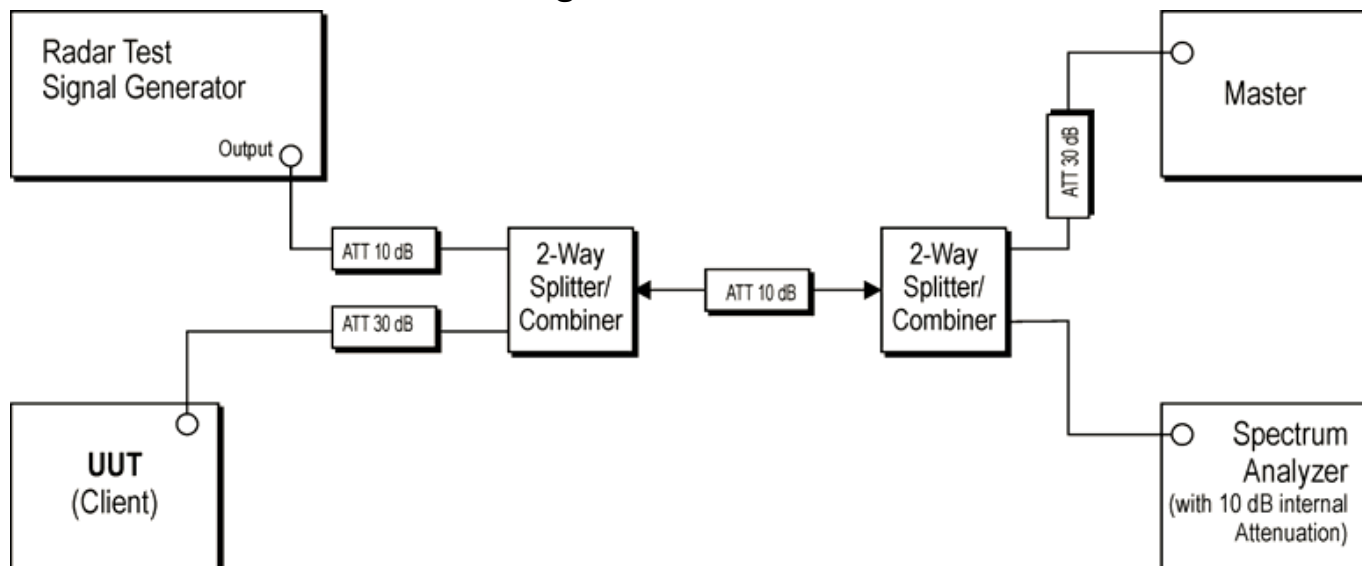
Not applicable for non radar detecting devices

List all antennas and their corresponding gains

The UUT employs a 0dBi trace antenna.

The calibrated conducted DFS detection threshold level was set at -63 dBm at the antenna port of the Master device. This satisfies the DFS detection threshold requirement +1 dB.

2.5 EUT Connection Block Diagram



2.6 System Configurations

Device reference	Manufacturer	Description	Model Number	Serial Number
Master	Cisco	Dual Band Access Point	AIR-SAP2602E-A-K9	FGL1648Z5HP
UUT	Murata Manufacturing Co., Ltd	WLAN + Bluetooth 4.0 Wireless Transceiver Module	LBEE5ZZ1CK-982	Not Labeled
Radar Test Signal Generator	Rohde & Schwarz	Vector Signal Generator	SMBV100A	261506

3 DFS Requirements

3.1 Test Result

Test Description	Basic Standards	Test Result
Channel Shutdown/Closing Transmission/Non-occupancy	FCC Part 15.407 (h)(2) RSS 247, S6.3	Compliant

3.2 Test Method

DFS Testing was performed using the conducted test methods defined in KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02. The device was a client only device without radar detection capability. The Rohde & Schwarz TS8997 test system in conjunction with WMS32 software was used for automation of the testing.

3.3 DFS requirements / Limits

Requirement	Limit
Channel Move Time	10 sec
Channel Closing Transmission Time	200 ms + an aggregate 60 ms over the following 10 seconds
Non-Occupancy Period	30 Minutes

3.4 Test Site

EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 21.5 °C
Relative Humidity: 32.6 %
Atmospheric Pressure: 98.5 kPa

3.5 Test Equipment

Test Start Date: 2-Dec-2016

Test End Date: 8-Dec-2016

Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL GENERATOR	SMB 100A	ROHDE & SCHWARZ	B085760	29-Jun-2017
VECTOR SIGNAL GENERATOR	SMBV100A	ROHDE & SCHWARZ	15002	16-Sep-2017
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017
ATTENUATOR, 10DB	10DB	ROHDE & SCHWARZ	B095591	27-Jul-2017
RF CABLE	141	HUBER & SUHNER	B095585	26-Jul-2017
ATTENUATOR, STEP 0-110DB	8494B	HEWLETT PACKARD	B094945	28-Jul-2017
OPEN SWITCH AND CONTROL PLATFORM	OSP 120	ROHDE & SCHWARZ	S/N: 101182	CNR
POWER SPLITTER	ZFRSC-123-S+	MINI-CIRCUITS	B101742	29-Jul-2017
POWER SPLITTER	ZFRSC-123-S+	MINI-CIRCUITS	B101740	28-Jul-2017

Note: The equipment calibration period is 1 year except for the FSV which is on a 2-year cycle.
FSV Signal Analyzer and Signal Generator were used to validate the OSP prior to testing.

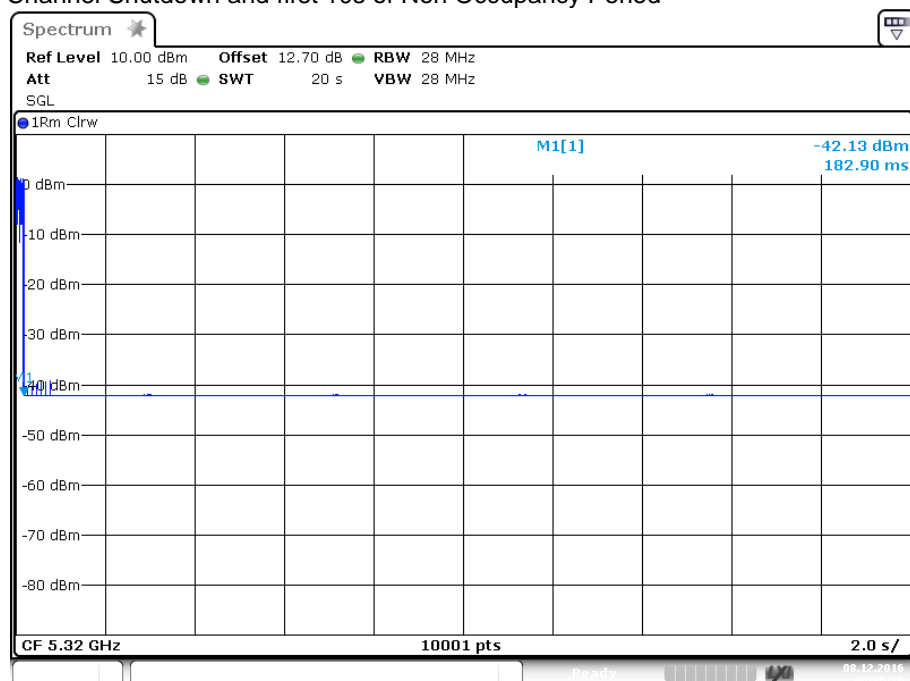
3.6 Test Data

DFS Channel Shutdown and Non-Occupancy period

DUT Frequency (MHz)	CCTT (s)	Limit CCTT (s)	Non Occupancy Time (s)	Limit Non Occupancy Time (s)	Result	Comment
5320.000000	0.183	0.260	1860.062	1800.000	PASS	

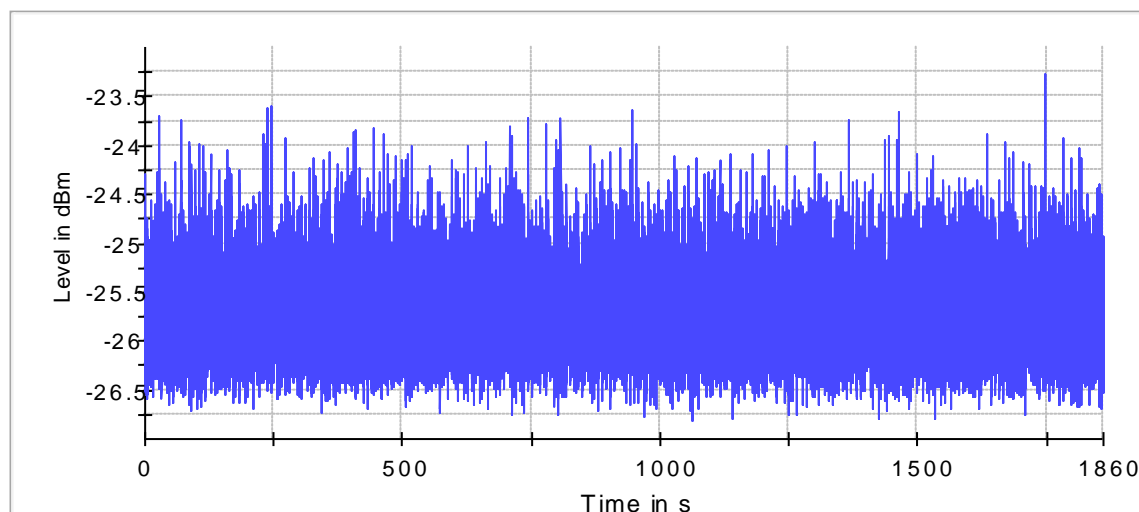
5320 MHz

Channel Shutdown and first 10s of Non Occupancy Period



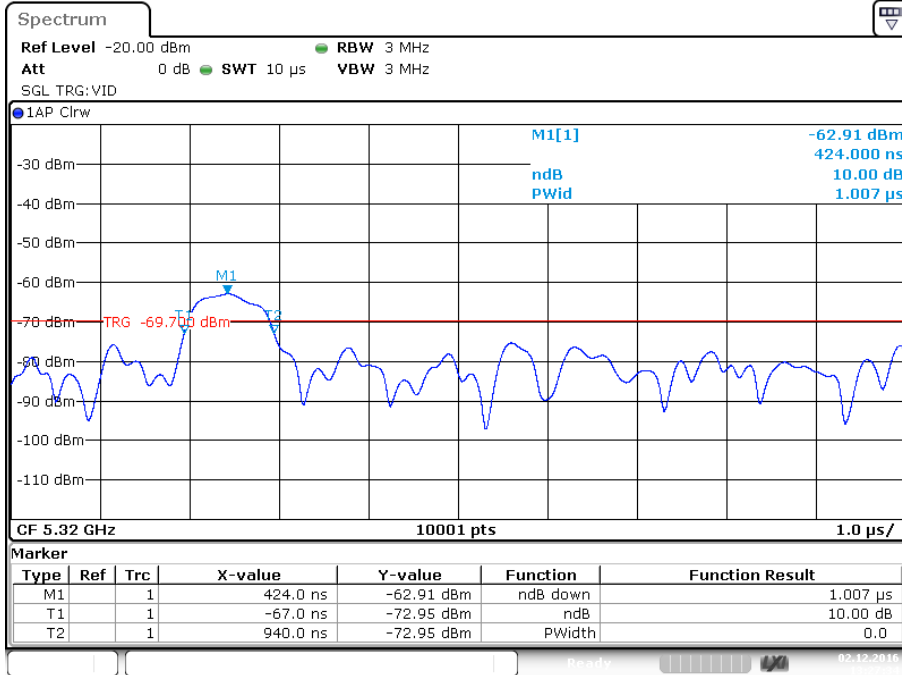
Date: 8.DEC.2016 06:36:36

Non Occupancy Period



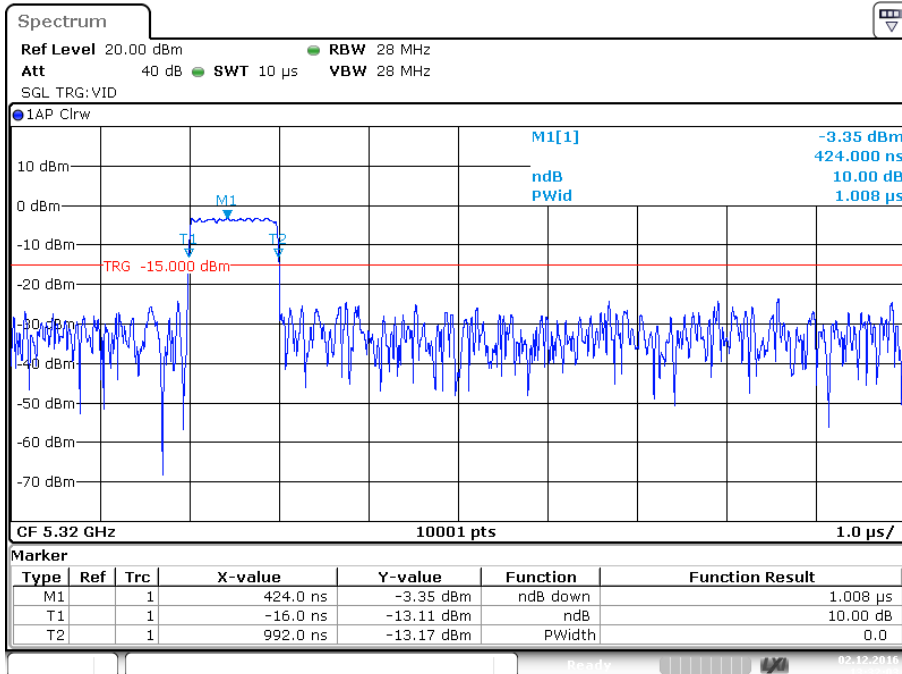
3.7 Radar Pulse Sample Plots

At the master device antenna port



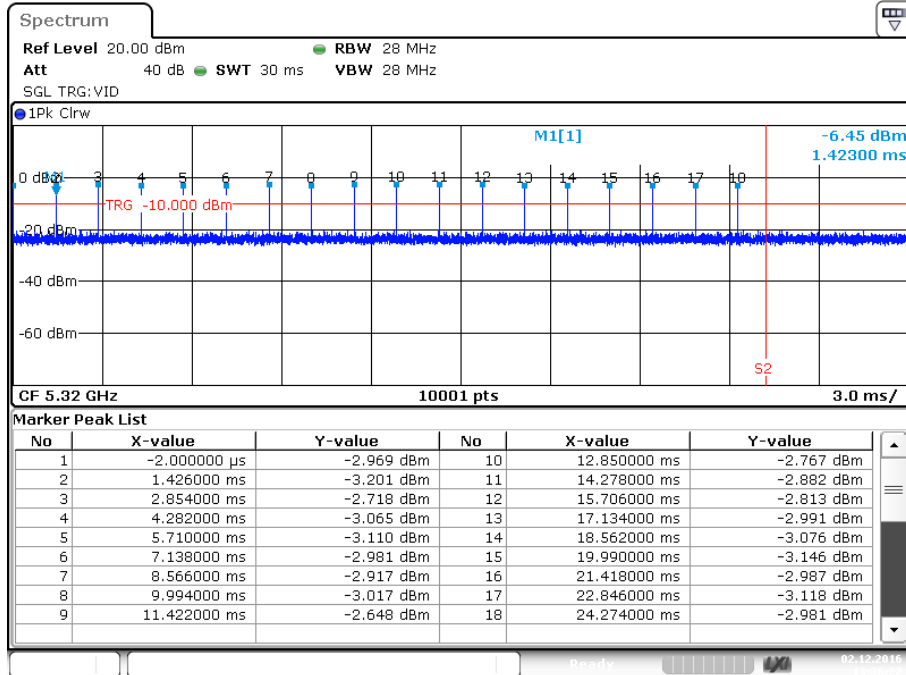
Date: 2.DEC.2016 13:27:34

Increase output level to differentiate pulse from noise floor



Date: 2.DEC.2016 13:32:03

Pulse Rate / Number of Pulses



Date: 2.DEC.2016 13:36:22

4 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	05 December 2016
1	- Updated CCTT measurement with spectrum analyzer screen shot. Removed 5500MHz test point.	08 December 2016