EMC Test Report

Project Number: 4272209
Report Number: 4272209EMC07 **Revision Level:** 0
Client: Curiouser Products Inc

Equipment Under Test: Smart Mirror
Model: M1R0
FCC ID: 2AOSD-RLSYM1R0
IC ID: 23685-RLSY

FCC Rule Parts: FCC Part 15.407 DFS
ISED: RSS-247, Issue 2
Test Procedure: KDB 905462 D02 v02

Report issued on: 10 August 2018
Test Result: Compliant

Tested by: Martin Taylor, Project Engineer
For Jacky Li, Senior Engineer

Reviewed by: David Schramm, Operations 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.

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1 Summary of Test Results

Summary of test results for a client only device without radar detection

Description of Test	Measurement	Limit	Test Result
Channel Move Time	139 ms	10 seconds	Compliant
Channel Closing Time	144 ms	200 ms + aggregate of 60 ms over remaining 10 second period	Compliant
Client Beacon Test	Moved Channel with Client	No client transmissions	Compliant

1.1 *Modifications Required for Compliance*

None

2 General Information

2.1 *Client Information*

Name:	Curiouser Products Inc
Address:	524 Broadway 11th Floor
City, State, Zip, Country:	New York, NY 10013, USA

2.2 *Test Laboratory*

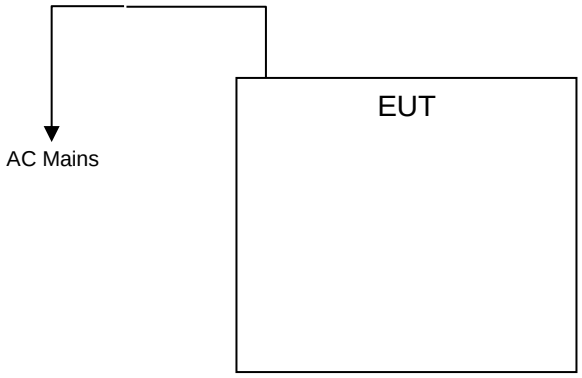
Name:	SGS North America, Inc.
Address:	620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country:	Suwanee, GA 30024, USA
FCC Site:	US1126
Industry Canada Site:	9984A-2
Accrediting Body:	A2LA
Accreditation Certificate:	3212-01

2.3 *General Information of EUT*

Type of Product:	Smart Mirror
Model Number:	1
Serial Number:	M1R010050

Mode of Operation:	Client Device (No radar detection)
Frequency:	5260 – 5320 MHz 5500 – 5700 MHz
Output power, conducted:	128 mW / 21.1 dBm (802.11a UNII Band 2A) 120 mW / 20.8 dBm (802.11a UNII Band 2C)
Modulation:	OFDM
Channel Bandwidth:	20, 40 MHz
Rated Voltage:	120Vac, 60Hz
Sample Received Date:	20 February 2018
Dates of testing:	30 May 2018

2.4 *EUT Connection Block Diagram – Conducted Measurements*



2.5 *System Configurations*

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Curiouser Products Inc	Smart Mirror	M1R0	M1R010050

2.6 *Cable List*

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	AC	EUT	AC mains	2.0m	No	No

3 Dynamic Frequency Selection Technical Requirements

3.1 *Applicability*

Applicability of DFS Requirements Prior to Use of a Channel			
Requirement	Operational Mode		
	Master	Client without radar detection	Client with Radar detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Applicability of DFS requirements during normal operation			
Requirement	Operational Mode		
	Master	Client without radar detection	Client with Radar detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

3.2 *Test Requirements for Client Devices*

a) A Client Device will not transmit before having received appropriate control signals from a Master Device.
b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.
c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.
d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.
e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

DFS Detection Thresholds	
Maximum Transmit Power	Value[1,2,3]
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Response Requirements	
Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds [1]
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. [1,2]
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. [3]
Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

3.3 *Radar Test Waveforms*

For a Client Device without DFS, the Channel Move Time and Channel Closing Transmission Time requirements will be verified with one of the defined Short Pulse Radar Types. Radar Pulse Type 0 was used for the channel move time and channel closing time tests.

Short Pulse Radar Test Waveforms					
Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18		
1	1	Refer to KDB 905462 D02		60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate of Radar Types 1-4				80%	120

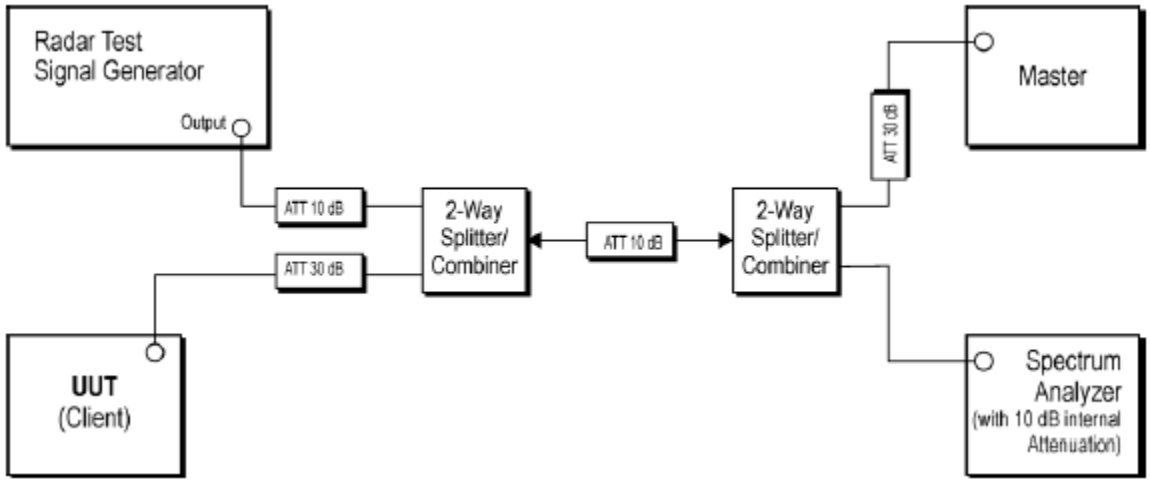
Long Pulse Radar Test Waveforms							
Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Frequency Hopping Radar Test Waveform							
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per hop	Hopping rate (kHz)	Hopping Sequence length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

3.4 *Test Procedures*

The conducted test setup was used for this testing. One channel was chosen for testing.

1. Connect equipment to the R&S TS8997. The figure below shows the concept of the connections.



2. The radar test signal level was set at the Master Device – Radar Detection Device according to the appropriate DFS Detection Threshold.
3. Communication between the Master and the Client (EUT) was established and was on a channel that contains control signals.
4. System testing was performed with channel-loading using means appropriate to the data types that are used by the unlicensed device. The following method was used:
    - Software with random ping intervals was used to ping the client in order to simulate data transfer.
5. Timing plots were recorded that demonstrate a minimum channel loading of approximately 17% or greater. The channel loading was estimated by setting the spectrum analyzer for zero span which shows the approximate the Time On/ (Time On + Off Time).
6. At T_0 the Radar Waveform generator sent a Burst of Type 0 pulses. The test level was set to the appropriate detection level with 1 dB added to the radar test signal to ensure it was at or above the DFS Detection Threshold.
7. The transmissions of the Client Device were observed and measured at the end of the radar Burst on the operating channel for a duration greater than 10 seconds.
8. After the initial radar burst, the channel is monitored for 30 minutes to ensure no transmissions or beacons occur.

3.5 *Test Equipment*

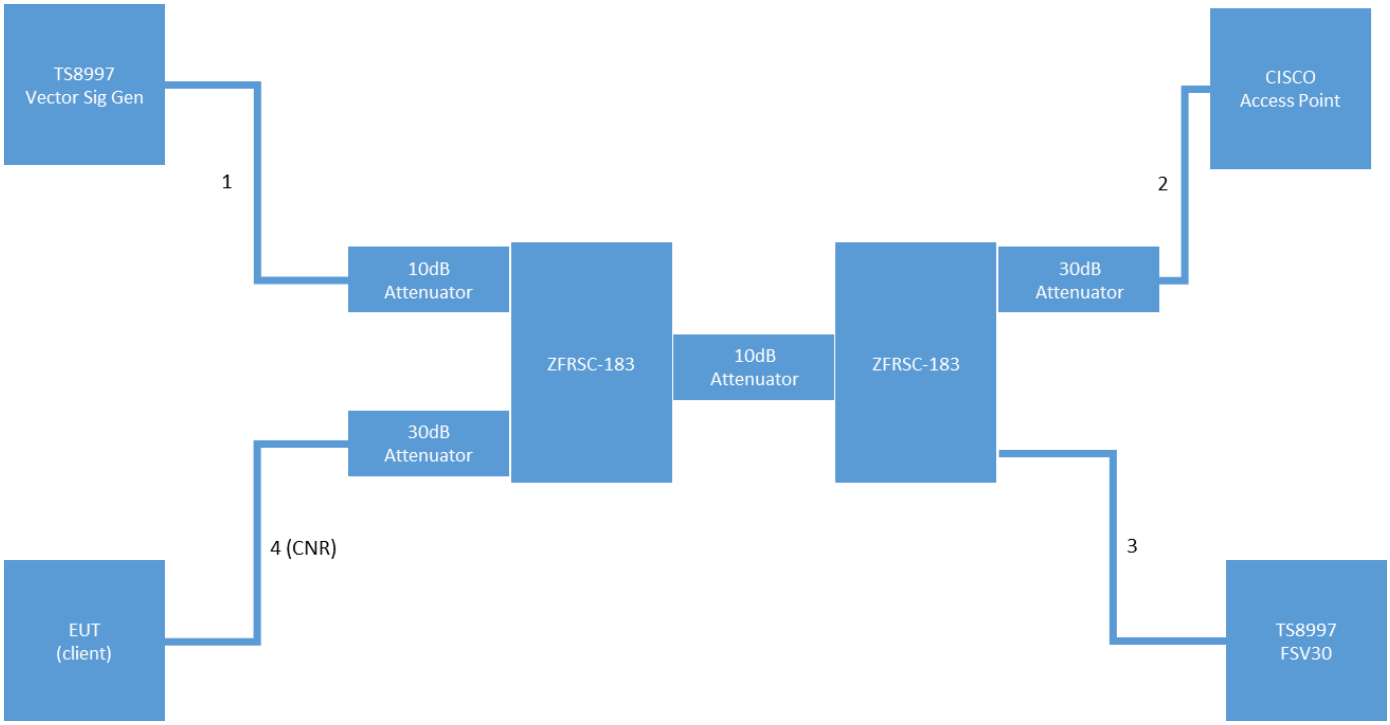
Test End Date: 30-May-2018 Tester: MT

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
RF SWITCH (TS8997)	OSP	ROHDE & SCHWARZ	15039	15-Dec-2019
POWER METER (TS8997)	OSP-B157	ROHDE & SCHWARZ	15040	15-Dec-2019
VECTOR SIGNAL GENERATOR (TS8997)	SMBV 100A	ROHDE & SCHWARZ	15002	2-Oct-2018
SIGNAL GENERATOR (TS89997)	SMB 100A	ROHDE & SCHWARZ	B094876	12-Jan-2020
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101741	25-Jul-2018
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	25-Jul-2018
ATTENUATOR, 10DB	BW-S10W2	MINI-CIRCUITS	15033	VBU
ATTENUATOR, 10DB	BW-S10W2	MINI-CIRCUITS	15034	VBU
ATTENUATOR, 30DB	BW-S30W2	MINI-CIRCUITS	15035	VBU
ATTENUATOR, 30DB	BW-S30W2	MINI-CIRCUITS	15036	VBU
RF CABLE	SF102	HUBER & SUHNER	B079822	25-Jul-2018
RF CABLE	141	HUBER & SUHNER	B095585	25-Jul-2018
RF CABLE	141	HUBER & SUHNER	B095586	25-Jul-2018
RF CABLE	141	HUBER & SUHNER	B095587	25-Jul-2018
RF CABLE	CBL-25FT-NMNM	MINI-CIRCUITS	B094941	24-Jul-2018

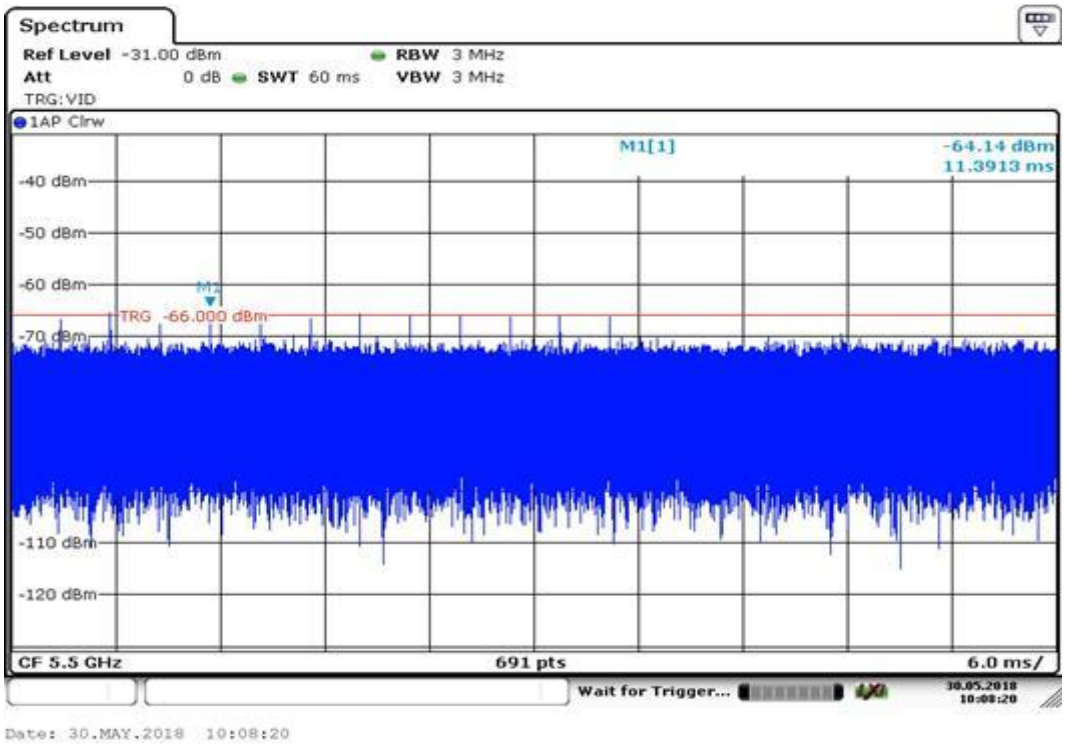
Note: The equipment calibration period is 1 year for the SF102, OSP, OPS-B157. The calibration period is 2 years for the FSV30, SMBV 100A, and SMB 100A. VBU = Verified before use

A DFS-compliant Master device was used for testing. It is the CISCO AIR-SAP2602E-A-K9, FCC ID:LDK1002080, IC:2461B-102080.

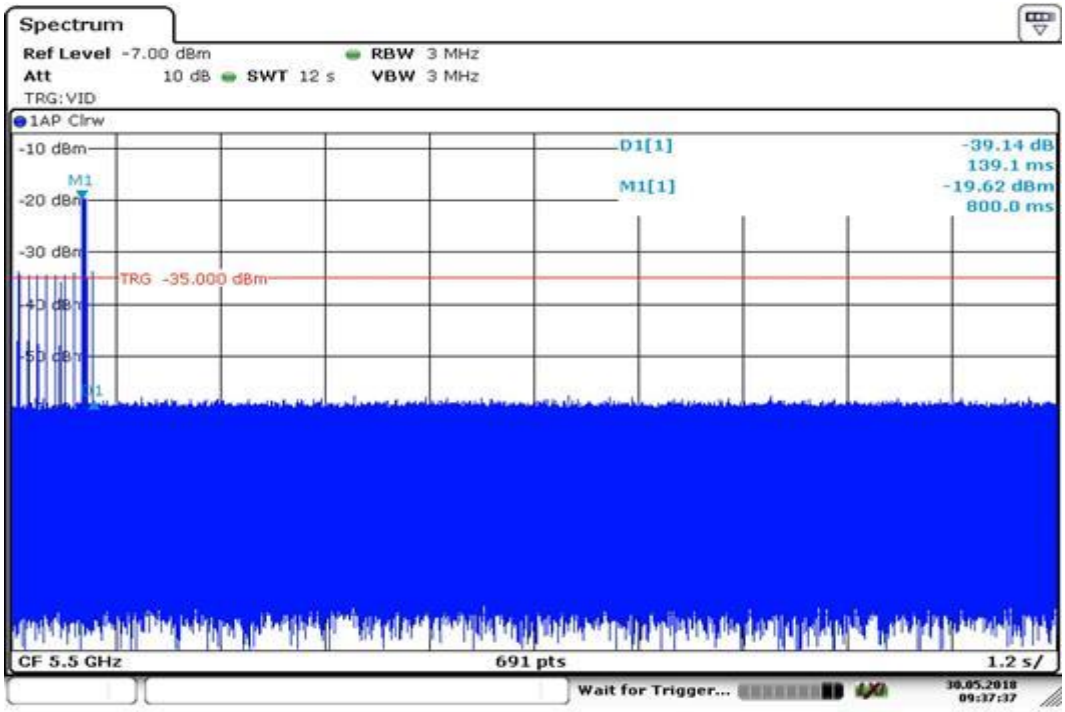
3.6 *DFS Setup Diagram*



3.7 *DFS Cal Level*



3.8 *Move Time and Aggregate Time*



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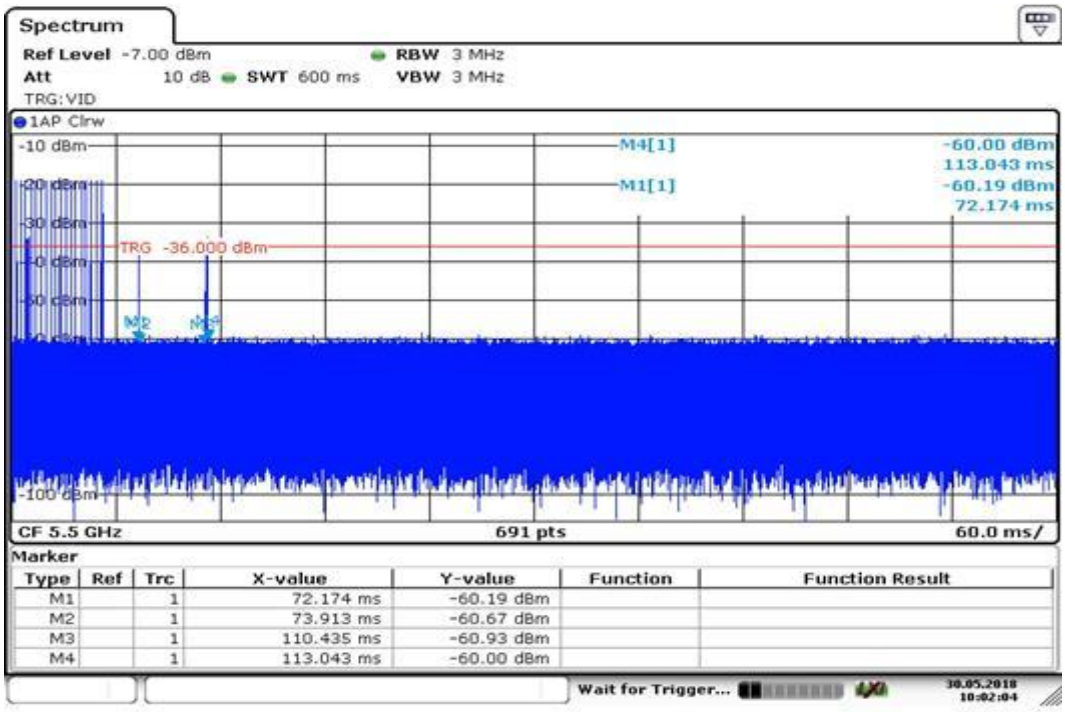

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4 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	10 August 2018