

TEST REPORT

KOSTEC CO., Ltd. 28(175-20, Annyeong-dong) 406-gil sejaro, Hwaseong-si, Gyeonggi-do, Korea Tel:031-222-4251, Fax:031-222-4252	Report No.: KST-FCR-200015	 KOSTEC Co., Ltd. http://www.kostec.org
1. Applicant • Name : IIRCADE, INC. • Address : No.A-627, 338 GwanggyoJungang-Ro, Suji-Gu, Yongin-Si, Gyeonggi-Do, 16942, Republic of KOREA 2. Test Item • Product Name: iiRcade Game Console Bartop • Model Name: IRORO1-128C19OGA • Brand: None • FCC ID: 2AXRR- IRORO1 3. Manufacturer • Name : IIRCADE, INC. • Address : No.A-627, 338 GwanggyoJungang-Ro, Suji-Gu, Yongin-Si, Gyeonggi-Do, 16942, Republic of KOREA 4. Date of Test : 2020. 09. 14. ~ 2020. 09. 23. 5. Test Method Used : FCC CFR 47, Part 15. Subpart E-15.407 ANSI C 63.10-2013 6. Test Result : Compliance 7. Note: Request for family model name by appearance and flash memory capacity change. Family model names: IRORO1-64C19OGA, IRORO1-128S19BLK, IRORO1-128S19DLA		
Supplementary Information The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with measurement procedures specified in <u>ANSI C 63.10-2013</u>. We attest to the accuracy of data and all measurements reported herein were performed by KOSTEC Co., Ltd. and were made under Chief Engineer's supervision. We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report is not related to KOLAS accreditation.		
Affirmation	Tested by Name : Jung, Ho-cheol  (Signature)	Technical Manager Name : Park, Gyeong-Hyeon  (Signature)
2020 .09. 25. KOSTEC Co., Ltd.		

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1. GENERAL INFORMATION

1.1 Test Facility

Test laboratory and address

KOSTEC Co., Ltd.

28(175-20,Annyeong-dong)406-gil sejaro, Hwaseong-si Gyeonggi-do, Korea

Telephone Number: 82-31-222-4251

Facsimile Number: 82-31-222-4252

Registration information

KOLAS No.: KT232

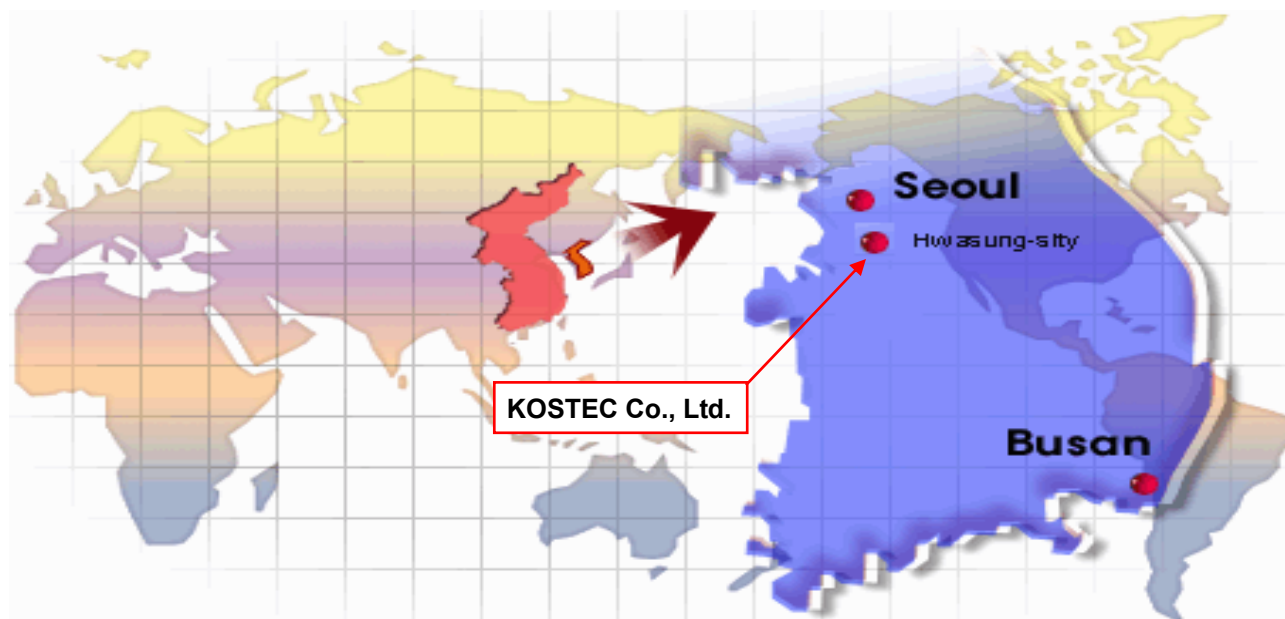
RRA (National Radio Research Agency): KR0041

FCC Designation No.: KR0041

IC Designation No.: KR0041

VCCI Membership No.: 2005

1.2 Location



1.3 Revision History of test report

Rev.	Revisions	Effect page	Reviewed	Date
-	Initial issue	All	Gyeong Hyeon, Park	2020 .09. 25.

2. EQUIPMENT DESCRIPTION

The product specification described herein was declared by manufacturer. And refer to user's manual for the details.

Equipment Name	iiRcade Game Console Bartop
Model No	IRORO1-128C19OGA (Family model names: IRORO1-64C19OGA, IRORO1-128S19BLK, IRORO1-128S19DLA)
Usage	iiRcade Game Console Bartop
Serial Number	Proto type
Modulation type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Emission Type	G1D, D1D
Maximum output power	5 180 ~ 5 240 MHz 802.11a : 18.34 dBm, 802.11n(HT20) : 17.26 dBm, 802.11n(HT40) : 17.35 dBm, 802.11ac(VHT20) : 14.67 dBm, 802.11ac(VHT40) : 14.85 dBm, 802.11ac(VHT80) : 14.59 dBm 5 260 ~ 5 320 MHz 802.11a : 19.69 dBm, 802.11n(HT20) : 18.90 dBm, 802.11n(HT40) : 18.83 dBm, 802.11ac(VHT20) : 16.42 dBm, 802.11ac(VHT40) : 16.45 dBm, 802.11ac(VHT80) : 15.66 dBm 5 500 ~ 5 720 MHz 802.11a : 18.77 dBm, 802.11n(HT20) : 17.87 dBm, 802.11n(HT40) : 16.81 dBm, 802.11ac(VHT20) : 15.53 dBm, 802.11ac(VHT40) : 14.37 dBm, 802.11ac(VHT80) : 14.35 dBm 5 745 ~ 5 825 MHz 802.11a : 16.84 dBm, 802.11n(HT20) : 15.84 dBm, 802.11n(HT40) : 16.00 dBm, 802.11ac(VHT20) : 15.92 dBm, 802.11ac(VHT40) : 16.01 dBm, 802.11ac(VHT80) : 13.43 dBm
Operated Frequency	5 180 ~ 5 240 MHz 802.11a/ n(HT20)/ ac(VHT20): 5 180 MHz ~ 5 240 MHz 802.11n(HT40)/ ac(VHT40): 5 190 MHz ~ 5 230 MHz 802.11ac(VHT80): 5 210 MHz 5 260 ~ 5 320 MHz 802.11a/ n(HT20)/ ac(VHT20): 5 260 MHz ~ 5 320 MHz 802.11n(HT40)/ ac(VHT40): 5 270 MHz ~ 5 310 MHz 802.11ac(VHT80): 5 290 MHz 5 500 ~ 5 720 MHz 802.11a/ n(HT20)/ ac(VHT20): 5 500 MHz ~ 5 720 MHz 802.11n(HT40)/ ac(VHT40): 5 510 MHz ~ 5 710 MHz 802.11ac(VHT80): 5 530 MHz ~ 5 690 MHz 5 745 ~ 5 825 MHz 802.11a/ n(HT20)/ ac(VHT20): 5 745 MHz ~ 5 825 MHz 802.11n(HT40)/ ac(VHT40): 5 755 MHz ~ 5 795 MHz 802.11ac(VHT80): 5 775 MHz

Channel Number	5 180 ~ 5 240 MHz: 4 for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 for 802.11n(HT40), 802.11ac(VHT40) 1 for 802.11ac(VHT80) 5 260 ~ 5 320 MHz: 4 for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 for 802.11n(HT40), 802.11ac(VHT40) 1 for 802.11ac(VHT80) 5 500 ~ 5 720 MHz: 12 for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 6 for 802.11n(HT40), 802.11ac(VHT40) 3 for 802.11ac(VHT80) 5 745 ~ 5 825 MHz: 5 for 802.11a, 802.11n(HT20), 802.11ac(VHT20) 2 for 802.11n(HT40), 802.11ac(VHT40) 1 for 802.11ac(VHT80)
Operation temperature	-10 °C ~ 55 °C
Power Source	AC/DC Adaptor, output: DC 24 V
Antenna Description	Internal PCB pattern antenna, gain : 6 dBi
Remark	1. TPC is not required since the maximum EIRP is less than 500mW(27dBm). 2. WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the controller/server PC to the EUT using Streaming Video.
FCC ID	2AXRR- IRORO1

3 SCOPE

This report has been prepared to demonstrate compliance with the requirements for Dynamic Frequency Selection(DFS) as stated in KDB 905462 D02 v02. Testing was performed in accordance with the measurement procedure described in FCC KDB 905462 D02 v02.

4 INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment s, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5 Used Test Equipment List

No.	Instrument	Model	S/N	Manufacturer	Next Cal Date	Cal interval	used
1	Spectrum Analyzer	FSV30	20-353063	Rohde & Schwarz	2021.01.21	1 year	☒
2	Vector Signal Generator	SMBV100A	257557	Rohde & Schwarz	2021.01.20	1 year	☒
3	Signal Generator	SMB100A	179628	Rohde & Schwarz	2021.05.13	1 year	☒
4	DC Power supply	UP-3005T	68	Unicon Co.,Ltd	2021.01.20	1 year	☒
5	Attenuator	54A-10	74564	WEINSCHEL	2021.09.02	1 year	☒
6	Attenuator	56-10	66920	WEINSCHEL	2021.05.13	1 year	☒
7	Band rejection filter	WTR-BRF2442-84NN	09020001	WAVE TECH Co.,LTD	2021.01.22	1 year	☒
8	Wireless AP	MR2200ac	N/A	Synology Incorporated	N/A	N/A	☒

6. SUMMARY TEST RESULTS

Band	Parameter	Limit	Used	Test Result
UNII-2A	Channel Move Time	10 seconds	☒	NT
	Channel Closing Transmission Time	200 ms + aggregate of 60 ms over remaining 10 second period	☒	NT
	Non-occupancy Period	30 minutes	☒	NT
UNII-2C	Channel Move Time	10 seconds	☒	PASS
	Channel Closing Transmission Time	200 ms + aggregate of 60 ms over remaining 10 second period	☒	PASS
	Non-occupancy Period	30 minutes	☒	PASS

Note:

1. NT = Not Tested, NA = Not Applicable

2. The KDB905462 D02 v02 : Each one channel selected between UNII-2A, UNII-2C is chosen for the testing.

Therefore, We performed the only UNII-2C test

Procedure Reference

FCC CFR 47, Part 15. Subpart E-15.407

ANSI C 63.10-2013

7. MEASUREMENT RESULTS

7.1 DFS

7.1.1 DESCRIPTION OF DYNAMIC FREQUENCY SELECTION TEST

KDB905462 D02 v02(04/08/2016) the following are the 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(KDB905462 D02 v02) apply.
- d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

7.1.2 Test Environment conditions

- Ambient temperature : (22 ~ 24) °C • Relative Humidity : (54 ~ 56) % R.H.

7.1.3 Limit

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an Aggregate of 60 milliseconds over Remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100 % of the U-NII 99 % transmission Power bandwidth. See Note 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.

Note3:

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.

7.1.4 DFS detection threshold values

The DFS detection thresholds are defined for Master devices and Client Devices with In-service monitoring. These detection thresholds are listed in the following table.

Maximum Transmit Power	Value (See Notes 1 and 2)
> 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.	

7.1.5 DFS test signals

As the EUT is a Client Device with no Radar Detection only one type radar pulse is required for the testing. Radar Pulse type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time.

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number Of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values Randomly selected From the list of 23 PRI values in Table 5a	Roundup $\left\{ \frac{1}{360} \right\}$ $\left\{ \frac{19 \cdot 10^6}{PRI \mu sec^2} \right\}$	60 %	30
		Test B: 15 unique PRI values Randomly selected within the range of 518-3066 μ sec, with a minimum increment of 1 μ sec, excluding PRI values selected in Test A			
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 (Radar Types 1-4)				60 %	120
Note1: Short pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

7.1.6 Test and measurement system

General Test Setup Procedure:

1. Connect FCC approved Master AP to a network, via wired Ethernet, that allows connection to an FTP server.
2. Associate the EUT with the Master AP.
3. Launch the FTP application on the EUT.
4. Connect to the FTP server application to the FTP server hosting the file
5. Initiate an FTP download of the file from the host.
6. Monitor the channel loading during transfer.
7. Reduce the maximum allowed data rate for the Master AP, using the AP's GUI interface.
8. Repeat steps 4-6 until the channel loading is as close to 20 % as possible.
9. Record the data rate setting on the Master AP and the channel loading.
10. While the system is performing an FTP transfer using the settings from item 8 above, perform the Channel Closing Transmission Time and Channel Move Time Measurements as required by KDB905462 D02 v02 using a conducted test.

System calibrations

A-50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a coaxial cable. The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of - 62 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the common port of the spectrum analyzer combiner or divider.

The spectrum analyzer displays the level of the signal generator higher than the client TX level.

Because we can not search the signal generator in the spectrum analyzer when the signal generator level is - 62 dBm. The spectrum analyzer will still indicate the level higher than the client TX level.

7.1.7 Procedure

The KDB905462 D02 v02 describes a radiated test setup and a conducted test setup. A radiated test setup was used for this testing. Figure 7-1 shows the typical test setup. Each one channel selected between UNII-2A, UNII-2C is chosen for the testing.

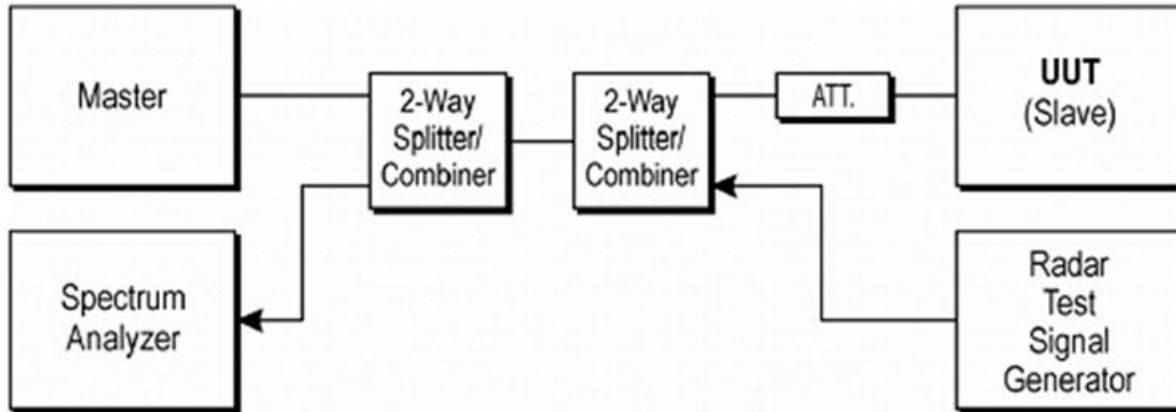
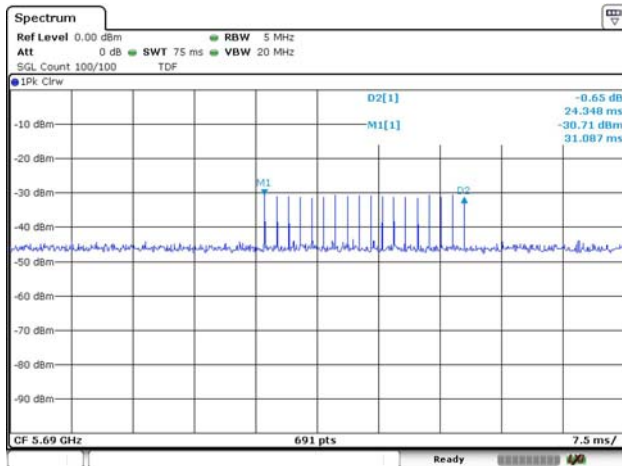


Figure 7-1. Test Setup

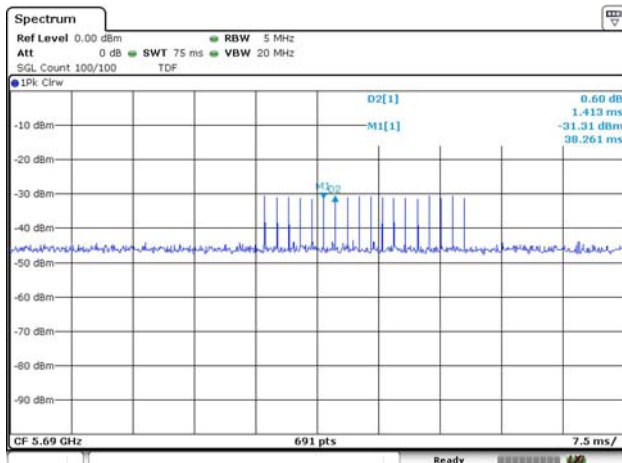
1. The radar pulse generator is setup to provide a pulse at the frequency that the Master and Client are operating. A Type 0 radar pulse with a 1 μ s pulse width and a 1428 μ s PRI is used for the testing.
 2. The vector signal generator is adjusted to provide the radar burst (18 pulses) at a level of approximately -62 dBm at the antenna of the Master device.
 3. The Client Device (EUT) is set up per the diagram in Figure 3-1 and communications between the Master device and the Client is established.
 4. The MPEG file specified by the FCC ("6½ Magic Hours") is streamed from the "file computer" through the Master to the Slave Device and played in full motion video using Media Player Classic Ver.6.4.8.6 in order to properly load the network.
 5. The spectrum analyzer is set to record about 15 sec window to any transmissions occurring up to and after 10 sec.
 6. The system is again setup and the monitoring time is shortened in order to capture the Channel Closing Transmission Time. This time is measured to insure that the Client ceases transmission within 200 ms and the aggregate of emissions occurring after 200 ms up to 10 sec do not exceed 60 ms.
- (Note: the channel may be different since the Master and Client have changed channels due to the detection of the initial radar pulse.)
7. After the initial radar burst the channel is monitored for 30 minutes to insure no transmissions or beacons occur. A second monitoring setup is used to verify that the Master and Client have both moved to different channels.

7.1.8 TEST RESULT

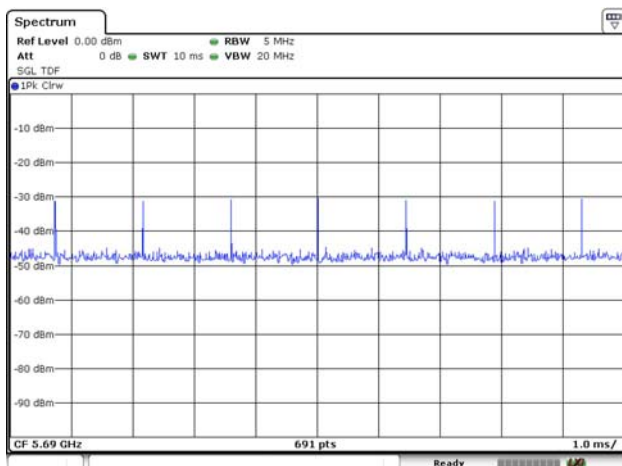
Type0 : PRI & Radar Pulse Number



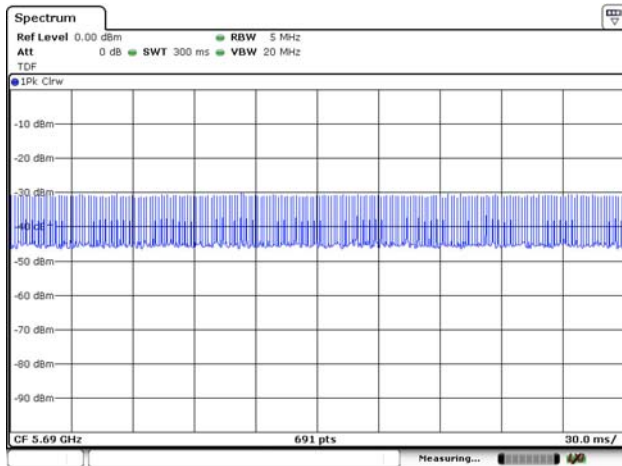
Number of Pulse Form : 18



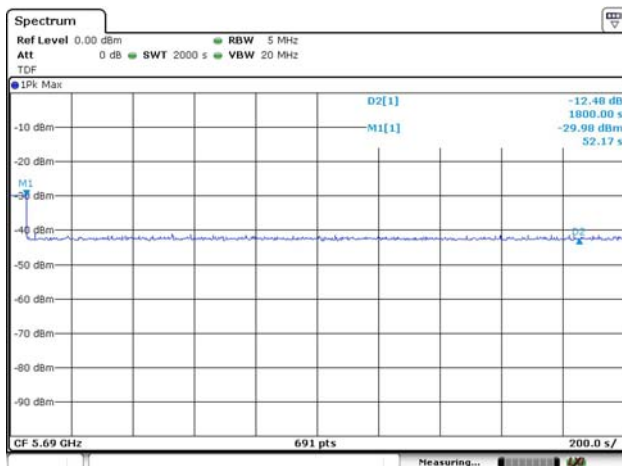
Time Display, Non WLAN Channel Traffic



Time Display, WLAN Channel Traffic (Streaming Video)



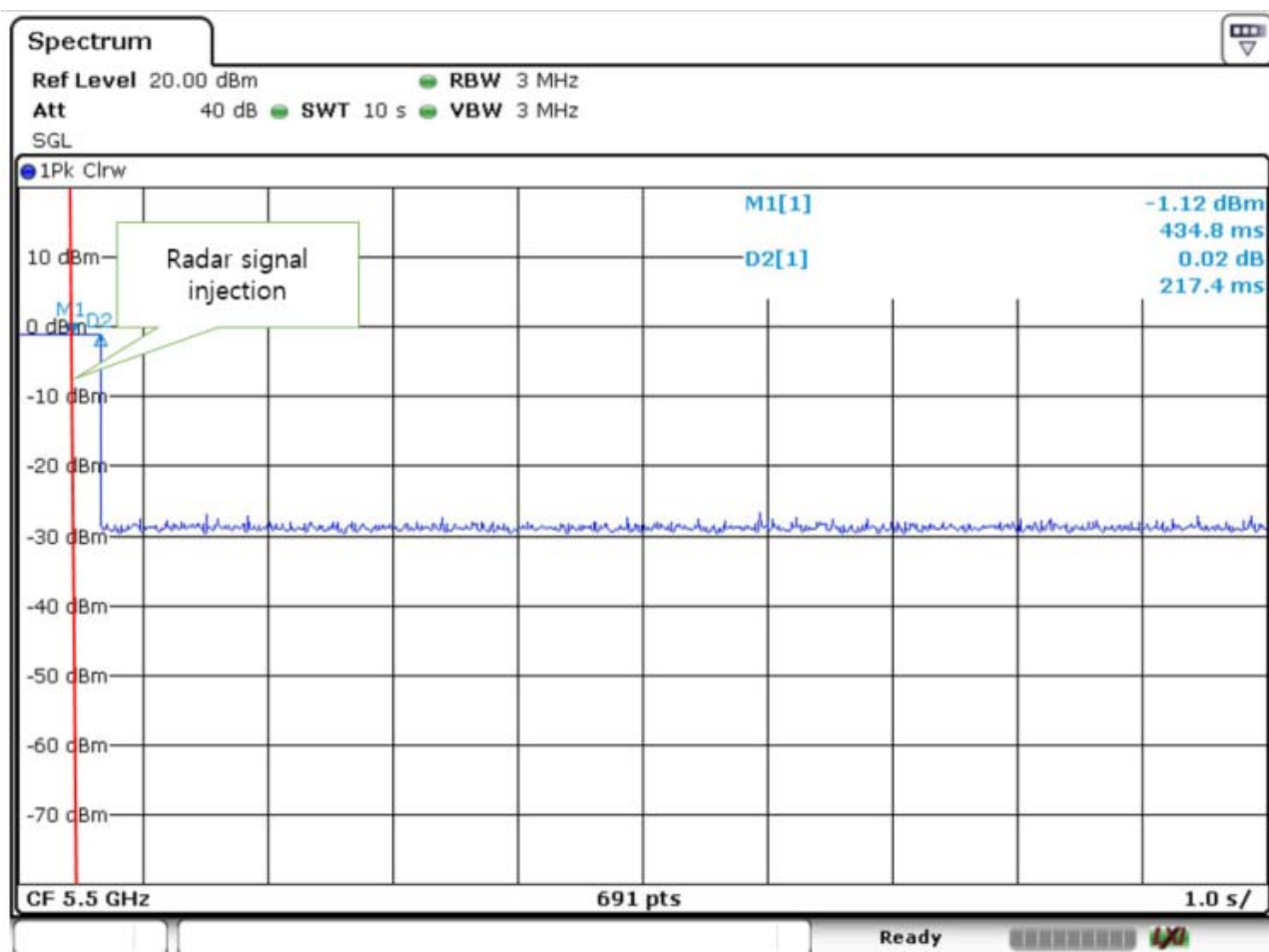
Non-occupancy Period - Monitoring live time spectrum analyzer - Elapse time 30 minutes



Note:

1. Test BW : 802.11ac(VHT80)
2. Test Channel : 138

Channel Move Time & Channel Closing Transmission Time



Note:

1. Test BW : 802.11ac(VHT80)
2. Test Channel : 138
3. Channel Move Time : 0.000434 (Limit : 10 s)
4. Channel Closing Transmission Time, Aggregate Time After 200 ms : 0 s (Limit : 60 ms)