## FCC Test Report

Product Name	23.1 inches Bar type Digital Signage
Model No.	D230
FCC ID.	S8CD230

Applicant	Shuttle Inc.
Address	No.30,Lane76,Rei Kuang Rd.,Nei-Hu Dist.,Taipei, Taiwan R.O.C.

Date of Receipt	Aug. 29, 2019		
Issued Date	Nov. 12, 2019		
Report No.	1980460R-RFUSP01V00		
Report Version	V1.0		
TESTING TAF			

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

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## Test Report

Issued Date: Nov. 12, 2019 Report No.: 1980460R-RFUSP01V00

# DEKRA

Product Name	23.1 inches Bar type Digital Signage		
Applicant	Shuttle Inc.		
Address	No.30,Lane76,Rei Kuang Rd.,Nei-Hu Dist.,Taipei, Taiwan R.O.C.		
Manufacturer	Shuttle Inc.		
Model No.	D230		
FCC ID.	S8CD230		
EUT Rated Voltage	AC 100-240V, 50-60Hz		
EUT Test Voltage	AC 120V / 60Hz		
Trade Name	Shuttle		
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C		
	ANSI C63.4: 2014, ANSI C63.10: 2013		
Test Result	Complied		
Documented Dry	Dita Huang		

Documented By :

Kiza Inno 8

(Senior Adm. Specialist / Rita Huang)

Tested By :

Jay Su

(Engineer / Jay Su)

Approved By :

(Director / Vincent Lin)



### TABLE OF CONTENTS

I.       GENERAL INFORMATION       5         1.1.       EUT Description       5         1.2.       Operational Description       7         1.3.       Tested System Details       8         1.4.       Configuration of Tested System       8         1.5.       EUT Exercise Software       9         1.6.       Test Facility       10         1.7.       List of Test Equipment       11         2.       CONDUCTED EMISSION       13         2.1.       Test Setup       13         2.2.       Limits       14         2.3.       Test Procedure       14         2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1.       Test Sctup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Sctup       23         4.2.       Limits       24	Des	scription	Page
1.1.       EUT Description	1.	GENERAL INFORMATION	5
1.2.       Operational Description	1.1.	EUT Description	5
1.3.       Tested System Details       8         1.4.       Configuration of Tested System       8         1.5.       EUT Exercise Software       9         1.6.       Test Facility       10         1.7.       List of Test Equipment.       11         1.7.       List of Test Equipment.       13         2.1.       Test Setup       13         2.2.       Limits       14         2.3.       Test Procedure       14         2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.7       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.1.       Test Setup       19         3.1.       Test Setup       19         3.1.       Test Procedure       19         3.3.       Test Procedure       20         4.4.       Uncertainty       20         4.5.       Test Result of Peak Power Output       20         4.6.       Audiated Emission       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Netun CONDUCTED TEST	1.2.	Operational Description	7
1.4.       Configuration of Tested System	1.3.	Tested System Details	
1.5.       EUT Exercise Software       .9         1.6.       Test Facility       .10         1.7.       List of Test Equipment.       .11         1.7.       List of Test Equipment.       .13         2.1.       Test Setup       .13         2.1.       Test Setup       .13         2.2.       Limits.       .14         2.3.       Test Procedure       .14         2.4.       Uncertainty       .14         2.5.       Test Result of Conducted Emission       .15         3.       PEAK POWER OUTPUT       .19         3.1.       Test Setup       .19         3.2.       Limit       .19         3.3.       Test Procedure       .19         3.4.       Uncertainty       .19         3.5.       Test Result of Peak Power Output       .20         4.       RADIATED EMISSION       .23         4.1.       Test Setup       .23         4.2.       Limits.       .24         4.3.       Test Procedure       .25         4.4.       Uncertainty       .25         5.7       Test Result of Radiated Emission       .26         5.8       RF ANTENNA CONDUCTED TEST <td>1.4.</td> <td>Configuration of Tested System</td> <td></td>	1.4.	Configuration of Tested System	
1.6.       Test Facility       10         1.7.       List of Test Equipment.       11         2.       CONDUCTED EMISSION       13         2.1.       Test Setup       13         2.2.       Limits       14         2.3.       Test Procedure       14         2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output.       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits.       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         5.       RE ASULT of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50 <td< td=""><td>1.5.</td><td>EUT Exercise Software</td><td>9</td></td<>	1.5.	EUT Exercise Software	9
1.7.       List of Test Equipment.       11         2.       CONDUCTED EMISSION       13         2.1.       Test Setup       13         2.2.       Limits.       14         2.3.       Test Procedure       14         2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output.       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits.       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits.       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.	1.6.	Test Facility	
2.       CONDUCTED EMISSION       13         2.1       Test Setup       13         2.2       Limits       14         2.3       Test Procedure       14         2.4       Uncertainty       14         2.5       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1       Test Setup       19         3.2       Limit       19         3.3       Test Procedure       19         3.4       Uncertainty       19         3.5       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1       Test Setup       23         4.2       Limits       24         4.3       Test Procedure       25         4.4       Uncertainty       25         4.5       Test Result of Radiated Emission       26         5.4       Uncertainty       25         5.1       Test Result of RADIATED EST       50         5.2       Limits       30         5.3       Test Procedure       50         5.4       Uncertainty       50         5.5       Tes	1.7.	List of Test Equipment	
2.1.       Test Setup       13         2.2.       Limits       14         2.3.       Test Procedure       14         2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.7       Test Result of Conducted Emission       15         3.8.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.8       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.6.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50      <	2.	CONDUCTED EMISSION	
2.2       Limits       14         2.3       Test Procedure       14         2.4       Uncertainty       14         2.5       Test Result of Conducted Emission       15         3.6       PEAK POWER OUTPUT       19         3.1       Test Setup       19         3.2       Limit       19         3.3       Test Procedure       19         3.4       Uncertainty       19         3.5       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1       Test Setup       23         4.2       Limits       24         4.3       Test Procedure       25         4.4       Uncertainty       25         4.5       Test Result of Radiated Emission       26         5.6       R FANTENNA CONDUCTED TEST       50         5.1       Test Setup       50         5.2       Limits       50         5.3       Test Procedure       50         5.4       Uncertainty       50         5.5       Test Result of R Antenna Conducted Test       51         6       BAND EDGE       54         6.1 </td <td>2.1.</td> <td>Test Setup</td> <td></td>	2.1.	Test Setup	
2.3.       Test Procedure       14         2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.6.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Result of R Antenna Conducted Test       51         6.4.       Uncertainty       50         5.5.       Test Result of R Antenna Conducted Test       51         6.8       BAND EDGE       54         6.1.       Test Setup	2.2.	Limits	
2.4.       Uncertainty       14         2.5.       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.6.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RA Antenna Conducted Test       51         6.6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54 <t< td=""><td>2.3.</td><td>Test Procedure</td><td></td></t<>	2.3.	Test Procedure	
2.5.       Test Result of Conducted Emission       15         3.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.6.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of R Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55 <t< td=""><td>2.4.</td><td>Uncertainty</td><td></td></t<>	2.4.	Uncertainty	
3.       PEAK POWER OUTPUT       19         3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.6       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       55         6.2.       Limit       54	2.5.	Test Result of Conducted Emission	
3.1.       Test Setup       19         3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       Test Result of Radiated Emission       26         5.       Test Result of Radiated Emission       26         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55 <tr< td=""><td>3.</td><td>PEAK POWER OUTPUT</td><td></td></tr<>	3.	PEAK POWER OUTPUT	
3.2.       Limit       19         3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       55         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56	3.1.	Test Setup	
3.3.       Test Procedure       19         3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       50         5.6.       Test Result of RF Antenna Conducted Test       51         6.8       BAND EDGE       54         6.1.       Test Setup       55         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         6.5.       Test Result of Band Edge <td>3.2.</td> <td>Limit</td> <td></td>	3.2.	Limit	
3.4.       Uncertainty       19         3.5.       Test Result of Peak Power Output       20         4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56 <td>3.3.</td> <td>Test Procedure</td> <td></td>	3.3.	Test Procedure	
3.5.       Test Result of Peak Power Output	3.4.	Uncertainty	
4.       RADIATED EMISSION       23         4.1.       Test Setup       23         4.2.       Limits.       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST.       50         5.1.       Test Setup       50         5.2.       Limits.       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74 <t< td=""><td>3.5.</td><td>Test Result of Peak Power Output</td><td></td></t<>	3.5.	Test Result of Peak Power Output	
4.1.       Test Setup       23         4.2.       Limits       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	4.	RADIATED EMISSION	
4.2.       Limits.       24         4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits.       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	4.1.	Test Setup	
4.3.       Test Procedure       25         4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits.       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	4.2.	Limits	
4.4.       Uncertainty       25         4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER.       74         7.1.       Test Setup       74         7.2.       Limit       74	4.3.	Test Procedure	
4.5.       Test Result of Radiated Emission       26         5.       RF ANTENNA CONDUCTED TEST       50         5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	4.4.	Uncertainty	25
5.       RF ANTENNA CONDUCTED TEST	4.5.	Test Result of Radiated Emission	
5.1.       Test Setup       50         5.2.       Limits       50         5.3.       Test Procedure       50         5.4.       Uncertainty       50         5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	5.	RF ANTENNA CONDUCTED TEST	
5.2.       Limits	5.1.	Test Setup	
5.3.       Test Procedure       .50         5.4.       Uncertainty       .50         5.5.       Test Result of RF Antenna Conducted Test       .51         6.       BAND EDGE       .54         6.1.       Test Setup       .54         6.2.       Limit       .54         6.3.       Test Procedure       .55         6.4.       Uncertainty       .55         6.5.       Test Result of Band Edge       .56         7.       CHANNEL NUMBER       .74         7.1.       Test Setup       .74         7.2.       Limit       .74	5.2.	Limits	
5.4.       Uncertainty	5.3.	Test Procedure	
5.5.       Test Result of RF Antenna Conducted Test       51         6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	5.4.	Uncertainty	
6.       BAND EDGE       54         6.1.       Test Setup       54         6.2.       Limit       54         6.3.       Test Procedure       55         6.4.       Uncertainty       55         6.5.       Test Result of Band Edge       56         7.       CHANNEL NUMBER       74         7.1.       Test Setup       74         7.2.       Limit       74	5.5.	Test Result of RF Antenna Conducted Test	51
6.1.       Test Setup	6.	BAND EDGE	54
6.2.       Limit	6.1.	Test Setup	54
6.3.       Test Procedure	6.2.	Limit	54
6.4.       Uncertainty	6.3.	Test Procedure	
6.5.       Test Result of Band Edge	6.4.	Uncertainty	
7.       CHANNEL NUMBER	6.5.	Test Result of Band Edge	
7.1.       Test Setup	7.	CHANNEL NUMBER	74
7.2. Limit	7.1.	Test Setup	74
	7.2.	Limit	74

# DEKRA

7.3.	Test Procedure	74
7.4.	Uncertainty	74
7.5.	Test Result of Channel Number	75
8.	CHANNEL SEPARATION	78
8.1.	Test Setup	78
8.2.	Limit	78
8.3.	Test Procedure	78
8.4.	Uncertainty	78
8.5.	Test Result of Channel Separation	79
9.	DWELL TIME	85
9.1.	Test Setup	85
9.2.	Limit	85
9.3.	Test Procedure	85
9.4.	Uncertainty	85
9.5.	Test Result of Dwell Time	86
10.	OCCUPIED BANDWIDTH	92
10.1.	Test Setup	92
10.2.	Limits	92
10.3.	Test Procedure	92
10.4.	Uncertainty	92
10.5.	Test Result of Occupied Bandwidth	93
11.	EMI REDUCTION METHOD DURING COMPLIANCE TESTING1	03
Attachme Attachme	ent 1: EUT Test Photographs ent 2: EUT Detailed Photographs	



#### 1. GENERAL INFORMATION

#### **1.1. EUT Description**

23.1 inches Bar type Digital Signage		
Shuttle		
D230		
S8CD230		
2402-2480MHz		
79		
FHSS: GFSK(1Mbps) /π/4DQPSK(2Mbps) / 8DPSK(3Mbps)		
PCB Antenna		
Auto		
Refer to the table "Antenna List"		
MFR: APD, M/N: WA-24Q12FU		
Input: 100-240V, 50-60Hz, 0.7A		
Output: 12V, 2A		
Cable out: Non-Shielded, 1.8m, with one ferrite core bonded.		

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WGT	43R-D23001-0300	PCB Antenna	3.2dBi for 2.4 GHz

Note:

1. The antenna of EUT conforms to FCC 15.203.

Center Frequency of Each Channel:

•	•						
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

- The EUT is a 23.1 inches Bar type Digital Signage, Contains functions and so on WLAN (802.11a/b/g/n/ac) with Bluetooth (5.0 and V3.0, V2.1+EDR) combo card module transceiver, this report for Bluetooth V3.0, V2.1+EDR.
- 2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
- 3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test
- 4. Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through pre-testing, to produce emissions similar to those for 3Mb/s.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK)
	Mode 2: Transmit - 2Mbps (4DQPSK)
Mode 3: Transmit - 3Mbps (8DPSK)	

#### **1.3.** Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Pro	oduct	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude 5491	1PL56S2	Non-Shielded, 0.8m
2	LED Monitor	ViewSonic	VX2257-mhd	UFY163502150	Non-Shielded, 1.8m
3	Test Fixture	N/A	N/A	N/A	N/A
4	Microphone &	DONEVED	105241		
	Earphone	RONEVER	MOE241	N/A	N/A
5	USB Mouse	Logitech	M-U0026	1245HS0684F8	N/A
6	Micro SD Card 1GB	SanDisk	N/A	0801002841D2N	N/A

Signal Cable Type		Signal cable Description
А	Test Fixture Cable	Non-Shielded, 1.2m
в	Test Fixture Cable	Non-Shielded, 0.2m
С	HCMI Cable	Non-Shielded, 1.8m
D	USB Cable	Shielded, 1.8m
Е	Microphone & Earphone Cable	Non-Shielded, 1.2m
F	LAN Cable	Non-Shielded, 2.0m

#### 1.4. Configuration of Tested System



#### **1.5.** EUT Exercise Software

- 1. Setup the EUT as shown in Section 1.4.
- 2. Execute software "Ampak RF Test Tool (Ver6.1)" on the Notebook PC.

DEKRA

- 3. Configure the test mode, the test channel, and the data rate.
- 4. Press "OK" to start the continuous Transmit.
- 5. Verify that the EUT works properly.



#### 1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
	Temperature (°C)	10~40 °C	23°C
Conducted Emission	Humidity (%RH)	10~90 %	70%
	Temperature (°C)	10~40 °C	25°C
Radiated Emission	Humidity (%RH)	10~90 %	72%
	Temperature (°C)	10~40 °C	23°C
Conductive	Humidity (%RH)	10~90 %	70%

#### USA : FCC Registration Number: TW3023 Canada : IC Registration Number: 4075A

Site Description:	Accredited by TAF Accredited Number: 3023
Test Laboratory:	DEKRA Testing and Certification Co., Ltd
Address:	No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
	Taiwan, R.O.C.
Phone number:	886-2-8601-3788
Fax number:	886-2-8601-3789
Email address:	info.tw@dekra.com
Website:	http://www.dekra.com.tw



#### 1.7. List of Test Equipment

#### For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2019/02/12	2020/02/11
Х	Spectrum Analyzer	Agilent	N9010A	MY48030495	2019/10/13	2020/10/12
Х	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/08/01	2020/07/31
Х	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/25	2020/07/24
Х	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/25	2020/07/24
Х	EMI Test Receiver	R&S	ESCS 30	100369	2019/11/07	2020/11/06
Х	LISN	R&S	ESH3-Z5	836679/017	2019/02/09	2020/02/08
Х	LISN	R&S	ENV216	100097	2019/02/09	2020/02/08
Х	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/21	2020/06/20
For	· Radiated measurement	s /Site3/CB8				
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
Х	Spectrum Analyzer	R&S	FSP40	100170	2019/03/12	2020/03/11
	Loop Antenna	Teseq	HLA6121	37133	2019/10/13	2021/10/12
Х	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2019/06/24	2020/06/23
Х	Coaxial Cable	DEKRA	RG 214	LC003-RG	2019/06/14	2020/06/13
X	Pre-Amplifier	Jet-Power	JPA-10M1G33	170101000330010	) 2019/06/14	2020/06/13
X	Horn Antenna	ETS-Lindgren	3117	00135205	2019/05/03	2020/05/02
X	Pre-Amplifier	EMCI !	EMC012630SE	980210	2019/04/10	2020/04/09
	Horn Antenna	Com-Power	AH-1840	101043	2019/01/09	2020/01/08
	Amplifier + Cable	EMCI	EMC184045SE	980370	2019/03/21	2020/03/20
	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/06	2020/08/05
Χ	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/06	2020/08/05

Note:

1. All equipments are calibrated every one year.

2. The test instruments marked with "X" are used to measure the final test results.

3. Test Software version : QuieTek EMI 2.0 V2.1.113.

#### 1.8. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.



#### 2. Conducted Emission

#### 2.1. Test Setup



#### 2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit				
Frequency	Limits			
MHz	QP	AV		
0.15 - 0.50	66-56	56-46		
0.50-5.0	56	46		
5.0 - 30	60	50		

Remarks: In the above table, the tighter limit applies at the band edges.

#### 2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

#### 2.4. Uncertainty

± 2.26 dB



#### 2.5. Test Result of Conducted Emission

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Conducted Emission Test
Test date	:	2019/10/04
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1	*	0.158	9.668	42.420	52.088	-13.683	65.771	QUASIPEAK
2		0.228	9.672	34.900	44.572	-19.199	63.771	QUASIPEAK
3		0.295	9.676	30.780	40.456	-21.401	61.857	QUASIPEAK
4		0.420	9.682	28.000	37.682	-20.604	58.286	QUASIPEAK
5		3.978	9.840	20.100	29.940	-26.060	56.000	QUASIPEAK
6		15.494	10.111	22.360	32.471	-27.529	60.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.

2. " \* ", means this data is the worst emission level.

3. Measurement Level = Reading Level + Correct Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Conducted Emission Test
- Test date : 2019/10/04
- Test Mode : Mode 3: Transmit 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1	*	0.158	9.668	30.470	40.138	-15.633	55.771	AVERAGE
2		0.228	9.672	24.540	34.212	-19.559	53.771	AVERAGE
3		0.295	9.676	23.790	33.466	-18.391	51.857	AVERAGE
4		0.420	9.682	19.840	29.522	-18.764	48.286	AVERAGE
5		3.978	9.840	11.130	20.970	-25.030	46.000	AVERAGE
6		15.494	10.111	15.530	25.641	-24.359	50.000	AVERAGE

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " \* ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Conducted Emission Test
- Test date : 2019/10/04
- Test Mode : Mode 3: Transmit 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1	*	0.177	9.703	39.480	49.183	-16.046	65.229	QUASIPEAK
2		0.232	9.702	33.880	43.582	-20.075	63.657	QUASIPEAK
3		0.353	9.709	31.660	41.369	-18.831	60.200	QUASIPEAK
4		3.849	9.877	20.440	30.317	-25.683	56.000	QUASIPEAK
5		9.966	10.086	16.020	26.106	-33.894	60.000	QUASIPEAK
6		14.951	10.222	21.740	31.962	-28.038	60.000	QUASIPEAK

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " \* ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Conducted Emission Test
- Test date : 2019/10/04
- Test Mode : Mode 3: Transmit 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1		0.177	9.703	26.290	35.993	-19.236	55.229	AVERAGE
2		0.232	9.702	24.190	33.892	-19.765	53.657	AVERAGE
3	*	0.353	9.709	27.260	36.969	-13.231	50.200	AVERAGE
4		3.849	9.877	10.880	20.757	-25.243	46.000	AVERAGE
5		9.966	10.086	10.190	20.276	-29.724	50.000	AVERAGE
6		14.951	10.222	14.520	24.742	-25.258	50.000	AVERAGE

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " \* ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

#### **3.** Peak Power Output

#### 3.1. Test Setup



#### 3.2. Limit

The maximum peak power shall be less 1Watt.

#### **3.3.** Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

#### 3.4. Uncertainty

± 1.19 dB



#### 3.5. Test Result of Peak Power Output

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Peak Power Output
Test Site	:	No.3 OATS
Test date	:	2019/11/04
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency	Measurement Level	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	-1.41	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-1.29	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-1.87	1 Watt= 30 dBm	Pass



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Peak Power Output
Test Site	:	No.3 OATS
Test date	:	2019/11/04
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK)

Channel No.	Frequency	Measurement Level	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	-5.89	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-5.94	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-6.37	1 Watt= 30 dBm	Pass



:	23.1 inches Bar type Digital Signage
:	Peak Power Output
:	No.3 OATS
:	2019/11/04
:	Mode 3: Transmit - 3Mbps (8DPSK)
	: : : :

Channel No.	Frequency	Measurement Level	Required Limit	Result
	(MHz)			
Channel 00	2402.00	-5.71	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-5.81	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-6.19	1 Watt= 30 dBm	Pass



#### 4. Radiated Emission

#### 4.1. Test Setup

Under 30MHz





#### Above 1GHz



#### 4.2. Limits

#### **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits						
Frequency MHz	Field strength	Measurement distance				
IVITIZ	(microvolts/meter)	(meter)				
0.009-0.490	2400/F(kHz)	300				
0.490-1.705	24000/F(kHz)	30				
1.705-30	30	30				
30-88	100	3				
88-216	150	3				
216-960	200	3				
Above 960	500	3				

Remarks: 1. RF Voltage  $(dB\mu V) = 20 \log RF$  Voltage (uV)

- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

#### 4.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

#### 4.4. Uncertainty

± 4.08 dB above 1GHz
± 4.22 dB below 1GHz



#### 4.5. Test Result of Radiated Emission

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	-12.148	56.650	44.502	-29.498	74.000	PEAK
2	*	7206.000	-13.147	58.130	44.983	-29.017	74.000	PEAK
3		9608.000	-13.430	57.120	43.690	-30.310	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
Trouuer	•	23.1 menes Dar type Digital Signage

- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- : Test date : 2019/11/01

Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

#### Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	-12.148	56.920	44.772	-29.228	74.000	PEAK
2	*	7206.000	-13.147	59.440	46.293	-27.707	74.000	PEAK
3		9608.000	-13.430	57.270	43.840	-30.160	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss Amplifier gain. 5.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	23.1 inches Bar type Digital Signage
1104401	•	25.1 menes Dur type Digital Signage

- Test Item : Harmonic Radiated Emission
- Test Site
  - Site : No.3 OATS date : 2019/11/01
- Test date : Test Mode :

Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	-11.589	56.030	44.441	-29.559	74.000	PEAK
2	*	7323.000	-13.572	58.090	44.518	-29.482	74.000	PEAK
3		9764.000	-12.529	56.020	43.491	-30.509	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	23.1	inches	Bar type	Digital	Signage
TTouuci	•	45.1	menes	Dartype	Digital	orginage

- Test Item Harmonic Radiated Emission :
- Test Site
- No.3 OATS : Test date : 2019/11/01

:

Test Mode

Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4882.000	-11.589	56.380	44.791	-29.209	74.000	PEAK
2		7323.000	-13.572	57.660	44.088	-29.912	74.000	PEAK
3		9764.000	-12.529	56.070	43.541	-30.459	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-10.882	55.430	44.548	-29.452	74.000	PEAK
2		7440.000	-14.622	56.780	42.158	-31.842	74.000	PEAK
3		9920.000	-14.231	57.520	43.289	-30.711	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-10.882	55.110	44.228	-29.772	74.000	PEAK
2		7440.000	-14.622	56.690	42.068	-31.932	74.000	PEAK
3		9920.000	-14.231	58.120	43.889	-30.111	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
TToquet	•	23.1 menes Dar type Digital Signage

- Test Item Harmonic Radiated Emission :
- Test Site
- No.3 OATS Test date :

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Test Mode

2019/11/01 Mode 2: Transmit - 2Mbps (4DQPSK)(2402MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	-12.148	55.900	43.752	-30.248	74.000	PEAK
2	*	7206.000	-13.147	57.400	44.253	-29.747	74.000	PEAK
3		9608.000	-13.430	57.650	44.220	-29.780	74.000	PEAK

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average 1. measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product : 23.1 inc	hes Bar type Digital Signage
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- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- : Test date : 2019/11/01 :

Test Mode

Mode 2: Transmit - 2Mbps (4DQPSK) (2402MHz)

#### Vertical



		Frequency	requency Correct Factor Reading Level		Measure Level	Margin Limit		Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	-12.148	54.980	42.832	-31.168	74.000	PEAK
2		7206.000	-13.147	57.600	44.453	-29.547	74.000	PEAK
3	*	9608.000	-13.430	58.590	45.160	-28.840	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss Amplifier gain. 5.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	23.1 inches Bar type Digital Signage
1104401	•	25.1 menes Dur type Digital Signage

- Test Item Harmonic Radiated Emission :
- Test Site
- No.3 OATS : Test date : 2019/11/01

Test Mode : Mode 2: Transmit - 2Mbps (4DQPSK) (2441MHz)

#### Horizontal



		Frequency Correct Factor Reading Level		Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4882.000	-11.589	56.990	45.401	-28.599	74.000	PEAK
2		7323.000	-13.572	57.650	44.078	-29.922	74.000	PEAK
3		9764.000	-12.529	56.540	44.011	-29.989	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	23.1	inches	Bar type	Digital	Signage
TTouuci	•	45.1	menes	Dartype	Digital	orginage

- Test Item Harmonic Radiated Emission :
- Test Site
- No.3 OATS : Test date : 2019/11/01

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Test Mode

Mode 2: Transmit - 2Mbps (4DQPSK) (2441MHz)



	Frequency Correct Factor		Frequency Correct Factor Reading Level		Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	-11.589	56.280	44.691	-29.309	74.000	PEAK
2	*	7323.000	-13.572	58.630	45.058	-28.942	74.000	PEAK
3		9764.000	-12.529	56.400	43.871	-30.129	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK) (2480MHz)





		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-10.882	55.370	44.488	-29.512	74.000	PEAK
2		7440.000	-14.622	56.780	42.158	-31.842	74.000	PEAK
3		9920.000	-14.231	58.060	43.829	-30.171	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK) (2480MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-10.882	55.650	44.768	-29.232	74.000	PEAK
2		7440.000	-14.622	56.430	41.808	-32.192	74.000	PEAK
3		9920.000	-14.231	58.600	44.369	-29.631	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.


Product	:	23.1 inches Bar type Digital Signage
TToquet	•	23.1 menes Dar type Digital Signage

- Test Item : Harmonic Radiated Emission
- Test Site
  - Site : No.3 OATS date : 2019/11/01

Test date : 2019 Test Mode : Mod

de : Mode 3: Transmit - 3Mbps (8DPSK)(2402MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	-12.148	55.380	43.232	-30.768	74.000	PEAK
2	*	7206.000	-13.147	57.690	44.543	-29.457	74.000	PEAK
3		9608.000	-13.430	57.450	44.020	-29.980	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
TTouuet	•	25.1 menes Dar type Digital Signage

- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- Test date 2019/11/01 :

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Test Mode

Mode 3: Transmit - 3Mbps (8DPSK)(2402MHz)

#### Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	-12.148	55.290	43.142	-30.858	74.000	PEAK
2	*	7206.000	-13.147	58.680	45.533	-28.467	74.000	PEAK
3		9608.000	-13.430	57.820	44.390	-29.610	74.000	PEAK

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average 1. measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss Amplifier gain. 5.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK) (2441MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	-11.589	56.270	44.681	-29.319	74.000	PEAK
2	*	7323.000	-13.572	58.600	45.028	-28.972	74.000	PEAK
3		9764.000	-12.529	56.480	43.951	-30.049	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



:	23.1 inches Bar type Digital Signage
:	Harmonic Radiated Emission
:	No.3 OATS
:	2019/11/01
:	Mode 3: Transmit - 3Mbps (8DPSK) (2441MHz)
	: : : :



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4882.000	-11.589	57.020	45.431	-28.569	74.000	PEAK
2		7323.000	-13.572	58.320	44.748	-29.252	74.000	PEAK
3		9764.000	-12.529	56.500	43.971	-30.029	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
TTOQUOL	•	25.1 menes bar type Digital Digitage

- Test Item : Harmonic Radiated Emission
- Test Site
  - Site : No.3 OATS date : 2019/11/01
- Test date : Test Mode :

Mode 3: Transmit - 3Mbps (8DPSK) (2480MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-10.882	55.810	44.928	-29.072	74.000	PEAK
2		7440.000	-14.622	57.040	42.418	-31.582	74.000	PEAK
3		9920.000	-14.231	58.490	44.259	-29.741	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
TTOQUOL	•	25.1 menes bar type Digital Digitage

- Test Item : Harmonic Radiated Emission
- Test Site
  - Site : No.3 OATS late : 2019/11/01
- Test date : 2019/1

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK) (2480MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	4960.000	-10.882	56.380	45.498	-28.502	74.000	PEAK
2		7440.000	-14.622	56.480	41.858	-32.142	74.000	PEAK
3		9920.000	-14.231	58.300	44.069	-29.931	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	23.1 inches Bar type Digital Signage
TTOuuci	•	25.1 menes Dar type Digital Signage

- Test Item : General Radiated Emission
- Test Site
  - t Site : No.3 OATS t date : 2019/11/01
- Test date : 2 Test Mode : 1

Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		97.478	-16.559	48.088	31.529	-11.971	43.500	PEAK
2		263.362	-18.346	55.840	37.493	-8.507	46.000	PEAK
3	*	377.232	-12.123	51.741	39.618	-6.382	46.000	PEAK
4		458.768	-10.460	48.371	37.911	-8.089	46.000	PEAK
5		696.348	-9.206	46.344	37.138	-8.862	46.000	PEAK
6		800.377	-8.930	42.515	33.585	-12.415	46.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	23.1 inches Bar type Digital Signage
TTouuci	•	25.1 menes Dar type Digital Signage

- Test Item General Radiated Emission :
- Test Site
- No.3 OATS : Test date :
- Test Mode
- 2019/11/01

: Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		52.493	-17.786	53.499	35.713	-4.287	40.000	PEAK
2		350.522	-13.279	56.923	43.643	-2.357	46.000	PEAK
3	*	458.768	-10.460	54.260	43.800	-2.200	46.000	PEAK
4		540.304	-11.395	46.355	34.960	-11.040	46.000	PEAK
5		675.261	-9.469	49.906	40.437	-5.563	46.000	PEAK
6		810.217	-8.944	41.882	32.938	-13.062	46.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	23.1 inches Bar type Digital Signage
1104400	•	2511 menes Bui type Digital Signage

- Test Item General Radiated Emission :
- Test Site
- No.3 OATS : Test date :
- Test Mode :

2019/11/01 Mode 2: Transmit - 2Mbps (4DQPSK) (2441MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		143.870	-18.476	51.185	32.709	-10.791	43.500	PEAK
2		246.493	-18.154	55.517	37.363	-8.637	46.000	PEAK
3	*	377.232	-12.123	51.960	39.837	-6.163	46.000	PEAK
4		485.478	-11.794	47.801	36.006	-9.994	46.000	PEAK
5		689.319	-9.230	47.734	38.503	-7.497	46.000	PEAK
6		860.826	-8.415	41.123	32.708	-13.292	46.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	23.1 inches Bar type Digital Signage
Ilouuot	•	23.1 menes Dai type Digital Digitage

Test Item General Radiated Emission :

No.3 OATS

- Test Site
- Test date : 2019/11/01 :

Test Mode

Mode 2: Transmit - 2Mbps (4DQPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		108.725	-16.705	53.913	37.209	-6.291	43.500	PEAK
2		188.855	-18.813	53.883	35.070	-8.430	43.500	PEAK
3		350.522	-13.279	56.990	43.710	-2.290	46.000	PEAK
4		405.348	-13.330	57.354	44.024	-1.976	46.000	PEAK
5	*	458.768	-10.460	54.519	44.059	-1.941	46.000	PEAK
6		756.797	-7.372	40.241	32.868	-13.132	46.000	PEAK

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average 1. measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	General Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK) (2441MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		118.565	-16.901	54.020	37.118	-6.382	43.500	PEAK
2		270.391	-18.646	55.075	36.428	-9.572	46.000	PEAK
3	*	350.522	-13.279	54.125	40.845	-5.155	46.000	PEAK
4		458.768	-10.460	48.950	38.490	-7.510	46.000	PEAK
5		666.826	-9.799	50.563	40.763	-5.237	46.000	PEAK
6		856.609	-8.385	43.413	35.028	-10.972	46.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	General Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/11/01
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		122.783	-16.678	48.533	31.855	-11.645	43.500	PEAK
2		215.565	-18.132	56.105	37.973	-5.527	43.500	PEAK
3	*	350.522	-13.279	57.082	43.802	-2.198	46.000	PEAK
4		432.058	-10.761	52.455	41.694	-4.306	46.000	PEAK
5		513.594	-11.113	45.048	33.935	-12.065	46.000	PEAK
6		756.797	-7.372	39.969	32.596	-13.404	46.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

# 5. **RF Antenna Conducted Test**

#### 5.1. Test Setup



#### 5.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

#### 5.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

#### 5.4. Uncertainty

± 1.20dB

#### 5.5. **Test Result of RF Antenna Conducted Test**

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test date	:	2019/03/13
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

#### **Figure Channel 00:** Spurious Emission(30MHz-25GHz) Reading Value 10 RBW: 100k, VBW: 1M Sweep Time: Auto 0 -10 -20 dBm -30 -40 -50 -<mark>60</mark> -70 5 10 15 20 25 GHz





Note: The above test pattern is synthesized by multiple of the frequency range.

# Figure Channel 39:



- Product : 23.1 inches Bar type Digital Signage
- Test Item : RF Antenna Conducted Test
- Test Site
  - Site : No.3 OATS late : 2019/03/13
- Test date : 2019
- Test Mode : Mode 2: Transmit 2Mbps (4DQPSK)











#### Note: The above test pattern is synthesized by multiple of the frequency range.



- Product 23.1 inches Bar type Digital Signage :
- Test Item RF Antenna Conducted Test :
- Test Site
  - No.3 OATS : 2019/03/13 :
- Test date
- Test Mode Mode 3: Transmit - 3Mbps (8DPSK) :







# Note: The above test pattern is synthesized by multiple of the frequency range.



# 6. Band Edge

#### 6.1. Test Setup

# **RF Radiated Measurement:**

#### Above 1GHz



#### **RF Conducted Measurement**



# 6.2. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

# 6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

# 6.4. Uncertainty

- ± 4.08 dB above 1GHz
- ± 4.22 dB below 1GHz



#### 6.5. Test Result of Band Edge

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/24
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	12.899	41.239	54.138	-19.862	74.000	PEAK
2		2400.000	12.961	62.457	75.418			PEAK
3	*	2401.884	12.974	83.745	96.719			PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
00 (Average)	2390.000	54.138	-30.755	23.383	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/24
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

#### Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	12.899	41.172	54.071	-19.929	74.000	PEAK
2		2400.000	12.961	61.625	74.586			PEAK
3	*	2401.884	12.974	83.259	96.233			PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Eraguanau	Peak	Duty Cycle	Average	Peak	Average Limit	
	(MHz)	Measurement	Factor	Measurement	Limit $(dB\mu V/m)$		Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
00 (Average)	2390.000	54.071	-30.755	23.316	74.00	54.00	Pass

- 1. Average Measurement=Peak Measurement + Duty Cycle Factor
- 2. The Duty Cycle is refer to section 11.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/24
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

#### Horizontal

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		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.877	13.369	85.706	99.075			PEAK
2		2483.500	13.375	56.787	70.161	-3.839	74.000	PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency	Peak Measurement	Duty Cycle Factor	Average Measurement	Peak Limit	Average Limit (dBµV/m)	Result
1	(MHz)	$(dB\mu V/m)$	(dB)	(dBµV/m)	(dBµV/m)		
78 (Average)	2483.500	70.161	-30.755	39.406	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

#### Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.877	13.369	86.216	99.585			PEAK
2		2483.500	13.375	57.090	70.464	-3.536	74.000	PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MU <sub>7</sub> )	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
	(MITZ)	$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
78 (Average)	2483.500	70.464	-30.755	39.709	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 2: Transmit - 2Mbps (4DQPSK) (2402MHz)

#### Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	12.899	40.936	53.835	-20.165	74.000	PEAK
2		2400.000	12.961	61.024	73.985			PEAK
3	*	2402.174	12.976	81.768	94.744			PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
00 (Average)	2390.000	53.835	-30.755	23.080	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/24
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK) (2402MHz)

#### Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	12.899	41.004	53.903	-20.097	74.000	PEAK
2		2400.000	12.961	61.409	74.370			PEAK
3	*	2401.884	12.974	82.198	95.172			PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eraguanau	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MU <sub>7</sub> )	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
	(MITZ)	$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
00 (Average)	2390.000	53.903	-30.755	23.148	74.00	54.00	Pass

- 1. Average Measurement=Peak Measurement + Duty Cycle Factor
- 2. The Duty Cycle is refer to section 11.



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/24
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK) (2480MHz)

#### Horizontal

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		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.877	13.369	82.744	96.113			PEAK
2		2483.500	13.375	55.993	69.367	-4.633	74.000	PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency	Peak Measurement	Duty Cycle Factor	Average Measurement	Peak Limit	Average Limit	Result
	(MHz)	$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(uDµ V/III)	Result
78 (Average)	2483.500	69.367	-30.755	38.612	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 2: Transmit - 2Mbps (4DQPSK) (2480MHz)

#### Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.877	13.369	83.001	96.370			PEAK
2		2483.500	13.375	56.422	69.796	-4.204	74.000	PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
78 (Average)	2483.500	69.796	-30.755	39.041	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK) (2402MHz)

#### Horizontal



		Frequency	Frequency Correct Factor		Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	12.899	42.444	55.343	-18.657	74.000	PEAK
2		2400.000	12.961	61.221	74.182			PEAK
3	*	2402.029	12.975	82.165	95.140			PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
00 (Average)	2390.000	55.343	-30.755	24.588	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



	Product	:	23.1 inches Bar type Digital Signage
--	---------	---	--------------------------------------

- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK) (2402MHz)

#### Vertical



		Frequency Correct Factor		Reading Level Measure Leve		Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	12.899	40.169	53.068	-20.932	74.000	PEAK
2		2400.000	12.961	60.750	73.711			PEAK
3	*	2402.029	12.975	82.662	95.637			PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
00 (Average)	2390.000	53.068	-30.755	22.313	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK) (2480MHz)

#### Horizontal



		Frequency Correct Factor		Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	13.369	82.967	96.336			PEAK
2		2483.500	13.375	56.092	69.466	-4.534	74.000	PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		(dBµV/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
78 (Average)	2483.500	69.466	-30.755	38.711	74.00	54.00	Pass

- 1. Average Measurement=Peak Measurement + Duty Cycle Factor
- 2. The Duty Cycle is refer to section 11.



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Band Edge
- Test Site : No.3 OATS
- Test date : 2019/10/24

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK) (2480MHz)

#### Vertical



		Frequency Correct Factor		Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	13.369	83.560	96.929			PEAK
2		2483.500	13.375	56.665	70.039	-3.961	74.000	PEAK

Note:

- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Measurement Level = Reading Level + Correct Factor.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.

	Eroquonou	Peak	Duty Cycle	Average	Peak	Average Limit	
Channel No.	(MHz)	Measurement	Factor	Measurement	Limit	$(dB\mu V/m)$	Result
		$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$		
78 (Average)	2483.500	70.039	-30.755	39.284	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(Hopping off)

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

# Figure Channel 00:

🎉 Key	/sight Sp	ectrum	Analyzer - S	iwept SA								
Cen	ter F	RF req	50 2.3970	Ω AC	łz	SE		Avg	ALIGN AUTO Type: Log-Pwr	09:13:34 P TRA	MOct 31, 2019 CE 1 2 3 4 5 6	Frequency
10 de	3/div	Rei Re	f Offset (	).5 dB dBm	NO: Fast ( Gain:Low	#Atten: 3	0 dB		Mkr3 2	.399 976 -44.	05 GHz 04 dBm	Auto Tune
10.5 0.500 -9.50												Center Freq 2.397000000 GHz
-19.5 -29.5 -39.5									<b>3</b>		21.82.00m	Start Freq 2.39000000 GHz
-49.5 -59.5 -69.5	Also lar	haddae	-Komen	manulului			witzensk <sup>a</sup>	www.WW			-## 4p	Stop Freq 2.404000000 GHz
Star #Res	t 2.39 s BW	100	0 GHz kHz		#VB	W 300 kHz		Sweet	o (#Swp) 2	Stop 2.40 .667 ms (4	4000 GHz 0001 pts)	CF Step 1.400000 MHz <u>Auto</u> Man
1 2 3 4 5 6	N N N			2.402 172 6 2.400 000 0 2.399 976 0	5 GHz 0 GHz 5 GHz	-1.82 d -45.77 d -44.04 d	Bm Bm Bm				E	Freq Offset 0 Hz
7 8 9 10 11						т						
MSG									STAT	US		

# Figure Channel 78:

📕 Keysight Spectri	um Analyzer - Swept S	iA						
Center Fre	q 2.4890000	DOO GHz	SENS	E:INT Avg Ty	ALIGN AUTO	09:26:24 PM TRACE	0ct 31, 2019 1 2 3 4 5 6	Frequency
10 dB/div	Ref Offset 0.5 dB	PNO: Fast IFGain:Low B M	#Atten: 30	Run dB	Mkr3 2.4	183 518 1 -50.2	5 GHz 3 dBm	Auto Tune
10.5 0.500 -9.50	1							Center Freq 2.489000000 GHz
-19.5 -29.5 -39.5	humme -	3					21.77 dBm	Start Freq 2.478000000 GHz
-49.5 -59.5 -69.5		Munner	Merilesenseleptersonale	ana anta franciation	an a	and a fear of a line of	(Antibinanta)	Stop Freq 2.50000000 GHz
Start 2.4780 #Res BW 10	00 GHz 00 kHz	#V	BW 300 kHz	Sweep	(#Swp) 2.0	Stop 2.500 567 ms (40	000 GHz 001 pts)	CF Step 2.200000 MHz Auto Man
1 N 1 2 N 1 3 N 1 4 5 6 7	f 2.44 f 2.44 f 2.44	80 185 70 GHz 83 500 00 GHz 83 518 15 GHz	-1.77 dBr -52.43 dBr -50.23 dBr	n n n				Freq Offset 0 Hz
8 9 10 11 <			m		STATUS	10		



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK) (Hopping off)

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

# Figure Channel 00:

🚺 Keysi	ght Spec	trum /	Analyzer - Sw	ept SA									- 6 🐱
Cente	er Fr	RF eq 2	50 Ω 2.39700	AC	Ηz	SE	NSE:INT	Avg	ALIG Type: Lo	in auto bg-Pwr	10:22:32 P	MOct 31, 2019 2 1 2 3 4 5 6	Frequency
10 dB/	div	Ref	Offset 0.0	P IF 5 dB dBm	NO: Fast Gain:Low	#Atten: 3	e Run 0 dB		Mk	r3 2.3	399 349 -55.	55 GHz 15 dBm	Auto Tune
10.5 - 0.500 - -9.50 -													Center Free 2.397000000 GH
-19.5 -29.5 -39.5												-30.46 dBm	Start Free 2.390000000 GH
-49.5 -59.5 🏜 -69.5	Anyadar		derflamiter	-	lan bahar sa	naniaa taa hokari daan-	latenastel	Section Party	¢³ ĝ	2 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		hanne	Stop Free 2.404000000 GH
Start #Res	2.390 BW 1	0000	) GHz kHz	1	#VE	W 300 kHz		Swee	p (#Sv	(p) 2.6	8top 2.404 667 ms (4	000 GHz 0001 pts)	CF Step 1.400000 MH Auto Ma
1 N 2 N 3 N 4 5 6		f		2.402 161 1 2.400 000 0 2.399 349 5	0 GHz 0 GHz 5 GHz	-10.46 d -57.33 d -55.15 d	Bm Bm Bm	PONCTION	PONCTR		PONCTI	E	Freq Offse 0 H
7 8 9 10 11													
MSG										STATUS	5		L

# Figure Channel 78:

Keysight Spectrum Analyzer - Swept SA			
	GH7	ALIGN AUTO 10:49: Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 Frequency
Ref Offset 0.5 dB	PNO: Fast IFGain:Low #Atten: 30 dB	Mkr3 2.493 88 -5	Auto Tur 4.51 dBm
10.5 0.500			Center Fro 2.489000000 G
-19.5			-30.09 dBn 2.478000000 Gi
-49.5 -59.5 -69.5	2	entitie de mattingelentiteter	Stop Fro 2.50000000 G
Start 2.47800 GHz #Res BW 100 kHz MKR MODE TRO SCL X	#VBW 300 kHz	Stop 2 Sweep (#Swp) 2.667 ms	2.50000 GHz (40001 pts) Auto M
1 N 1 f 2.480 17 2 N 1 f 2.483 50 3 N 1 f 2.493 88 4 5 6 6	79 65 GHz -10.09 dBm 00 00 GHz -57.23 dBm 33 45 GHz -54.51 dBm		Freq Offs
7     8       9     10       11     11			
MSG	m	STATUS	· ·



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK) (Hopping off)

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

# Figure Channel 00:

📕 Keysight S	Spectrum Anal	yzer - Swept SA								- 6 🐱
Center	RF Freq 2.3	50 Q AC 397000000 G	Ηz	SENS		g Type: L	IGN AUTO Log-Pwr	09:44:09 Pt TRAC	4 Oct 31, 2019 E 1 2 3 4 5 6	Frequency
10 dB/div	Ref Of Ref 2	۳ IF 15et 0.5 dB 10.50 dBm	NO: Fast Gain:Low	#Atten: 30	dB	М	kr3 2.3	98 501 -55.4	15 GHz 41 dBm	Auto Tune
10.5 0.500										Center Freq 2.397000000 GHz
-19.5 -29.5 -39.5									-30.11 dBm	Start Freq 2.390000000 GH2
-49.5 -59.5 ****** -69.5	heteologista	ahisishtein dara an	anta di tata di di tata	h	3- 		2		marcue	Stop Fred 2.404000000 GH
Start 2.3 #Res BV	390000 C N 100 kH	GHz Iz	#VBV	V 300 kHz	Swe	ep (#S	S wp) 2.6	top 2.404 67 ms (4	000 GHz 0001 pts)	CF Step 1.400000 MH: <u>Auto</u> Mar
1 N 2 N 3 N 4 5 6 7	1 f 1 f 1 f	2.402 181 4 2.400 000 0 2.398 501 1	0 GHz 0 GHz 5 GHz	-10.11 dBr -56.97 dBr -55.41 dBr	m m m			PONCTR		Freq Offsel 0 Hz
9 10 11 <				ш			STATUS			

# Figure Channel 78:

🔰 Keysight Spectrum Analyzer - Swept SA			- 6 🛋
Center Freq 2.489000000 GHz	SENSE:INT Avg Type	ALIGN AUTO 09:56:19 PM Oct 31, 2019 E: Log-Pwr TRACE 2 3 4 5 6	Frequency
PNO: Fast IFGain:Low 10 dB/div Ref 20.50 dBm	#Atten: 30 dB	Mkr3 2.497 595 40 GHz -55.17 dBm	Auto Tune
10.5 0.500 			Center Freq 2.489000000 GHz
-19.5		-29.78 dām	Start Freq 2.478000000 GHz
-49.5 -59.5 -69.5	a unitar l'Al Armanth bit de como emerce	Sometime in the Society	Stop Freq 2.50000000 GHz
Start 2.47800 GHz #Res BW 100 kHz #VBW	300 kHz Sweep (#	Stop 2.50000 GHz Swp) 2.667 ms (40001 pts)	CF Step 2.200000 MHz <u>Auto</u> Man
1 N 1 f 2.480 184 60 GHz 2 N 1 f 2.483 500 00 GHz 3 N 1 f 2.483 500 00 GHz 4	-9.78 dBm -58.77 dBm -55.17 dBm		Freq Offset 0 Hz
7 8 9 10 11 11 11 11 11			
MSG		STATUS	



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(Hopping on)

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

# Figure Channel 00 Hopping:

Keysight Spectrum Analyzer - Swept SA			(#
	SENSE:INT	ALIGN AUTO 09:15:28 PM Oct 3 a Type: Log-Pwr TRACE 1 2	1,2019 3 4 5 6 Frequency
Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm	ast - Trig: Free Run .ow #Atten: 30 dB	Mkr3 2.399 409 05 -47.19 c	GHz Auto Tune
10.5 0.500			Center Free 2.397000000 GH
-19.5		▲3	2.390000000 GH
-49.5 -59.5 -69.5	hanne an an the second second		Stop Fre 2.404000000 GH
Start 2.390000 GHz #Res BW 100 kHz #	#VBW 300 kHz Swe	Stop 2.404000 ep (#Swp) 2.667 ms (4000	GHz CF Ste 1 pts) 1.400000 MH Auto Ma
I     N     I     f     2.402 065 55 GH       2     N     1     f     2.402 065 55 GH       3     N     1     f     2.400 000 00 GH       3     N     1     f     2.399 409 05 GH       4     -     -     -     -       5     -     -     -     -	z -2.39 dBm z -57.50 dBm z -47.19 dBm		Freq Offse
7 7 8 9 9 10 11			-
MSG	m	STATUS	•

#### Figure Channel 78 Hopping:

🚺 Keysight Spectrum Analyzer - Swept SA			- 0
Center Freq 2.489000000 GHz	SENSE:INT Avg Type	LIGN AUTO 09:28:41 PM Oct 31, 2019 : Log-Pwr TRACE 1 2 3 4 5 6	Frequency
PNO: Fast IFGain:Low 10 dB/div Ref 20.50 dBm	Trig: Free Run #Atten: 30 dB	/kr3 2.484 527 95 GHz -53.74 dBm	Auto Tune
			Center Freq 2.48900000 GHz
-195		-22.00 686	Start Freq 2.478000000 GHz
49.5	*******************************	Annan dalam makan ang a	Stop Freq 2.50000000 GHz
Start 2.47800 GHz #Res BW 100 kHz #VBW	300 kHz Sweep (#	Stop 2.50000 GHz Swp) 2.667 ms (40001 pts) criton width function value	CF Step 2.200000 MHz Auto Man
1     N     1     f     2.478 019 25 GHz       2     N     1     f     2.483 500 00 GHz       3     N     1     f     2.484 527 95 GHz       4	-2.00 dBm -58.55 dBm -53.74 dBm		Freq Offset 0 Hz
7	π.		
MSG		STATUS	



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK) (Hopping on)

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

# Figure Channel 00 Hopping:

🐹 Keysight Spectrum Analyzer - Swept SA			- 6 🐱
Center Freq 2.397000000 (	GHz SENSE:INT	ALIGN AUTO 10:24:46 PM Oct 31, 2019 Avg Type: Log-Pwr TRACE 1 2 3 4 5	Frequency
Ref Offset 0.5 dB	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Mkr3 2.392 580 20 GHz -55.25 dBm	Auto Tune
10.5 0.500			Center Freq 2.397000000 GHz
-19.5		-30.66 604	Start Freq 2.390000000 GHz
-49.5 -59.5 -69.5			Stop Freq 2.404000000 GHz
Start 2.390000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 2.404000 GHz Sweep (#Swp) 2.667 ms (40001 pts crion function within function value	CF Step 1.400000 MHz Auto Man
1     N     1     f     2.402.02       2     N     1     f     2.400.00       3     N     1     f     2.392.580       4     5     5     5       6     6     6     6	4 60 GHz -10.66 dBm 0 00 GHz -57.35 dBm 0 20 GHz -55.25 dBm		Freq Offset 0 Hz
7 8 9 9 10 11			
MSG		STATUS	

# Figure Channel 78 Hopping:

Keysight Spectrum Analyzer - Swept SA				
RL RF 50 Ω AC Cepter Freq 2.489000000 G	SENSE:INT	ALIGN AUTO 10	TRACE 1 2 3 4 5 6	Frequency
Ref Offset 0.5 dB	FGain:Low Trig: Free Run #Atten: 30 dB	Mkr3 2.498	539 20 GHz -54.57 dBm	Auto Tune
10.5 0.500				Center Freq 2.489000000 GHz
-19.5			31.96 dBm	Start Freq 2.478000000 GH2
-49.5 -59.5 -69.5				Stop Freq 2.500000000 GHz
Start 2.47800 GHz #Res BW 100 kHz	#VBW 300 kHz	Sto Sweep (#Swp) 2.667	p 2.50000 GHz ms (40001 pts)	CF Step 2.200000 MHz Auto Man
1     N     1     f     2,479 002       2     N     1     f     2,479 002       3     N     1     f     2,483 500       4	10 GHz -11.96 dBm 00 GHz -56.57 dBm 20 GHz -54.57 dBm		E	Freq Offsel 0 Hz
9 10 11 11	π.	STATUS		



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK) (Hopping on)

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

# Figure Channel 00 Hopping:

🐹 Keysight Spectrum Analyzer - Swept SA			- 0 <b>- X</b>
Center Freq 2.397000000	GHz	ALIGN AUTO 09:46:57 PM Oct 31, 2019 Avg Type: Log-Pwr TRACE 1 2 3 4 5 6	Frequency
Ref Offset 0.5 dB	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Мkr3 2.391 207 50 GHz -55.41 dBm	Auto Tune
10.5 0.500		 	Center Freq 2.397000000 GHz
-19.5			Start Freq 2.390000000 GHz
-49.5 -59.5 -69.5			Stop Freq 2.404000000 GHz
Start 2.390000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 2.404000 GHz Sweep (#Swp) 2.667 ms (40001 pts)	CF Step 1.400000 MHz <u>Auto</u> Man
1     N     1     f     2.40192     2     N     1     f     2.40000     3     N     1     f     2.40192     4     5	25 20 GHz -10.92 dBm 10 00 GHz -58.48 dBm 17 50 GHz -56.41 dBm		Freq Offset 0 Hz
7     8       9     10       11     11			
MSG	m	STATUS	

# Figure Channel 78 Hopping:

Keysight Spectrum Analyzer - Swept SA				- 6 <b>- X</b>
	GH7	ALIGN AUTO	09:59:21 PM Oct 31, 2019 TRACE 1 2 3 4 5 6	Frequency
Ref Offset 0.5 dB	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Mkr3 2.4	184 399 80 GHz	Auto Tune
10.5 0.500 01				Center Freq 2.489000000 GHz
-19.5	2.43		-30.21 dBm	Start Freq 2.478000000 GHz
-49.5		and the second		Stop Freq 2.50000000 GHz
Start 2.47800 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep (#Swp) 2.	Stop 2.50000 GHz 567 ms (40001 pts)	CF Step 2.200000 MHz Auto Man
1     N     1     f     2.480 02       2     N     1     f     2.483 56       3     N     1     f     2.484 33       4     5     6     6     7	20 70 GHz -10.21 dBm 00 00 GHz -56.68 dBm 99 80 GHz -54.69 dBm			Freq Offset 0 Hz
8 9 9 10 11 11 × 1	m	STATU	•	


# 7. Channel Number

# 7.1. Test Setup



## 7.2. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

# 7.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

# 7.4. Uncertainty

N/A



# 7.5. Test Result of Channel Number

Product :	23.1 inches Bar type Digital Signage
Test Item :	Channel Number
Test Site :	No.3 OATS
Test Mode :	Mode 1: Transmit - 1Mbps (GFSK)

Frequency Range	Measurement	Required Limit	Pagult
(MHz)	(Hopping Channel)	(Hopping Channel)	Kesun
$2402 \sim 2480$	79	>75	Pass

#### 2402-2421MHz

#### 2422-2441MHz

M Keysight Sp	pectrum Analyzer - Swept SA	100	1014 AU	10.000	TA SUDARS	an and so was a set of the	0 0 0	BK Ke	ysight Spe	ctrum A	nalyzer - Swe	pt SA	10	1010100	10.612	7.8	SMOLTS-		- AMARINA DI MANANA	0 0 0
Center F	req 2.411000000	GHz	Trig: Free	Run	Aug Type: Log-Pv	0 09:29:39 PM Oct 31, 2019 # TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency	Cen	ter Fr	req 2	.43150	0000 GH	Z	Trio: Free	Run	Avg Typ	ALIGN AUTO	09:30:22 F TRA TV	MOct 31, 2019 CE 1 2 3 4 5 6 PE MWWWWW	Frequency
10 dB/div	Ref Offset 0.5 dB Ref 20.50 dBm	IFGain:Low	#Atten: 30	dB	Mk	2 2.421 000 GHz -3.45 dBm	Auto Tune	10 d	B/div	Ref	Offset 0.5 20.50 d	dB IBm	ain:Low	#Atten: 34	) dB		Mkr	2 2.441 -2.	00 GHz 31 dBm	Auto Tune
10.5 0.500	8 ana	hh	n A /	Inc	1000		Center Freq 2.411000000 GHz	10.5 0.500	2 <sup>1</sup>		ΛΛ	лл	0.0	AA	ΔΑ	20	nn	20	nÅ	Center Freq 2.431500000 GHz
-19.5		V V V	V V	VV	VVVV	VVVV	Start Freq 2.400500000 GHz	-19.5 -29.5 -39.5		Y	VY	/ \/ \		VVV	/ / /	V V	V V	V V V	V V V	Start Freq 2.421500000 GHz
-49.5 -59.5 -69.5		-					Stop Freq 2.421500000 GHz	-49.5 -59.5 -69.5												Stop Freq 2.441500000 GHz
Start 2.40 #Res BW	0050 GHz / 100 kHz	#VBW	V 100 kHz		Sweep (#Swp)	Stop 2.42150 GHz 2.533 ms (1001 pts)	CF Step 2.100000 MHz Auto Man	Star #Re	t 2.42 s BW	150 0 100 I	GHz kHz		#VBV	/ 100 kHz		Sweep	(#Swp) 2	Stop 2.4 .467 ms	4150 GHz (1001 pts)	CF Step 2.000000 MHz Auto Man
1 N 2 N 3 4 5	1 1 2.402 1 1 2.421	2 000 GHz 1 000 GHz	-3.12 dB -3.45 dB	m	TION FUNCTION WE		Freq Offset 0 Hz	1 2 3 4 5	N 1	1		2.422.00	) GHz ) GHz	-2.75 dE -2.31 dE	3m 3m	TION	NETONWOTH	AUNCT	e e	Freq Offset 0 Hz
5 7 8 9 10 11								6 7 8 9 10												
*1			18		577	tus -		+ msg						18			STATU	s]	•	

#### 2442-2461MHz

#### 2462-2480MHz

Keysight Spectrum Analyzer - Swept SA				0.9	BE Keysight S	ectrum Analyze	r - Swept SA					0.0
Center Freq 2.451500000 GHz	SENSE: INT	Avg Type: Log-Pwr	09:30:46 PM Oct 31, 2019 TRACE 1 2 3 4 5 6	Frequency	Center F	req 2.47	1500000 GHz	SEN	Avg T	ype: Log-Pwr	09:31:15 PM Oct 31, 2019 TRACE 1 2 3 4 5 6	Frequency
PNC: Fast IF Gain:Low Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm	#Atten: 30 dB	Mkr	2 2.461 00 GHz -2.41 dBm	Auto Tune	10 dB/div	Ref Offs Ref 20.	PNO: Fa IFGaint et 0.5 dB .50 dBm	est ing: Free ow #Atten: 30	dB	Mki	r2 2.480 00 GHz -2.35 dBm	Auto Tune
				Center Freq 2.451500000 GHz	10.5 0.500	00		000	000	NAM		Center Freq 2.471500000 GHz
-195 V V V V V V V -295 -305	V V V V	V V V V V		Start Freq 2.441500000 GHz	-19.5 -29.5 -39.5			V V V V		VV	V V V	Start Free 2.461500000 GH
-49.5 				Stop Freq 2.461500000 GHz	-49.5 -69.5	_				-	- L	Stop Free 2.481500000 GH
Start 2.44150 GHz #Res BW 100 kHz #VB	W 100 kHz	Sweep (#Swp) 2.	Stop 2.46150 GHz 467 ms (1001 pts)	CF Step 2.000000 MHz Auto Man	Start 2.4 #Res BW	5150 GHz 100 kHz		VBW 100 kHz	Swee	p (#Swp) 2	Stop 2.48150 GHz 2.467 ms (1001 pts)	CF Stej 2.000000 MH Auto Ma
1 N 1 f 2.442.00 GHz 2 N 1 f 2.461.00 GHz 3 4 5	-2.81 dBm -2.41 dBm			Freq Offset 0 Hz	1 N 2 N 3 4 5		2,452 00 GH 2,480 00 GH	z -2.80 dB z -2.35 dB	m			Freq Offse 0 H
6 7 8 9 9					6 7 8 9 10							
			· · · ·		1	1 1		1			· · · ·	
274 J		510105								since	74	



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK)

Frequency Range	Measurement	Required Limit	Pagult		
(MHz)	(Hopping Channel)	(Hopping Channel)	Kesuit		
$2402 \sim 2480$	79	>75	Pass		

#### 2402-2421MHz

#### 2422-2441MHz

Center Freq 2.411000000 GHz State: 30 dB Sta	quency
Indicative SAtten: 30 dB Der/P NNNN N Is GainLow SAtten: 30 dB Der/P NNNN N	
Ref Offset 0.5 dB         Mkr2 2.421 000 GHz         Add 0 fulle         Ref Offset 0.5 dB         Mkr2 2.441 00 GHz           10 dB/div         Ref 20.50 dBm         -12.41 dBm         10 dB/div         Ref 20.50 dBm         -10.93 dBm	Auto Tune
Control         <	enter Freq 500000 GHz
StartFreq         105         240         200         200         200         2	Start Freq 500000 GHz
485         485         485         6         6         6         244           685         2.42160000 GHz         65         6         6         6         6         244	Stop Freq 500000 GHz
Start 2.40050 GHz         Stop 2.42150 GHz         Stop 2.42150 GHz         Stop 2.42150 GHz         2.100000 MHz         #VBW 100 kHz         Stop 2.42150 GHz         2.4150 GHz         2.40050 MHz         #VBW 100 kHz         Stop 2.42150 GHz         2.40050 MHz         #US MIZ         Stop 2.42150 GHz         2.40050 MHz <t< td=""><td>CF Step 000000 MHz Man</td></t<>	CF Step 000000 MHz Man
Discretion fraction         A         Y         Y	req Offsel 0 Ha

#### 2442-2461MHz

#### 2462-2480MHz

🐹 Keysight Spectrum Analyzer - Swept SA		0.0	III Keysight Spectrum Analyzer - Swept SA	0.0
RL         RF         S0:0         AC         SERVICE:DNT           Center Freq 2.451500000 GHz         51         51         50         51	AUGN AUTO 10:54:12 PM Oct 31, 2019 Avg Type: Log-Pwr TRACE 1 2 3 4 5 6	Frequency	RL         RF         SE D: AC         SEME:::N1         ALIGN AUTO         10:55:94 FM Oct 31, 2019           Center Freq 2.471500000 GHz         Avg Type: Log-Pwr         TRACE[1:2:3:45:6	Frequency
PRO: Fast Ing: Pree Run IF GainLow #Atten: 30 dB Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm	Mkr2 2.461 00 GHz -11.35 dBm	Auto Tune	PHIC Fail         Thig: Free Kun         Composition           Ref Offset 0.5 dB         Mkr2 2.480 00 GHz         0 GB/div           10 dB/div         Ref 2.50 dBm         -12.55 dBm	Auto Tune
	<b>€</b>	Center Freq 2.451500000 GHz		Center Freq 471500000 GHz
195 295 395	and a second	Start Freq 2.441500000 GHz		Start Freq 461500000 GHz
-49.5 		Stop Freq 2.461500000 GHz	495	Stop Freq 481500000 GHz
Start 2.44150 GHz #Res BW 100 kHz #VBW 100 kHz \$	Stop 2.46150 GHz Sweep (#Swp) 2.467 ms (1001 pts)	CF Step 2.000000 MHz Auto Man	Start 2.46150 GHz Stop 2.48150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep (#Swp) 2.467 ms (1001 pts) Auto	CF Step 2.000000 MHz Man
Link         1         1         2         42         0.0 Hz         -10.99 dBm           II         N         1         f         2.442 00 GHz         -10.99 dBm         -11.35 dBm           II         N         1         f         2.461 00 GHz         -11.35 dBm         -11.35 dBm           II         6         -		Freq Offset 0 Hz	Control time text         0	Freq Offset 0 Hz
MSG	STATUS		MSG STATUS	



Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 3: Transmit - 3Mbps (8DPSK)

Frequency Range	Measurement	Required Limit	Pogult
(MHz)	(Hopping Channel)	(Hopping Channel)	Result
$2402 \sim 2480$	79	>75	Pass

#### 2402-2421MHz

## 2422-2441MHz

Keysight Spectrum Analyzer - Snept SA		0.0	🗱 Keysight Spectrum Analyzer - Swegt SA	0.0
Center Freq 2.411000000 GHz Tric Free Run	Aug Type: Log-Pwr TRACE 1 2 3 4 5 6	Frequency	RL         RF         SED AC         SENSE INT         ALIGN AUTO         10:82:10 FM Oct 31, 2019           Center Freq 2.431500000 GHz         Trig: Free Run         Avg Type: Log-Pwr         TRACE[1: 2: 3: 4: 5: 6: 7000	Frequency
PRO: bast #Atten: 30 dB Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm	Mkr2 2.421 000 GHz -10.48 dBm	Auto Tune	PAC + BAL PAC + BAL PAC + BAL Atten: 30 dB Atten: 30 dB Mkr2 2.441 00 GHz -10.4 dBm -10.4 dBm -10.4 dBm	Auto Tune
	2	Center Freq 2.411000000 GHz		Center Freq 2.431500000 GHz
305	ويستحيم والمستحير والمستحير والمستحير والمستحير والمستحير والمستحير والمستحين والمستحير والمستحير والمستح	Start Freq 2.400500000 GHz		Start Freq 2.421500000 GHz
495		Stop Freq 2.421500000 GHz	-495	Stop Freq 2.441500000 GHz
Start 2.40050 GHz #Res BW 100 kHz #VBW 100 kHz	Stop 2.42150 GHz Sweep (#Swp) 2.533 ms (1001 pts)	CF Step 2.100000 MHz Auto Man	Start 2.42150 GHz Stop 2.44150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep (#Swp) 2.467 ms (1001 pts)	CF Step 2.000000 MHz Auto Man
I         N         I         I         2.402 000 GHz         -10.81 dBm           Z         N         I         I         2.402 000 GHz         -10.81 dBm           Z         N         I         I         2.421 000 GHz         -10.48 dBm           3		Freq Offset 0 Hz	I         N         I         Z         A22200 GHz         -10.87 dBm           I         N         I         Z         A4100 GHz         -10.74 dBm           I         N         I         Z         A4100 GHz         -10.74 dBm           I         S         I	Freq Offset 0 Hz
6 7 8 9 9				
e l	STATUS		et and status	

#### 2442-2461MHz

#### 2462-2480MHz

rysight Spectrum Analyzer - Swept SA		0 9 2	🗱 Keysight Spectrum Analyzer - Swept SA	0.0
IL RF 50 D AC SENSE SHT ALIGN AU Iter Freq 2.451500000 GHz Avg Type: Log-P	TO 10:03:02 PM Oct 31, 2019 W/ TRACE 1 2 3 4 5 6	Frequency	RL         RF         SS 0         AC         SENSE:INT         ALIGN AUTO         10/02/49 FM Oct 31, 2019           Center Freq 2.471500000 GHz         Trace Sense Sens	Frequency
PNC: Fast Ing. ree run IFGain.tow #Atten: 30 dB Ref Offset 0.5 dB N IB/div Ref 20.50 dBm	Ikr2 2.461 00 GHz -10.78 dBm	Auto Tune	PRC Fast C 10g res dla End and C 2,480 00 GHz 10 dB/dy Ref 20.50 dBm -111.87 dBm	Auto Tune
	¢	Center Freq 2.451500000 GHz		Center Freq 2.471500000 GHz
		Start Freq 2.441500000 GHz		Start Fred 2.461500000 GH:
		Stop Freq 2.461500000 GHz	495	Stop Fred 2.481500000 GH:
rt 2.44150 GHz Is BW 100 kHz #VBW 100 kHz Sweep (#Swp	Stop 2.46150 GHz ) 2.467 ms (1001 pts)	CF Step 2.000000 MHz Auto Man	Start 2.46150 GHz Stop 2.48150 GHz #Res BW 100 kHz #VBW 100 kHz Sweep (#Swp) 2.467 ms (1001 pts)	CF Step 2.000000 MH Auto Mar
N 1 1 1 2442 00 GHz -10.95 dBm N 1 1 7 2.461 00 GHz -10.78 dBm		Freq Offset 0 Hz	1         N         1         f         2.462.00 GHz         -10.62 dBm           12         N         1         f         2.480.00 GHz         -11.87 dBm           3         -         -         -         -         -           4         -         -         -         -         -           5         -         -         -         -         -	Freq Offse 0 Hi
	TATUS		e status	

# 8. Channel Separation

# 8.1. Test Setup



## 8.2. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

# 8.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

# 8.4. Uncertainty

± 283Hz

# 8.5. Test Result of Channel Separation

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Channel Separation
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

	Engglion or	Measurement	Limit	Limit of (2/3)*20dB	
Channel No.	(MHz)	Level	(1,11,2)	Dondwidth (kHz)	Result
	(MHZ)	(kHz)	(кпz)	Bandwidth (KHZ)	
00	2402	1000	>25 kHz	634.0	Pass
39	2441	1000	>25 kHz	636.0	Pass
78	2480	1000	>25 kHz	678.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

Center Fr	RF 50	AC AC							
	eq 2.402	000000 GHz		SENSE:IN	Avg Type	ALIGN AUTO e: Log-Pwr	09:12:48 PM TRACE	Oct 31, 2019	Frequency
10 dB(div	Ref Offset	PNO: N IFGain 0.5 dB	Wide  I I	Atten: 30 dB	1	Mkr	2 2.403 ( -2.4		Auto Tune
					2				Center Freq 2.402000000 GHz
-19.5 -29.5 -39.5									<b>Start Freq</b> 2.397000000 GHz
-49.5 -59.5 -69.5	hard assurbanding								<b>Stop Freq</b> 2.407000000 GHz
Center 2.4 #Res BW 1	02000 GH 100 kHz	jz	#VBW 10	)0 kHz	#	Sweep 5	Span 1( 00.0 ms (1	).00 MHz  001 pts)	CF Step 1.000000 MHz Auto Man
MKR         MODE         TRO           1         N         1           2         N         1           3		× 2.402 00 G 2.403 00 G		Y -2.38 dBm -2.40 dBm			FUNCTIO		Freq Offset 0 Hz

# Channel 00 (2402MHz)

🊺 Keysig	ght Spec	trum A	alyzer - Swe	pt SA										x
Cente	er Fro	RF eq 2	50 Ω 2.44100	AC 0000 GH	z	SEI	NSE:INT	Avg	ALIGN ype: Log	auto J-Pwr	09:19:52 PI TRAC	H Oct 31, 2019	Frequency	
10 dB/d	div	Ref Ref	Offset 0.5 7 20.50 c	dB IBm	iO: Wide ∟ Gain:Low	#Atten: 3	0 dB			Mkr	2 2.442 -2.:	00 GHz 24 dBm	Auto Tur	ne
10.5							1	2					Center Fre 2.441000000 GH	eq Hz
-19.5 — -29.5 — -39.5 —													Start Fre 2.436000000 GH	eq Hz
-49.5 -59.5	handrall	<b>M</b> M/**	unip franklandsta	And Ballinghore and Sandra								and the second s	<b>Stop Fre</b> 2.446000000 GH	eq Hz
Cente #Res	r 2.4 BW 1	410 100	00 GHz kHz	N.	#VBV	V 100 kHz			#Swe	ep 50	Span 1 00.0 ms (	0.00 MHz 1001 pts)	CF Ste 1.000000 MH Auto Ma	e <b>p</b> Hz an
MKR M0 1 N 2 N 3 4 5 6 7 8 9 10 11 < ↓ 				× 2.441 0 2.442 0	0 GHz 0 GHz	Y -2.25 dł -2.24 dł	3m 3m		FUNCTION		FUNCTION		Freq Offs 0 F	;et Hz
MSG										STATUS				

# Channel 39 (2441MHz)

# Channel 78 (2480MHz)

🊺 Key	ysight	Spect	um A	nalyzer - Sw	ept SA													
Cen	ter	Fre	RF q 2	50 Ω 2.48000	AC   00000 GI	Hz	_	SEI	NSE:INT	Г	Avg	Туре	LIGN AUTO	09:25	TRACE	ct 31, 201 1 2 3 4 5	9 6 AW	Frequency
10 di	B/div	,	Ref Ref	Offset 0.	5 dB	Gain:Low		#Atten: 3	0 dB				Mk	r1 2.4	ا <sub>DET</sub> 79 0 2.29-	OGH	z	Auto Tune
Log 10.5 0.500							-		2									Center Freq 2.480000000 GHz
-19.5 -29.5 -39.5																		<b>Start Freq</b> 2.475000000 GHz
-49.5 -59.5 -69.5	lyan <sup>t</sup> int	Mr.J.A.		ne cletor type of the									L. Conder and Decomposition		VIELS LA	radharran fa	**	<b>Stop Freq</b> 2.48500000 GHz
Cen #Re:	ter : s Bl	2.48 N 1	800 00	00 GHz kHz		#V	вw	100 kHz				#\$	Sweep	Spa 500.0 m	in 10. ns (10	00 MH 01 pts	iz s)	<b>CF Step</b> 1.000000 MHz Auto Man
MKR 1 2 3 4 5 6 7 8 9	N N N		SCL f		× 2.479 ( 2.480 (	00 GHz 00 GHz		Y -2.29 dl -2.31 dl	3m 3m	FUNC		FUN	CTION WIDTH	H FU	NCTION	VALUE		Freq Offset 0 Hz
10 11 < MSG													STATU	us		•	•	



Product :	23.1 inches Bar	r type Digital Signage
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Test Item	:	Channel Separation
		1

Test Site : No.3 OATS

Test Mode : Mode 2: Transmit - 2Mbps (4DQPSK)

	Engglion or	Measurement	Limit	Limit of (2/3)*20dB		
Channel No.	(MHz)	Level	(1.11)	Donduridth (1-11-)	Result	
	(MITZ)	(kHz)	(KHZ)	Bandwidin (KHZ)		
00	2402	1000	>25 kHz	908.0	Pass	
39	2441	1000	>25 kHz	906.0	Pass	
78	2480	1000	>25 kHz	910.0	Pass	

NOTE: The 20dB Bandwidth is refer to section 10.

🎉 Keysight Sp	ectrum Anal	lyzer - Swept	SA										
(X) RL Contor F	RF	50 Ω		-		SENSE:INT	A		ALIGN AUTO	) 10:21 r	1:31 PM Oc TRACE 1	t 31, 2019	Frequency
	164 2.4	+02000	PN IFG	IC: Wide( Gain:Low	Trig: Fi #Atten:	ree Run 30 dB		.9.)	NAL	(12.2.4			Auto Tune
10 dB/div	Ref Of Ref 2	fset 0.5 d 2 <b>0.50 dE</b>	IB Sm						IVIF	-	10.61	dBm	
10.5 0.500						1	2						Center Freq 2.402000000 GHz
-9.50 -19.5 -29.5 -39.5													Start Freq 2.397000000 GHz
-49.5 -59.5	talang A. Anglei	, Ulter to the second	and a second and a second as	hriton half and the				4.	twowner	Lover manager		*up-dasau	<b>Stop Freq</b> 2.407000000 GHz
Center 2. #Res BW	402000 100 kH	GHz Iz		#VB	SW 100 kH	lz		#	Sweep	Spa 500.0 r	an 10.0 ns (10	00 MHz 01 pts)	CF Step 1.000000 MHz Auto Map
MKS         MODE         T           1         N         4           2         N         3           4         5         6           6         7         8           9         10         11            1         -	RC         SCL           f		× 2.402 00 2.403 00	0 GHz 0 GHz	-10.62 -10.61	dBm dBm	FUNCTION						Freq Offset 0 Hz

# Channel 00 (2402MHz)

🊺 Keysigh	t Spectrum	Analyzer - Swe	ept SA						
K RL Center	· Freq	F 50 Ω <b>2.44100</b>	AC 0000 GHz	SENSE	Avg Ty	ALIGN AUTO	10:29:53 P TRAC	M Oct 31, 2019 DE 1 2 3 4 5 6	Frequency
10 dB/di	Re iv <b>R</b> e	f Offset 0.5 ef 20.50 c	PNO: Wid IFGain:Lo dB <b>IBm</b>	w #Atten: 30 d	IB	Mkr	2 2.442 -10.	00 GHz 21 dBm	Auto Tune
10.5 0.500				1	2				Center Freq 2.441000000 GHz
-19.5 — -29.5 — -39.5 —									<b>Start Freq</b> 2.436000000 GHz
-49.5 -59.5		mush/hormonikation	and a construction of the second second	1		and marked	เลา เลาะเกระการสำหรุงรูลกา	rendentlineterne	<b>Stop Freq</b> 2.446000000 GHz
Center #Res B	2.441 W 100	000 GHz kHz	#\ ×	/BW 100 kHz	FUNCTION	#Sweep 5	Span 1 00.0 ms (	0.00 MHz 1001 pts)	<b>CF Step</b> 1.000000 MHz <u>Auto</u> Man
1 N 2 N 3 4 5 6 7	1 f 1 f		2.441 00 GHz 2.442 00 GHz	-10.18 dBm -10.21 dBm				=	Freq Offset 0 Hz
8 9 10 11 < MSG				III		STATU	5		

### Channel 39 (2441MHz)

## Channel 78 (2480MHz)





Product :	23.1 inches Bar type Digital Signage
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Test Item	:	Channel Separation
		1

- Test Site : No.3 OATS
- Test Mode : Mode 3: Transmit 3Mbps (8DPSK)

Channel No.	Fraguarau	Measurement	Limit	Limit of (2/3)*20dB	
	(MHz)	Level	(kHz)	Bandwidth (kHz)	Result
		(kHz)	(MIZ)	Dunawian (KHZ)	
00	2402	1000	>25 kHz	882.0	Pass
39	2441	1000	>25 kHz	880.0	Pass
78	2480	1000	>25 kHz	882.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

💓 Keysight Spe	ctrum Ana	alyzer - Swep	pt SA										
(XIRL	RF	50 Ω	AC	-		SENSE:IN	IT	Ave T	A		09:43:42	M Oct 31, 2019	Frequency
Center Fr	eq z.	40200	UUUU GF PN IFC	1Z NO: Wide Gain:Low	Trig: F #Atter	ree Rur : 30 dB	ı	Avgi	ype.	Log-P wi	TT I	PE MWWWW DET P NNNN	
10 dB/div	Ref 0 Ref 3	ffset 0.5 2 <b>0.50 d</b>	dB Bm							Mkr	2 2.403 -10	00 GHz 35 dBm	Auto I une
10.5						1		2					Center Freq 2.402000000 GHz
-9.50 -19.5 -29.5 -39.5							~~~	M 1					<b>Start Freq</b> 2.397000000 GHz
-49.5 -59.5 -69.5	*( <b>)~</b>		Average of the second second	and the second					<b>ω</b>	Weev, way - pool	-y-4-th:/h/h/h-4		<b>Stop Freq</b> 2.407000000 GHz
Center 2.4 #Res BW	0200 100 ki	0 GHz Hz		#VE	3W 100 k	Hz			#S	weep 5	Span ′ 00.0 ms	10.00 MHz (1001 pts)	CF Step 1.000000 MHz Auto Man
MKR         MODE         TR           1         N         1           2         N         1           3         4         -           6         -         -           7         -         -           9         -         10         -           11         -         -         -	C SCL f f - - - - - - - - - - - - -		× 2.402 0 2.403 0	0 GHz 0 GHz	¥ -10.38 -10.35	dBm dBm	FUNG		FUNC		FUNCT		Freq Offset 0 Hz

# Channel 00 (2402MHz)

🎉 Keysight S	Spectrum	Analyzer - Swej	ot SA								
Center	Freq 3	50 Ω 2.44100	AC 0000 GHz		SEN	ISE:INT	Avg Ty	ALIGN AUTO pe: Log-Pwr	09:50:46 P TRAC	M Oct 31, 2019 DE 1 2 3 4 5 6	Frequency
10 dB/div	Ref Re	Offset 0.5 f 20.50 d	dB Bm	:Wide ( ) in:Low	#Atten: 30	) dB		Mk	r2 2.442 -10.	00 GHz 05 dBm	Auto Tune
Log 10.5 0.500						<u>∖</u> 1	2				Center Freq 2.441000000 GHz
-19.5 -29.5 -39.5						- Lun					Start Freq 2.436000000 GHz
-49.5 -59.5		+1++++++++++++++++++++++++++++++++++++	มาระเทศไปแรงการในสูงปากปรุญปั	~~~~	<u>مرا</u>			had been the sort	แกะเหลือการ	the stand of the second of the	<b>Stop Freq</b> 2.446000000 GHz
Center 2 #Res BV	2.4410 N 100	00 GHz kHz	~	#VBW	100 kHz			#Sweep	Span 1 500.0 ms (	0.00 MHz 1001 pts)	CF Step 1.000000 MHz <u>Auto</u> Man
Mixe         Mode           1         N           2         N           3         4           5         6           7         8           9         10           11         1			× 2.441 00 ( 2.442 00 (	GHz GHz	-10.18 dE -10.05 dE	Bm Bm		UNCTION WIDTH			Freq Offset 0 Hz
MSG								STATU	JS	•	

#### Channel 39 (2441MHz)

## Channel 78 (2480MHz)





# 9. Dwell Time

#### 9.1. Test Setup



#### **9.2.** Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

# 9.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

# 9.4. Uncertainty

 $\pm$  25msec



# 9.5. Test Result of Dwell Time

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Dwell Time
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.880	99	31600	285.120	400	Pass
2441	2.880	106	31600	305.280	400	Pass
2480	2.890	91	31600	262.990	400	Pass

Dwell time = Time slot length\*Hopping of number

Sweep time= 79 CHannel \* 0.4

#### CH 00 Time Interval between hops

#### K to 10 m to 10 Conjut spectra # 500 MC enter Freq 2.402000000 GHz PRO: Fast →→ #5Gala.Low Frequency Avg Type: Log-Pr Avg[Hold: 1/1 Avg Type: Log-Frequency Trig Delay Trig: Vide Auto Tur Mkr1 970.0 µs -2.21 dBm Auto Tu Ref Offset 0.5 dB Ref 0.50 dBm Ref Offset 0.5 dB Ref 10.50 dBm 10 dE Center Fre Center Fre Start Fre 2000000 GH Start Fre hiptored Stop Free 2000000 GH hype Stop Fre CF Step 1.000 kHz Man CF Step 1.000000 MI ter 2.4020000 BW 1.0 MHz Span 0 H Sweep 10.00 ms (1001 pts VBW 1.0 MHz 970.0 μs 2.880 ms (Δ) -2.21 dBm -0.01 dB Ν Δ1 t (Δ) Freq Offse 0 H Freq Offse 0 H Span 0 H Sweep 31.60 s (1001 pts #VBW 3.0 kHz

#### CH39 Time Interval between hops

#### CH 39Transmission Time

CH 00 Transmission Time

🗱 Keysight Spectrum Analyzer - Swept SA	0.0	🔤 💹 Keysight Spectrum Analyzer - Swept SA
KL RF 200 AC STREEMT ALLOA AUTO 0041146 PM Nev 65     Center Freq 2.441000000 GHz     Tris: Free Run Avgitybe: Log-Pwr TRACE [2]     Avg Type: Log-Pwr TRACE [2]     Avg Type: Log-Pwr TRACE [2]	3,2019 3,4,5,6 Frequency	Center Freq 2.441000000 GHz Trig Delay-1.000 ms Avg Type: Log-Pwr TRACE 13 4 5 6 Trig Delay-1.000 ms Avg Type: Log-Pwr TRACE 13 4 5 6 Trig Work was the first Video
Production #Atten: 10 dB      ContP N     Ref Offset 0.5 dB     O dB/dy: Ref 0.50 dBm	Auto Tune	Ref         Control with the section of the sect
450	Center Freq 2.441000000 GHz	Log with the food data
195	Start Freq 2.441000000 GHz	100 100 100 100 100 100 100 100 100 100
-05	Stop Freq 2.441000000 GHz	40.5         μαμέλανα         Ατοροφορία
Ø5	CF Step 1.000 kHz Auto Man	р Center 2.441000000 GHz гд Res BW 1.0 MHz VBW 1.0 MHz Sweep 10.00 ms (1001 pts) ап Подержейна вали х у прином прискомуще - Андо Мал
	Freq Offset 0 Hz	1         N         t         980 0 μs         -2.14 dBm           et         3         Δ1         t         (Δ)         2.880 ms         (Δ)           +tz         4         5
Center 2.44100000 GHz Span I Res BW 1.0 kHz #VBW 3.0 kHz Sweep 31.60 s (1001	0 Hz 1 pts)	
MSG STATUS		MSS STATUS



#### CH 78 Time Interval between hops

#### CH 78 Transmission Time

Center Freq 2.480000000 G	Hz Trig: Free Run	ALIGN AUTO 09:42:36 PM Nov 05, Avg Type: Log-Pwr TRACE 1 2 3 Avg Hold: 1/1 TYFE MWW	Frequency	Center Freq 2.48000000	0 GHz Trig Delay-1.000 ms	AUGN AUTO 09:25:46 PM Nov 05, 2019 Avg Type: Log-Pwr TRACE [1 2 3 4 5 6 TVPE WWWWWW	Frequency
Ref Offset 0.5 dB 10 dB/div Ref 0.50 dBm	FGein:Low ≇Atten: 10 dB	DETJP NNI	Auto Tune	Ref Offset 0.5 dB	IFGain:Low #Atten: 20 dB	ΔMkr2 2.890 ms -0.11 dB	Auto Tune
.9 50			Center Freq 2.480000000 GHz	1 0 500 (1 1 9 50)	2Δ1	5951/4	Center Freq 2.48000000 GHz
-19.5			Start Freq 2.480000000 GHz	-29.5			Start Freq 2.48000000 GHz
-49.5			Stop Freq 2.480000000 GHz	-59.5 <b>Bywyturysty</b> -69.5 -79.5	<b>นะสมาระ</b> ะอย่างสร้างสร้างสร้างสร้าง	งทุกระที่เห็นขึ้นที่สุดที่มาในที่สุดที่มาร์สูทร์เหลียมกับระไม่มีกระบบก	Stop Freq 2.48000000 GHz
-50.5	not nan dara		CF Step 1.000 kHz Auto Man	Center 2.480000000 GHz Res BW 1.0 MHz	VBW 1.0 MHz	Span 0 Hz Sweep 10.00 ms (1001 pts)	CF Step 1.000000 MHz Auto Man
.795			Freq Offset 0 Hz	1 Ν t (Δ) 3 4 5 6	970.0 μs -1.93 dBm 2.890 ms (Δ) -0.11 dB		Freq Offset 0 Hz
Center 2.480000000 GHz	#VBW 3.0 kHz	Span 0 Sween 3160 s (1001	Hz	7 8 9 10 11			
MSG	IN DIT 0.0 KHZ	STATUS	A.5/	MSG		STATUS	

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.



Product	:	23.1	inches	Bar typ	e Digital	Signage
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Test Item : Dwell Time

- Test Site : No.3 OATS
- Test Mode

: Mode 2: Transmit - 2Mbps (4DQPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.880	102	31600	293.760	400	Pass
2441	2.890	94	31600	271.660	400	Pass
2480	2.890	105	31600	303.450	400	Pass

Dwell time = Time slot length\*Hopping of number

Sweep time= 79 CHannel \* 0.4

#### CH 00 Time Interval between hops

#### CH 00 Transmission Time

MSG		STATUS	e 2	MSG		STATUS	
Res BW 1.0 kHz	#VBW 3.0 kHz	Sweep 31.60 s (1001 pts)					
Center 2.402000000	GHz AVENU 2 0 LUL	Span 0 Hz		11		· · ·	
an an in strates.	A MARKAN AND A MARKA	La cathe mail an Distance of the		9			
-89.5				5 6 7			
.79.5	te venet a tie tere en e		Freq Offset 0 Hz	3 4			Freq Offset 0 Hz
69.5				1 N t 2 Δ1 t (Δ)	970.0 μs -9.80 dBm 2.880 ms (Δ) 1.49 dB		
			Auto Man	Res BW 1.0 MHZ	VBW 1.0 MHZ	Sweep 10.00 ms (1001 pts)	Auto Man
60.5			CF Step	Center 2.402000000 GHz		Span 0 Hz	CF Step
-49.5			2.40200000 GHz	-79.5			2.40200000 GHz
-39.5	desembles at a solution for the	ter and the second s	Stop Freq	-69.5	Andrewise the second	and a star of the start of the	Stop Freq
				-49.5			
-29.5			2.402000000 GHz	-39.5			2.402000000 GHz
-19.5			Start Fred	-29.5			Start Fred
9.50			2.402000000 GHz	.9.50		DBUEVE	2.402000000 GHz
			Center Freq	0.500	2∆1		Center Freq
10 dB/div Ref 0.50 c	0.5 dB dBm			10 dB/div Ref 10.50 dBm		ДМКГ2 2.880 MS 1.49 dB	
	IFGain:Low #Atten: 10 dB	DET P NNNN I	Auto Tune		IFGain:Low #Atten: 20 dB	DET P NNNNN	Auto Tune
Center Freq 2.4020	PNC: Close Trig: Free Run	Avg Type: Log-Pwr TRACE 1 2 3 4 5 4 Avg[Hold: 1/1 Type Mwwww	Frequency	Center Freq 2.40200000	GHz Trig Delay-1.000 ms Av	rg Type: Log-Pwr TRACE 1 2 3 4 5 6 TYPE WWWWWW	Frequency
OR RL RF 50	Q AC SENSE:INT	ALION AUTO 09:43:50 PM Nov 05, 2019		AL RE SOD AC	SENSE (INT)	ALTON AUTO 09:28:29 PM Nov 05, 2019	

#### CH39 Time Interval between hops

#### CH 39Transmission Time

Keysight Spectrum Analyzer - Swept SA	a tank merupakan kanal sa pana sa sa tan bara sa sa sa	0.0	🗧 🚺 Keysight Spectrum Analyzer - Swept SA 👘 👘 🚱
RL         RF         S0 D         AC         SERSE SMT         ALION           Center Freq 2.441000000 GHz         Trip Freq Dup         Avg Type: Log         Avg Type: Log <t< td=""><td>Pwr TRACE 1 2 3 4 5 6</td><td>Frequency</td><td>RL         RF         SEQ AC         SENSE INT         AUGN AUTO         G92839 PMNev 68, 2019         Frequency           Center Freq 2.441000000 GHz         Trig Delay-1.000 ms         Avg Type: Log-Pwr         Twace [12 3 4 5 6         Frequency</td></t<>	Pwr TRACE 1 2 3 4 5 6	Frequency	RL         RF         SEQ AC         SENSE INT         AUGN AUTO         G92839 PMNev 68, 2019         Frequency           Center Freq 2.441000000 GHz         Trig Delay-1.000 ms         Avg Type: Log-Pwr         Twace [12 3 4 5 6         Frequency
PNO: Close ++ Try: Pret Kon Avg(mod. 87 BGainLow #Atten: 10 dB Ref Offset 0.5 dB	DET P NNNNN	Auto Tune	e Ref Offset 0.5 dB Auto Tune
10 dB/div Ref 0.50 dBm		Center Freq	10 dBdiv Ref 10.50 dBm 7.50 dB 10 g 250 1 Center Freq 1 250 1 Center Freq
990		2.441000000 GHz	2 9 00 / / /////////////////////////////
-29.5		Start Freq 2.441000000 GHz	g 25
-05		Stop Freq 2.441000000 GHz	ส 85 สราชานิส์ 2550 รางสาขานสาขานสาขานสาขานสาขานสาขานสาขานสาข
-015	[	CF Step 1.000 kHz Auto Man	P Center 2.441000000 GHz Span 0 Hz Iz Res BW 1.0 MHz VBW 1.0 MHz Sweep 10.00 ms (1001 pts) Autor Man
est Hy the first set of the Hiller transform 255	n o shekir ne di davan (	Freq Offset 0 Hz	1         N         4         970.0 μs         -9.72 dBm         -9.72 dBm
695	Span 0 Hz		9
Res BW 1.0 kHz #VBW 3.0 kHz Sw	veep 31.60 s (1001 pts)		



#### CH 78 Time Interval between hops CH 78 Transmission Time If transmission Center Freq 2.480000000 If transmission If transmission Trig: Free Run BrainLow Free Run If transmission If transmission If transmission RL IF 500 AC SERVE SMT Priter Freq 2.480000000 GHz Trig Delay-1.000 ms PNO: Fast + Trig: Video FGain draw Edition and B Auton Auto Avg Type: Log-Pwr Aug Type: Log-Pwr Avg Hold: 1/1 Frequency Frequency DET P NNNN DET P NNNN Auto Tu Auto Tu ΔMkr2 2.890 ms 0.56 dB Ref Offset 0.5 dB Ref 0.50 dBm Ref Offset 0.5 dB Ref 10.50 dBm Center Fre 480000000 GH Center Free 480000000 GH <sup>2∆1</sup> t1 Start Fre Start Free Stop Free Stop Fre CF Step 1.000 kHz Man CF Step nter 2.4800000 s BW 1.0 MHz Span 0 H Sweep 10.00 ms (1001 pts VBW 1.0 MHz 970.0 μs 2.890 ms (Δ) -9.90 dBm 0.56 dB 1 N t 2 Δ1 t (Δ) Freq Offse 0 H Freq Offse 11 #VBW 3.0 kHz Sweep 31.60 s (1001 pts

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.



Product	:	23.1 inches Bar type Digital Signage

Test Item : Dwell Time

- Test Site : No.3 OATS
- Test Mode :

Mode 3: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.890	103	31600	297.670	400	Pass
2441	2.890	99	31600	286.110	400	Pass
2480	2.890	103	31600	297.670	400	Pass

Dwell time = Time slot length\*Hopping of number

Sweep time= 79 CHannel \* 0.4

#### CH 00 Time Interval between hops

# CH 00 Transmission Time



#### CH39 Time Interval between hops

#### CH 39Transmission Time

Keysight Spectrum Analyzer - Swept SA		0.0.0	🗱 Keysight Spectrum Analyzer - Swept SA.
RL         RF         50.0         AC         SERVICE           Center Freq 2.441000000 GHz         Trig: Free Run         Trig: Free Run	Aug Type: Log-Pwr TRACE 1 2 3 4 5 6 Avg Hold: 1/1 TYPE MWWWWW	Frequency	RL         #F         50.0         AC         SENSE INT         ALION AUTO         Gender 50.045 PMNev 65, 2019           Center Freq 2.441000000 GHz         Trig Delay-1.000 ms         Avg Type: Log-Pwr         Trace[12.34.5.6         Frequency
IFGainLow #Atten: 10 dB	DET P NNNNN	Auto Tune	Piccinate Anten: 20 dB Der PINNINN Ficancow #Atten: 20 dB Der PINNINN Auto Tune
10 dB/div Ref 0.50 dBm			10 dB/div Ref 10.50 dBm 0.86 dB
0.00		Center Freq 2.441000000 GHz	250 1 Center Freq 9.90 24100000 GHz 2.44100000 GHz
-295		Start Freq 2.441000000 GHz	295 295 295 2445 244100000 GHz 244100000 GHz
.015		Stop Freq 2.441000000 GHz	005 (44 14 44 44 14 14 14 14 14 14 14 14 14 1
Ø5		CF Step 1.000 kHz Auto Man	Center 2.44 1000000 GHz Res BW 1.0 MHz VBW 1.0 MHz Sweep 10.00 ms (1001 pt) Auto Mar
ess 	he desta here in the	Freq Offset 0 Hz	All Mathematics         2         970.0 μs         -9.63 dBm         Column Local Column
enter 2.441000000 GHz	Span 0 Hz		6
Res BW 1.0 kHz #VBW 3.0 kHz	Sweep 31.60 s (1001 pts)		eso status



# CH 78 Time Interval between hops

#### CH 78 Transmission Time

Keysight Spectrum Analyzer - Swept SA									0.0	BE Keys	sight Spectru	m Analyzer - 1	Swept SA								0.0
Center Freq 2.480000000	GHz	SEN	Run	Avg Type Avg/Hold	Log-Pwr	09;48:24 TR	ACE 1 2 3	5,2019 3 4 5 6	Frequency	Cent	ter Fred	2.480	000000 GH	łz	Trig Dela Trig: Vide	vse but iy-1.000 ms	Avg Type	Log-Pwr	09:31:09 PB TRAC TV5	MNov 05, 2019 26 1 2 3 4 5 6 PE WWWWWWW	Frequency
Ref Offset 0.5 dB	IFGain:Low	#Atten: 10	dB				DET P N	NNNN	Auto Tune	10 dB	R S/div R	tef Offset tef 10.50	0.5 dB 0 dBm	Gain:Low	#Atten: 2	0 dB		Δ	Mkr2 2.	.890 ms 0.85 dB	Auto Tune
.050									Center Freq 2.480000000 GHz	0.500 -9.50		1			2Δ1					DROEVE	Center Freq 2.480000000 GHz
-19.5									Start Freq 2.480000000 GHz	-29.5 -39.5 -49.5											Start Freq 2.480000000 GHz
-39.5									Stop Freq 2.480000000 GHz	-50.5 -60.5 -79.5	uniperser	•		,	mhaitepear	i an the state	hite territory	erster filteriste	enter ente	~20009747~00 <sup>0</sup> 00	Stop Freq 2.480000000 GHz
-59.5								H	CF Step 1.000 kHz Auto Man	Cent Res I	ter 2.480 BW 1.0	0000000 MHz	GHz	VBW	1.0 MHz	FUNC	TON	Sweep 1	S 0.00 ms (*	pan 0 Hz 1001 pts)	CF Step 1.000000 MHz Auto Man
-79.5									Freq Offset 0 Hz	1 3 4 5 6	Δ1	t t (Δ)	97 2.8	70.0 μs 190 ms (Δ)	-9.90 dl 0.85	Bm dB					Freq Offset 0 Hz
Center 2.480000000 GHz Res BW 1.0 kHz	#vBW	3.0 kHz			Sweep	31.60 s	Span (1001	0 Hz pts)		7 8 9 10 11										<u>.</u>	
MSG					STATUS					MSG								STATUS	6		

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.



# 10. Occupied Bandwidth

# 10.1. Test Setup



#### 10.2. Limits

N/A

# **10.3.** Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

# 10.4. Uncertainty

± 283Hz



# 10.5. Test Result of Occupied Bandwidth

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	951		NA
39	2441	954		NA
78	2480	1017		NA

# Figure Channel 00:

🗾 Keysight Spectru	m Analyzer - Swept SA								- ē 🔀
Center Fred	RF 50 Ω AC 2.402000000	GHz	SENSE	INT	Avg Type	align auto : Log-Pwr	09:16:29 PI TRAC	E 1 2 3 4 5 6	Frequency
R 10 dB/div R	ef Offset 0.5 dB	PNO: Wide 🖵 IFGain:Low	#Atten: 30 d	iB		Mkr2	2.401 5 -22.9	50 GHz 55 dBm	Auto Tune
Log 10.5 0.500 -9.50				$\sqrt{1}$					Center Freq 2.402000000 GHz
-19.5 -29.5 -39.5		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and the second		-22:92 dBm	<b>Start Freq</b> 2.400500000 GHz
-49.5								<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	<b>Stop Freq</b> 2.403500000 GHz
Center 2.402 #Res BW 30	2000 GHz kHz	#VBW	( 100 kHz	ELINCT	Sweep (	#Swp) 3.	Span 3 200 ms (	.000 MHz 1001 pts)	<b>CF Step</b> 300.000 kHz <u>Auto</u> Man
$\begin{array}{c c} \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	r 2.40 f 2.40 f 2.40	2 171 GHz 1 550 GHz 2 501 GHz	-2.91 dBn -22.95 dBm -22.95 dBm			G NONWIDI II	FUNCTION		Freq Offset 0 Hz
MSG						STATUS			



		Figure Ci	iannei 39.		
Keysight Spectrum Analyzer - Swept SA		CENCERNE	ALICN AUTO	00-00-50 PM Oct 01 - 0010	
enter Freq 2.44100000	DO GHz PNO: Wide C	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	Frequency
Ref Offset 0.5 dB			Mkr2	2.440 553 GHz -23.05 dBm	Auto Tune
'9 ).5 		^1			Center Freq 2 441000000 GHz
50	▲2	m			
.5	~ ~ ~			-22:71 dBm	<b>Start Freq</b> 2.439500000 GHz
.5					04 <b>F</b>
.5					2.442500000 GHz
enter 2.441000 GHz es BW 30 kHz	#VBW	100 kHz	Sweep (#Swp) 3	Span 3.000 MHz .200 ms (1001 pts)	CF Step 300.000 kHz Auto Man
R MODE TRC SCL		2 71 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	
N 1 f 2, N 1 f 2, N 1 f 2,	441 174 GHZ 440 553 GHz 441 507 GHz	-23.05 dBm -22.74 dBm			Freq Offset 0 Hz
9 D D D D D D D D D D D D D D D D D D D					
G			STATUS		L

#### Figure Channel 39:

## Figure Channel 78:





Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 2Mbps (4DQPSK)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1362		NA
39	2441	1359		NA
78	2480	1365		NA

# Figure Channel 00:

💓 К	eysight	Spectr	rum A	analyzer - Swe	ept SA								
⊫ <mark>الا</mark> ISP	nter	Fre	RF q2	50 Ω 2.40200	AC 0000 GH	z	SE Tria: Ero	NSE:INT	Avg Typ	ALIGN AUTO	10:26:19 P TRAC	M Oct 31, 2019	Frequency
			Ref	Offset 0.5	dB	lO:Wide ⊂ Gain:Low	#Atten: 3	0 dB		Mkr2	2.401 3	31 GHz	Auto Tune
10 c Log	B/div	<u> </u>	Ref	<sup>-</sup> 20.50 c	Bm						-33.	09 aBm	
10.9 0.500	5 —— )												Center Freq 2.40200000 GHz
-9.50 -19.4							~~~~~	h.X.					
-29.6	;				<b>↓</b> <sup>2</sup>					3		-32.70 dDm	Start Freq 2.400500000 GHz
-39.5	; —		_										
-49.5 -59.6	; 	~~~		~~~~	w					h.	m han	Denter of surfaces	<b>Stop Freq</b> 2.403500000 GHz
-69.6	j												
Cei #Re	nter es Bl	2.40 N 3	020 0 ki	00 GHz Hz		#VBI	N 100 kHz		Sweep	(#Swp) 3	Span 3 .200 ms (	.000 MHz 1001 pts)	CF Step 300.000 kHz Auto Man
MKR 1	MODE N	TRC 1	SCL f		× 2.402 17	7 GHz	۲ -12.70 dl	FUN Bm	CTION FI	JNCTION WIDTH	FUNCTION	DN VALUE	
2 3 4 5	N N	1	f		2.401 33 2.402 69	1 GHz 3 GHz	-33.09 dl -32.80 dl	Bm Bm					Freq Offset 0 Hz
6 7 8 9			_									_	
10 11							m						
MSG										STATUS	3		J]



📜 Keysight Spectrum Analyzer - Swept SA					
LXI RL RF 50 Ω AC	SE	ENSE:INT	ALIGN AUTO 10:32	:43 PM Oct 31, 2019	
Center Freq 2.441000000	GHz	Avg Typ	e: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide C Trig: Fre IFGain:Low #Atten: 3	ee Run 30 dB			Auto Tupo
Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm			Mkr2 2.44 -:	0 337 GHz 32.58 dBm	Auto Tune
10.5 0.500					Center Freq 2.441000000 GHz
-19.5	2~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		3		<b>Start Freq</b> 2.439500000 GHz
-49.5 -59.5					<b>Stop Freq</b> 2.442500000 GHz
Center 2.441000 GHz #Res BW 30 kHz	#VBW 100 kH	z Sweep	Spa (#Swp) 3.200 n	n 3.000 MHz ns (1001 pts)	CF Step 300.000 kHz Auto Man
I         N         I         f         2.441           2         N         1         f         2.441           3         N         1         f         2.440           3         N         1         f         2.441           4         -         -         -         -           6         -         -         -         -	177 GHz -12.20 d 337 GHz -32.58 d 696 GHz -32.23 d	Bm Bm Bm Bm			Freq Offset 0 Hz
7 8 9 10 11 <					
MSG			STATUS		

#### Figure Channel 39:

#### **Figure Channel 78:**





Product : 23.1 inches Bar type Digital Sig	gnage
--	-------

- Test Item : Occupied Bandwidth Data
- Test Site : No.3 OATS

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1323		NA
39	2441	1320		NA
78	2480	1323		NA

#### Figure Channel 00:

🊺 Ke	ysight S	pectrum	Analyzer - Sw	ept SA								
<mark>⊯</mark> R Cen	∟ nter F	req	F 50 Ω 2.40200	AC 0000 GH	lz	SEI	NSE:INT	Avg Type	ALIGN AUTO e: Log-Pwr	09:48:00 P	M Oct 31, 2019	Frequency
		Re	f Offset 0.		NO: Wide ⊆⊾ Gain:Low	#Atten: 3	0 dB		Mkr2	2.401 3	55 GHz	Auto Tune
10 d Log 10.5 0.500	B/div	Re	ef 20.50 (	BM						-51.		Center Freq 2.402000000 GHz
-19.5 -29.5 -39.5				-	2,				<b>∂</b> <sup>3</sup>		-30.93 dBm	Start Freq 2.400500000 GHz
-49.5 -59.5 -69.5		<del>,</del>	m							m	<u>میں میں میں میں میں میں میں میں میں میں </u>	<b>Stop Freq</b> 2.403500000 GHz
Cen #Re	ter 2 s BW	.4020 / 30	000 GHz (Hz	×	#VBW	/ 100 kHz	FUN	Sweep (	(#Swp) 3	Span 3 .200 ms (	.000 MHz 1001 pts)	<b>CF Step</b> 300.000 kHz <u>Auto</u> Man
1 3 4 5 6 7 8 9 10	N N N			2.402 17 2.401 35 2.402 67	1 GHz 5 GHz 8 GHz	-10.93 df -31.32 df -31.49 df	Bm Bm Bm			PUNCIN		Freq Offset 0 Hz
•		-	+			III	-				- F	
MSG									STATUS	3		



🊺 Keysig	ght Spectrun	n Analyzer - Swe	pt SA								
Cente	er Freq	<sup>ε 50 Ω</sup>	AC 0000 GH	łz	SE	NSE:INT	Avg Ty	ALIGN AUTO pe: Log-Pwr	09:53:06 PI	M Oct 31, 2019	Frequency
	R	of Offset 0.5	dB	NO: Wide( Gain:Low	#Atten: 3	0 dB		Mkr2	2.440 3	61 GHz	Auto Tune
10 dB/c Log 10.5 -	div R	ef 20.50 d	Bm						-30.0	67 aBm	Center Freq 2.441000000 GHz
-9.50				2		n h	and a or	3		-30.58 dBm	<b>Start Freq</b> 2.439500000 GHz
-49.5 — -59.5 — -69.5 —	<u>~~~~</u> 0/	~~~~	~~					bu		n an	<b>Stop Freq</b> 2.442500000 GHz
Cente #Res I	r 2.441 BW 30	000 GHz kHz	~	#VB	W 100 kHz	FUN	Sweep	(#Swp) 3	Span 3 .200 ms (	.000 MHz 1001 pts)	<b>CF Step</b> 300.000 kHz <u>Auto</u> Man
1 N 2 N 3 N 4 5			2.441 17 2.440 36 2.441 68	7 GHz 1 GHz 1 GHz	-10.58 dl -30.67 dl -30.79 dl	3m 3m 3m				=====	Freq Offset 0 Hz
7 8 9 10 11											
MSG								STATUS			L

#### Figure Channel 39:

#### **Figure Channel 78:**





# 11. Duty Cycle

# 11.1. Test Setup



# 11.2. Uncertainty

± 25msec



# **11.3.** Test Result of Duty Cycle

Product	:	23.1 inches Bar type Digital Signage
Test Item	:	Duty Cycle
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

SGL										
DIPK CI	W		1			D	2[1]			-0.08 df
10 d8m										2.899 m
-10 uBill						M	1[1]			29.09 dBn
-20 dBm	-						-		1	31.739 m
				M1 D2						
-30 dBm	-									
-40 dBm	-			_				_		
-50 dBm	+							_		
-60 dBm		to a secol a			A (1.1.)	La marca		In strendent		thad at a set
-70 dBm	mun	marchanary	Honomer Diament	w vilo	Mindering	ውጭዲ <del>መ</del> ው ውጭ የመታት እና	maren	vallearedra	NUM Recordship	Merrowel Arton
-80 dBm	+		-		-					
-90 dBm	+							_		
CF 2.40	2 GH	z			691	pts				10.0 ms/
Marker										
Туре	Ref	Trc	X-value	20	Y-value	Func	tion	Fund	ction Result	
IMIT		1	31.7	39 ms	-29.09 08	m				

Date: 9.JAN.2007 03:28:48

Time on of 100ms= 2.899ms Duty Cycle=2.899ms / 100ms= 0.02899 Duty Cycle correction factor= 20 LOG 0.02899= -30.755 dB

Duty Cycle correction factor	-30.755	dB
------------------------------	---------	----



Product :	23.1 inches Bar type Digital Signage
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- Test Item : Duty Cycle
- Test Site : No.3 OATS

Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Spect	um	S	pectrum 2 🛛 🚿	Spectrum 3	X Spec	trum 4 🛛 🕅	•) (₩
Ref Le	evel (	0.00 dBm	🖷 R	BW 1 MHz			
Att		10 dB	👄 SWT 100 ms 👄 V	BW 1 MHz			
SGL							
1Pk Cli	rw						
					D2[1]		1.61 df
-10 dBm	+			-	MILLI		-27.09 dBm
					witti		55,797 m
-20 dBm							
					_		
-30 dBm					M1 D2		
10 10-							
-40 UBI							
-50 dBm							
-56 abii							
-60 dBm							
ruphand	when	unununu	and another and a second s	moundershipping	bland Webstein	rehardpublication	nontronally many house and
-70 dBm							
-80 dBm							
00 40-							
-90 aBm	1						
05.0.40				601 mt			10.0 ms/
GF Z.H	JZ GH	2		091 pt	>		10.0 1157
Tung	Pof	Trol	X-ualuo I	Y-ualuo	Eunction	1 6	Function Result
M1	KGI	1	55.797 ms	-37.08 dBm	ranction	-	unction Result
D2	M1	1	2.899 ms	1.61 dB			
	-	1r				The second se	AND AND AND

Date: 9.JAN.2007 03:30:23

# Time on of 100ms= 2.899ms Duty Cycle=2.899ms / 100ms= 0.02899 Duty Cycle correction factor= 20 LOG 0.02899= -30.755 dB



- Product : 23.1 inches Bar type Digital Signage
- Test Item : Duty Cycle
- Test Site : No.3 OATS

Test Mode : Mode 3: Transmit - 3Mbps (8DPSK)

Ref Level         0.00 dBm         RBW         1 MHz           Att         10 dB         SWT 100 ms         VBW         1 MHz           SGL         D2[1]         D2[1]         D2[1]           -10 dBm         M1[1]         M1[1]         D2[1]           -20 dBm         M1 D2         D2[1]         D2[1]           -30 dBm         M1 D2         D2[1]         D2[1]           -50 dBm         M1 D2         D2[1]         D2[1]           -70 dBm         M1 D2         D2[1]         D2[1]         D2[1]           -70 dBm         M1 D2         D2[1]	
Att         10 dB         SWT 100 ms         VBW 1 MHz           SGL         91Pk Clrw         02[1]           -10 dBm         M1[1]         -20 dBm           -20 dBm         M1[1]         -20 dBm           -30 dBm         M1 D2         -10 dBm           -60 dBm         -10 dBm         -10 dBm	
SGL       1Pk Clrw       -10 dBm       -20 dBm       -30 dBm       -40 dBm       -50 dBm       -60 dBm       -70 dBm	
10 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -50 dBm -60 dBm -6	
-10 dBm     -10 dBm     M1[1]       -20 dBm     -10 dBm     -10 dBm       -30 dBm     -10 dBm     -10 dBm       -30 dBm     -10 dBm     -10 dBm       -40 dBm     -10 dBm     -10 dBm       -50 dBm     -10 dBm     -10 dBm       -50 dBm     -10 dBm     -10 dBm       -60 dBm     -10 dBm     -10 dBm       -70 dBm     -10 dBm     -10 dBm	
-10 dBm M1[1] -20 dBm M1[1] -30 dBm M1 D2 -40 dBm M1 D2 -40 dBm M1 D2 -50 dBm M1 D2 -50 dBm M1 D2 -50 dBm M1 D2 -60 dBm M1 D2 -70 dBm M1 D2 -60 dBm M	1.99 di
-20 dBm -30 dBm -40 dBm -50 dBm -50 dBm -50 dBm -60 dBm -60 dBm -60 dBm -60 dBm -60 dBm -70 dBm	2.899 m
-20 dBm -30 dBm -40 dBm -50 dBm -50 dBm -60 dBm -60 dBm -60 dBm -70 dBm -70 dBm	34 638 m
-30 dBm -40 dBm -50 dBm -50 dBm -50 dBm -60 dBm -70 dBm	01.000 m
-30 dBm	
-40 dBm -50 dBm -60 dBm -70 dBm -70 dBm	
-40 dBm -50 dBm -60 dBm -60 dBm -70 dBm- -70 dBm-	
-50 dBm	
-50 dBm -60 dBm -70 dBm -70 dBm	
-60 dBm	
man and the second second the second second to the second	
-70 dBm	Amel anony with
-80 dBm	
-90 dBm-	
CE 2 402 CH2 601 ptc	10.0 ms/
GF 2.102 GF2	10.0 1137
Tune Ref Trc Y-value Y-value Eunction Eunction Function	ocult
M1 1 34.638 ms -37.16 dBm	io suit
D2 M1 1 2.899 ms 1.99 dB	
	4.46

Date: 9.JAN.2007 03:27:34

Time on of 100ms= 2.899ms

Duty Cycle=2.899ms / 100ms= 0.02899

Duty Cycle correction factor= 20 LOG 0.02899= -30.755 dB

Duty Cycle correction factor	-30.755	dB
Duty Cycle correction factor	001100	uD



# 12. EMI Reduction Method During Compliance Testing

No modification was made during testing.