

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

**Test Report No.** : OT-206-RWD-022

**AGR No.** : A206A-048

**Applicant** : LG Electronics USA

**Address** : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States

**Manufacturer** : LG Electronics Inc.

**Address** : 10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea

**Type of Equipment** : CID (Central Information Display) system

**FCC ID** : BEJ-COGD14FGA01

**Model Name** : COGD14FGA01

**Multiple Model Name** : N/A

**Serial number** : N/A

**Total page of Report** : 21 pages (including this page)

**Date of Incoming** : June 03, 2020

**Date of Issuing** : June 12, 2020

## SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART C Section 15.225**

This test report contains only the result of a single test of the sample supplied for the examination.

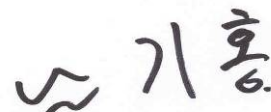
It is not a general valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Tae-Ho, Kim / Senior Manager  
ONETECH Corp.

Approved by:



Ki-Hong, Nam / Chief Engineer  
ONETECH Corp.

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**Revision History**

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-206-RWD-022	June 12, 2020	Initial Release	All

## 1. VERIFICATION OF COMPLIANCE

- . APPLICANT : LG Electronics USA
- . ADDRESS : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States
- . CONTACT PERSON : Kyung-Su, Han / Director, Standards & Compliance
- . TELEPHONE NO : 201-472-2623
- . FCC ID : BEJ-COGD14FGA01
- . MODEL NO/NAME : COGD14FGA01
- . SERIAL NUMBER : N/A
- . DATE : June 12, 2020

DEVICE TYPE	DXX – Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	CID (Central Information Display) system
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC CFR47 Part 15 Subpart C Section 15.225
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	3 m Semi Anechoic Chamber

- . The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.225 (a) (b) (c)	Field Strength of Fundamental Emissions	Met the Limit / PASS
15.225 (d) & 15.209	Radiated Emission Limits	Met the Limit / PASS
2.1049	20dB Bandwidth	Met the Limit / PASS
15.225(e)	FREQUENCY STABILITY WITH TEMPERATURE VARIATION / FREQUENCY STABILITY WITH VOLTAGE VARIATION	Met the Limit / PASS
15.207	Conducted Limits	N/A (See Note)
15.203	Antenna Requirement	Met requirement / PASS

Note : As this product is only using DC power, AC conducted emission test has not been performed.

### 2.2 Product Description

The LG Electronics USA, Model COGD14FGA01 (referred to as the EUT in this report) is an CID (Central Information Display) system, Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	CID (Central Information Display) system
TRANSMITTING FREQUENCY	13.560 7 MHz
MODULATION	ASK
ANTENNA TYPE	FPCB Antenna
LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz)	10 MHz, 20 MHz, 24 MHz, 25 MHz, 26 MHz, 27 MHz, 27.12 MHz

### 2.3 Model Differences:

-. None

### 2.4 Related Submittal(s) / Grant(s)

Original submittal only

### 2.5 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.225.

### 2.6 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

## 2.7 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
CID Board	N/A	N/A	N/A
CLUSTER Board	N/A	N/A	N/A
SUB Board (1)	N/A	N/A	N/A
SUB Board (2)	N/A	N/A	N/A
LED Board	N/A	N/A	N/A

#### 3.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

Model	Manufacturer	Description	Connected to
COGD14FGA01	LG Electronics USA	CID (Central Information Display) system (EUT)	-
PCS14-CDG1	LG ELECTRONICS INC.	Cluster	EUT
GP-4303D	LG Precision Co.,Ltd	DC Power Supply	EUT

#### 3.3 Mode of operation during the test

-. The EUT has 13.560 7 MHz RF boards for reading Card and program was used for making continuous transmission mode during the test.

#### 3.4 Equipment Modifications

-. None



### 3.5 Configuration of Test System

**Radiated Emission Test :** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. The radiated emissions measurements were performed on the 3 m Semi Anechoic Chamber.

For frequencies from 150 kHz to 30 MHz measurements were made of the magnetic H field. The measuring antenna is an electrically screened loop antenna.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

### 3.6 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

**Antenna Construction:**

The transmitter antenna of the EUT is a FPCB Antenna so there is no consideration of replacement by the user.

## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emissions Tests

As this product is only using DC power, AC conducted emission test has not been performed.

### 4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 RADIATED EMISSION TEST

#### 5.1.1 Operation frequency band: (13.553 ~ 13.567) MHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 45 % R.H. Temperature: 23 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209  
 Type of Test : Low Power Transmitter below 1 705 kHz  
 Result : PASSED

EUT : CID (Central Information Display) system Date: June 03, 2020 ~ June 10, 2020  
 Operating Condition : Transmitting Mode  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)  
 Distance : 3 m

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amplitud (dBμV)	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
13.560 7	48.13	H	19.34	0.5	67.97	124	56.03
13.560 7	44.46	V	19.34	0.5	64.30	124	59.70

Remark. The EUT was tested at 3 m, so conversation factor was included at above limit.



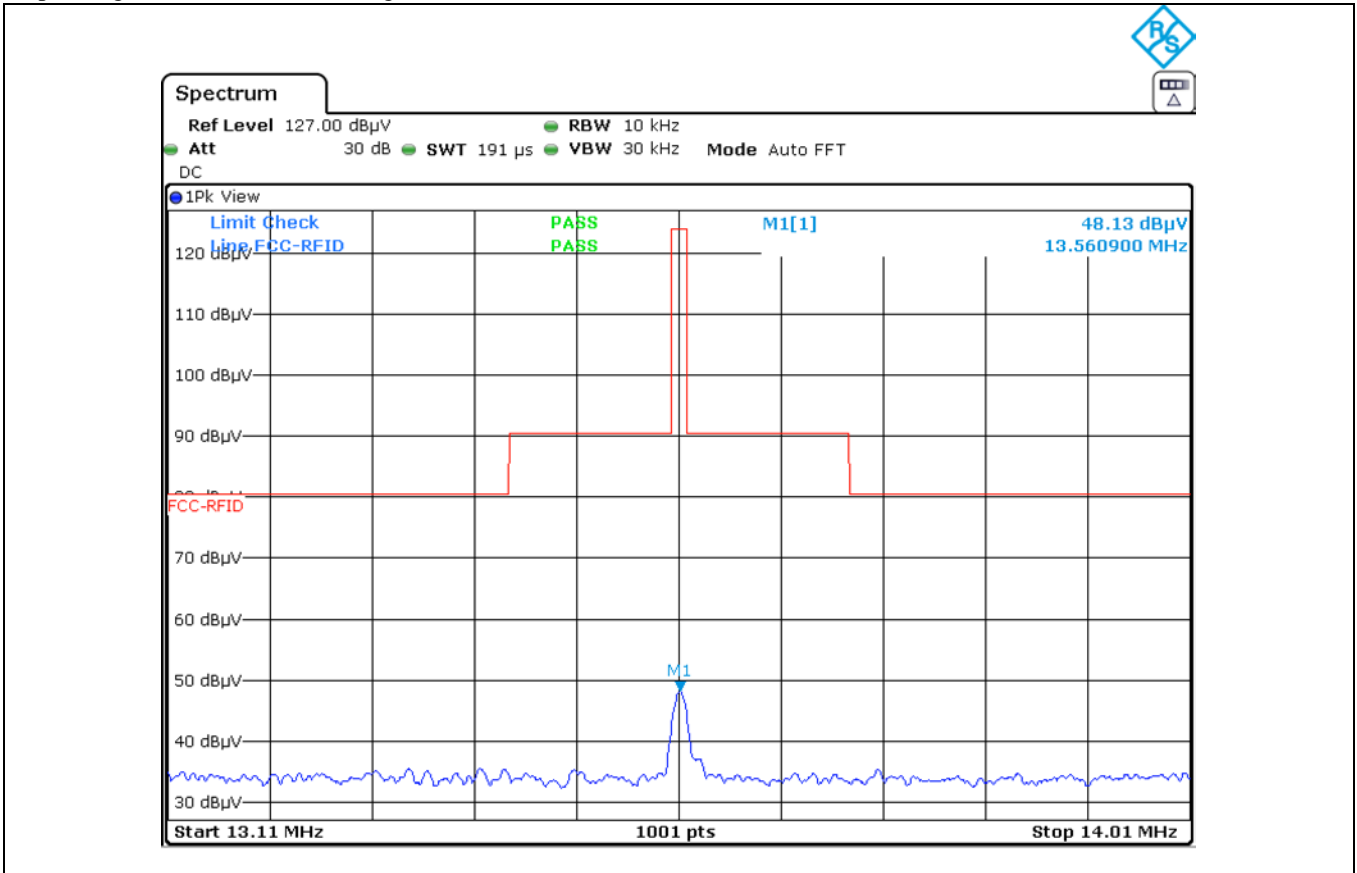
**Tested by: Ju Yun Park / Assistant Manager**

**5.1.2 Operation frequency band: Below 13.553 MHz and above 13.567 MHz**

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 45 % R.H. Temperature: 23 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209  
 Type of Test : Low Power Transmitter below 1 705 kHz  
 Result : PASSED

EUT : CID (Central Information Display) system Date: June 03, 2020 ~ June 10, 2020  
 Operating Condition : Transmitting Mode



cc. to above test data, the field strength level of 13.560 9 MHz is 48.13 dBuV/m and the worst limit subject to 15.225 (b) and (c) is 80.5 dBuV/m, so the EUT meets the requirement.

**Tested by: Ju Yun Park / Assistant Manager**

## 5.2 SPURIOUS EMISSION TEST

### 5.2.1 Spurious Radiated Emission Below 30 MHz

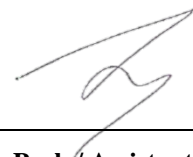
Humidity Level : 45 % R.H. Temperature: 23 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209  
 Type of Test : Low Power Transmitter below 1 705 kHz  
 Frequency Range : 9 kHz ~ 30 MHz  
 Result : PASSED

EUT : CID (Central Information Display) system Date: June 03, 2020 ~ June 10, 2020  
 Operating Condition : Transmitting Mode  
 Distance : 3 m

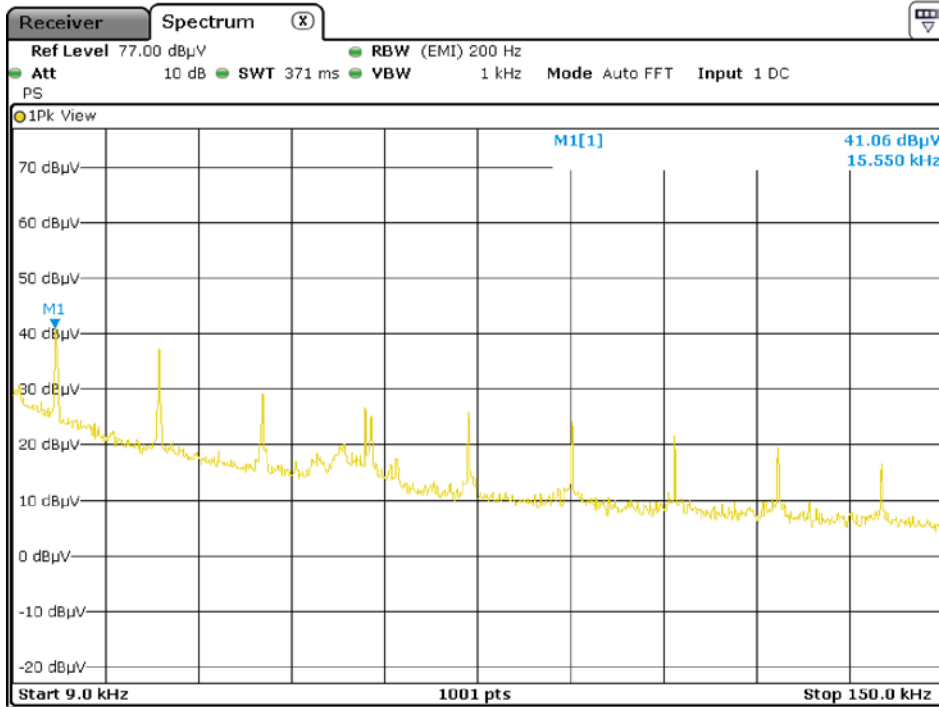
Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amplitud (dBμV)	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.015 55	41.06	H	18.63	0.3	59.99	123.8	63.81
0.156 00	25.89	V	18.91	0.3	45.10	103.7	58.60
21.877 00	11.30	H	19.74	0.6	31.64	69.6	37.96

Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

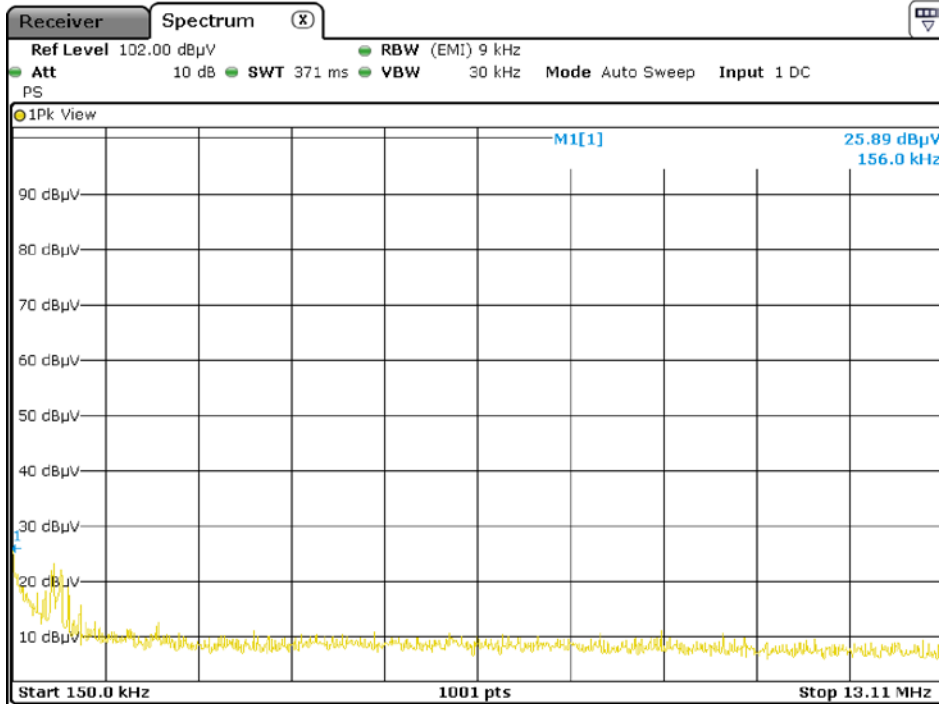
Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz



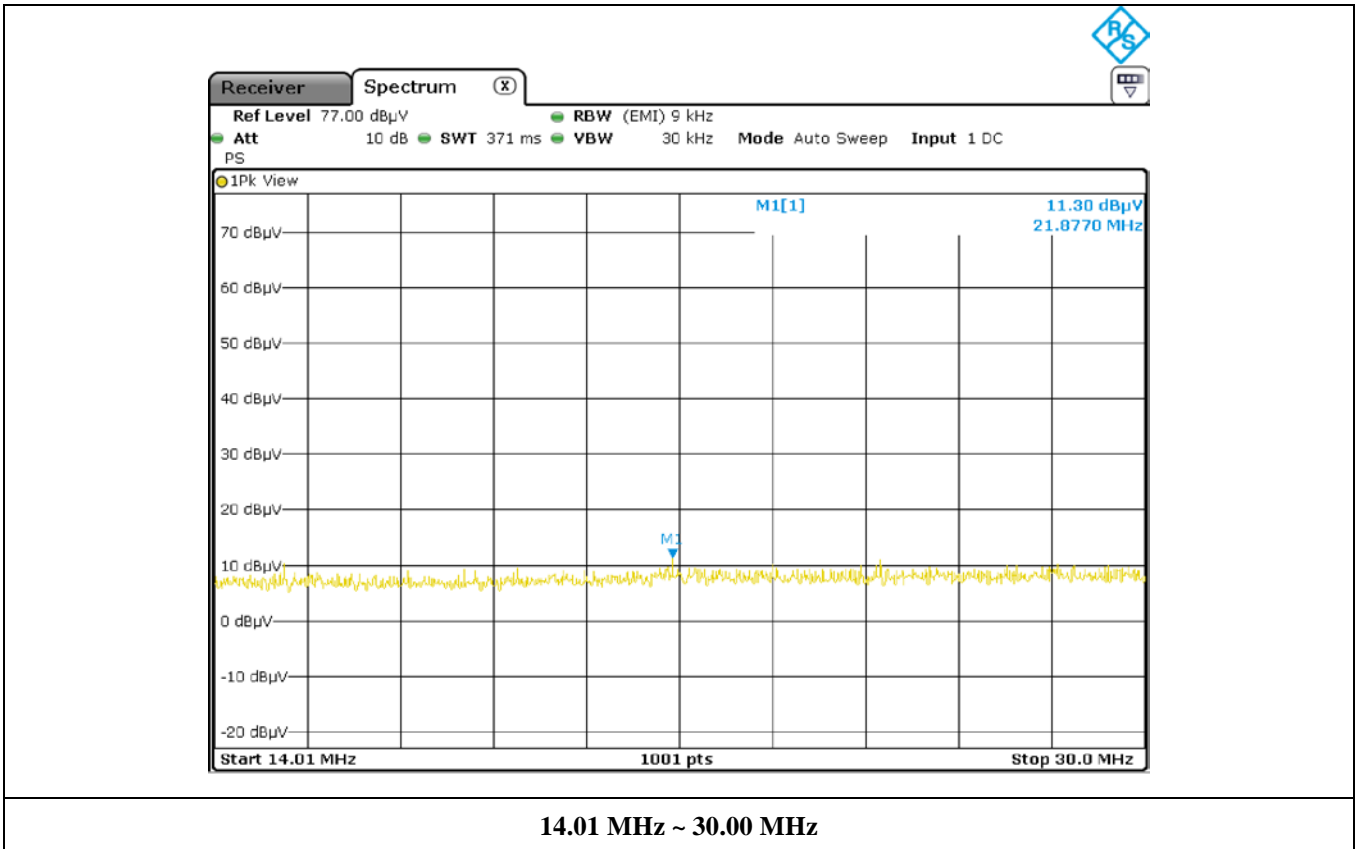
**Tested by: Ju Yun Park / Assistant Manager**



9.00 kHz ~ 150.00 kHz



150.00 kHz ~ 13.11 MHz



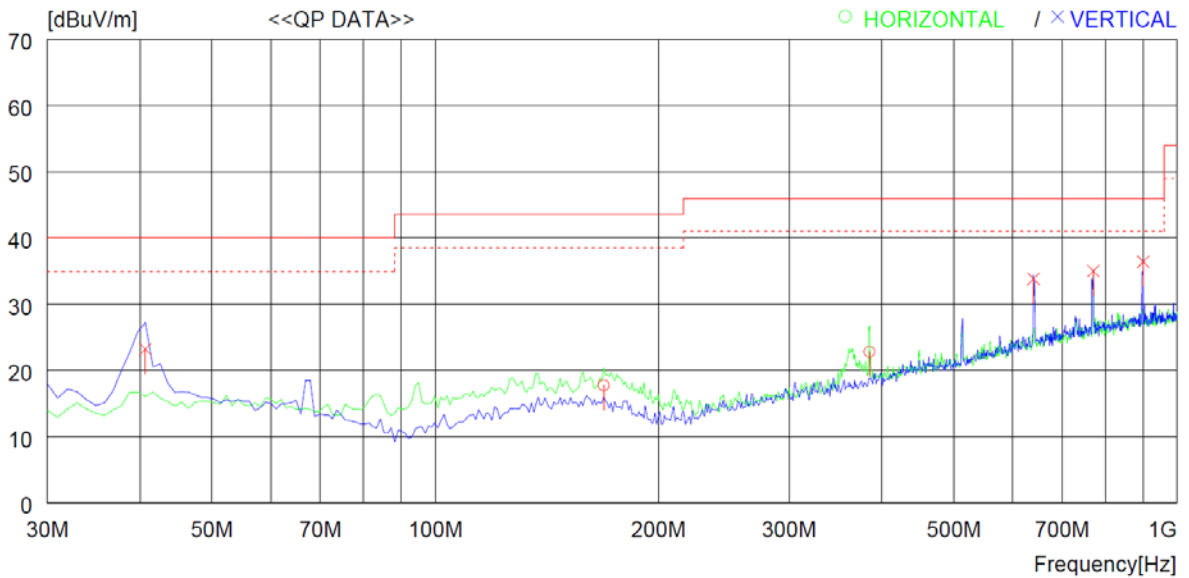
14.01 MHz ~ 30.00 MHz

**5.2.2 Spurious Radiated Emission below 1 GHz**

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 45 % R.H. Temperature: 23 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209  
 Type of Test : Low Power Transmitter below 1 705 kHz  
 Frequency range : 30 MHz ~ 1 000 MHz  
 Result : PASSED

EUT : CID (Central Information Display) system Date: June 03, 2020 ~ June 10, 2020  
 Operating Condition : Transmitting Mode  
 Distance : 3 m



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	168.710	29.3	18.8	2.2	32.6	17.7	43.5	25.8	200	359
2	385.020	30.7	21.2	3.3	32.4	22.8	46.0	23.2	100	0
----- Vertical -----										
3	40.670	35.8	19.0	1.0	32.6	23.2	40.0	16.8	100	359
4	640.127	35.8	26.1	4.4	32.5	33.8	46.0	12.2	100	359
5	771.073	34.8	27.8	4.8	32.4	35.0	46.0	11.0	100	359
6	900.079	34.2	29.0	5.3	32.1	36.4	46.0	9.6	100	150

**Tested by: Ju Yun Park / Assistant Manager**

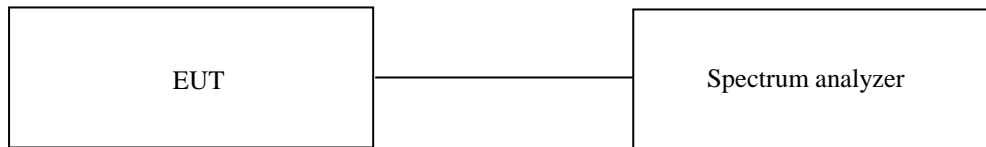
### 5.3 20 dB BANDWIDTH

#### 5.3.1 Operating environment

Temperature : 23 °C  
Relative humidity : 45 % R.H.

#### 5.3.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 10 kHz, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



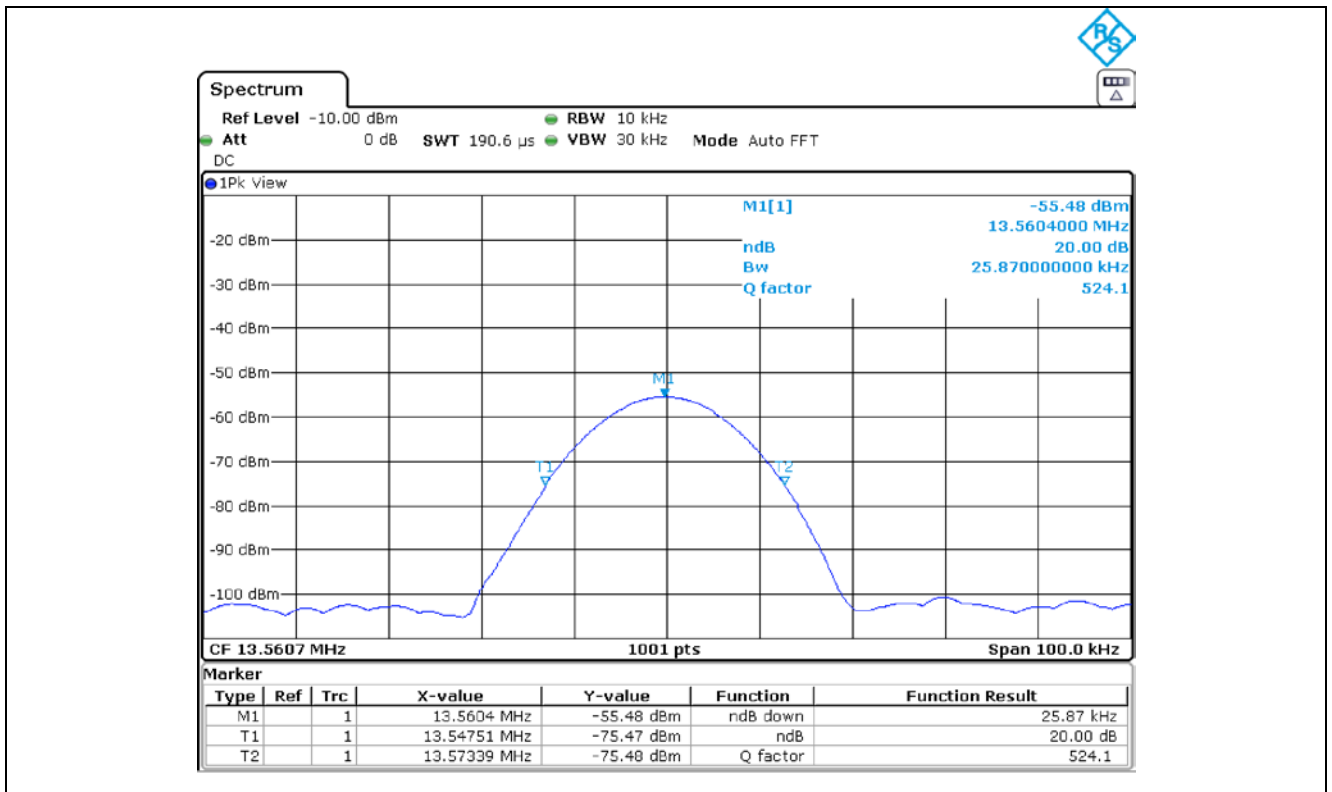


**5.3.3 Test data**

- Test Date : June 03, 2020 ~ June 10, 2020
- Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Operating Freq. (MHz)	Measured Value (kHz)	Assigned Operating Frequency Band (kHz)	Result
13.560 7	25.87	900	<b>PASS</b>

**Tested by: Ju Yun Park / Assistant Manager**



## 5.4 FREQUENCY STABILITY WITH TEMPERATURE VARIATION

### 5.4.1 Operating environment

Temperature : 23 °C  
 Relative humidity : 45 % R.H.

### 5.4.2 Test set-up

Turn EUT off and set chamber temperature to -20 °C and then allow sufficient time (approximately 20 to 30 minutes after chamber reach the assigned temperature) for EUT to stabilize. Turn ON EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 °C step from -20 °C to +50°C. Repeat above method for frequency measurements every 10 °C step and then record all measured frequencies on each temperature step.

### 5.4.3 Test data

-. Test Date : June 03, 2020 ~ June 10, 2020  
 -. Result : PASSED

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
-20	13,560,700	13,560,886	186	± 1 356.07
-10		13,560,876	176	
0		13,560,833	133	
10		13,560,822	122	
20		13,560,744	44	
30		13,560,692	-8	
40		13,560,639	-61	
50		13,560,607	-93	



Tested by: **Ju Yun Park** / Assistant Manager

## 5.5 FREQUENCY STABILITY WITH VOLTAGE VARIATION

### 5.5.1 Operating environment

Temperature : 23 °C  
 Relative humidity : 45 % R.H.

### 5.5.2 Test set-up


An external DC power supply was connected to the input of the EUT. The voltage of EUT set to 115 % of the nominal value and then was reduced to 85 % of nominal voltage. The output frequency was recorded at each step.

### 5.5.3 Test data

-. Test Date : June 03, 2020 ~ June 10, 2020

-. Result : PASSED

Voltage (Vac)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
17.25(115 %)	13,560,700	13,560,774	74	± 1 356.07
15.0(100 %)		13,560,744	44	
12.75(85 %)		13,560,767	67	



Tested by: **Ju Yun Park** / Assistant Manager

## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses.

+ Meter reading	(dB $\mu$ V)
- Amplifier Gain	(dB)
+ Cable Loss	(dB)
- Antenna Factor	(dB/m)
<hr/>	
= Corrected Result	(dB $\mu$ V/m)

Margin (dB)

Specification Limit	(dBuV/m)
- Corrected Result	(dBuV/m)
<hr/>	
= dB Relative to Spec	( $\pm$ dB)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESCI	101012	Oct. 22, 2019	One Year	-
2.		R/S	ESR	101470	Oct. 22, 2019	One Year	■
3.		R/S	ESCI	101012	Oct. 22, 2019	One Year	-
4.	Spectrum analyzer	R/S	FSV30	101372	Jul. 24, 2019	One Year	■
5.	Amplifier	Sonoma Instrument	310N	312544	Mar. 16, 2020	One Year	■
6.	Amplifier	Sonoma Instrument	310N	312545	Mar. 16, 2020	One Year	-
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-255	Sep. 24, 2019	Two Year	■
8.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-419	Mar. 20, 2020	Two Year	-
9.	Controller	Innco System	CO3000	CO3000/904/ 37211215/L	N/A	N/A	■
10.	LISN	EMCO	3825/2	9109-1869	Mar. 16, 2020	One Year	-
		Schwarzbeck	NNLK8121	804	Oct. 21, 2019	One Year	-
		Schwarzbeck	NSLK8128	8128-216	Mar. 16, 2020	One Year	-
11.	Turn Table	Innco System	DT3000	930611	N/A	N/A	■
12.	Antenna Master	Innco System	MA4000-EP	MA4000/332	N/A	N/A	-
13.	Antenna Master	Innco System	MA-4000XPET	MA4000/509	N/A	N/A	■
14.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	Mar. 24, 2020	Two Year	■
15.	Frequency Counter	HP	53152A	US39270295	Jul. 25, 2019	One Year	■
16.	Environmental Test Chamber	ESPEC	PSL-2KP	14009407	Feb. 21, 2020	One Year	■
17.	DC Power Supply	Protek	PWS-3003D	4020409	Jul. 24, 2019	One Year	■