



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : W168R-D055

AGR No. : A169A-030

Applicant : LG Innotek Co., Ltd.

Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, 506-731, Gwangju, Korea

Manufacturer : SUZHOU NIHONE Electronics Technology Co., LTD.

Address : No.185 XiaoXiang Road Suzhou High tech Zone

Type of Equipment : Electronic Shelf Label

FCC ID. : YZP-REBETZ58A

Model Name : REBE-TZ58A

Multiple Model Name : REBE-MZ58A

Serial number : N/A

Total page of Report : 32 pages (including this page)

Date of Incoming : August 01, 2016

Date of issue : August 31, 2016

## **SUMMARY**

The equipment complies with the regulation; FCC PART 15 SUBPART C Section 15.247

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

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

Reviewed by:

Ki-Hong, Nam / Asst, Chief Engineer

Approved by:

Sung-Ik, Han/ Managing Director ONETECH Corp.

Report No.: W168R-D055

ONETECH Corp.



# **CONTENTS**

1. MEDIELGATION OF COMPLIANCE	_
1. VERIFICATION OF COMPLIANCE	
2. TEST SUMMARY	6
2.1 TEST ITEMS AND RESULTS	6
2.2 ADDITIONS, DEVIATIONS, EXCLUSIONS FROM STANDARDS	6
2.3 RELATED SUBMITTAL(S) / GRANT(S)	6
2.4 PURPOSE OF THE TEST	6
2.5 TEST METHODOLOGY	6
2.6 TEST FACILITY	6
3. GENERAL INFORMATION	7
3.1 PRODUCT DESCRIPTION	7
3.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT.	7
4. EUT MODIFICATIONS	7
5. SYSTEM TEST CONFIGURATION	Q
5.1 JUSTIFICATION	
5.2 PERIPHERAL EQUIPMENT  5.3 MODE OF OPERATION DURING THE TEST	
5.4 CONFIGURATION OF TEST SYSTEM	
5.5 ANTENNA REQUIREMENT	
6. PRELIMINARY TEST	
6.1 AC POWER LINE CONDUCTED EMISSIONS TESTS.	
6.2 GENERAL RADIATED EMISSIONS TESTS	
7. MIMIMUM 6 DB BANDWIDTH	11
7.1 OPERATING ENVIRONMENT	11
7.2 TEST SET-UP	11
7.3 TEST EQUIPMENT USED	11
7.4 TEST DATA	12
8. MAXIMUM PEAK OUTPUT POWER	14
8.1 OPERATING ENVIRONMENT	14
8.2 TEST SET-UP	14
8.3 TEST EQUIPMENT USED	14
8.4 Test data	15
9. 100 KHZ BANDWIDTH OUTSIDE THE FREQUENCY BAND	17

Report No.: W168R-D055

**PAGE** 





9.1 OPERATING ENVIRONMENT	17
9.2 TEST SET-UP FOR CONDUCTED MEASUREMENT	17
9.3 TEST SET-UP FOR RADIATED MEASUREMENT.	17
9.4 TEST EQUIPMENT USED.	17
9.5 TEST DATA FOR CONDUCTED EMISSION	18
9.6 Test data for radiated emission	23
9.6.1 Radiated Emission which fall in the Restricted Band	23
9.6.2 Spurious & Harmonic Radiated Emission	24
10. PEAK POWER SPECTRAL DENSITY	25
10.1 OPERATING ENVIRONMENT	25
10.2 TEST SET-UP	25
10.3 TEST EQUIPMENT USED	25
10.4 TEST DATA	26
11. RADIATED EMISSION TEST	28
11.1 OPERATING ENVIRONMENT	28
11.2 TEST SET-UP	28
11.3 TEST EQUIPMENT USED	28
11.4 Test data	29
11.4.1 Test data for Below 30 MHz	32
11.4.2 Test data for above 1 GHz	32





**Revision History** 

Issued Report No.	Issued Date	Revisions	Effect Section
W168R-D055	August 31, 2016	Initial Issue	All



Page 5 of 32 Report No.: W168R-D055

# 1. VERIFICATION OF COMPLIANCE

Applicant : LG Innotek Co., Ltd.

Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, 506-731, Gwangju, Korea

Contact Person : Jeong, Inchang / Director

Telephone No. : +86-62-950-0332 FCC ID : YZP-REBETZ58A

Model Name : REBE-TZ58A

Serial Number : N/A

Date : August 31, 2016

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM	
E.U.T. DESCRIPTION	Electronic Shelf Label	
THIS REPORT CONCERNS	Original Grant	
MEASUREMENT PROCEDURES	ANSI C63.10: 2013	
TYPE OF EQUIPMENT TESTED	Pre-Production	
KIND OF EQUIPMENT	Continue to	
AUTHORIZATION REQUESTED	Certification	
EQUIPMENT WILL BE OPERATED	FCC DART 15 CURDART C C 15 247	
UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247	
Modifications on the Equipment to Achieve	None	
Compliance	None	
Final Test was Conducted On	3 m, Semi Anechoic Chamber	

<sup>-.</sup> 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. TEST SUMMARY

## 2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	N/A (See Note)
15.203	Antenna Requirement	Met requirement / PASS

Note: This test is not performed because the EUT is operated by DC battery.

## 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

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

Original submittal only

## 2.4 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 15.247.

## 2.5 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.

## 2.6 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-4617/ G-666/ T-1842

IC (Industry Canada) - Registration No. Site# 3736-3

-. Site Accreditation:

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

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) - Designation No. KR0013

It should not be reproduced except in full, without the written approval of ONETECH Corp.

EMC-003 (Rev.2)





# 3. GENERAL INFORMATION

# 3.1 Product Description

The LG Innotek Co., Ltd., Model REBE-TZ58A (referred to as the EUT in this report) is a Electronic Shelf Label. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Electronic Shelf Label
Temperature Range	0 °C ~ +40 °C
Operating Frequency	2 405 MHz ~ 2 480 MHz
RF Output Power	4.53 dBm
Number of Channel	16 Channel
Modulation Type	O-QPSK
Antenna Type	PCB Pattern Antenna
Hall De Chin	Marker: TEXAS INSRUMENTS
USED RF CHIP	Model Name: CC2530
Antenna Gain	3.10 dBi
List of each Osc. or crystal	16.00
Freq.(Freq. >= 1 MHz)	16 MHz
RATED SUPPLY VOLTAGE	3.0 V Battery(CR2477-3P)

# 3.2 Alternative type(s)/model(s); also covered by this test report.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
DEDE TZ50 A	Basic Model.	
REBE-TZ58A	(DISPLAY: COLOR)	$\overline{\square}$
REBE-MZ58A	These models are identical to basic model except for the DISPLAY.  (DISPLAY: MONO)	

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

# 4. EUT MODIFICATIONS

-. None



Page 8 of 32 Report No.: W168R-D055

## 5. SYSTEM TEST CONFIGURATION

#### 5.1 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
Main Board	SUZHOU NIHONE Electronics Technology Co., LTD.	ES Tag 5.83" Rev 0.2	N/A
DISPLAY	N/A	N/A	N/A

## 5.2 Peripheral equipment

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

## 5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 405 MHz, 2 440 MHz, and 2 480 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XZ" axis, but the worst data was recorded in this report.



Page 9 of 32 Report No.: W168R-D055

## 5.4 Configuration of Test System

**Line Conducted Test**: It is not need to test this requirement, because the EUT shall be operated by DC battery.

**Radiated Emission Test**: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10:

2013 to determine the worse operating conditions. Final radiated emission tests were

conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both

vertical and horizontal polarization.

## 5.5 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 antenna of the EUT is a PCB pattern antenna on the main board in the EUT, so no consideration of replacement by the user.



Page 10 of 32 Report No.: W168R-D055

## 6. PRELIMINARY TEST

# **6.1 AC Power line Conducted Emissions Tests**

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)	
It is not need to test this requirement, because the power of the EUT is supplied by battery.		

## **6.2 General Radiated Emissions Tests**

During Preliminary Tests, the following operating modes were investigated

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





## 7. MIMIMUM 6 dB BANDWIDTH

# 7.1 Operating environment

Temperature :  $24.3 \, ^{\circ}\text{C}$ 

Relative humidity : 43.2 % R.H.

## 7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



# 7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
-	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2016 (1Y)

All test equipment used is calibrated on a regular basis.





## 7.4 Test data

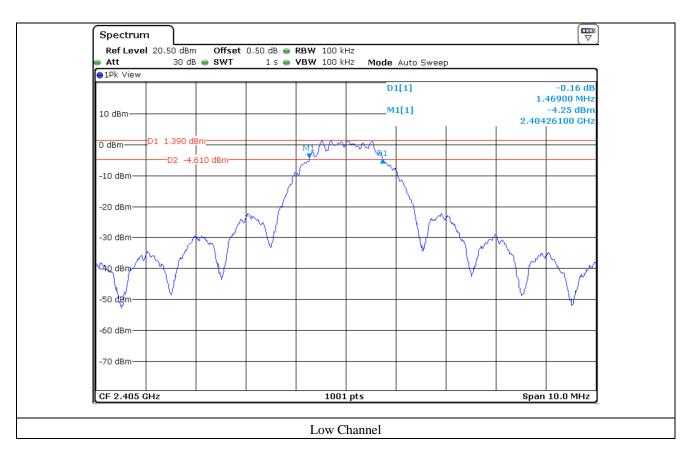
-. Test Date : August 21, 2016

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 405	1.47	0.5	0.97
Middle	2 440	1.55	0.5	1.05
High	2 480	1.61	0.5	1.11

Remark. Margin = Measured Value - Limit

Tested by: Tae-Ho, Kim / Senior Engineer









# 8. MAXIMUM PEAK OUTPUT POWER

# 8.1 Operating environment

ONETECH

Temperature :  $24.3 \,^{\circ}\text{C}$ Relative humidity :  $43.2 \,^{\circ}\text{R.H.}$ 

# 8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to ≥DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



# 8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
<b>-</b>	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2016 (1Y)

All test equipment used is calibrated on a regular basis.





## 8.4 Test data

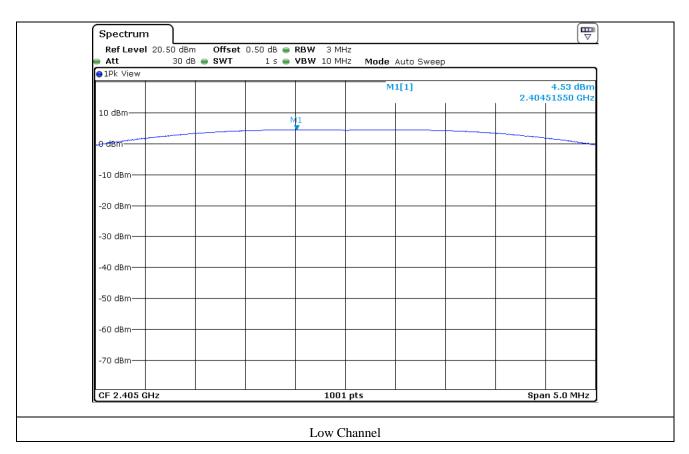
-. Test Date : August 21, 2016

-. Test Result : Pass

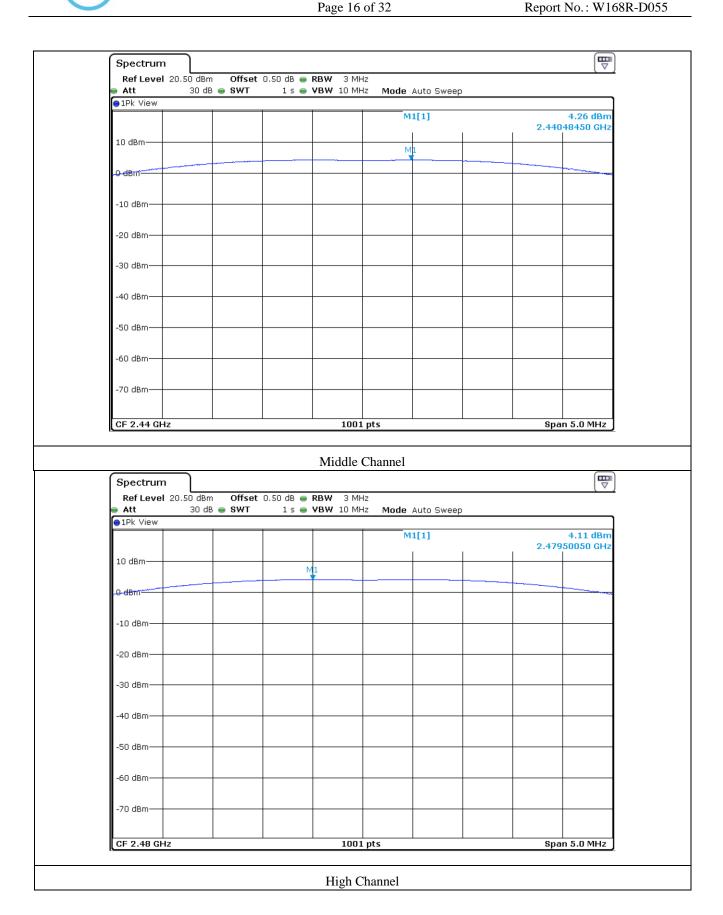
CHANNEL	FREQUENCY	DTS	MEASURED VALUE	LIMIT	MARGIN
CHANNEL	(MHz)	(MHz)	(dBm)	(dBm)	(dB)
LOW	2 405	1.47	4.53	30	25.47
MIDDLE	2 440	1.55	4.26	30	25.74
HIGH	2 480	1.61	4.11	30	25.89

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Tested by: Tae-Ho, Kim / Senior Engineer









Page 17 of 32 Report No.: W168R-D055

# 9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

## 9.1 Operating environment

Temperature :  $24.1 \, ^{\circ}\text{C}$ 

Relative humidity : 43.8 % R.H.

# 9.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



## 9.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels 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 horizontal and vertical polarization of the receiving antenna.

# 9.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2016 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (1Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

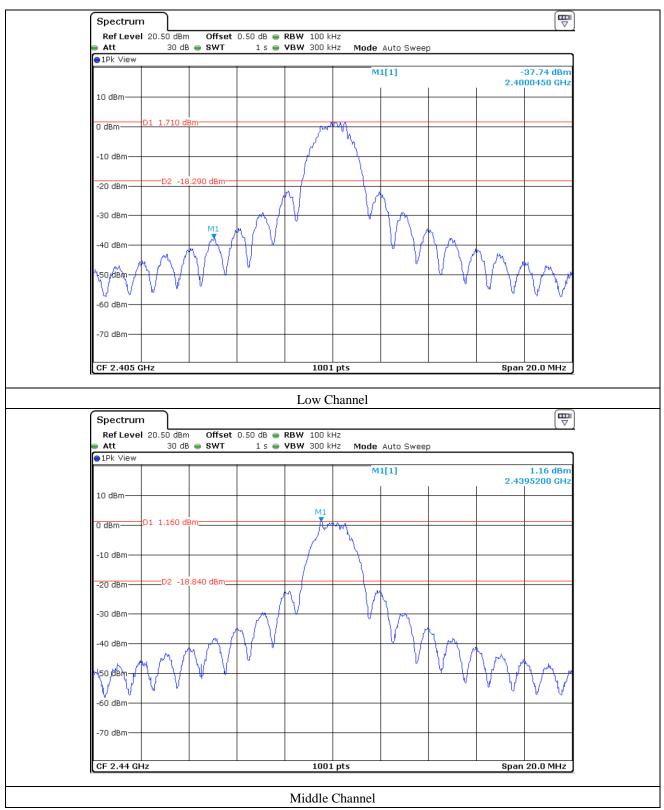
All test equipment used is calibrated on a regular basis.

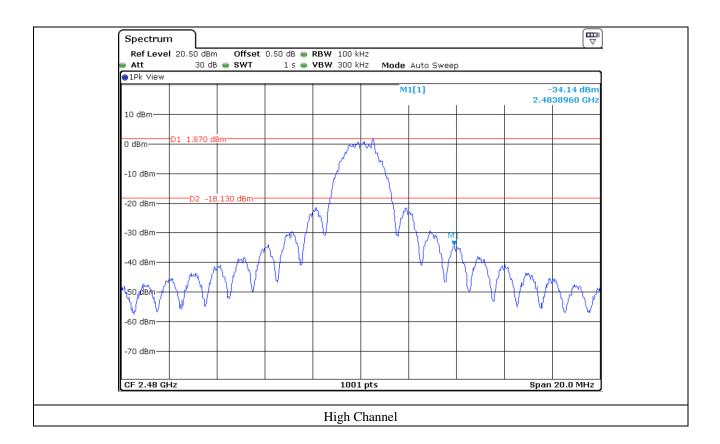


Report No.: W168R-D055

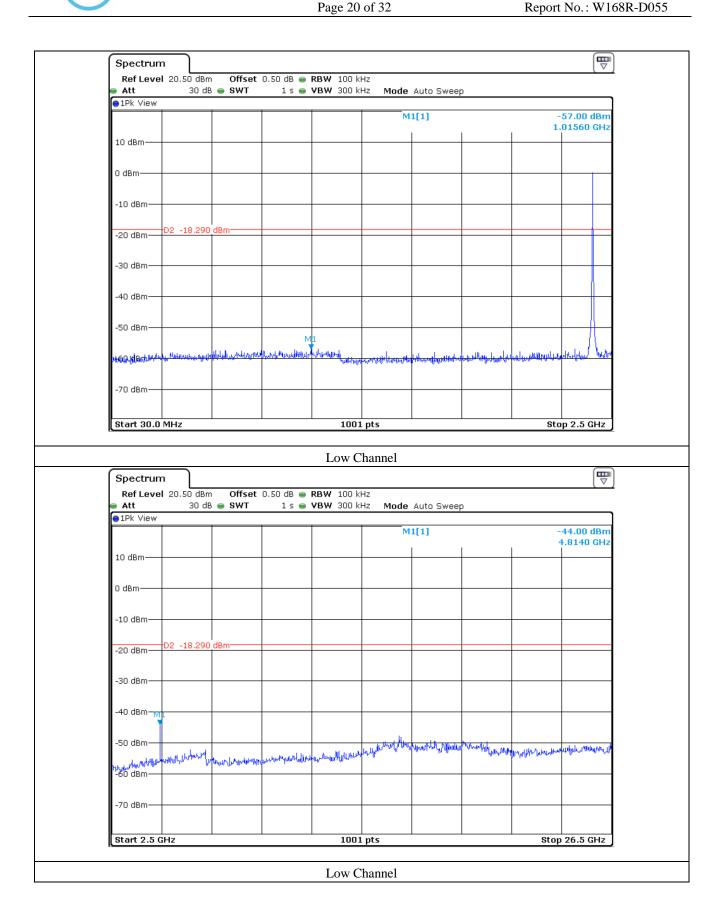
DUETECH

## 9.5 Test data for conducted emission

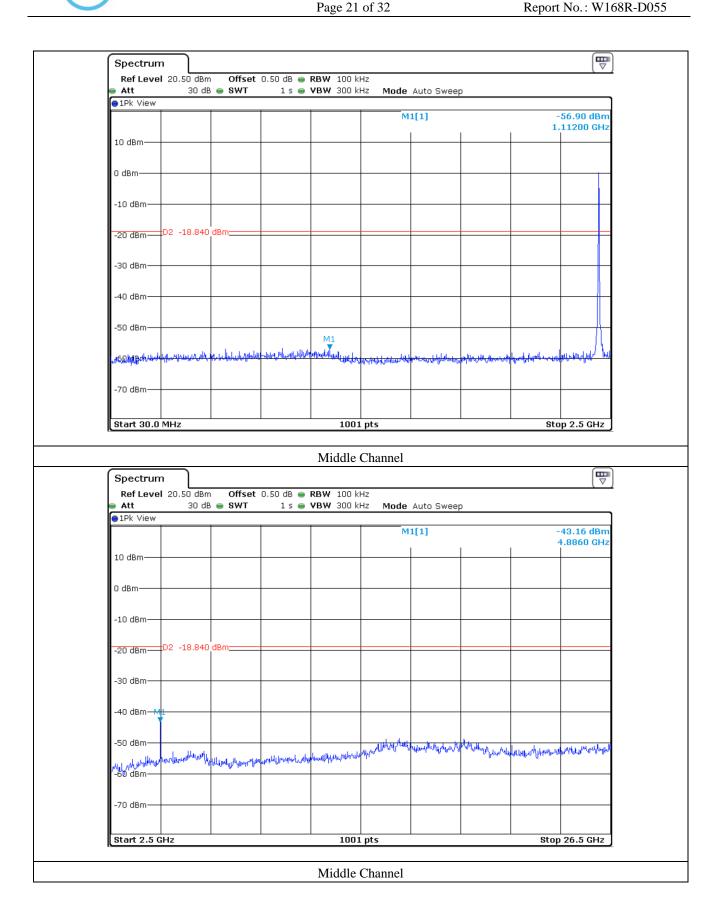




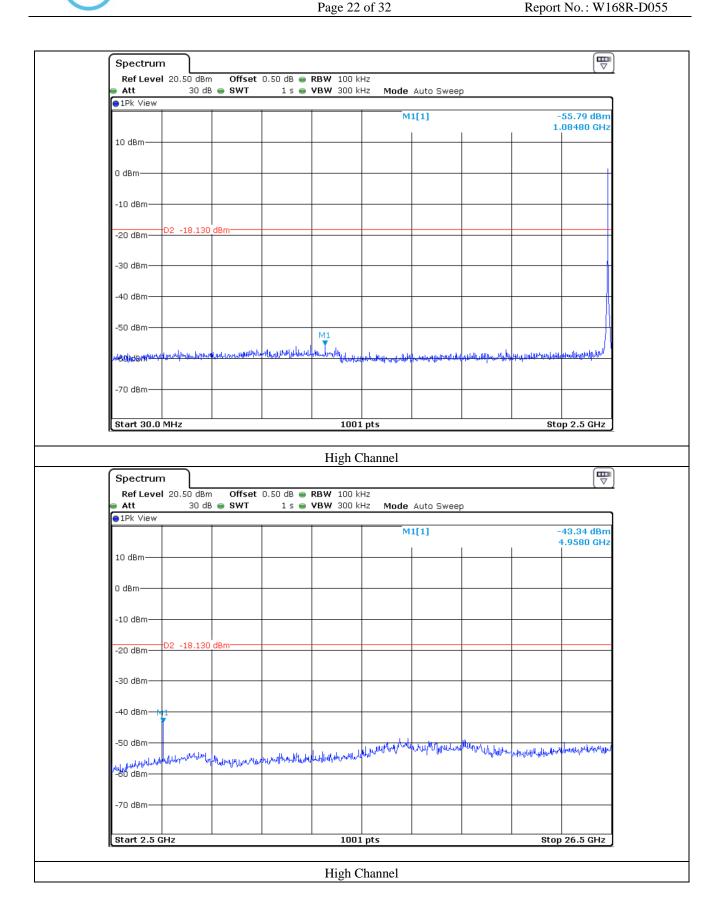














Page 23 of 32 Report No.: W168R-D055

## 9.6 Test data for radiated emission

## 9.6.1 Radiated Emission which fall in the Restricted Band

-. Test Date : August 21, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Result : <u>PASSED</u>

Frequency	Reading	Detector	Ant. Pol.	Ant.	Cable	Amp	Total	Limits	Margin				
(GHz)	$(dB\mu V)$	Mode	(H/V)	Factor	Loss	Gain	(dBµV/m)	$(dB\mu V/m)$	(dB)				
	Test Data for Low Channel												
	47.51	Peak	Н				38.71	74.00	35.29				
2 200 000	38.94	Average	Н	27.20	<b>5</b> 40	10.10	30.14	54.00	23.86				
2.390 000	47.05	Peak	V	27.20	7.10	0 43.10	38.25	74.00	35.75				
	38.21	Average	V				29.41	54.00	24.59				
Test Data for Low Channel													
	49.21	Peak	Н				40.41	74.00	33.59				
2 400 000	40.84	Average	Н			42.10	32.04	54.00	21.96				
2.400 000	48.22	Peak	V	27.20	7.10	43.10	39.42	74.00	34.58				
	39.09	Average	V				30.29	54.00	23.71				
			Test I	Oata for Hi	gh Channe	el							
	55.88	Peak	Н	-	-	-	47.28	74.00	26.72				
	46.84	Average	Н	40	- 10		38.24	54.00	15.76				
2.483 500	49.05	Peak	V	27.40	7.10	43.10	40.45	74.00	33.55				
	40.21	Average	V				31.61	54.00	22.39				

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dB $\mu$ V/m) - Total Level (dB $\mu$ V/m)

Total Level = Reading + Antenna Factor + Cable Loss - Pre-Amplifier Gain

Tested by: Tae-Ho, Kim / Senior Engineer



Page 24 of 32 Report No.: W168R-D055

## 9.6.2 Spurious & Harmonic Radiated Emission

-. Test Date : August 21, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,

100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range  $: 1 \text{ GHz} \sim 26.5 \text{ GHz}$ 

-. Measurement distance : 3 m

-. Result : <u>PASSED</u>

Frequency (GHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBµV/m)	Margin (dB)				
(0111)	Test Data for Low Channel												
	46.56	Peak	Н	-			44.86	73.98	29.12				
	36.21	Average	Н				34.51	53.98	19.47				
4 810.00	45.20	Peak	V	31.10	9.60	42.40	43.50	73.98	30.48				
	35.48	Average	V				33.78	53.98	20.20				
Test Data for Middle Channel													
	46.08	Peak	Н				44.78	73.98	29.20				
	35.88	Average	Н						34.58	53.98	19.40		
4 880.00	46.15	Peak	V	31.30	9.80	42.40	44.85	73.98	29.13				
	36.21	Average	V				34.91	53.98	19.07				
			Test	Data for H	ligh Chan	nel							
	45.84	Peak	Н				44.74	73.98	29.24				
	36.84	Average	Н				35.74	53.98	18.24				
4 960.00	46.21	Peak	V	31.30	31.30	9.90	42.30	45.11	73.98	28.87			
	35.47	Average	V				34.37	53.98	19.61				

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dB $\mu$ V/m) - Total Level (dB $\mu$ V/m)

 $Total\ Level = Reading + Antenna\ Factor + Cable\ Loss - Pre-Amplifier\ Gain$ 

Tested by: Tae-Ho, Kim / Senior Engineer

It should not be reproduced except in full, without the written approval of ONETECH Corp.



Page 25 of 32 Report No.: W168R-D055

## 10. PEAK POWER SPECTRAL DENSITY

# 10.1 Operating environment

Temperature :  $24.3 \,^{\circ}\text{C}$ Relative humidity :  $43.2 \,^{\circ}\text{R.H.}$ 

## 10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to 3 kHz  $\leq$  RBW  $\leq$ 100 kHz, the video bandwidth is set to 3 times the resolution bandwidth.



# 10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2016 (1Y)

All test equipment used is calibrated on a regular basis.



Page 26 of 32 Report No.: W168R-D055

## 10.4 Test data

-. Test Date : August 21, 2016

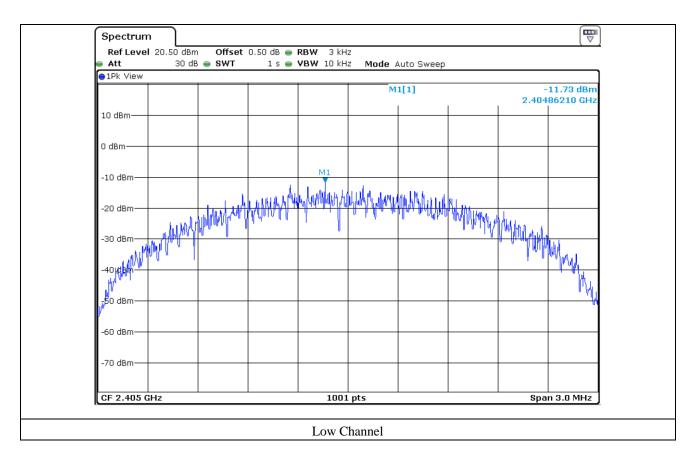
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

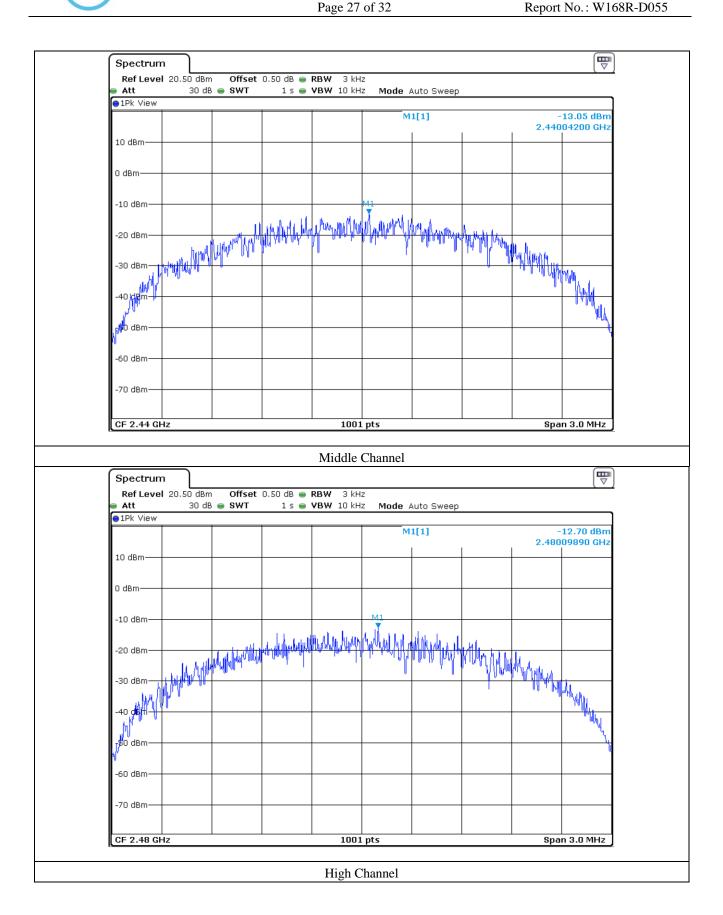
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 405	-11.73	8.00	-19.73
Middle	2 440	-13.05	8.00	-21.05
High	2 480	-12.70	8.00	-20.70

Remark. Margin = Limit - Measured value

Tested by: Tae-Ho, Kim/Senior Engineer











## 11. RADIATED EMISSION TEST

## 11.1 Operating environment

Temperature :  $24.1 \,^{\circ}\text{C}$ Relative humidity :  $43.8 \,^{\circ}\text{R.H.}$ 

## 11.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in 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.

## 11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2016 (1Y)
<b>-</b>	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (1Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

All test equipment used is calibrated on a regular basis.



Page 29 of 32 Report No.: W168R-D055

## 11.4 Test data

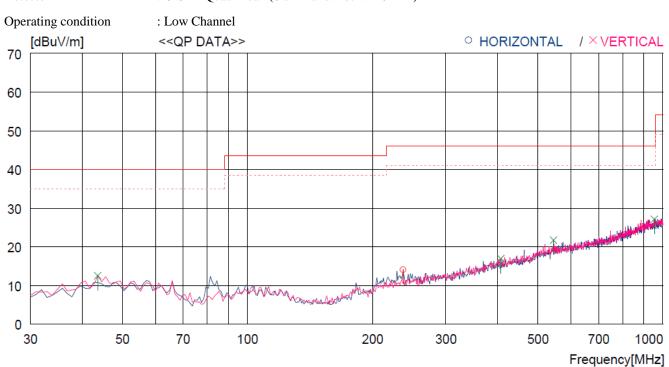
Humidity Level : 43.8 % R.H. Temperature: 24.1 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

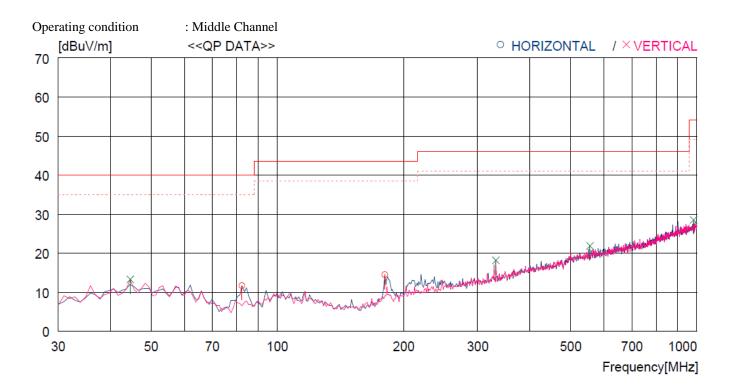
EUT : Electronic Shelf Label Date: August 21, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



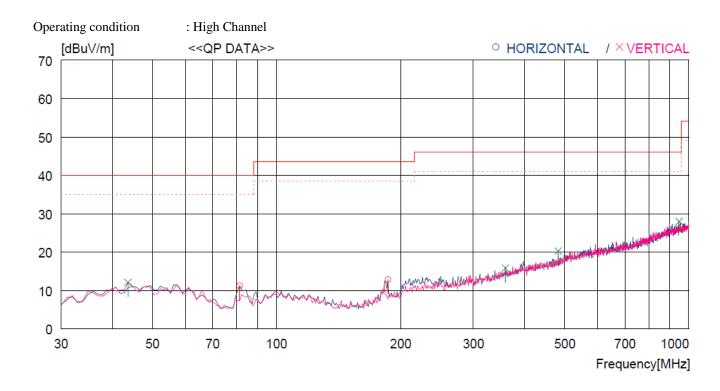
No.	FREQ	READING QP I	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
H	orizontal -									
1 2	81.410 236.610	5.0 31.4	7.9 11.7	2.5 4.0	33.1 33.0	-17.7 14.1	40.0 46.0	57.7 31.9	100 100	173 0
Ve	ertical									
3 4 5 6	43.580 407.330 545.070 953.427	29.8 28.6 30.2 28.4	13.8 16.2 18.0 22.2	1.9 5.3 6.8 8.7	33.0 33.2 33.3 32.2	12.5 16.9 21.7 27.1	40.0 46.0 46.0 46.0	27.5 29.1 24.3 18.9	200 100 200 100	93 335 143 356





No.	FREQ	READING QP I	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
Ho	orizontal -									
1 2	82.380 180.350	34.2 34.5	8.1 9.4	2.5 3.6	33.1 33.0	11.7 14.5	40.0 43.5	28.3 29.0	300 400	359 4
Ve	ertical									
3 4 5 6	44.550 331.670 555.739 982.526	30.5 32.2 30.3 29.3	13.9 14.2 18.2 22.3	1.9 4.8 6.8 8.8	33.0 33.0 33.4 31.9	13.3 18.2 21.9 28.5	40.0 46.0 46.0 54.0	26.7 27.8 24.1 25.5	100 100 200 300	239 359 308 85





No.	FREQ	READING QP F	ANT ACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
H	orizontal -									
1 2	81.410 186.170	33.9 32.5	7.9 9.7	2.5 3.6	33.1 33.0	11.2 12.8	40.0 43.5	28.8 30.7	100 262	231 0
Ve	ertical									
3 4 5 6	43.580 358.830 482.021 947.607	30.6	13.8 14.9 16.9 22.1	1.9 5.1 6.0 8.6	33.0 33.1 33.2 32.3	12.1 15.9 20.3 28.0	40.0 46.0 46.0 46.0	27.9 30.1 25.7 18.0	400 400 300 400	67 189 324 340

Tested by: Tae-Ho, Kim / Senior Engineer



Page 32 of 32 Report No.: W168R-D055

## 11.4.1 Test data for Below 30 MHz

-. Test Date : August 21, 2016

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Height (m)	0	Ant. Factor (dB/m)	Emission Level(dBμV/m)	Limits (dBµV/m)	Margin (dB)

It was not observed any emissions from the EUT.

## 11.4.2 Test data for above 1 GHz

-. Test Date : August 21, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Emission Level(dBμV/m)	Limits (dBµV/m)	Margin (dB)

It was not observed any emissions from the EUT.

Tested by: Tae-Ho, Kim / Senior Engineer