RF Test Report

Applicant:	Shanghai RetailEye Intelligence Co., Ltd
Address:	Room 1602, No. 200Wending Road, Xuhui District, Shanghai, China
Product:	Vertical Cooler Camera
Model No.:	REC-PH550I-W, REC-PH550I-B, REC-AI550I-W
Brand Name:	RETAILEYE
FCC ID:	2BD9S-REC
Standards:	47 CFR Part 22 47 CFR Part 24 47 CFR Part 27
Report No.:	PD20230232RF01
Issue Date:	2024/04/11
Test Result:	PASS *

* **The above equipment has been tested and compliance with the requirement of the relative standards by Hefei Panwin Technology Co., Ltd.**

Reviewed By: Jerry Zhang **Approved By:** Alec Yang

Hefei Panwin Technology Co., Ltd.

Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, No.106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province,China

TEL: +86-0551-63811775

Revision History

Report No.	Version	Description	Issue Date	Note
PD20230232RF01	1	Initial Report	2024/04/11	Valid

Remark:

The gain used in this report is smaller than that of the original module, verified the conducted power, and the result did not deteriorate.. This testing report only tested Radiated Spurious Emission data, please refer to the module report for other testing items.(Model No.: **EG915Q-NA**, Report No.: **SEWM2307000235RG01**)

CONTENTS

Test Summary

LTE Band 2

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §24.232(c)	EIRP ≤2 Watt	Reference report SEWM2307000235RG01
2	Peak-to-Average Ratio	§24.232(d)	≤13 dB	Reference report SEWM2307000235RG01
3	Occupied Bandwidth	§2.1049	No limit.	Reference report SEWM2307000235RG01
4	Conducted Band Edge Measurement	§2.1051, §24.238(a)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Reference report SEWM2307000235RG01
5	Spurious Emissions at Antenna Terminals	§2.1051, §24.238(a)	≤ -13 dBm/1 MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Reference report SEWM2307000235RG01
6	Radiated Spurious Emission	§2.1053, §24.238(a)	≤ -13 dBm/1 MHz.	PASS
7	Frequency Stability	§2.1055 §24.235	Within authorized bands of operation/frequency block.	Reference report SEWM2307000235RG01

LTE Band 4 /66

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(d)(4)	EIRP ≤ 1 Watt	Reference report SEWM2307000235RG01
2	Peak-to-Average Ratio	§27.50(d)(5)	≤13 dB	Reference report SEWM2307000235RG01
3	Occupied Bandwidth	§2.1049	No limit.	Reference report SEWM2307000235RG01
4	Conducted Band Edge Measurement	§2.1051, §27.53(h)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Reference report SEWM2307000235RG01
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(h)	≤ -13 dBm/1 MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Reference report SEWM2307000235RG01
6	Radiated Spurious Emission	§2.1053, §27.53(h)	≤ -13 dBm/1 MHz.	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	Reference report SEWM2307000235RG01

LTE Band 5

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046 §22.913 (a)(5)	ERP ≤ 7 Watt	Reference report SEWM2307000235RG01
2	Peak-to-Average Ratio	§22.913 (d)	≤13 dB	Reference report SEWM2307000235RG01
3	Occupied Bandwidth	§2.1049	No limit.	Reference report SEWM2307000235RG01
4	Conducted Band Edge Measurement	§2.1051 §22.917 (a)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Reference report SEWM2307000235RG01
5	Spurious Emissions at Antenna Terminals	§2.1051 §22.917(a)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Reference report SEWM2307000235RG01
6	Radiated Spurious Emission	§2.1053 §22.917(a)	FCC: ≤ -13 dBm/100 kHz.	PASS
7	Frequency Stability	§2.1055 §22.355	< ±2.5 ppm	Reference report SEWM2307000235RG01

LTE Band 13

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(b)(10)	ERP ≤ 3 Watt	Reference report SEWM2307000235RG 01
2	Peak-to-Average Ratio	--	≤13 dB	Reference report SEWM2307000235RG 01
3	Occupied Bandwidth	§2.1049	No limit.	Reference report SEWM2307000235RG 01
4	Conducted Band Edge Measurement	§2.1051, §27.53(c)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Reference report SEWM2307000235RG 01
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(c) §27.53(f)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations; For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	Reference report SEWM2307000235RG 01
6	Radiated Spurious Emission	§2.1053, §27.53(c) §27.53(f)	FCC: ≤ -13 dBm/100 kHz. For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	Reference report SEWM2307000235RG 01

LTE Band 12

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(c)(10)	ERP ≤ 3 Watt	Reference report SEWM2307000235RG01
2	Peak-to-Average Ratio	--	≤13 dB	Reference report SEWM2307000235RG01
3	Occupied Bandwidth	§2.1049	No limit.	Reference report SEWM2307000235RG01
4	Conducted Band Edge Measurement	§2.1051, §27.53(g)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Reference report SEWM2307000235RG01
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Reference report SEWM2307000235RG01
6	Radiated Spurious Emission	§2.1053, §27.53(g)	FCC: ≤ -13 dBm/100 kHz.	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	Reference report SEWM2307000235RG01

Radiated detection date: 2024/02/23 to 2024/04/10
Date of Sample Received: 2024/01/30

• We, Hefei Panwin Technology Co., Ltd., would like to declare that the tested sample has been evaluated in accordance with the procedures given in applied standard(s) in **Section 2.5** of this report and shown compliance with the applicable technical standards.

• All indications of PASS/FAIL in this report are based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

1 Test Laboratory

1.1 Notes of the Test Report

This report is invalid without signature of auditor and approver or with any alterations. The report shall not be partially reproduced without written approval of the testing company. Entrusted test results are only responsible for incoming samples. If there is any objection to the testing report, it shall be raised to the testing company within 15 days from the date of receiving the report. In the test results, "NA" means "not applicable", and the test items marked with "Δ" are subcontracted projects.

1.2 Test Facility

FCC (Designation Number: CN1361, Test Firm Registration Number: 473156)

Hefei Panwin Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 6849.01)

Hefei Panwin Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Laboratory

Company Name	Hefei Panwin Technology Co., Ltd.
Address	Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, No.106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province,China
Telephone	+86-0551-63811775
Post Code	230031

2 General Description of Equipment under Test

2.1 Details of Application

Applicant	Shanghai RetailEye Intelligence Co., Ltd
Applicant Address	Room 1602, No. 200Wending Road, Xuhui District, Shanghai, China
Manufacturer	Shanghai RetailEye Intelligence Co., Ltd
Manufacturer Address	Room 1602, No. 200Wending Road, Xuhui District, Shanghai, China
Factory	FOOFEE intelligent manufacturing Technology (dongguan) Co., Ltd.
Factory Address	Room 401, Building 10, No.1 Pushi 1st Road, Qiaotou Town, Dongguan City, Guangdong Province, PRC.

2.2 Details of EUT

Product		Vertical Cooler Camera							
Model		REC-PH550I-W							
Series Model		REC-PH550I-B, REC-AI550I-W							
Hardware Version		205							
Software Version		228							
Power Supply		Battery power supply Typical 3.6Vdc External power supply 12 to 24Vdc							
E-UTRA Specification									
Single Band		FDD Band: 2, 4, 5, 12, 13, 66							
Power Class for LTE		PC3							
Type of Modulation		UL: QPSK, 16QAM							
Antenna Type		☑ Internal ☐ External							
Antenna Gain		LTE Band 2: 1.18dBi LTE Band 4: 1.20dBi LTE Band 5: -0.11dBi LTE Band 12: -1.28dBi LTE Band 13: -1.23dBi LTE Band 66: 1.20dBi							
Frequency Band(s)	**SISO Band**	**Supported Channel Bandwidth (MHz)**						**Tx (MHz)**	**Rx (MHz)**
		1.4	**3**	**5**	**10**	**15**	**20**		
	LTE Band 2	v	v	v	v	v	v	1850 to 1910	1930 to 1990
	LTE Band 4	v	v	v	v	v	v	1710 to 1755	2110 to 2155
	LTE Band 5	v	v	v	v	-	-	824 to 849	869 to 894
	LTE Band 12	v	v	v	v	-	-	699 to 716	729 to 746
	LTE Band 13	-	-	v	v	-	-	777 to 787	746 to 756
	LTE Band 66	v	v	v	v	v	v	1710 to 1780	2110 to 2200

Note 1: The declared of product specification for EUT and/or Antenna presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Note 2: REC-PH550I-W is the main testing model, REC-PH550I-B and REC-AI550I-W are series models, and their main difference is that the power supply battery is different. Each model was pre scanned, and REC-PH550I-W was the worst model. This report only records the worst model.

Support Equipment				
Equipment	**Manufacturer**	**Description**	**Model**	**Serial Number**
USB cable	/	0.5m	/	/
Internal Antenna	QUECTEL	4G FPC Antenna	YOLMZ00A0AA	/
AC/DC Adaptor	/	Input 100-240VAC 50/60Hz Output 24Vdc 0.5A	2405	/

2.3 Maximum Conducted power and Emission Designator

E-UTRA:	Bandwidth (MHz)	QPSK		16QAM	
		Max Power (W)	Designator	Max Power (W)	Designator
LTE Band 2	1.4	Reference report SEWM2307000235RG01			
	3				
	5				
	10				
	15				
	20				
LTE Band 4	1.4	Reference report SEWM2307000235RG01			
	3				
	5				
	10				
	15				
	20				
LTE Band 5	1.4	Reference report SEWM2307000235RG01			
	3				
	5				
	10				
LTE Band 12	1.4	Reference report SEWM2307000235RG01			
	3				
	5				
	10				
LTE Band 13	5	Reference report SEWM2307000235RG01			
	10				
LTE Band 66	1.4	Reference report SEWM2307000235RG01			
	3				
	5				
	10				
	15				
	20				

2.4 Frequency List of Low/Middle/High Channels

LTE Band 2 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
1.4	Channel	18607	18900	19193
	Frequency	1850.7	1880	1909.3
3	Channel	18615	18900	19185
	Frequency	1851.5	1880	1908.5
5	Channel	18625	18900	19175
	Frequency	1852.5	1880	1907.5
10	Channel	18650	18900	19150
	Frequency	1855	1880	1905
15	Channel	18675	18900	19125
	Frequency	1857.5	1880	1902.5
20	Channel	18700	18900	19100
	Frequency	1860	1880	1900

LTE Band 4 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
1.4	Channel	19957	20175	20393
	Frequency	1710.7	1732.5	1754.3
3	Channel	19965	20175	20385
	Frequency	1711.5	1732.5	1753.5
5	Channel	19975	20175	20375
	Frequency	1712.5	1732.5	1752.5
10	Channel	20000	20175	20350
	Frequency	1715	1732.5	1750
15	Channel	20025	20175	20325
	Frequency	1717.5	1732.5	1747.5
20	Channel	20050	20175	20300
	Frequency	1720	1732.5	1745

LTE Band 5 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
1.4	Channel	20407	20525	20643
	Frequency	824.7	836.5	848.3
3	Channel	20415	20525	20635
	Frequency	825.5	836.5	847.5
5	Channel	20425	20525	20625
	Frequency	826.5	836.5	846.5
10	Channel	20450	20525	20600
	Frequency	829	836.5	844

LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
1.4	Channel	23017	23095	23173
	Frequency	699.7	707.5	715.3
3	Channel	23025	23095	23165
	Frequency	700.5	707.5	714.5
5	Channel	23035	23095	23155
	Frequency	701.5	707.5	713.5
10	Channel	23060	23095	23130
	Frequency	704	707.5	711

LTE Band 13 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
5	Channel	23025	23230	23255
	Frequency	779.5	782	784.5
10	Channel	23230	23230	23230
	Frequency	782	782	782

LTE Band 66 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
1.4	Channel	131979	132322	132665
	Frequency	1710.7	1745	1779.3
3	Channel	131987	132322	132657
	Frequency	1711.5	1745	1778.5
5	Channel	131997	132322	132647
	Frequency	1712.5	1745	1777.5
10	Channel	132022	132322	132622
	Frequency	1715	1745	1775
15	Channel	132047	132322	132597
	Frequency	1717.5	1745	1772.5
20	Channel	132072	132322	132572
	Frequency	1720	1745	1770

2.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR Part 2
47 CFR Part 22
47 CFR Part 24
47 CFR Part 27
ANSI C63.26-2015
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

3 Test Condition

3.1 Test Environmental Conditions

During testing, environmental conditions are described below.

Normal Configuration		Extreme Configuration		
Voltage	Battery power supply Typical 3.6Vdc External power supply 12 to 24Vdc	Voltage	High: /	Low: /

3.2 Test Configuration

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The worst cases were recorded in this report.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes (Z, X, Y axis), receiver antenna polarization (horizontal and vertical), the worst emission was found in ‘ Z ‘ position and the worst case was recorded.

3.3 Equipment List

Instrument	Manufacturer	Model	Asset No.	Cal. Interval	Cal. Due Date
Radiated					
Receiver	R&S	ESR7	PWB0023	1 Year	2024/10/11
Spectrum Analyzer	R&S	FSV3044	PWB0024	1 Year	2024/10/11
TRILOG Broadband Antenna	Schwarzbeck	VULB9162	PWB0029	1 Year	2024/10/14
Double-Ridged Guide Antenna	ETS-Lindgren	3117	PWB0031	1 Year	2024/10/12
Loop Antenna	R&S	HFH2-Z2E	PWB0026	1 Year	2024/10/21
k Type Horn Antenna	Steatite Antennas	QMS-00880	PWB0035	1 Year	2024/10/17
Horn Antenna	Steatite Antennas	QMS-00208	PWB0033	1 Year	2024/10/21
Pre-Amplifier	R&S	SCU08F1	PWB0030	1 Year	2024/10/11
Pre-Amplifier	R&S	SCU40F1	PWB0036	1 Year	2024/10/11
Pre-Amplifier	R&S	OSP220 (OSP-B155G)	PWB0042	1 Year	2024/10/13
Pre-Amplifier	R&S	SCU18F	PWB0034	1 Year	2024/10/11
Pre-Amplifier	COM-MW	DLNA8	PWB0094	1 Year	2024/11/08
Anechoic Chamber	ETS.LINDGREN	Fact 3-2m	PWB0003	3 Years	2026/06/05
Test Software	R&S	ELEKTRA 4.20.2	/	/	/

3.4 Test Uncertainty

No.	Parameter	Uncertainty
1	Radiated Spurious Emission	4.46 dB
2	Temperature	3°C
3	Humidity	1.3 %
4	Supply voltages	0.006 V

4 Test Items Description

Ambient condition

Anechoic Chamber

Temperature [°C]	20.4 to 23.6
Humidity [%RH]	45 to 46
Pressure [kPa]	100.7 to 102.1

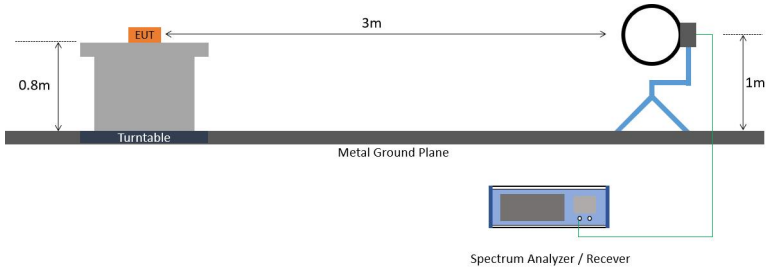
4.1 Radiated Spurious Emission

Methods of Measurement

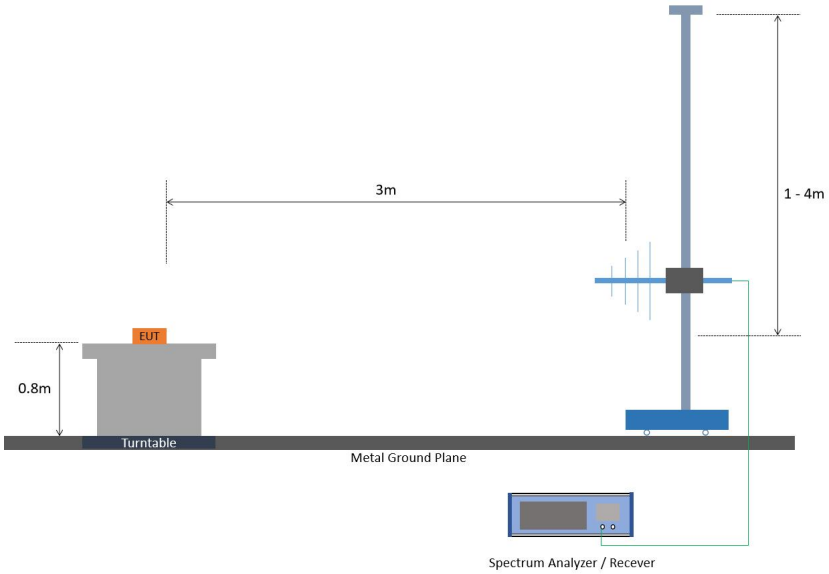
The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

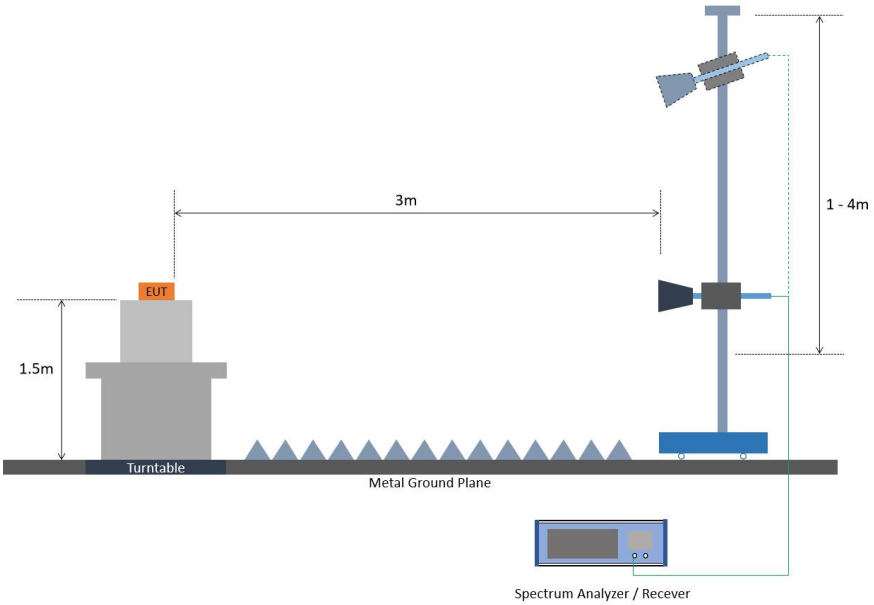
Test Setup



For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz

1.The testing follows ANSI C63.26 Section 5.5
2.The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3.The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4.The table was rotated 360 degrees to determine the position of the highest spurious emission.
5.The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6.During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7.Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8.A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9.Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10.EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11.ERP (dBm) = EIRP - 2.15
12.The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Remark: The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Appendixes

External Photograph	Refer to “Attachment A.1: External Photograph” file.
Internal Photograph	Refer to “Attachment A.2: Internal Photograph” file.
Test Setup Photograph	Refer to “Attachment A.4: RF Test Setup Photograph” file.

Test Results of Radiated Test

All LTE Bands	Refer to “Attachment B” file.

****** End of the Report ******