

Test Report No:
2490281R-RFUSV24S-A

VARIANT TEST REPORT

FCC Rules&Regulations

Product Name	goRAN LTE Base Station
Brand Name	
Model No.	BS1AL-D54US
FCC ID	2AXTDBS1ALD54US
Applicant's Name / Address	Ubiik Inc. 19F., No. 17, Sec. 1, Chengde Rd., Datong Dist., Taipei City 103, Taiwan (R.O.C.)
Manufacturer's Name / Address	Ubiik Inc. 19F., No. 17, Sec. 1, Chengde Rd., Datong Dist., Taipei City 103, Taiwan (R.O.C.)
Test Method Requested, Standard	FCC CFR Title 47 Part 27 Subpart J ANSI/TIA-603-E-2016 ANSI C63.26-2015
Verdict Summary	IN COMPLIANCE
Documented By	 Vera Hsu
Approved By	 Allen Lin
Date of Receipt	Sep. 09, 2024
Date of Issue	Oct. 17, 2024
Report Version	V1.0

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Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

General Conditions

1. The test results relate only to the samples tested.
2. 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.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. 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.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Oct. 17, 2024

Permissive Change

Report No.	Version	Description	Issued Date
2410704R-RFUSV24S-A	V1.0	Original application.	Apr. 15, 2024
2450097R-RFNAOTHV02-A	V1.0	<u>Class II Permissive Change (C2PC)</u> Add a new WWAN antenna (Model: 750 10074) of the same type as the original application with higher gain. After evaluating, it was verified for radiated spurious emission above 1 GHz test, and other test results are based on original test report.	Jun. 24, 2024
2490281R-RFUSV24S-A	V1.0	<u>Class II Permissive Change (C2PC)</u> 1. Change Control Board RX as below description. a. Change HPL6 to 0402 100pF from 0402 0 Ω . b. Change C675 to 0402 100pF from 0402 33pF. c. Remove CON102 MCX connector. d. Change CON102 to R49.9 Ω to ground. e. Solder a 50 ohm copper pipe to FLM7 and connect it to ground. 2. Change PA Board as below description. Add 4pcs RC1206 510 Ω resistors above PC15, PC17, PC18, PC16 capacitors. After evaluating, the worst result of original report is selected to verify radiated emission and record in the report.	Oct. 17, 2024

Summary of Test Result

Report Clause	Test Items	Band	Ref Std. Clause	Limit	Result (PASS/FAIL)	Remark
3	Spurious Emission	54	§27.53	< -13 dBm	PASS	-
Note: The EUT supports two radio functions, a chip on board and the other is a certified WWAN module (brand name: UBIK, model: RC7611-1, FCC ID: 2AXTDRC76B).						

Comments and Explanations

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1. General Information

1.1. EUT Description

Uplink Frequency Range	LTE Band 54: 1670~1675 MHz
Downlink Frequency Range	LTE Band 54: 1670~1675 MHz
Bandwidth	5 MHz
Type of Modulation	QPSK / 16QAM

Accessories Information					
No.	Equipment Name	Brand Name	Model No.	Rating	
1	PoE 1	PHIHONG	POE60U-BTA	INPUT: 100~240V, 1.5A, 50~60Hz OUTPUT 1: 56V, 0.535A, 30W PIN 3,6 + PIN 1,2 Return OUTPUT 2: 56V, 0.535A, 30W PIN 4,5 + PIN 7,8 Return	
2	PoE 2	PHIHONG	POEO75U-1BT	INPUT: 100~240V, 2.0A, 50~60Hz OUTPUT 1: 56V, 0.8A, 45W PIN 3,6 - +56V PIN 1,2 - RETURN OUTPUT 2: 56V, 0.8A, 45W PIN 4,5 - +56V PIN 7,8 - RETURN	
No.	Equipment Name	Brand Name	Model No.	Description	Remark
3	Power Cable 1	SHEE LINE	SL-2 to SL-3	Non-Shielded, 1.8m	For PoE 1 use
4	Power Cable 2	SHEE LINE	SL-2 to POE Injector	Non-Shielded, 1.8m	For PoE 2 use
5	MicroSD Card	ADATA	DU3A-016GT	--	Internal of EUT

For WWAN Function:

Antenna Information						
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)	Cable Loss (dB)	Actual Gain (dBi)
1	Dawn Communication Co., Ltd.	DB-698-4000-7-65A-OD-NV3	Panel	8.00	0.80	7.20
2	Invax	DS1619-1048WNM	OMNI	4.28	--	4.28
3	KATHREIN	750 10074	OMNI	13.00	0.30	12.70

For GNSS Function:

Antenna Information				
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)
1	Jinchang	JCA225-N	RHCP	5

For WWAN Module:

Antenna Information											
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)							
				Band 2	Band 5	Band 12	Band 13	Band 14	Band 25	Band 26	Band 71
1	Grand-Tek	OA-LTEWB-035-C0-UB	OMNI	1.80	0.00	-0.80	1.40	1.40	1.80	-0.50	-1.50

1.2. EUT Information

EUT Power Type	From PoE
EUT Type	Fixed and base stations
Hardware Version	V21_DVT3
Software Version	eNB 2024-3-26

1.3. Testing Applied Standards

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

- FCC CFR Title 47 Part 27 Subpart J
- ANSI/TIA-603-E (2016)
- ANSI C63.26-2015
- FCC KDB 971168 D01 v03r01

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

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

1.4. Testing Location Information

Testing Location Information		
Test Laboratory : DEKRA Testing and Certification Co., Ltd.		
1 (TAF: 3024)	ADD: No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 FAX: +886-3-582-8958 Test site Designation No. TW3024 with FCC. Conformity Assessment Body Identifier (CABID) TW3024 with ISED.	
2 (TAF: 3024)	ADD: No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 FAX: +886-3-582-8958 Test site Designation No. TW3024 with FCC. Conformity Assessment Body Identifier (CABID) TW3024 with ISED.	
Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.		

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated Emission	HC-CB04	Gary Liao	23.5 / 60	2024/09/26

1.5. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Test Item	Uncertainty
Spurious Emissions	± 3.52 dB below 1 GHz ± 3.56 dB above 1 GHz

1.6. List of Test Equipment

HC-CB04

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	10 Hz-40 GHz	2023/10/03	2024/10/02
EXA Signal Analyzer	Keysight	N9010A	MY51440132	10 Hz-44 GHz	2023/12/11	2024/12/10
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1209	30 MHz-2 GHz	2024/06/11	2025/06/10
Double Ridged Horn Antenna	RF SPIN	DRH18-E	211212A18EN	1G-18GHz	2023/11/17	2024/11/16
Horn Antenna	Schwarzbeck	BBHA 9170	203	18G-40GHz	2024/02/02	2025/02/01
Pre-Amplifier	EMCI	EMC01820I	980364	30M-8 GHz,20 dB	2024/06/04	2025/06/03
Pre-Amplifier	EMEC	EM01G18GA	060835	1-18 GHz,50 dB	2024/07/16	2025/07/15
Pre-Amplifier	DEKRA	AP-400C	201801231	18G-40 GHz,48 dB	2023/10/03	2024/10/02
Coaxial Cable(11m)	Suhner	SF102_SF104	HC-CB04	30M-18 GHz	2024/08/07	2025/08/06
Coaxial Cable(3m)	Suhner,Rosnol	SF102_UP0264	HC-CB04-1	18G-40 GHz	2024/08/13	2025/08/12
Radiated Software	Audix	e3 V9	HC-CB04_1	N/A	N/A	N/A

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2. Test Configuration of EUT

2.1. Test Condition

EUT Operational Condition			
Testing Voltage	Vnom (AC 120V/60Hz)	Vmax (AC 138V/60Hz)	Vmin (AC 102V/60Hz)
Operational Climatic	Tnom (25°C)	Tmax (55°C)	Tmin (-40°C)

2.2. The Worst Case Measurement Configuration

Test Mode	Mode 1: LTE Band 54 / Ant. 1
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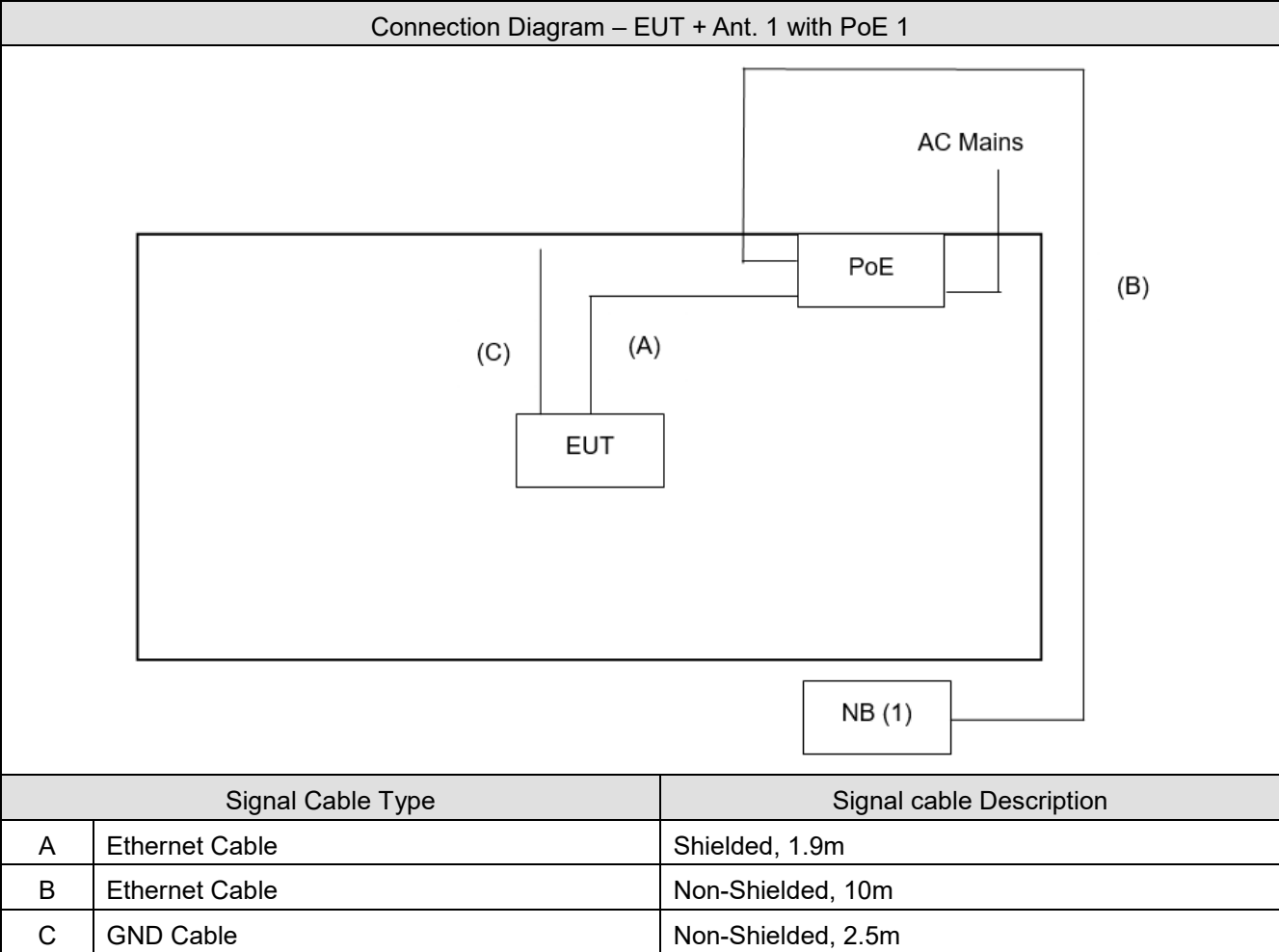
Note:

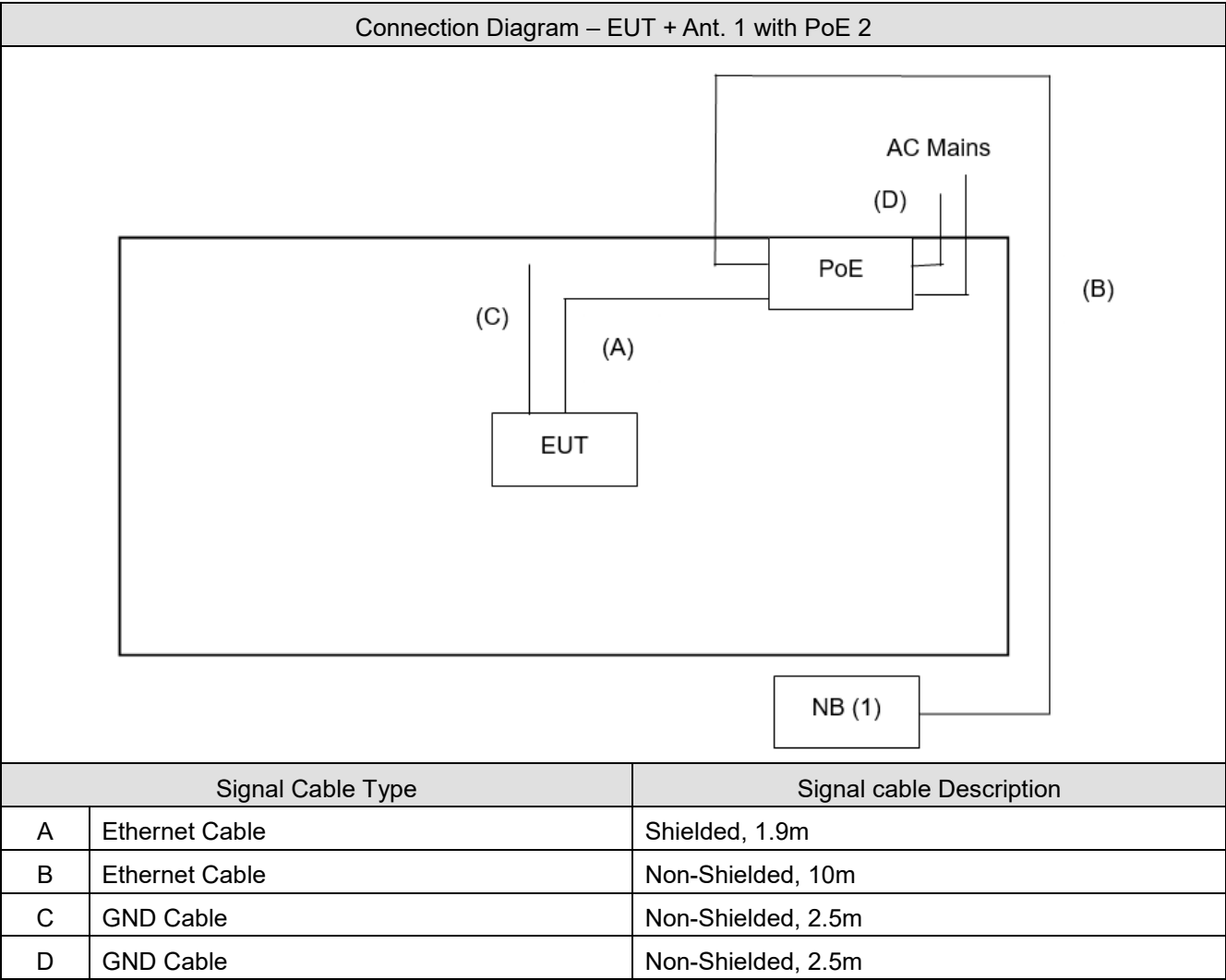
1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The device was tested under all bandwidths, RB configurations and modulations.
The worst case was found in "QPSK / 5 MHz" and show in "Spurious Emission".
3. The EUT could be applied with WWAN LTE of EUT + WWAN LTE of WWAN module function; therefore Co-location Maximum Permissible Exposure and Radiated Emission Co-location tests (Please refer to Report No.: 2410704R & 2450097R) are added for simultaneously transmit with WWAN LTE of EUT + WWAN LTE of WWAN module function.

2.3. Tested System Details

No.	Equipment	Brand Name	Model No.	Serial No.
1	NB	ASUS	E402S	GBN0CV14W224476

2.4. Configuration of Tested System





3.2. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic. Taking the record of maximum spurious emission.

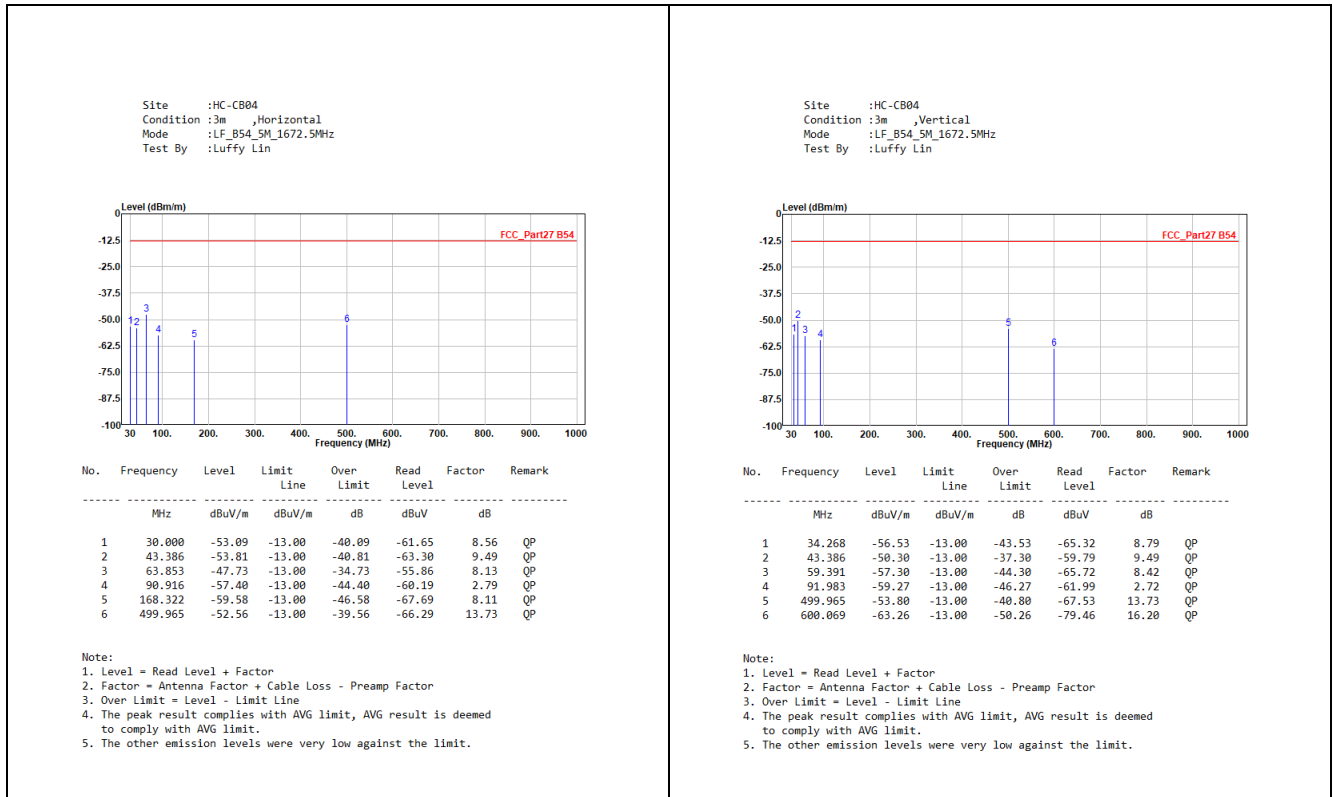
3.3. Test Result of Spurious Emission

Refer as Appendix A

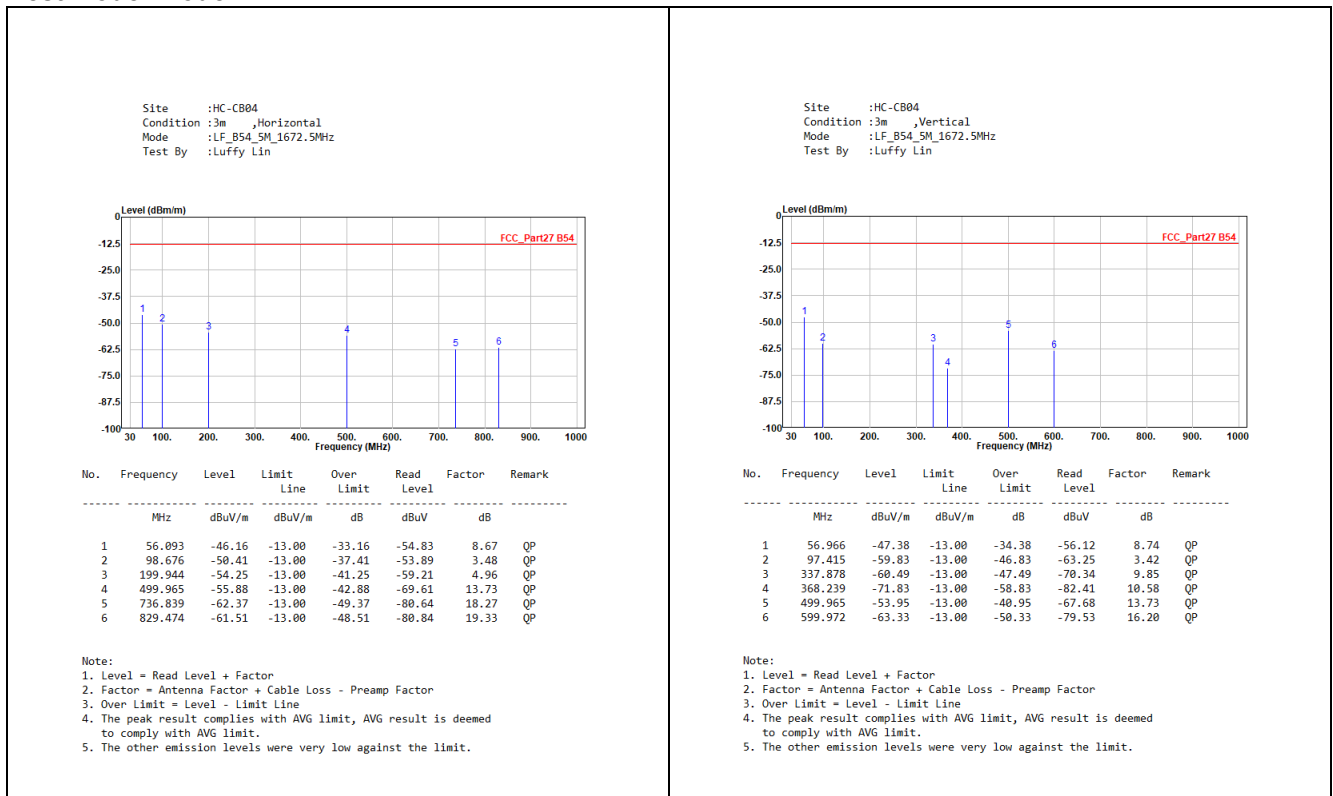
Appendix A. Test Result of Radiated Spurious Emission

30 MHz ~ 1 GHz

Test Mode: Mode 1

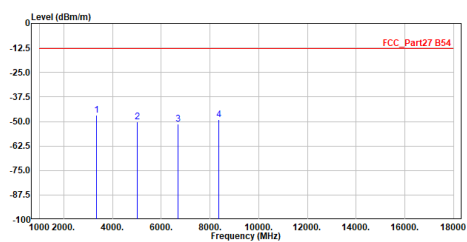


Test Mode: Mode 2



<Above 1 GHz>

Site :HC-CB04
 Condition :3m Horizontal
 Mode :LTE_Band54_CH60280
 Test By :Gary Liao

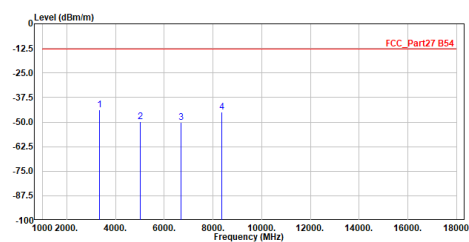


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	Limit	Level	dB	
1	3345.000	-46.87	-13.00	-33.87	-36.85	-10.02	Peak
2	5017.500	-50.27	-13.00	-37.27	-44.78	-5.49	Peak
3	6690.000	-51.24	-13.00	-38.24	-49.46	-1.78	Peak
4	8362.500	-49.23	-13.00	-36.23	-49.92	0.69	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuV) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB04
 Condition :3m Vertical
 Mode :LTE_Band54_CH60280
 Test By :Gary Liao



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBm	dBm	Limit	Level	dB	
1	3345.000	-43.89	-13.00	-30.89	-33.87	-10.02	Peak
2	5017.500	-49.87	-13.00	-36.87	-44.38	-5.49	Peak
3	6690.000	-50.27	-13.00	-37.27	-48.49	-1.78	Peak
4	8362.500	-44.78	-13.00	-31.78	-45.47	0.69	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuV) to EIRP (dBm)
 $= 107 + 20\log(3) - 104.8 = 11.8 \text{ dB}$
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.