

VARIANT FCC TEST REPORT

(PART 27)

Applicant:	Fibocom Wireless Inc.
Address:	1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China.

Manufacturer or Supplier:	Fibocom Wireless Inc.
Address:	1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China.
Product:	LTE module
Brand Name:	Fibocom
Model Name:	L850-GLL
FCC ID:	ZMOL850GLL
Date of tests:	Sep. 10, 2021 ~ Sep. 13, 2021

The tests have been carried out according to the requirements of the following standard:

☒ FCC Part 27, Subpart C, M ☒ ANSI/TIA/EIA-603-D
☒ FCC Part 2 ☒ ANSI/TIA/EIA-603-E ☒ ANSI C63.26-2015

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
	
Date: Jan. 20, 2022	Date: Jan. 20, 2022

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Test Report No.: W7L-220113W001RF05

TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1 SUMMARY OF TEST RESULTS	5
1.1 MEASUREMENT UNCERTAINTY	5
1.2 TEST SITE AND INSTRUMENTS	6
2 GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 CONFIGURATION OF SYSTEM UNDER TEST	8
2.3 DESCRIPTION OF SUPPORT UNITS	9
2.4 TEST ITEM AND TEST CONFIGURATION	9
2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	12
3 TEST TYPES AND RESULTS	13
3.1 OUTPUT POWER MEASUREMENT	13
3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT	13
3.1.2 TEST PROCEDURES	13
3.1.3 TEST SETUP	14
3.1.4 TEST RESULTS	15
3.2 FREQUENCY STABILITY MEASUREMENT	18
3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT	18
3.2.2 TEST PROCEDURE	18
3.2.3 TEST SETUP	18
3.2.4 TEST RESULTS	19
3.3 OCCUPIED BANDWIDTH MEASUREMENT	21
3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT	21
3.3.2 TEST SETUP	21
3.3.3 TEST PROCEDURES	21
3.3.4 TEST RESULTS	22
3.4 BAND EDGE MEASUREMENT	24
3.4.1 LIMITS OF BAND EDGE MEASUREMENT	24
3.4.2 TEST SETUP	24
3.4.3 TEST PROCEDURES	25
3.4.4 TEST RESULTS	26
3.5 CONDUCTED SPURIOUS EMISSIONS	29
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	29
3.5.2 TEST PROCEDURE	29
3.5.3 TEST SETUP	29
3.5.4 TEST RESULTS	30
3.6 RADIATED EMISSION MEASUREMENT	32
3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT	32
3.6.2 TEST PROCEDURES	32
3.6.3 DEVIATION FROM TEST STANDARD	32
3.6.4 TEST SETUP	33
3.6.5 TEST RESULTS	34
3.7 PEAK TO AVERAGE RATIO	44
3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT	44
3.7.2 TEST SETUP	44
3.7.3 TEST PROCEDURES	44
3.7.4 TEST RESULTS	45



Test Report No.: W7L-220113W001RF05

4 INFORMATION ON THE TESTING LABORATORIES	47
5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	48



Test Report No.: W7L-220113W001RF05

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170106C02-3	Original release	Feb. 21, 2017
RF190122W003-5	Based on the original report RF170106C02-3 change FCC ID	Jan. 17, 2019
W7L-220113W001RF05	Based on the original report RF190122W003-5 Update components , update LTE band 30 data	Jan. 20, 2022

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 27 & Part 2		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
2.1046 27.50(a)(3)	Equivalent Isotropically Radiated Power	Compliance
2.1055 27.54	Frequency Stability	Compliance
2.1049	Occupied Bandwidth	Compliance
2.1051 27.53(a)(4)	Band Edge Measurements	Compliance
2.1051 27.53(a)(4)	Conducted Spurious Emissions	Compliance
2.1053 27.53(a)(4)	Radiated Spurious Emissions	Compliance

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Frequency Stability	$\pm 76.97\text{Hz}$
Radiated emissions & Radiated Power (30MHz~1GMHz)	$\pm 4.98\text{dB}$
Radiated emissions & Radiated Power (1GMHz ~6GMHz)	$\pm 4.70\text{dB}$
Radiated emissions (6GMHz ~18GMHz)	$\pm 4.60\text{dB}$
Radiated emissions (18GMHz ~40GMHz)	$\pm 4.12\text{dB}$
Conducted emissions	$\pm 4.01\text{dB}$
Occupied Channel Bandwidth	$\pm 43.58\text{KHz}$
Conducted Output power	$\pm 2.06\text{dB}$
Band Edge Measurements	$\pm 4.70\text{dB}$

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 22,21	Apr. 21,22
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Jun. 03,21	Jun. 02,22
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 02,21	Apr. 01,22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 25,21	Feb. 24,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 03,21	Jun. 02,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 22,21	Apr. 21,22
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Test Software	E3	V 9.160323	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
Temperature Chamber	ESPEC	SH-242	93000855	Jun. 02,21	Jun. 01,22
Power Divider	MCLI/USA	PS2-15	24880	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
 3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

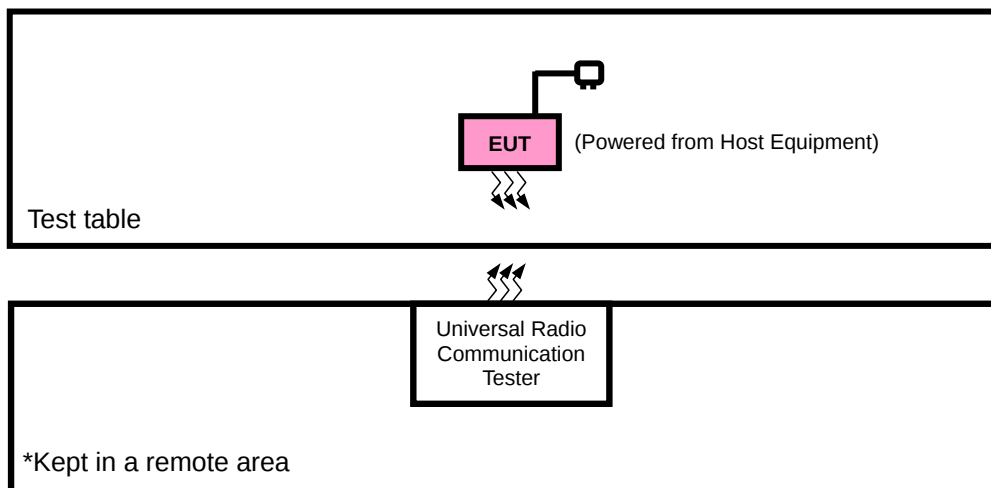
PRODUCT	LTE module	
BRAND NAME	Fibocom	
MODEL NAME	L850-GLL	
NOMINAL VOLTAGE	3.3Vdc (Form Host Equipment)	
MODULATION TECHNOLOGY	LTE	QPSK, 16QAM
FREQUENCY RANGE	LTE Band 30 Channel Bandwidth: 5MHz	2307.5MHz ~ 2312.5MHz
	LTE Band 30 Channel Bandwidth: 10MHz	2310MHz
EMISSION DESIGNATOR	LTE Band 30 Channel Bandwidth: 5MHz	QPSK: 4M58G7D 16QAM: 4M58W7D
	LTE Band 30 Channel Bandwidth: 10MHz	QPSK: 9M17G7D 16QAM: 9M15W7D
MAX. EIRP POWER	LTE Band 30 Channel Bandwidth: 5MHz	78.29mW
	LTE Band 30 Channel Bandwidth: 10MHz	73.78mW
ANTENNA TYPE	External Antenna with 5dBi gain for LTE band 30	
HW VERSION	V1.0.4	
SW VERSION	18500.5001.00.05.27.12	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	
EXTREME TEMPERATURE	-10-55 °C	
EXTREME VOLTAGE	3.3V- 4.4V	

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Y-plane for EIRP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + DC Source with LTE link

LTE BAND 30

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	ERP	27685 to 27735	27685, 27710, 27735	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		27710	27710	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
A	FREQUENCY STABILITY	27685 to 27735	27685, 27735	5MHz	QPSK	1 RB / 0 RB Offset
		27710	27710	10MHz	QPSK	1 RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	27685 to 27735	27685, 27710, 27735	5MHz	QPSK,16QAM	25 RB / 0 RB Offset
		27710	27710	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
A	BAND EDGE	27685 to 27735	27685	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
		27710	27735	5MHz	QPSK,16QAM	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		27710	27710	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
			/	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
A	CONDCUDETED EMISSION	27685 to 27735	27685, 27710, 27735	5MHz	QPSK	1 RB / 0 RB Offset
		27710	27710	10MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	27685 to 27735	27685, 27710, 27735	5MHz	QPSK	1 RB / 0 RB Offset
		27710	27710	10MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP/EIRP	23deg. C, 70%RH	DC 3.3V By Host Equipment	Jace Hu
FREQUENCY STABILITY	23deg. C, 70%RH	DC 3.3V By Host Equipment	Lily Zhao
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC 3.3V By Host Equipment	Lily Zhao
BAND EDGE	23deg. C, 70%RH	DC 3.3V By Host Equipment	Lily Zhao
CONDUCTED EMISSION	23deg. C, 70%RH	DC 3.3V By Host Equipment	Lily Zhao
RADIATED EMISSION	23deg. C, 70%RH	DC 3.3V By Host Equipment	Jace Hu



Test Report No.: W7L-220113W001RF05

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth.(Band30)

3.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T - L_C$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

CONDUCTED POWER MEASUREMENT:

- The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP

CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 30

Band/BW	Modulation	RB Size	RB Offset	Low CH 27685	Mid CH 27710	High CH 27735	MPR
				2307.5 MHz	2310.0 MHz	2312.5 MHz	
30/ 5	QPSK	1	0	22.72	22.70	22.72	0
		1	12	22.73	22.67	22.74	0
		1	24	22.68	22.65	22.72	0
		12	0	21.77	21.76	21.76	1
		12	6	21.72	21.79	21.75	1
		12	13	21.71	21.70	21.74	1
		25	0	21.72	21.76	21.73	1
	16QAM	1	0	21.76	21.78	21.81	1
		1	12	21.72	21.78	21.75	1
		1	24	21.83	21.77	21.83	1
		12	0	20.84	20.86	20.84	2
		12	6	20.84	20.88	20.84	2
		12	13	20.80	20.82	20.85	2
		25	0	20.85	20.84	20.86	2

Band/BW	Modulation	RB Size	RB Offset	/	Mid CH 27710	/	MPR
				/	2310.0 MHz	/	
30/ 10	QPSK	1	0	/	22.77	/	0
		1	24	/	22.75	/	0
		1	49	/	22.73	/	0
		25	0	/	21.81	/	1
		25	12	/	21.80	/	1
		25	25	/	21.75	/	1
		50	0	/	21.78	/	1
	16QAM	1	0	/	21.83	/	1
		1	24	/	21.80	/	1
		1	49	/	21.85	/	1
		25	0	/	20.92	/	2
		25	12	/	20.90	/	2
		25	25	/	20.87	/	2
		50	0	/	20.91	/	2

EIRP

LTE BAND 30

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (mW/5MHz)
27685	2307.5	18.9370	78.29	250
27710	2310	18.6918	73.99	250
27735	2312.5	18.8406	76.57	250

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (mW/5MHz)
27685	2307.5	17.6664	58.43	250
27710	2310	17.5553	56.95	250
27735	2312.5	18.0717	64.15	250

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (mW/5MHz)
-	-	-	-	-
27710	2310	18.6791	73.78	250
-	-	-	-	-

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (mW/5MHz)
-	-	-	-	-
27710	2310	17.7718	59.87	250
-	-	-	-	-

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

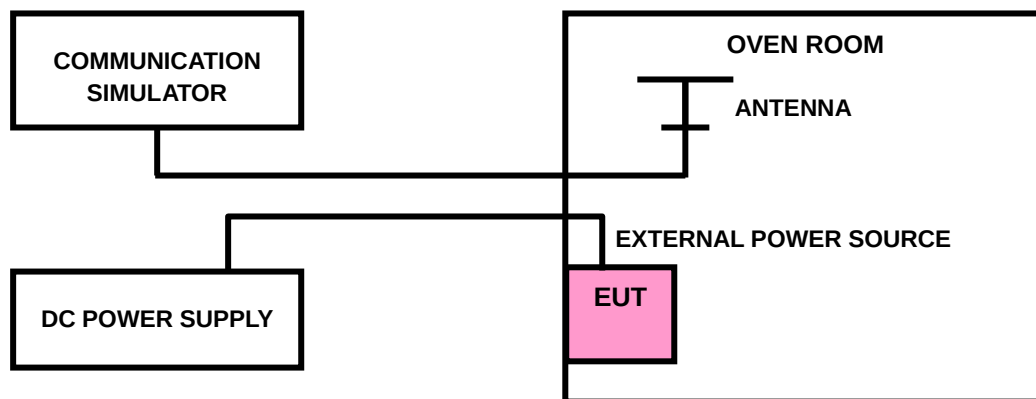
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.2.2 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

LTE BAND 30

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0008	0.0016	2.5
V _{min}	-0.0008	-0.002	2.5
V _{max}	0.0008	0.0013	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} Vdc to V_{max} Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0042	-0.0043	2.5
-20	-0.004	-0.0035	2.5
-10	-0.003	-0.003	2.5
0	-0.0027	-0.0027	2.5
10	-0.0019	-0.0018	2.5
20	-0.0014	-0.0014	2.5
30	-0.001	-0.0014	2.5
40	-0.0006	-0.0008	2.5
50	-0.0001	-0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Middle Channel	
V_{nor}	0.0009	2.5
V_{min}	-0.0011	2.5
V_{max}	0.0009	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} Vdc to V_{max} Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

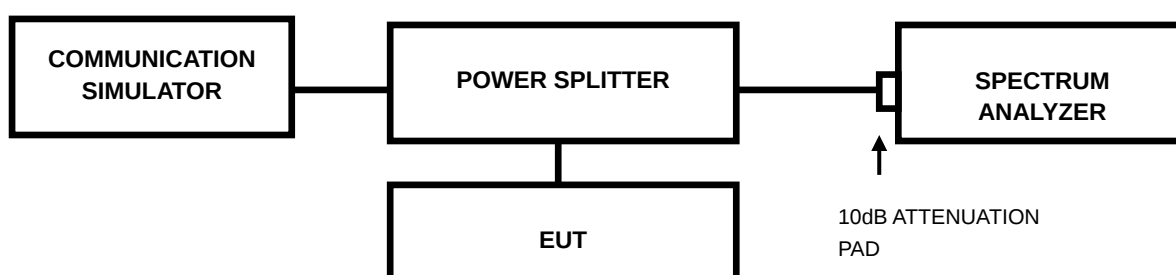
TEMP. (°C)	5MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Middle Channel	
-30	-0.0041	2.5
-20	-0.0038	2.5
-10	-0.0029	2.5
0	-0.0027	2.5
10	-0.002	2.5
20	-0.0014	2.5
30	-0.0015	2.5
40	-0.0006	2.5
50	-0.0002	2.5

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.3.2 TEST SETUP



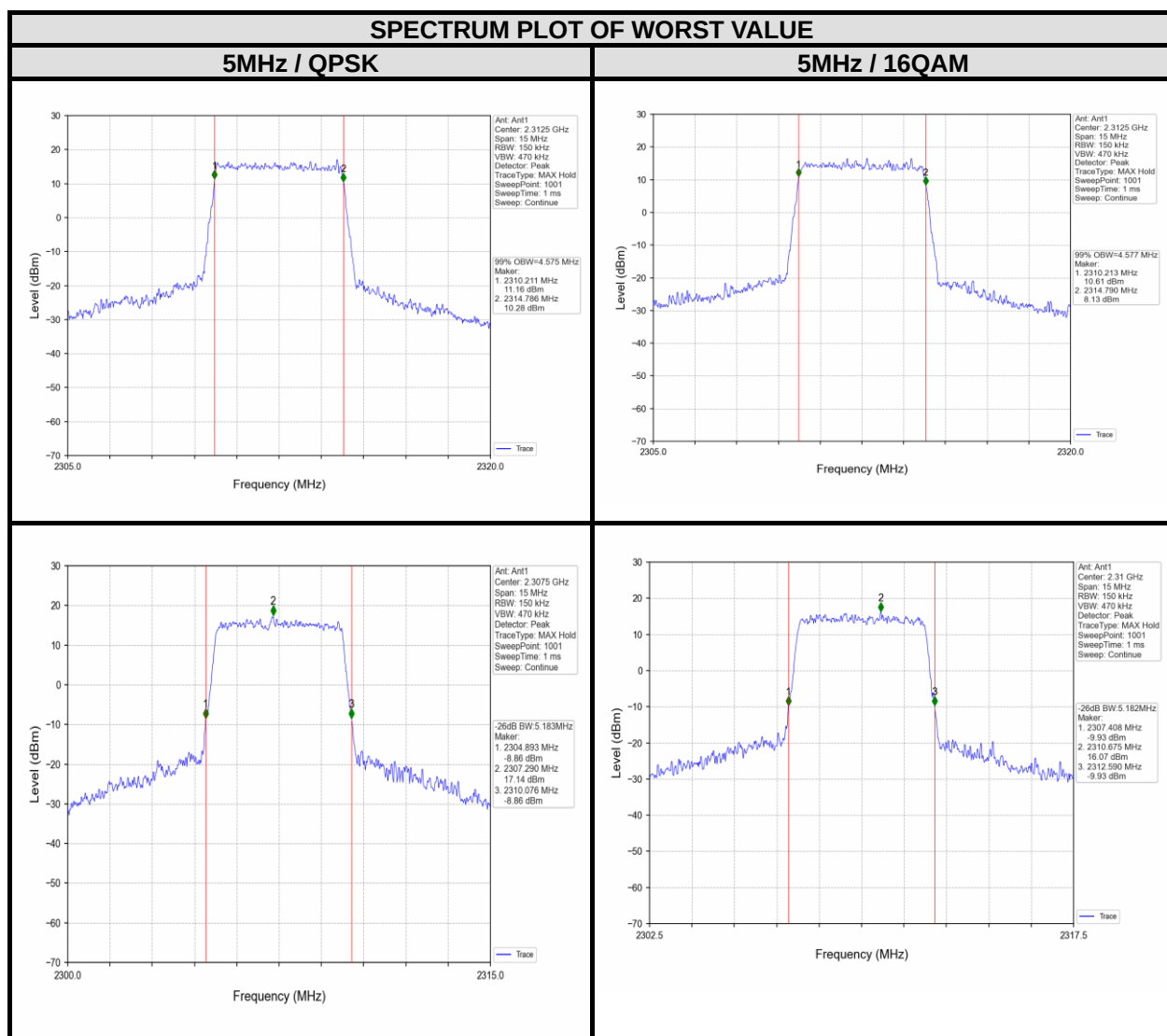
3.3.3 TEST PROCEDURES

- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

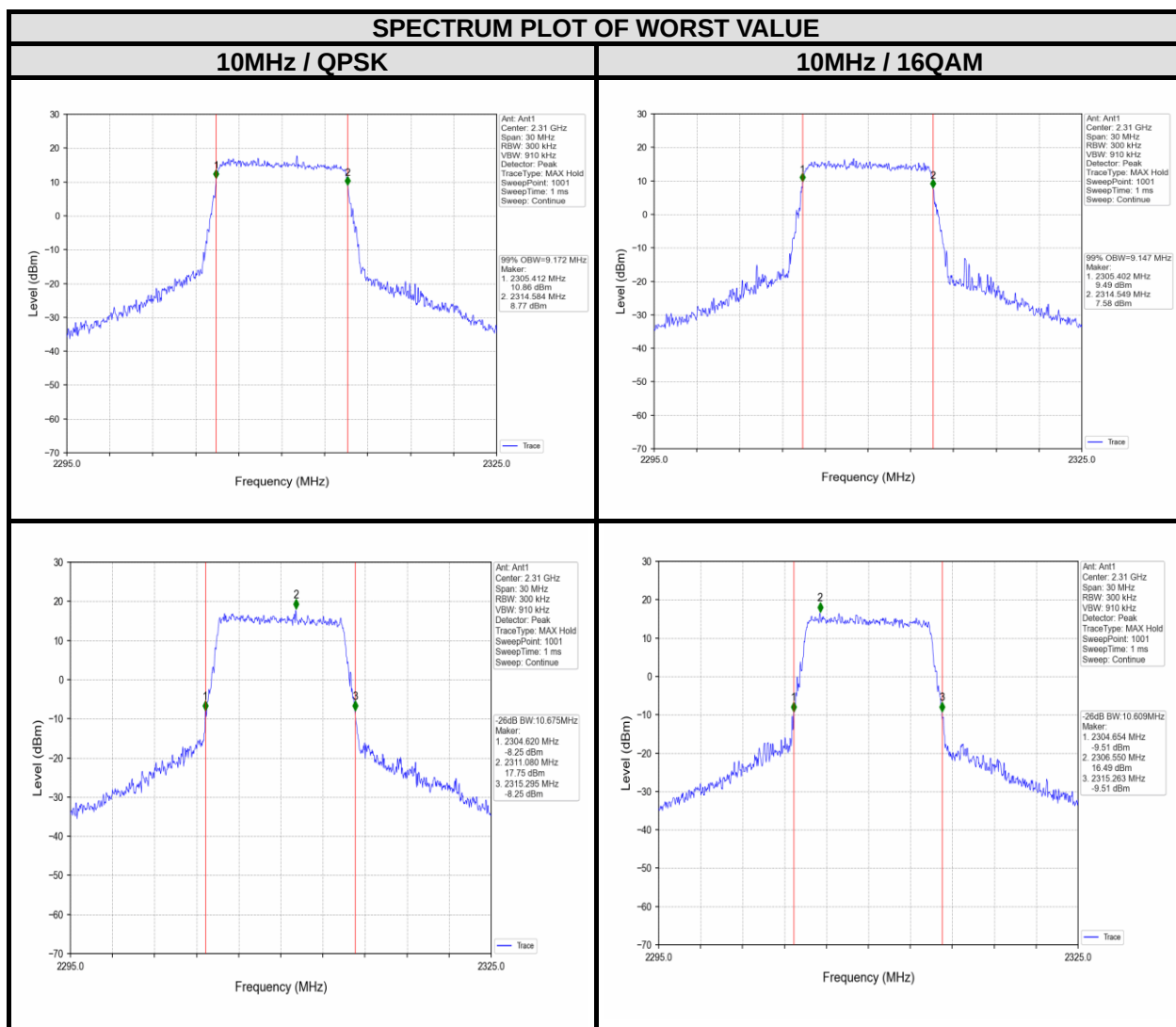
3.3.4 TEST RESULTS

LTE BAND 30

CHANNEL BANDWIDTH: 5MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
27685	2307.5	4.55	4.57	/	5.18	5.13	/
27710	2310	4.56	4.57	/	5.18	5.18	/
27735	2312.5	4.58	4.58	/	5.14	5.13	/



CHANNEL BANDWIDTH: 10MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-	-	-	-	-	-	-	-
27710	2310	9.17	9.15	/	10.68	10.65	/
-	-	-	-	-	-	-	-

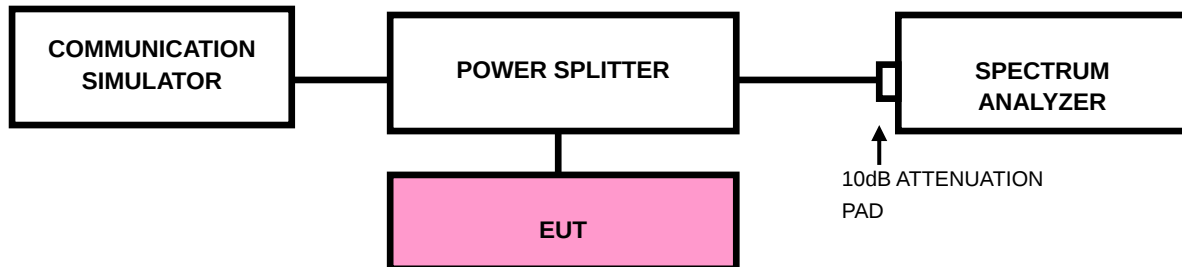


3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC 27.53(a)(4) specified that For operations in the minimum permissible attenuation level for Band30 is $>43 + 10 \log (P)$ dB at 2300-2305MHz & 2345-2360MHz, $> 55 + 10 \log (P)$ dB at 2320-2324MHz & 2341-2345MHz, $> 61 + 10 \log (P)$ dB at 2324-2328MHz & 2337-2341MHz, $> 67 + 10 \log (P)$ dB at 2288-2292MHz & 2328-2337MHz, and $>70 + 10 \log (P)$ dB at frequencies < 2288 MHz & >2365 MHz.(Band30)

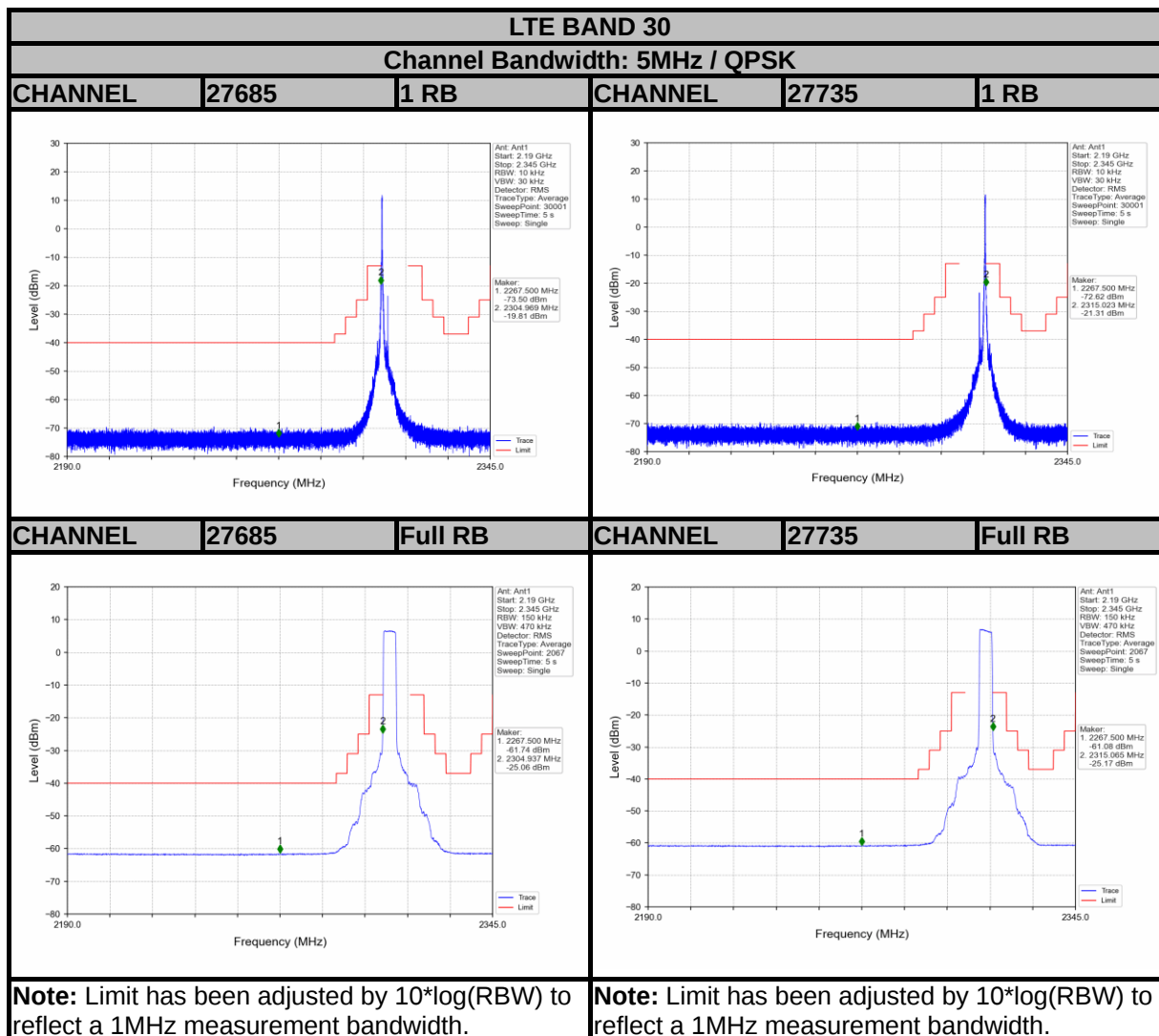
3.4.2 TEST SETUP

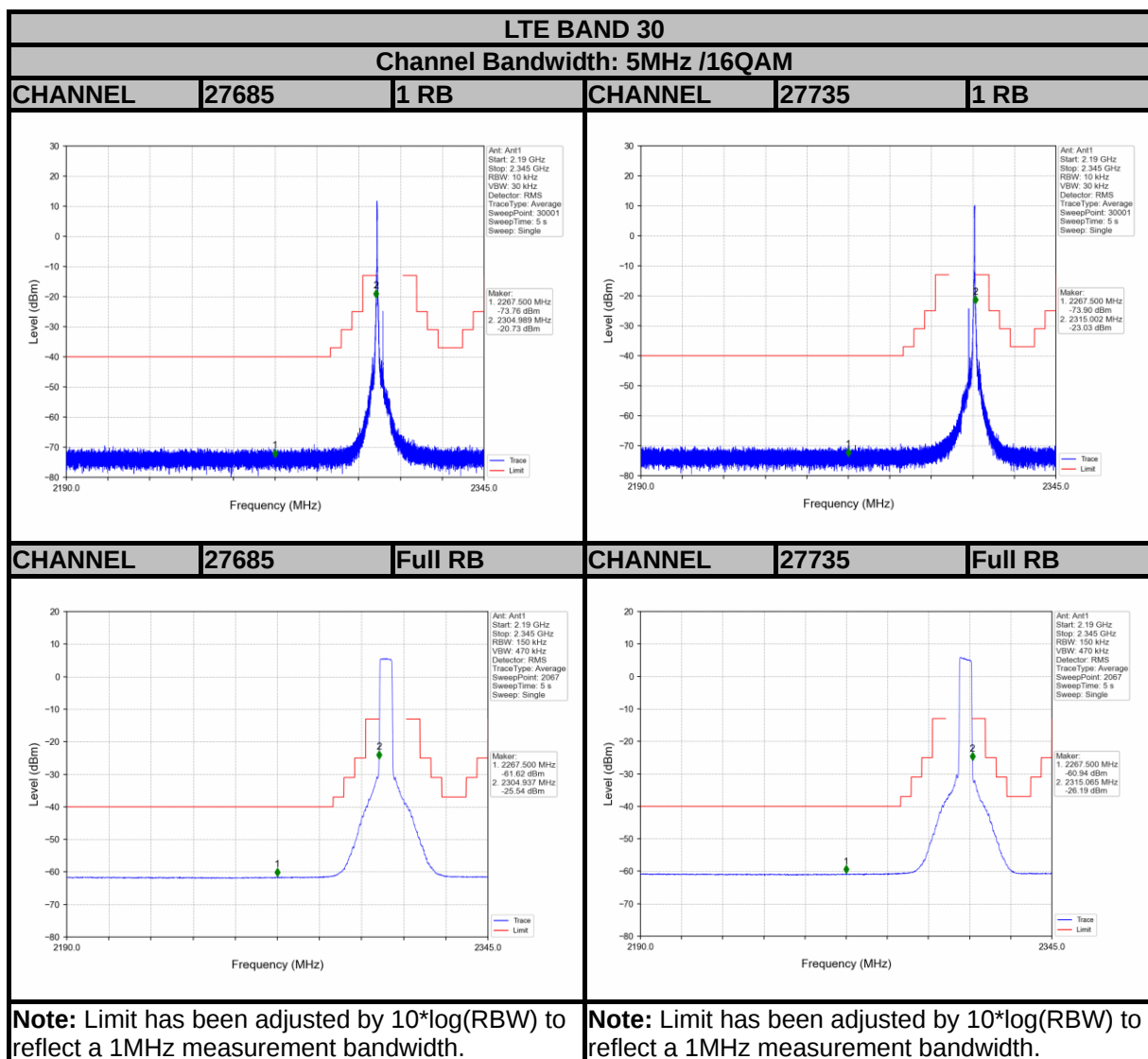


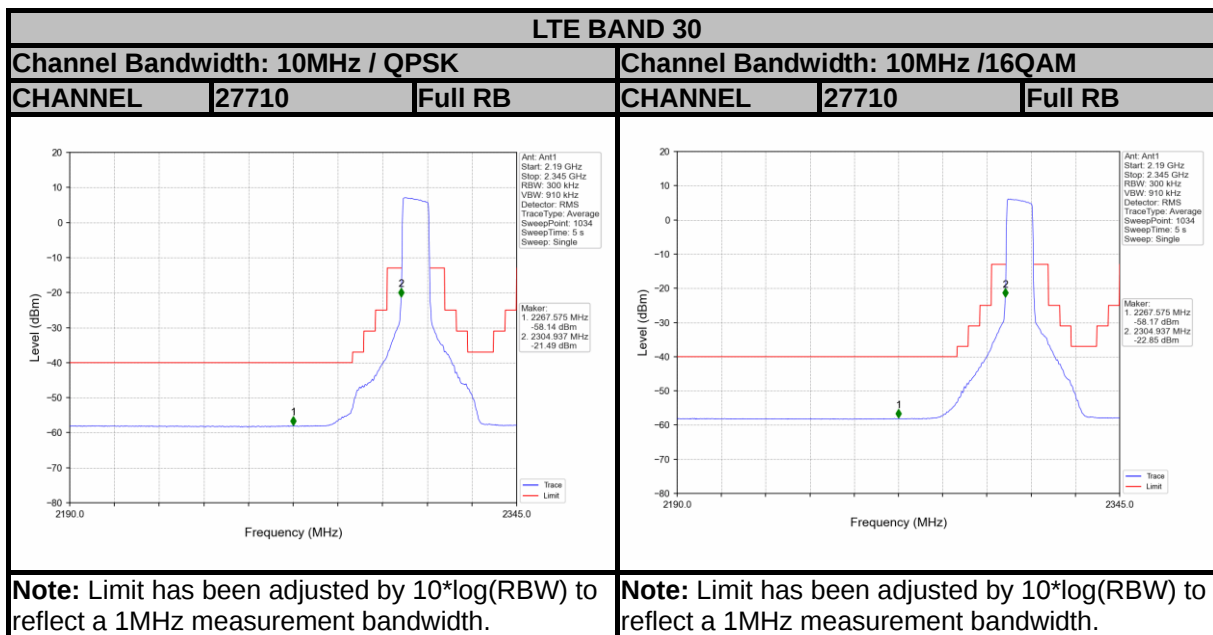
3.4.3 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz)
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 150kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)
- i. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 20MHz)
- j. Record the max trace plot into the test report.

3.4.4 TEST RESULTS







3.5 CONDUCTED SPURIOUS EMISSIONS

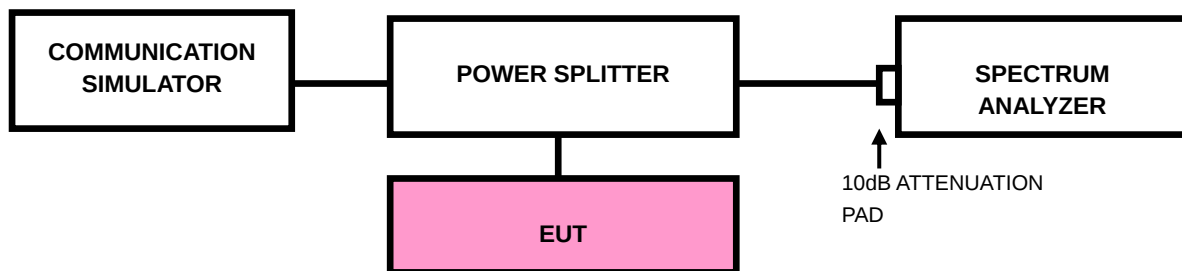
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $70 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -40dBm.(Band30)

3.5.2 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30MHz~23.15GHz for LTE Band 30. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.5.3 TEST SETUP





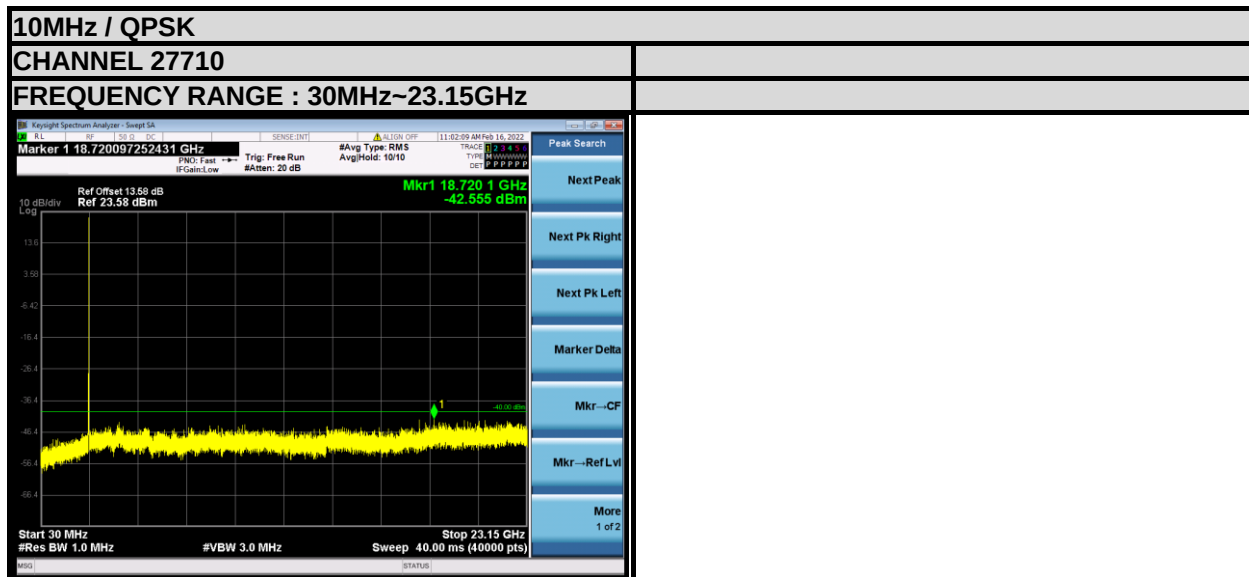
BUREAU
VERITAS

Test Report No.: W7L-220113W001RF05

3.5.4 TEST RESULTS

LTE BAND 30





3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $70 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -40dBm.

3.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G.
- c. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,
 $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15\text{dBi}.$

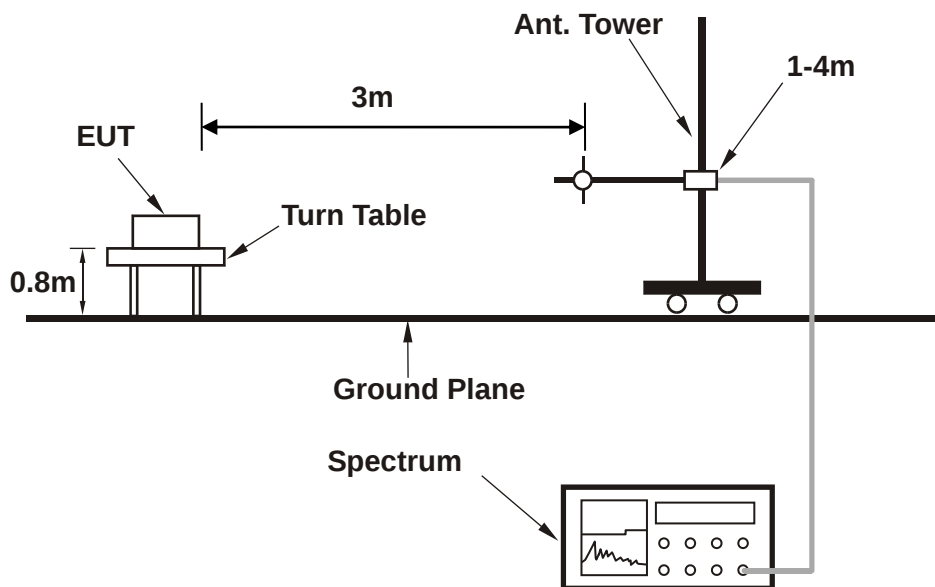
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

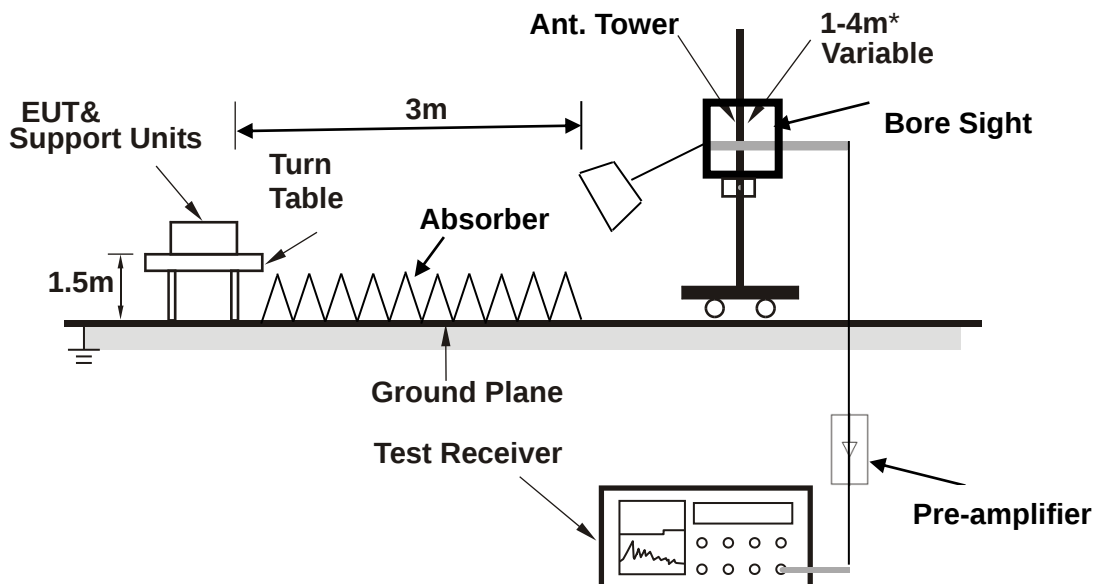
No deviation

3.6.4 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

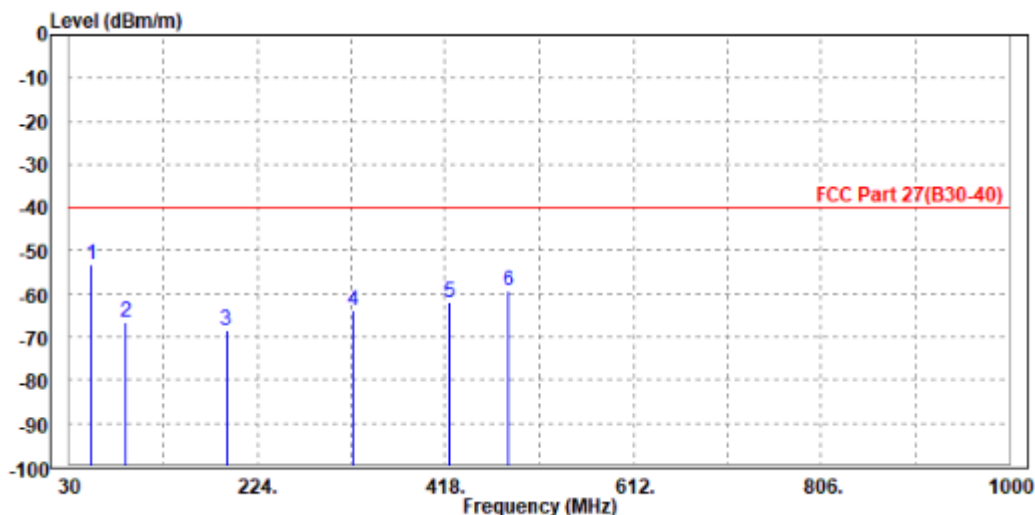
30 MHz – 1GHz data:

LTE Band 30

CHANNEL BANDWIDTH: 5MHz / QPSK

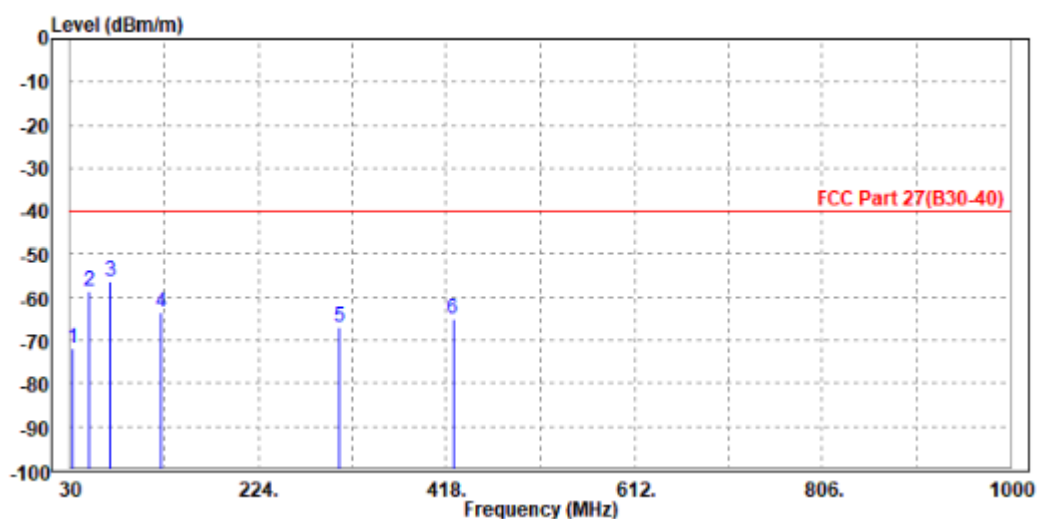
MODE	TX channel 27735	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	53.280	-53.40	-53.14	-40.00	-13.40	-0.26	Peak	Horizontal
2		88.200	-66.62	-57.82	-40.00	-26.62	-8.80	Peak	Horizontal
3		191.990	-68.47	-51.02	-40.00	-28.47	-17.45	Peak	Horizontal
4		322.940	-63.93	-50.89	-40.00	-23.93	-13.04	Peak	Horizontal
5		422.850	-62.15	-51.71	-40.00	-22.15	-10.44	Peak	Horizontal
6		482.990	-59.44	-49.05	-40.00	-19.44	-10.39	Peak	Horizontal



MODE	TX channel 27735	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	31.940	-72.01	-74.76	-40.00	-32.01	2.75	Peak	Vertical
2	49.400	-58.45	-53.92	-40.00	-18.45	-4.53	Peak	Vertical
3 PP	71.710	-56.22	-41.55	-40.00	-16.22	-14.67	Peak	Vertical
4	124.090	-63.66	-51.24	-40.00	-23.66	-12.42	Peak	Vertical
5	307.420	-66.95	-55.68	-40.00	-26.95	-11.27	Peak	Vertical
6	424.790	-64.83	-54.81	-40.00	-24.83	-10.02	Peak	Vertical





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Test Report No.: W7L-220113W001RF05

ABOVE 1GHz

Note: For higher frequency, the emission is too low to be detected.

WORST-CASE DATA

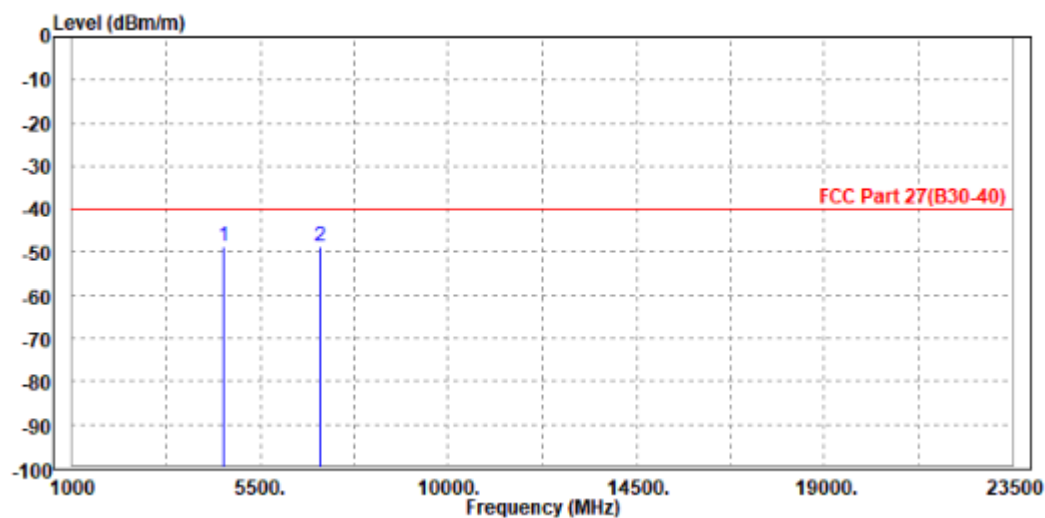
LTE B30

CHANNEL BANDWIDTH: 5MHz / QPSK

CH27685

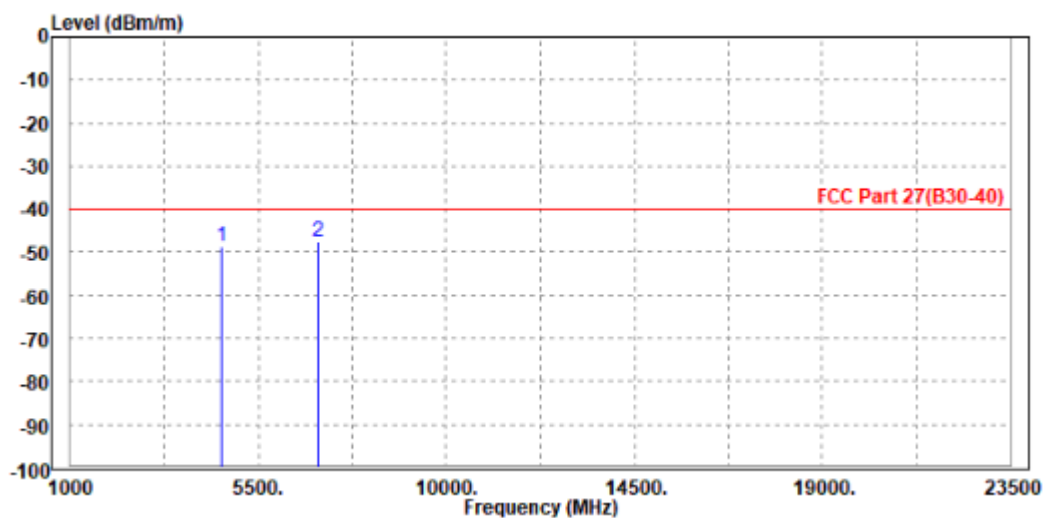
CH1: 666			
MODE	TX channel 27685	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	4622.500	-48.66	-58.21	-40.00	-8.66	9.55	Peak	Horizontal
2 PP	6922.500	-48.50	-59.88	-40.00	-8.50	11.38	Peak	Horizontal



MODE	TX channel 27685	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

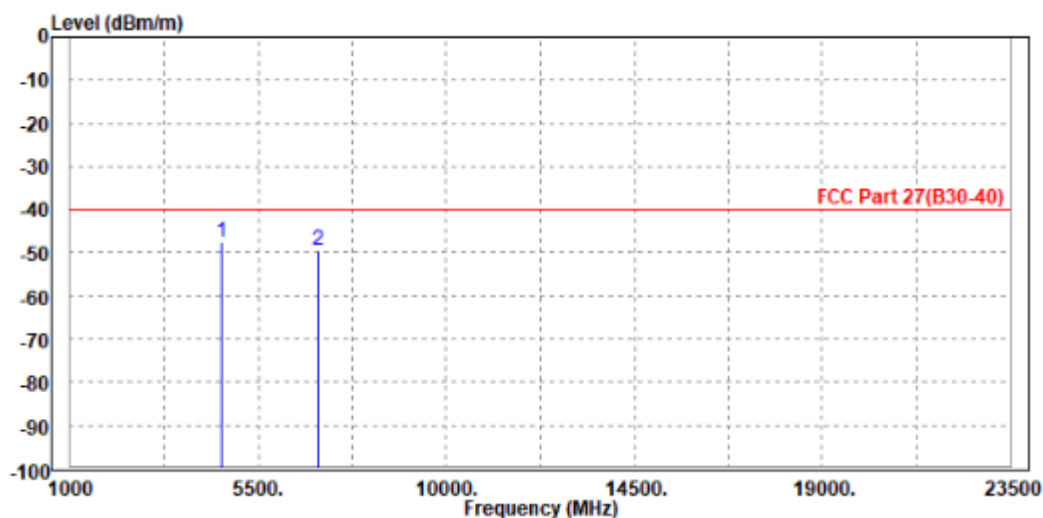
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	4615.000	-48.61	-58.55	-40.00	-8.61	9.94	Peak	Vertical
2 PP	6917.500	-47.67	-60.44	-40.00	-7.67	12.77	Peak	Vertical



CH27710

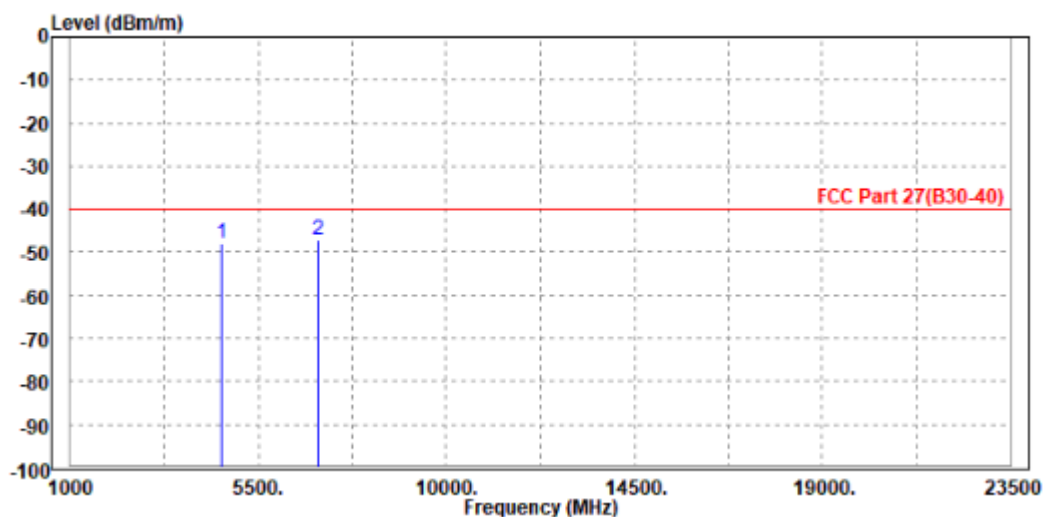
CH27710			
MODE	TX channel 27710	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	4620.000	-47.40	-56.96	-40.00	-7.40	9.56	Peak	Horizontal
2		6940.000	-49.45	-60.80	-40.00	-9.45	11.35	Peak	Horizontal



MODE	TX channel 27710	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

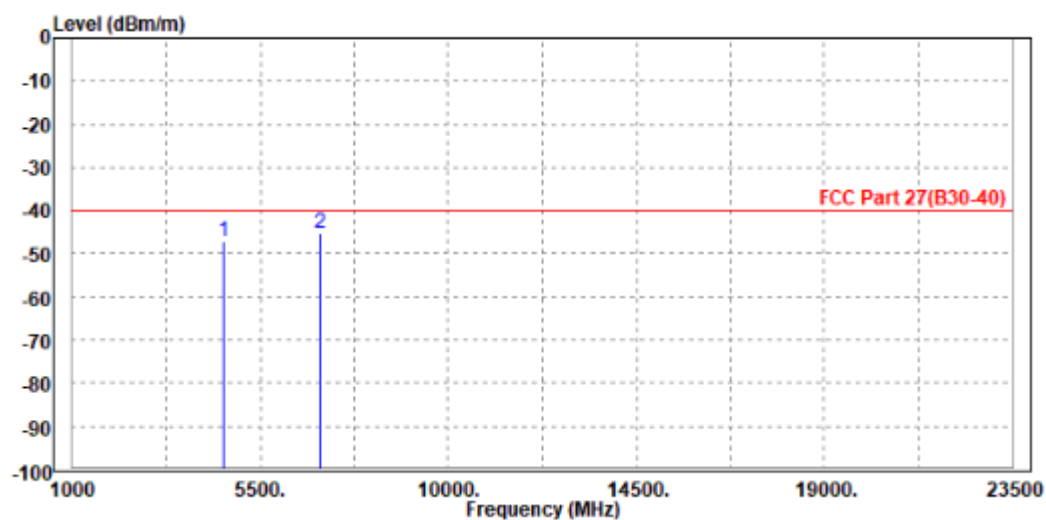
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	4622.500	-48.05	-57.99	-40.00	-8.05	9.94	Peak	Vertical
2 PP	6930.000	-47.20	-59.98	-40.00	-7.20	12.78	Peak	Vertical



CH27735

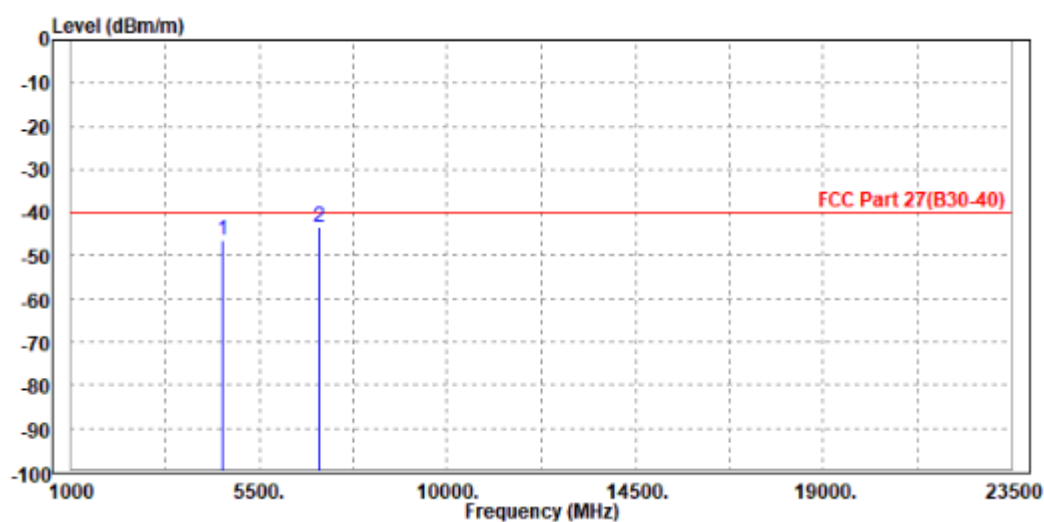
CH27735			
MODE	TX channel 27735	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	4625.000	-47.12	-56.66	-40.00	-7.12	9.54	Peak	Horizontal
2 PP	6940.000	-45.24	-56.59	-40.00	-5.24	11.35	Peak	Horizontal



MODE	TX channel 27735	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

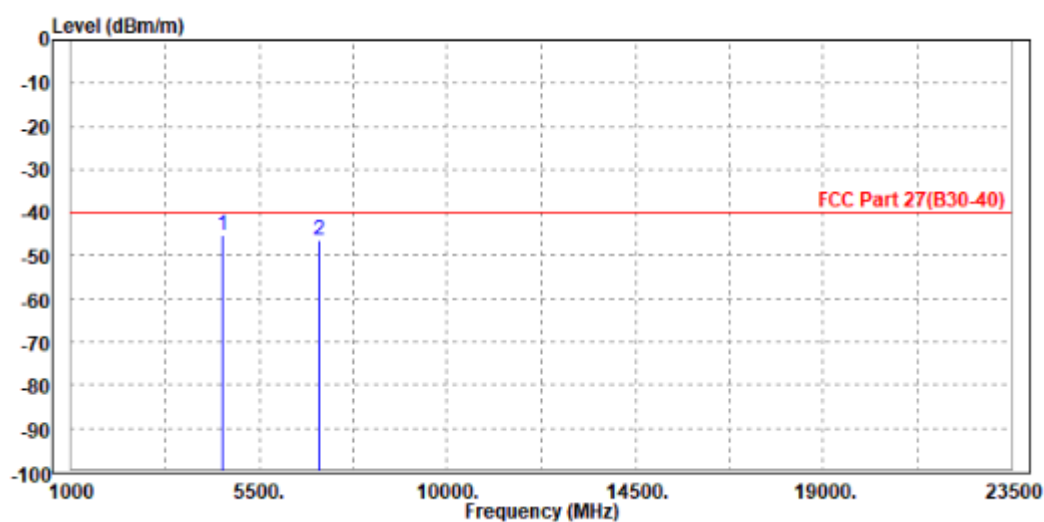
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	4622.500	-46.51	-56.45	-40.00	-6.51	9.94	Peak	Vertical
2 PP	6937.500	-43.24	-56.02	-40.00	-3.24	12.78	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

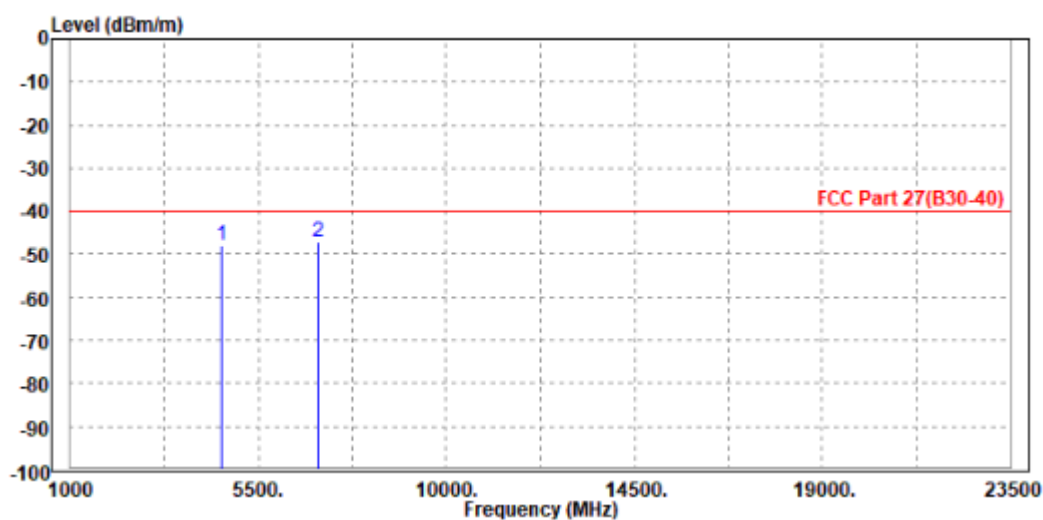
MODE	TX channel 27710	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	4622.500	-45.21	-54.76	-40.00	-5.21	9.55	Peak	Horizontal
2	6930.000	-46.36	-57.73	-40.00	-6.36	11.37	Peak	Horizontal



MODE	TX channel 27710	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC3.3V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	4620.000	-47.79	-57.73	-40.00	-7.79	9.94	Peak	Vertical
2 PP	6940.000	-47.10	-59.88	-40.00	-7.10	12.78	Peak	Vertical

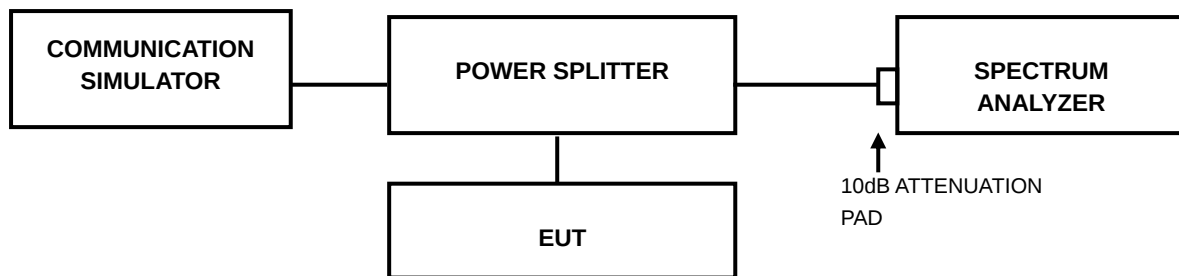


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

3.7.2 TEST SETUP



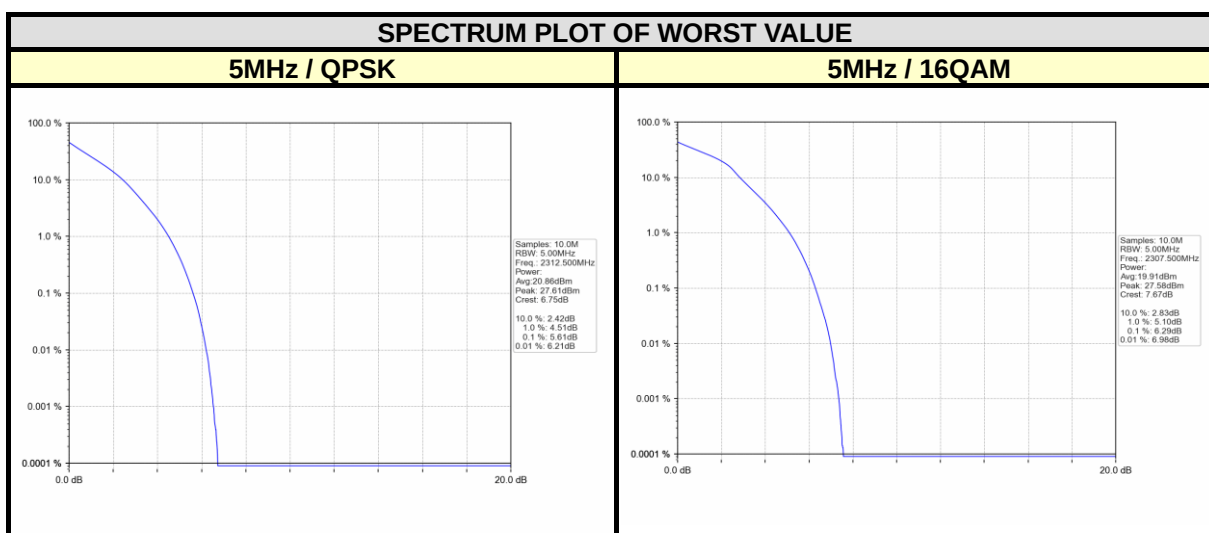
3.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

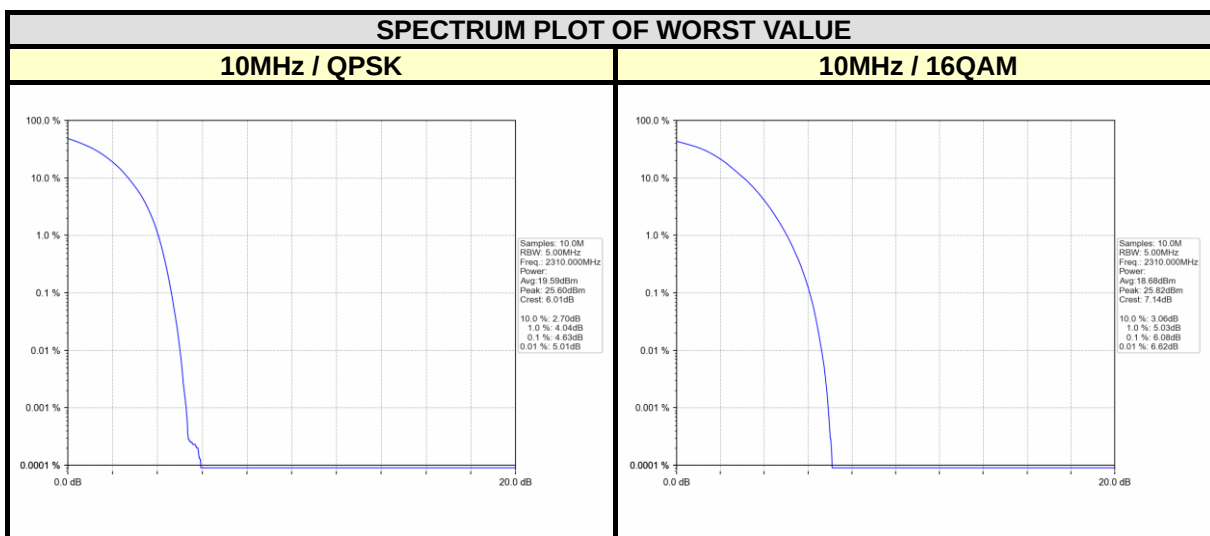
3.7.4 TEST RESULTS

LTE BAND 30

CHANNEL BANDWIDTH: 5MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
27685	2307.5	5.47	6.29	/
27710	2310	5.49	6.23	/
27735	2312.5	5.61	6.28	/



CHANNEL BANDWIDTH: 10MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
-	-	-	-	-
27710	2310	4.63	6.08	/
-	-	-	-	-





Test Report No.: W7L-220113W001RF05

4 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Shenzhen EMC/RF Lab:

Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.sw@bureauveritas.com

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.



Test Report No.: W7L-220113W001RF05

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---