



Test Report No.: RF210906W002-1



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-GL
FCC ID:	ZMOL850GL
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: Sep. 14, 2021	Date: Sep. 14, 2021

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute you unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170106C02-3	Original release	Feb. 21, 2017
RF210906W002-1	Based on the original report RF170106C02-3 Update components , update LTE band 30 data	Sep. 14, 2021



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 27 & Part 2		
STANDARD SECTION	1.1.1.1.1 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	±76.97Hz
Radiated emissions & Radiated Power (30MHz~1GHz)	±4.98dB
Radiated emissions & Radiated Power (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Band Edge Measurements	±4.70dB

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



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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, GRRGT/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-GL	
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:

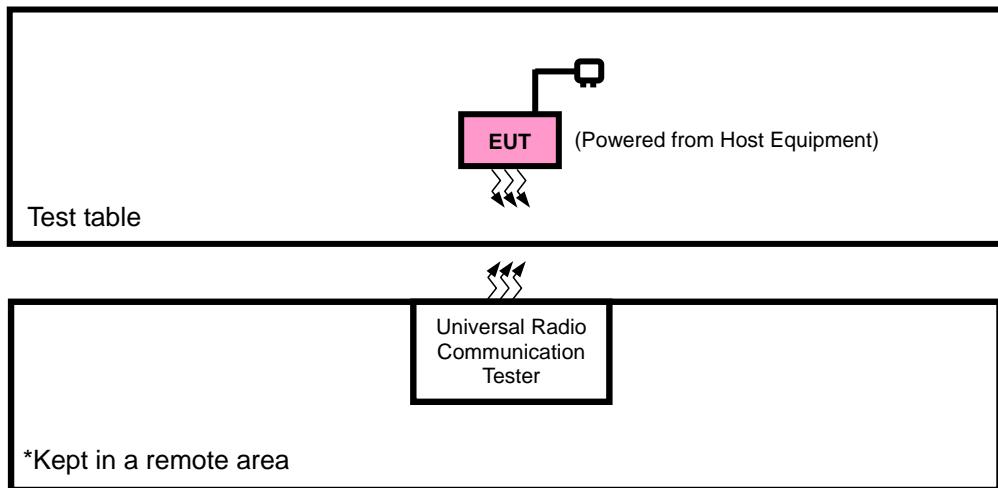
1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



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2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST





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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
B	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
B	FREQUENCY STABILITY	27685 to 27735	27685, 27735	5MHz	QPSK	1 RB / 0 RB Offset
		27710	27710	10MHz	QPSK	1 RB / 0 RB Offset
B	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
B	BAND EDGE	27685 to 27735	27685	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
			27735	5MHz	QPSK,16QAM	25 RB / 0 RB Offset
		27710	27710	10MHz	QPSK,16QAM	1 RB / 24 RB Offset
			/	10MHz	QPSK,16QAM	25 RB / 0 RB Offset
		27710	27710	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
			/	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
B	CONDUCED 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.



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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
CONDUCED 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



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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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP

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:

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



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3.1.3 TEST SETUP

CONDUCTED POWER MEASUREMENT:



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



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3.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 30

Band/BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH	MPR
				27685	27710	27735	
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



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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



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EIRP

LTE BAND 30

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (W)
27685	2307.5	18.9370	78.29	0.25
27710	2310	18.6918	73.99	0.25
27735	2312.5	18.8406	76.57	0.25

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (W)
27685	2307.5	17.6664	58.43	0.25
27710	2310	17.5553	56.95	0.25
27735	2312.5	18.0717	64.15	0.25

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (W)
-	-	-	-	-
27710	2310	18.6791	73.78	0.25
-	-	-	-	-

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (W)
-	-	-	-	-
27710	2310	17.7718	59.87	0.25
-	-	-	-	-

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

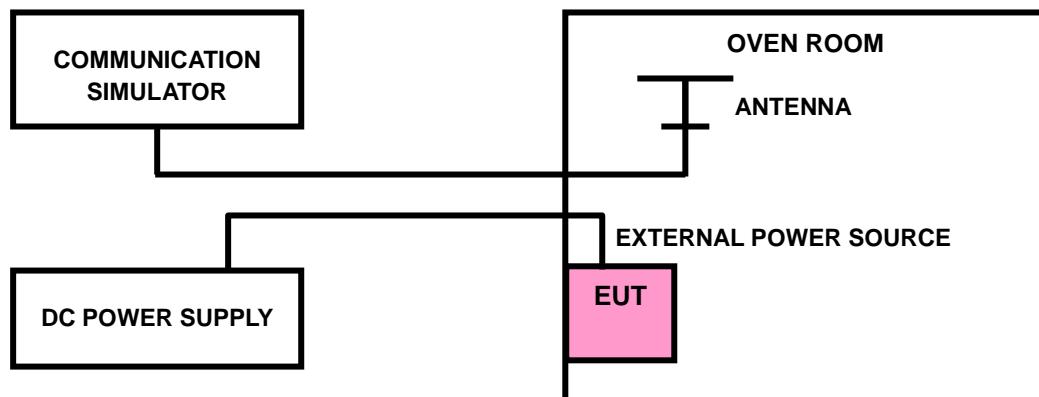
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.2.2 TEST PROCEDURE

- a. 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.
- b. 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.
- c. 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





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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	



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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.

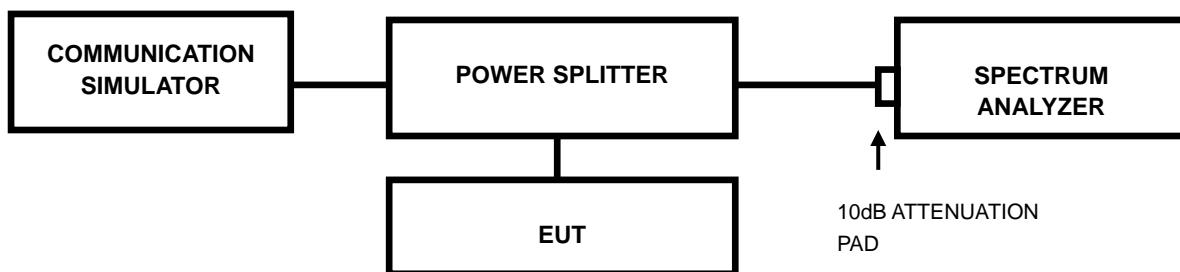
TEMP. (°C)	5MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Middle Channel	
-30	-0.0041	2.5
-20	-0.0038	2.5
-10	-0.0029	2.5
0	-0.0027	2.5
10	-0.002	2.5
20	-0.0014	2.5
30	-0.0015	2.5
40	-0.0006	2.5
50	-0.0002	2.5

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

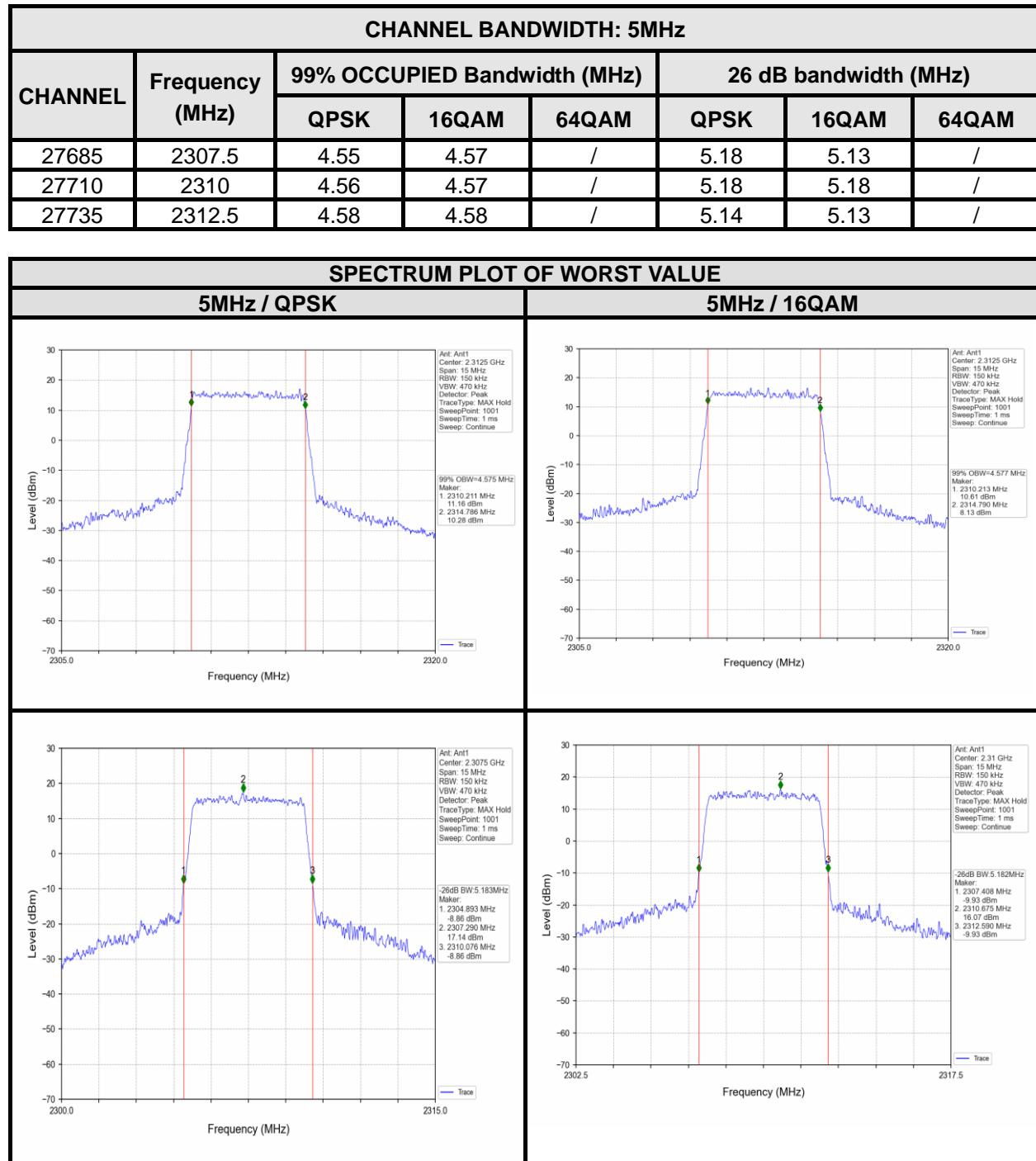


3.3.3 TEST PROCEDURES

- 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





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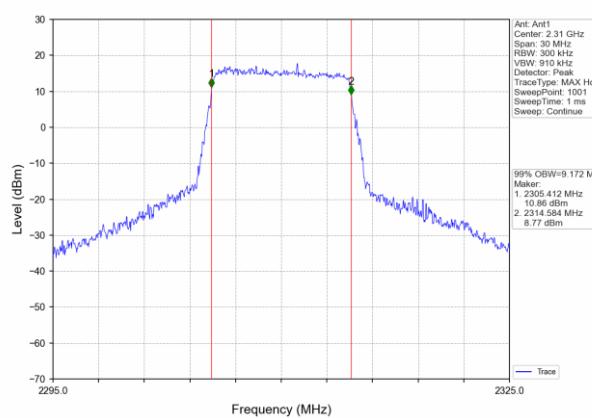
BUREAU
VERITAS

CHANNEL BANDWIDTH: 10MHz

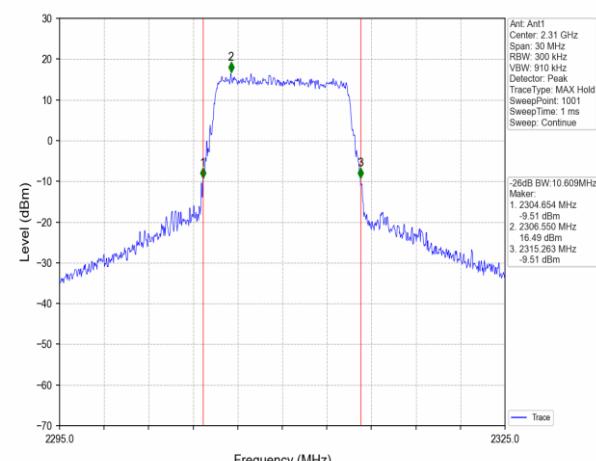
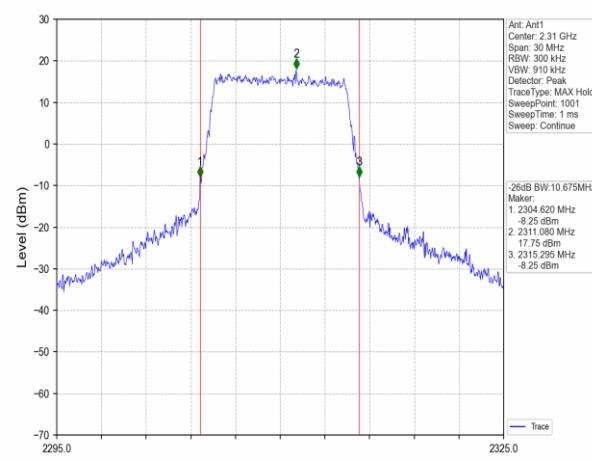
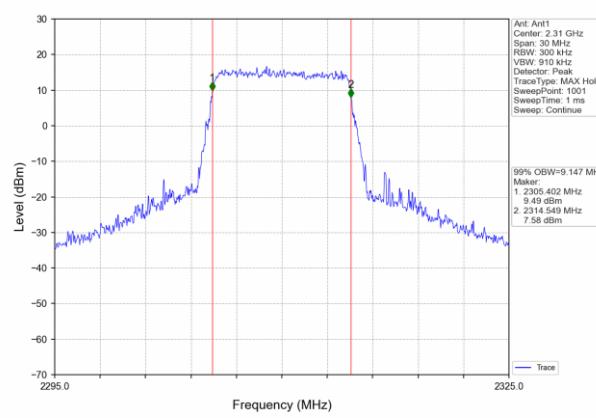
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-	-	-	-	-	-	-	-
27710	2310	9.17	9.15	/	10.68	10.65	/
-	-	-	-	-	-	-	-

SPECTRUM PLOT OF WORST VALUE

10MHz / QPSK



10MHz / 16QAM

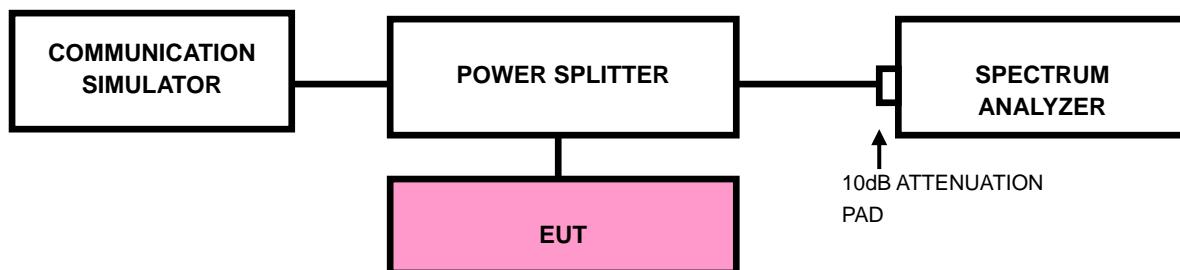


3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC 27.53(m)(4) specified that For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. For mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed.

3.4.2 TEST SETUP



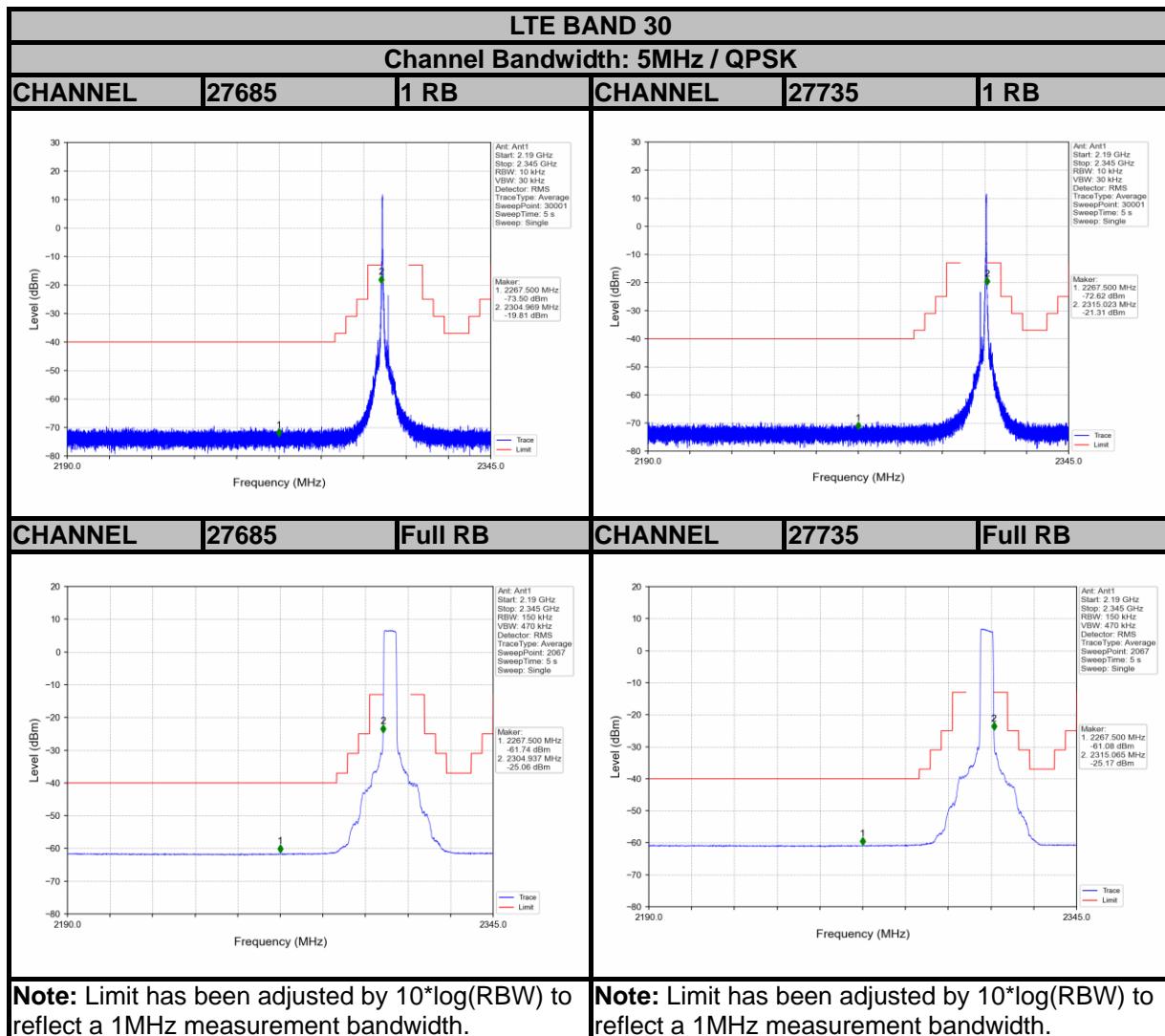


3.4.3 TEST PROCEDURES

- 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.



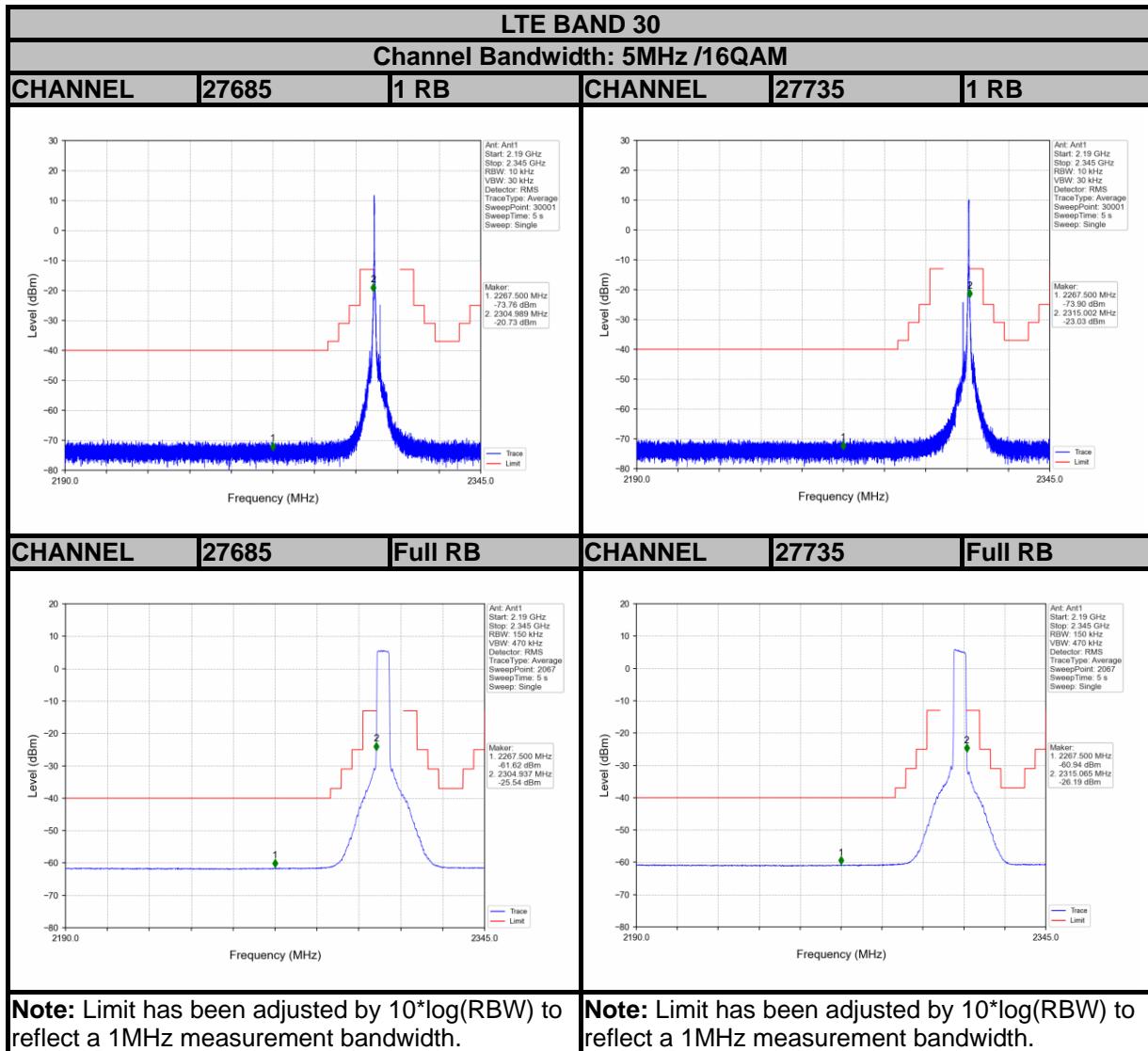
3.4.4 TEST RESULTS





Test Report No.: RF210906W002-1

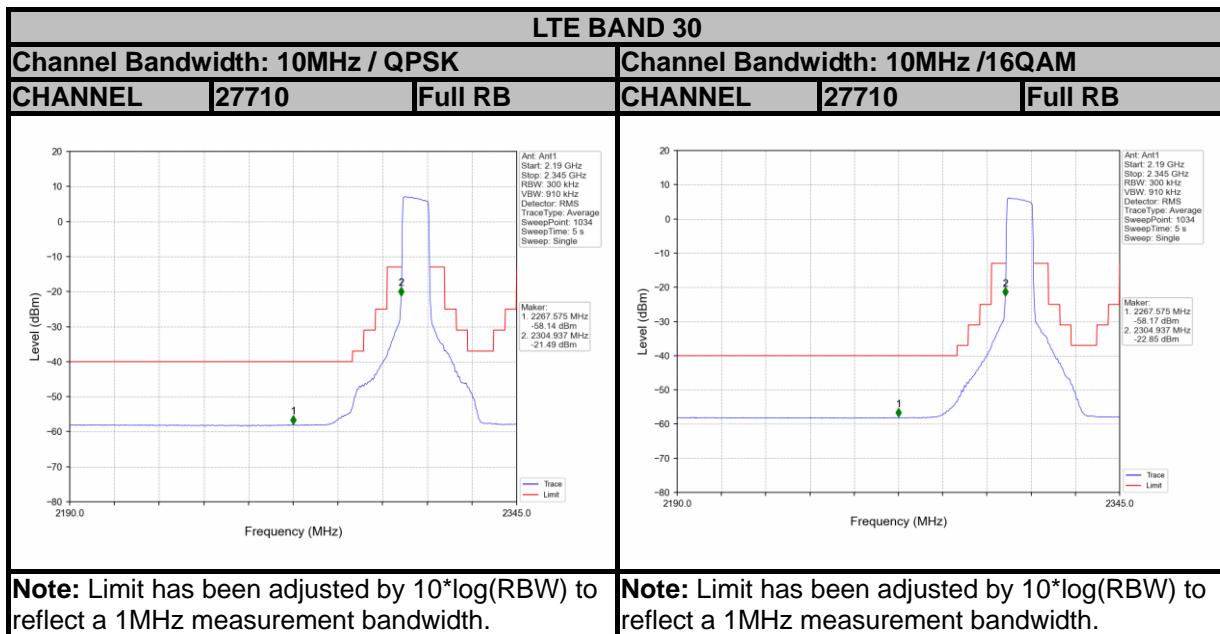
BUREAU
VERITAS





Test Report No.: RF210906W002-1

BUREAU
VERITAS



3.5 CONDUCTED SPURIOUS EMISSIONS

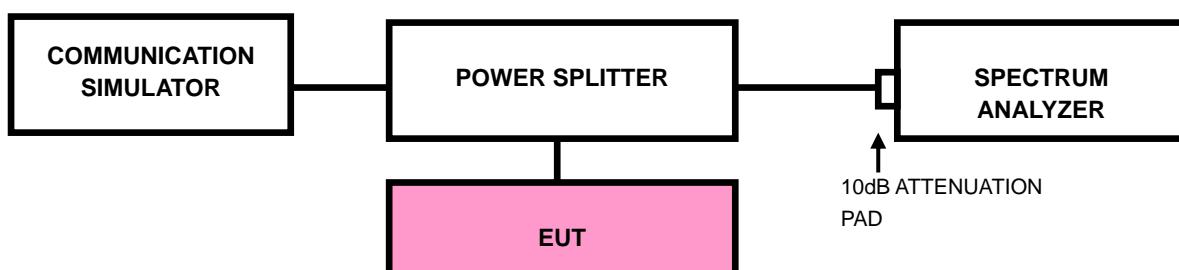
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25dBm.

3.5.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30MHz~27GHz for LTE Band 7 & 30MHz~26.2GHz for LTE Band 38, 30MHz~27GHz for LTE Band 41. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.5.3 TEST SETUP



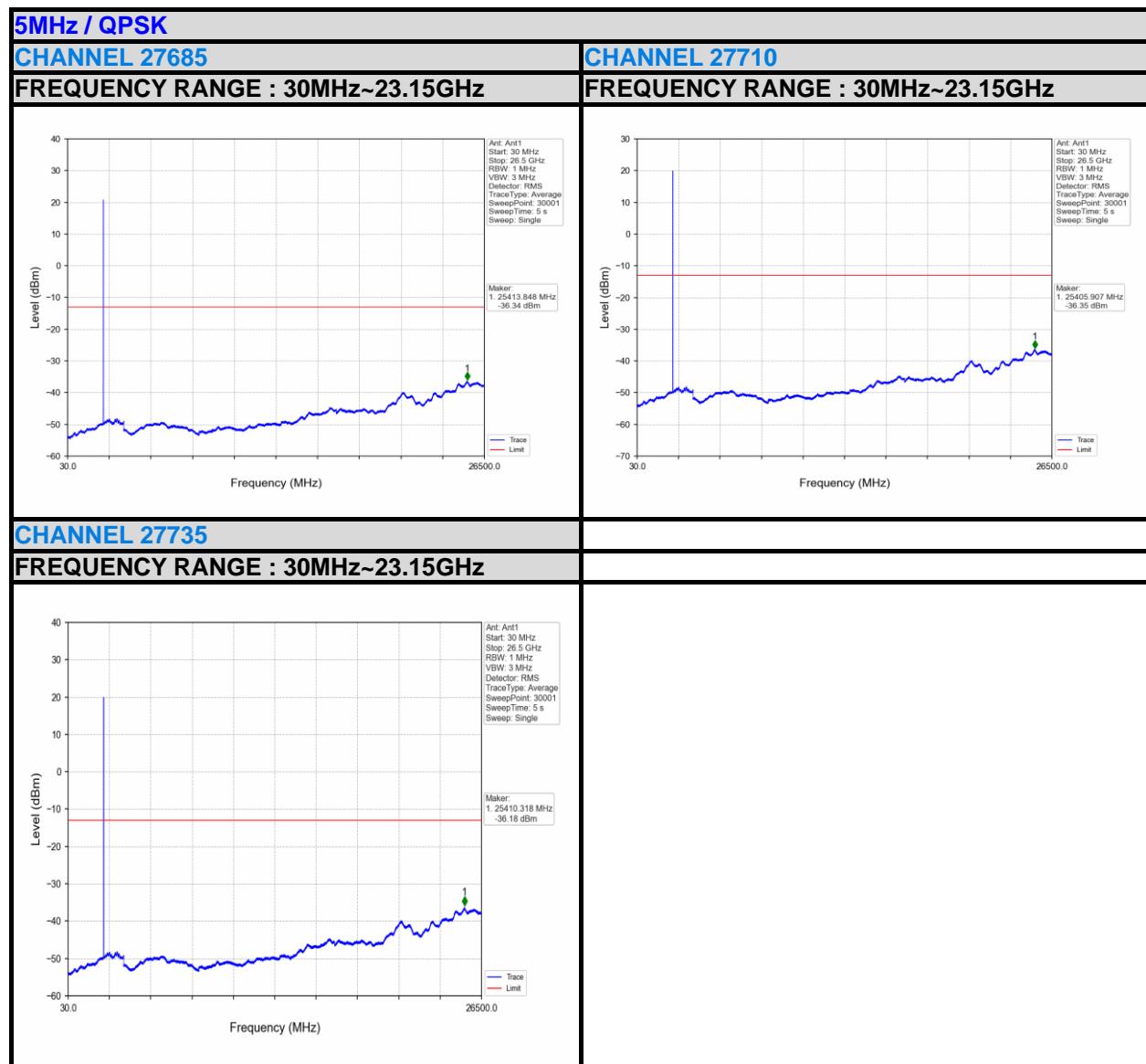


Test Report No.: RF210906W002-1

BUREAU
VERITAS

3.5.4 TEST RESULTS

LTE BAND 30



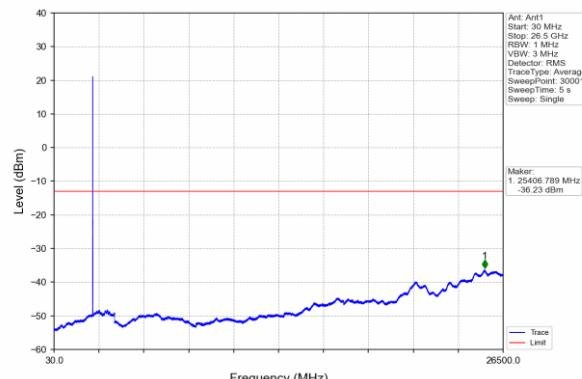


Test Report No.: RF210906W002-1

10MHz / QPSK

CHANNEL 27710

FREQUENCY RANGE : 30MHz~23.15GHz





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 $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25dBm.

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 = Output power level of S.G – TX cable loss + 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 power = E.I.P.R power - 2.15dBi.

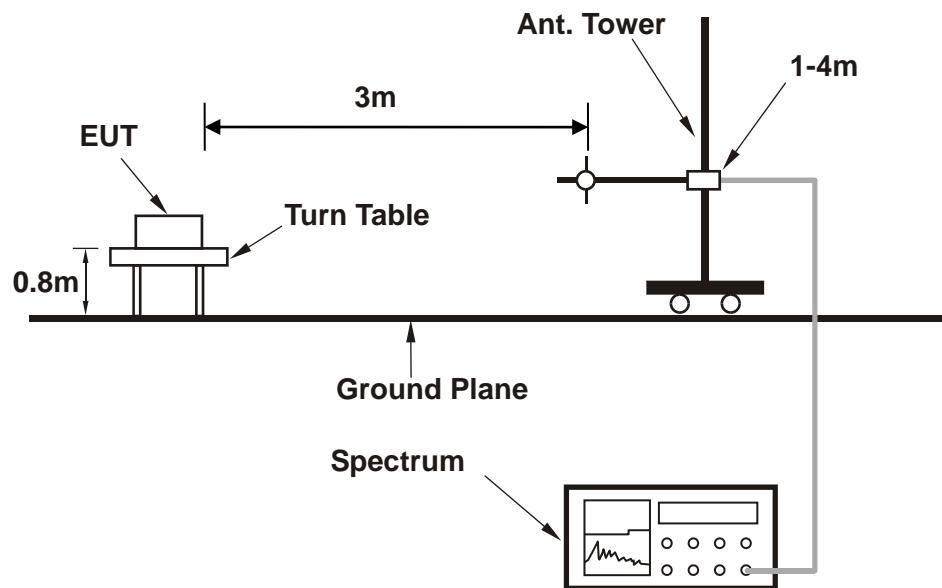
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

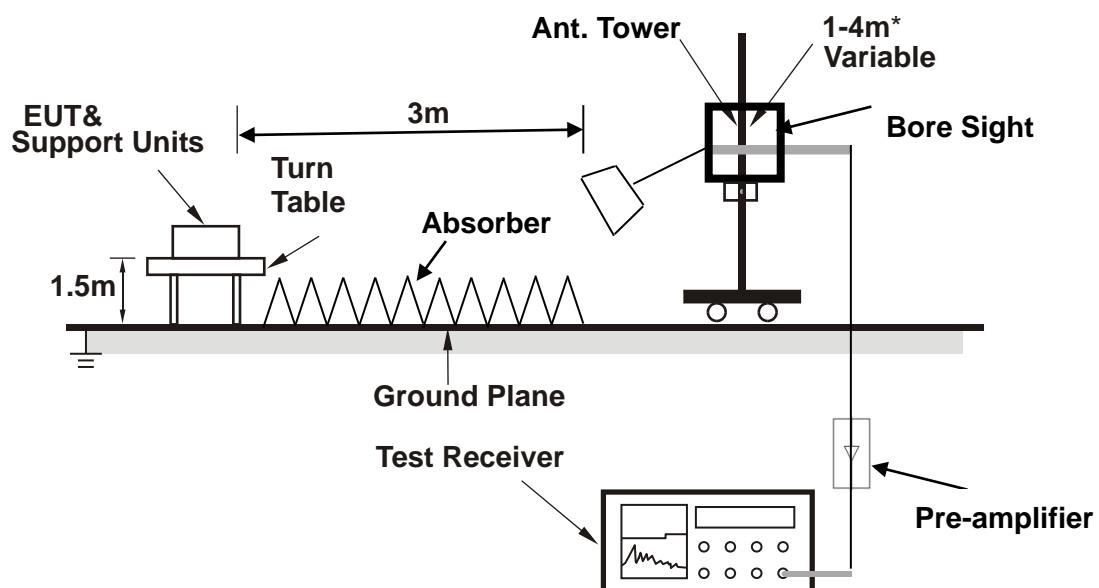
No deviation

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).



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3.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

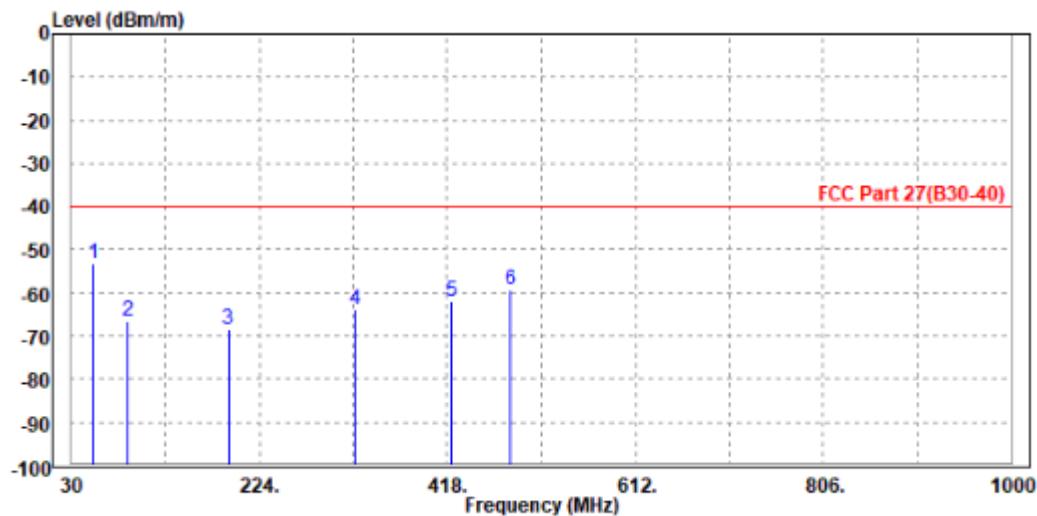
30 MHz – 1GHz data:

LTE Band 13

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 MHz	Level dBm/m	Read Level	Limit Line	Over Limit	Over Factor	Remark	Pol/Phase
		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



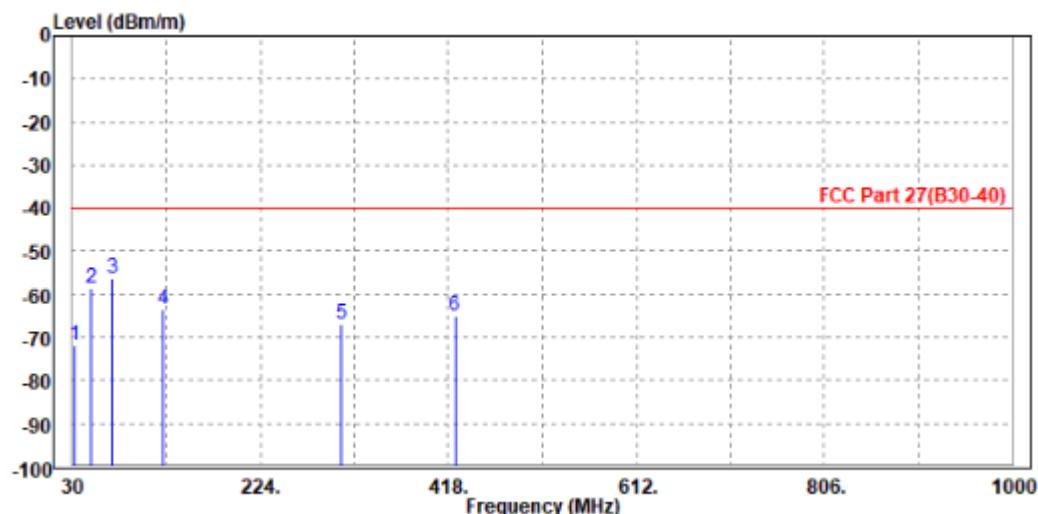


Test Report No.: RF210906W002-1

BUREAU
VERITAS

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	Limit	Over	Factor	Remark	Pol/Phase
		Level	Line	Limit			
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





Test Report No.: RF210906W002-1

BUREAU
VERITAS

ABOVE 1GHz

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

WORST-CASE DATA

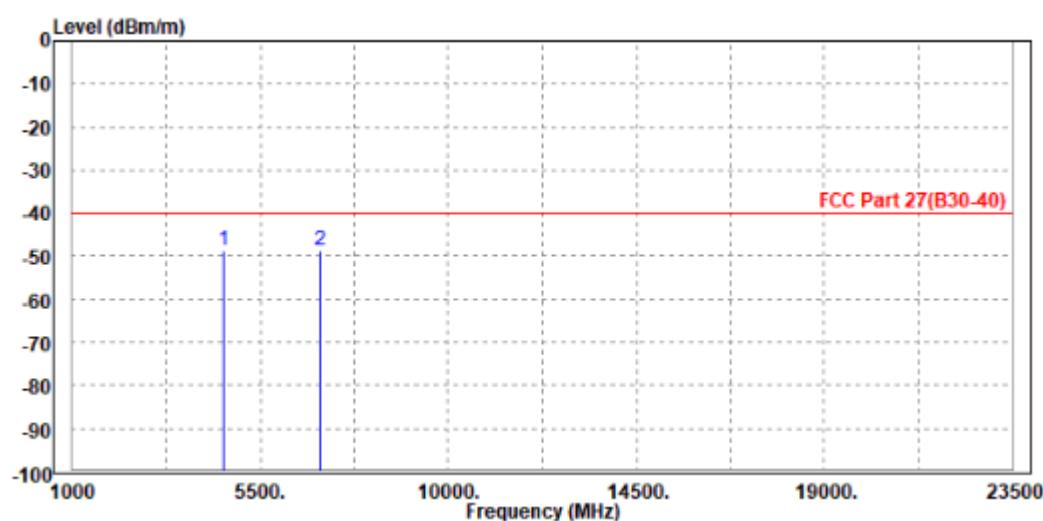
LTE B30

CHANNEL BANDWIDTH: 5MHz / QPSK

CH27685

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 MHz	Level dBm/m	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		dBm	dBm/m	dB			
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



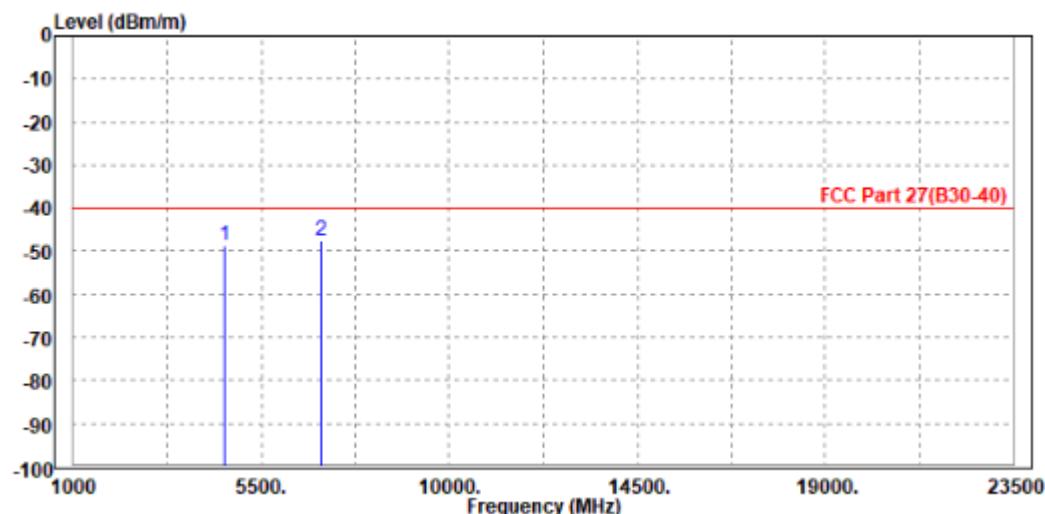


Test Report No.: RF210906W002-1

BUREAU
VERITAS

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	Limit	Over	Factor	Remark	Pol/Phase
		Level	Line	Limit			
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



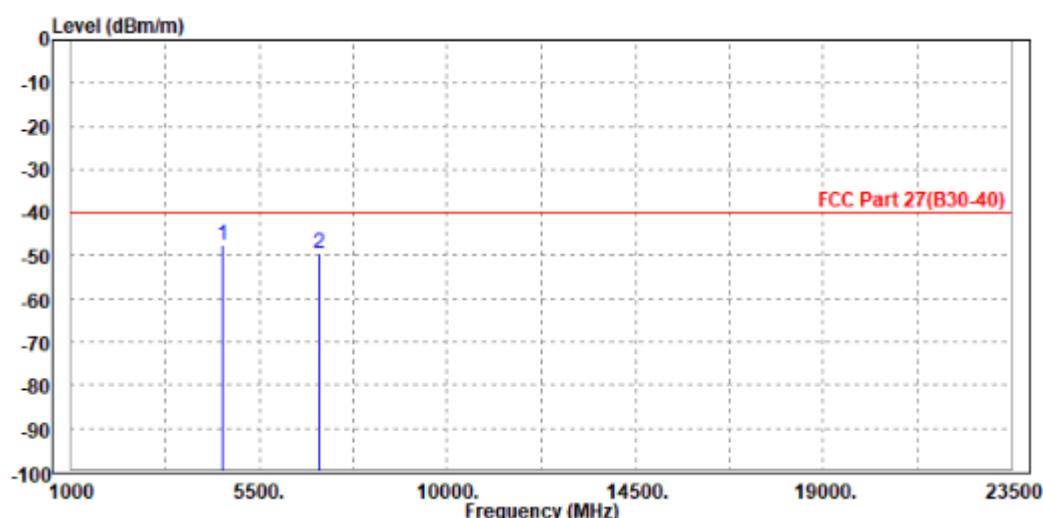


Test Report No.: RF210906W002-1

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	Limit	Over	Factor	Remark	Pol/Phase
		Level	Line	Limit			
PP	4620.000	-47.40	-56.96	-40.00	-7.40	9.56	Peak
PP	6940.000	-49.45	-60.80	-40.00	-9.45	11.35	Peak



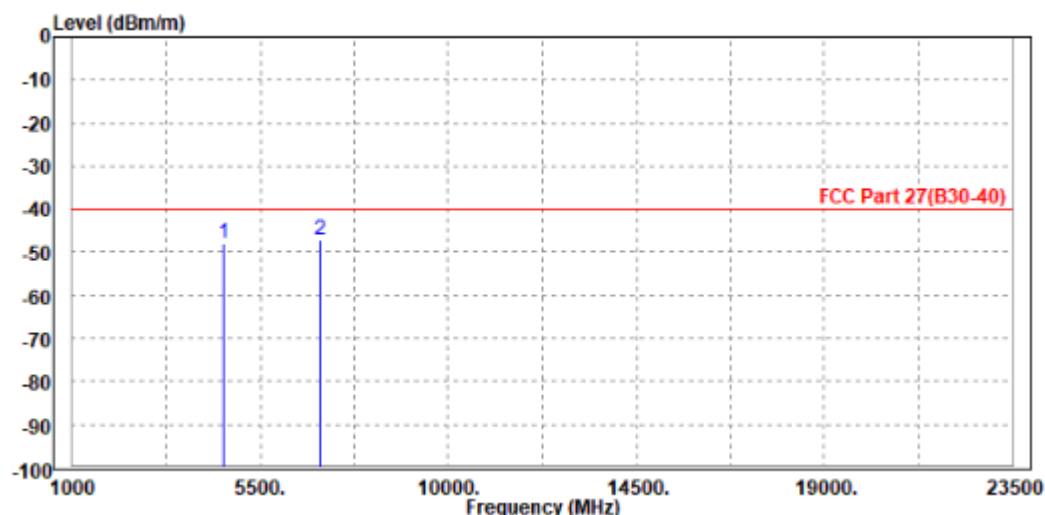


Test Report No.: RF210906W002-1

BUREAU
VERITAS

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	Limit	Over	Remark	Pol/Phase
		Line	dBm/m	dB		
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





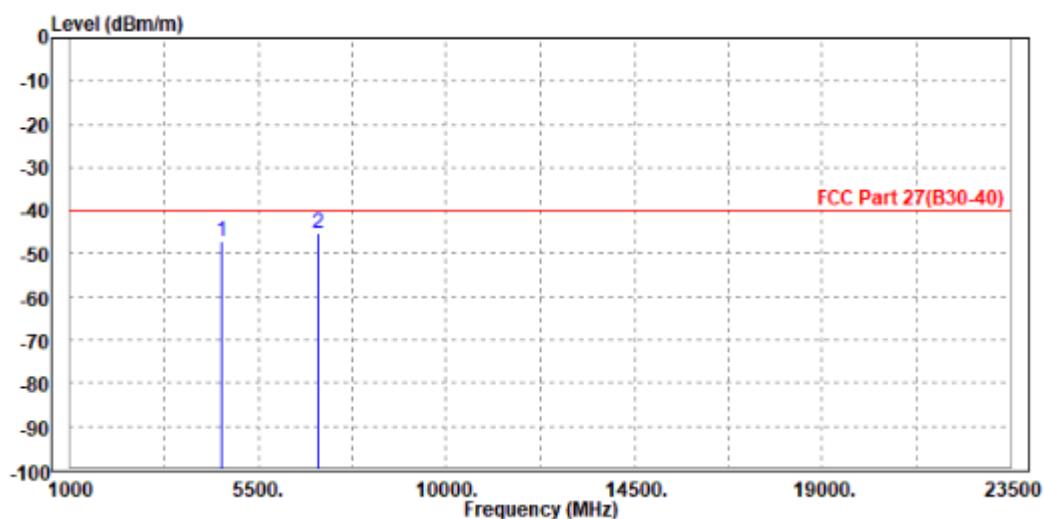
Test Report No.: RF210906W002-1

BUREAU
VERITAS

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



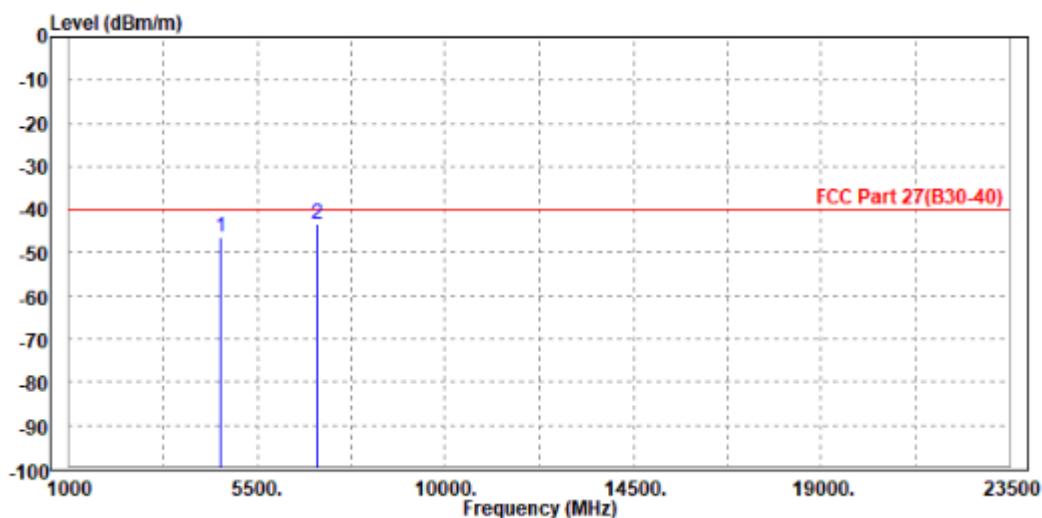


Test Report No.: RF210906W002-1

BUREAU
VERITAS

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	Limit	Over	Factor	Remark	Pol/Phase
		Level	Line	Limit			
MHz	dBm/m	dBm	dBm/m	dB	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





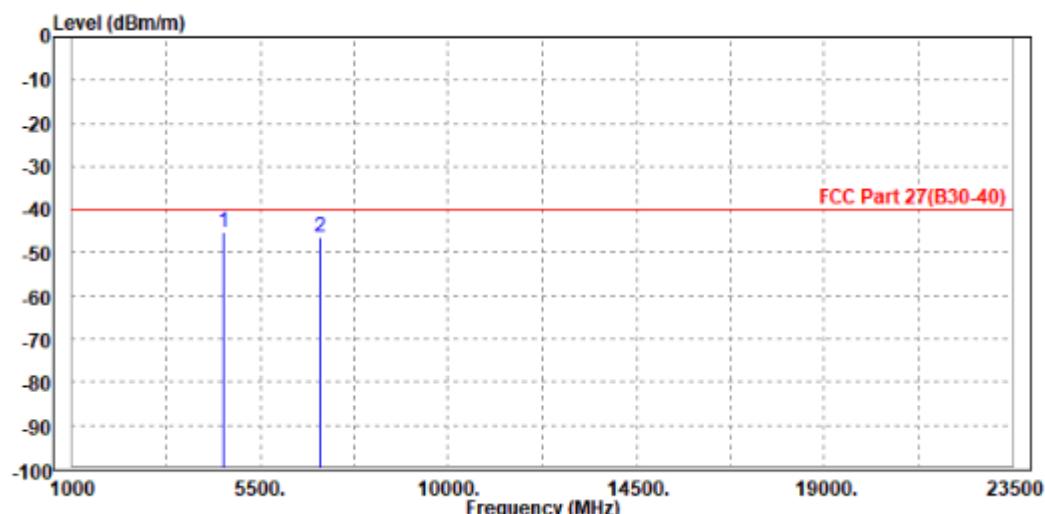
Test Report No.: RF210906W002-1

BUREAU
VERITAS

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 MHz	Level dBm/m	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		dBm	dBm/m	dB			
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



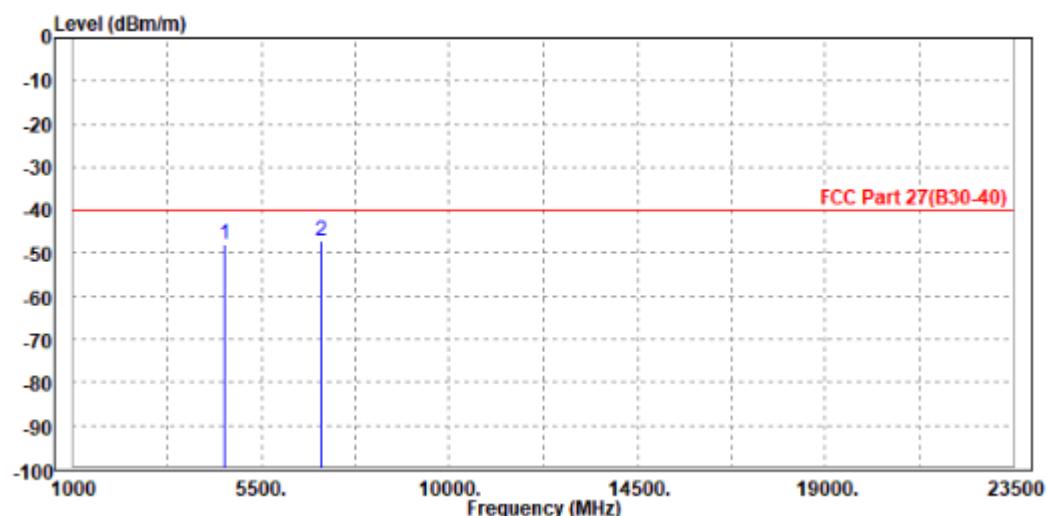


Test Report No.: RF210906W002-1

BUREAU
VERITAS

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	Limit	Over	Remark	Pol/Phase
		Line	dBm	dBm/m		
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

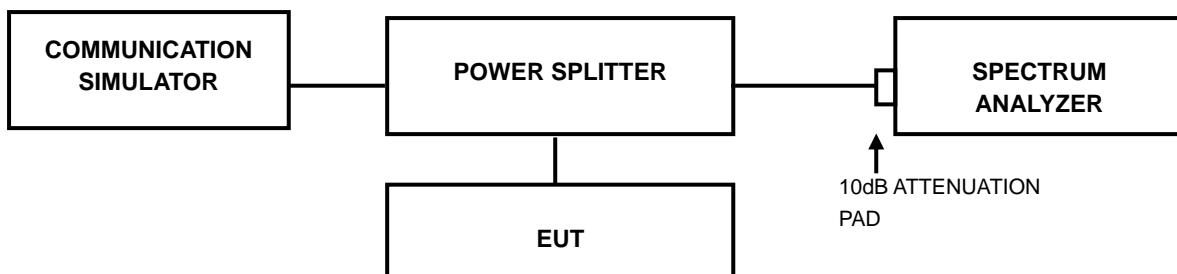


3.7 PEAK TO AVERAGE RATIO

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%.

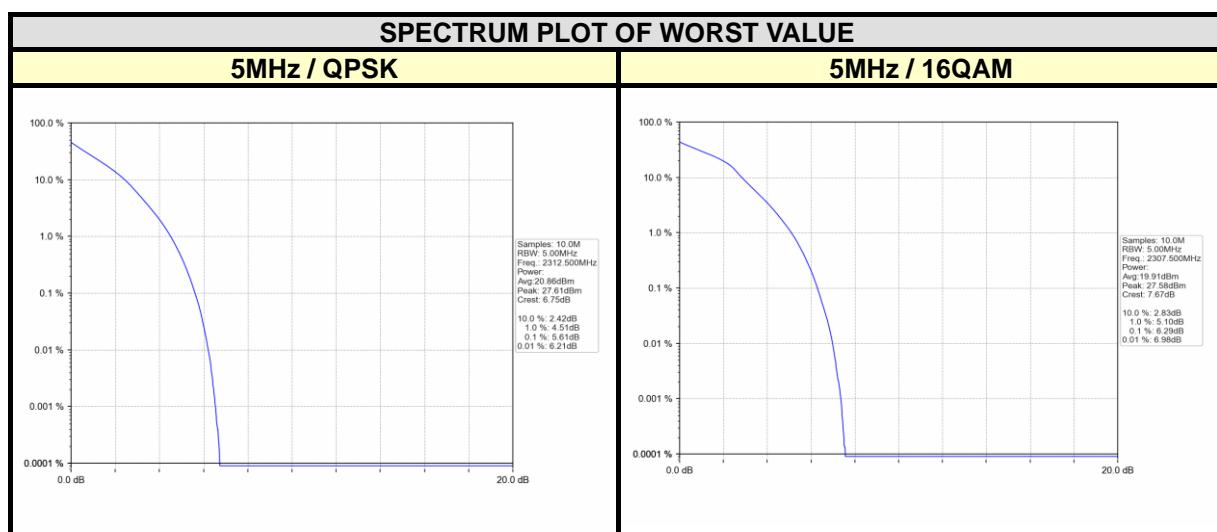


Test Report No.: RF210906W002-1

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	/

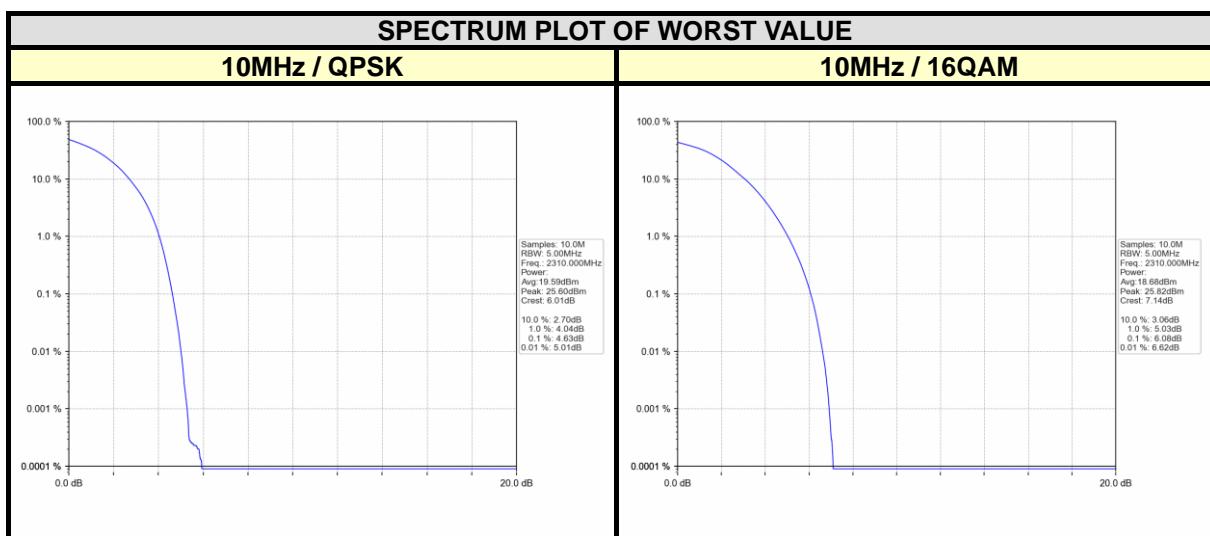




Test Report No.: RF210906W002-1

BUREAU
VERITAS

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





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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.dg@cn.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.



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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---