FCC TEST REPORT

(PART 24)

Applicant:	PAX Technology Limited
Address:	Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Hong Kong, China

Manufacturer or Supplier:	PAX Computer Technology (Shenzhen) Co., Ltd.
Address:	4/F, No.3 Building, Software Park, Second Central Science-Tech Road, High-Tech industrial Park, Shenzhen, Guangdong, P.R.C.
Product:	Smart Mobile Payment Terminal
Brand Name:	PAX
Model Name:	A920Pro
FCC ID:	V5PA920PRO
Date of tests:	Apr. 01, 2020~ May 15, 2020

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

☒ **FCC PART 24, Subpart E** ☒ **ANSI C63.26-2015**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E**

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

Issued by Evans He Engineer / Mobile Department	Approved by David Huang Manager / Mobile Department
Evans He Date: May 18, 2020	David Huang Date: May 18, 2020

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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 9
2.3 DESCRIPTION OF SUPPORT UNITS 10
2.4 TEST ITEM AND TEST CONFIGURATION 10
2.5 EUT OPERATING CONDITIONS 13
2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS 13

3 TEST TYPES AND RESULTS 14

3.1 OUTPUT POWER MEASUREMENT 14
3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT 14
3.1.2 TEST PROCEDURES 14
3.1.3 TEST SETUP 14
3.1.4 TEST RESULTS 16
3.2 FREQUENCY STABILITY MEASUREMENT 22
3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT 22
3.2.2 TEST PROCEDURE 22
3.2.3 TEST SETUP 22
3.2.4 TEST RESULTS 23
3.3 OCCUPIED BANDWIDTH MEASUREMENT 29
3.3.1 TEST PROCEDURES 29
3.3.2 TEST SETUP 29
3.3.3 TEST RESULTS 30
3.4 BAND EDGE MEASUREMENT 36
3.4.1 LIMITS OF BAND EDGE MEASUREMENT 36
3.4.2 TEST SETUP 36
3.4.3 TEST PROCEDURES 36
3.4.4. TEST RESULTS 38
3.5 CONDUCTED SPURIOUS EMISSIONS 44
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT 44
3.5.2 TEST PROCEDURE 44
3.5.3 TEST SETUP 44
3.5.4 TEST RESULTS 45
3.6 RADIATED EMISSION MEASUREMENT 51
3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT 51
3.6.2 TEST PROCEDURES 51
3.6.3 DEVIATION FROM TEST STANDARD 51
3.6.4 TEST SETUP 52
3.6.5 TEST RESULTS 54
3.7 PEAK TO AVERAGE RATIO 68
3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT 68
3.7.2 TEST SETUP 68
3.7.3 TEST PROCEDURES 68
3.7.4 TEST RESULTS 69

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 72

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF200327S003-2	Original release	May 18, 2020

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
2.1046 24.232	Equivalent Isotropic Radiated Power	PASS	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 24.238(b)	Occupied Bandwidth	PASS	Meet the requirement of limit.
24.232(d)	Peak to average ratio	PASS	Meet the requirement of limit.
24.238(b)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -12.16dB at 3720MHz.

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	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GHz	3.74dB
	1GHz ~ 18GHz	4.66dB
	18GHz ~ 40GHz	4.67dB

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.
EMI Test Receiver	Rohde&Schwarz	ESL6	1300.5001K06-100262-eQ	Mar. 24,20	Mar. 24,21
Bilog Antenna	Sunol Sciences	JB6	A110712	Apr. 08, 20	Apr. 07, 21
Active Antenna	CMO-POWER	AL-130	121031	Mar. 27, 20	Mar. 26, 21
Signal Amplifier	HP	8447E	443008	Mar. 24, 20	Mar. 24, 21
Spectrum	Agilent	E4446A	MY46180622	Mar. 24, 20	Mar. 24, 21
MXA signal analyzer	Agilent	N9020A	MY49100060	Mar. 22, 20	Mar. 21, 21
Horn Antenna	COM-POWER	HAH-118	71259	Mar. 20, 20	Mar. 19, 21
Horn Antenna	COM-POWER	HAH-118	71283	Jun. 30, 19	Jun. 29, 20
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170147	Jun. 30, 19	Jun. 29, 20
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170242	Mar. 24, 20	Mar. 24, 21
AMPLIFIER	EM Electornic Corporation	EM01G26G	60613	Jan. 04, 20	Jan. 03,21
AMPLIFIER	Emc Instruments Corporation	Emc012645	980077	Oct. 18,18	Oct. 17,21
3m Semi-anechoic Chamber	SAEMC	9m*6m*6m	N/A	Mar. 24, 20	Mar. 24, 21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A
Wireless Connectivity Tester	R&S	CMW270	1201.0002K75	Dec. 18, 19	Dec. 17, 20
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 24,20	Mar. 24,21
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 24,20	Mar. 24,21
RF Control Unit	Tonscend	JS0806-2	188060112	Mar. 24,20	Mar. 24,21
Signal Generation	Agilent	E4421B	US40051152	Dec. 18, 19	Dec. 17, 20
DC Power Supply	Agilent	E3640A	MY40004013	Mar. 28,20	Mar. 27,21
Programmable Temperature & Humidity Chamber	Hongjin	HYC-TH-225DH	DG-180746	Mar. 24,20	Mar. 24,21
Test System	Tonscend	JS 1120-3	N/A	N/A	N/A
Power Splitter	Weinschel	1580-1	TL177	Mar. 20,20	Mar. 19,21
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	112012	Mar. 24,20	Mar. 24,21
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	121393	Mar. 28,20	Mar. 27,21
Wireless Communication Test Set	ROHDE&SCHWARZ	CMW500	1201.0002K500-155842-Gd	Nov. 1, 19	Oct. 31, 20

NOTE: 1. The calibration interval of the above test instruments is 12 months (except 3m Semi-anechoic Chamber). 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 535293.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smart Mobile Payment Terminal	
BRAND NAME	PAX	
MODEL NAME	A920Pro	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.7Vdc (Li-ion, ion battery)	
MODULATION TYPE	**LTE Band 2:** QPSK, 16QAM	
FREQUENCY RANGE	**LTE Band 2 Channel Bandwidth: 1.4MHz**	1850.7MHz ~ 1909.3MHz
	LTE Band 2 Channel Bandwidth: 3MHz	1851.5MHz ~ 1908.5MHz
	LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~ 1907.5MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855.0MHz ~ 1905.0MHz
	LTE Band 2 Channel Bandwidth: 15MHz	1857.5MHz ~ 1902.5MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860.0MHz ~ 1900.0MHz
MAX. EIRP POWER	**LTE Band 2 Channel Bandwidth: 1.4MHz**	290.4mW
	LTE Band 2 Channel Bandwidth: 3MHz	287.08mW
	LTE Band 2 Channel Bandwidth: 5MHz	296.48mW
	LTE Band 2 Channel Bandwidth: 10MHz	287.08mW
	LTE Band 2 Channel Bandwidth: 15MHz	284.45mW
	LTE Band 2 Channel Bandwidth: 20MHz	297.85mW
EMISSION DESIGNATOR	**LTE Band 2 Channel Bandwidth: 1.4MHz**	QPSK: 1M09G7D
		16QAM: 1M09W7D
	LTE Band 2 Channel Bandwidth: 3MHz	QPSK: 2M69G7D
		16QAM: 2M69W7D
	LTE Band 2 Channel Bandwidth: 5MHz	QPSK: 4M46G7D
		16QAM: 4M47W7D
	LTE Band 2	QPSK: 8M95G7D

	Channel Bandwidth: 10MHz	16QAM: 8M95W7D
	LTE Band 2 Channel Bandwidth: 15MHz	QPSK: 13M40G7D
		16QAM: 13M40W7D
	LTE Band 2 Channel Bandwidth: 20MHz	QPSK: 17M90G7D
		16QAM: 17M89W7D
ANTENNA TYPE	FPC Antenna with 1.5dBi gain	
HW VERSION	N/A	
SW VERSION	N/A	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB cable: non-shielded, detachable, 1.0m	
EUT STAGE	Production Unit	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	N/A
MODEL:	GLH50D2000HW
INPUT:	100-240V～50/60Hz 0.40A
OUTPUT:	5.0V⎓2000mA

3. The EUT matched the following USB cable:

USB CABLE	
BRAND:	N/A
MODEL:	N/A
SIGNAL LINE:	1.0 METER

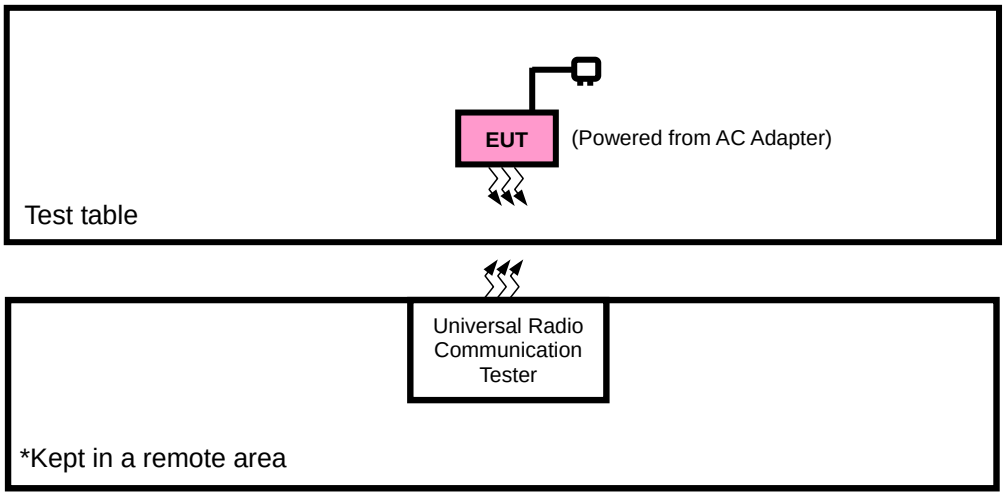
4. The EUT was powered by the following Battery:

ADAPTER	
BRAND:	VEKEN
MODEL:	YW-008
POWER RATING:	3.7V ⎓ 5150mAh 19.05Wh

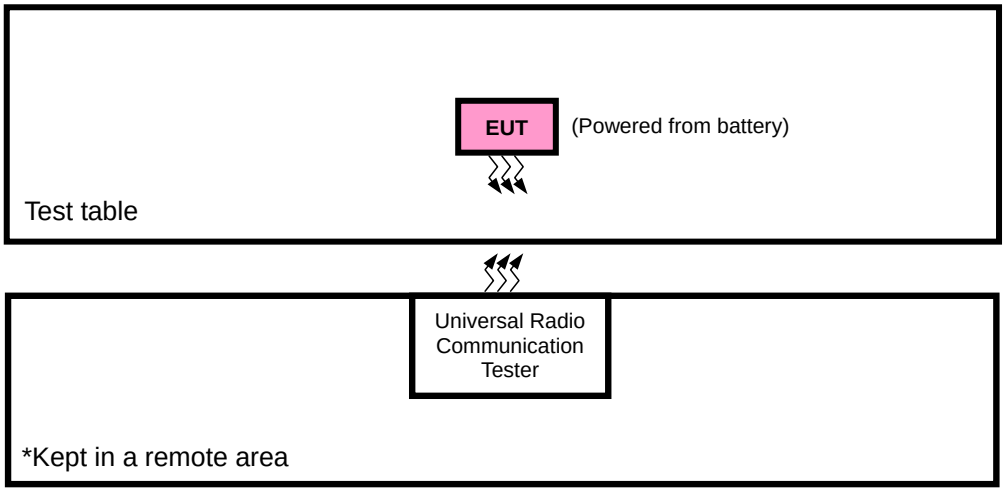
5. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR CONDUCTED & E.I.R.P. 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	N/A	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

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 in EIRP and radiated emission was found when positioned on X-plane for GSM/EDGE/WCDMA/ LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter + USB Cable with LTE link**
B	EUT + Battery with **LTE link**

LTE BAND 2

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	18607 to 19193	18607, 19193	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 19185	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 19175	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 19150	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 19125	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 19100	20MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM	15 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM	25 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM	75 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM	100 RB / 0 RB Offset
B	PEAK TO AVERAGE RATIO	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM	1 RB / 0 RB Offset

B	BAND EDGE	18607 to 19193	18607	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			19193	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		18615 to 19185	18615	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			19185	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		18625 to 19175	18625	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			19175	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		18650 to 19150	18650	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			19150	10MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		18675 to 19125	18675	15MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			19125	15MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		18700 to 19100	18700	20MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			19100	20MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
B	CONDCUDETED EMISSION	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
FREQUENCY STABILITY	24deg. C, 60%RH	DC 3.4V/3.7V/4.2V	Aaron Liang
OCCUPIED BANDWIDTH	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
PEAK TO AVERAGE RATIO	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
BAND EDGE	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
CONDCUDETED EMISSION	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
RADIATED EMISSION	25deg. C, 59%RH	5Vdc from adapter	Aaron Liang

2.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

2.6 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 24

KDB 971168 D01 Power Meas License Digital Systems v03

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

Mobile and portable stations are limited to 2 watts 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 determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

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

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);

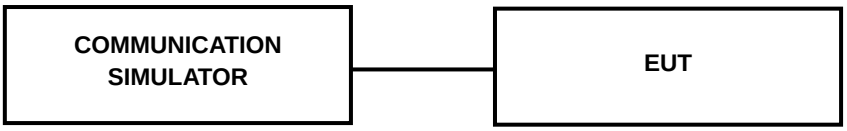
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

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.

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

CONDUCTED OUTPUT POWER (dBm)

LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18607	Mid CH 18900	High CH 19193	3GPP MPR (dB)
				Frequency 1850.7 MHz	Frequency 1880 MHz	Frequency 1909.3 MHz	
1.4MHz	QPSK	1	0	23.01	23.07	22.97	0
		1	2	22.97	23.09	22.91	0
		1	5	23.01	23.08	22.95	0
		3	0	23.07	22.99	22.99	0
		3	1	23.1	23.04	23.07	0
		3	3	23.06	22.94	23.13	0
		6	0	22.12	21.9	22.04	1
	16QAM	1	0	22.38	21.77	22.35	1
		1	2	22.37	21.73	22.32	1
		1	5	22.42	21.76	22.36	1
		3	0	21.94	22.31	21.94	1
		3	1	21.92	22.3	21.96	1
		3	3	21.93	22.29	21.92	1
		6	0	21.31	21.41	21.26	2
BW	Modulation	RB Size	RB Offset	Low CH 18615	Mid CH 18900	High CH 19185	3GPP MPR (dB)
				Frequency 1851.5 MHz	Frequency 1880 MHz	Frequency 1908.5 MHz	
3 MHz	QPSK	1	0	22.95	22.95	23.08	0
		1	7	22.95	23.01	23.01	0
		1	14	22.94	22.97	22.99	0
		8	0	22.09	21.99	22.08	1
		8	3	21.97	21.98	22.03	1
		8	7	21.94	22.06	21.95	1
		15	0	22.09	22.09	22.08	1
	16QAM	1	0	22.37	21.65	22.55	1
		1	7	22.39	21.64	22.59	1
		1	14	22.37	21.75	22.54	1
		8	0	21.26	21.31	21.38	2
		8	3	21.1	20.96	21	2
		8	7	21.08	21.05	21.01	2
		15	0	21.05	21.07	21.05	2

LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175	3GPP MPR (dB)
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz	
5 MHz	QPSK	1	0	22.96	23.22	23.06	0
		1	12	22.96	23.15	23.07	0
		1	24	22.9	23.19	23.07	0
		12	0	22.1	22.15	22.06	1
		12	6	22.12	22.04	22.03	1
		12	13	22.06	21.95	21.98	1
		25	0	22.03	22	22.07	1
	16QAM	1	0	21.79	21.79	22.03	1
		1	12	21.78	21.81	22.03	1
		1	24	21.82	21.83	22.01	1
		12	0	21.16	21.1	21.11	2
		12	6	21.15	21.11	21.01	2
		12	13	21.15	21.12	21.05	2
		25	0	21.13	21.08	21.04	2
BW	Modulation	RB Size	RB Offset	Low CH 18650	Mid CH 18900	High CH 19150	3GPP MPR (dB)
				Frequency 1855 MHz	Frequency 1880 MHz	Frequency 1905 MHz	
10 MHz	QPSK	1	0	22.93	22.97	23.08	0
		1	24	22.93	22.99	23.07	0
		1	49	22.97	22.96	23.05	0
		25	0	21.93	21.96	22.05	1
		25	12	21.92	22.01	22.08	1
		25	25	21.89	22.05	22.06	1
		50	0	22.06	21.99	21.97	1
	16QAM	1	0	22.35	22.28	22.51	1
		1	24	22.37	22.33	22.45	1
		1	49	22.33	22.37	22.53	1
		25	0	21.2	21.21	21.37	2
		25	12	21.2	21.22	21.36	2
		25	25	21.23	21.14	21.33	2
		50	0	21.04	21.13	21.2	2

LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18675 Frequency 1857.5 MHz	Mid CH 18900 Frequency 1880 MHz	High CH 19125 Frequency 1902.5 MHz	3GPP MPR (dB)
15 MHz	QPSK	1	0	23	22.94	22.99	0
		1	37	22.96	22.98	23.02	0
		1	74	22.94	22.96	22.98	0
		36	0	22.1	21.96	21.97	1
		36	19	22.03	22.06	22.06	1
		36	39	22.01	21.95	22.09	1
		75	0	22.08	22.03	21.96	1
	16QAM	1	0	22.36	22.78	23.04	1
		1	37	22.32	22.73	22.95	1
		1	74	22.38	22.71	23.04	1
		36	0	21.16	21.17	21.15	2
		36	19	21.17	21.09	21.17	2
		36	39	21.12	21.2	21.21	2
		75	0	21.12	21.09	21.12	2
BW	Modulation	RB Size	RB Offset	Low CH 18700 Frequency 1860 MHz	Mid CH 18900 Frequency 1880 MHz	High CH 19100 Frequency 1900 MHz	3GPP MPR (dB)
20MHz	QPSK	1	0	23.06	23.2	23.06	0
		1	50	23.09	23.19	22.97	0
		1	99	23.08	**23.24**	23.03	0
		50	0	22	21.95	22.11	1
		50	25	21.96	22.02	22.12	1
		50	50	22.06	21.94	22.04	1
		100	0	22.07	21.93	21.96	1
	16QAM	1	0	22.03	22.17	22.07	1
		1	50	21.98	22.19	22.12	1
		1	99	22.01	22.2	22.09	1
		50	0	21.17	21.15	21.1	2
		50	25	21.17	21.11	21.13	2
		50	50	21.19	21.1	21.18	2
		100	0	22.07	21.93	22.08	2

EIRP POWER (dBm)

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18607	1850.7	23.1	1.5	24.6	288.4	2
18900	1880	23.09	1.5	24.59	287.74	2
19193	1909.3	23.13	1.5	24.63	290.4	2

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18607	1850.7	22.42	1.5	23.92	246.6	2
18900	1880	22.31	1.5	23.81	240.44	2
19193	1909.3	22.36	1.5	23.86	243.22	2

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18615	1851.5	22.95	1.5	24.45	278.61	2
18900	1880	23.01	1.5	24.51	282.49	2
19185	1908.5	23.08	1.5	24.58	287.08	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18615	1851.5	22.39	1.5	23.89	244.91	2
18900	1880	21.75	1.5	23.25	211.35	2
19185	1908.5	22.59	1.5	24.09	256.45	2

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18625	1852.5	22.96	1.5	24.46	279.25	2
18900	1880	23.22	1.5	24.72	296.48	2
19175	1907.5	23.07	1.5	24.57	286.42	2

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18625	1852.5	21.82	1.5	23.32	214.78	2
18900	1880	21.83	1.5	23.33	215.28	2
19175	1907.5	22.03	1.5	23.53	225.42	2

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18650	1855	22.97	1.5	24.47	279.9	2
18900	1880	22.99	1.5	24.49	281.19	2
19150	1905	23.08	1.5	24.58	287.08	2

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18650	1855	22.37	1.5	23.87	243.78	2
18900	1880	22.37	1.5	23.87	243.78	2
19150	1905	22.53	1.5	24.03	252.93	2

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18675	1857.5	23	1.5	24.5	281.84	2
18900	1880	22.98	1.5	24.48	280.54	2
19125	1902.5	23.02	1.5	24.52	283.14	2

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18675	1857.5	22.38	1.5	23.88	244.34	2
18900	1880	22.78	1.5	24.28	267.92	2
19125	1902.5	23.04	1.5	24.54	284.45	2

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18700	1860	23.09	1.5	24.59	287.74	2
18900	1880	23.24	1.5	24.74	297.85	2
19100	1900	23.06	1.5	24.56	285.76	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18700	1860	22.07	1.5	23.57	227.51	2
18900	1880	22.2	1.5	23.7	234.42	2
19100	1900	22.12	1.5	23.62	230.14	2

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
: 2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.2.2 TEST PROCEDURE

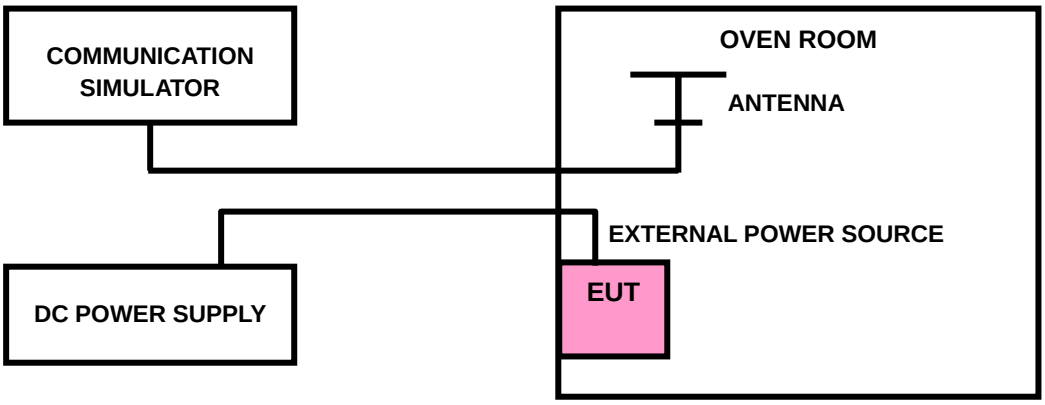
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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 ±0.5℃ 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 2

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.1003	0.1012	2.5
3.55(BEP)	0.1124	0.0914	2.5
4.35	0.1177	0.0904	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.55Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	0.1151	0.1013	2.5
-20	0.1291	0.1127	2.5
-10	0.129	0.1101	2.5
0	0.1235	0.1228	2.5
10	0.1352	0.1122	2.5
20	0.1224	0.0978	2.5
30	0.1286	0.1003	2.5
40	0.1401	0.0991	2.5
50	0.1412	0.1141	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0985	0.1115	2.5
3.55(BEP)	0.0928	0.1006	2.5
4.35	0.1021	0.1114	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.55Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	0.0814	0.0921	2.5
-20	0.0826	0.1019	2.5
-10	0.08	0.0891	2.5
0	0.0804	0.0828	2.5
10	0.0867	0.0679	2.5
20	0.092	0.0611	2.5
30	0.0821	0.0704	2.5
40	0.0707	0.0829	2.5
50	0.074	0.0892	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.1048	0.096	2.5
3.55(BEP)	0.117	0.0899	2.5
4.35	0.1128	0.0798	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.55Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	0.1125	0.0923	2.5
-20	0.1263	0.1025	2.5
-10	0.1364	0.1008	2.5
0	0.1467	0.1032	2.5
10	0.1351	0.1058	2.5
20	0.1204	0.1016	2.5
30	0.1176	0.1146	2.5
40	0.1276	0.1121	2.5
50	0.1426	0.1036	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0975	0.1048	2.5
3.55(BEP)	0.0894	0.099	2.5
4.35	0.0812	0.1106	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.55Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	0.1042	0.0857	2.5
-20	0.0913	0.0877	2.5
-10	0.0986	0.0761	2.5
0	0.1126	0.0898	2.5
10	0.0996	0.1032	2.5
20	0.1079	0.0938	2.5
30	0.0942	0.1003	2.5
40	0.0823	0.09	2.5
50	0.0726	0.0845	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.1067	0.1057	2.5
3.55(BEP)	0.1213	0.1078	2.5
4.35	0.118	0.1001	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.55Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	0.1069	0.1019	2.5
-20	0.1167	0.0954	2.5
-10	0.1162	0.0941	2.5
0	0.1172	0.0913	2.5
10	0.1207	0.1033	2.5
20	0.1344	0.09	2.5
30	0.1302	0.0951	2.5
40	0.1314	0.11	2.5
50	0.1353	0.1001	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.1098	0.0987	2.5
3.55(BEP)	0.1213	0.0983	2.5
4.35	0.1213	0.0942	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.55Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

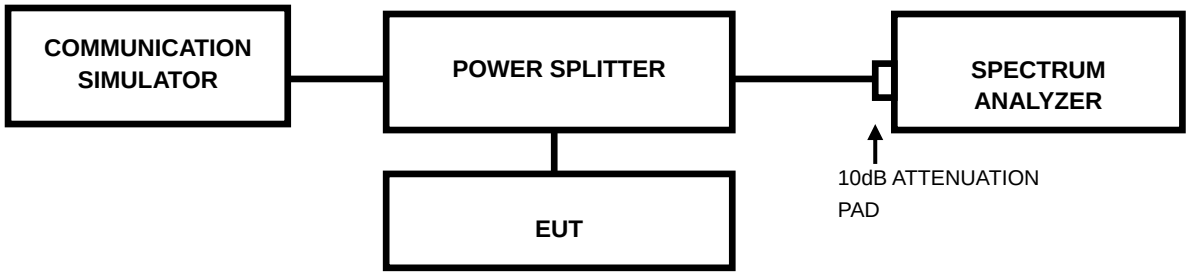
TEMP. (℃)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	0.1343	0.0878	2.5
-20	0.1267	0.0795	2.5
-10	0.1176	0.0779	2.5
0	0.1094	0.0912	2.5
10	0.1041	0.0904	2.5
20	0.1005	0.0899	2.5
30	0.086	0.0807	2.5
40	0.0847	0.0695	2.5
50	0.0713	0.0649	2.5

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.2 TEST SETUP

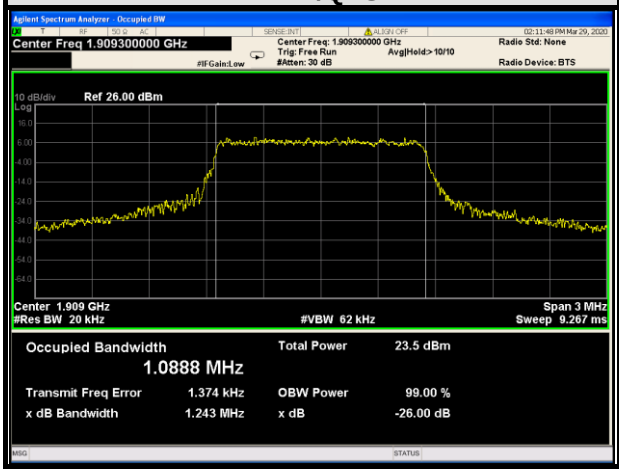


3.3.3 TEST RESULTS

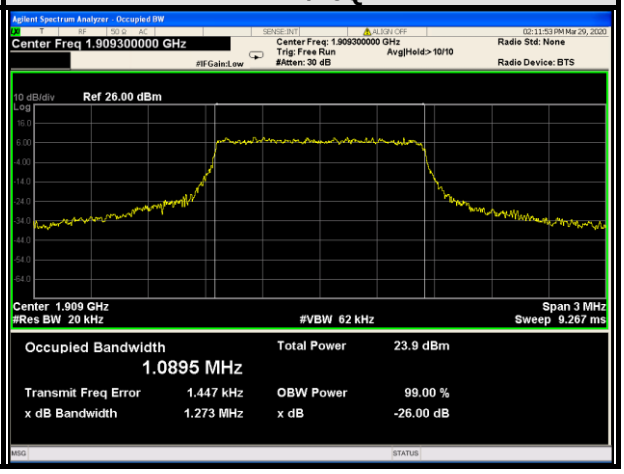
LTE band 2							
Channel Bandwidth : 1.4MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.0852	1.0824	18607	1850.7	1.270	1.238
18900	1880	1.0839	1.0836	18900	1880	1.266	1.261
19193	1909.3	1.0888	1.0895	19193	1909.3	1.243	1.273

SPECTRUM PLOT OF WORST VALUE

1.4MHz/QPSK



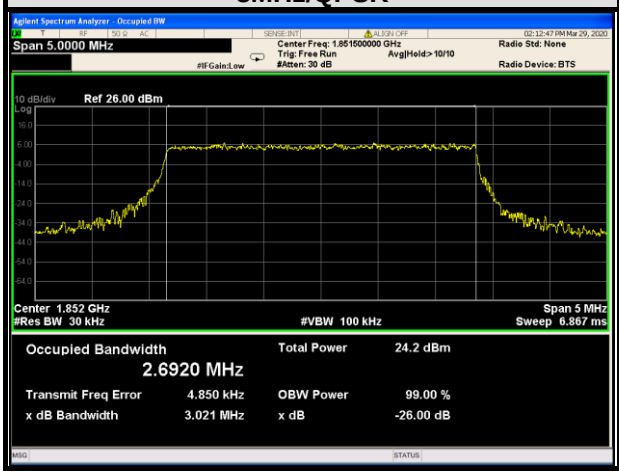
1.4MHz/16QAM



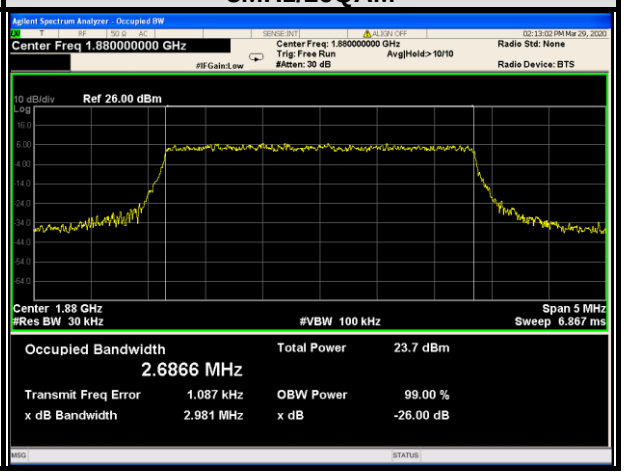
LTE band 2							
Channel Bandwidth : 3MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18615	1851.5	2.6920	2.6850	18615	1851.5	3.021	2.982
18900	1880	2.6877	2.6866	18900	1880	2.992	2.981
19185	1908.5	2.6871	2.6820	19185	1908.5	3.003	3.003

SPECTRUM PLOT OF WORST VALUE

3MHz/QPSK



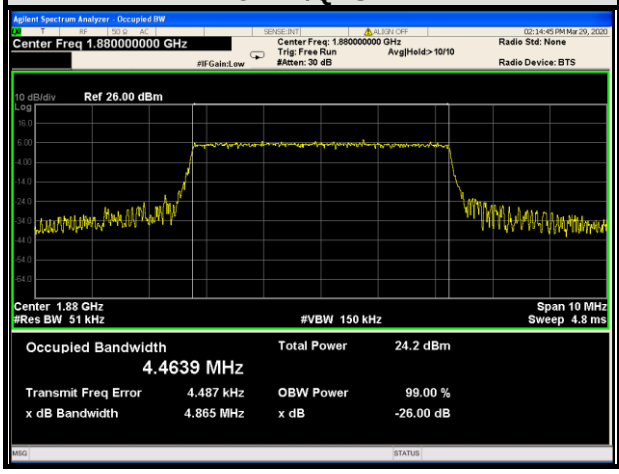
3MHz/16QAM



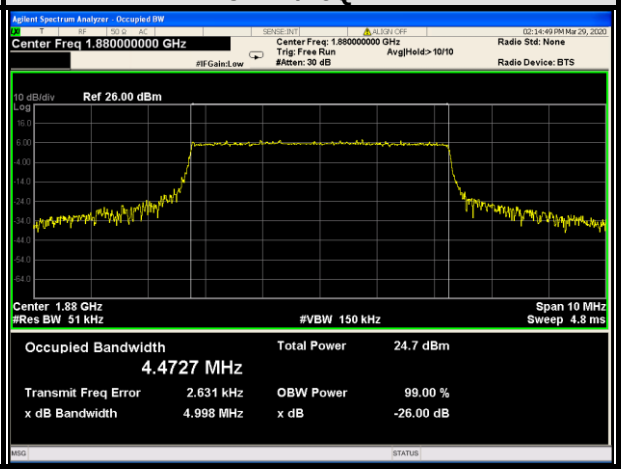
LTE band 2							
Channel Bandwidth : 5 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.4621	4.4622	18625	1852.5	4.961	4.965
18900	1880	4.4625	4.4668	18900	1880	5.076	5.075
19175	1907.5	4.4639	4.4727	19175	1907.5	4.865	4.998

SPECTRUM PLOT OF WORST VALUE

5MHz/QPSK



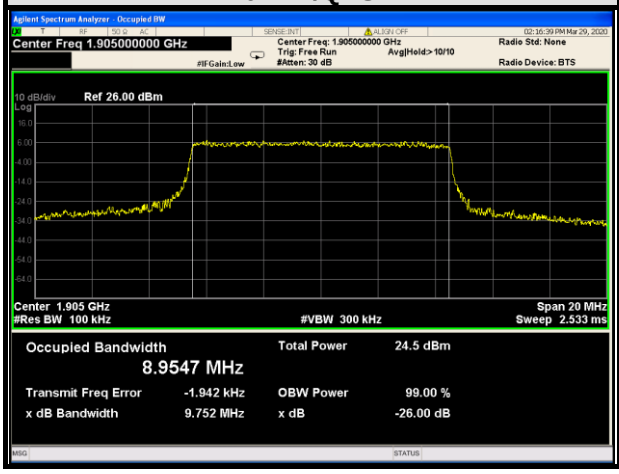
5MHz/16QAM



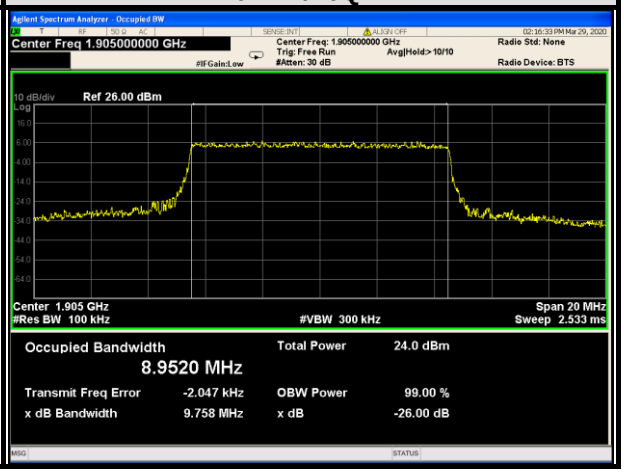
LTE band 2							
Channel Bandwidth : 10 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18650	1855	8.9410	8.9395	18650	1855	9.716	9.667
18900	1880	8.9397	8.9437	18900	1880	9.867	9.847
19150	1905	8.9547	8.9520	19150	1905	9.752	9.758

SPECTRUM PLOT OF WORST VALUE

10MHz/QPSK



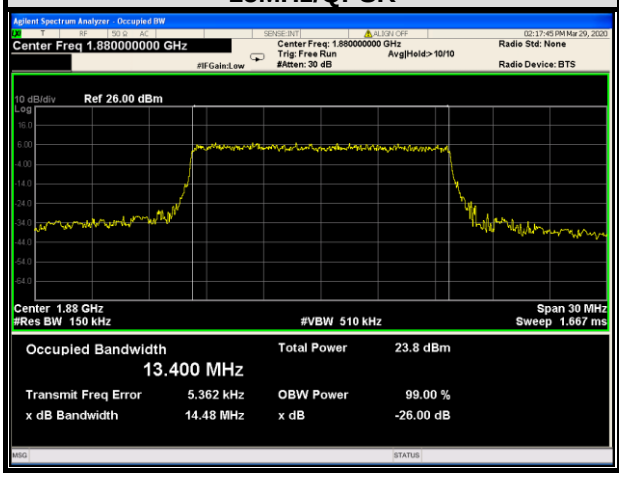
10MHz/16QAM



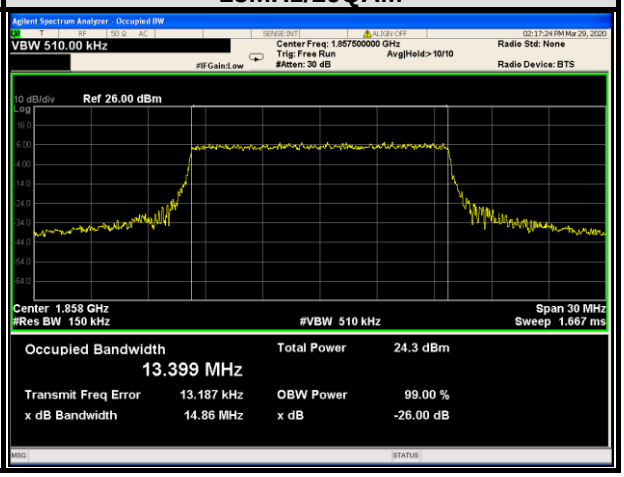
LTE band 2							
Channel Bandwidth : 15 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	13.398	13.399	18675	1857.5	14.86	14.86
18900	1880	13.400	13.397	18900	1880	14.48	14.76
19125	1902.5	13.386	13.387	19125	1902.5	14.52	14.98

SPECTRUM PLOT OF WORST VALUE

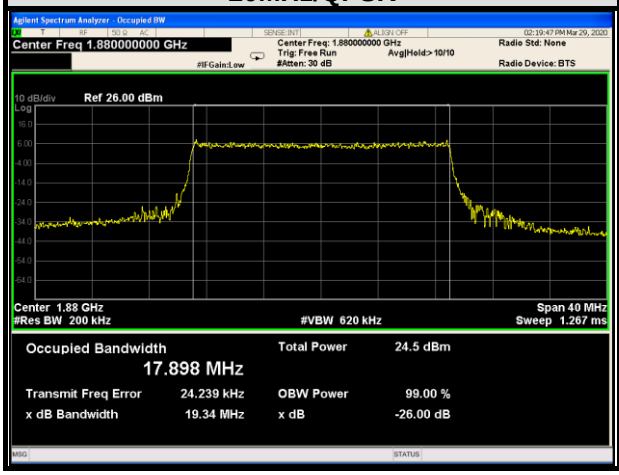
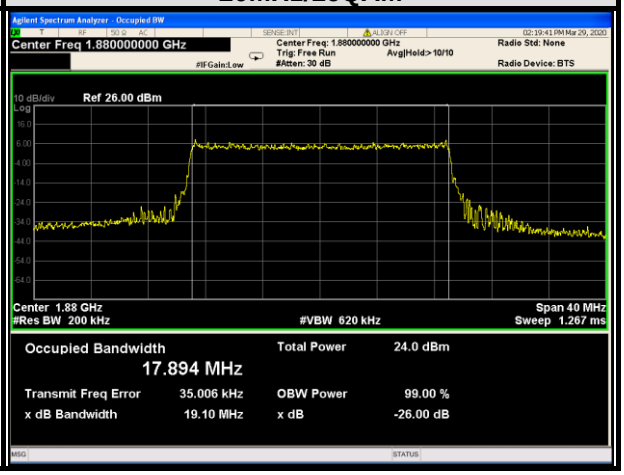
15MHz/QPSK



15MHz/16QAM



LTE band 2							
Channel Bandwidth : 20 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18700	1860	17.874	17.883	18700	1860	19.42	19.40
18900	1880	17.870	17.884	18900	1880	19.24	19.38
19100	1900	17.898	17.894	19100	1900	19.34	19.10

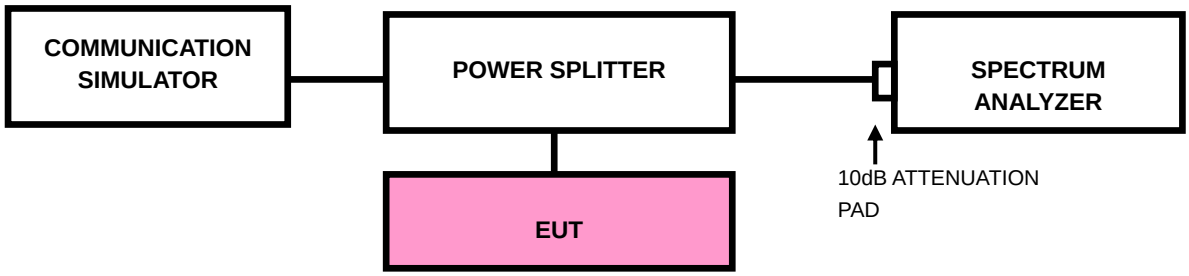
SPECTRUM PLOT OF WORST VALUE	
20MHz/QPSK	20MHz/16QAM
	

3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

a. All measurements were done at low and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and span is 1.5 MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/ EDGE).

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 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)

i. he 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)

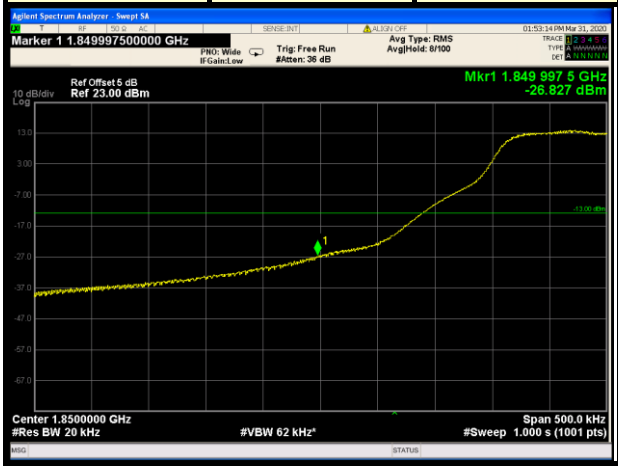
j. Record the max trace plot into the test report.

3.4.4. TEST RESULTS

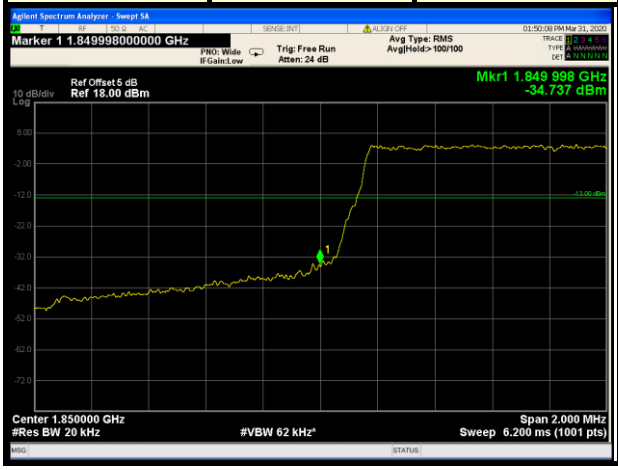
LTE BAND 2

Channel Bandwidth: 1.4MHz

CHANNEL	18607	1 RB	CHANNEL	19193	1 RB



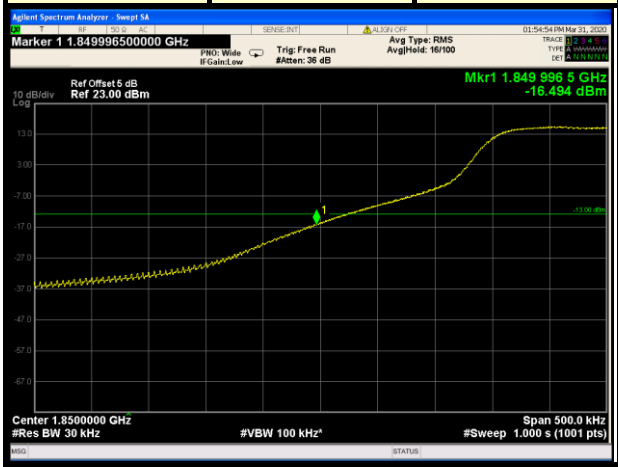
CHANNEL	18607	Full RB	CHANNEL	19193	Full RB

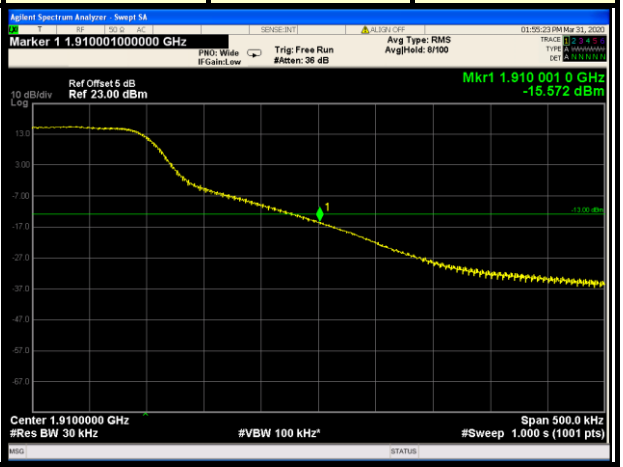


LTE BAND 2

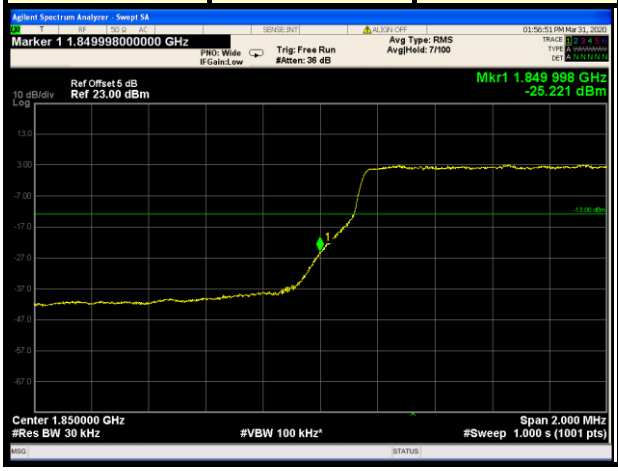
Channel Bandwidth: 3MHz

CHANNEL	18615	1 RB	CHANNEL	19185	1 RB





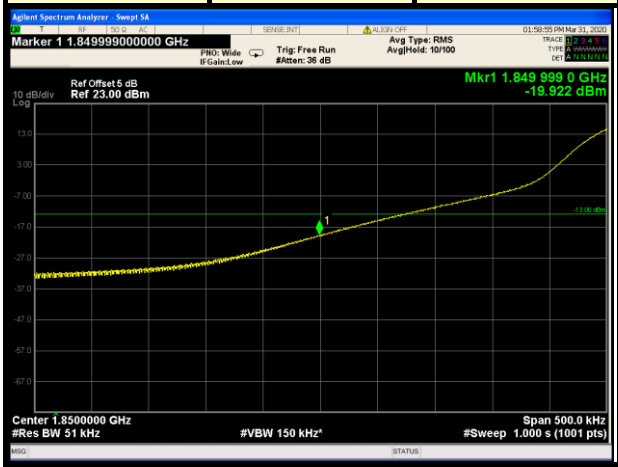
CHANNEL	18615	Full RB	CHANNEL	19185	Full RB



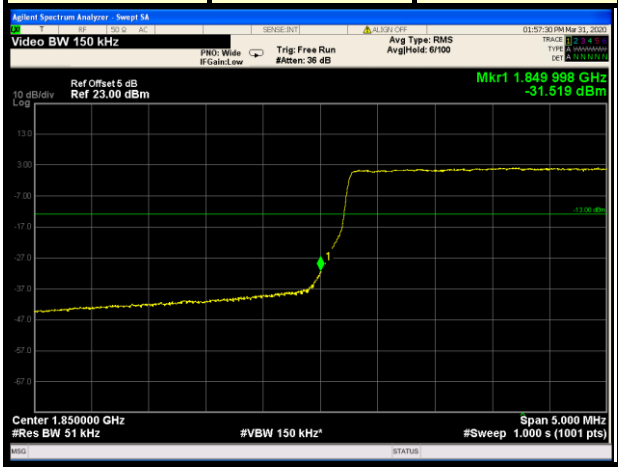
LTE BAND 2

Channel Bandwidth: 5MHz

CHANNEL	18625	1 RB	CHANNEL	19175	1 RB



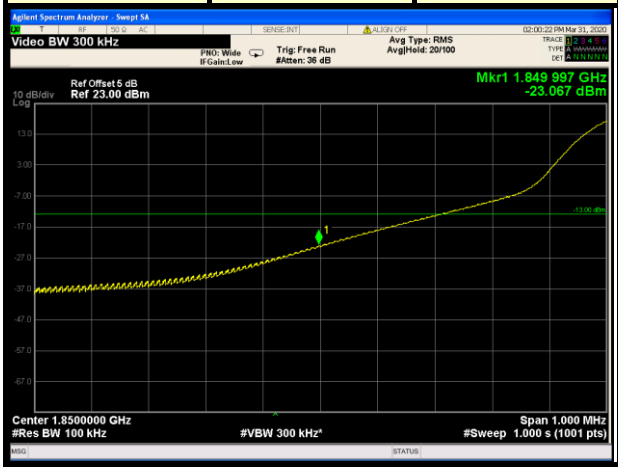
CHANNEL	18625	Full RB	CHANNEL	19175	Full RB

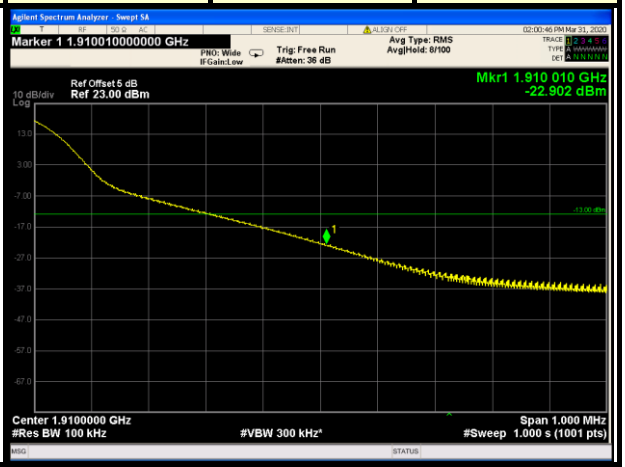


LTE BAND 2

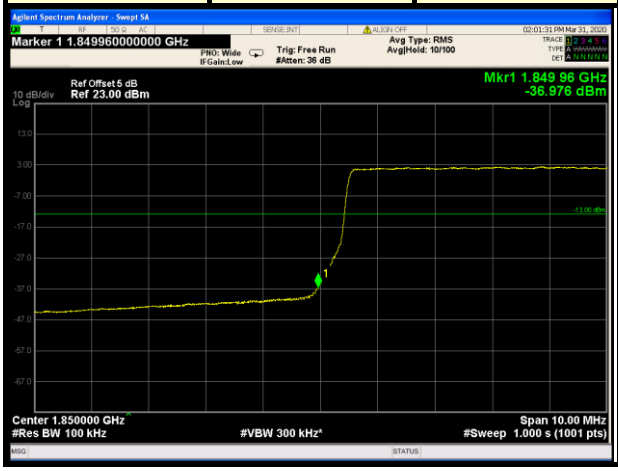
Channel Bandwidth: 10MHz

CHANNEL	18650	1 RB	CHANNEL	19150	1 RB





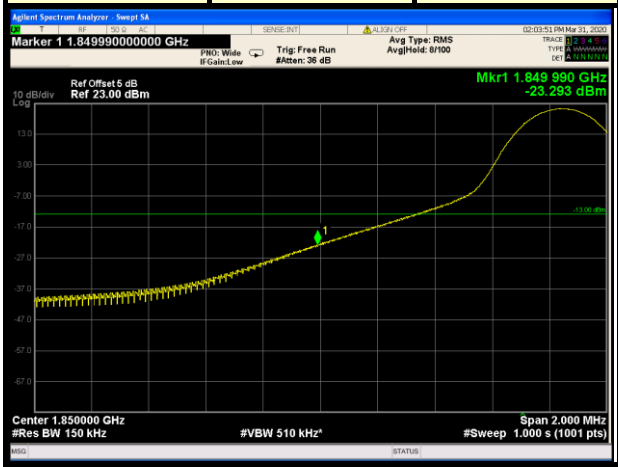
CHANNEL	18650	Full RB	CHANNEL	19150	Full RB



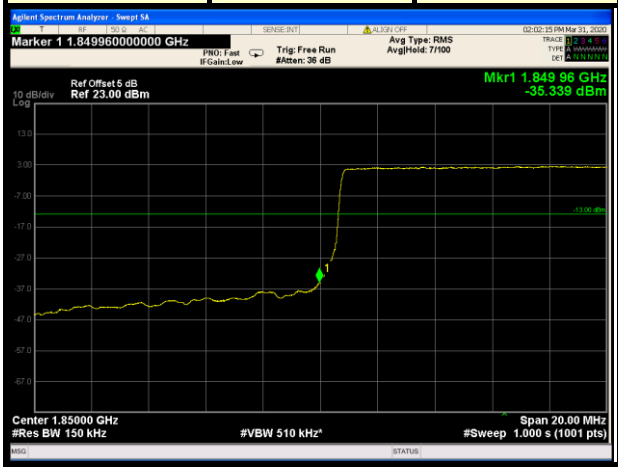
LTE BAND 2

Channel Bandwidth: 15MHz

CHANNEL	18675	1 RB	CHANNEL	19125	1 RB



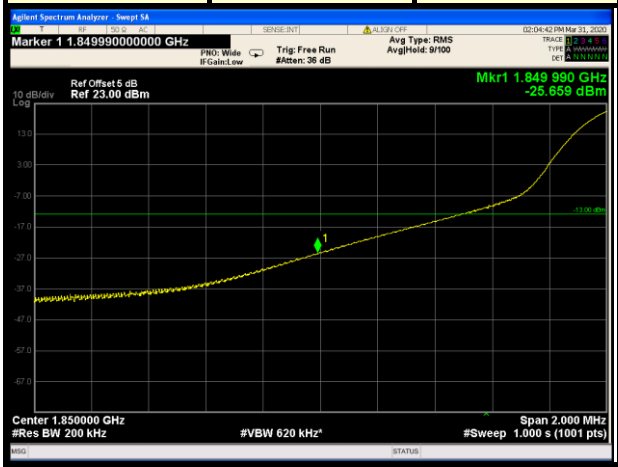
CHANNEL	18675	Full RB	CHANNEL	19125	Full RB

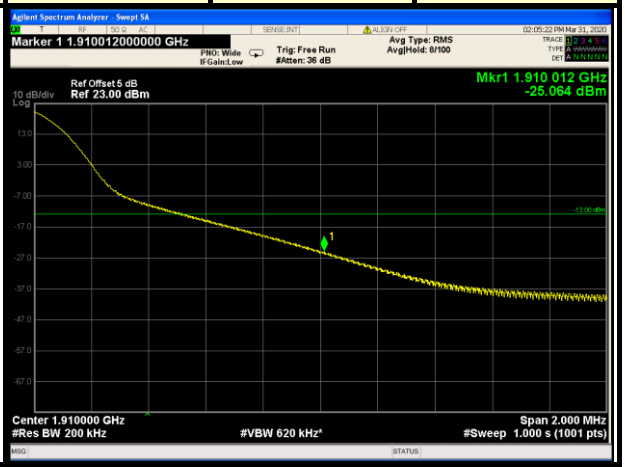


LTE BAND 2

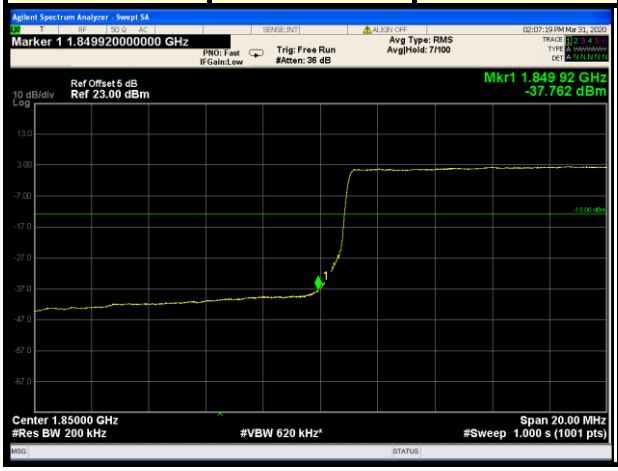
Channel Bandwidth: 20MHz

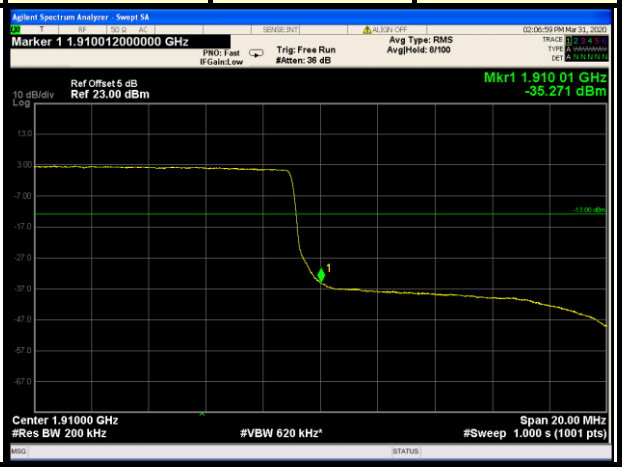
CHANNEL	18700	1 RB	CHANNEL	19100	1 RB





CHANNEL	18700	Full RB	CHANNEL	19100	Full RB





3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

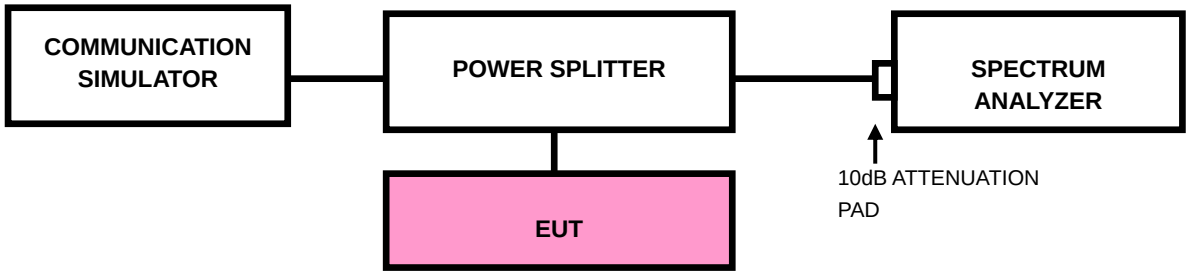
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

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 9 kHz to 19.1GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP



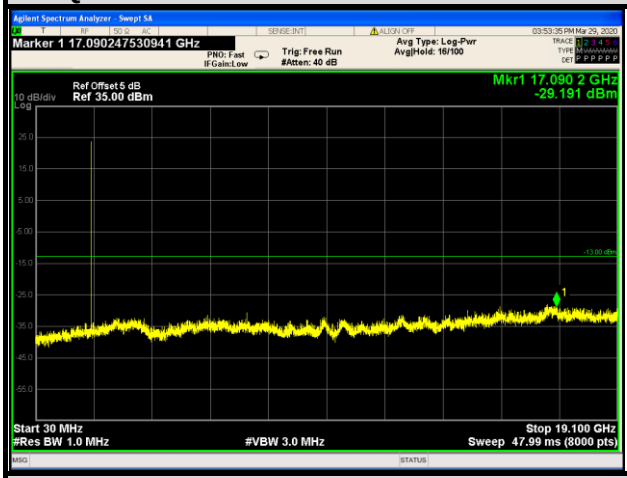
3.5.4 TEST RESULTS

LTE BAND 2

1.4MHz / QPSK

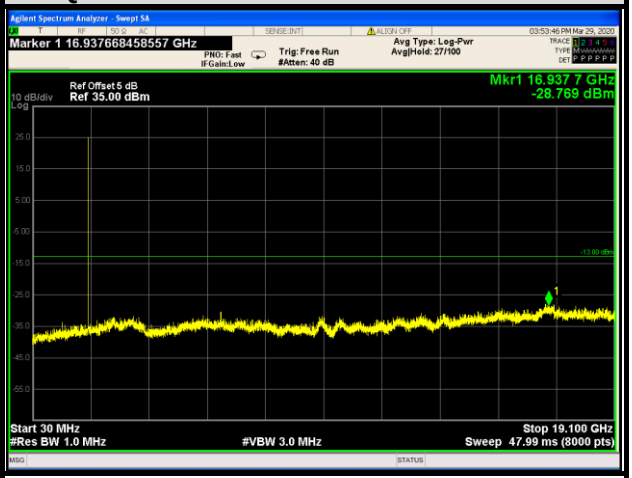
CHANNEL 18607

FREQUENCY RANGE : 30MHz~19.1GHz



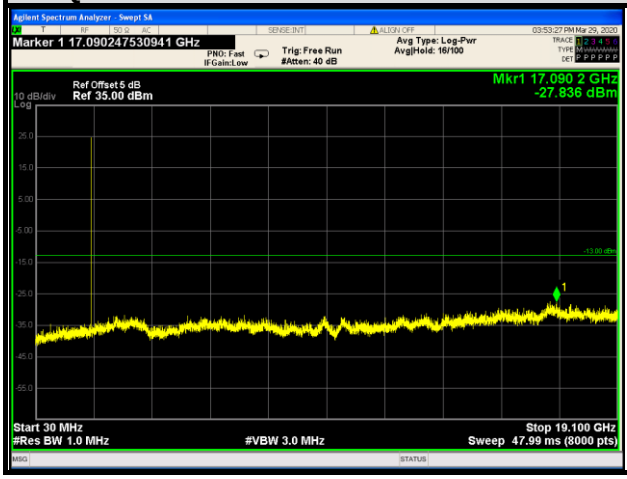
CHANNEL 18900

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 19193

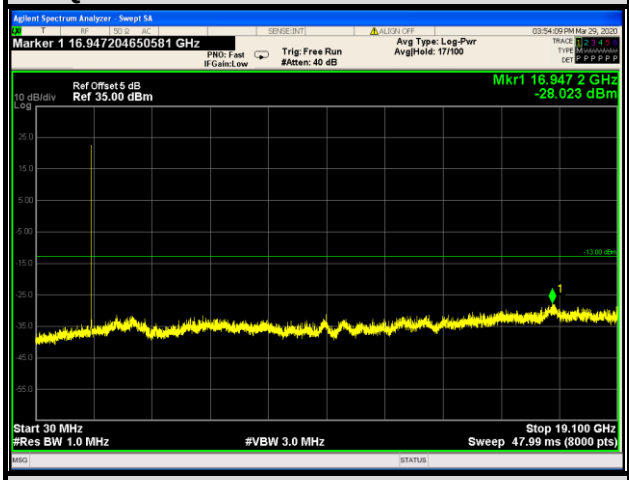
FREQUENCY RANGE : 30MHz~19.1GHz



3MHz / QPSK

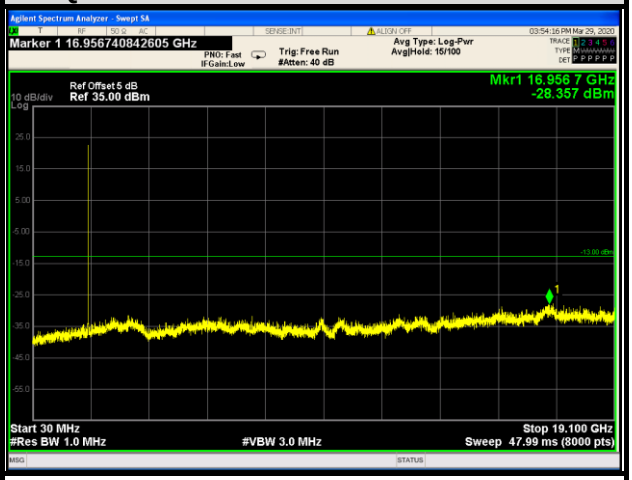
CHANNEL 18615

FREQUENCY RANGE : 30MHz~19.1GHz



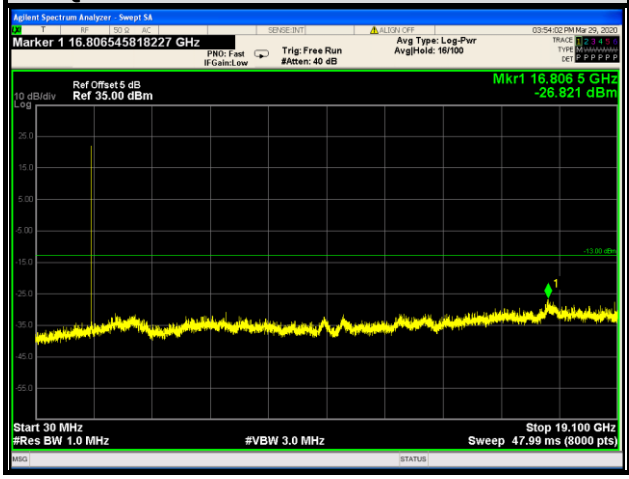
CHANNEL 18900

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 19185

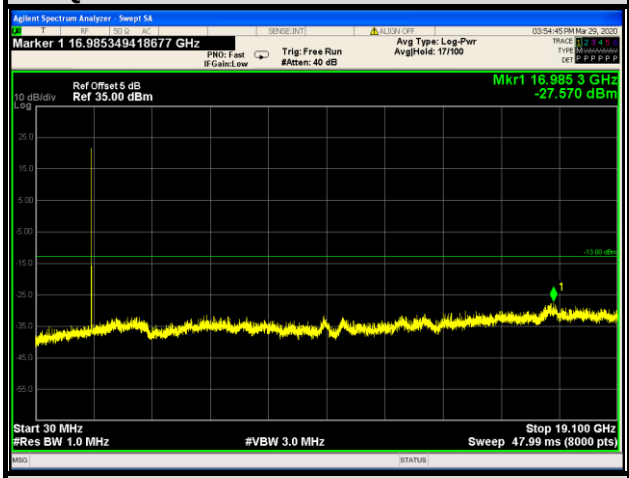
FREQUENCY RANGE : 30MHz~19.1GHz



5MHz / QPSK

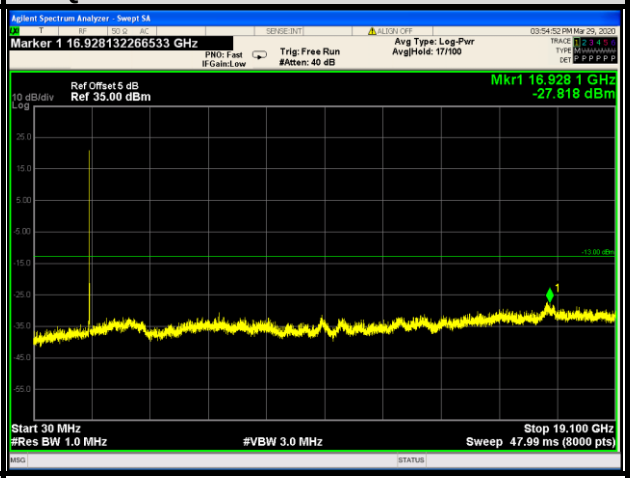
CHANNEL 18625

FREQUENCY RANGE : 30MHz~19.1GHz



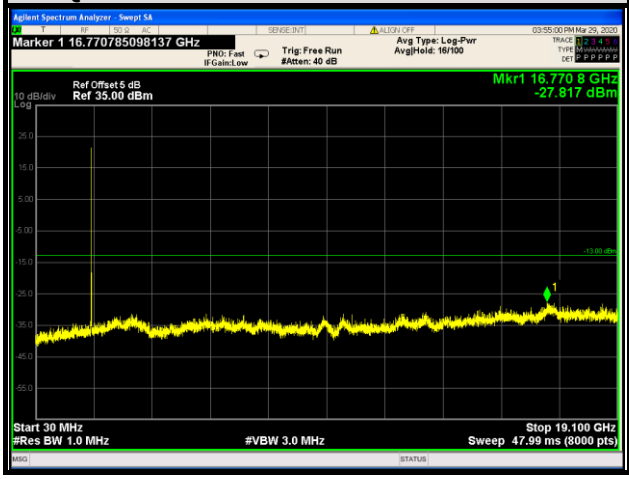
CHANNEL 18900

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 19175

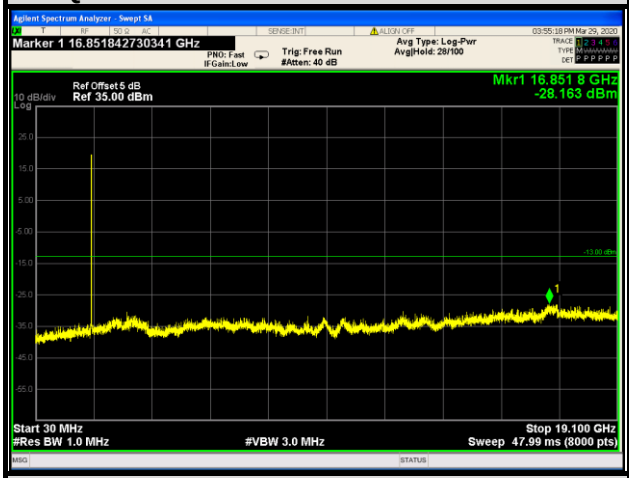
FREQUENCY RANGE : 30MHz~19.1GHz



10MHz / QPSK

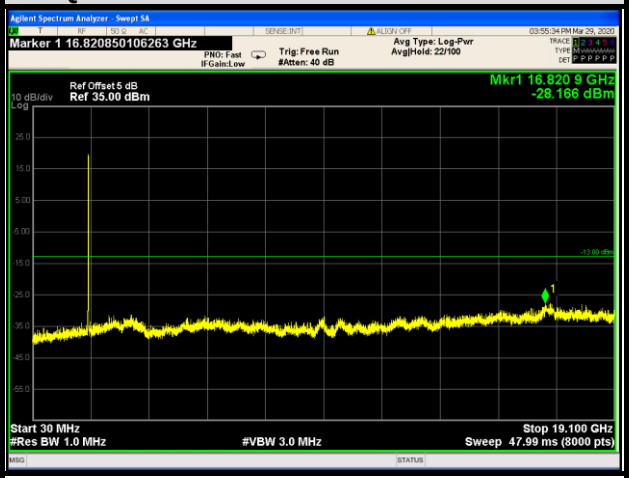
CHANNEL 18650

FREQUENCY RANGE : 30MHz~19.1GHz



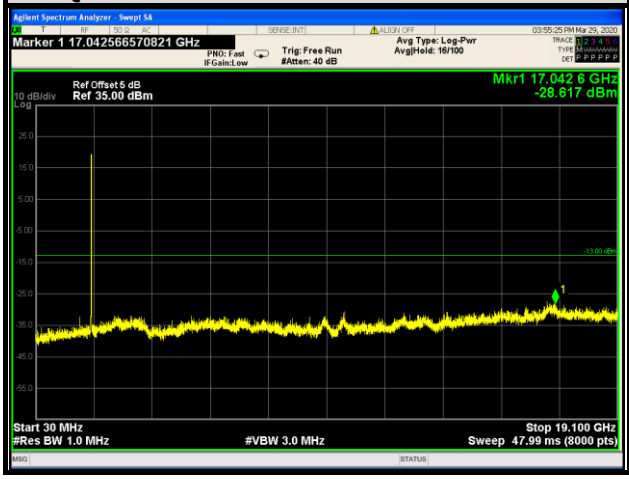
CHANNEL 18900

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 19150

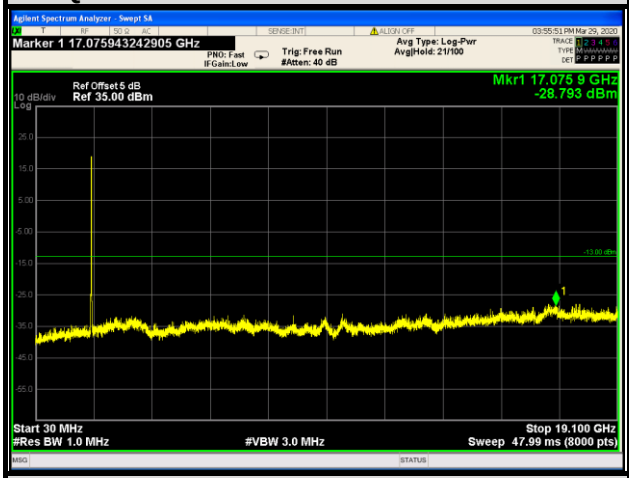
FREQUENCY RANGE : 30MHz~19.1GHz



15MHz / QPSK

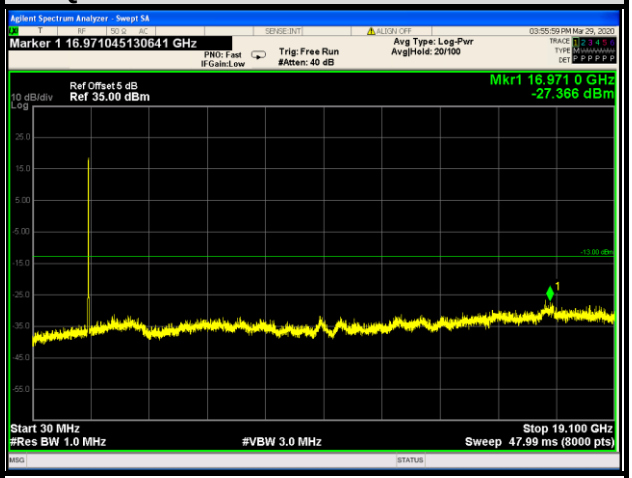
CHANNEL 18675

FREQUENCY RANGE : 30MHz~19.1GHz



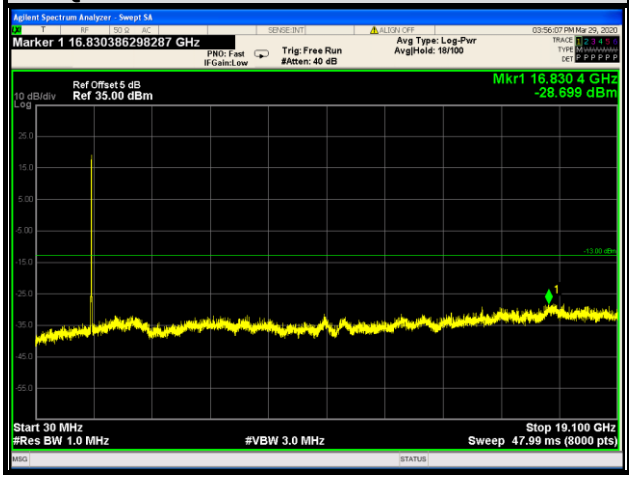
CHANNEL 18900

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 19125

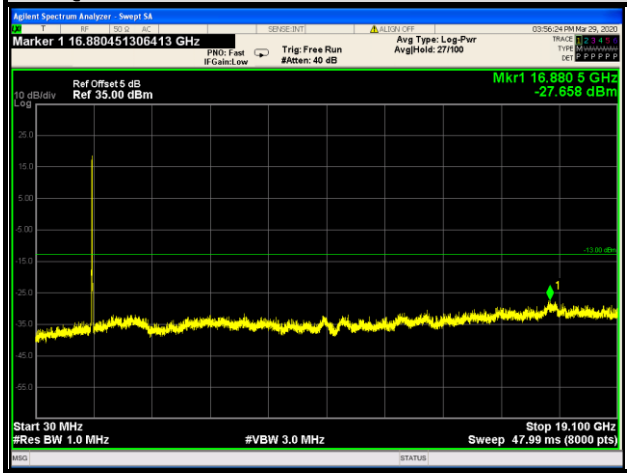
FREQUENCY RANGE : 30MHz~19.1GHz



20MHz / QPSK

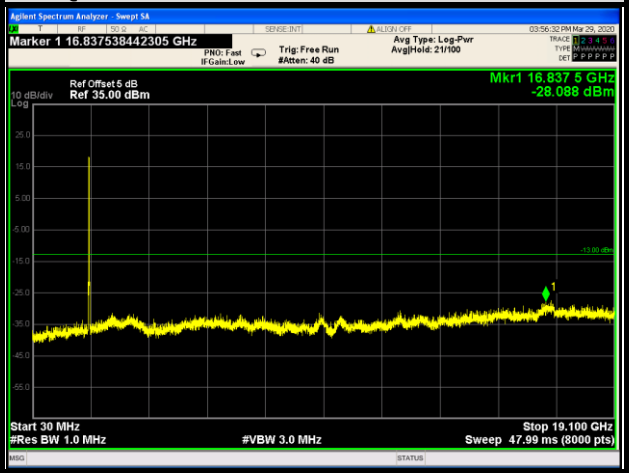
CHANNEL 18700

FREQUENCY RANGE : 30MHz~19.1GHz



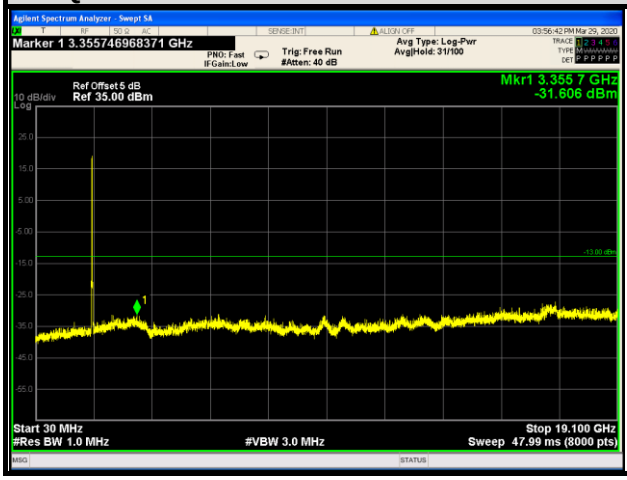
CHANNEL 18900

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 19100

FREQUENCY RANGE : 30MHz~19.1GHz



3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

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.

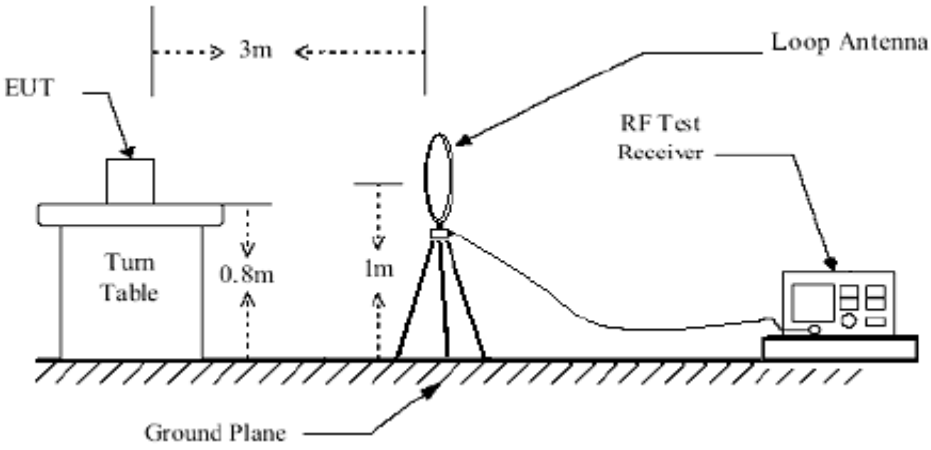
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

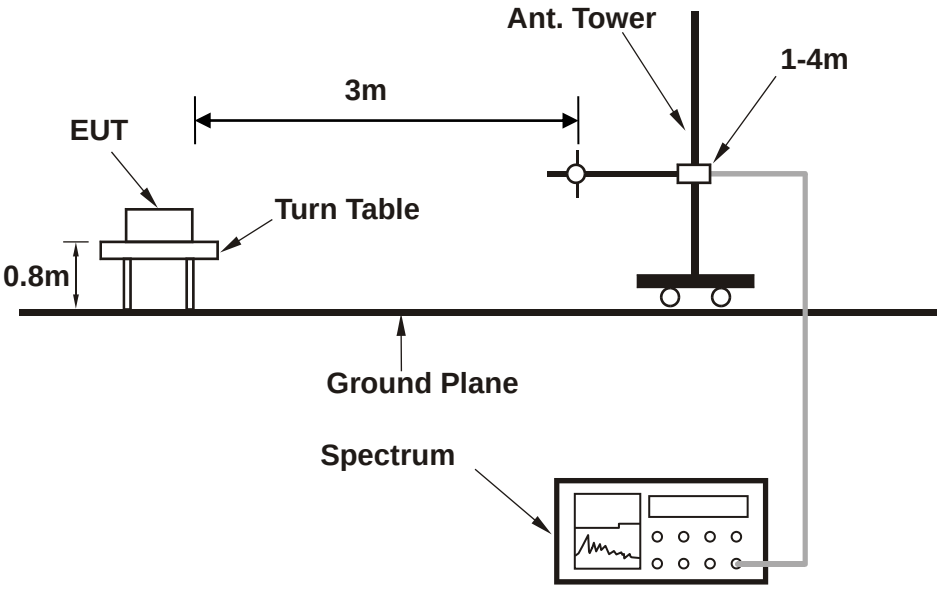
No deviation

3.6.4 TEST SETUP

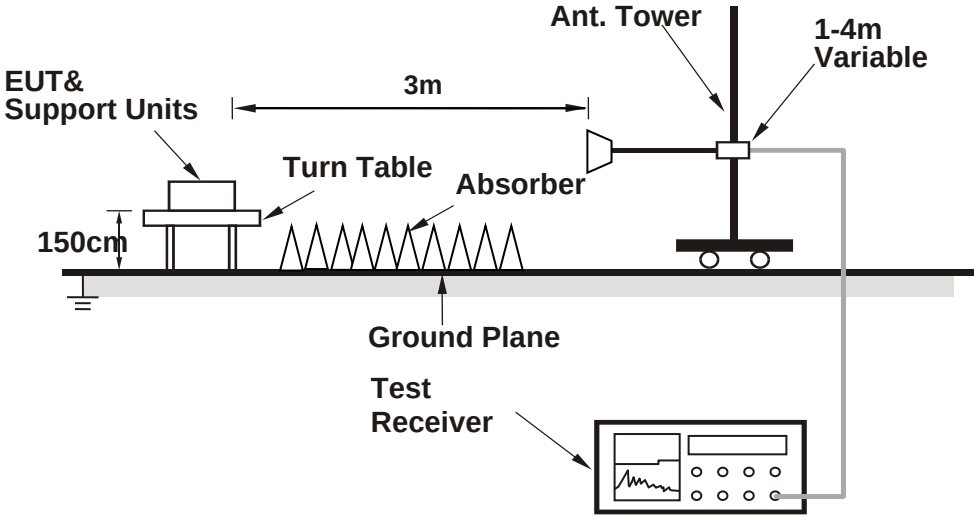
<Below 30MHz>



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.6.5 TEST RESULTS

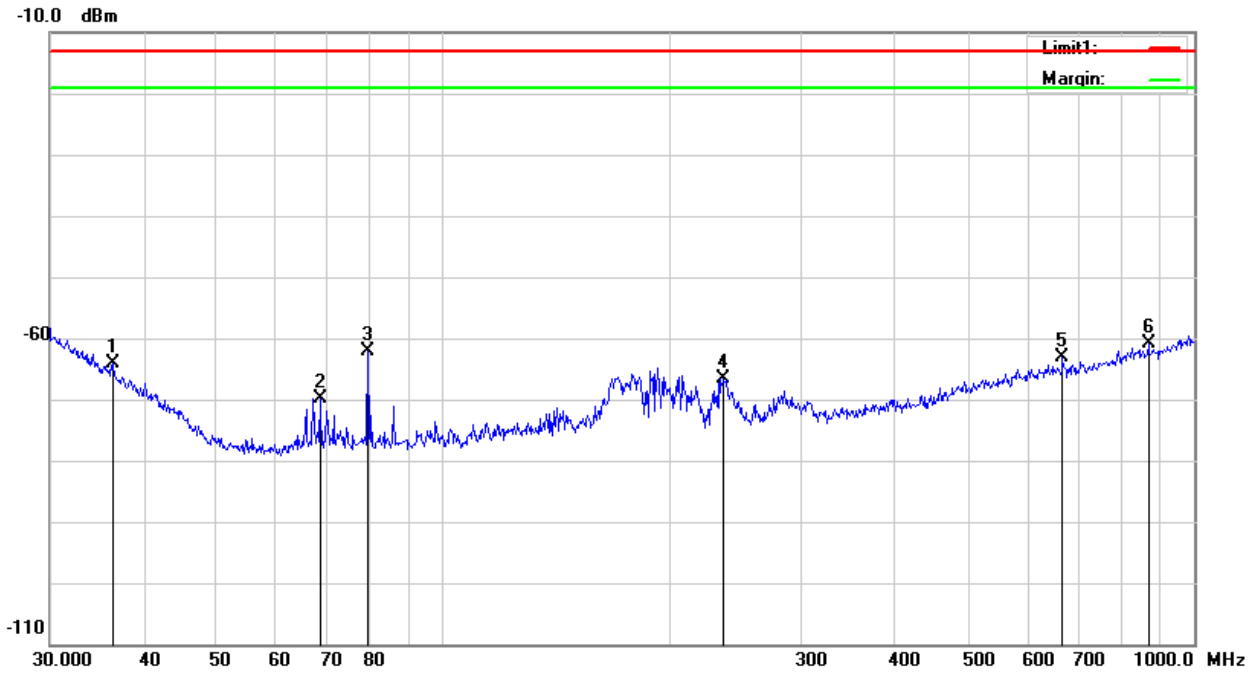
BELOW 1GHz WORST-CASE DATA

30 MHz – 1GHz data:

LTE Band 2

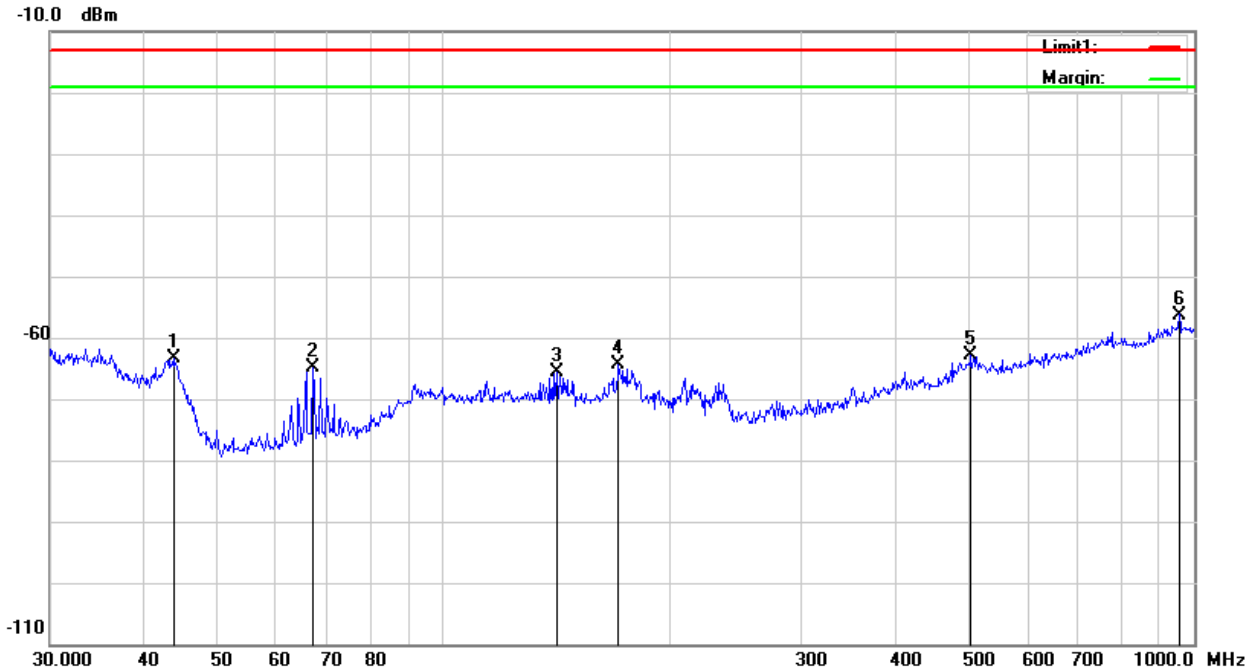
MODE	TX channel 18900	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Aaron Liang		

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	36.3814	H	-64.18	peak	-13	-51.18	-72.48	-8.3
2	68.631	H	-69.96	peak	-13	-56.96	-67.38	2.58
3	79.5209	H	-62.04	peak	-13	-49.04	-58.98	3.06
4	236.6447	H	-66.54	peak	-13	-53.54	-67.28	-0.74
5	668.1423	H	-63.08	peak	-13	-50.08	-71.39	-8.31
6	869.1302	H	-60.91	peak	-13	-47.91	-71.94	-11.03



MODE	TX channel 18900	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Aaron Liang		

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	43.8119	V	-63.48	peak	-13	-50.48	-61.35	2.13
2	67.2022	V	-64.97	peak	-13	-51.97	-63.09	1.88
3	141.8262	V	-65.69	peak	-13	-52.69	-70.68	-4.99
4	171.3926	V	-64.31	peak	-13	-51.31	-68.54	-4.23
5	504.7062	V	-62.93	peak	-13	-49.93	-72.7	-9.77
6	955.4381	V	-56.25	peak	-13	-43.25	-70.96	-14.71



ABOVE 1GHz

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

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

Low channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3701.4	V	-41.76	PK	-13	-28.76	-60.2	18.44
2	3701.4	H	-39.13	PK	-13	-26.13	-57.57	18.44
3	5552.1	V	-41.64	PK	-13	-28.64	-61.17	19.53
4	5552.1	H	-40.76	PK	-13	-27.76	-60.29	19.53

Middle channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3760	V	-42.22	PK	-13	-29.22	-60.66	18.44
2	3760	H	-39.18	PK	-13	-26.18	-57.62	18.44
3	5640	V	-40.85	PK	-13	-27.85	-62.88	22.03
4	5640	H	-40.11	PK	-13	-27.11	-62.14	22.03

High channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3818.6	V	-42	PK	-13	-29	-60.44	18.44
2	3818.6	H	-36.99	PK	-13	-23.99	-55.43	18.44
3	5727.9	V	-41.03	PK	-13	-28.03	-63.06	22.03
4	5727.9	H	-41.61	PK	-13	-28.61	-63.64	22.03

Note:

*1, The testing has been conformed to 10*1909.3MHz=19,093MHz*

2, All other emissions more than 30 dB below the limit

3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

LTE Band 2:

CHANNEL BANDWIDTH: 3MHz / QPSK

Low channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3703	V	-42.03	PK	-13	-29.03	-60.47	18.44
2	3703	H	-40.41	PK	-13	-27.41	-58.85	18.44
3	5554.5	V	-40.95	PK	-13	-27.95	-60.48	19.53
4	5554.5	H	-41.01	PK	-13	-28.01	-60.54	19.53

Middle channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3760	V	-40.29	PK	-13	-27.29	-58.73	18.44
2	3760	H	-39.23	PK	-13	-26.23	-57.67	18.44
3	5640	V	-40.98	PK	-13	-27.98	-63.01	22.03
4	5640	H	-41.51	PK	-13	-28.51	-63.54	22.03

High channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3817	V	-40.99	PK	-13	-27.99	-59.43	18.44
2	3817	H	-36.75	PK	-13	-23.75	-55.19	18.44
3	5725.5	V	-41.67	PK	-13	-28.67	-63.7	22.03
4	5725.5	H	-40.64	PK	-13	-27.64	-62.67	22.03

Note:

*1, The testing has been conformed to 10*1908.5 MHz=19,085MHz*

2, All other emissions more than 30 dB below the limit

3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

LTE Band 2:

CHANNEL BANDWIDTH: 5MHz / QPSK

Low channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3705	V	-41.78	PK	-13	-28.78	-60.22	18.44
2	3705	H	-40.71	PK	-13	-27.71	-59.15	18.44
3	5557.5	V	-41.48	PK	-13	-28.48	-61.01	19.53
4	5557.5	H	-43.28	PK	-13	-30.28	-62.81	19.53

Middle channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3760	V	-43.53	PK	-13	-30.53	-61.97	18.44
2	3760	H	-39.49	PK	-13	-26.49	-57.93	18.44
3	5640	V	-41.54	PK	-13	-28.54	-63.57	22.03
4	5640	H	-41.67	PK	-13	-28.67	-63.7	22.03

High channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3815	V	-41.9	PK	-13	-28.9	-60.34	18.44
2	3815	H	-35.92	PK	-13	-22.92	-54.36	18.44
3	5722.5	V	-40.11	PK	-13	-27.11	-62.14	22.03
4	5722.5	H	-39.58	PK	-13	-26.58	-61.61	22.03

Note:

*1, The testing has been conformed to 10*1907.5 MHz=19,075MHz*

2, All other emissions more than 30 dB below the limit

3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

LTE Band 2:

CHANNEL BANDWIDTH: 10MHz / QPSK

Low channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3710	V	-42.32	PK	-13	-29.32	-60.76	18.44
2	3710	H	-37.25	PK	-13	-24.25	-55.69	18.44
3	5565	V	-41.13	PK	-13	-28.13	-60.66	19.53
4	5565	H	-41.93	PK	-13	-28.93	-61.46	19.53

Middle channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3760	V	-43.91	PK	-13	-30.91	-62.35	18.44
2	3760	H	-39.77	PK	-13	-26.77	-58.21	18.44
3	5640	V	-41.44	PK	-13	-28.44	-63.47	22.03
4	5640	H	-41.85	PK	-13	-28.85	-63.88	22.03

High channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3810	V	-42.6	PK	-13	-29.6	-61.04	18.44
2	3810	H	-38.38	PK	-13	-25.38	-56.82	18.44
3	5715	V	-41.05	PK	-13	-28.05	-63.08	22.03
4	5715	H	-40.14	PK	-13	-27.14	-62.17	22.03

Note:

*1, The testing has been conformed to 10*1905MHz=19,050MHz*

2, All other emissions more than 30 dB below the limit

3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

LTE Band 2:

CHANNEL BANDWIDTH: 15MHz / QPSK

Low channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3715	V	-43.92	PK	-13	-30.92	-62.36	18.44
2	3715	H	-39.33	PK	-13	-26.33	-57.77	18.44
3	5572.5	V	-40.62	PK	-13	-27.62	-60.15	19.53
4	5572.5	H	-42.1	PK	-13	-29.1	-61.63	19.53

Middle channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3760	V	-43.23	PK	-13	-30.23	-61.67	18.44
2	3760	H	-37.74	PK	-13	-24.74	-56.18	18.44
3	5640	V	-41.08	PK	-13	-28.08	-63.11	22.03
4	5640	H	-41.13	PK	-13	-28.13	-63.16	22.03

High channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3805	V	-41.48	PK	-13	-28.48	-59.92	18.44
2	3805	H	-36.21	PK	-13	-23.21	-54.65	18.44
3	5707.5	V	-40.38	PK	-13	-27.38	-62.41	22.03
4	5707.5	H	-39.73	PK	-13	-26.73	-61.76	22.03

Note:

*1, The testing has been conformed to 10*1902.5MHz=19,025MHz*

2, All other emissions more than 30 dB below the limit

3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

LTE Band 2:

CHANNEL BANDWIDTH: 20MHz / QPSK

Low channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3720	V	-42.22	PK	-13	-29.22	-60.66	18.44
2	3720	H	-39.67	PK	-13	-26.67	-58.11	18.44
3	5580	V	-41.01	PK	-13	-28.01	-60.54	19.53
4	5580	H	-42.08	PK	-13	-29.08	-61.61	19.53

Middle channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3760	V	-42.38	PK	-13	-29.38	-60.82	18.44
2	3760	H	-39.46	PK	-13	-26.46	-57.9	18.44
3	5640	V	-41.88	PK	-13	-28.88	-63.91	22.03
4	5640	H	-41.34	PK	-13	-28.34	-63.37	22.03

High channel

NO.	FREQ. (MHz)	Antenna Polarization (H/V)	EMISSION LEVEL (dBm/m)	DETECTOR (PK/AV)	LIMIT (dBm/m)	MARGIN (dB)	RAW VALUE (dBm)	CORRECTION FACTOR (dB/m)
1	3800	V	-40.29	PK	-13	-27.29	-58.73	18.44
2	3800	H	-38.06	PK	-13	-25.06	-56.5	18.44
3	5700	V	-41.54	PK	-13	-28.54	-63.57	22.03
4	5700	H	-40.93	PK	-13	-27.93	-62.96	22.03

Note:

*1, The testing has been conformed to 10*1900MHz=19,000MHz*

2, All other emissions more than 30 dB below the limit

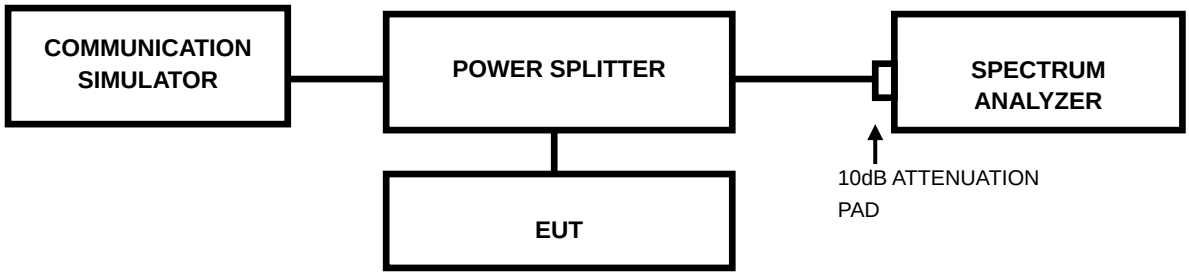
3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

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 ≥ 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%.

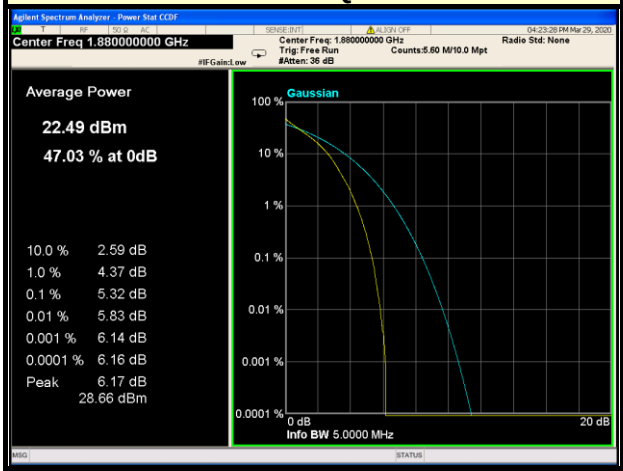
3.7.4 TEST RESULTS

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz				CHANNEL BANDWIDTH: 3MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	5.28	6.11	18615	1851.5	5.32	6.11
18900	1880	5.32	6.05	18900	1880	5.27	5.98
19193	1909.3	4.97	5.67	19185	1908.5	5.11	5.68

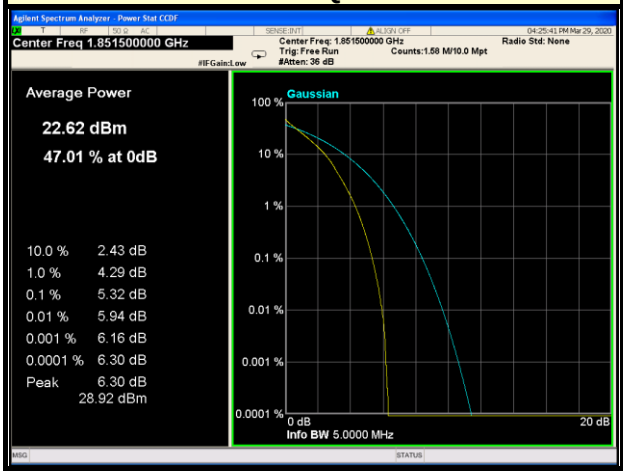
SPECTRUM PLOT OF WORST VALUE

1.4MHz / QPSK

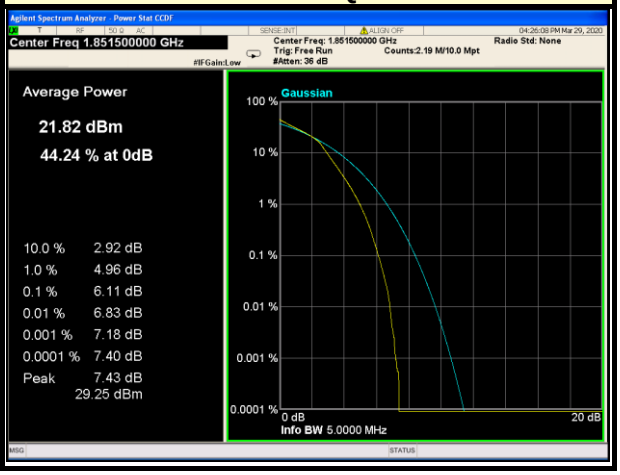


1.4MHz / 16QAM

3MHz / QPSK



3MHz / 16QAM



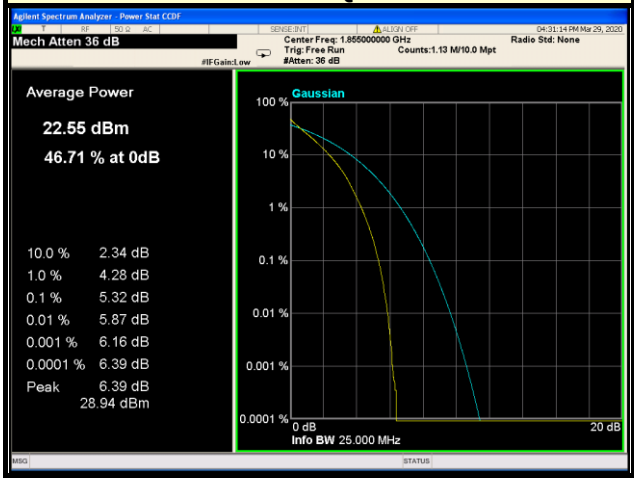
CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	5.47	6.12	18650	1855	5.32	6.09
18900	1880	5.36	5.97	18900	1880	5.22	6.04
19175	1907.5	5.18	5.71	19150	1905	5.07	5.75

SPECTRUM PLOT OF WORST VALUE

5MHz / QPSK

5MHz / 16QAM

10MHz / QPSK

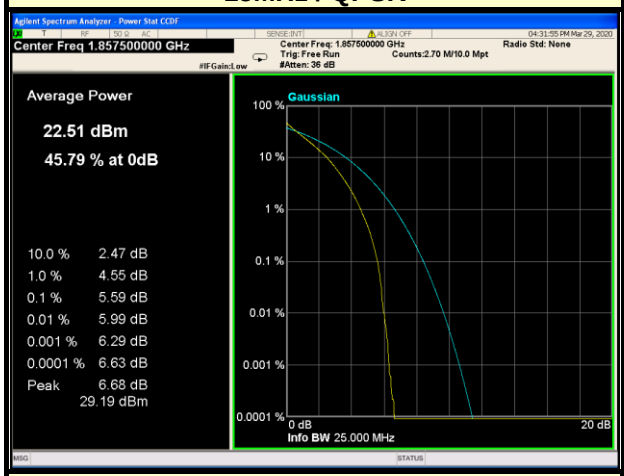


10MHz / 16QAM

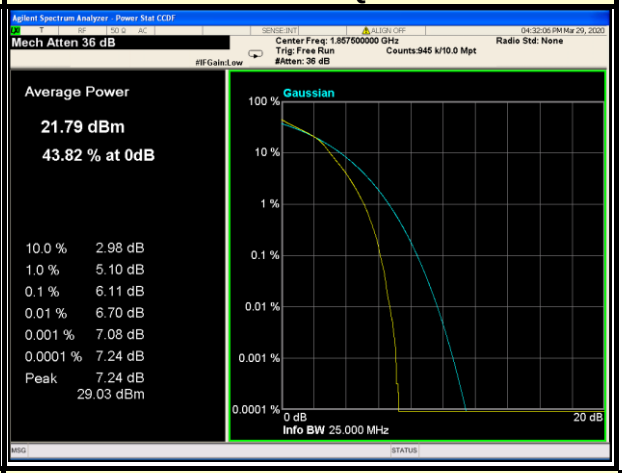
CHANNEL BANDWIDTH: 15MHz				CHANNEL BANDWIDTH: 20MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	5.59	6.11	18700	1860	5.53	6.08
18900	1880	5.53	5.96	18900	1880	5.44	6.01
19125	1902.5	5.36	5.70	19100	1900	5.24	5.68

SPECTRUM PLOT OF WORST VALUE

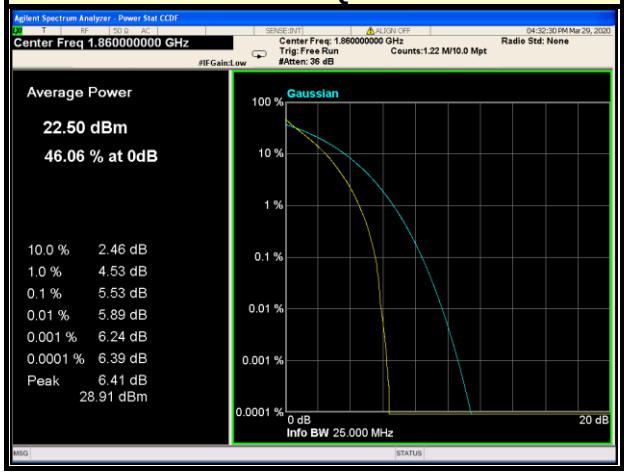
15MHz / QPSK



15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

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---