

FCC TEST REPORT

(PART 90)

Applicant:	PepperlFuchs SE
Address:	Lilienthalstrasse 200, 68307, Mannheim, Germany

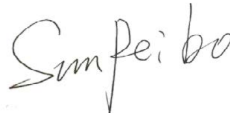
Manufacturer or Supplier	PepperlFuchs SE
Address	Lilienthalstrasse 200, 68307, Mannheim, Germany
Product	Smart-Ex 203
Brand Name	PEPPERL+FUCHS
Model Name	Smart-Ex 203
FCC ID	2AXZAS203GR01
Date of tests	Nov. 22, 2024 ~ Jul. 23, 2025

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

☒ **FCC Part 90, Subpart R, S**
☒ **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 Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
	
Date: Jul. 23, 2025	Date: Jul. 23, 2025

This report is governed by, and incorporates by reference, the Conditions of Testing 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. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. 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 your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



Table of Contents

1	SUMMARY OF TEST RESULTS	5
1.1	MEASUREMENT UNCERTAINTY	6
1.2	TEST SITE AND INSTRUMENTS	7
2	GENERAL INFORMATION	9
2.1	GENERAL DESCRIPTION OF EUT	9
2.2	CONFIGURATION OF SYSTEM UNDER TEST	12
2.3	DESCRIPTION OF SUPPORT UNITS	13
2.4	DESCRIPTION OF TEST MODES	14
2.5	GENERAL DESCRIPTION OF APPLIED STANDARDS	17
3	TEST TYPES AND RESULTS	18
3.1	OUTPUT POWER MEASUREMENT	18
3.1.1	LIMITS OF OUTPUT POWER MEASUREMENT	18
3.1.2	TEST PROCEDURES	18
3.1.3	TEST SETUP	19
3.1.4	TEST RESULTS	20
3.2	FREQUENCY STABILITY MEASUREMENT	28
3.2.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	28
3.2.2	TEST PROCEDURE	28
3.2.3	TEST SETUP	28
3.2.4	TEST RESULTS	29
3.3	OCCUPIED BANDWIDTH MEASUREMENT	30
3.3.1	LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT	30
3.3.2	TEST SETUP	30
3.3.3	TEST PROCEDURES	30
3.3.4	TEST RESULTS	30
3.4	EMISSION MASK MEASUREMENT	31
3.4.1	LIMITS OF EMISSION MASK MEASUREMENT	31
3.4.2	TEST SETUP	31
3.4.3	TEST PROCEDURES	32
3.4.4	TEST RESULTS	32
3.5	CONDUCTED SPURIOUS EMISSIONS	33
3.5.1	LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	33
3.5.2	TEST PROCEDURE	33
3.5.3	TEST SETUP	33
3.5.4	TEST RESULTS	34
3.6	RADIATED EMISSION MEASUREMENT	35
3.6.1	LIMITS OF RADIATED EMISSION MEASUREMENT	35
3.6.2	TEST PROCEDURES	35
3.6.3	DEVIATION FROM TEST STANDARD	35
3.6.4	TEST SETUP	36
3.6.5	TEST RESULTS	38
3.7	PEAK TO AVERAGE RATIO	60
3.7.1	LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT	60
3.7.2	TEST SETUP	60
3.7.3	TEST PROCEDURES	60
3.7.4	TEST RESULTS	60
4	INFORMATION ON THE TESTING LABORATORIES	61
5	MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	62
6	APPENDIX	63



LTE BAND 14	63
PEAK-TO-AVERAGE RATIO(CCDF).....	63
TEST RESULT	63
TEST GRAPHS	64
26DB BANDWIDTH AND OCCUPIED BANDWIDTH	70
TEST RESULT	70
TEST GRAPHS	70
BAND EDGE	74
TEST RESULT	74
TEST GRAPHS	75
CONDUCTED SPURIOUS EMISSION	80
TEST RESULT	80
TEST GRAPHS	81
FREQUENCY STABILITY	84
TEST RESULT	84
LTE BAND 26(814-824)	86
PEAK-TO-AVERAGE RATIO(CCDF).....	86
TEST RESULT	86
TEST GRAPHS	88
26DB BANDWIDTH AND OCCUPIED BANDWIDTH	104
TEST RESULT	104
TEST GRAPHS	106
BAND EDGE	113
TEST RESULT	113
TEST GRAPHS	116
CONDUCTED SPURIOUS EMISSION	127
TEST RESULT	127
TEST GRAPHS	128
FREQUENCY STABILITY	132
TEST RESULT	132



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-QSU2411180418RF05	Original release	Jul. 23, 2025



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 90 & Part 2		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
§2.1046 §90.635(b)	Conducted Output Power	PASS
§2.1055 §90.213	Frequency Stability	PASS
§2.1049 §90.209	Occupied Bandwidth	PASS
§2.1051 §90.691	Emission Masks	PASS
§2.1051 §90.691	Conducted Spurious Emissions	PASS
§2.1053 §90.691	Radiated Spurious Emissions	PASS

*Test Lab Information Reference

Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province, China

Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

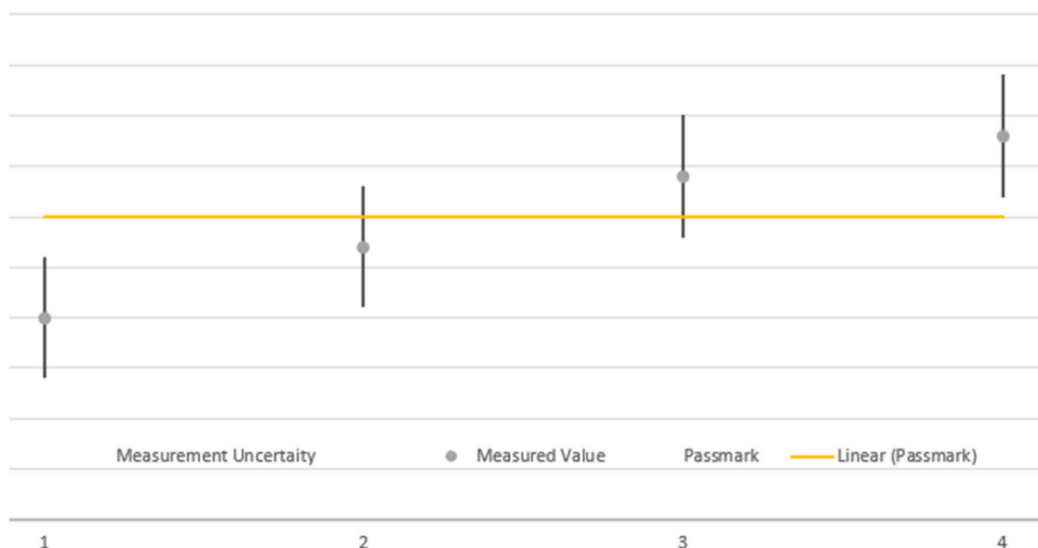


1.1 MEASUREMENT UNCERTAINTY

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	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.68dB
	30MHz ~ 1GHz	3.26dB
	1GHz ~ 18GHz	4.48dB
	18GHz ~ 40GHz	4.12dB

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



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

**1.2 TEST SITE AND INSTRUMENTS****#1**

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.29,24	Aug.28,26
Pre-Amplifier	R&S	SCU08F1	101028	Sep.15,24	Sep.14,26
Vector Signal Generator	R&S	SMBV100B	102176	Feb.15,24	Feb.14,26
Signal Generator	R&S	SMB100A	182185	Feb.15,24	Feb.14,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Feb.24,24	Feb.23,26
EMI TEST Receiver	R&S	ESW44	101973	Feb.24,24	Feb.23,26
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.27,24	Feb.26,26
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.21,24	Aug.20,26
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.22,24	Feb.21,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.21,24	Aug.20,26
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.26,24	Jun.25,26
Test Software	EMC32	EMC32	N/A	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Sep.30,24	Sep.29,26
DC Source	HYELEC	HY3010B	551016	Aug.30,24	Aug.29,26
Hygrothermograph	DELI	20210528	SZ014	Sep.05,24	Sep.04,26
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Oct.25,24	Apr.24,25
CABLE	R&S	W13.02	N/A	Apr.24,25	Oct.23,25
CABLE	R&S	W12.14	N/A	Oct.25,24	Apr.24,25
CABLE	R&S	W12.14	N/A	Apr.24,25	Oct.23,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Oct.25,24	Apr.24,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.24,25	Oct.23,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Oct.25,24	Apr.24,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.24,25	Oct.23,25
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26

#2

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 19,24	Feb. 18,25
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 18,25	Feb. 17,26
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.13,24	May.12,25

Huarui 7layers High Technology
(Suzhou) Co., Ltd.

Tower N, Innovation Center, 88 Zuyi Road, High-tech
District, Suzhou City, Anhui Province, China

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BUREAU VERITAS Test Report No.: PSU-QSU2411180418RF07

EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.12,25	May.11,26
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.02,24	Sep.01,25
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 04,24	Mar. 03,25
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 03,25	Mar. 02,26
Horn Antenna	ETS-LINDGREN	3117	00168692	Mar. 04,24	Mar. 03,25
Horn Antenna	ETS-LINDGREN	3117	00168692	Mar. 03,25	Mar. 02,26
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40- K-SG/QMS- 00361	15433	Aug. 22, 24	Aug. 21, 25
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 13,24	Feb. 12,25
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 12,25	Feb. 11,26
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.10,24	May.09,25
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.09,25	May.08,26
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,24	May.09,25
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.09,25	May.08,26
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 19,24	Feb.18,25
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 18,25	Feb.17,26
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn- CT0001143- 1216	May. 18,23	May. 17,26
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	May. 05,24	May. 04,25
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	May. 04,25	May. 03,26
Power Meter	Anritsu	ML2495A	1506002	Feb. 20,24	Feb. 19,25
Power Meter	Anritsu	ML2495A	1506002	Feb. 19,25	Feb. 18,26
Power Sensor	Anritsu	MA2411B	1339352	May. 05,24	May. 04,25
Power Sensor	Anritsu	MA2411B	1339352	May. 04,25	May. 03,26
Temperature Chamber	ESPEC	SH-242	93000855	May. 10,24	May. 09,25
Temperature Chamber	ESPEC	SH-242	93000855	May. 09,25	May. 08,26
MXG Analog Microwave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 16,24	Feb. 15,25
MXG Analog Microwave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 15,25	Feb. 14,26
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.10,24	May.09,25
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.09,25	May.08,26
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 22,24	Aug. 21,25

NOTE:

1. The calibration interval of the above test instruments is 12/24/36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 434559; The Designation No. is CN1325.



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smart-Ex 203	
BRAND NAME	PEPPERL+FUCHS	
MODEL NAME	Smart-Ex 203	
NOMINAL VOLTAGE	5.4Vdc (adapter or host equipment) 3.8Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	LTE	QPSK, 16QAM, 64QAM, 256QAM
FREQUENCY RANGE	LTE Band 14 Channel Bandwidth: 5MHz	790.5MHz ~ 795.5MHz
	LTE Band 14 Channel Bandwidth: 10MHz	793MHz
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	814.7MHz ~ 823.3MHz
	LTE Band 26 (Channel Bandwidth: 3MHz)	815.5MHz ~ 822.5MHz
	LTE Band 26 (Channel Bandwidth: 5MHz)	816.5MHz ~ 821.5MHz
	LTE Band 26 (Channel Bandwidth: 10MHz)	819MHz
EMISSION DESIGNATOR	LTE Band 14 Channel Bandwidth: 5MHz	QPSK: 4M53G7D
		16QAM: 4M53W7D
		64QAM: 4M53W7D
		256QAM: 4M53W7D
	LTE Band 14 Channel Bandwidth: 10MHz	QPSK: 9M01G7D
		16QAM: 9M01W7D
		64QAM: 9M04W7D
		256QAM: 9M00W7D
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	QPSK: 1M10G7D
		16QAM: 1M11W7D
		64QAM: 1M10W7D
		256QAM: 1M10W7D
	LTE Band 26 (Channel Bandwidth: 3MHz)	QPSK: 2M70G7D
		16QAM: 2M70W7D
		64QAM: 2M70W7D
		256QAM: 2M71W7D
	LTE Band 26 (Channel Bandwidth: 5MHz)	QPSK: 4M52G7D
		16QAM: 4M53W7D
		64QAM: 4M52W7D
		256QAM: 4M53W7D
	LTE Band 26 (Channel Bandwidth: 10MHz)	QPSK: 8M99G7D
		16QAM: 9M00W7D



		64QAM: 8M99W7D
		256QAM: 9M00W7D
MAX. EIRP POWER	LTE Band 14 Channel Bandwidth: 5MHz	66.53mW
	LTE Band 14 Channel Bandwidth: 10MHz	67.61mW
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	74.30mW
	LTE Band 26 (Channel Bandwidth: 3MHz)	73.79mW
	LTE Band 26 (Channel Bandwidth: 5MHz)	74.13mW
	LTE Band 26 (Channel Bandwidth: 10MHz)	74.64mW
ANTENNA GAIN	B14	Ant0 -3.11dBi
		Ant2 -1.36dBi
	B26	Ant0 -2.16dBi
		Ant2 -0.68dBi
ANTENNA TYPE	PIFA	
HW VERSION	DVT2	
SW VERSION	S203.14.00.00.056.4_USERDEBUG	
I/O PORTS	Refer to user's manual	
DATA CABLE	USB cable: non-shielded cable, with w/o ferrite core, 1.2 meter	
EXTREME TEMPERATURE	-20°C-55°C	
EXTREME VOLTAGE	3.4V-4.35V	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receivers.

MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

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



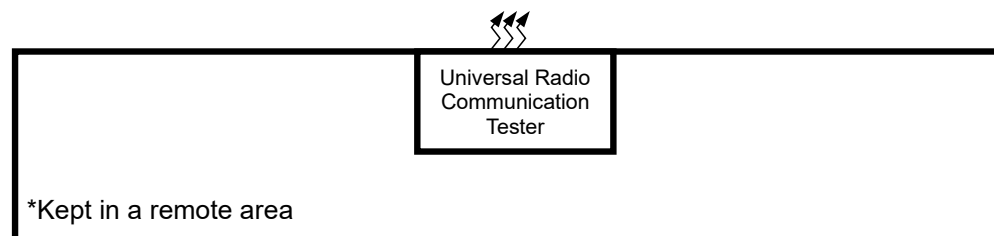
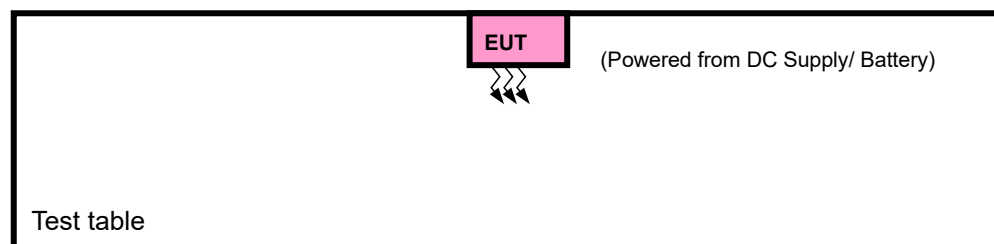
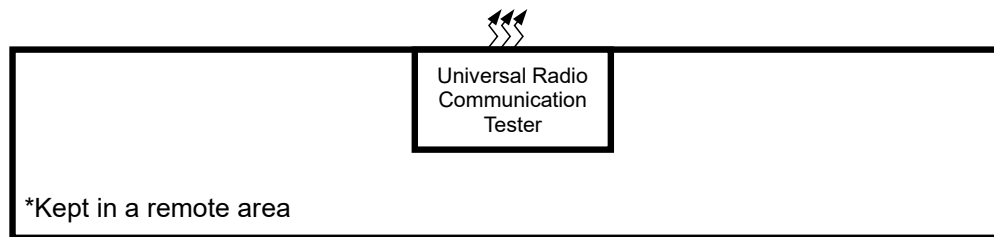
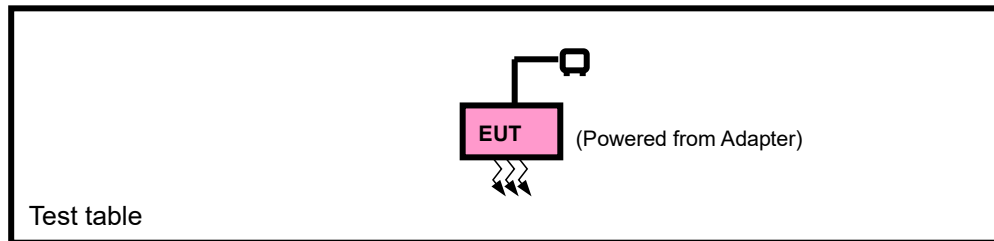
4. List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
AC Adapter	N/A	Shenzhen ABP Technology Co., Ltd.	NFC05B5403C	I/P: 100-240Vac, 0.5A, O/P: 5.4Vdc, 3A, 16.2W
Battery	Pepper+Fuchs	Shenzhen Cholipower Technology Co.,Ltd.	Ex-BP S203	Capacity: 3.8Vdc, 4500mAh
USB Cable	Delock	TRAGANT Handels- und Beteiligungs GmbH	35156	Signal Line, 1.2meter



2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST





2.3 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	ThinkPad E14	HRSW00024	N/A
2	DC Source	HYELEC	HY3010B	551016	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable, 1.0m;
2	USB Line: Unshielded, Detachable, 1.2m;



2.4 DESCRIPTION OF TEST MODES

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

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter with LTE link
B	EUT + DC Supply/ Battery with LTE link

LTE BAND 14 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	ERP	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	23305 to 23355	23305, 23355	5MHz	QPSK	25 RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM, 64QAM, 256QAM	25 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	50 RB / 0 RB Offset
A	PEAK TO AVERAGE RATIO	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB Offset 25 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB Offset 50 RB / 0 RB Offset
A	BAND EDGE	23305 to 23355	23305	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB Offset 25 RB / 0 RB Offset
			23355	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 24 RB Offset 25 RB / 0 RB Offset
		23300	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB Offset 50 RB / 0 RB Offset 1 RB / 49 RB Offset /
A	CONDUCTED EMISSION	23305 to 23355	23305, 23330, 23355	5MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK	1 RB / 0 RB Offset



A	RADIATED EMISSION	23305 to 23355	23305, 23330, 23355	5MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	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.

LTE BAND 26 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	ERP	26697 to 26783	26697, 23330, 26783	1.4MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
		26705 to 26775	26705, 23330, 26775	3MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
		26715 to 26765	26715, 23330, 26765	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
B	FREQUENCY STABILITY	26715 to 26765	26715, 26765	5MHz	QPSK	25 RB / 0 RB offset
A	OCCUPIED BANDWIDTH	26697 to 26783	26697, 23330, 26783	1.4MHz	QPSK, 16QAM, 64QAM, 256QAM	6 RB / 0 RB offset
		26705 to 26775	26705, 23330, 26775	3MHz	QPSK, 16QAM, 64QAM, 256QAM	15 RB / 0 RB offset
		26715 to 26765	26715, 23330, 26765	5MHz	QPSK, 16QAM, 64QAM, 256QAM	25 RB / 0 RB offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	50 RB / 0 RB offset
A	BAND EDGE	26697 to 26783	26697	1.4MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
						6 RB / 0 RB offset
		26783	26783	1.4MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 5 RB offset
						6 RB / 0 RB offset
		26705 to 26775	26705	3MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
						15 RB / 0 RB offset
		26775	26775	3MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 14 RB offset
						15 RB / 0 RB offset
		26715 to 26765	26715	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
						25 RB / 0 RB offset
		26765	26765	5MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 24 RB offset
						25 RB / 0 RB offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM, 256QAM	1 RB / 0 RB offset
						50 RB / 0 RB offset



			23330	10MHz	QPSK,16QAM,64QAM,256QAM	1 RB / 49 RB offset
						50 RB / 0 RB offset
A	CONDUCTED EMISSION	26697 to 26783	26697, 23330, 26783	1.4MHz	QPSK	1 RB / 0 RB offset
		26705 to 26775	26705, 23330, 26775	3MHz	QPSK	1 RB / 0 RB offset
		26715 to 26765	26715, 23330, 26765	5MHz	QPSK	1 RB / 0 RB offset
		23330	23330	10MHz	QPSK	1 RB / 0 RB offset
A	PEAK-TO- AVERAGE RATIO	26697 to 26783	26697, 23330, 26783	1.4MHz	QPSK,16QAM,64QAM,256QAM	1 RB / 0 RB offset
		26715 to 26765	26715, 23330, 26765	5MHz	QPSK,16QAM,64QAM,256QAM	6 RB / 0 RB offse
		23330	23330	10MHz	QPSK,16QAM,64QAM,256QAM	1 RB / 0 RB offset
						50 RB / 0 RB offse
A	RADIATED EMISSION	26697 to 26783	23330	1.4MHz	QPSK	1 RB / 0 RB offset
		26705 to 26775	23330	3MHz	QPSK	1 RB / 0 RB offset
		26715 to 26765	23330	5MHz	QPSK	1 RB / 0 RB offset
		23330	23330	10MHz	QPSK	1 RB / 0 RB offset

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

TEST CONDITION			
TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP(ERP)	24deg. C, 60%RH	DC 5.4V By Adapter	Hanwen Xu
FREQUENCY STABILITY	24deg. C, 61%RH	DC 3.4/3.8/4,35V By Battery	Hanwen Xu
OCCUPIED BANDWIDTH	24deg. C, 61%RH	DC 5.4V By Adapter	Hanwen Xu
BAND EDGE	24deg. C, 61%RH	DC 5.4V By Adapter	Hanwen Xu
CONDUCTED EMISSION	24deg. C, 61%RH	DC 5.4V By Adapter	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC 5.4V By Adapter	Hanwen Xu



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 90

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

Per FCC Part 90.635(a)(b)

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

3.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

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

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

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as P_{Meas} , typically dBW or dBm);

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

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

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

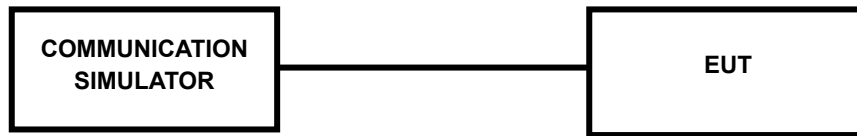
CONDUCTED POWER MEASUREMENT:

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



3.1.3 TEST SETUP

CONDUCTED POWER MEASUREMENT:



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



3.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 14						
BW	Modulation	RB Size	RB Offset	Mid		
		Channel		23330		
		Frequency (MHz)		793		
10M	QPSK	1	0		23.53	
		1	24		23.56	
		1	49		23.42	
		25	0		22.45	
		25	12		22.41	
		25	25		22.39	
		50	0		22.45	
	16QAM	1	0		22.71	
		1	24		22.67	
		1	49		22.59	
		25	0		21.52	
		25	12		21.49	
		25	25		21.43	
		50	0		21.45	
	64QAM	1	0		21.73	
		1	24		21.70	
		1	49		21.64	
		25	0		20.55	
		25	12		20.49	
		25	25		20.44	
		50	0		20.43	
	256QAM	1	0		18.65	
		1	24		18.59	
		1	49		18.50	
		25	0		18.53	
		25	12		18.48	
		25	25		18.45	
		50	0		18.59	
BW	Modulation	Channel		23305	23330	23355
		Frequency (MHz)		790.5	793	795.5
5M	QPSK	1	0	23.36	23.40	23.33
		1	12	23.38	23.49	23.48
		1	24	23.25	23.33	23.25
		12	0	22.38	22.43	22.41
		12	6	22.23	22.38	22.24
		12	13	22.18	22.28	22.20
		25	0	22.31	22.32	22.30
	16QAM	1	0	22.46	22.58	22.45
		1	12	22.56	22.65	22.57
		1	24	22.44	22.51	22.41



		12	0	21.33	21.40	21.37
		12	6	21.22	21.34	21.25
		12	13	21.23	21.37	21.26
		25	0	21.23	21.36	21.35
	64QAM	1	0	21.58	21.63	21.59
		1	12	21.53	21.58	21.57
		1	24	21.50	21.63	21.49
		12	0	20.39	20.53	20.47
		12	6	20.36	20.44	20.38
		12	13	20.29	20.31	20.16
		25	0	20.33	20.41	20.30
	256QAM	1	0	18.46	18.53	18.43
		1	12	18.43	18.47	18.46
		1	24	18.45	18.49	18.34
		12	0	18.31	18.43	18.41
		12	6	18.25	18.34	18.28
		12	13	18.22	18.36	18.24
		25	0	18.32	18.46	18.37



LTE Band 26						
BW	MCS Index	RB Size	RB Offset		Mid	
		Channel			26740	
		Frequency (MHz)			819	
10M	QPSK	1	0		22.98	
		1	24		23.04	
		1	49		22.98	
		25	0		22.05	
		25	12		22.03	
		25	25		22.02	
		50	0		21.99	
	16QAM	1	0		22.26	
		1	24		22.33	
		1	49		22.20	
		25	0		21.07	
		25	12		21.06	
		25	25		21.11	
		50	0		21.09	
	64QAM	1	0		21.21	
		1	24		21.17	
		1	49		21.16	
		25	0		20.05	
		25	12		20.09	
		25	25		20.07	
		50	0		20.06	
	256QAM	1	0		18.18	
		1	24		18.20	
		1	49		18.23	
		25	0		18.09	
		25	12		18.06	
		25	25		18.08	
		50	0		18.11	
BW	MCS Index	Channel		26715	26740	26765
		Frequency (MHz)		816.5	819	821.5
5M	QPSK	1	0	22.86	22.87	22.91
		1	12	22.96	23.01	22.98
		1	24	22.92	22.96	22.96
		12	0	21.94	21.91	21.95
		12	6	22.01	21.88	21.96
		12	13	22.00	22.00	21.91
		25	0	21.98	21.91	21.97
	16QAM	1	0	22.11	22.25	22.14
		1	12	22.29	22.22	22.28



BUREAU VERITAS Test Report No.: PSU-QSU2411180418RF07

		1	24	22.09	22.19	22.07
		12	0	20.97	20.92	20.94
		12	6	21.05	20.97	20.98
		12	13	21.07	21.09	21.05
		25	0	21.00	21.00	21.01
	64QAM	1	0	21.18	21.13	21.12
		1	12	21.02	21.06	21.03
		1	24	21.08	21.10	21.08
		12	0	19.93	19.92	19.92
		12	6	20.04	19.99	19.96
		12	13	19.99	20.01	20.03
		25	0	19.91	20.04	19.93
	256QAM	1	0	18.09	18.04	18.15
		1	12	18.10	18.18	18.14
		1	24	18.09	18.18	18.10
		12	0	17.99	18.00	18.06
		12	6	17.94	18.00	17.98
		12	13	18.05	17.95	18.00
		25	0	18.08	18.08	18.04
BW	MCS Index	Channel		26705	26740	26775
		Frequency (MHz)		815.5	819	822.5
3M	QPSK	1	0	22.87	22.91	22.83
		1	7	22.96	22.96	22.99
		1	14	22.86	22.95	22.92
		8	0	21.97	21.97	21.90
		8	3	21.88	21.96	21.88
		8	7	22.00	21.99	21.98
		15	0	21.89	21.87	21.93
	16QAM	1	0	22.11	22.12	22.19
		1	7	22.27	22.20	22.20
		1	14	22.11	22.09	22.12
		8	0	20.95	21.04	21.06
		8	3	21.04	20.91	20.95
		8	7	21.02	21.06	21.04
		15	0	21.06	21.04	21.08
	64QAM	1	0	21.12	21.11	21.11
		1	7	21.07	21.02	21.02
		1	14	21.14	21.05	21.12
		8	0	19.99	19.95	19.90
		8	3	19.96	19.98	19.97
		8	7	20.02	19.95	20.01
		15	0	20.05	19.97	19.98
	256QAM	1	0	18.06	18.12	18.03
		1	7	18.09	18.17	18.07



		1	14	18.20	18.19	18.20
		8	0	18.01	17.95	17.95
		8	3	17.97	17.99	17.92
		8	7	18.04	18.02	18.03
		15	0	17.99	18.08	18.00
BW	MCS Index	Channel		26697	26740	26783
		Frequency (MHz)		814.7	819	823.3
1.4M	QPSK	1	0	22.76	22.95	22.77
		1	2	22.86	22.96	22.91
		1	5	23.02	22.90	22.89
		3	0	22.62	22.90	22.71
		3	1	22.71	22.90	22.81
		3	3	22.95	22.78	22.84
		6	0	21.92	21.92	21.94
	16QAM	1	0	22.04	22.11	22.03
		1	2	22.03	22.20	22.02
		1	5	22.18	22.07	22.18
		3	0	21.91	22.06	21.95
		3	1	21.97	22.12	21.92
		3	3	22.10	22.06	22.10
		6	0	21.06	21.03	21.02
	64QAM	1	0	20.94	21.16	20.91
		1	2	20.89	21.05	20.89
		1	5	20.97	21.11	20.89
		3	0	20.86	21.13	20.77
		3	1	20.83	21.01	20.84
		3	3	20.96	20.97	20.76
		6	0	20.03	19.98	19.97
	256QAM	1	0	18.03	18.12	18.08
		1	2	18.16	18.17	18.15
		1	5	18.01	18.14	18.04
		3	0	17.92	18.00	17.93
		3	1	17.92	17.98	17.87
		3	3	17.93	17.97	17.89
		6	0	17.96	18.10	17.95



ERP

LTE Band 14_Ant 0							
BW [MHz] Modulation	Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	ERP (dBm)	ERP (mW)	Limit (W)
10M-QPSK	23330	793	23.56	-3.11	18.30	67.61	3
10M- 16QAM	23330	793	22.71	-3.11	17.45	55.59	3
10M- 64QAM	23330	793	21.73	-3.11	16.47	44.36	3
10M- 256QAM	23330	793	18.65	-3.11	13.39	21.83	3
BW [MHz] Modulation	Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	ERP (dBm)	ERP (mW)	Limit (W)
5M-QPSK	23305	790.5	23.38	-3.11	18.12	64.86	3
	23330	793	23.49	-3.11	18.23	66.53	3
	23355	795.5	23.48	-3.11	18.22	66.37	3
5M-16QAM	23305	790.5	22.56	-3.11	17.30	53.70	3
	23330	793	22.65	-3.11	17.39	54.83	3
	23355	795.5	22.57	-3.11	17.31	53.83	3
5M-64QAM	23305	790.5	21.58	-3.11	16.32	42.85	3
	23330	793	21.63	-3.11	16.37	43.35	3
	23355	795.5	21.59	-3.11	16.33	42.95	3
5M- 256QAM	23305	790.5	18.46	-3.11	13.20	20.89	3
	23330	793	18.53	-3.11	13.27	21.23	3
	23355	795.5	18.46	-3.11	13.20	20.89	3



Part90_LTE Band 26_Ant 0							
BW [MHz] Modulation	Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	ERP (dBm)	ERP (mW)	Limit (W)
10M-QPSK	26740	819	23.04	-2.16	18.73	74.64	100
10M-16QAM	26740	819	22.33	-2.16	18.02	63.39	100
10M-64QAM	26740	819	21.21	-2.16	16.90	48.98	100
10M-256QAM	26740	819	18.23	-2.16	13.92	24.66	100
BW [MHz] Modulation	Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	ERP (dBm)	ERP (mW)	Limit (W)
5M-QPSK	26715	816.5	22.96	-2.16	18.65	73.28	100
	26740	819	23.01	-2.16	18.70	74.13	100
	26765	821.5	22.98	-2.16	18.67	73.62	100
5M-16QAM	26715	816.5	22.29	-2.16	17.98	62.81	100
	26740	819	22.25	-2.16	17.94	62.23	100
	26765	821.5	22.28	-2.16	17.97	62.66	100
5M-64QAM	26715	816.5	21.18	-2.16	16.87	48.64	100
	26740	819	21.13	-2.16	16.82	48.08	100
	26765	821.5	21.12	-2.16	16.81	47.97	100
5M-256QAM	26715	816.5	18.10	-2.16	13.79	23.93	100
	26740	819	18.18	-2.16	13.87	24.38	100
	26765	821.5	18.15	-2.16	13.84	24.21	100
BW [MHz] Modulation	Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	ERP (dBm)	ERP (mW)	Limit (W)
3M-QPSK	26705	815.5	22.96	-2.16	18.65	73.28	100
	26740	819	22.96	-2.16	18.65	73.28	100
	26775	822.5	22.99	-2.16	18.68	73.79	100
3M-16QAM	26705	815.5	22.27	-2.16	17.96	62.52	100
	26740	819	22.20	-2.16	17.89	61.52	100
	26775	822.5	22.20	-2.16	17.89	61.52	100
3M-64QAM	26705	815.5	21.14	-2.16	16.83	48.19	100
	26740	819	21.11	-2.16	16.80	47.86	100
	26775	822.5	21.12	-2.16	16.81	47.97	100
	26705	815.5	18.20	-2.16	13.89	24.49	100



BUREAU VERITAS Test Report No.: PSU-QSU2411180418RF07

3M-256QAM	26740	819	18.19	-2.16	13.88	24.43	100
	26775	822.5	18.20	-2.16	13.89	24.49	100
BW [MHz] Modulation	Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	ERP (dBm)	ERP (mW)	Limit (W)
1.4M-QPSK	26697	814.7	23.02	-2.16	18.71	74.30	100
	26740	819	22.96	-2.16	18.65	73.28	100
	26783	823.3	22.91	-2.16	18.60	72.44	100
1.4M-16QAM	26697	814.7	22.18	-2.16	17.87	61.24	100
	26740	819	22.20	-2.16	17.89	61.52	100
	26783	823.3	22.18	-2.16	17.87	61.24	100
1.4M-64QAM	26697	814.7	20.97	-2.16	16.66	46.34	100
	26740	819	21.16	-2.16	16.85	48.42	100
	26783	823.3	20.91	-2.16	16.60	45.71	100
1.4M-256QAM	26697	814.7	18.16	-2.16	13.85	24.27	100
	26740	819	18.17	-2.16	13.86	24.32	100
	26783	823.3	18.15	-2.16	13.84	24.21	100

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).



3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

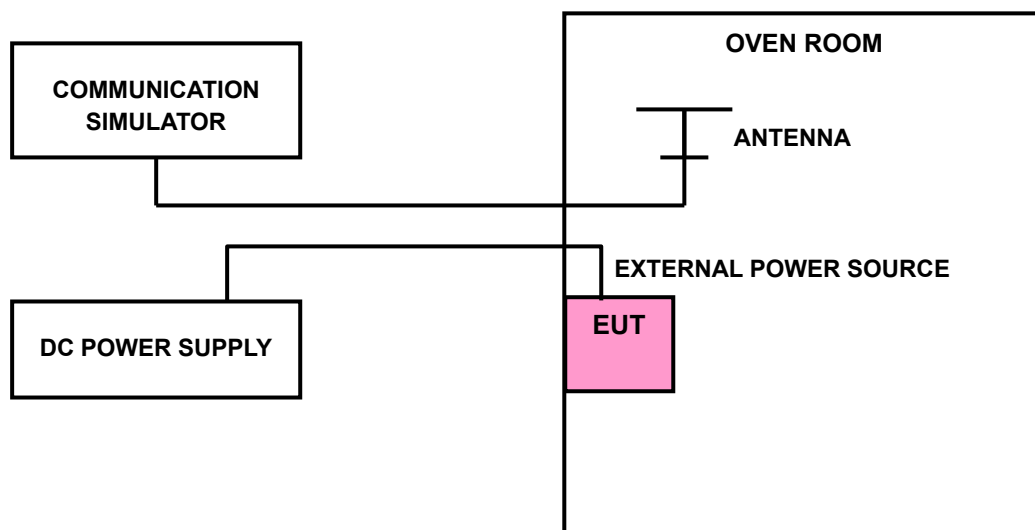
The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked

3.2.2 TEST PROCEDURE

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

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

3.2.3 TEST SETUP





3.2.4 TEST RESULTS

Please Refer to Appendix of this test report.

Note: VL = Low voltage(3.6V); VN/NV = Normal voltage(3.87V); VH = High voltage(4.45V);
NT = Normal temperature (25°C)

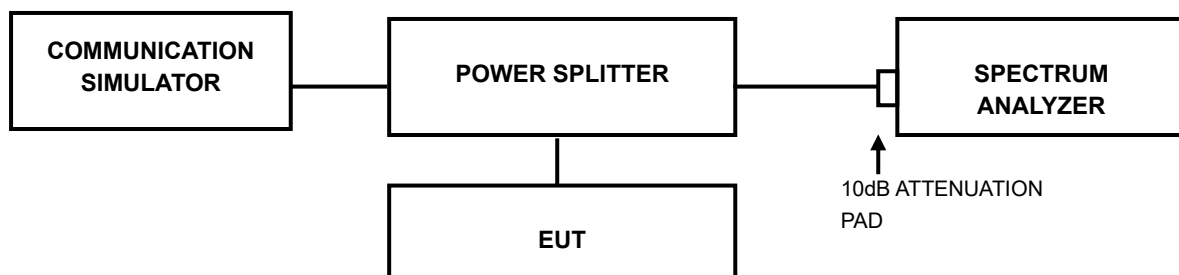


3.3 OCCUPIED BANDWIDTH MEASUREMENT

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

Please Refer to Appendix of this test report.



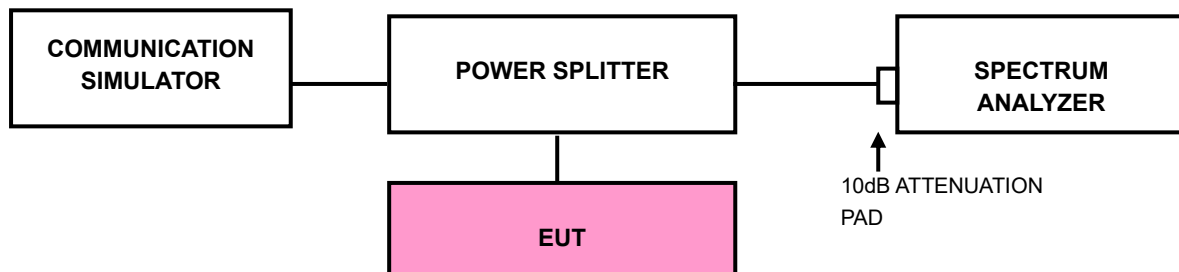
3.4 EMISSION MASK MEASUREMENT

3.4.1 LIMITS OF EMISSION MASK MEASUREMENT

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

3.4.2 TEST SETUP





3.4.3 TEST PROCEDURES

- a) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
- b) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW).
- c) Set the resolution bandwidth (RBW) $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
- d) Beyond the 1MHz band from the band edge, RBW=1MHz was used.
- e) Set the video bandwidth (VBW) to $\geq 3 \times$ RBW.
- f) Select the average power (RMS) display detector.
- g) Set the number of measurement points to ≥ 1001 .
- h) Use auto-coupled sweep time.
- i) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.
- j) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.
- k) Record the max trace plot into the test report.

3.4.4 TEST RESULTS

Please Refer to Appendix of this test report.



3.5 CONDUCTED SPURIOUS EMISSIONS

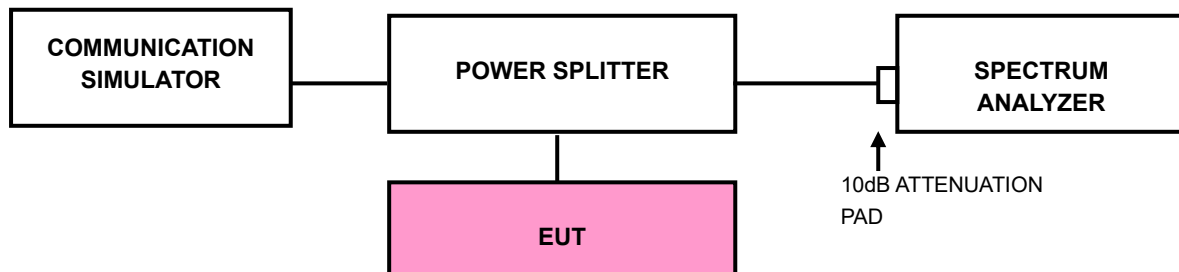
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

3.5.2 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.
- Measuring frequency range is from 9kHz up to a frequency including its 10th harmonic. 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

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

Please Refer to Appendix of this test report.



3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

(1) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

(2) For operations in the 763–775 MHz and 793–805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,
 $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}.$

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

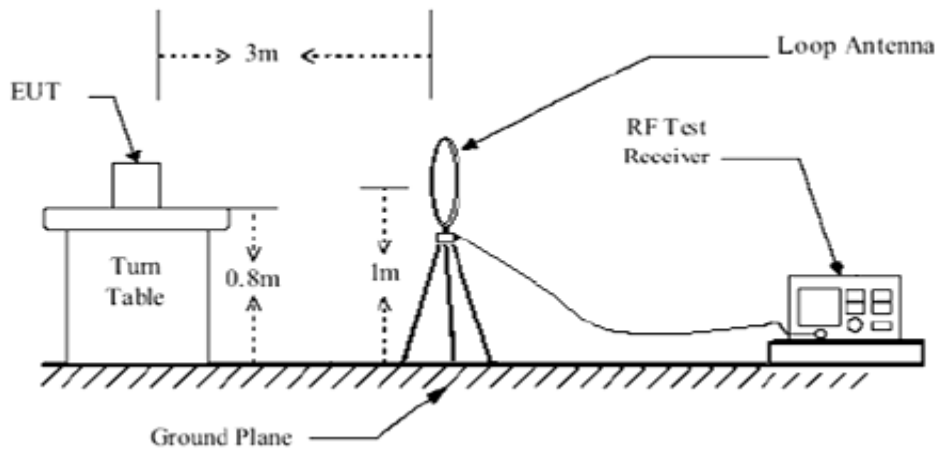
3.6.3 DEVIATION FROM TEST STANDARD

No deviation

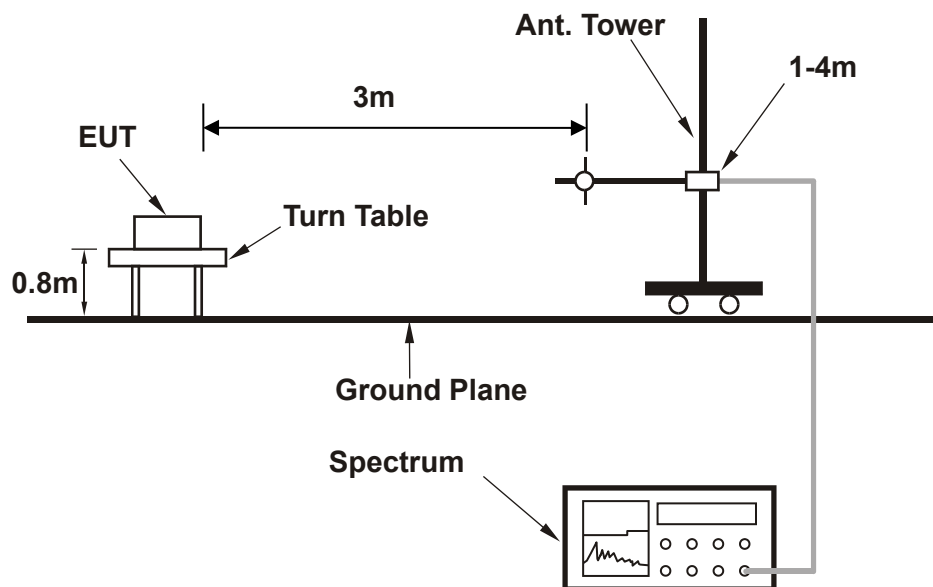


3.6.4 TEST SETUP

<Below 30MHz>

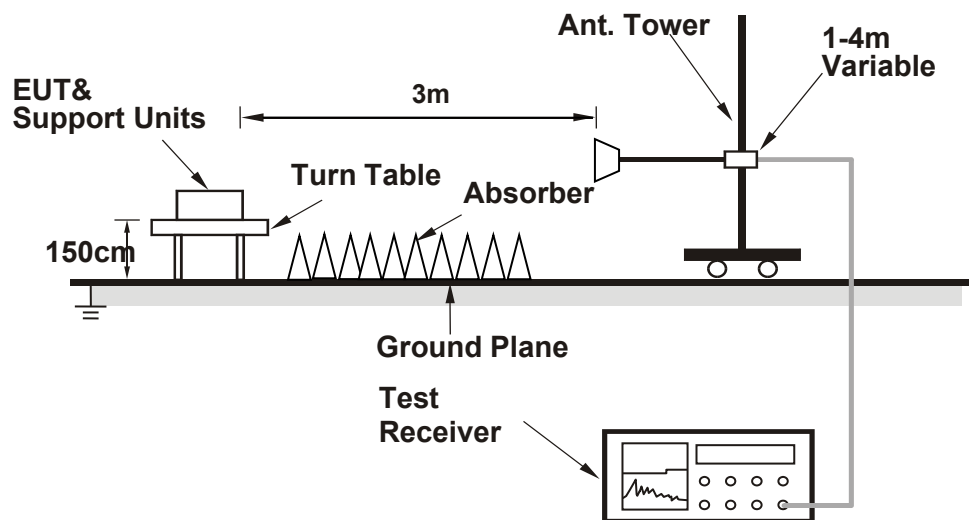


< Frequency Range 30MHz~1GHz >





< Frequency Range above 1GHz >



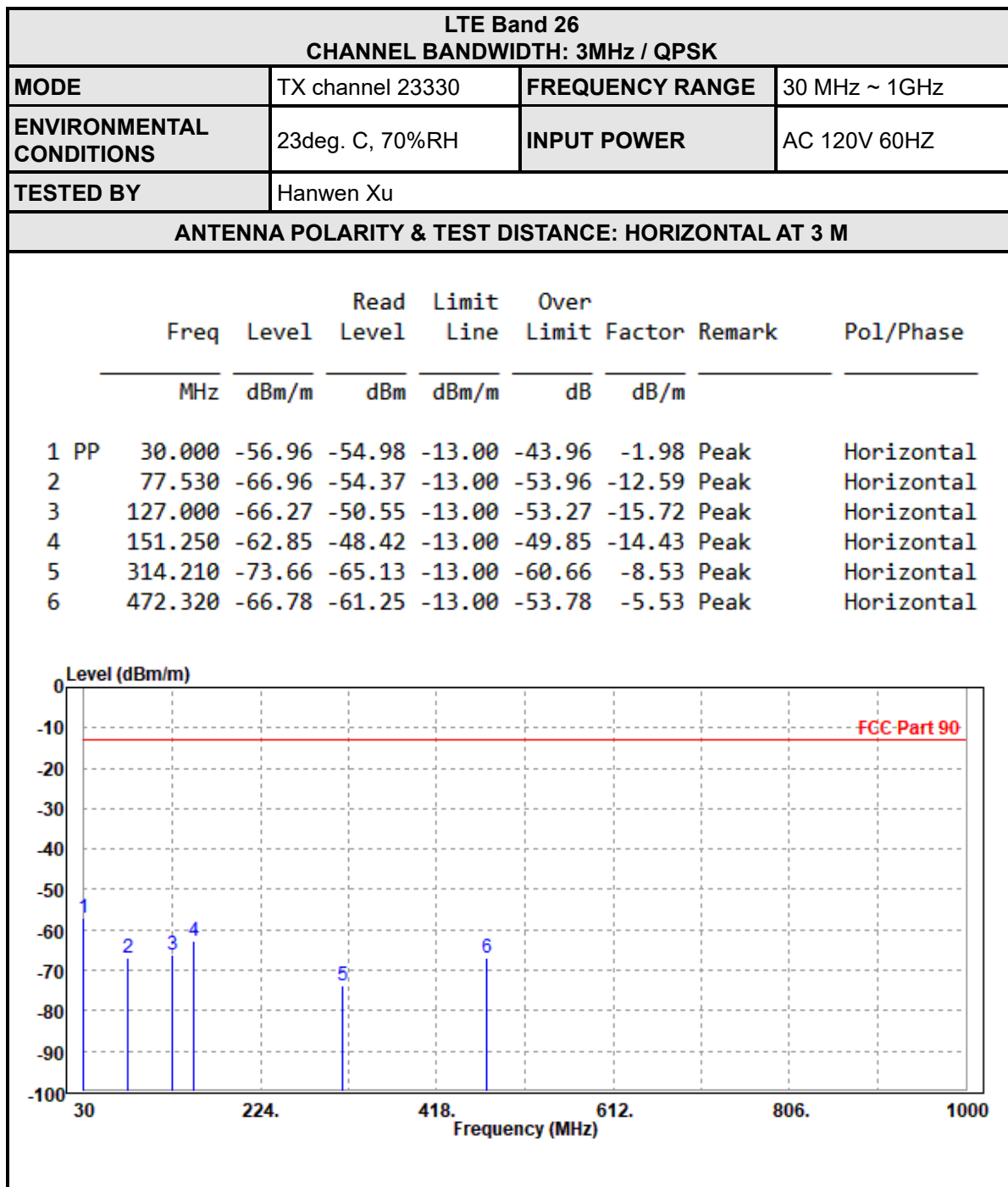
For the actual test configuration, please refer to the attached file (Test Setup Photo).



3.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

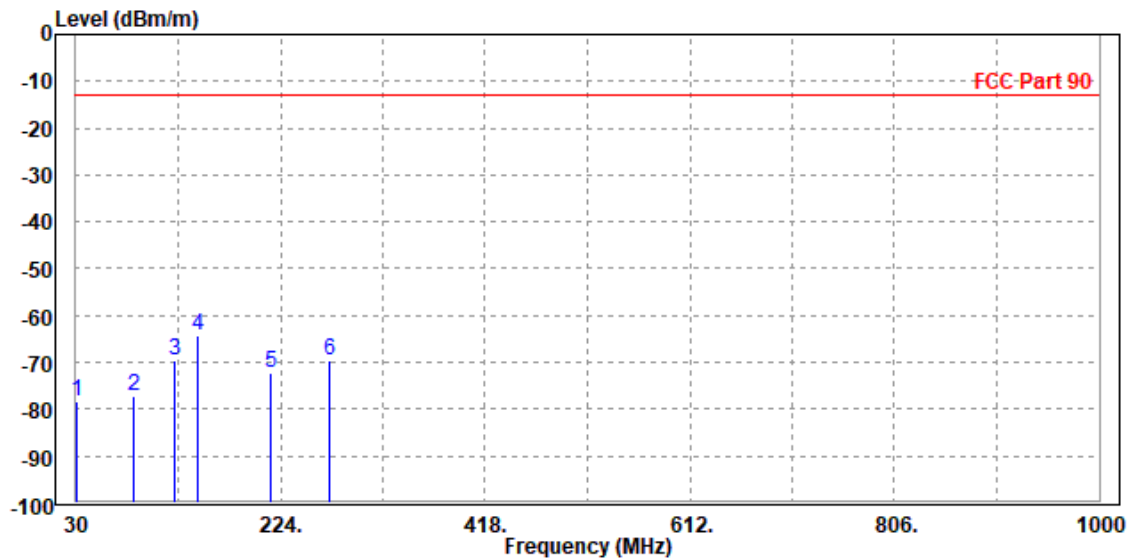




MODE	TX channel 23330	FREQUENCY RANGE	30 MHz ~ 1GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

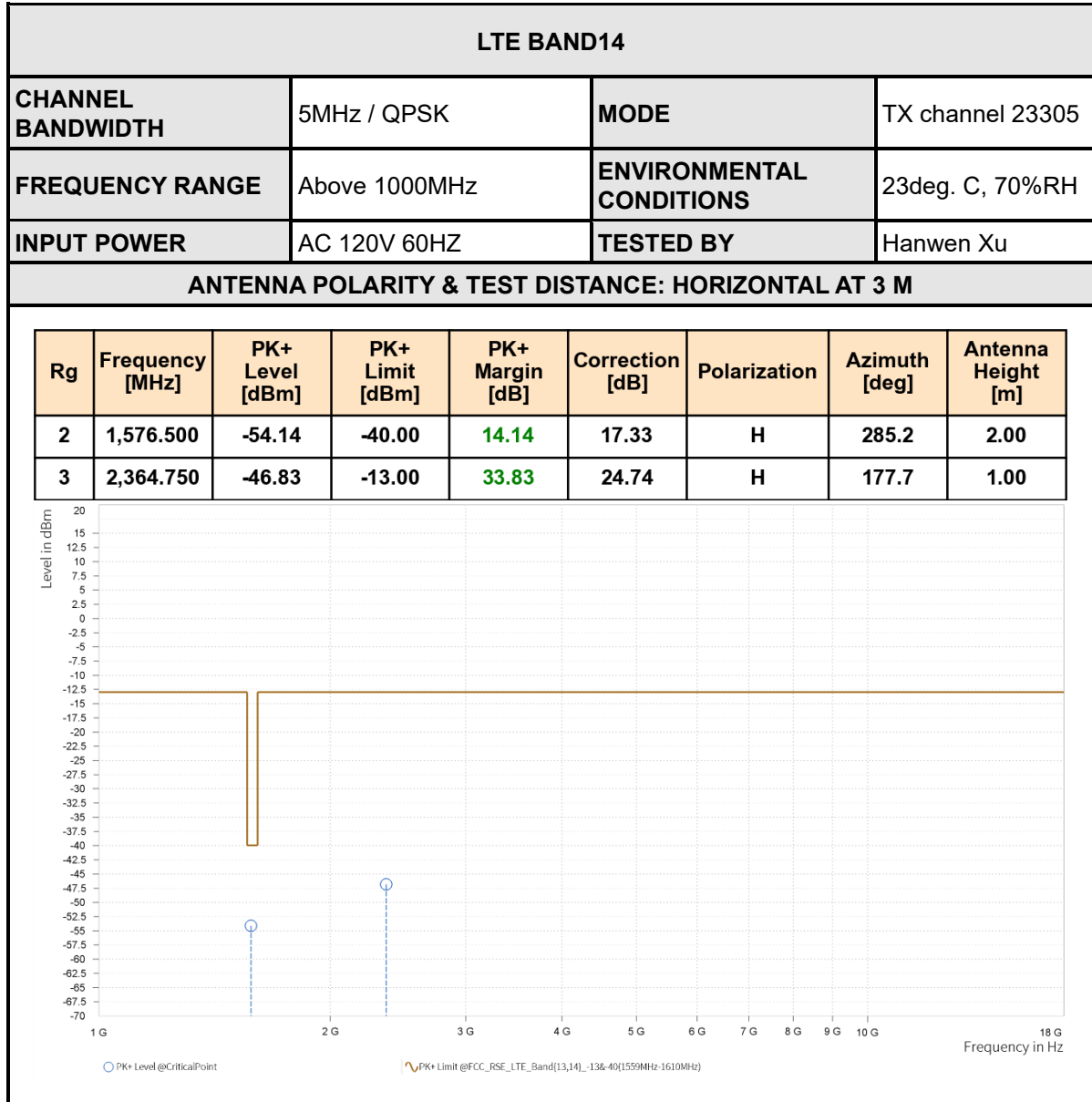
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	30.970	-78.20	-56.65	-13.00	-65.20	-21.55	Peak	Vertical
2	85.290	-77.37	-59.24	-13.00	-64.37	-18.13	Peak	Vertical
3	124.090	-69.65	-52.98	-13.00	-56.65	-16.67	Peak	Vertical
4 PP	146.400	-64.14	-50.36	-13.00	-51.14	-13.78	Peak	Vertical
5	214.300	-72.24	-64.62	-13.00	-59.24	-7.62	Peak	Vertical
6	270.560	-69.73	-66.13	-13.00	-56.73	-3.60	Peak	Vertical





ABOVE 1GHz

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

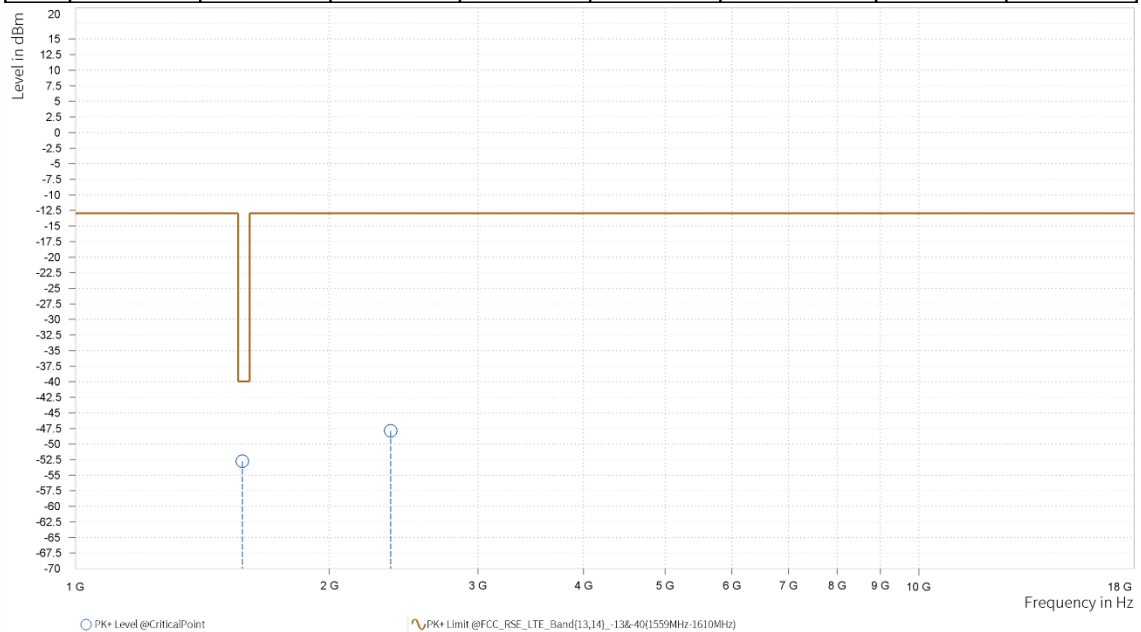




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23305
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,576.500	-52.77	-40.00	12.77	17.14	V	282.9	2.00
3	2,364.750	-47.89	-13.00	34.89	24.43	V	359.1	1.00

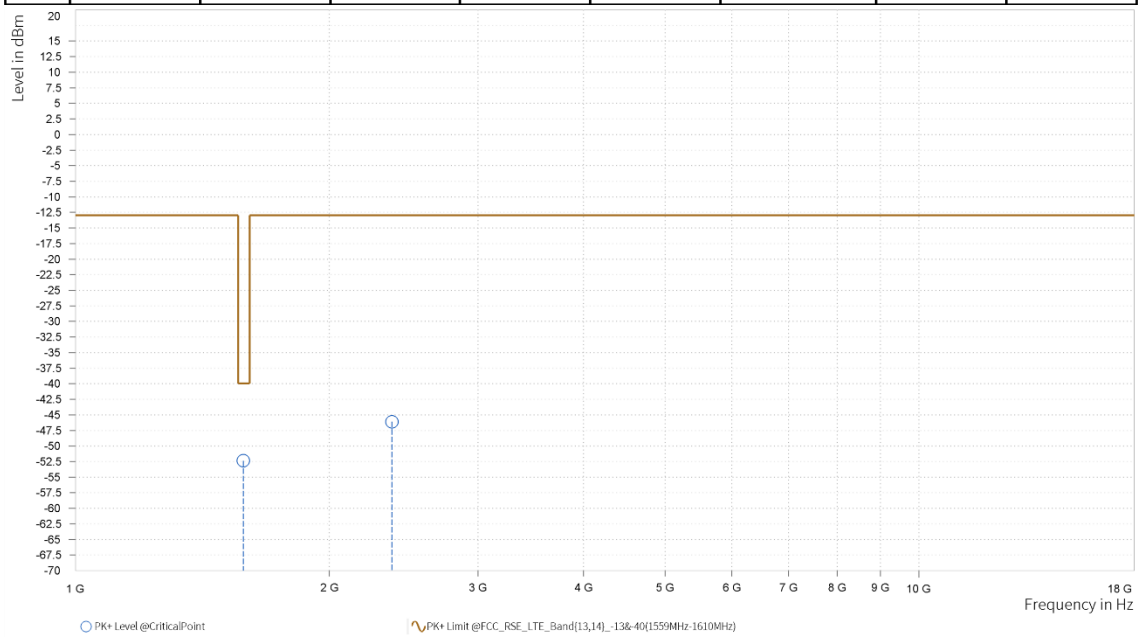




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,581.500	-52.37	-40.00	12.37	17.40	H	359.1	1.00
3	2,372.250	-46.11	-13.00	33.11	24.65	H	0.9	2.00

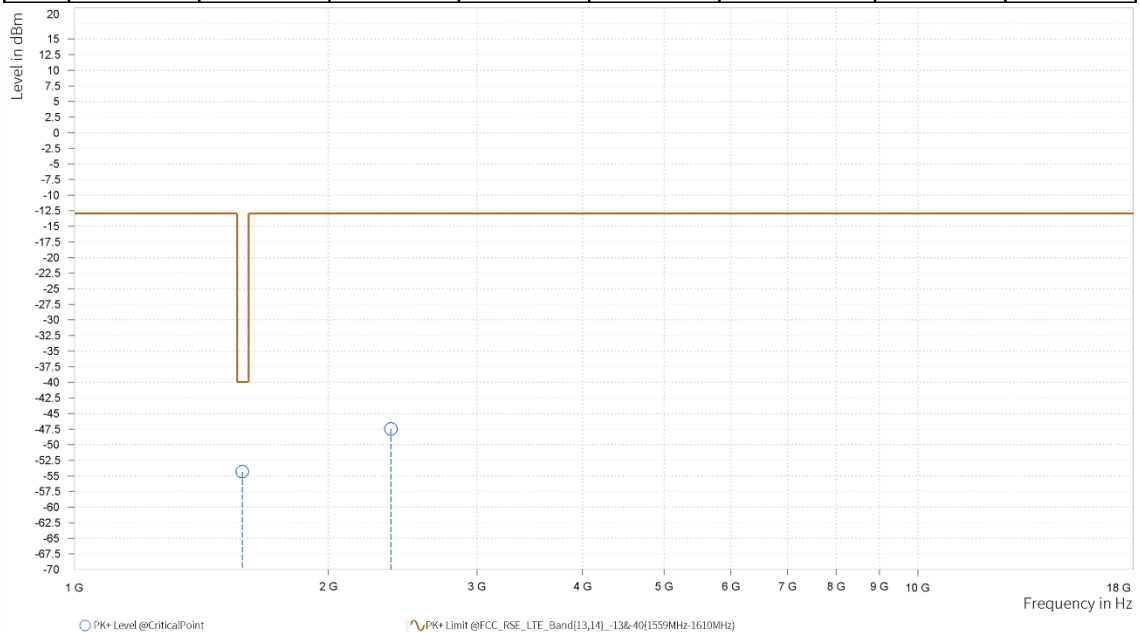




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,581.500	-54.33	-40.00	14.33	17.25	V	1	1.00
3	2,372.250	-47.45	-13.00	34.45	24.36	V	138.2	1.00

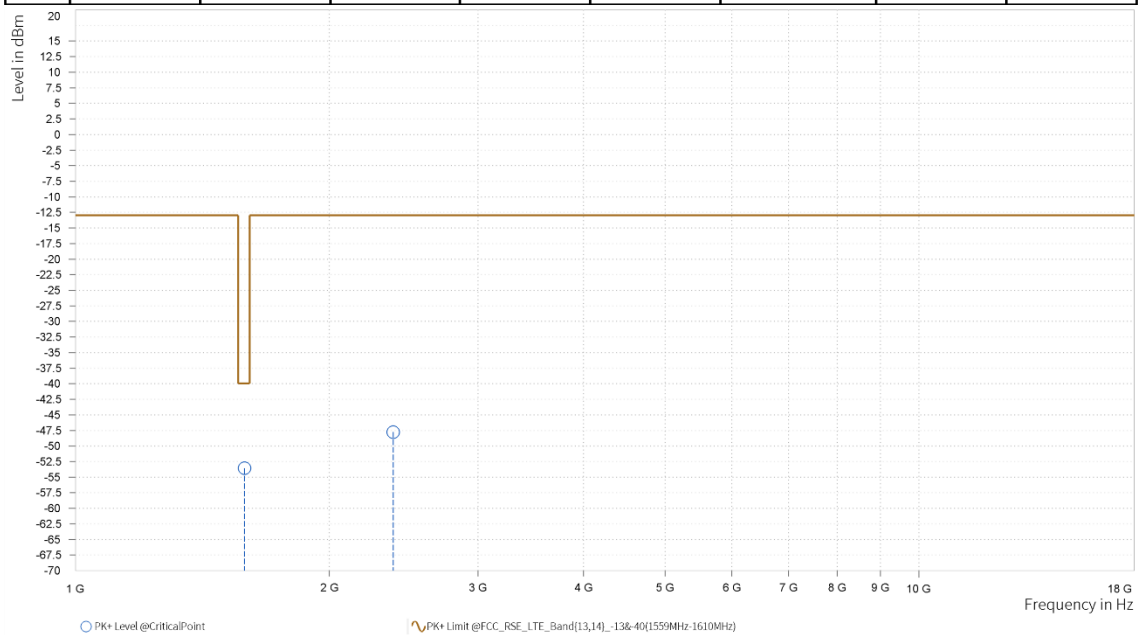




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23355
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,586.500	-53.58	-40.00	13.58	17.22	H	359	2.00
3	2,379.750	-47.77	-13.00	34.77	24.40	H	359	2.00

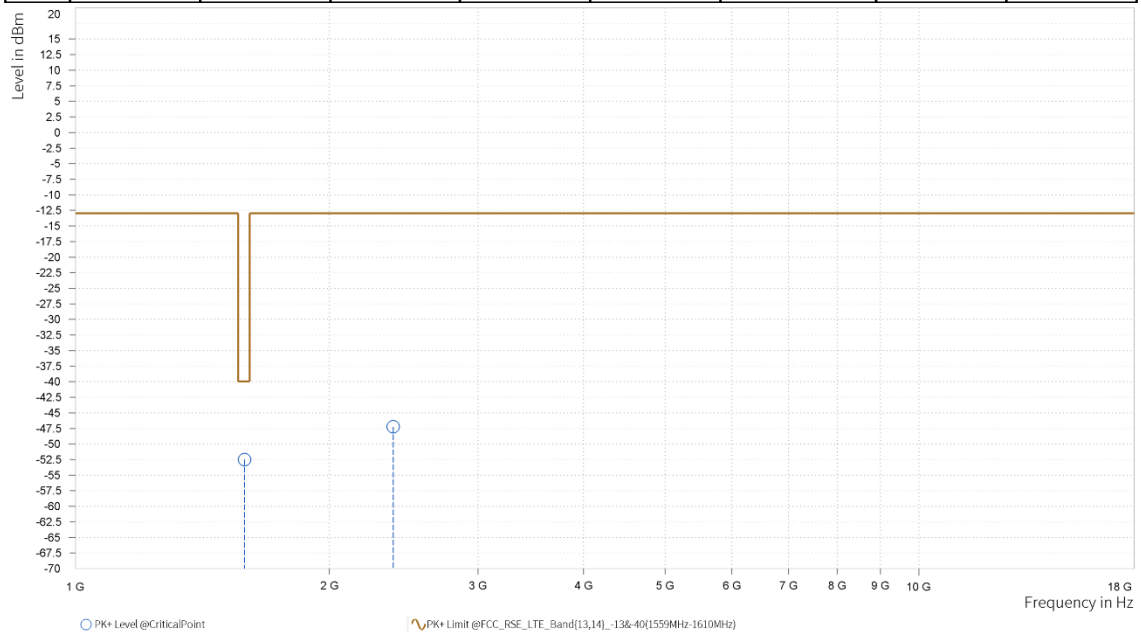




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23355
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,586.500	-52.49	-40.00	12.49	17.11	V	359	2.00
3	2,379.750	-47.24	-13.00	34.24	24.14	V	1	1.00

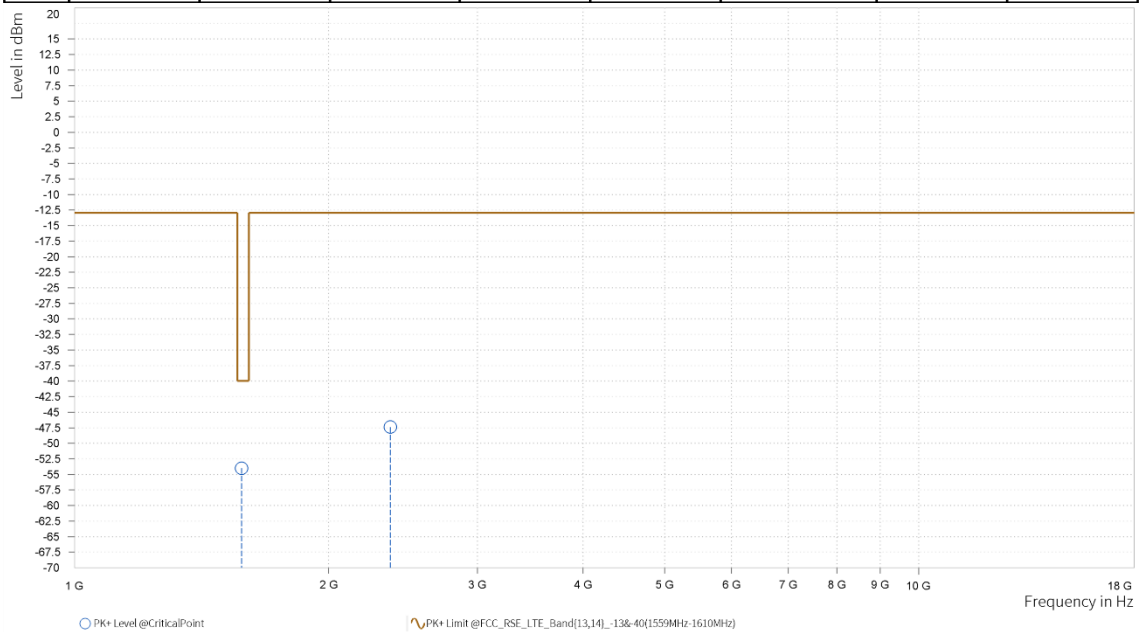




CHANNEL BANDWIDTH	10MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,577.000	-54.00	-40.00	14.00	17.35	H	1	2.00
3	2,365.500	-47.38	-13.00	34.38	24.74	H	1	2.00

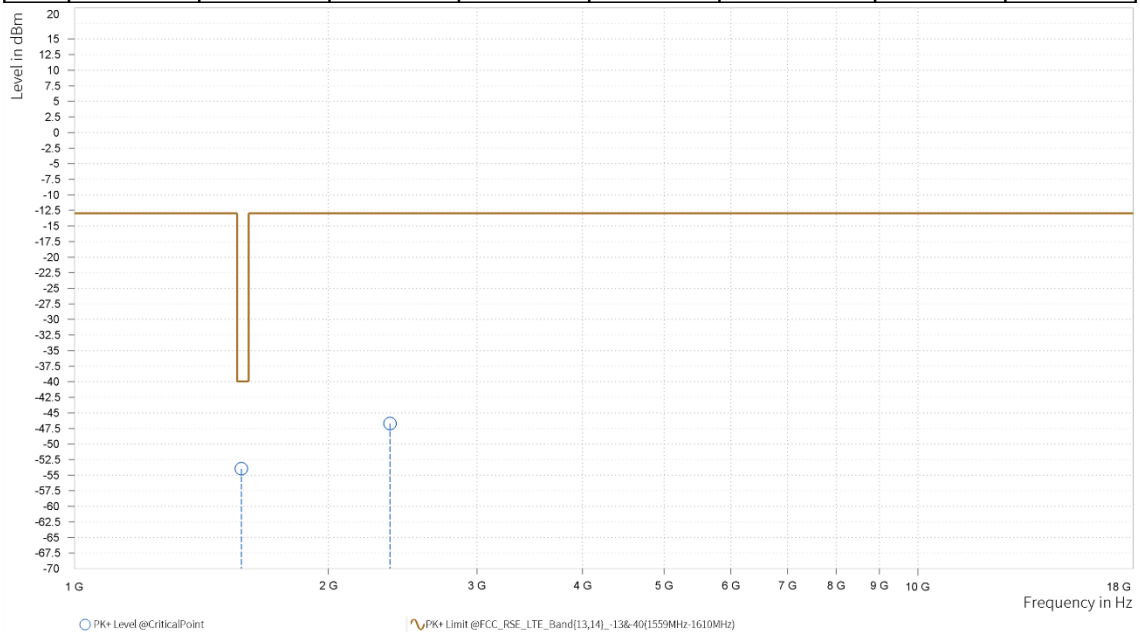


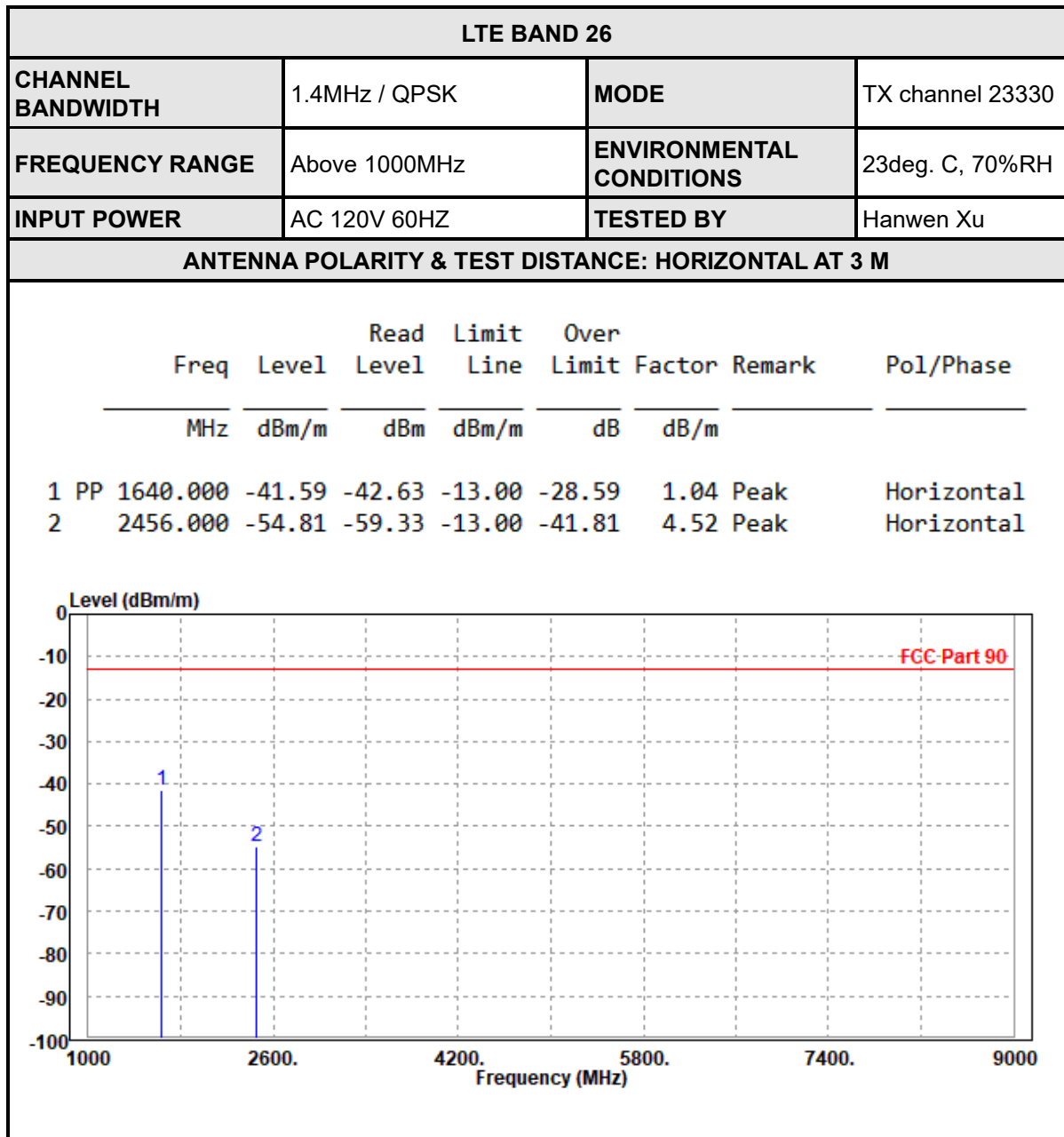


CHANNEL BANDWIDTH	10MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,577.000	-53.97	-40.00	13.97	17.16	V	245.8	2.00
3	2,365.500	-46.73	-13.00	33.73	24.42	V	141.8	2.00



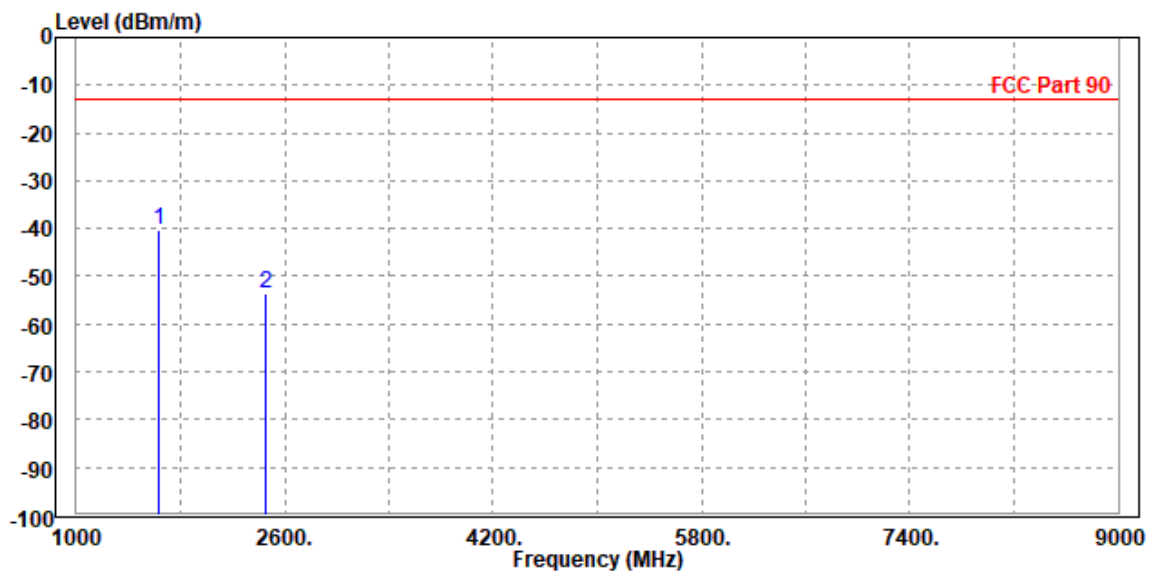




CHANNEL BANDWIDTH	1.4MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1640.000	-40.22	-42.00	-13.00	-27.22	1.78	Peak	Vertical
2	2457.000	-53.59	-58.98	-13.00	-40.59	5.39	Peak	Vertical

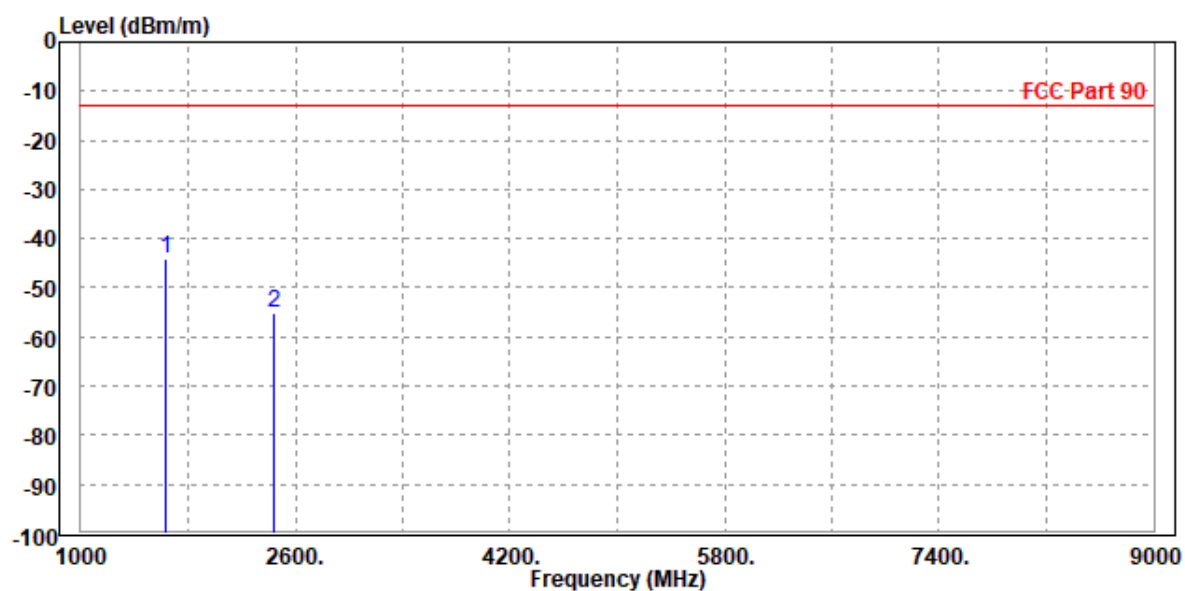




CHANNEL BANDWIDTH	3MHz / QPSK	MODE	TX channel 26705
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

			Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1632.000	-43.93	-44.88	-13.00	-30.93	0.95	Peak	Horizontal
2	2446.500	-55.31	-59.84	-13.00	-42.31	4.53	Peak	Horizontal

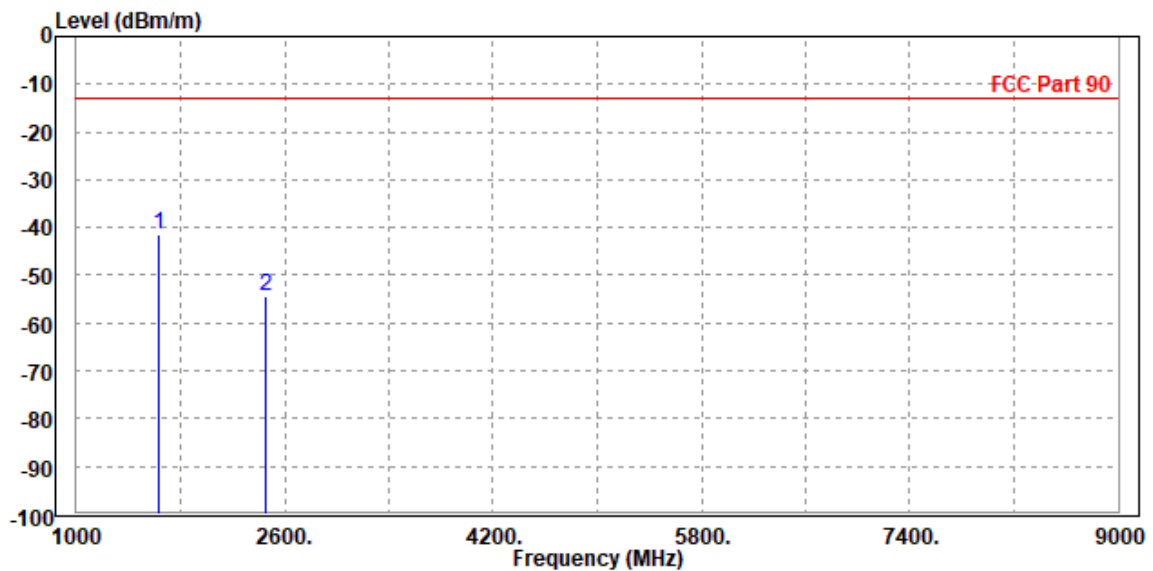




CHANNEL BANDWIDTH	3MHz / QPSK	MODE	TX channel 26705
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1632.000	-41.61	-43.33	-13.00	-28.61	1.72	Peak	Vertical
2		2448.000	-54.23	-59.60	-13.00	-41.23	5.37	Peak	Vertical

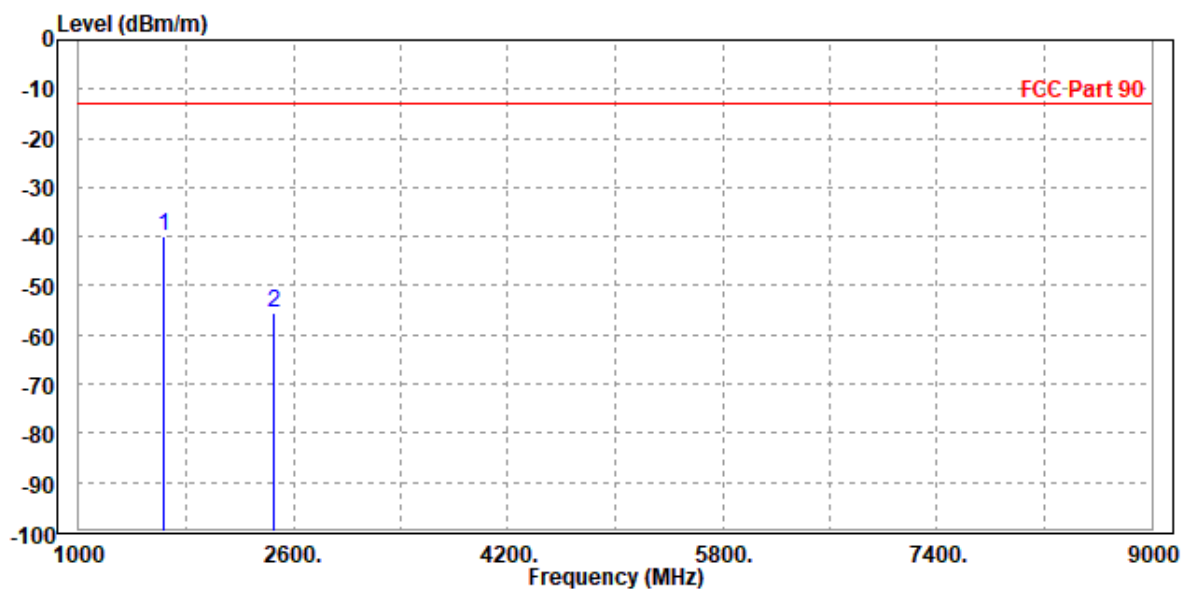




CHANNEL BANDWIDTH	3MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL 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 PP 1640.000	-40.11	-41.15	-13.00	-27.11	1.04	Peak	Horizontal
2 2457.000	-55.56	-60.07	-13.00	-42.56	4.51	Peak	Horizontal

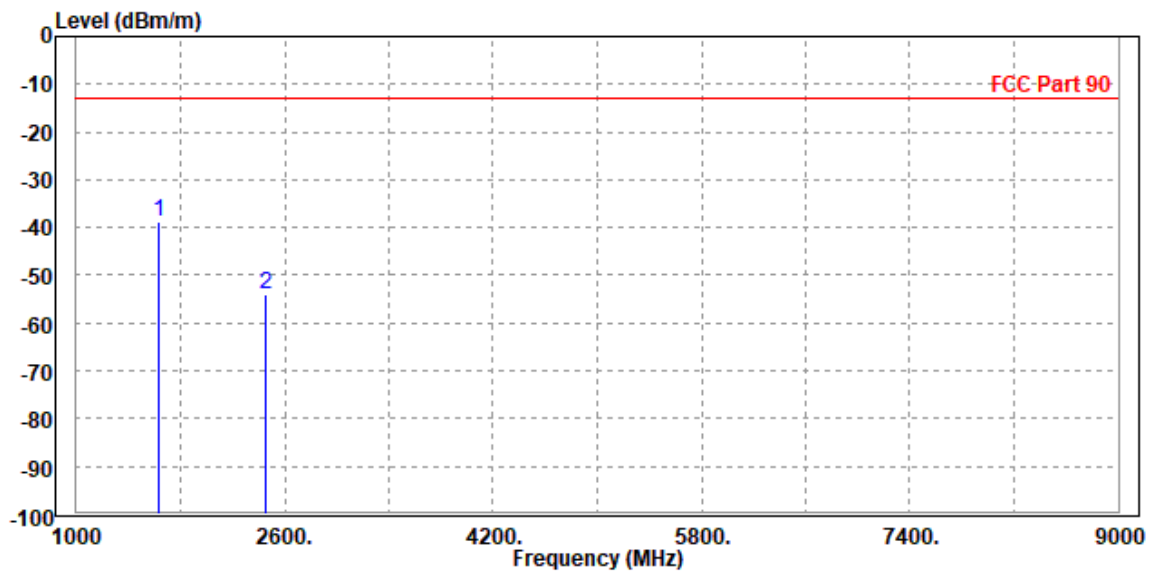




CHANNEL BANDWIDTH	3MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1640.000	-38.79	-40.57	-13.00	-25.79	1.78	Peak	Vertical
2		2456.000	-54.14	-59.53	-13.00	-41.14	5.39	Peak	Vertical

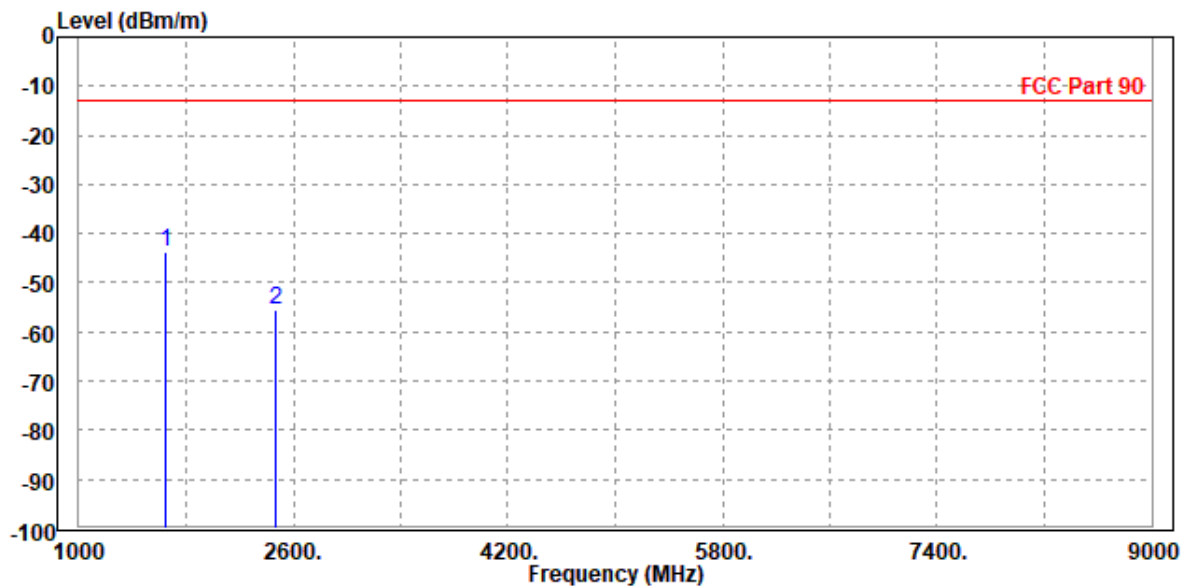




CHANNEL BANDWIDTH	3MHz / QPSK	MODE	TX channel 26775
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1648.000	-43.91	-45.04	-13.00	-30.91	1.13	Peak	Horizontal
2	2464.000	-55.38	-59.88	-13.00	-42.38	4.50	Peak	Horizontal

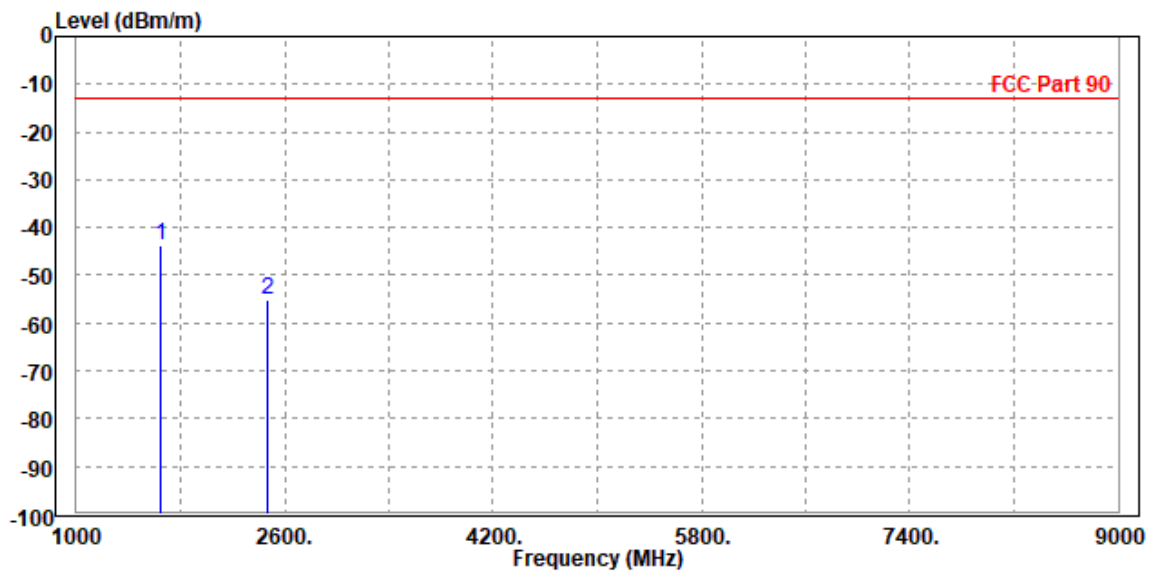




CHANNEL BANDWIDTH	3MHz / QPSK	MODE	TX channel 26775
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1648.000	-43.88	-45.72	-13.00	-30.88	1.84	Peak	Vertical
2		2467.500	-54.97	-60.38	-13.00	-41.97	5.41	Peak	Vertical

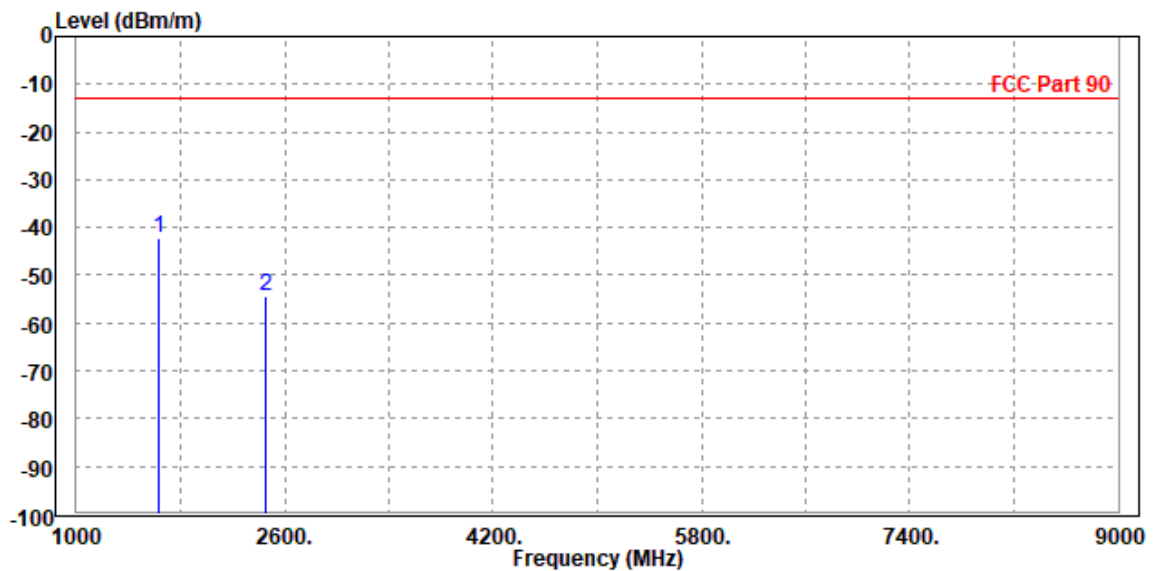




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

			Read	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1640.000	-42.30	-43.34	-13.00	-29.30	1.04	Peak	Horizontal
2	2456.000	-54.39	-58.91	-13.00	-41.39	4.52	Peak	Horizontal

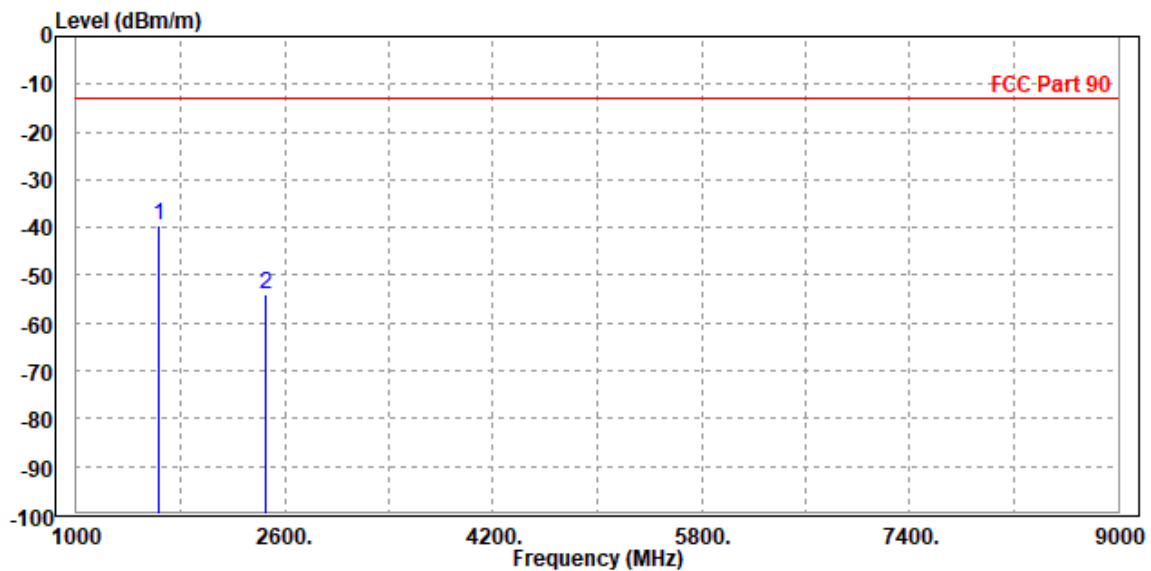




CHANNEL BANDWIDTH	5MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1640.000	-39.63	-41.41	-13.00	-26.63	1.78	Peak	Vertical
2		2457.000	-53.95	-59.34	-13.00	-40.95	5.39	Peak	Vertical

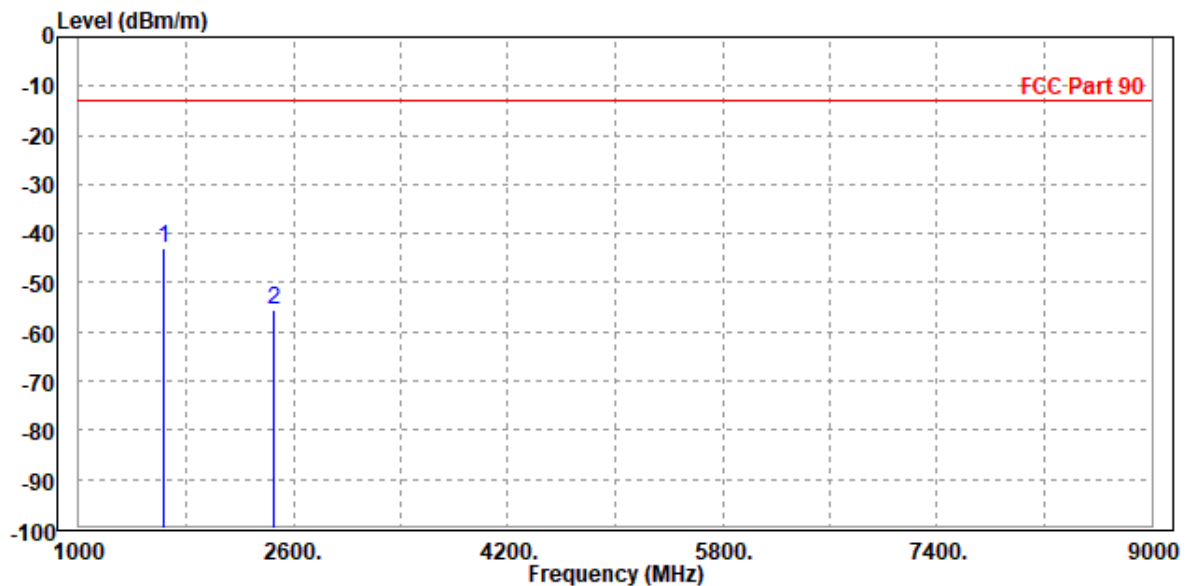




CHANNEL BANDWIDTH	10MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1640.000	-42.91	-43.95	-13.00	-29.91	1.04	Peak	Horizontal
2	2457.000	-55.33	-59.84	-13.00	-42.33	4.51	Peak	Horizontal

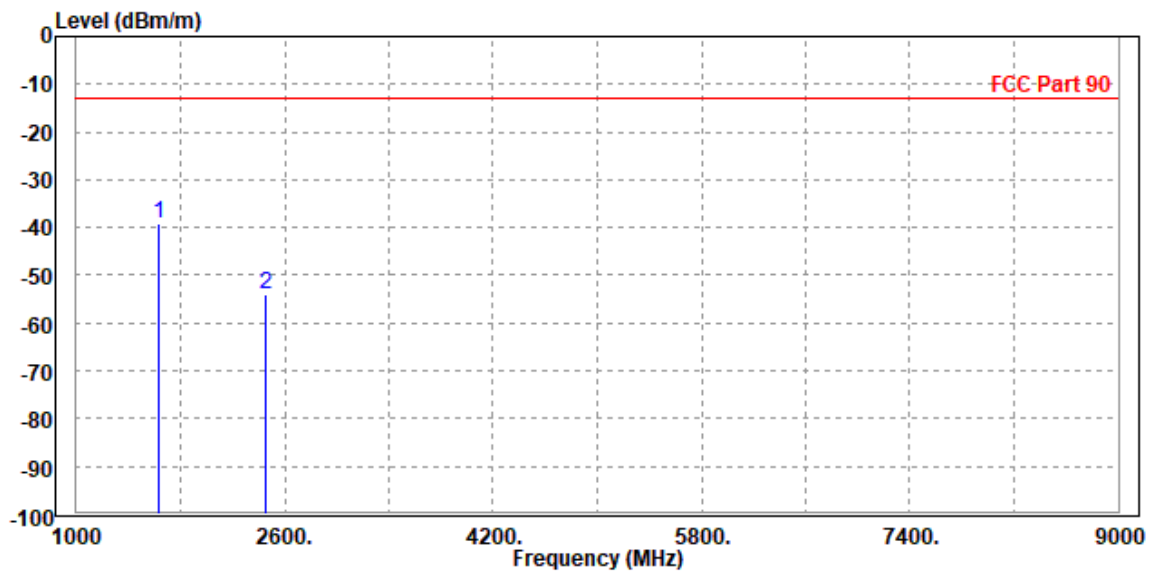




CHANNEL BANDWIDTH	10MHz / QPSK	MODE	TX channel 23330
FREQUENCY RANGE	Above 1000MHz	ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH
INPUT POWER	AC 120V 60HZ	TESTED BY	Hanwen Xu

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1640.000	-39.27	-41.05	-13.00	-26.27	1.78	Peak	Vertical
2	2456.000	-54.17	-59.56	-13.00	-41.17	5.39	Peak	Vertical

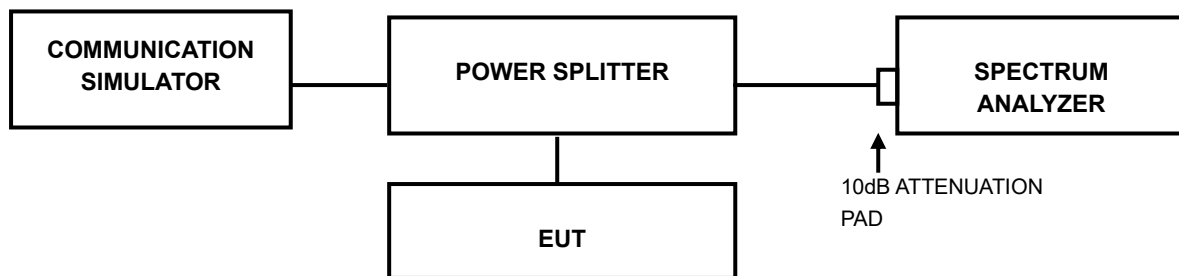


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

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

3.7.4 TEST RESULTS

Please Refer to Appendix of this test report.



4 INFORMATION ON THE TESTING LABORATORIES

We, Huarui 7layers High Technology (Suzhou) Co., Ltd. ,were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province, China
Accredited Test Lab Cert 6613.01

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

Suzhou EMC/RF Lab:

Tel: +86 (0557) 368 1008



5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.



6 APPENDIX

LTE BAND 14

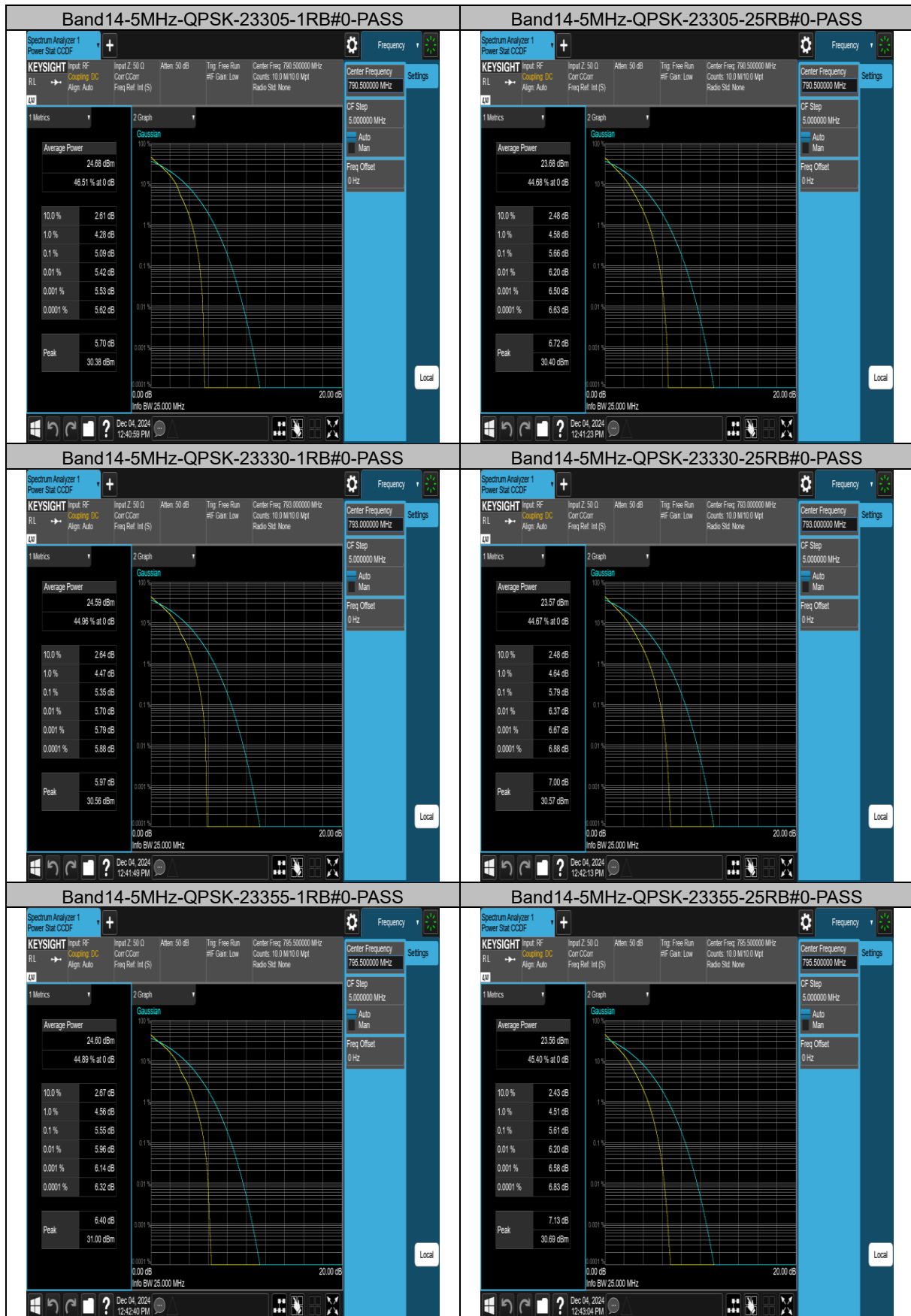
PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band14	5MHz	QPSK	23305	1RB#0	5.09	13	PASS
Band14	5MHz	QPSK	23305	25RB#0	5.66	13	PASS
Band14	5MHz	QPSK	23330	1RB#0	5.35	13	PASS
Band14	5MHz	QPSK	23330	25RB#0	5.79	13	PASS
Band14	5MHz	QPSK	23355	1RB#0	5.55	13	PASS
Band14	5MHz	QPSK	23355	25RB#0	5.61	13	PASS
Band14	5MHz	64QAM	23305	1RB#0	6.42	13	PASS
Band14	5MHz	64QAM	23305	25RB#0	6.70	13	PASS
Band14	5MHz	64QAM	23330	1RB#0	6.47	13	PASS
Band14	5MHz	64QAM	23330	25RB#0	6.82	13	PASS
Band14	5MHz	64QAM	23355	1RB#0	6.78	13	PASS
Band14	5MHz	64QAM	23355	25RB#0	6.68	13	PASS
Band14	5MHz	256QAM	23305	1RB#0	6.80	13	PASS
Band14	5MHz	256QAM	23305	25RB#0	6.84	13	PASS
Band14	5MHz	256QAM	23330	1RB#0	6.87	13	PASS
Band14	5MHz	256QAM	23330	25RB#0	6.89	13	PASS
Band14	5MHz	256QAM	23355	1RB#0	6.90	13	PASS
Band14	5MHz	256QAM	23355	25RB#0	6.79	13	PASS
Band14	5MHz	16QAM	23305	1RB#0	5.98	13	PASS
Band14	5MHz	16QAM	23305	25RB#0	6.41	13	PASS
Band14	5MHz	16QAM	23330	1RB#0	6.21	13	PASS
Band14	5MHz	16QAM	23330	25RB#0	6.55	13	PASS
Band14	5MHz	16QAM	23355	1RB#0	6.34	13	PASS
Band14	5MHz	16QAM	23355	25RB#0	6.34	13	PASS
Band14	10MHz	QPSK	23330	1RB#0	5.05	13	PASS
Band14	10MHz	QPSK	23330	50RB#0	5.71	13	PASS
Band14	10MHz	64QAM	23330	1RB#0	6.27	13	PASS
Band14	10MHz	64QAM	23330	50RB#0	6.72	13	PASS
Band14	10MHz	256QAM	23330	1RB#0	6.75	13	PASS
Band14	10MHz	256QAM	23330	50RB#0	6.83	13	PASS
Band14	10MHz	16QAM	23330	1RB#0	5.95	13	PASS
Band14	10MHz	16QAM	23330	50RB#0	6.45	13	PASS



Test Graphs



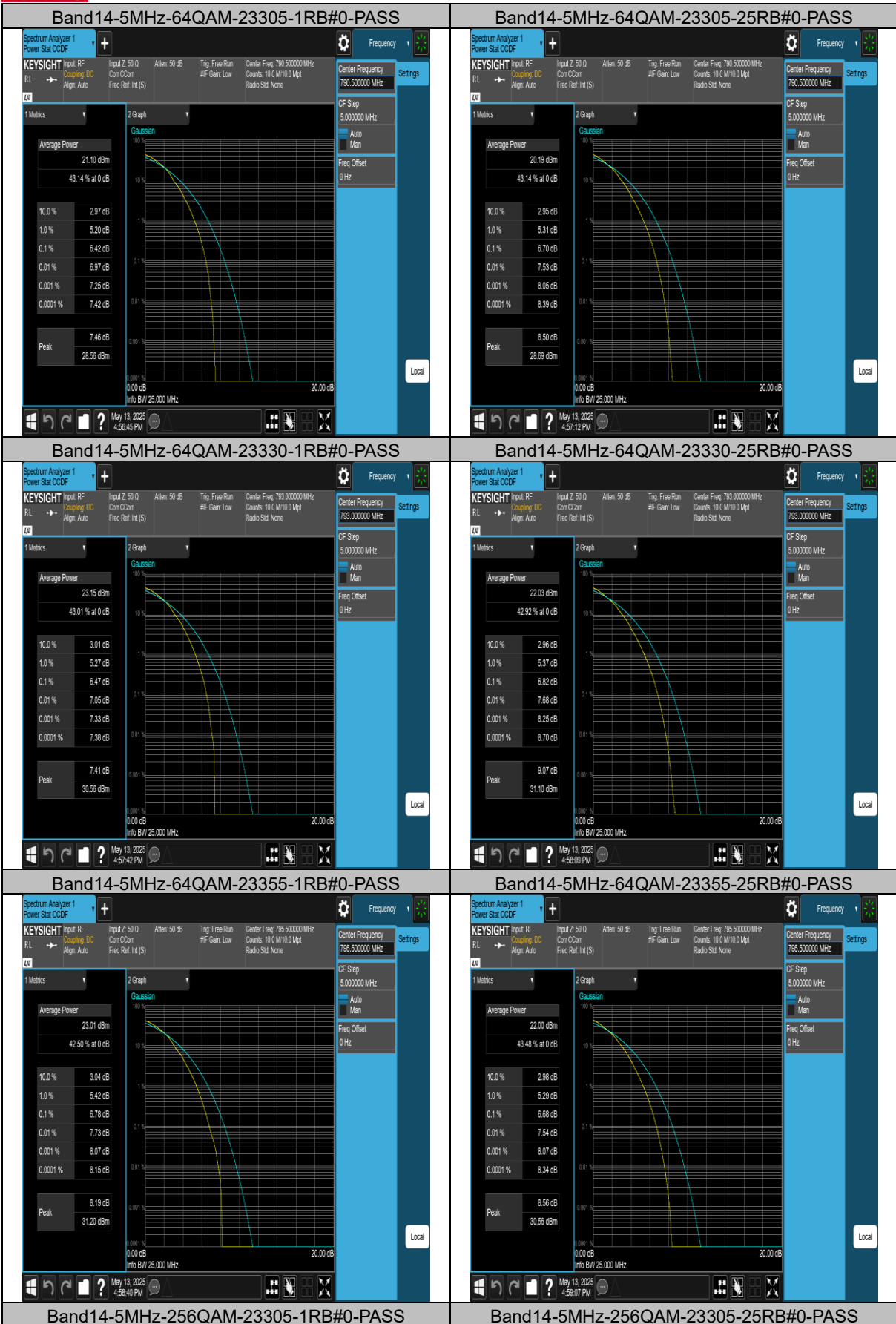
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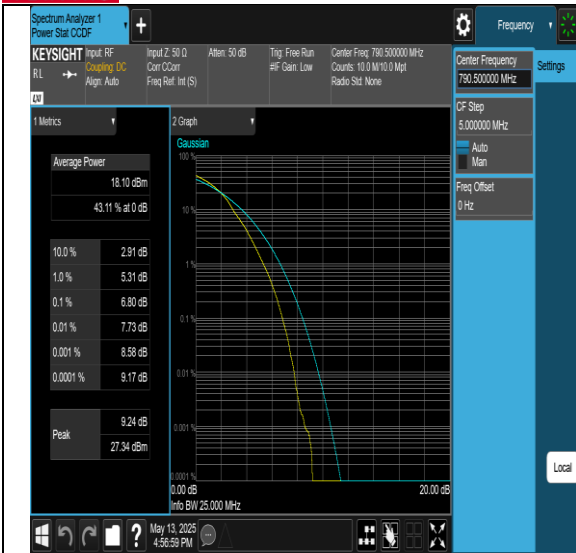
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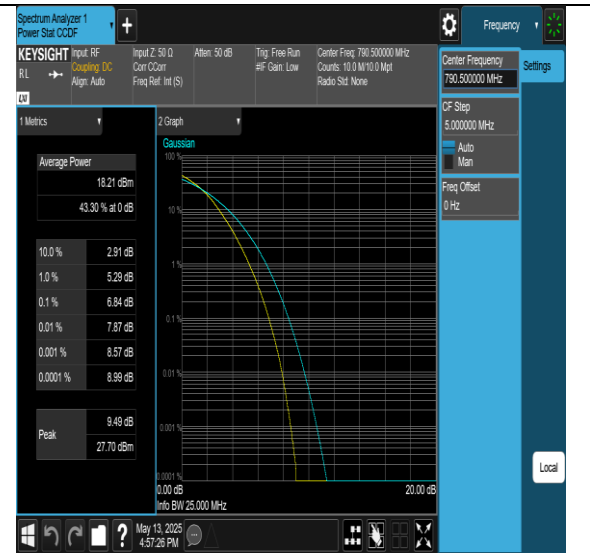
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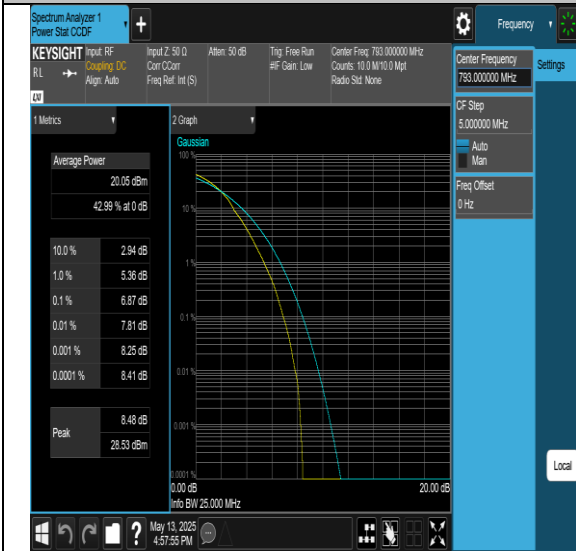
BUREAU VERITAS Test Report No.: PSU-QSU2411180418RF07



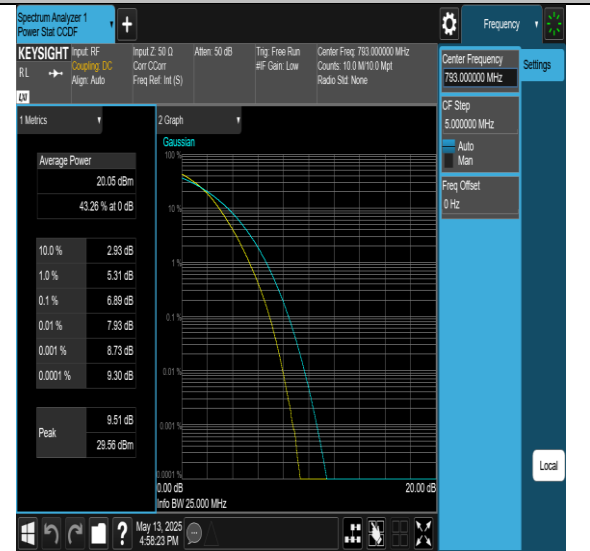
Band14-5MHz-256QAM-23330-1RB#0-PASS



Band14-5MHz-256QAM-23330-25RB#0-PASS



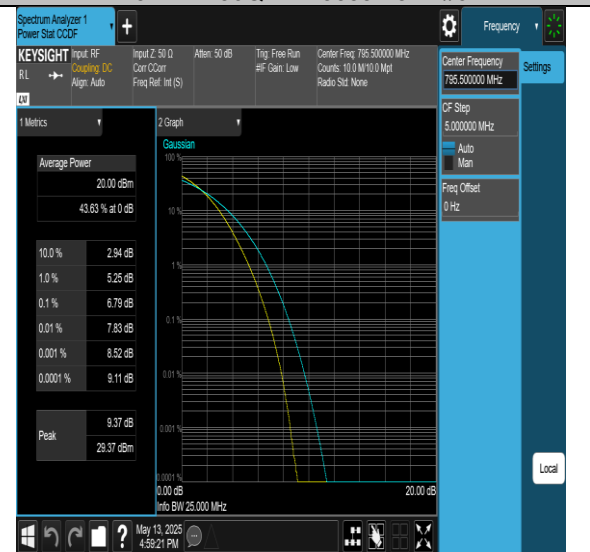
Band14-5MHz-256QAM-23355-1RB#0-PASS



Band14-5MHz-256QAM-23355-25RB#0-PASS



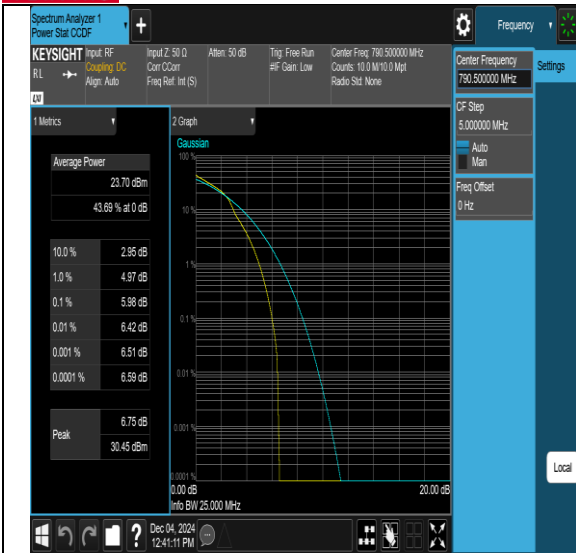
Band14-5MHz-16QAM-23305-1RB#0-PASS



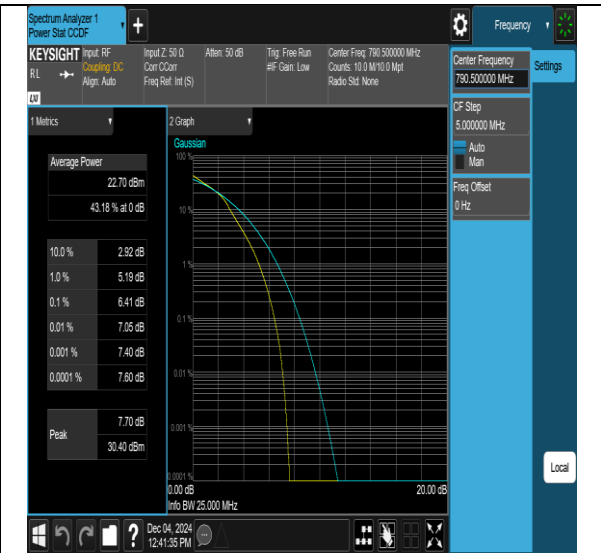
Band14-5MHz-16QAM-23305-25RB#0-PASS



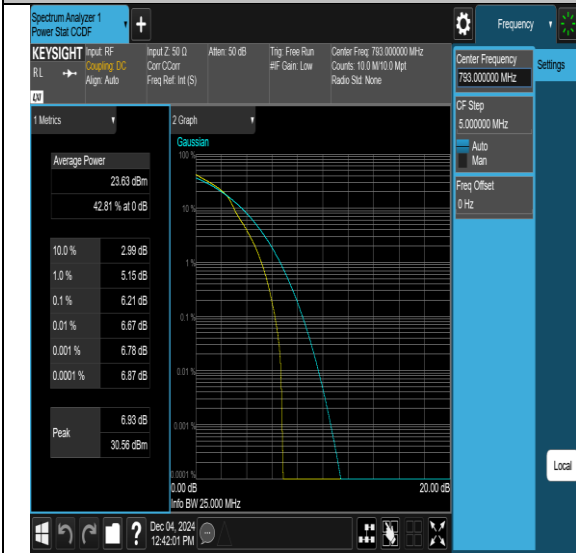
BUREAU VERITAS Test Report No.: PSU-QSU2411180418RF07



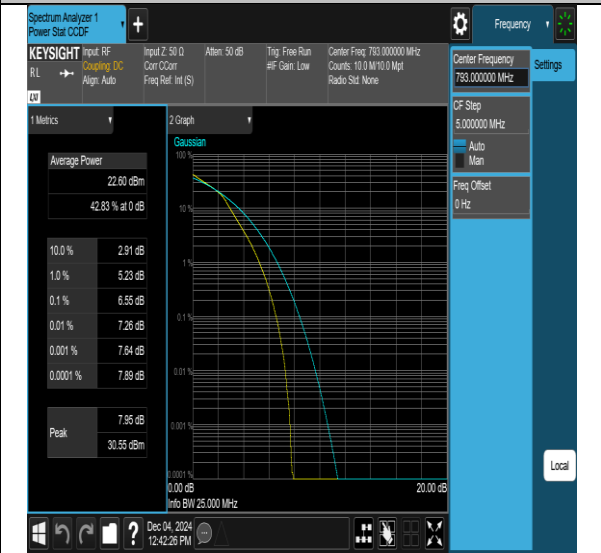
Band14-5MHz-16QAM-23330-1RB#0-PASS



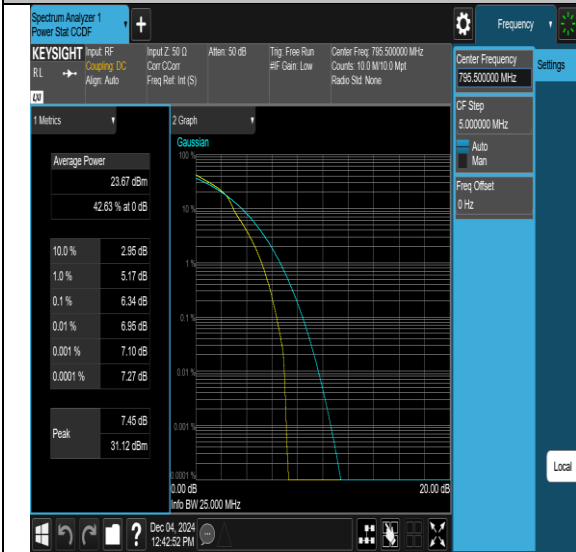
Band14-5MHz-16QAM-23330-25RB#0-PASS



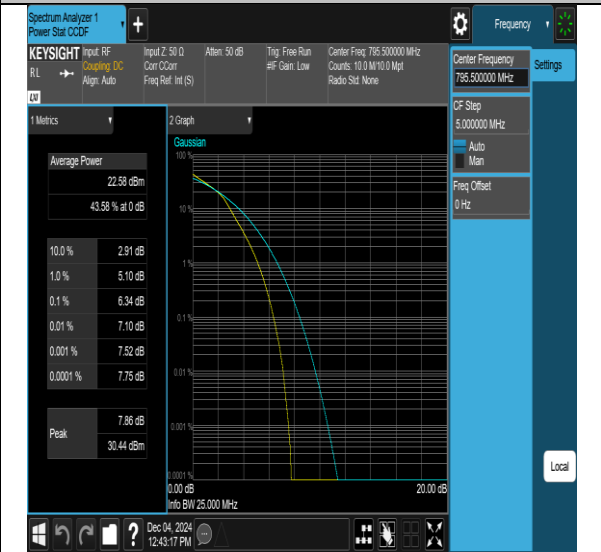
Band14-5MHz-16QAM-23355-1RB#0-PASS



Band14-5MHz-16QAM-23355-25RB#0-PASS



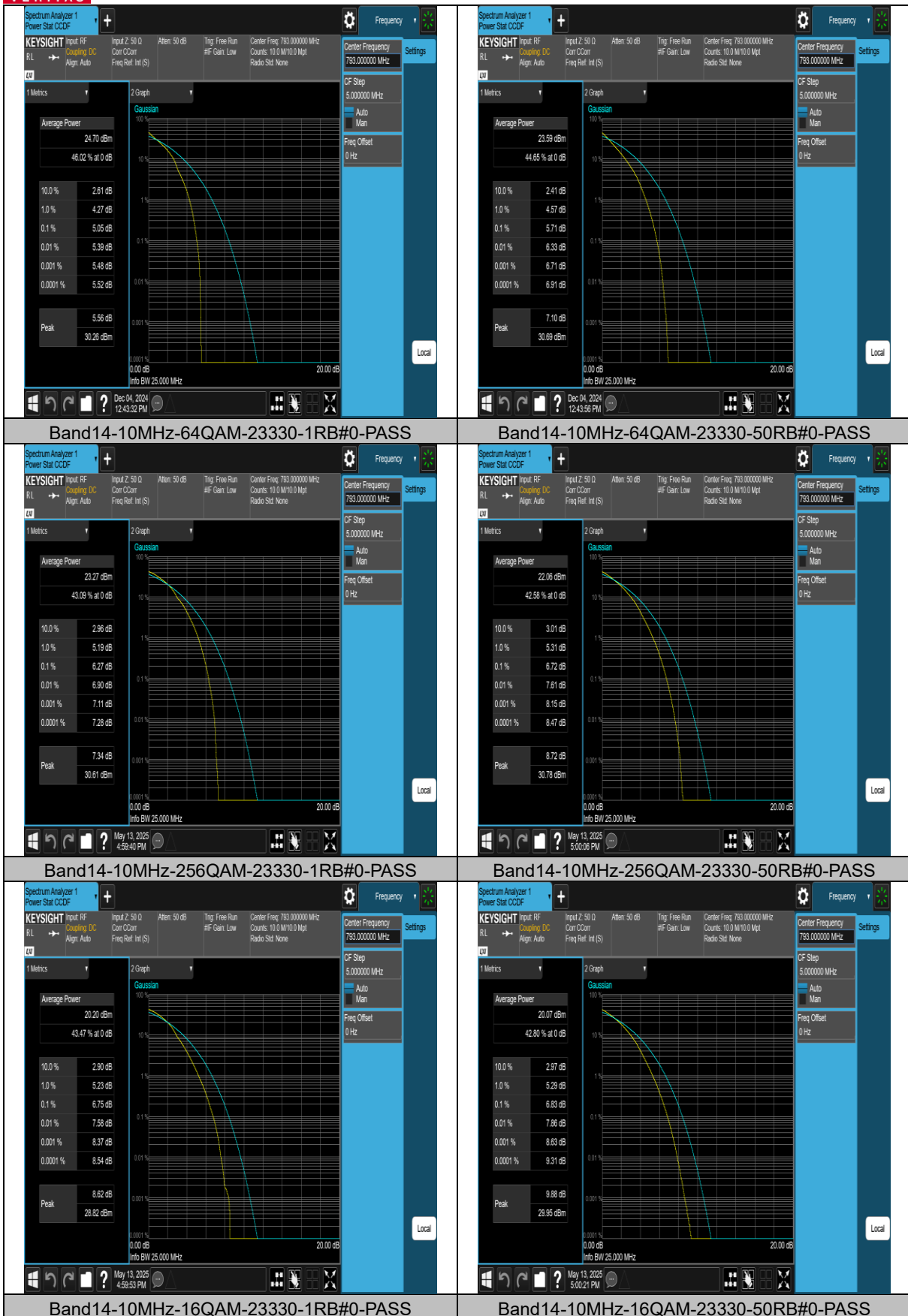
Band14-10MHz-QPSK-23330-1RB#0-PASS



Band14-10MHz-QPSK-23330-50RB#0-PASS



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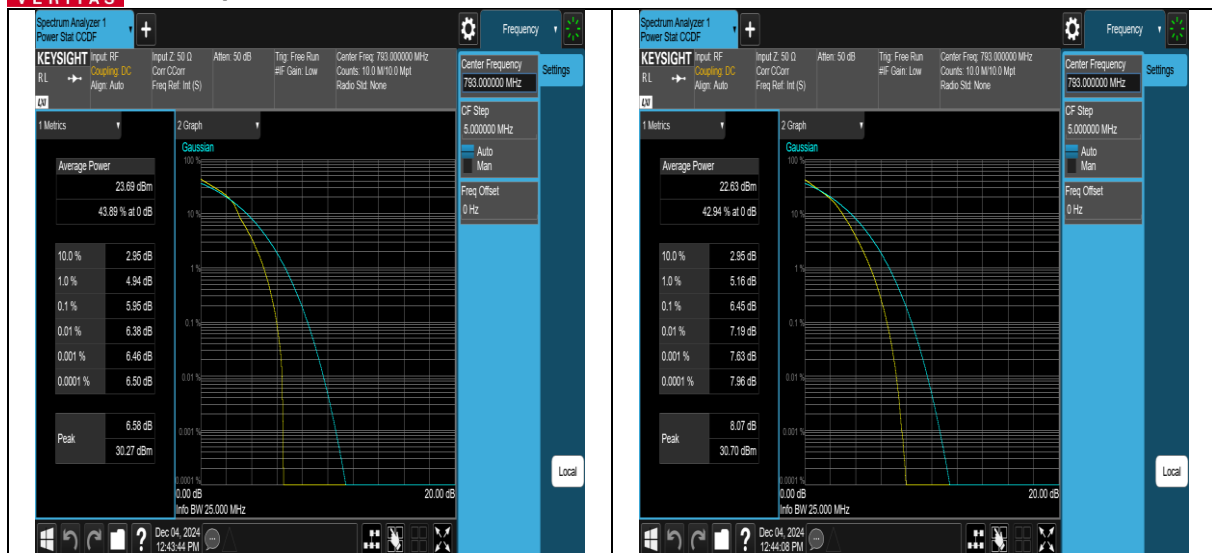
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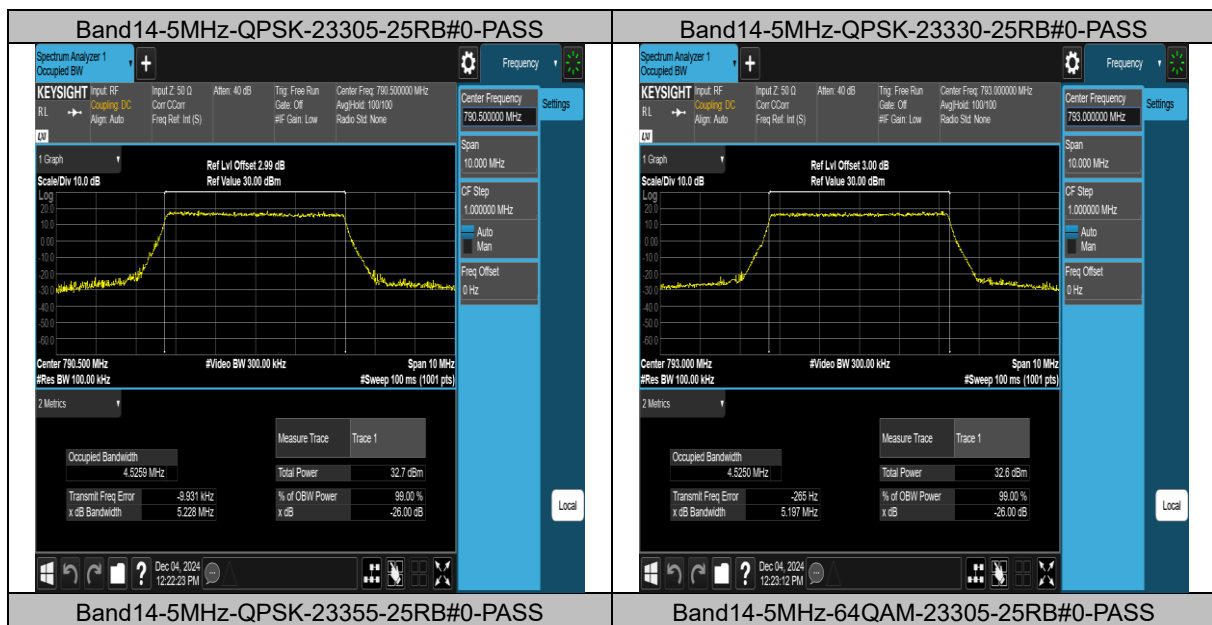
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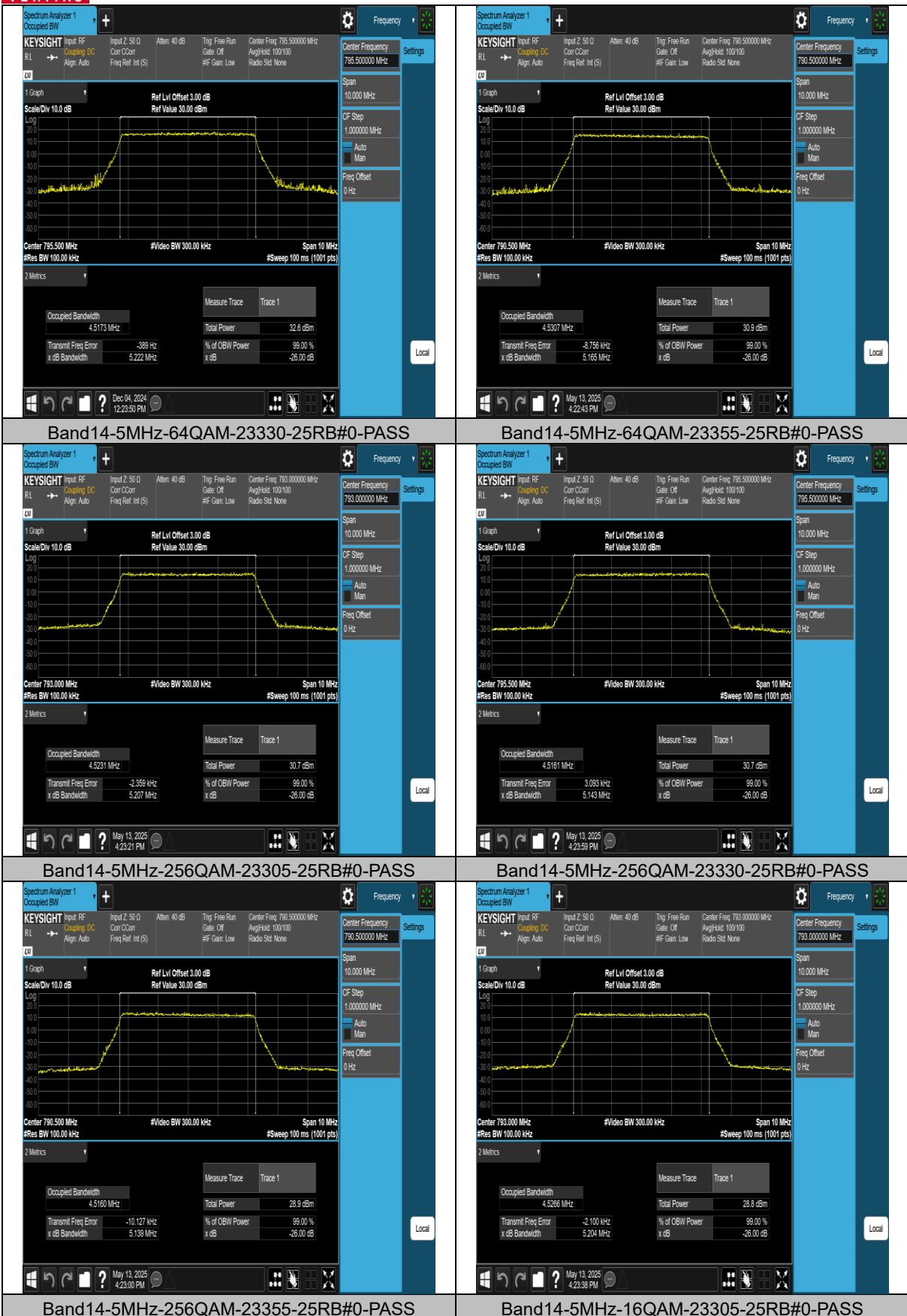
**26DB BANDWIDTH AND OCCUPIED BANDWIDTH****Test Result**

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band14	5MHz	QPSK	23305	25RB#0	4.5259	5.228	PASS
Band14	5MHz	QPSK	23330	25RB#0	4.5250	5.197	PASS
Band14	5MHz	QPSK	23355	25RB#0	4.5173	5.222	PASS
Band14	5MHz	64QAM	23305	25RB#0	4.5307	5.165	PASS
Band14	5MHz	64QAM	23330	25RB#0	4.5231	5.207	PASS
Band14	5MHz	64QAM	23355	25RB#0	4.5161	5.143	PASS
Band14	5MHz	256QAM	23305	25RB#0	4.5160	5.139	PASS
Band14	5MHz	256QAM	23330	25RB#0	4.5266	5.204	PASS
Band14	5MHz	256QAM	23355	25RB#0	4.5160	5.171	PASS
Band14	5MHz	16QAM	23305	25RB#0	4.5246	5.187	PASS
Band14	5MHz	16QAM	23330	25RB#0	4.5261	5.174	PASS
Band14	5MHz	16QAM	23355	25RB#0	4.5194	5.165	PASS
Band14	10MHz	QPSK	23330	50RB#0	9.0135	10.14	PASS
Band14	10MHz	64QAM	23330	50RB#0	9.0389	10.11	PASS
Band14	10MHz	256QAM	23330	50RB#0	9.0019	10.07	PASS
Band14	10MHz	16QAM	23330	50RB#0	9.0139	9.968	PASS

Test Graphs



BUREAU VERITAS Test Report No.: PSU-QSU2411180418RF07



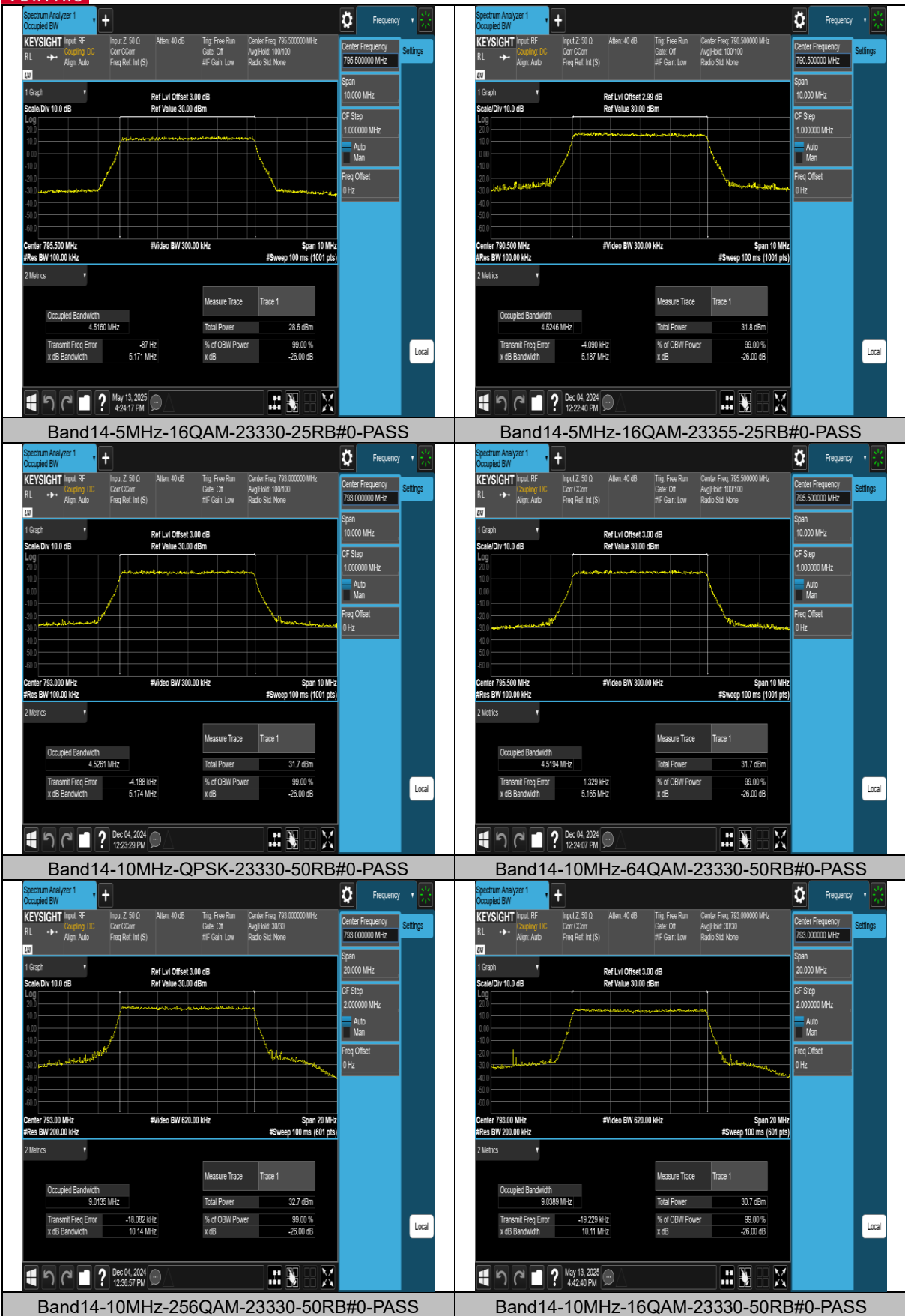
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BAND EDGE

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
Band14	5MHz	QPSK	23305	1RB#0	-26.31	PASS
Band14	5MHz	QPSK	23305	25RB#0	-51.89	PASS
Band14	5MHz	QPSK	23355	1RB#24	-51.93	PASS
Band14	5MHz	QPSK	23355	25RB#0	-48.66	PASS
Band14	5MHz	64QAM	23305	1RB#0	-22.75	PASS
Band14	5MHz	64QAM	23305	25RB#0	-19.78	PASS
Band14	5MHz	64QAM	23355	1RB#24	-27.24	PASS
Band14	5MHz	64QAM	23355	25RB#0	-44.80	PASS
Band14	5MHz	256QAM	23305	1RB#0	-26.27	PASS
Band14	5MHz	256QAM	23305	25RB#0	-21.71	PASS
Band14	5MHz	256QAM	23355	1RB#24	-27.79	PASS
Band14	5MHz	256QAM	23355	25RB#0	-46.92	PASS
Band14	5MHz	16QAM	23305	1RB#0	-28.77	PASS
Band14	5MHz	16QAM	23305	25RB#0	-51.84	PASS
Band14	5MHz	16QAM	23355	1RB#24	-51.72	PASS
Band14	5MHz	16QAM	23355	25RB#0	-48.22	PASS
Band14	10MHz	QPSK	23330	1RB#0	-51.99	PASS
Band14	10MHz	QPSK	23330	1RB#49	-51.95	PASS
Band14	10MHz	QPSK	23330	50RB#0	-49.21	PASS
Band14	10MHz	64QAM	23330	1RB#0	-32.91	PASS
Band14	10MHz	64QAM	23330	1RB#49	-33.27	PASS
Band14	10MHz	64QAM	23330	50RB#0	-46.71	PASS
Band14	10MHz	256QAM	23330	1RB#0	-57.00	PASS
Band14	10MHz	256QAM	23330	1RB#49	-56.68	PASS
Band14	10MHz	256QAM	23330	50RB#0	-49.45	PASS
Band14	10MHz	16QAM	23330	1RB#0	-51.81	PASS
Band14	10MHz	16QAM	23330	1RB#49	-51.90	PASS
Band14	10MHz	16QAM	23330	50RB#0	-49.45	PASS



Test Graphs

