



Test Report No.: RF181011N013-5

FCC TEST REPORT

(PART 27)

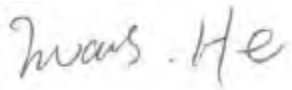
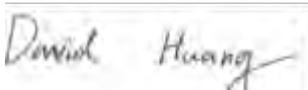
Applicant:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address:	Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District, Shenzhen

Manufacturer or Supplier:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address:	Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District, Shenzhen
Product:	Feature phone
Brand Name:	coolpad
Model Name:	Coolpad 3312A
FCC ID:	R38YL3312A
Date of tests:	Oct. 12, 2018 ~ Nov. 21, 2018

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

☒ FCC Part 27, Subpart C, L ☒ 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 Evans He Engineer / Mobile Department	Approved by David Huang Manager / Mobile Department
 Date: Nov. 30, 2018	 Date: Nov. 30, 2018

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV181011N013-5	Original release	Nov. 30, 2018

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 27 & Part 2			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
2.1046 27.50(d)(4)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	PASS	Meet the requirement of limit.
27.50(d)(5)	Peak to average ratio	PASS	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -13.21dB at 1569MHz.

NOTE : Test Lab Information:

Lab: Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

Test Lab Address: Zone A, Floor 1, Building 2 Wan Ye Long Technology Park
South Side of Zhoushi Road, Bao'an District Shenzhen, Guangdong, 518108, People's
Republic of China

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	3.11dB
Radiated emissions	9KHz ~ 30MHz	3.11dB
	30MHz ~ 1GMHz	5.12dB
	1GHz ~ 18GHz	5.34dB
	18GHz ~ 40GHz	5.02dB

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



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1.2 TEST SITE AND INSTRUMENTS

Instrument	Model	Serial #	Cal Date	Cal Due
EMI test receiver	ESL6	100262	Jan. 05, 18	Jan. 04, 19
Active Antenna	AL-130	121031	Feb. 08, 18	Feb. 07, 19
3m Semi-anechoic Chamber	9m*6m*6m	N/A	Oct. 18, 18	Oct. 17, 19
Signal Amplifier	8447E	443008	Jan. 25, 18	Jan. 24, 19
MXA signal analyzer	N9020A	MY49100060	Jan. 05, 18	Jan. 04, 19
Horn Antenna	HAH-118	71259	Jan. 26, 18	Jan. 25, 19
Horn Antenna	HAH-118	71283	Feb. 02, 18	Feb. 01, 19
AMPLIFIER	EM01G26G	60613	Feb. 25, 18	Feb. 24, 19
AMPLIFIER	Emc012645	980077	Jan. 05, 18	Jan. 04, 19
Bilog Antenna (30MHz~6GHz)	JB6	A110712	Feb. 08, 18	Feb. 07, 19
DC Power Supply	E3640A	MY40004013	Jan. 05, 18	Jan. 04, 19
MXA Signal Analyzer	N9020A	MY49100060	Jan. 05, 18	Jan. 04, 19
MXG Vector Signal Generator	N5182A	MY50140530	Jan. 05, 18	Jan. 04, 19
Series Signal Generator	E4421B	US40051152	May. 12, 18	May. 11, 19
RF control unit	JS0806-0806-2	188060112	Apr. 25, 18	Apr. 24, 19
Wireless Connectivity Tester	CMW270	1201.0002K75-101 601-PE	Apr. 25, 18	Apr. 24, 19
Universal Radio Communication Tester	CMU200	121393	Jan. 05, 18	Jan. 04, 19
Programmable Temperature & Humidity Chamber	HYL-TH-225DH	DG-180746	Jul. 15, 18	Jul. 14, 19
Test Software	EZ-EMC	ver.lcp-03A1	N/A	N/A

- NOTE:** 1. The calibration interval of the above test instruments is 12 months or 24 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 535293.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Feature phone	
MODEL NAME	Coolpad 3312A	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.7Vdc (Li-ion, ion battery)	
MODULATION TECHNOLOGY	LTE	QPSK, 16QAM
FREQUENCY RANGE	LTE Band 4 Channel Bandwidth: 1.4MHz	1710.7MHz ~ 1754.3MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.5MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~ 1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715.0MHz ~ 1750.0MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720.0MHz ~ 1745.0MHz
	LTE Band 12 Channel Bandwidth: 1.4MHz	699.7MHz ~ 715.3MHz
	LTE Band 12 Channel Bandwidth: 3MHz	700.5MHz ~ 714.5MHz
	LTE Band 12 Channel Bandwidth: 5MHz	701.5MHz ~ 713.5MHz
	LTE Band 12 Channel Bandwidth: 10MHz	704.0MHz ~ 711.0MHz
	LTE Band 13 Channel Bandwidth: 5MHz	779.5MHz ~ 784.5MHz
	LTE Band 13 Channel Bandwidth: 10MHz	782.0MHz
EMISSION DESIGNATOR	LTE Band 4 Channel Bandwidth: 1.4MHz	QPSK: 1M09G7D 16QAM: 1M09W7D
	LTE Band 4 Channel Bandwidth: 3MHz	QPSK: 2M69G7D 16QAM: 2M69W7D
	LTE Band 4 Channel Bandwidth: 5MHz	QPSK: 4M53G7D 16QAM: 4M52W7D
	LTE Band 4 Channel Bandwidth: 10MHz	QPSK: 8M93G7D 16QAM: 8M93W7D
	LTE Band 4 Channel Bandwidth: 15MHz	QPSK: 13M4G7D 16QAM: 13M4W7D
	LTE Band 4	QPSK: 17M8G7D



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	Channel Bandwidth: 20MHz	16QAM: 17M8W7D
EMISSION DESIGNATOR	LTE Band 12 Channel Bandwidth: 1.4MHz	QPSK: 1M09G7D 16QAM: 1M09W7D
	LTE Band 12 Channel Bandwidth: 3MHz	QPSK: 2M69G7D 16QAM: 2M69W7D
	LTE Band 12 Channel Bandwidth: 5MHz	QPSK: 4M48G7D 16QAM: 4M47W7D
	LTE Band 12 Channel Bandwidth: 10MHz	QPSK: 8M92G7D 16QAM: 8M92W7D
	LTE Band 13 Channel Bandwidth: 5MHz	QPSK: 4M47G7D 16QAM: 4M48W7D
	LTE Band 13 Channel Bandwidth: 10MHz	QPSK: 8M95G7D 16QAM: 8M95W7D
MAX. ERP/EIRP POWER	LTE Band 4 Channel Bandwidth: 1.4MHz	207.01mW
	LTE Band 4 Channel Bandwidth: 3MHz	208.45mW
	LTE Band 4 Channel Bandwidth: 5MHz	198.61mW
	LTE Band 4 Channel Bandwidth: 10MHz	207.49mW
	LTE Band 4 Channel Bandwidth: 15MHz	205.59mW
	LTE Band 4 Channel Bandwidth: 20MHz	204.17mW
	LTE Band 12 Channel Bandwidth: 1.4MHz	179.89mW
	LTE Band 12 Channel Bandwidth: 3MHz	176.20mW
	LTE Band 12 Channel Bandwidth: 5MHz	160.32mW
	LTE Band 12 Channel Bandwidth: 10MHz	167.11mW
	LTE Band 13 Channel Bandwidth: 5MHz	204.17mW
	LTE Band 13 Channel Bandwidth: 10MHz	196.79mW
ANTENNA TYPE	LTE Band 4/ LTE Band 13	FPC Antenna with 3.5dBi
	LTE Band 12	FPC Antenna with 1.4dBi
HW VERSION	P1	



**BUREAU
VERITAS**

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SW VERSION	3312A.SPRINT.181214.0D
ACCESSORY DEVICE	Refer to note as below
DATA CABLE	USB cable: non-shielded, detachable, 1.0m Earphone cable: non-shielded, detachable, 1.2m

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:	RD0501000-USBA-18MG
INPUT:	AC 100-240V~50/60Hz, 0.25A MAX
OUTPUT:	DC 5V,1000mA

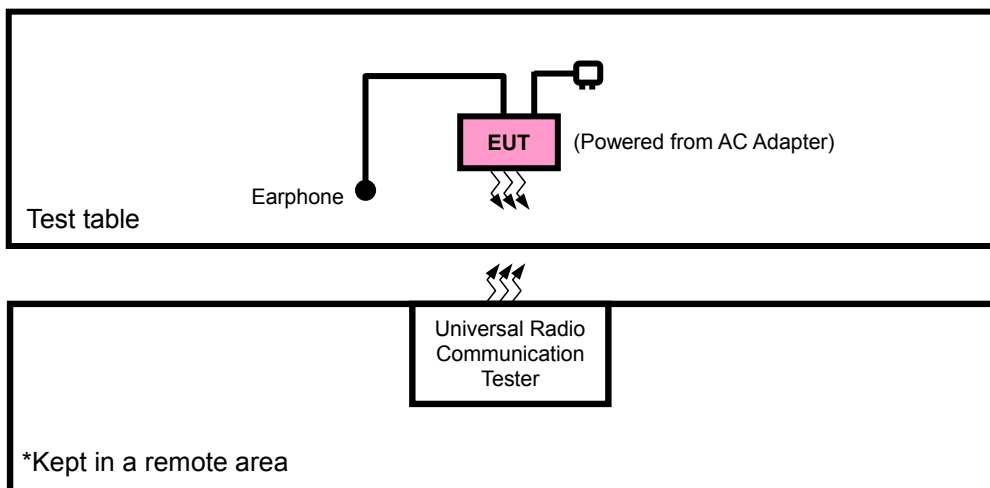
3. The EUT matched the following USB cable:

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

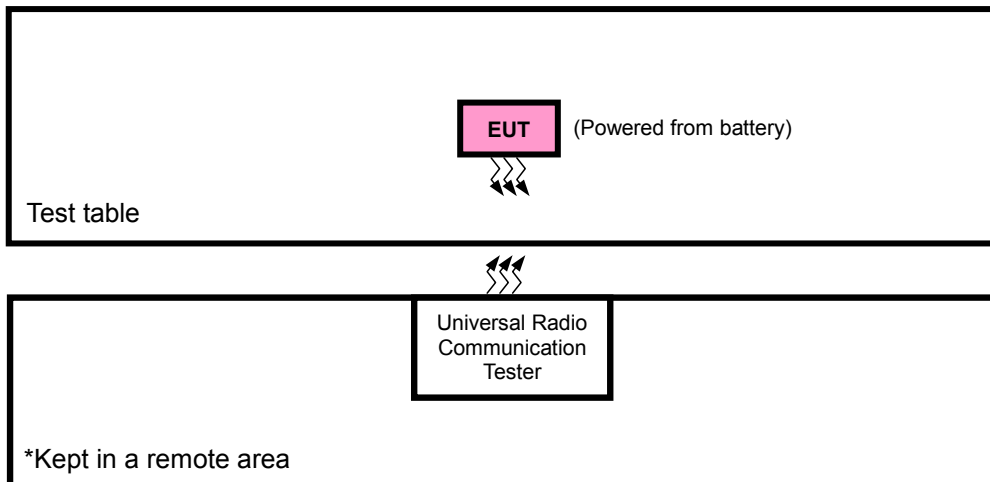
4. The above models are identical except the model name for marketing purpose.
5. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR CONDUCTED & E.R.P./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	Laptop	Lenovo	E40	LR-1EHRX	N/A
2					

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

1. All power cords of the above support units are no shielded (1.8m).

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 + USB Cable + Earphone with LTE link
B	EUT + Battery with LTE link

LTE BAND 4

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	EIRP	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	19957 to 20393	19957, 20393	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20385	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20375	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20350	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025, 20325	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20300	20MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
B	PEAK TO AVERAGE RATIO	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	BAND EDGE	19957 to 20393	19957	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
		19957 to 20393	20393	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		19965 to 20385	19965	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
		19965 to 20385	20385	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		19975 to 20375	19975	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
		19975 to 20375	20375	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		20000 to 20350	20000	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
		20000 to 20350	20350	10MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset

B	BAND EDGE	20025 to 20325	20025	15MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
		20050 to 20300	20325	15MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
			20050	20MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
B	CONDCUDETED EMISSION	19957 to 20393	20300	20MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
		19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	20025 to 20325	20025, 20175, 20325	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK	1 RB / 0 RB Offset
		19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	20175	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20175	20MHz	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 12

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	ERP	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095 ,23165	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095 ,23155	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095 ,23130	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	23017 to 23173	23017, 23173	1.4MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23165	3MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23155	5MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23130	10MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK,16QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095 ,23165	3MHz	QPSK,16QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095 ,23155	5MHz	QPSK,16QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095 ,23130	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
B	PEAK TO AVERAGE RATIO	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095 ,23165	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095 ,23155	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095 ,23130	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	BAND EDGE	23017 to 23173	23017	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
		23025 to 23165	23173	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		23035 to 23155	23025	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
		23060 to 23130	23165	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		23017 to 23173	23035	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
		23025 to 23165	23155	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
B	CONDCUETED EMISSION	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095 ,23165	3MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095 ,23155	5MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095 ,23130	10MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23095	3MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23095	5MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23095	10MHz	QPSK	1 RB / 0 RB Offset

LTE BAND 13

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	ERP	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23230	23230	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	23205 to 23255	23205, 23255	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23230	23230	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23230	23230	10MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
B	PEAK TO AVERAGE RATIO	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23230	23230	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
B	BAND EDGE	23205 to 23255	23205	5MHz	QPSK	1 RB / 0 RB Offset
			23255	5MHz	QPSK	25 RB / 0 RB Offset
		23230	23230	10MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
			23230	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
B	CONDCUDED EMISSION	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23230	23230	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	23205 to 23255	23230	5MHz	QPSK	1 RB / 0 RB Offset
		23230	23230	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	3.7Vdc from Battery	Evans He
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
CONDUCTED EMISSION	24deg. C, 60%RH	3.7Vdc from Battery	Evans He
RADIATED EMISSION	26deg. C, 62.5%RH	5Vdc from adapter	Evans He



Test Report No.: RF181011N013-5

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 2

FCC 47 CFR Part 27

KDB 971168 D01 Power Meas License Digital Systems 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

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

Portable stations (hand-held devices) operating in the 699-716 MHz bands are limited to 3 watts ERP.

3.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

- a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RBW and VBW is 10MHz for LTE.
- b. E.I.R.P power 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.
- c. 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
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- e. $E.R.P = E.I.R.P - 2.15 \text{ dB}$

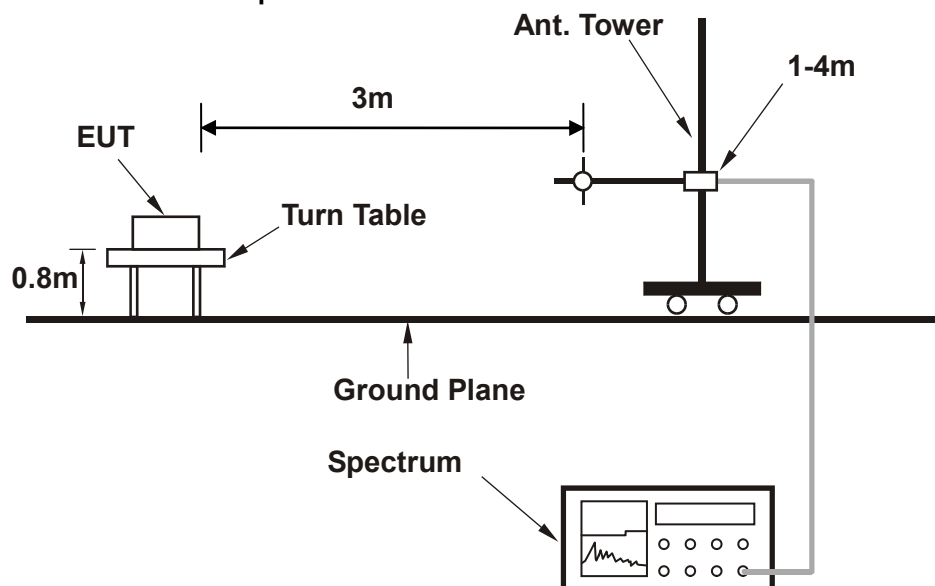
CONDUCTED POWER MEASUREMENT:

- 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.

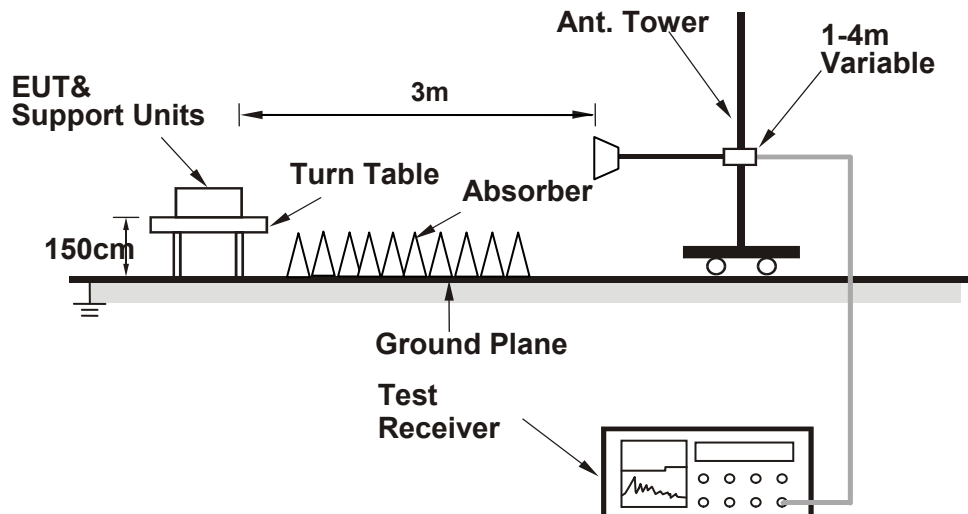
3.1.3 TEST SETUP

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

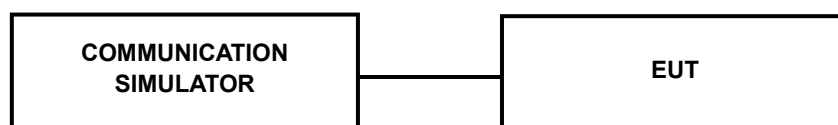


<Radiated Emission above 1 GHz>



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

CONDUCTED POWER MEASUREMENT:





**BUREAU
VERITAS**

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3.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 20175	High CH 20393	MPR
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz	
1.4MHz	QPSK	1	0	23.55	23.58	23.62	0
		1	2	23.41	23.44	23.48	0
		1	5	23.37	23.40	23.44	0
		3	0	23.53	23.56	23.60	0
		3	1	23.39	23.42	23.46	0
		3	3	23.35	23.38	23.42	0
		6	0	22.50	22.53	22.57	1
	16QAM	1	0	22.47	22.50	22.54	1
		1	2	21.65	21.68	21.72	1
		1	5	21.49	21.52	21.56	1
		3	0	22.46	22.49	22.53	1
		3	1	21.64	21.67	21.71	1
		3	3	21.48	21.51	21.55	1
		6	0	21.47	21.50	21.54	2
BW	Modulation	RB Size	RB Offset	Low CH 19965	Mid CH 20175	High CH 20385	MPR
				Frequency 1711.5 MHz	Frequency 1732.5 MHz	Frequency 1753.5 MHz	
3 MHz	QPSK	1	0	23.56	23.59	23.63	0
		1	7	23.42	23.45	23.49	0
		1	14	23.38	23.41	23.45	0
		8	0	22.56	22.59	22.63	1
		8	3	22.41	22.44	22.48	1
		8	7	22.39	22.42	22.46	1
		15	0	22.51	22.54	22.58	1
	16QAM	1	0	22.48	22.51	22.55	1
		1	7	21.66	21.69	21.73	1
		1	14	21.50	21.53	21.57	1
		8	0	21.48	21.51	21.55	2
		8	3	21.34	21.37	21.41	2
		8	7	21.44	21.47	21.51	2
		15	0	21.48	21.51	21.55	2

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19975	Mid CH 20175	High CH 20375	MPR
				Frequency 1712.5 MHz	Frequency 1732.5 MHz	Frequency 1752.5 MHz	
5 MHz	QPSK	1	0	23.59	23.62	23.66	0
		1	12	23.45	23.48	23.52	0
		1	24	23.41	23.44	23.48	0
		12	0	22.59	22.62	22.66	1
		12	6	22.44	22.47	22.51	1
		12	13	22.42	22.45	22.49	1
		25	0	22.54	22.57	22.61	1
	16QAM	1	0	22.51	22.54	22.58	1
		1	12	21.69	21.72	21.76	1
		1	24	21.53	21.56	21.60	1
		12	0	21.51	21.54	21.58	2
		12	6	21.37	21.40	21.44	2
		12	13	21.47	21.50	21.54	2
		25	0	21.51	21.54	21.58	2
BW	Modulation	RB Size	RB Offset	Low CH 20000	Mid CH 20175	High CH 20350	MPR
				Frequency 1715 MHz	Frequency 1732.5 MHz	Frequency 1750 MHz	
10 MHz	QPSK	1	0	23.63	23.66	23.70	0
		1	24	23.49	23.52	23.56	0
		1	49	23.45	23.48	23.52	0
		25	0	22.63	22.66	22.70	1
		25	12	22.48	22.51	22.55	1
		25	25	22.46	22.49	22.53	1
		50	0	22.58	22.61	22.65	1
	16QAM	1	0	22.55	22.58	22.62	1
		1	24	21.73	21.76	21.80	1
		1	49	21.57	21.60	21.64	1
		25	0	21.55	21.58	21.62	2
		25	12	21.41	21.44	21.48	2
		25	25	21.51	21.54	21.58	2
		50	0	21.55	21.58	21.62	2

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 20025	Mid CH 20175	High CH 20325	MPR
				Frequency 1717.5 MHz	Frequency 1732.5 MHz	Frequency 1747.5 MHz	
15 MHz	QPSK	1	0	23.69	23.72	23.76	0
		1	37	23.55	23.58	23.62	0
		1	74	23.51	23.54	23.58	0
		36	0	22.69	22.72	22.76	1
		36	19	22.54	22.57	22.61	1
		36	39	22.52	22.55	22.59	1
		75	0	22.64	22.67	22.71	1
	16QAM	1	0	22.61	22.64	22.68	1
		1	37	21.79	21.82	21.86	1
		1	74	21.63	21.66	21.70	1
		36	0	21.61	21.64	21.68	2
		36	19	21.47	21.50	21.54	2
		36	39	21.57	21.60	21.64	2
		75	0	21.61	21.64	21.68	2
BW	Modulation	RB Size	RB Offset	Low CH 20050	Mid CH 20175	High CH 20300	MPR
				Frequency 1720 MHz	Frequency 1732.5 MHz	Frequency 1745 MHz	
20MHz	QPSK	1	0	23.72	23.75	23.79	0
		1	50	23.58	23.61	23.65	0
		1	99	23.54	23.57	23.61	0
		50	0	22.72	22.75	22.79	1
		50	25	22.57	22.60	22.64	1
		50	50	22.55	22.58	22.62	1
		100	0	22.67	22.70	22.74	1
	16QAM	1	0	22.64	22.67	22.71	1
		1	50	21.82	21.85	21.89	1
		1	99	21.66	21.69	21.73	1
		50	0	21.64	21.67	21.71	2
		50	25	21.50	21.53	21.57	2
		50	50	21.60	21.63	21.67	2
		100	0	21.64	21.67	21.71	2

LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23017	Mid CH 23095	High CH 23173	MPR
				Frequency 699.7 MHz	Frequency 707.5 MHz	Frequency 715.3 MHz	
1.4 MHz	QPSK	1	0	23.45	23.08	23.32	0
		1	2	23.32	22.95	23.19	0
		1	5	23.39	23.02	23.26	0
		3	0	23.43	23.06	23.30	0
		3	1	23.30	22.93	23.17	0
		3	3	23.37	23.00	23.24	0
		6	0	22.36	21.99	22.23	1
	16QAM	1	0	22.05	21.68	21.92	1
		1	2	21.96	21.59	21.83	1
		1	5	22.00	21.63	21.87	1
		3	0	22.04	21.67	21.91	1
		3	1	21.95	21.58	21.82	1
		3	3	21.99	21.62	21.86	1
		6	0	21.45	21.08	21.32	2
LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23025	Mid CH 23095	High CH 23165	MPR
				Frequency 700.5 MHz	Frequency 707.5 MHz	Frequency 714.5 MHz	
3 MHz	QPSK	1	0	23.49	23.12	23.36	0
		1	7	23.36	22.99	23.23	0
		1	14	23.43	23.06	23.30	0
		8	0	22.42	22.05	22.29	1
		8	3	22.29	21.92	22.16	1
		8	7	22.36	21.99	22.23	1
		15	0	22.40	22.03	22.27	1
	16QAM	1	0	22.09	21.72	21.96	1
		1	7	22.00	21.63	21.87	1
		1	14	22.04	21.67	21.91	1
		8	0	21.32	20.95	21.19	2
		8	3	21.31	20.94	21.18	2
		8	7	21.30	20.93	21.17	2
		15	0	21.49	21.12	21.36	2

LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23035	Mid CH 23095	High CH 23155	MPR
				Frequency 701.5 MHz	Frequency 707.5 MHz	Frequency 713.5 MHz	
5 MHz	QPSK	1	0	23.55	23.18	23.42	0
		1	12	23.42	23.05	23.29	0
		1	24	23.49	23.12	23.36	0
		12	0	22.48	22.11	22.35	1
		12	6	22.35	21.98	22.22	1
		12	13	22.42	22.05	22.29	1
		25	0	22.46	22.09	22.33	1
	16QAM	1	0	22.15	21.78	22.02	1
		1	12	22.06	21.69	21.93	1
		1	24	22.10	21.73	21.97	1
		12	0	21.38	21.01	21.25	2
		12	6	21.37	21.00	21.24	2
		12	13	21.36	20.99	21.23	2
		25	0	21.55	21.18	21.42	2
LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23060	Mid CH 23095	High CH 23130	MPR
				Frequency 704 MHz	Frequency 707.5 MHz	Frequency 711 MHz	
10 MHz	QPSK	1	0	23.58	23.21	23.45	0
		1	24	23.45	23.08	23.32	0
		1	49	23.52	23.15	23.39	0
		25	0	22.51	22.14	22.38	1
		25	12	22.38	22.01	22.25	1
		25	25	22.45	22.08	22.32	1
		50	0	22.49	22.12	22.36	1
	16QAM	1	0	22.18	21.81	22.05	1
		1	24	22.09	21.72	21.96	1
		1	49	22.13	21.76	22.00	1
		25	0	21.41	21.04	21.28	2
		25	12	21.40	21.03	21.27	2
		25	25	21.39	21.02	21.26	2
		50	0	21.58	21.21	21.45	2

LTE Band 13							
BW	Modulation	RB Size	RB Offset	Low CH 23205	Mid CH 23230	High CH 23255	MPR
				Frequency 779.5 MHz	Frequency 782.0 MHz	Frequency 784.5 MHz	
5 MHz	QPSK	1	0	23.49	23.31	23.62	0
		1	12	23.53	23.35	23.66	0
		1	24	23.51	23.33	23.64	0
		12	0	22.44	22.26	22.57	1
		12	6	22.66	22.48	22.79	1
		12	13	22.45	22.27	22.58	1
		25	0	22.51	22.33	22.64	1
	16QAM	1	0	21.95	21.77	22.08	1
		1	12	22.24	22.06	22.37	1
		1	24	22.03	21.85	22.16	1
		12	0	21.62	21.44	21.75	2
		12	6	21.42	21.24	21.55	2
		12	13	21.51	21.33	21.64	2
		25	0	21.55	21.37	21.68	2

LTE Band 13							
BW	Modulation	RB Size	RB Offset	CH	CH 23230	CH	MPR
				Frequency MHz	Frequency 782.0 MHz	Frequency MHz	
10 MHz	QPSK	1	0	-	23.34	-	0
		1	24	-	23.68	-	0
		1	49	-	23.51	-	0
		25	0	-	22.59	-	1
		25	12	-	22.66	-	1
		25	25	-	22.61	-	1
		50	0	-	22.51	-	1
	16QAM	1	0	-	22.11	-	1
		1	24	-	22.24	-	1
		1	49	-	22.19	-	1
		25	0	-	21.62	-	2
		25	12	-	21.58	-	2
		25	25	-	21.51	-	2
		50	0	-	21.71	-	2

EIRP

LTE BAND 4

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19957	1710.7	-19.97	41.77	21.8	151.36	H	1
20175	1732.5	-20.1	41.87	21.77	150.31	H	1
20393	1754.3	-18.91	41.11	22.2	165.96	H	1
19957	1710.7	-19.55	42.42	22.87	193.64	V	1
20175	1732.5	-19.24	42.4	23.16	207.01	V	1
20393	1754.3	-19.42	41.67	22.25	167.88	V	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19957	1710.7	-19.62	41.77	22.15	164.06	H	1
20175	1732.5	-19.91	41.87	21.96	157.04	H	1
20393	1754.3	-19.12	41.11	21.99	158.12	H	1
19957	1710.7	-20.09	42.42	22.33	171	V	1
20175	1732.5	-19.4	42.4	23	199.53	V	1
20393	1754.3	-19.13	41.67	22.54	179.47	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19965	1711.5	-19.52	41.74	22.22	166.72	H	1
20175	1732.5	-19.22	41.3	22.08	161.44	H	1
20385	1753.5	-18.03	40.32	22.29	169.43	H	1
19965	1711.5	-19.32	42.36	23.04	201.37	V	1
20175	1732.5	-20.25	42.39	22.14	163.68	V	1
20385	1753.5	-20.33	42.46	22.13	163.31	V	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19965	1711.5	-19.61	41.74	22.13	163.31	H	1
20175	1732.5	-19.17	41.3	22.13	163.31	H	1
20385	1753.5	-18.11	40.32	22.21	166.34	H	1
19965	1711.5	-20.15	42.36	22.21	166.34	V	1
20175	1732.5	-19.2	42.39	23.19	208.45	V	1
20385	1753.5	-20.51	42.46	21.95	156.68	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19975	1712.5	-19.09	40.81	21.72	148.59	H	1
20175	1732.5	-19.75	41.46	21.71	148.25	H	1
20375	1752.5	-19.97	41.89	21.92	155.6	H	1
19975	1712.5	-19.58	41.74	22.16	164.44	V	1
20175	1732.5	-19.37	41.28	21.91	155.24	V	1
20375	1752.5	-19.99	42.23	22.24	167.49	V	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19975	1712.5	-18.58	40.81	22.23	167.11	H	1
20175	1732.5	-19.59	41.46	21.87	153.82	H	1
20375	1752.5	-19.61	41.89	22.28	169.04	H	1
19975	1712.5	-19.77	41.74	21.97	157.4	V	1
20175	1732.5	-18.3	41.28	22.98	198.61	V	1
20375	1752.5	-19.34	42.23	22.89	194.54	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20000	1715	-19.42	41.14	21.72	148.59	H	1
20175	1732.5	-19.93	41.7	21.77	150.31	H	1
20350	1750	-19.89	41.74	21.85	153.11	H	1
20000	1715	-19.65	41.9	22.25	167.88	V	1
20175	1732.5	-19.87	42.13	22.26	168.27	V	1
20350	1750	-18.68	41.21	22.53	179.06	V	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20000	1715	-19.21	41.14	21.93	155.96	H	1
20175	1732.5	-19.93	41.7	21.77	150.31	H	1
20350	1750	-19.77	41.74	21.97	157.4	H	1
20000	1715	-19.96	41.9	21.94	156.31	V	1
20175	1732.5	-20.32	42.13	21.81	151.71	V	1
20350	1750	-18.04	41.21	23.17	207.49	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20025	1717.5	-19.95	42.12	22.17	164.82	H	1
20175	1732.5	-20.11	41.97	21.86	153.46	H	1
20325	1747.5	-18.93	40.98	22.05	160.32	H	1
20025	1717.5	-18.66	41.79	23.13	205.59	V	1
20175	1732.5	-20.24	42.35	22.11	162.55	V	1
20325	1747.5	-19.58	41.56	21.98	157.76	V	1

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20025	1717.5	-20.33	42.12	21.79	151.01	H	1
20175	1732.5	-20.11	41.97	21.86	153.46	H	1
20325	1747.5	-18.79	40.98	22.19	165.58	H	1
20025	1717.5	-19.01	41.79	22.78	189.67	V	1
20175	1732.5	-19.4	42.35	22.95	197.24	V	1
20325	1747.5	-18.64	41.56	22.92	195.88	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20050	1720	-18.11	40.26	22.15	164.06	H	1
20175	1732.5	-19.4	41.61	22.21	166.34	H	1
20300	1745	-19.94	41.76	21.82	152.05	H	1
20050	1720	-19.96	42.25	22.29	169.43	V	1
20175	1732.5	-18.82	41.45	22.63	183.23	V	1
20300	1745	-19.94	42.42	22.48	177.01	V	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20050	1720	-18.45	40.26	21.81	151.71	H	1
20175	1732.5	-19.41	41.61	22.2	165.96	H	1
20300	1745	-19.93	41.76	21.83	152.41	H	1
20050	1720	-19.15	42.25	23.1	204.17	V	1
20175	1732.5	-19.45	41.45	22	158.49	V	1
20300	1745	-19.7	42.42	22.72	187.07	V	1

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

LTE BAND 12

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23017	699.7	-9.13	32.72	21.44	139.32	H	3
23095	707.5	-8.32	31.74	21.27	133.97	H	3
23171	715.3	-9.35	33.12	21.62	145.21	H	3
23017	699.7	-7.97	32.67	22.55	179.89	V	3
23095	707.5	-8.94	32.41	21.32	135.52	V	3
23171	715.3	-8.71	32.98	22.12	162.93	V	3

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23017	699.7	-9.31	32.72	21.26	133.66	H	3
23095	707.5	-7.89	31.74	21.7	147.91	H	3
23171	715.3	-9.46	33.12	21.51	141.58	H	3
23017	699.7	-9.31	32.67	21.21	132.13	V	3
23095	707.5	-8.97	32.41	21.29	134.59	V	3
23171	715.3	-8.68	32.98	22.15	164.06	V	3

LTE BAND 12

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23025	700.5	-9.17	32.87	21.55	142.89	H	3
23095	707.5	-7.96	31.64	21.53	142.23	H	3
23165	714.5	-9.6	33.14	21.39	137.72	H	3
23025	700.5	-8.78	33.1	22.17	164.82	V	3
23095	707.5	-9.36	33.04	21.53	142.23	V	3
23165	714.5	-8.54	33.15	22.46	176.2	V	3

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23025	700.5	-9.47	32.87	21.25	133.35	H	3
23095	707.5	-8.32	31.64	21.17	130.92	H	3
23165	714.5	-9.74	33.14	21.25	133.35	H	3
23025	700.5	-8.88	33.1	22.07	161.06	V	3
23095	707.5	-8.64	33.04	22.25	167.88	V	3
23165	714.5	-9.78	33.15	21.22	132.43	V	3

LTE BAND 12

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23035	701.5	-8.02	31.71	21.54	142.56	H	3
23095	707.5	-9.69	33.28	21.44	139.32	H	3
23155	713.5	-9.79	33.29	21.35	136.46	H	3
23035	701.5	-8.99	32.92	21.78	150.66	V	3
23095	707.5	-8.76	32.36	21.45	139.64	V	3
23155	713.5	-8.35	32.47	21.97	157.4	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23035	701.5	-7.97	31.71	21.59	144.21	H	3
23095	707.5	-9.79	33.28	21.34	136.14	H	3
23155	713.5	-10	33.29	21.14	130.02	H	3
23035	701.5	-8.72	32.92	22.05	160.32	V	3
23095	707.5	-8.54	32.36	21.67	146.89	V	3
23155	713.5	-8.76	32.47	21.56	143.22	V	3

LTE BAND 12

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23060	704	-8.52	32.13	21.46	139.96	H	3
23095	707.5	-9.81	33.24	21.28	134.28	H	3
23130	711	-9.78	33.24	21.31	135.21	H	3
23060	704	-9.65	33.03	21.23	132.74	V	3
23095	707.5	-9.16	33.13	21.82	152.05	V	3
23130	711	-9.48	33.58	21.95	156.68	V	3

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23060	704	-8.64	32.13	21.34	136.14	H	3
23095	707.5	-9.77	33.24	21.32	135.52	H	3
23130	711	-9.76	33.24	21.33	135.83	H	3
23060	704	-8.65	33.03	22.23	167.11	V	3
23095	707.5	-9.18	33.13	21.8	151.36	V	3
23130	711	-9.64	33.58	21.79	151.01	V	3

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

LTE BAND 13

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23205	779.5	-8.62	32.8	22.03	159.59	H	3
23230	782	-9.36	33.27	21.76	149.97	H	3
23255	784.5	-8.69	32.56	21.72	148.59	H	3
23205	779.5	-8.97	33.55	22.43	174.98	V	3
23230	782	-8.91	33.31	22.25	167.88	V	3
23255	784.5	-8.35	32.51	22.01	158.85	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23205	779.5	-8.75	32.8	21.9	154.88	H	3
23230	782	-9.18	33.27	21.94	156.31	H	3
23255	784.5	-8.5	32.56	21.91	155.24	H	3
23205	779.5	-9.16	33.55	22.24	167.49	V	3
23230	782	-9.25	33.31	21.91	155.24	V	3
23255	784.5	-7.26	32.51	23.1	204.17	V	3

LTE BAND 13

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23230	782	-7.98	32.83	22.7	186.21	H	3
23230	782	-7.71	32.33	22.47	176.6	V	3

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23230	782	-8.33	32.83	22.35	171.79	H	3
23230	782	-7.24	32.33	22.94	196.79	V	3

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 STABILITY MEASUREMENT

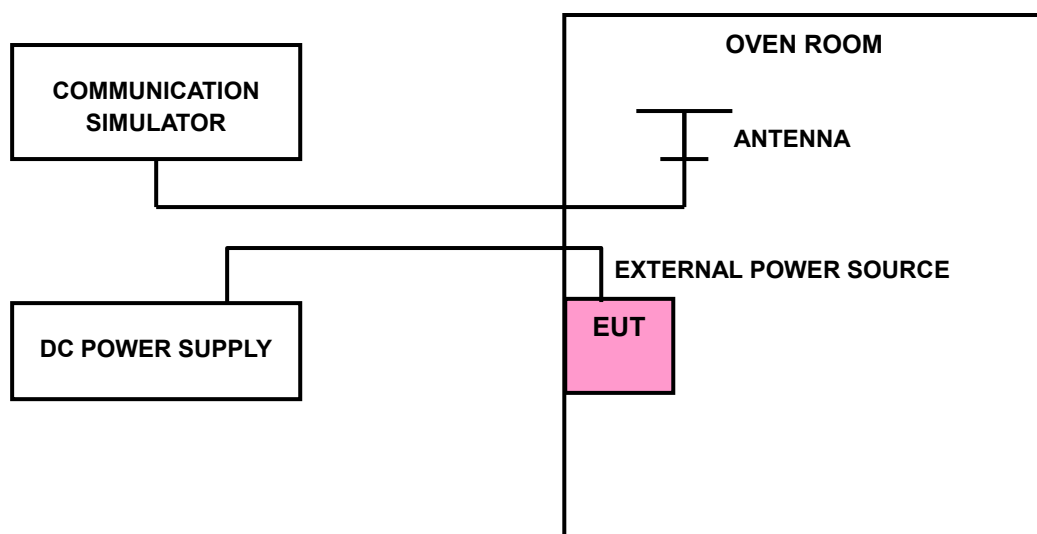
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.2.2 TEST PROCEDURE

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

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

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

LTE BAND 4

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0008	0.0009	2.5
3.4(BEP)	-0.0009	-0.0010	2.5
4.2	0.0007	0.0009	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. (°C)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0055	-0.0055	2.5
-20	-0.0050	-0.0051	2.5
-10	-0.0044	-0.0045	2.5
0	-0.0039	-0.0039	2.5
10	-0.0030	-0.0030	2.5
20	-0.0024	-0.0023	2.5
30	-0.0018	-0.0018	2.5
40	-0.0006	-0.0006	2.5
50	-0.0003	-0.0004	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0008	0.0010	2.5
3.4(BEP)	-0.0010	-0.0010	2.5
4.2	0.0010	0.0009	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. (°C)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0055	-0.0057	2.5
-20	-0.0050	-0.0048	2.5
-10	-0.0044	-0.0041	2.5
0	-0.0035	-0.0033	2.5
10	-0.0030	-0.0029	2.5
20	-0.0018	-0.0025	2.5
30	-0.0015	-0.0014	2.5
40	-0.0009	-0.0008	2.5
50	-0.0003	-0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0009	0.0011	2.5
3.4(BEP)	-0.0011	-0.0012	2.5
4.2	0.0010	0.0010	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. (°C)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0053	-0.0053	2.5
-20	-0.0046	-0.0048	2.5
-10	-0.0041	-0.0039	2.5
0	-0.0036	-0.0034	2.5
10	-0.0030	-0.0028	2.5
20	-0.0023	-0.0020	2.5
30	-0.0014	-0.0013	2.5
40	-0.0008	-0.0007	2.5
50	-0.0002	0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0010	0.0008	2.5
3.4(BEP)	-0.0012	-0.0009	2.5
4.2	0.0009	0.0008	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. (°C)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0051	-0.0052	2.5
-20	-0.0044	-0.0046	2.5
-10	-0.0039	-0.0040	2.5
0	-0.0034	-0.0034	2.5
10	-0.0028	-0.0025	2.5
20	-0.0021	-0.0019	2.5
30	-0.0015	-0.0013	2.5
40	-0.0010	-0.0008	2.5
50	0.0003	0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0012	0.0011	2.5
3.4(BEP)	-0.0011	-0.0012	2.5
4.2	0.0009	0.0010	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. (°C)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0051	-0.0049	2.5
-20	-0.0047	-0.0043	2.5
-10	-0.0039	-0.0036	2.5
0	-0.0030	-0.0028	2.5
10	-0.0024	-0.0025	2.5
20	-0.0019	-0.0013	2.5
30	-0.0011	-0.0010	2.5
40	-0.0007	-0.0003	2.5
50	0.0002	0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0011	0.0011	2.5
3.4(BEP)	-0.0012	-0.0011	2.5
4.2	0.0010	0.0012	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. (°C)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0048	-0.0051	2.5
-20	-0.0041	-0.0042	2.5
-10	-0.0037	-0.0036	2.5
0	-0.0028	-0.0029	2.5
10	-0.0022	-0.0023	2.5
20	-0.0018	-0.0013	2.5
30	-0.0008	-0.0009	2.5
40	-0.0005	-0.0001	2.5
50	0.0002	0.0002	2.5

LTE BAND 12

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0018	0.0019	2.5
3.4(BEP)	-0.0022	-0.0021	2.5
4.2	0.0018	0.0021	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. (°C)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0146	-0.0144	2.5
-20	-0.0134	-0.0132	2.5
-10	-0.0116	-0.0115	2.5
0	-0.0095	-0.0093	2.5
10	-0.0077	-0.0074	2.5
20	-0.0060	-0.0057	2.5
30	-0.0052	-0.0050	2.5
40	-0.0026	-0.0024	2.5
50	-0.0008	-0.0005	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0020	0.0026	2.5
3.4(BEP)	-0.0031	-0.0029	2.5
4.2	0.0023	0.0022	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. (°C)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0146	-0.0145	2.5
-20	-0.0128	-0.0126	2.5
-10	-0.0107	-0.0106	2.5
0	-0.0079	-0.0076	2.5
10	-0.0060	-0.0058	2.5
20	-0.0045	-0.0043	2.5
30	-0.0027	-0.0024	2.5
40	-0.0012	-0.0009	2.5
50	0.0005	0.0008	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0020	0.0019	2.5
3.4(BEP)	-0.0027	-0.0024	2.5
4.2	0.0019	0.0022	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. (°C)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0138	-0.0137	2.5
-20	-0.0122	-0.0120	2.5
-10	-0.0106	-0.0104	2.5
0	-0.0090	-0.0088	2.5
10	-0.0075	-0.0072	2.5
20	-0.0055	-0.0052	2.5
30	-0.0035	-0.0032	2.5
40	-0.0023	-0.0021	2.5
50	-0.0005	-0.0005	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0025	0.0026	2.5
3.4(BEP)	-0.0026	-0.0026	2.5
4.2	0.0022	0.0021	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. (°C)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0134	-0.0134	2.5
-20	-0.0119	-0.0119	2.5
-10	-0.0102	-0.0101	2.5
0	-0.0090	-0.0089	2.5
10	-0.0063	-0.0061	2.5
20	-0.0055	-0.0053	2.5
30	-0.0036	-0.0034	2.5
40	-0.0019	-0.0017	2.5
50	0.0008	0.0011	2.5

LTE BAND 13

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0021	0.0027	2.5
3.4(BEP)	-0.0026	-0.0027	2.5
4.2	0.0026	0.0025	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0124	-0.0142	2.5
-20	-0.0133	-0.0131	2.5
-10	-0.0113	-0.0113	2.5
0	-0.0093	-0.0097	2.5
10	-0.0074	-0.0072	2.5
20	-0.0068	-0.0063	2.5
30	-0.0046	-0.0043	2.5
40	-0.0026	-0.0024	2.5
50	-0.0003	-0.0004	2.5
60	-0.0141	-0.0141	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 23230	
3.8	0.0021	2.5
3.4(BEP)	-0.0024	2.5
4.2	0.0022	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

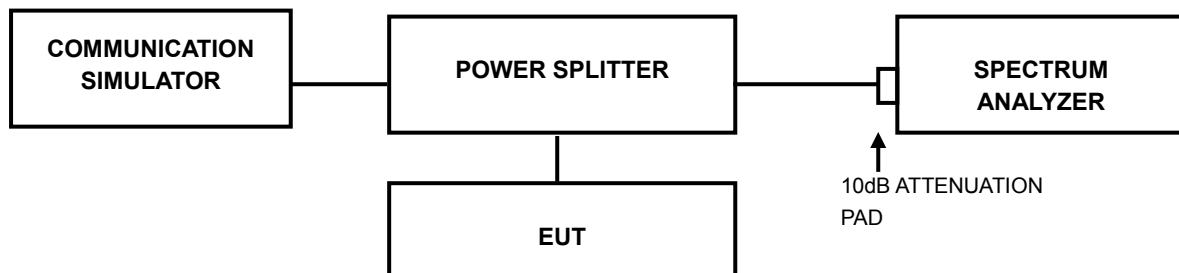
TEMP. (°C)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 23230	
-30	-0.0142	2.5
-20	-0.0122	2.5
-10	-0.0102	2.5
0	-0.0029	2.5
10	-0.0022	2.5
20	-0.0046	2.5
30	-0.0022	2.5
40	-0.0012	2.5
50	0.00052	2.5
60	-0.0129	2.5

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

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

3.3.2 TEST SETUP



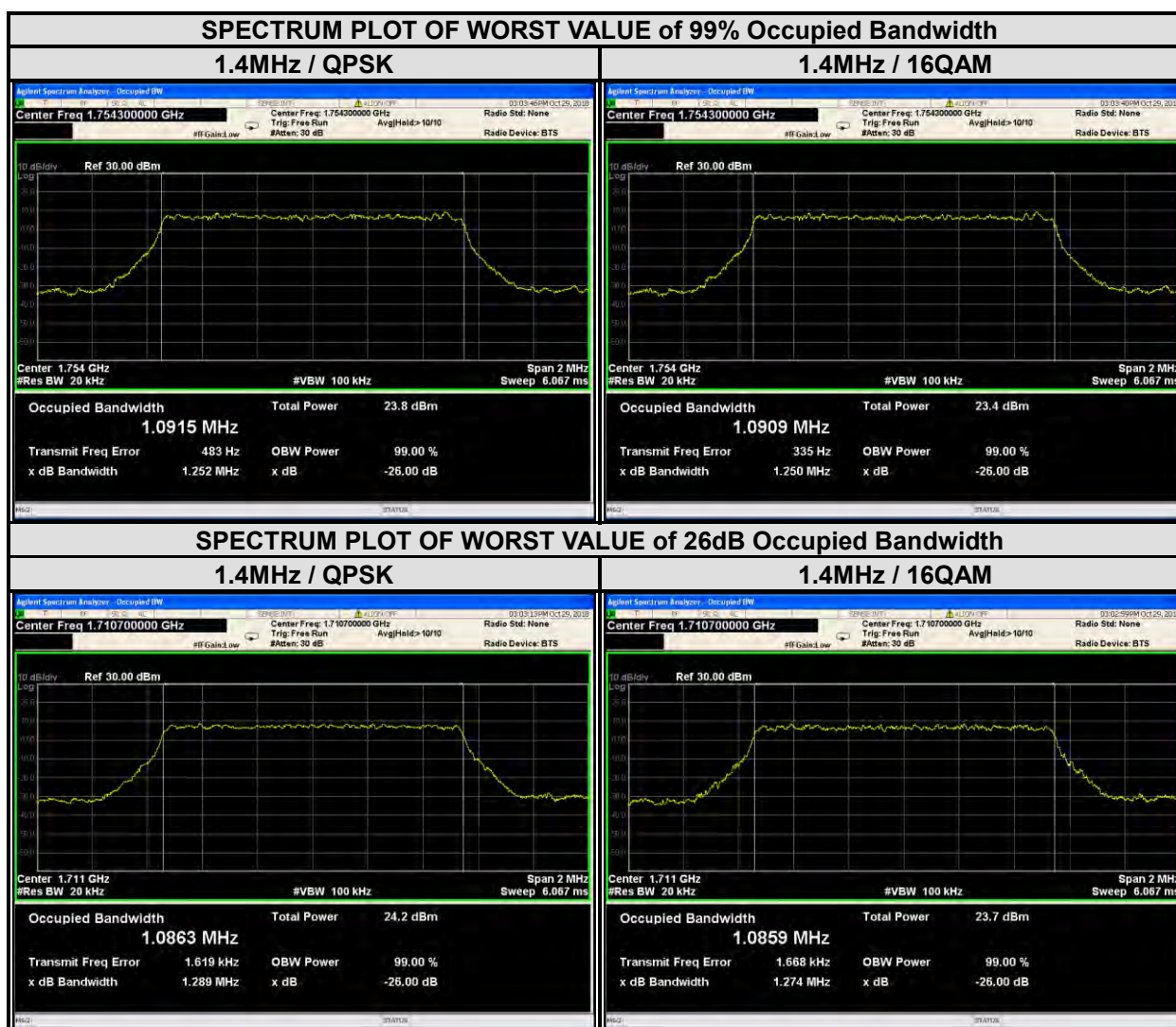
3.3.3 TEST PROCEDURES

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

3.3.4 TEST RESULTS

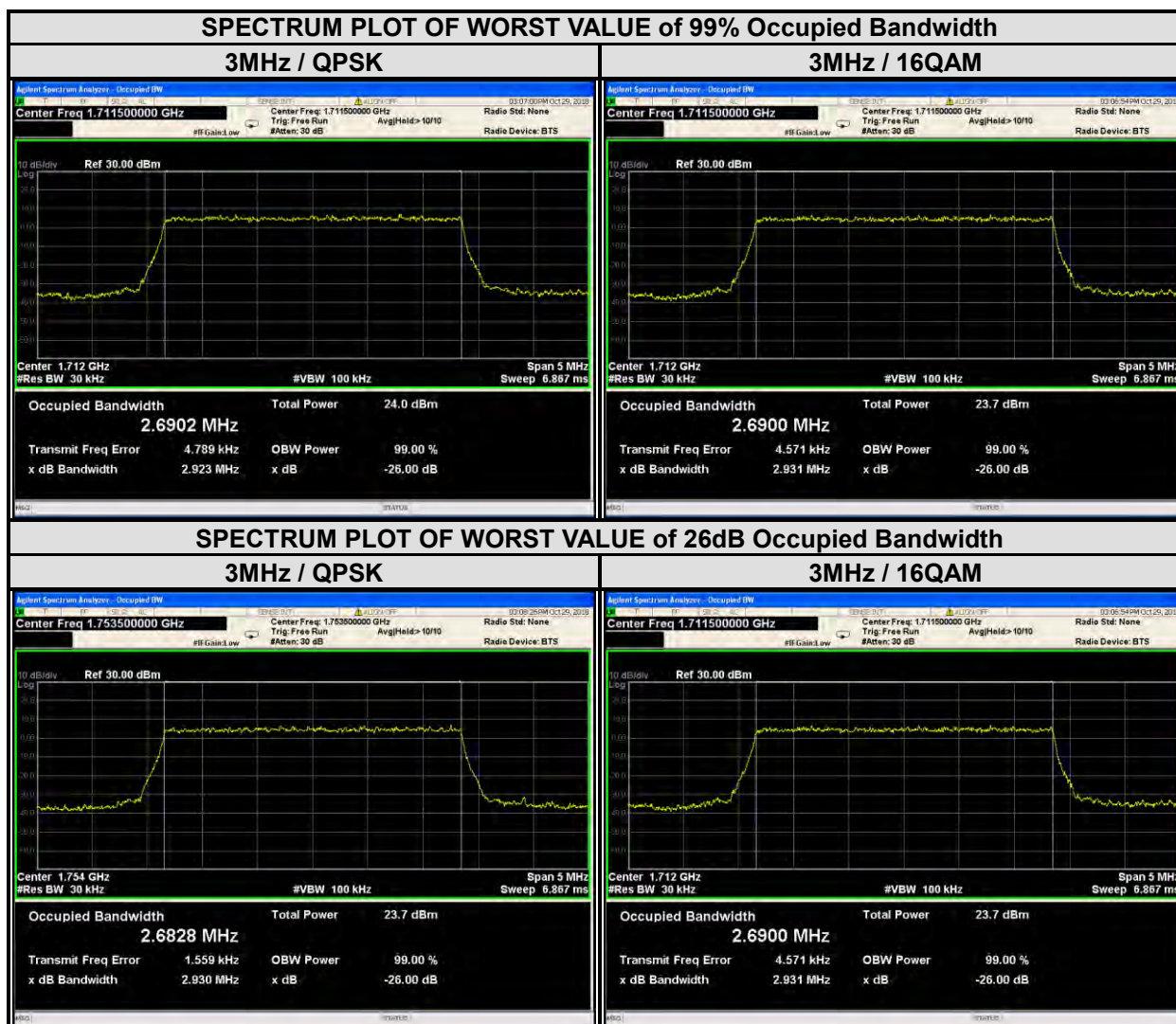
LTE BAND 4

CHANNEL BANDWIDTH: 1.4MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	1.0863	1.0859	19957	1710.7	1.289	1.274
20175	1732.5	1.0822	1.0794	20175	1732.5	1.252	1.262
20393	1754.3	1.0915	1.0909	20393	1754.3	1.252	1.250



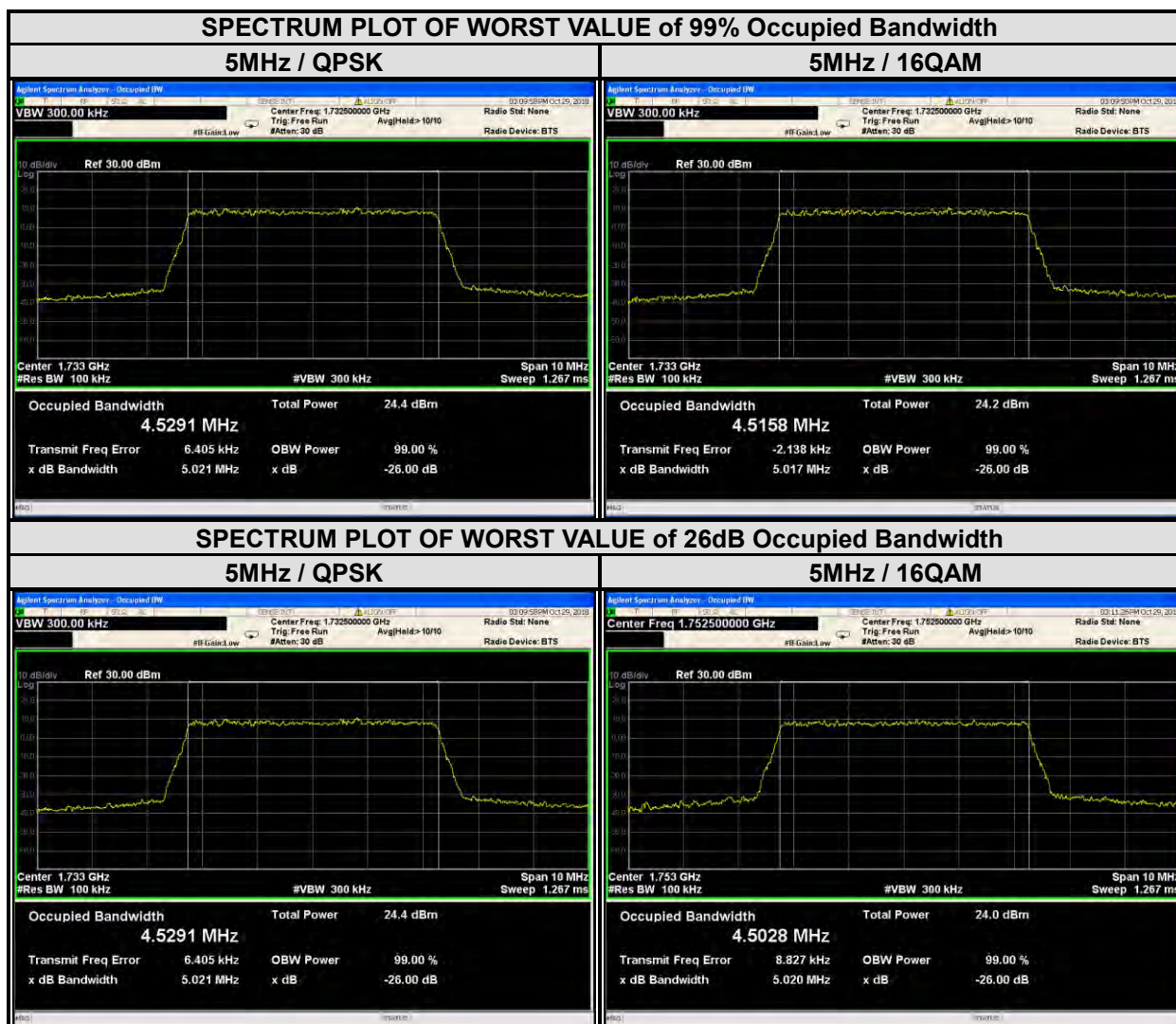
LTE BAND 4

CHANNEL BANDWIDTH: 3MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
19965	1711.5	2.6902	2.6900	19965	1711.5	2.923	2.931
20175	1732.5	2.6814	2.6805	20175	1732.5	2.925	2.926
20385	1753.5	2.6828	2.6829	20385	1753.5	2.930	2.928



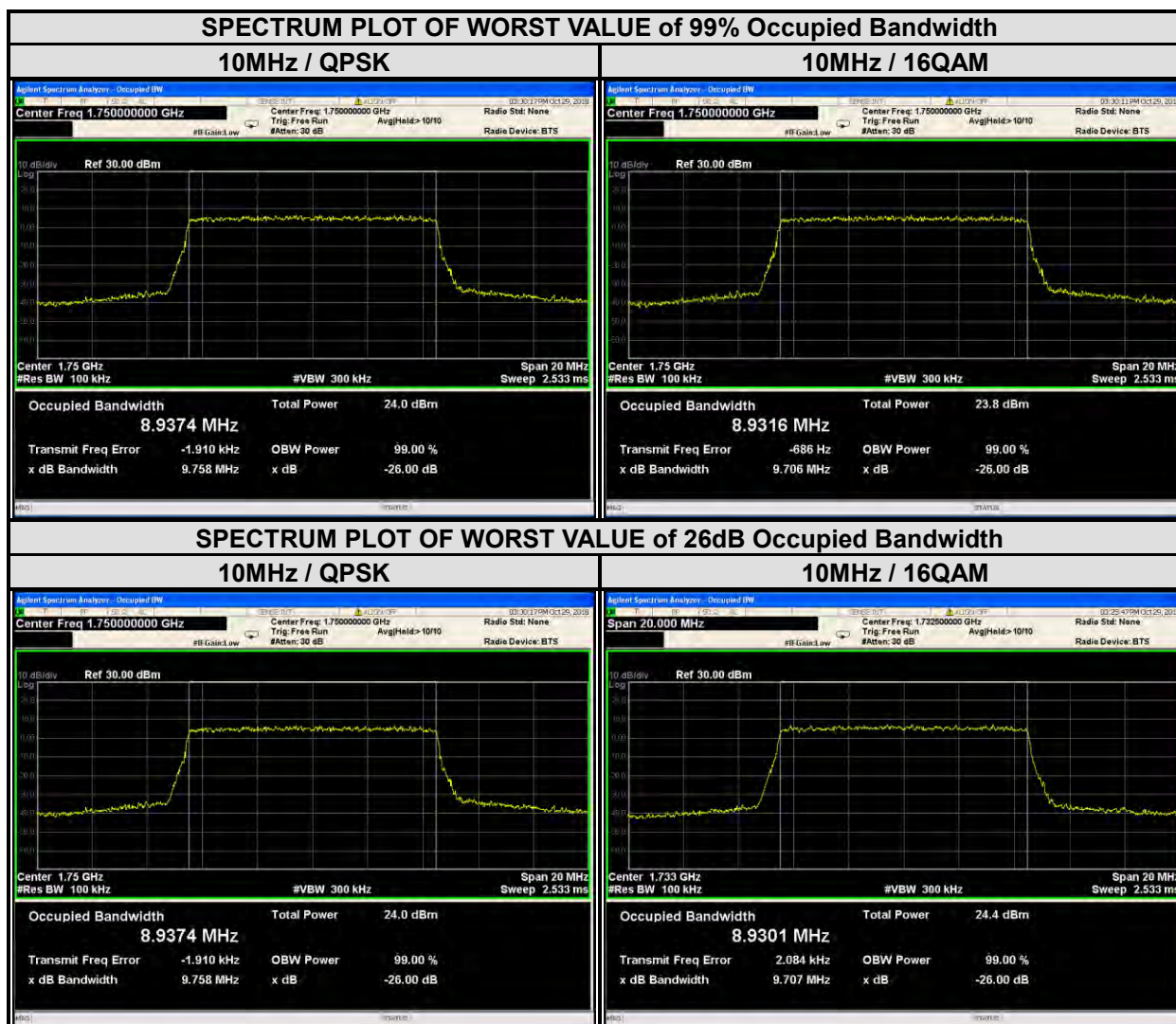
LTE BAND 4

CHANNEL BANDWIDTH: 5MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.5075	4.5005	19975	1712.5	4.981	4.970
20175	1732.5	4.5291	4.5158	20175	1732.5	5.021	5.017
20375	1752.5	4.5018	4.5028	20375	1752.5	5.007	5.020



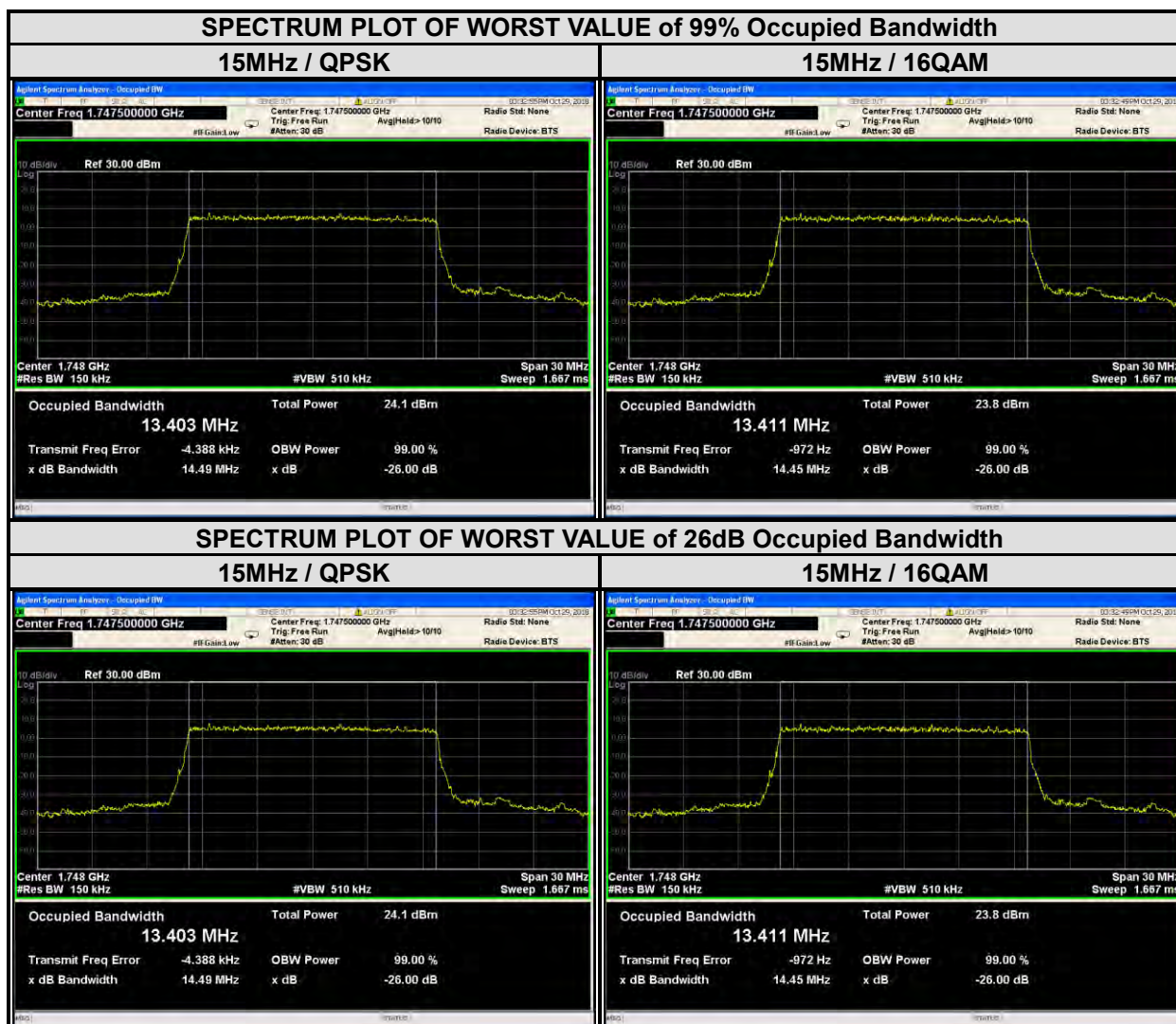
LTE BAND 4

CHANNEL BANDWIDTH: 10MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
20000	1715	8.9249	8.9264	20000	1715	9.625	9.694
20175	1732.5	8.9269	8.9301	20175	1732.5	9.655	9.707
20350	1750	8.9374	8.9316	20350	1750	9.758	9.706



LTE BAND 4

CHANNEL BANDWIDTH: 15MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	13.370	13.363	20025	1717.5	14.38	14.35
20175	1732.5	13.370	13.362	20175	1732.5	14.39	14.31
20325	1747.5	13.403	13.411	20325	1747.5	14.49	14.45



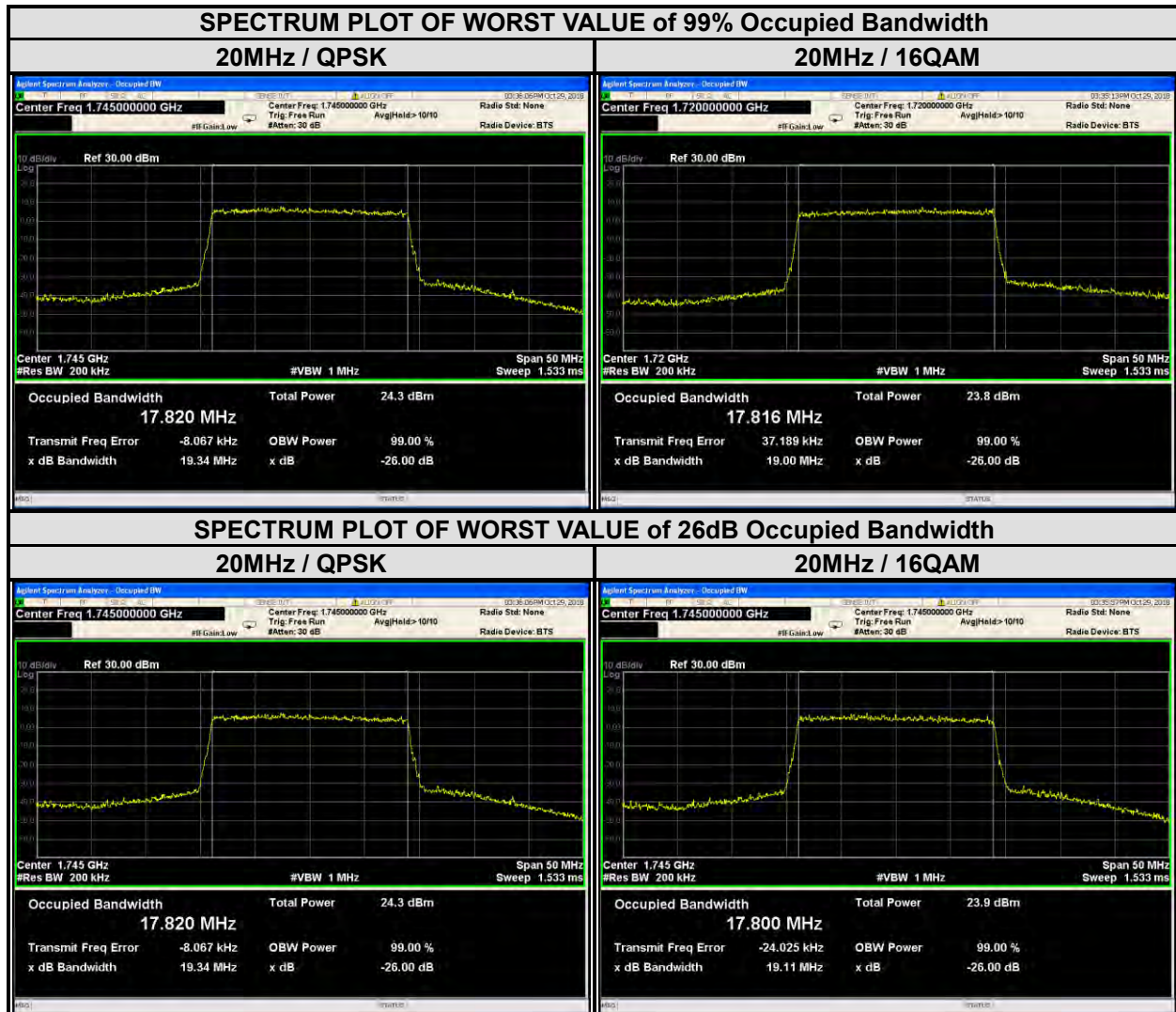


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Test Report No.: RF181011N013-5

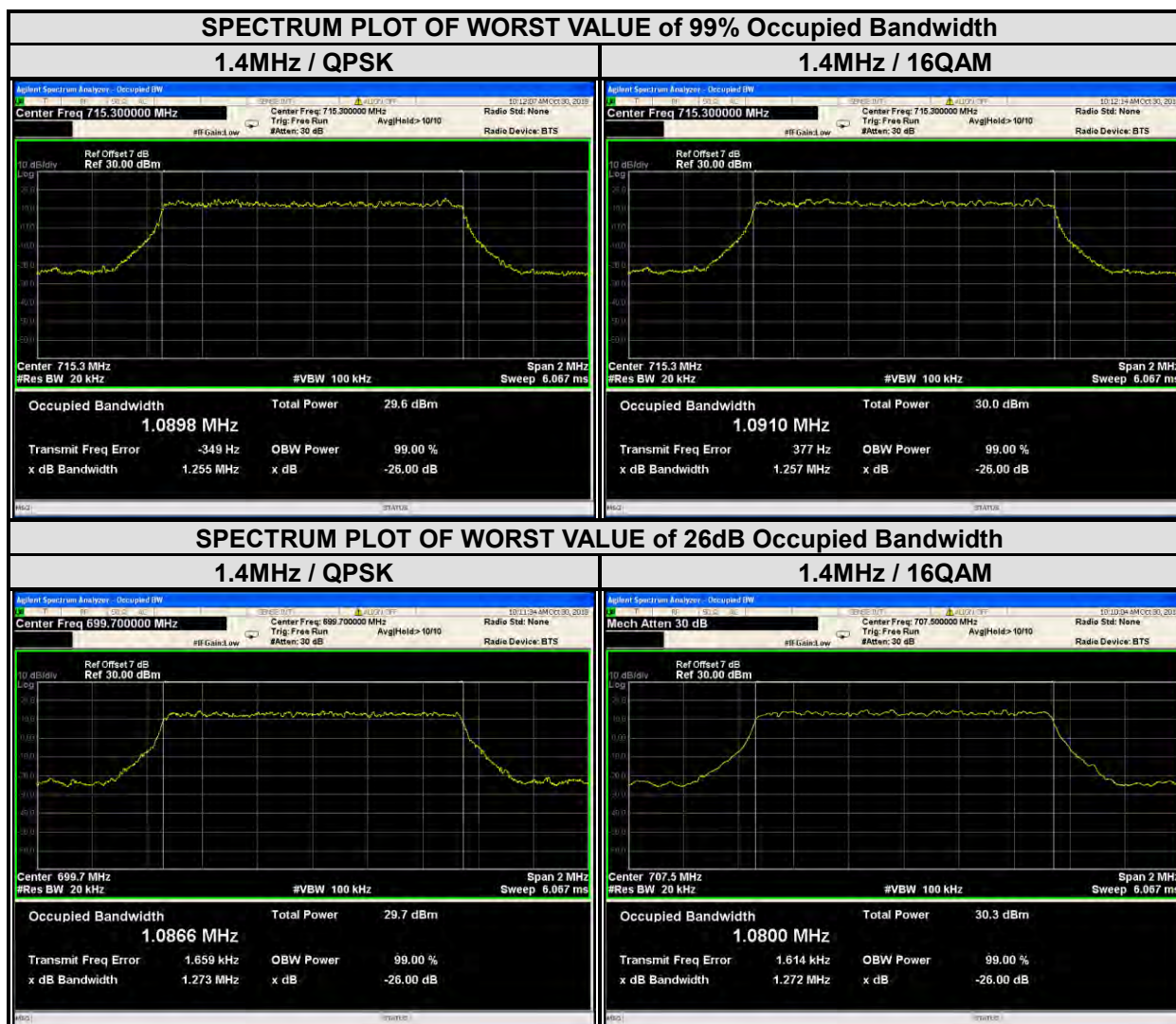
LTE BAND 4

CHANNEL BANDWIDTH: 20MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
20050	1720	17.819	17.816	20050	1720	19.02	19.00
20175	1732.5	17.774	17.780	20175	1732.5	18.81	18.78
20300	1745	17.820	17.800	20300	1745	19.34	19.11



LTE BAND 12

CHANNEL BANDWIDTH: 1.4MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	1.0866	1.0861	23017	699.7	1.273	1.260
23095	707.5	1.0801	1.0800	23095	707.5	1.260	1.272
23173	715.3	1.0898	1.0910	23173	715.3	1.255	1.257



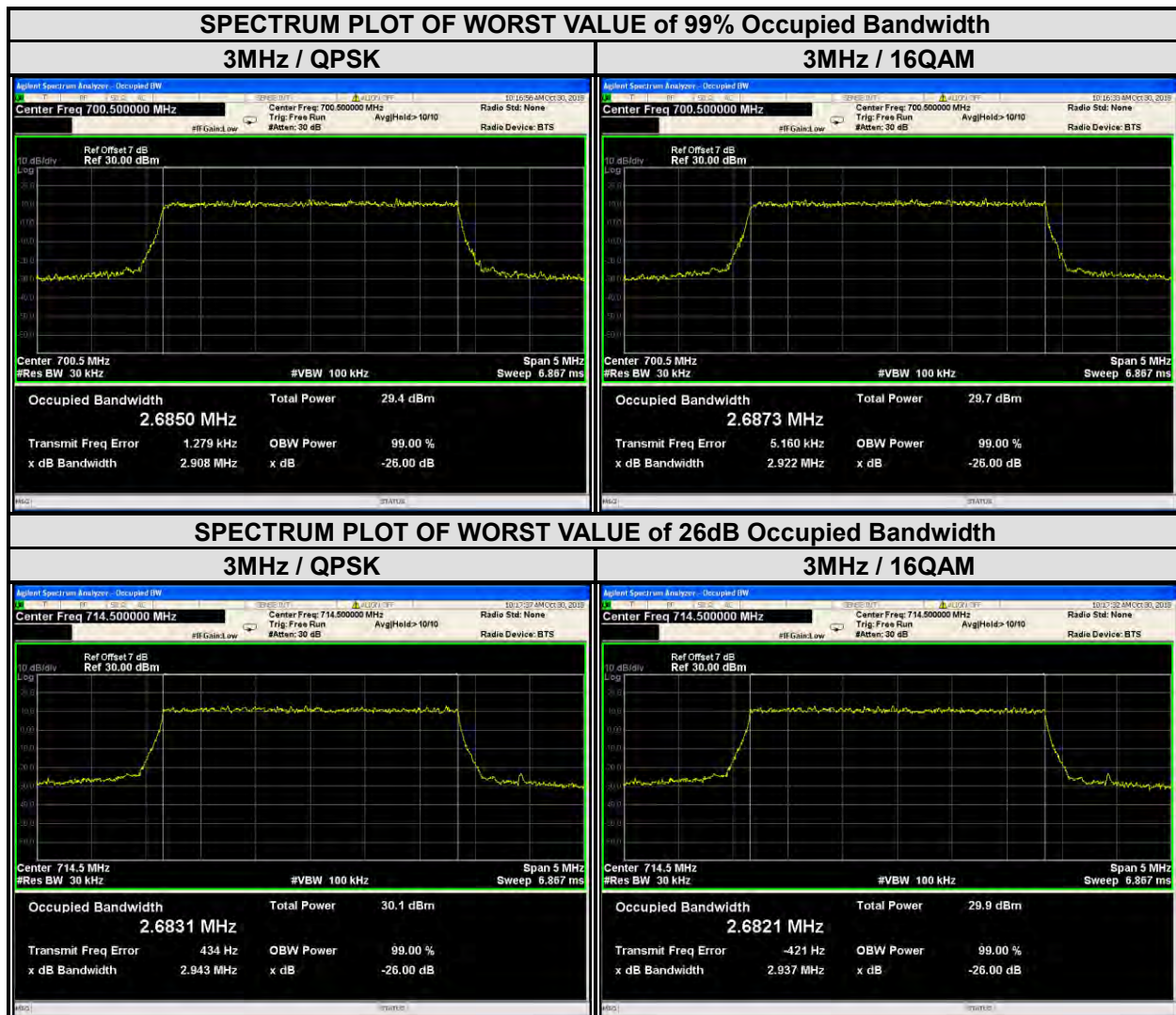


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Test Report No.: RF181011N013-5

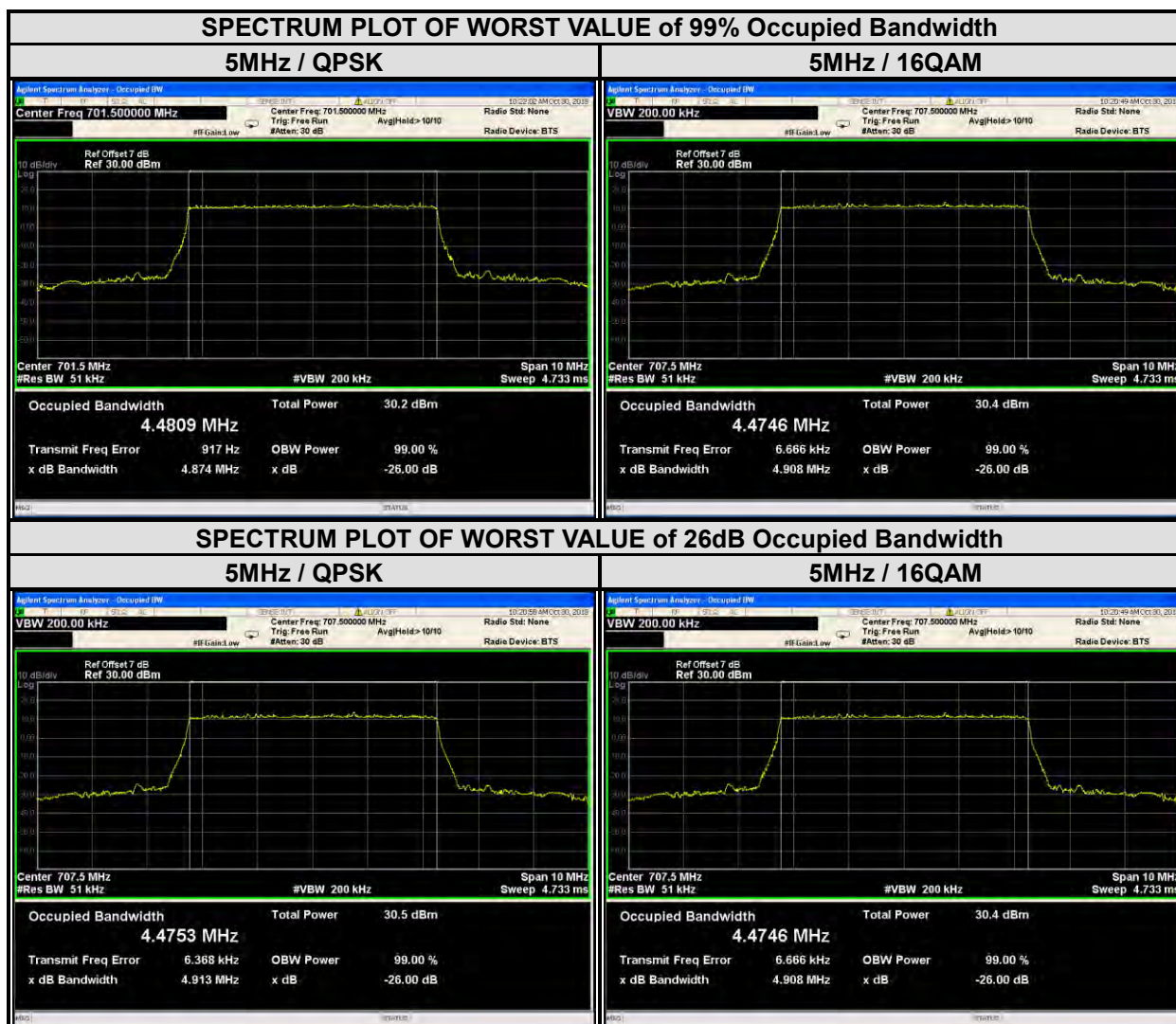
LTE BAND 12

CHANNEL BANDWIDTH: 3MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
23025	700.5	2.6850	2.6873	23025	700.5	2.908	2.922
23095	707.5	2.6819	2.6826	23095	707.5	2.918	2.922
23165	714.5	2.6831	2.6821	23165	714.5	2.943	2.937



LTE BAND 12

CHANNEL BANDWIDTH: 5MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.4809	4.4582	23035	701.5	4.874	4.867
23095	707.5	4.4753	4.4746	23095	707.5	4.913	4.908
23155	713.5	4.4626	4.4606	23155	713.5	4.889	4.870



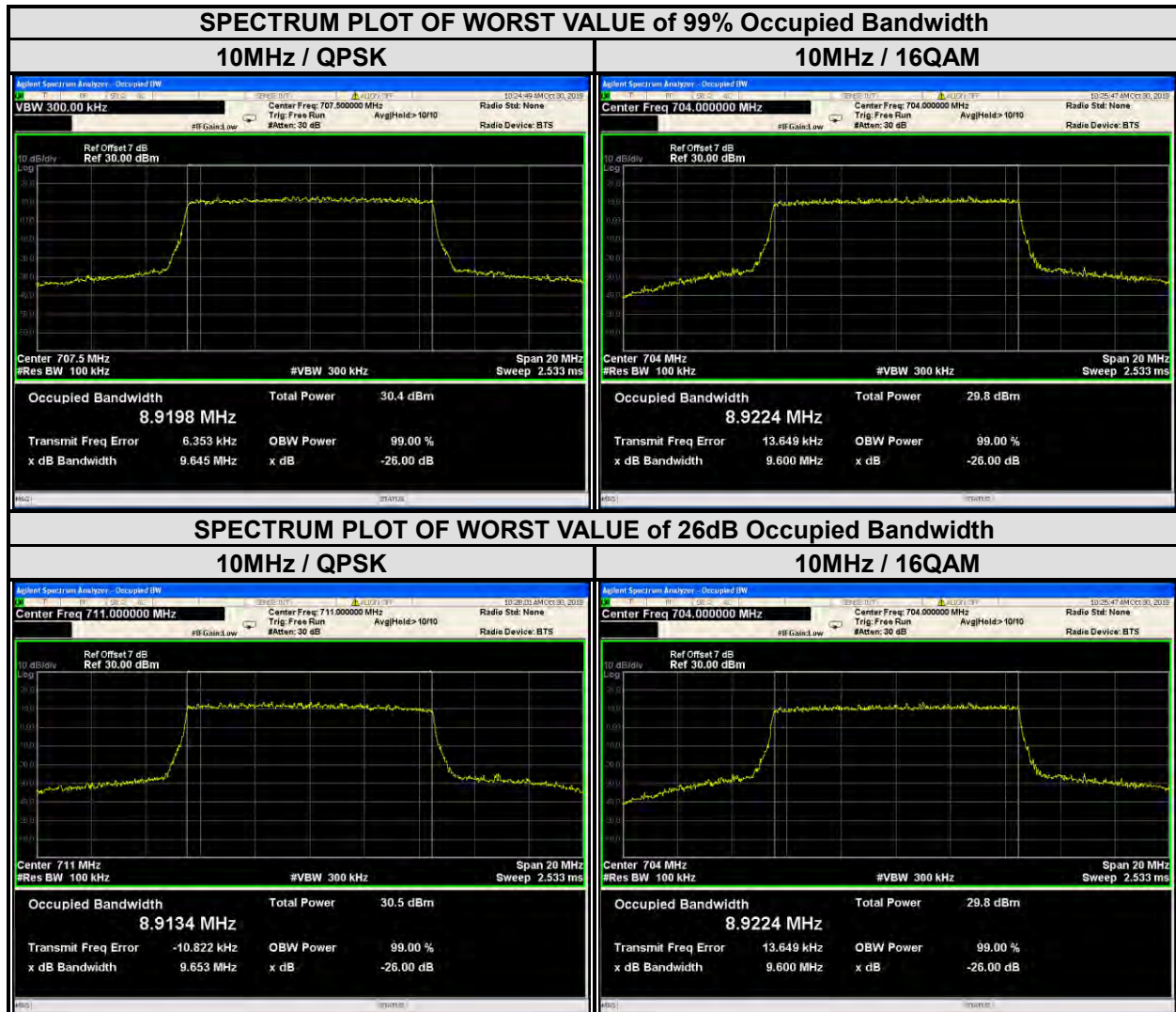


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Test Report No.: RF181011N013-5

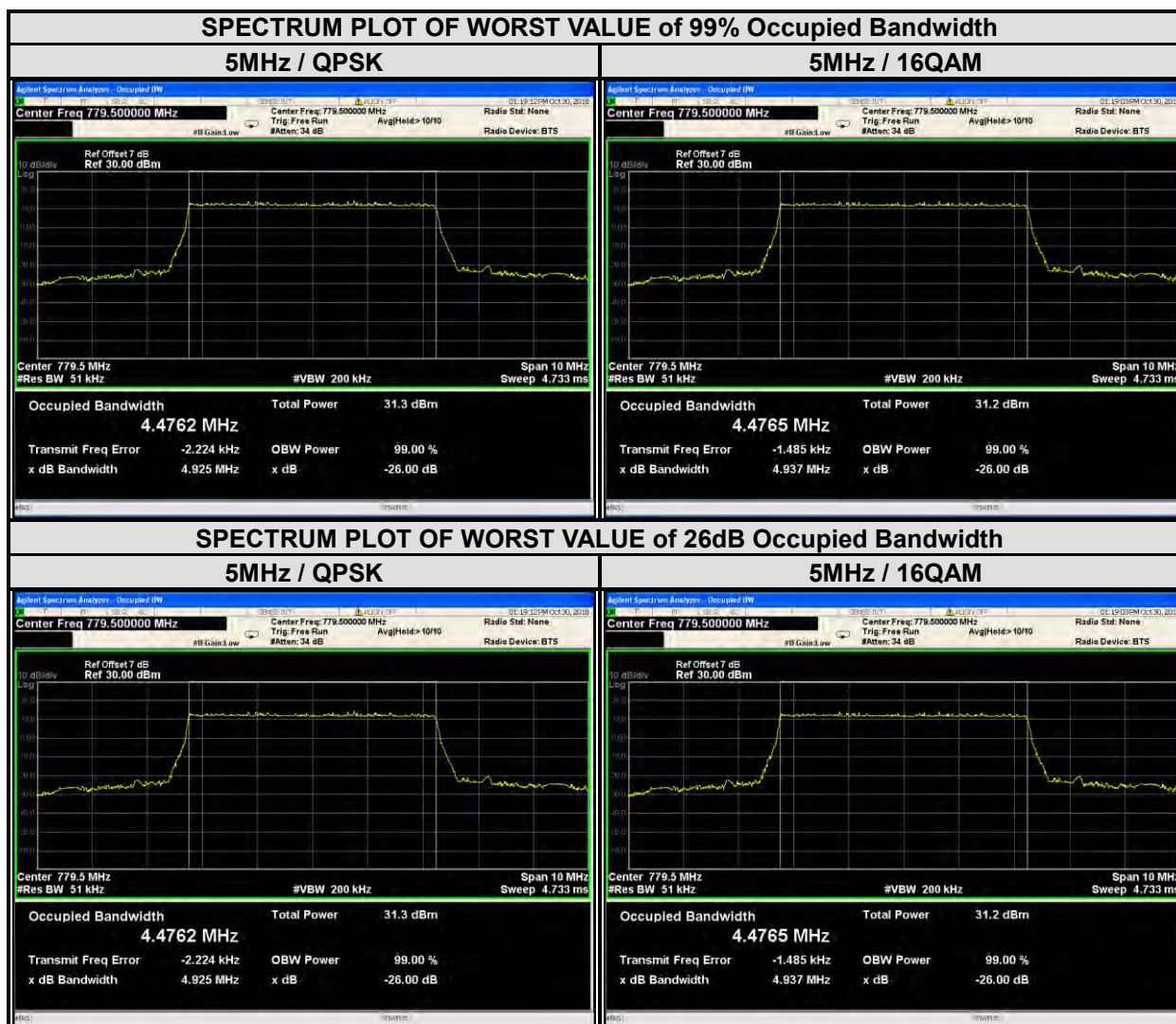
LTE BAND 12

CHANNEL BANDWIDTH: 10MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
23060	704	8.9141	8.9224	23060	704	9.625	9.600
23095	707.5	8.9198	8.9175	23095	707.5	9.645	9.629
23130	711	8.9134	8.9179	23130	711	9.653	9.582



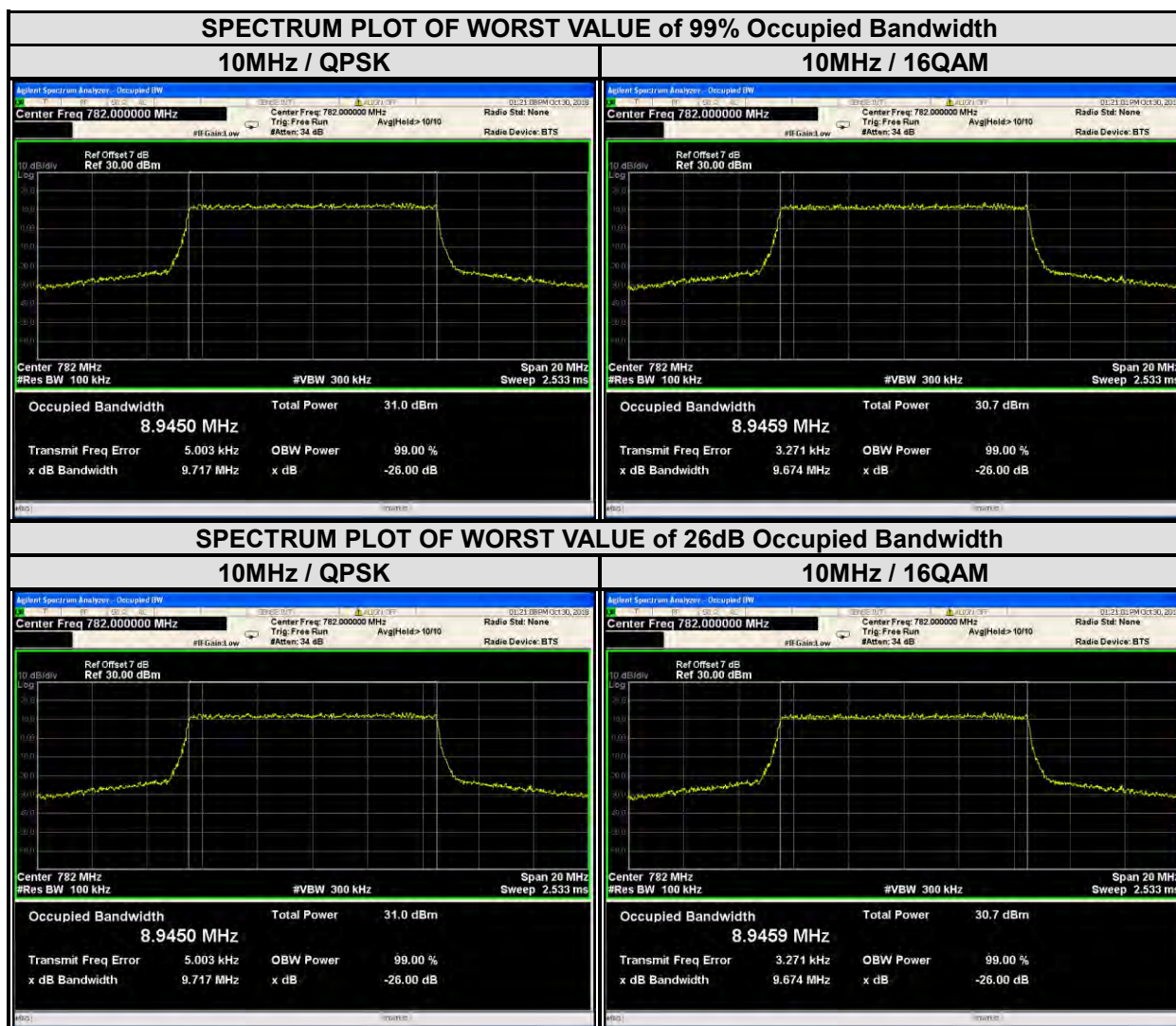
LTE BAND 13

CHANNEL BANDWIDTH: 5MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
23205	779.5	4.4762	4.4765	23205	779.5	4.925	4.937
23230	782	4.4666	4.4661	23230	782	4.915	4.903
23255	784.5	4.4619	4.4603	23255	784.5	4.902	4.866



LTE BAND 13

CHANNEL BANDWIDTH: 10MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		QPSK	16QAM			QPSK	16QAM
-	-	-	-	-	-	-	-
23230	782	8.9450	8.9459	23230	782	9.717	9.674
-	-	-	-	-	-	-	-

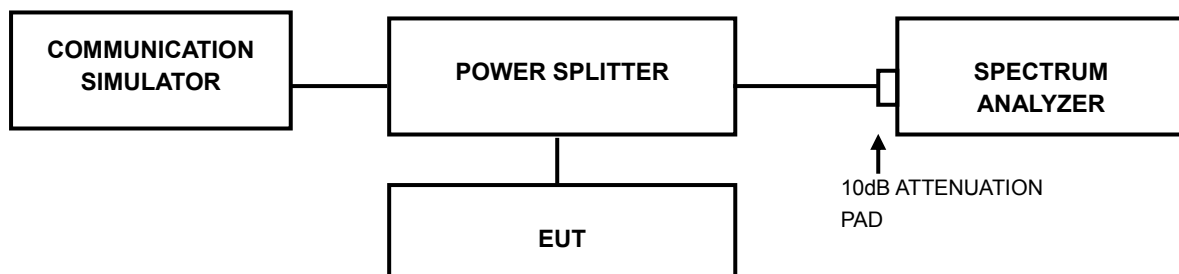


3.4 PEAK TO AVERAGE RATIO

3.4.1 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

3.4.2 TEST SETUP



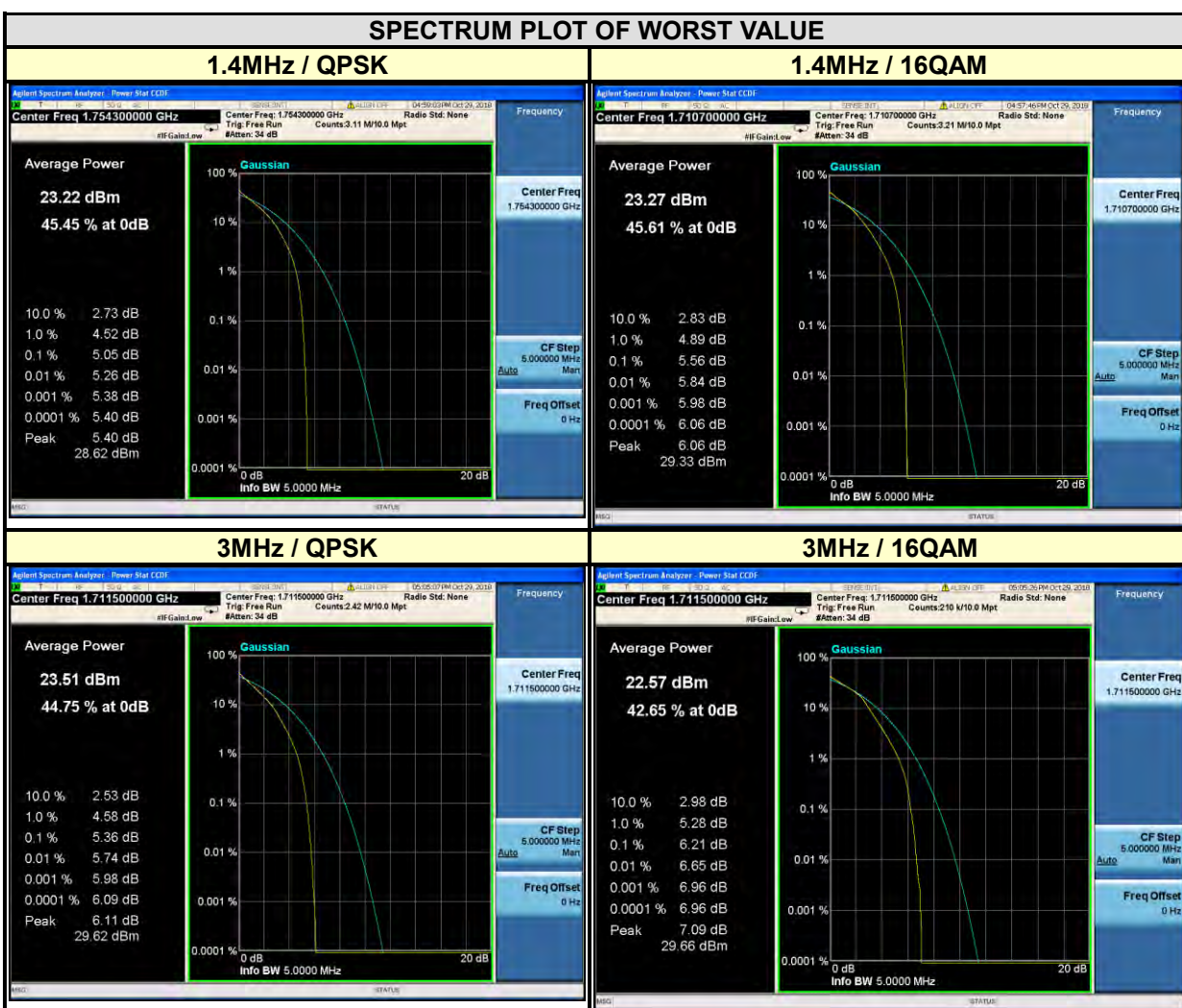
3.4.3 TEST PROCEDURES

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%.

3.4.4 TEST RESULTS

LTE BAND 4

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
19957	1710.7	5.14	5.56	19965	1711.5	5.36	6.21
20175	1732.5	5.02	5.20	20175	1732.5	5.17	5.35
20393	1754.3	5.05	5.38	20385	1753.5	5.23	6.09



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
19975	1712.5	5.37	6.17	20000	1715	4.65	4.94
20175	1732.5	5.22	6.00	20175	1732.5	4.62	4.90
20375	1752.5	5.24	5.39	20350	1750	4.63	6.21



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
20025	1717.5	5.77	5.96	20050	1720	6.47	6.61
20175	1732.5	5.78	5.89	20175	1732.5	6.47	6.62
20325	1747.5	5.78	5.96	20300	1745	6.43	6.53



LTE BAND 12

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
23017	699.7	4.98	5.89	23025	700.5	5.10	5.96
23095	707.5	4.92	5.49	23095	707.5	5.05	5.91
23173	715.3	4.91	5.03	23165	714.5	5.05	5.89



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
23035	701.5	5.08	5.51	23060	704	4.65	5.51
23095	707.5	4.97	5.15	23095	707.5	4.61	6.04
23155	713.5	4.92	5.76	23130	711	5.05	6.08





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Test Report No.: RF181011N013-5

LTE BAND 13

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
23205	779.5	5.23	5.32	-	-	-	-
23230	782	5.35	5.54	23230	782	4.67	5.16
23255	784.5	5.22	5.48	-	-	-	-



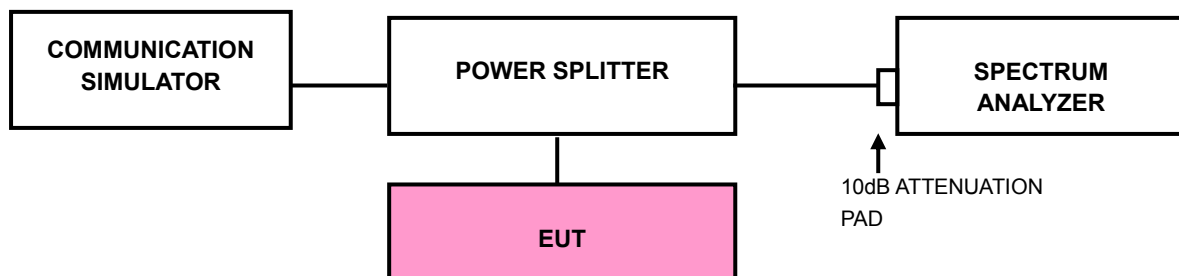
3.5 BAND EDGE MEASUREMENT

3.5.1 LIMITS OF BAND EDGE MEASUREMENT

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

3.5.2 TEST SETUP



3.5.3 TEST PROCEDURES

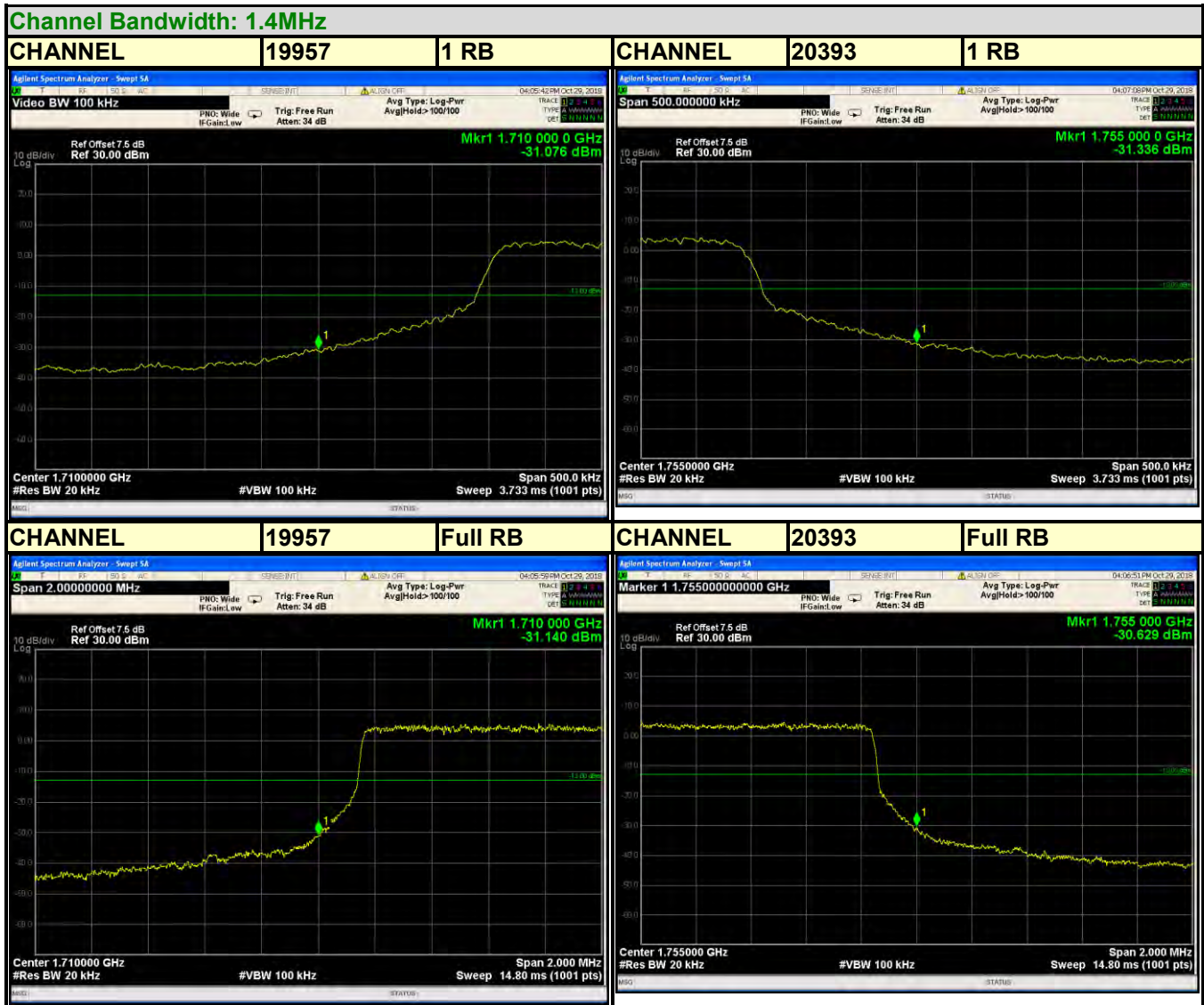
- a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- b. The band edge measurement used the power splitter via EUT RF power connector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



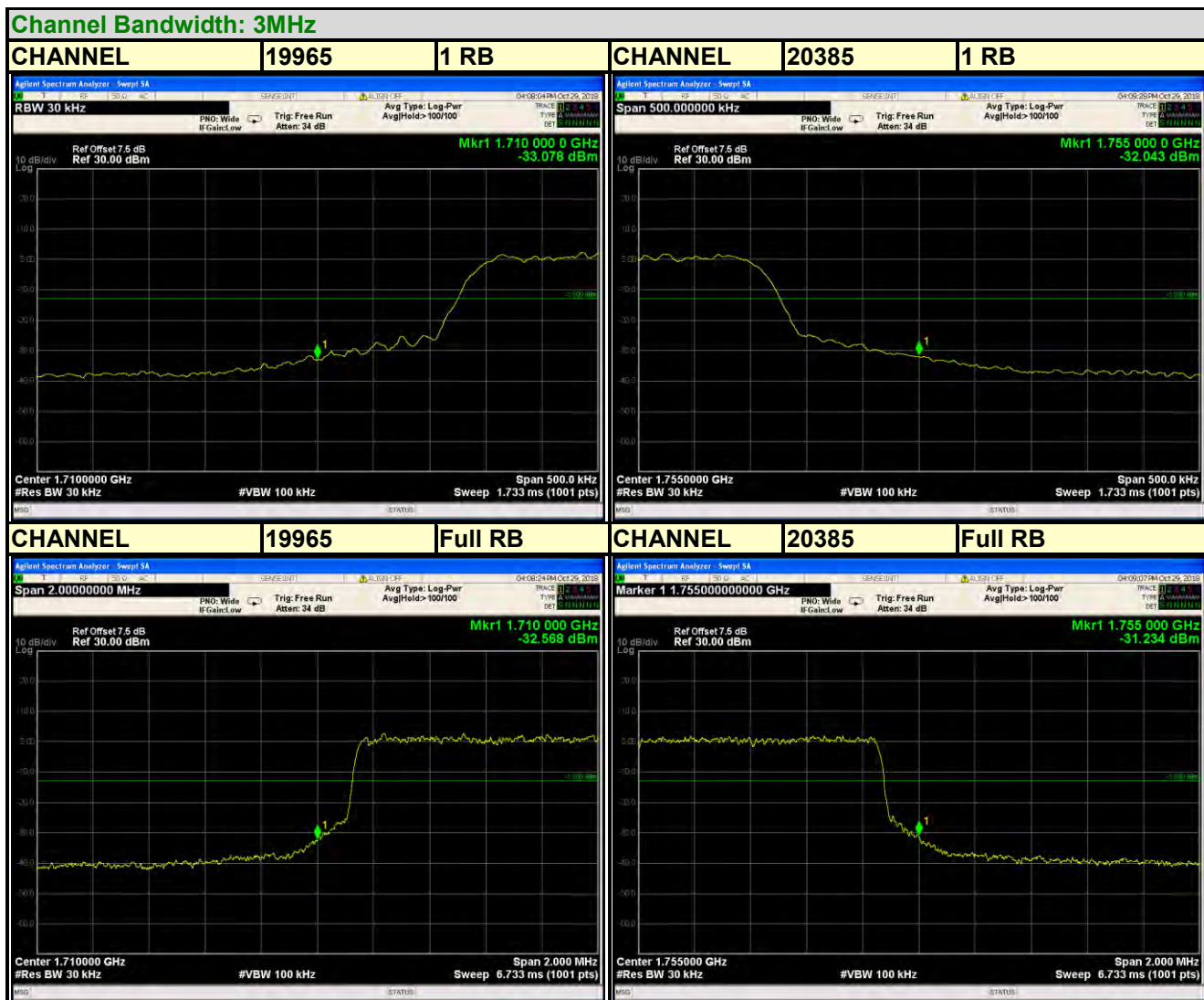
Test Report No.: RF181011N013-5

3.5.4 TEST RESULTS

LTE BAND 4



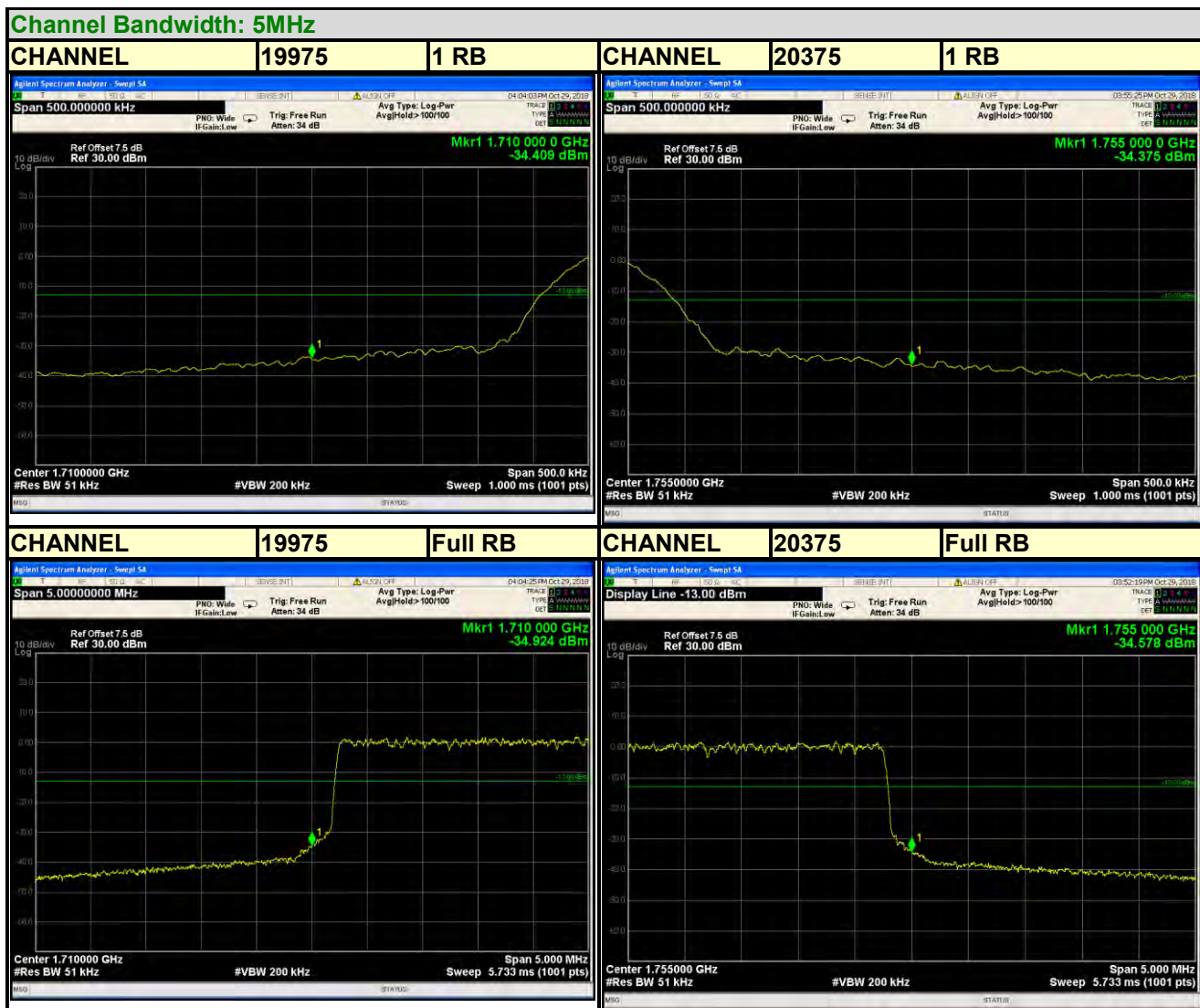
LTE BAND 4





Test Report No.: RF181011N013-5

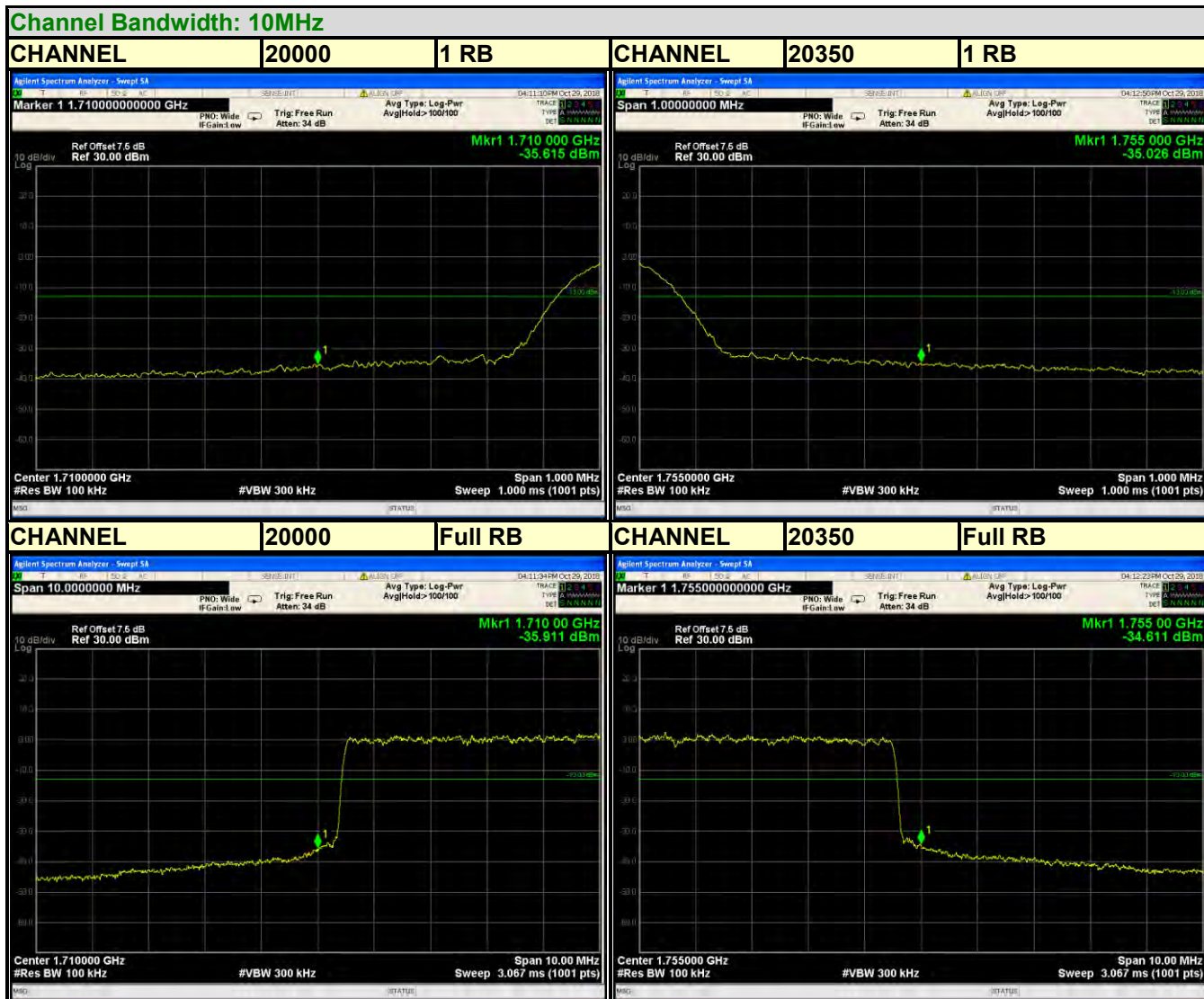
LTE BAND 4





Test Report No.: RF181011N013-5

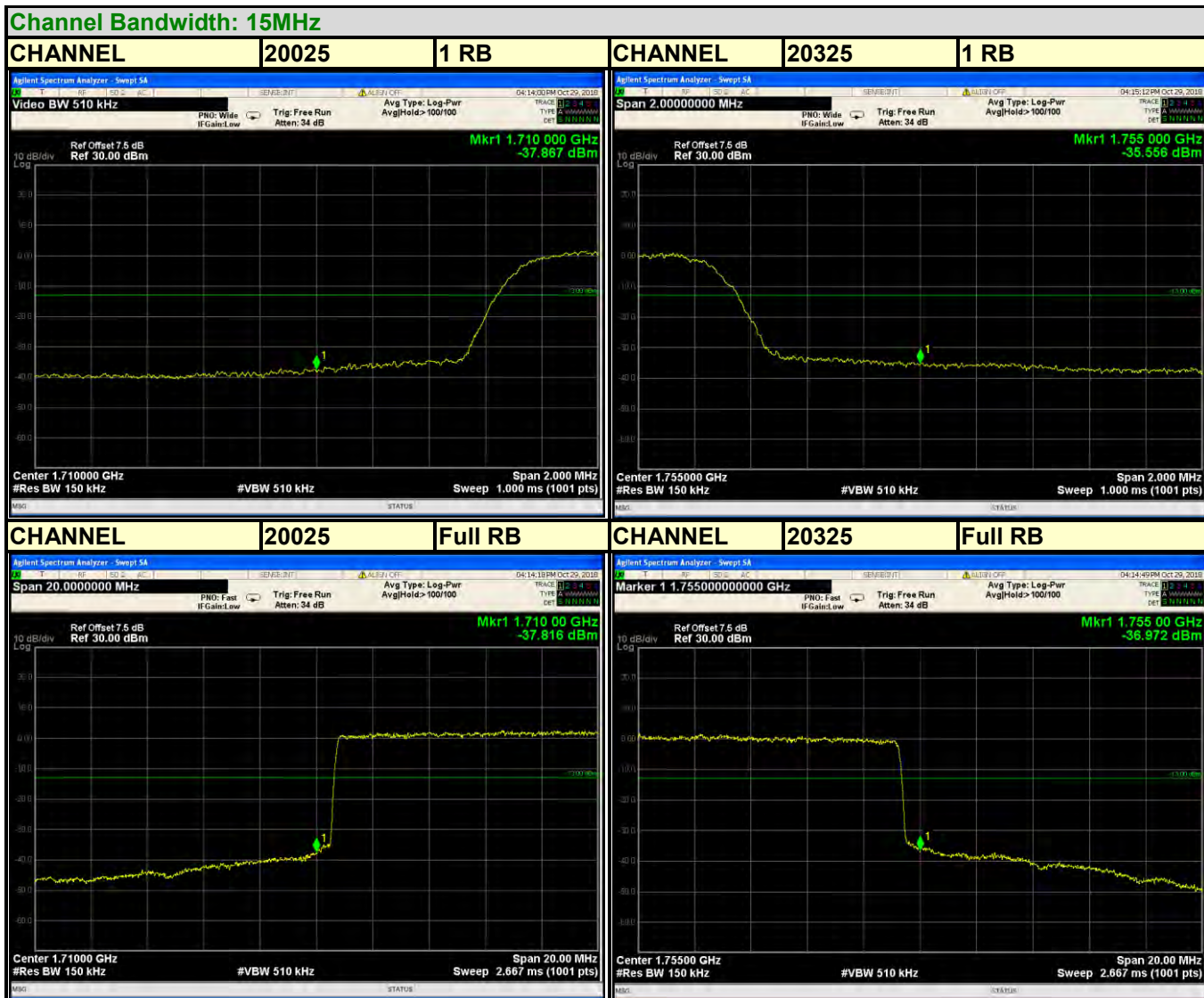
LTE BAND 4





Test Report No.: RF181011N013-5

LTE BAND 4

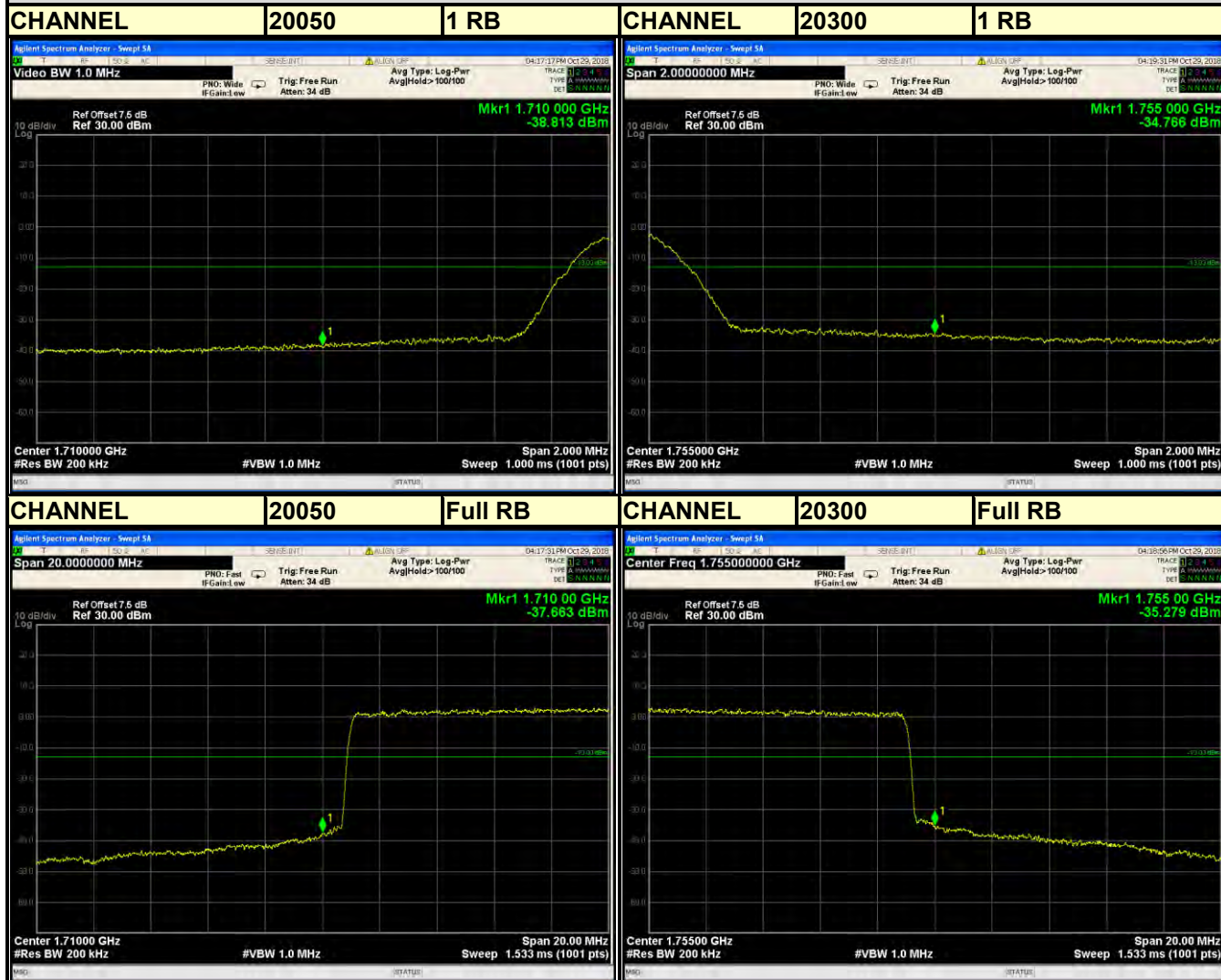




Test Report No.: RF181011N013-5

LTE BAND 4

Channel Bandwidth: 20MHz

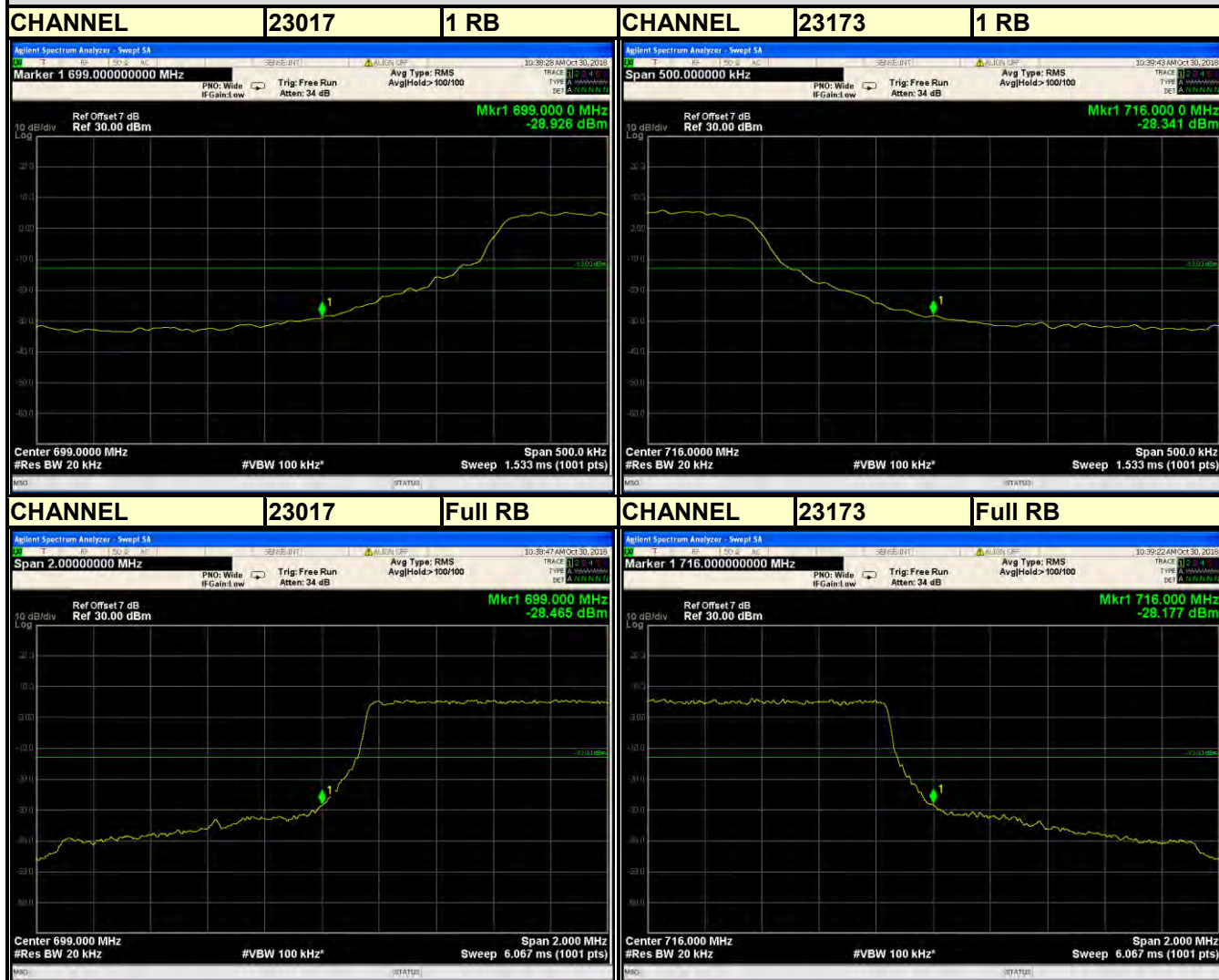




Test Report No.: RF181011N013-5

LTE BAND 12

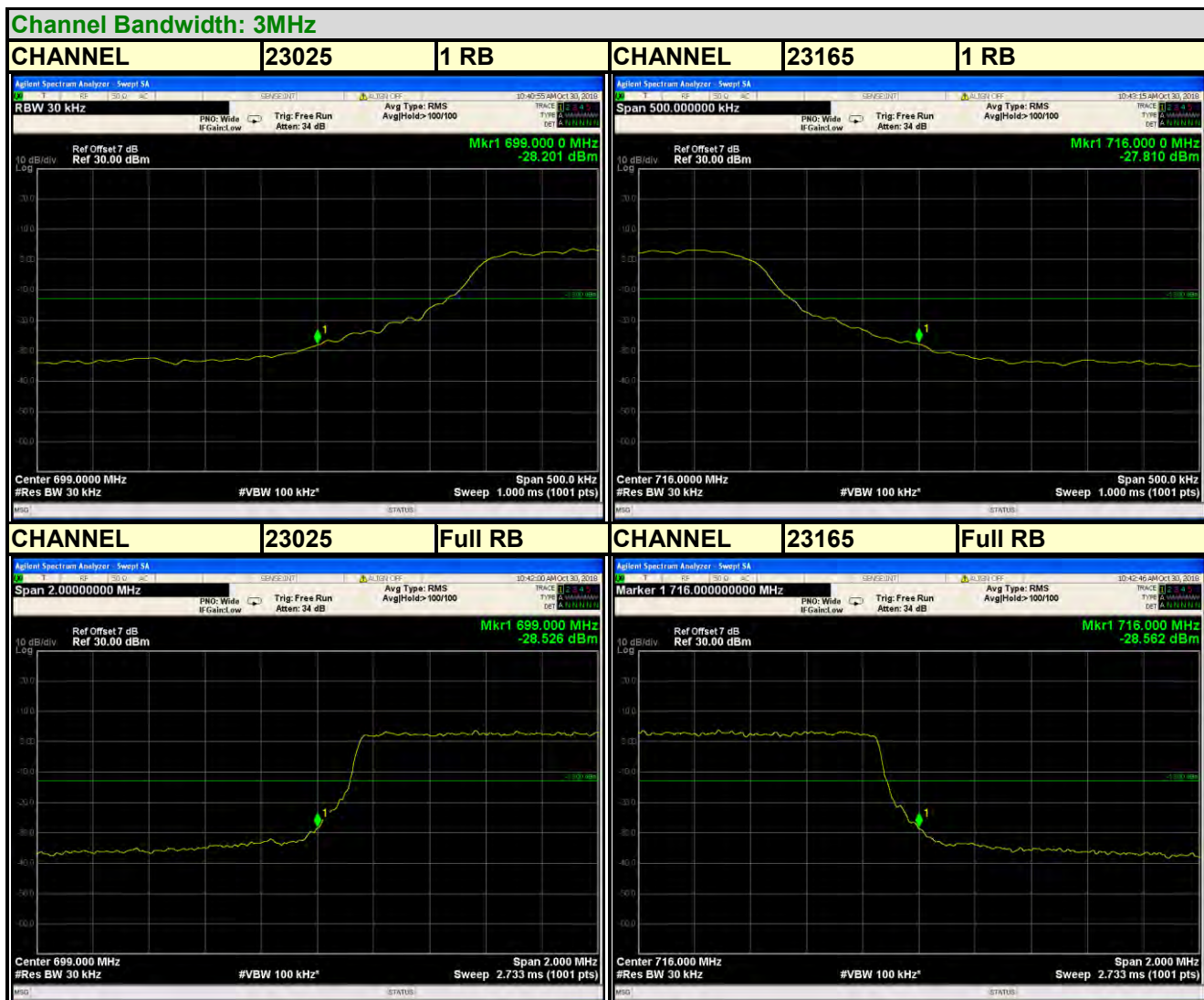
Channel Bandwidth: 1.4MHz





Test Report No.: RF181011N013-5

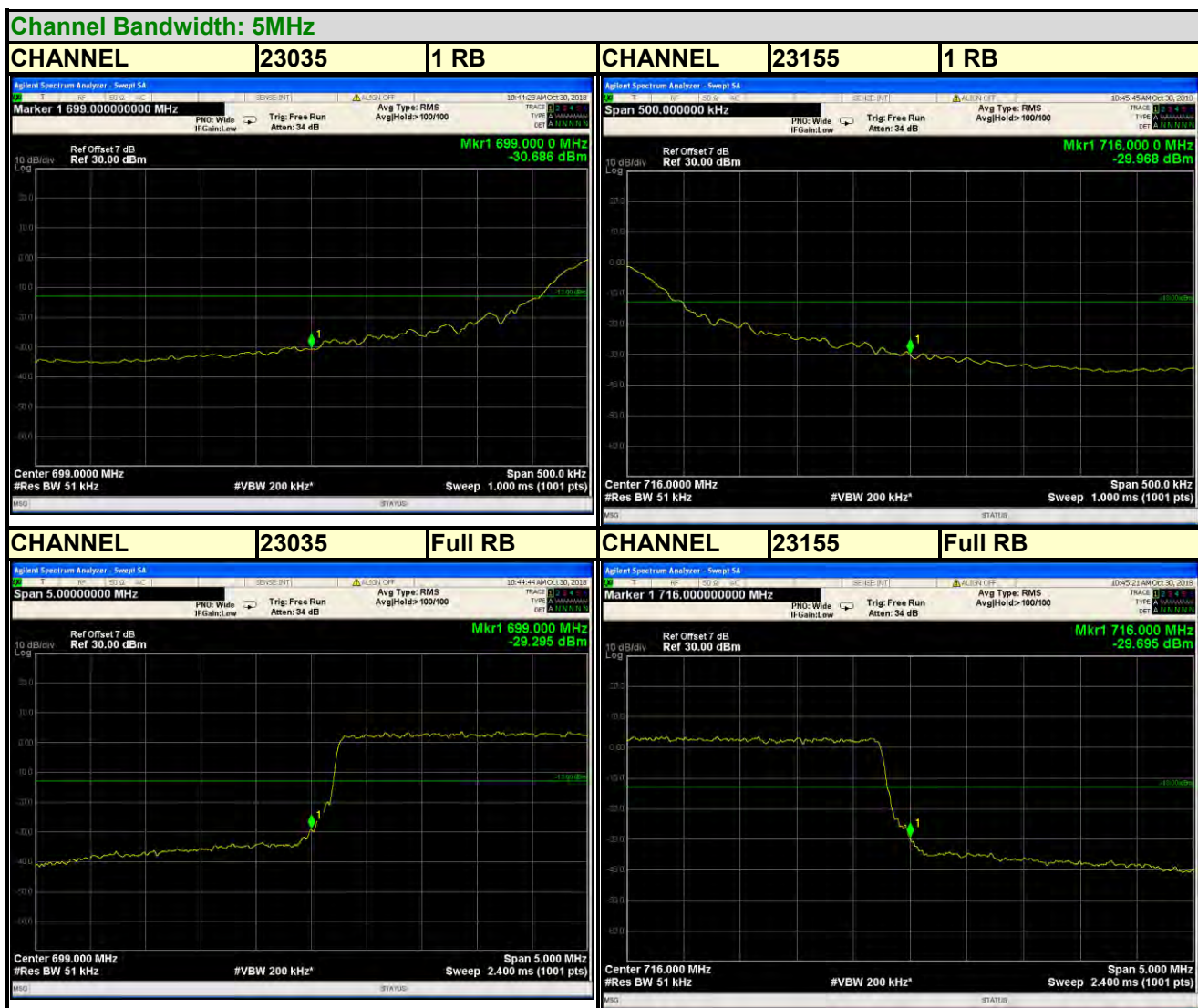
LTE BAND 12





Test Report No.: RF181011N013-5

LTE BAND 12



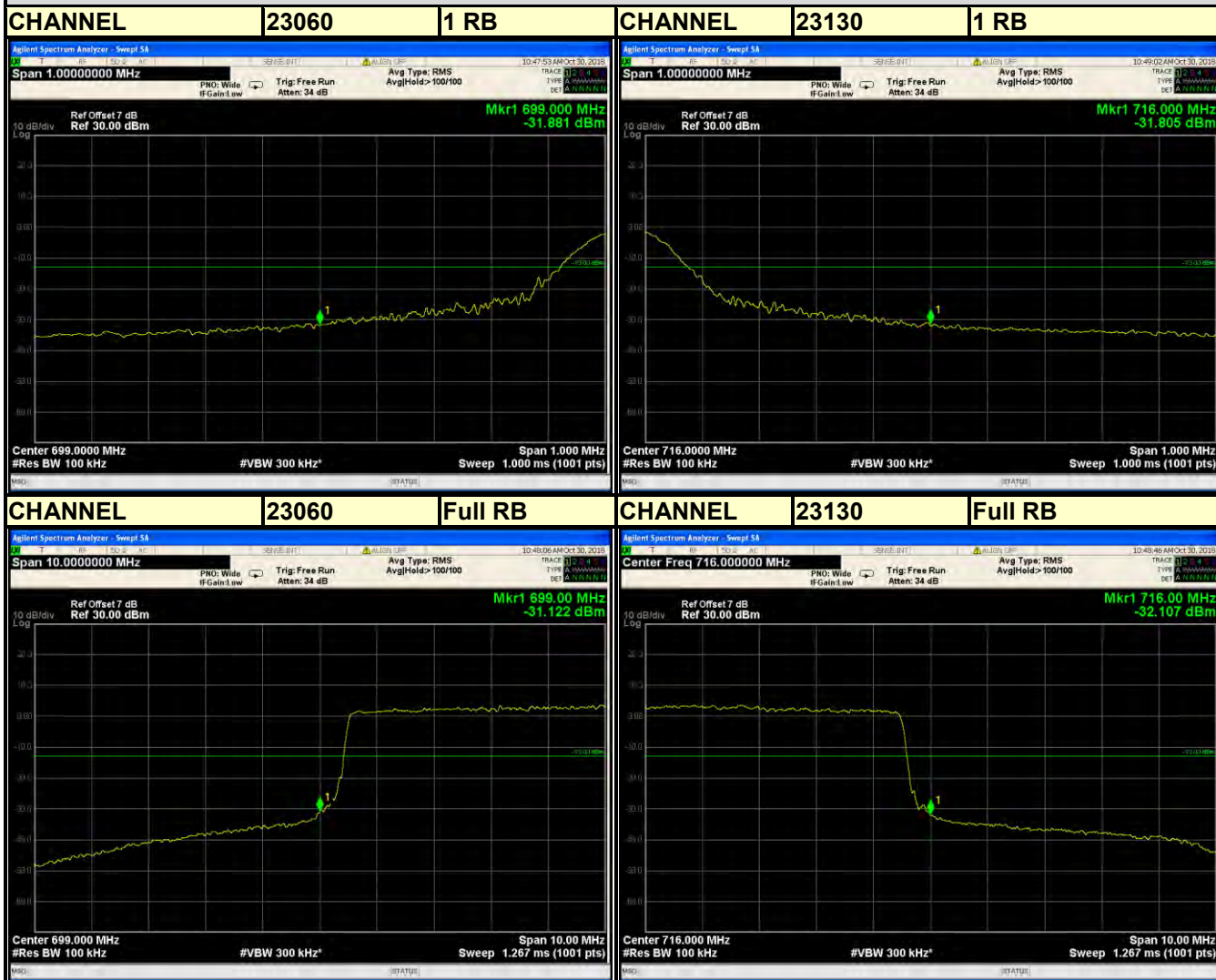


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LTE BAND 12

Test Report No.: RF181011N013-5

Channel Bandwidth: 10MHz



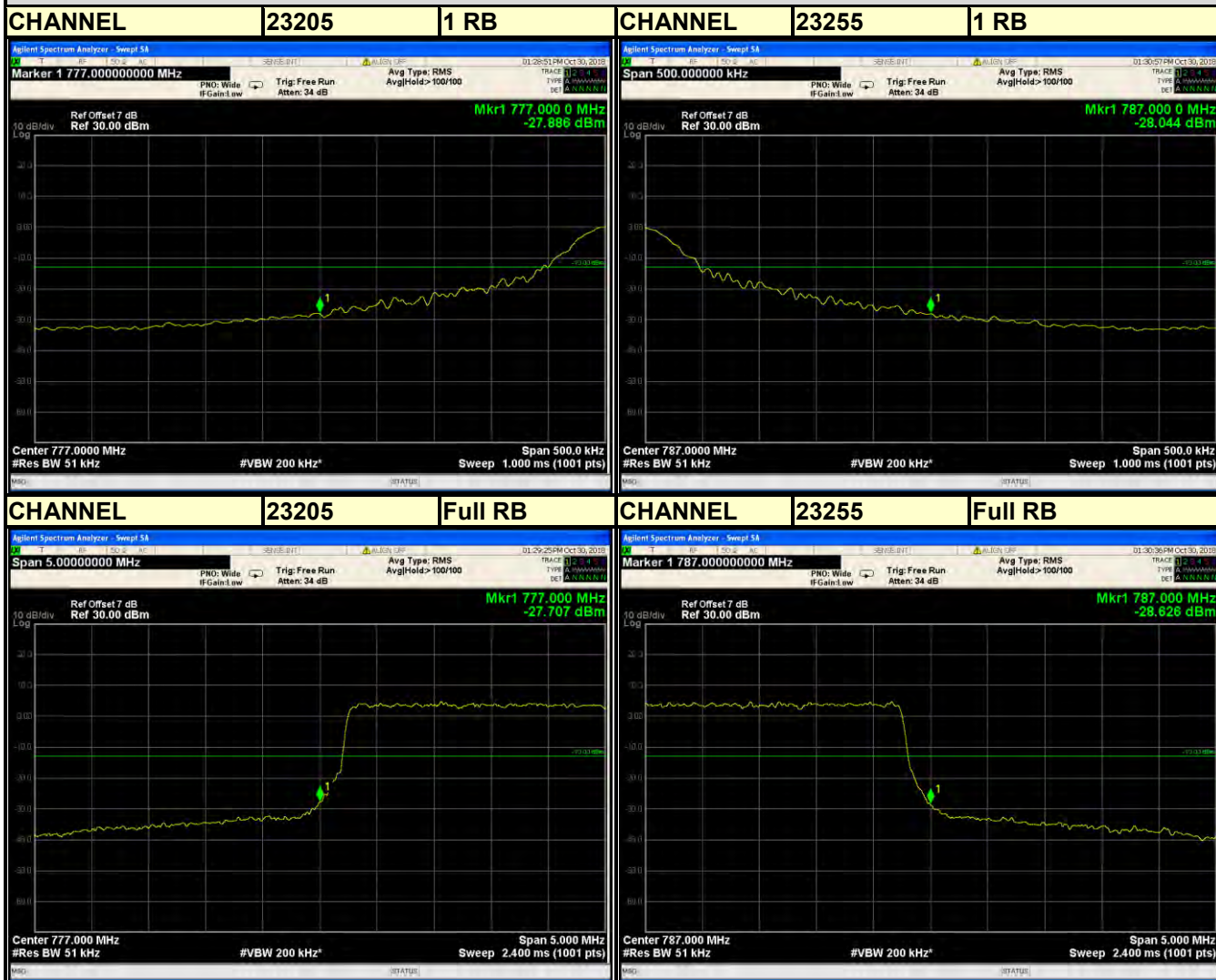


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LTE BAND 13

Test Report No.: RF181011N013-5

Channel Bandwidth: 5MHz

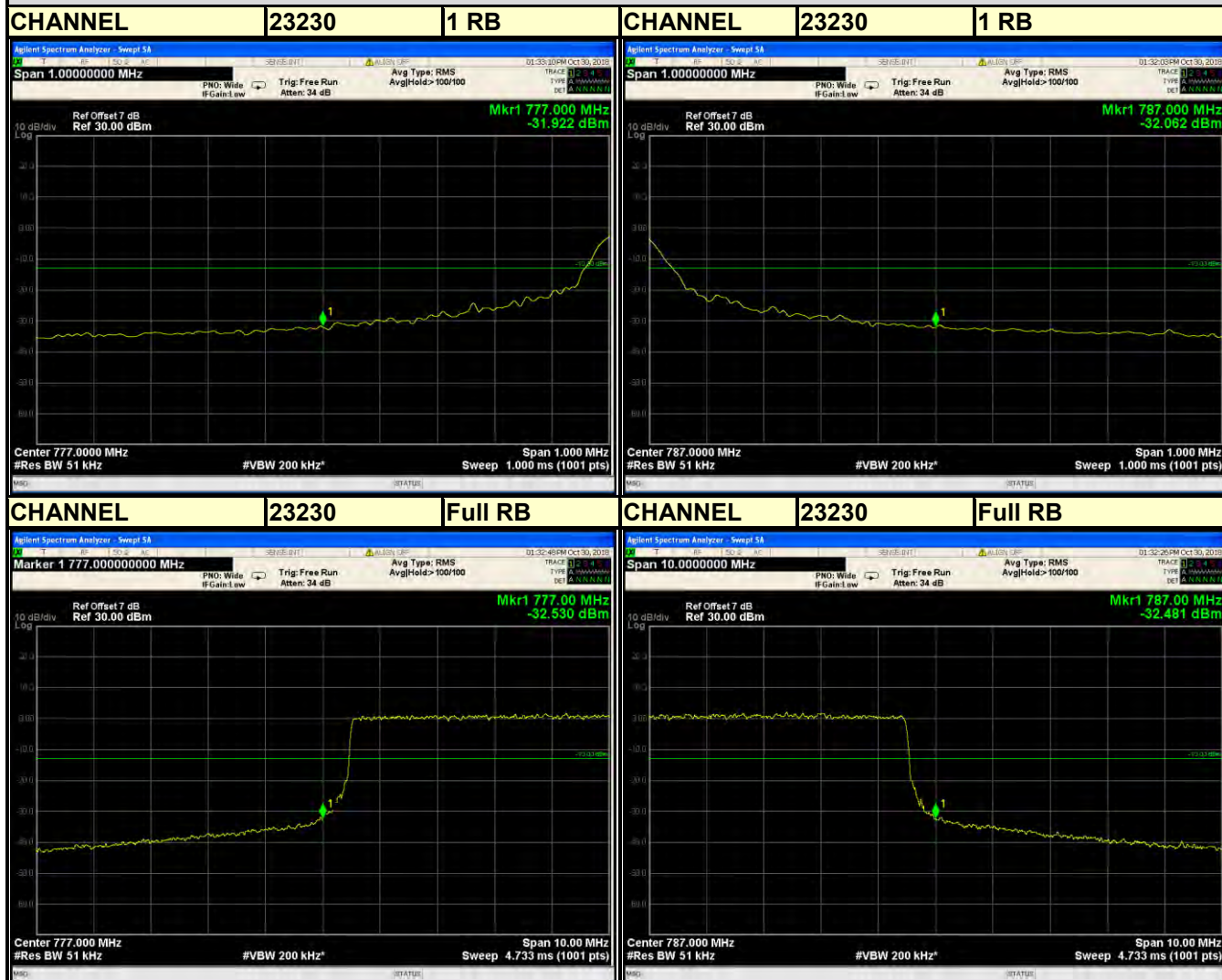




Test Report No.: RF181011N013-5

LTE BAND 13

Channel Bandwidth: 10MHz



3.6 CONDUCTED SPURIOUS EMISSIONS

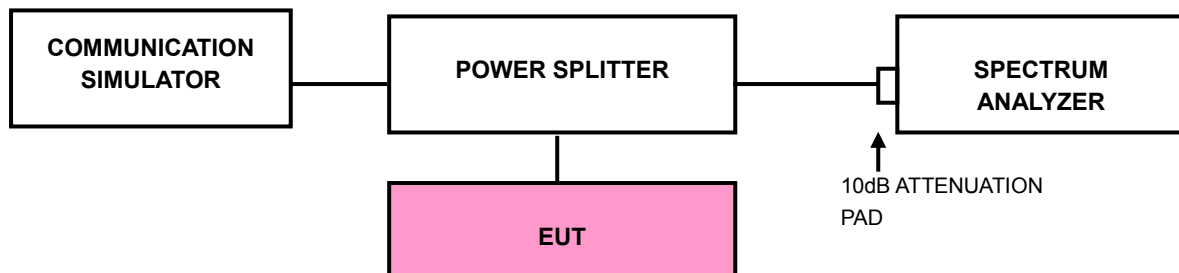
3.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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

3.6.2 TEST PROCEDURE

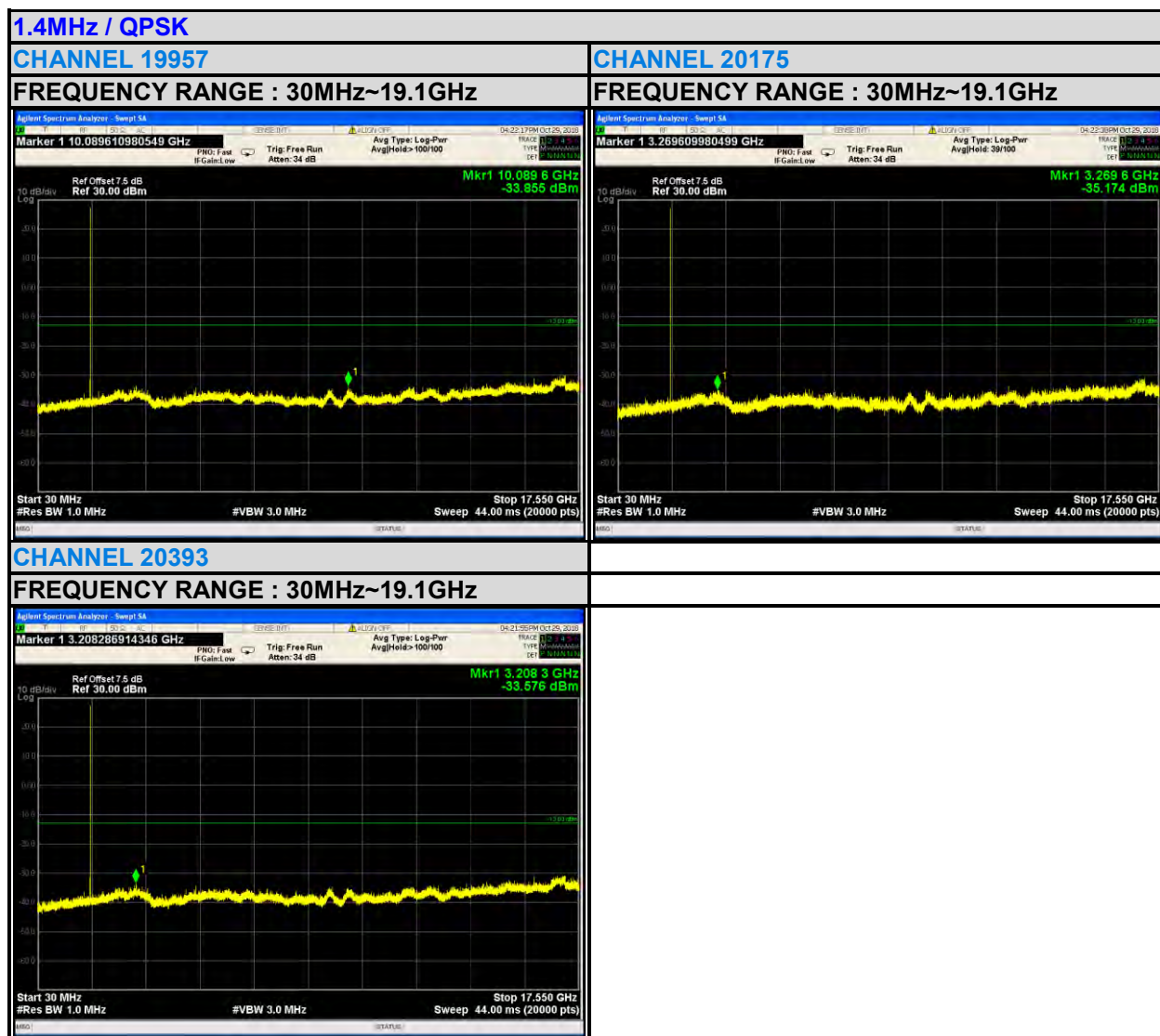
- a. The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.
- b. Measuring frequency range is from 30 MHz to 19.1GHz for LTE Band 4 and 30 MHz to 9GHz for LTE Band 12. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.6.3 TEST SETUP



3.6.4 TEST RESULTS

LTE BAND 4





Test Report No.: RF181011N013-5

3MHz / QPSK

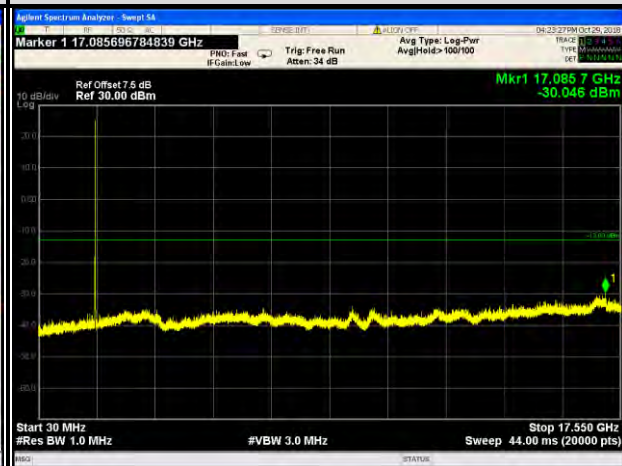
CHANNEL 19965

FREQUENCY RANGE : 30MHz~19.1GHz



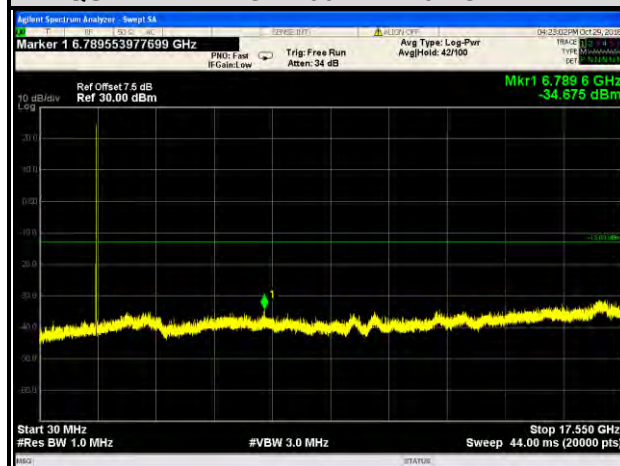
CHANNEL 20175

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 20385

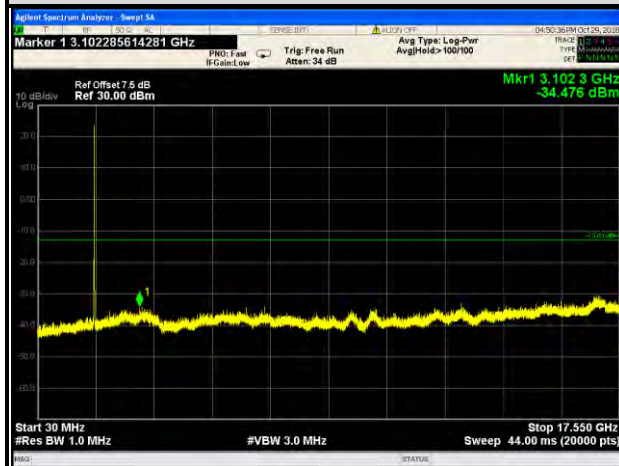
FREQUENCY RANGE : 30MHz~19.1GHz



5MHz / QPSK

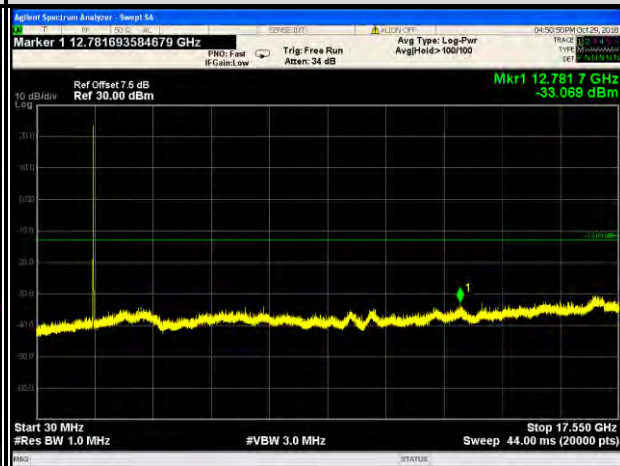
CHANNEL 19975

FREQUENCY RANGE : 30MHz~19.1GHz



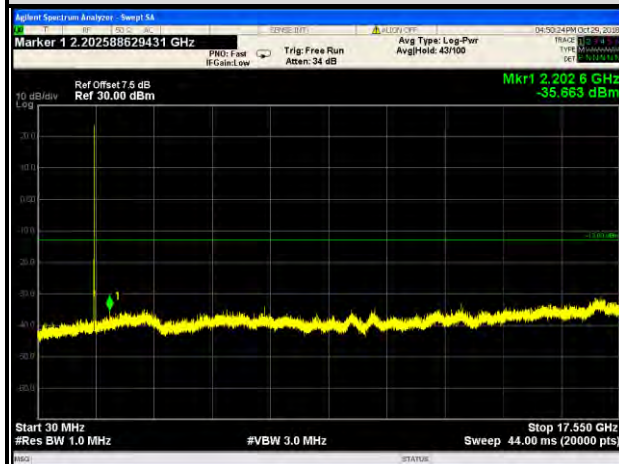
CHANNEL 20175

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 20375

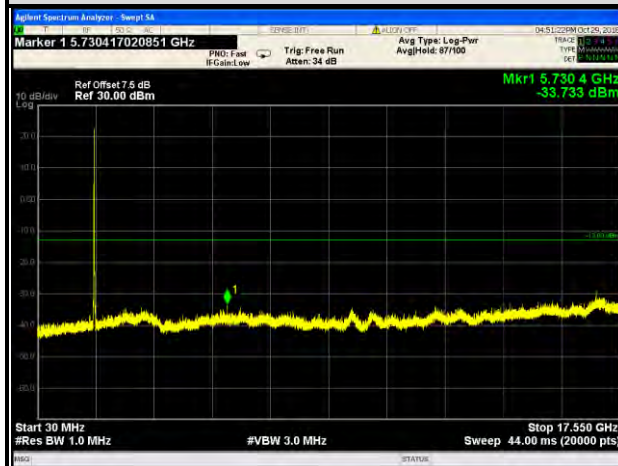
FREQUENCY RANGE : 30MHz~19.1GHz



10MHz / QPSK

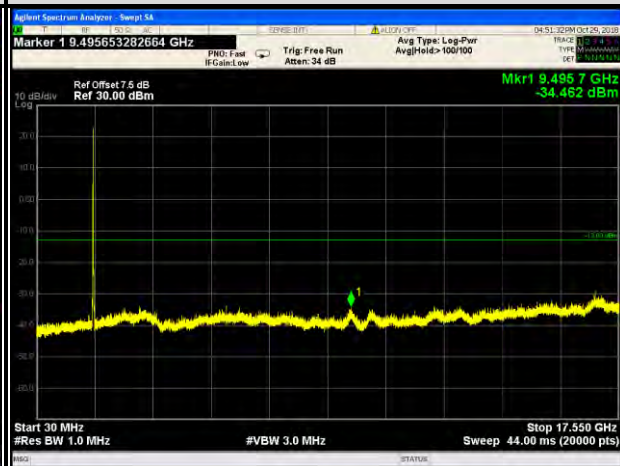
CHANNEL 20000

FREQUENCY RANGE : 30MHz~19.1GHz



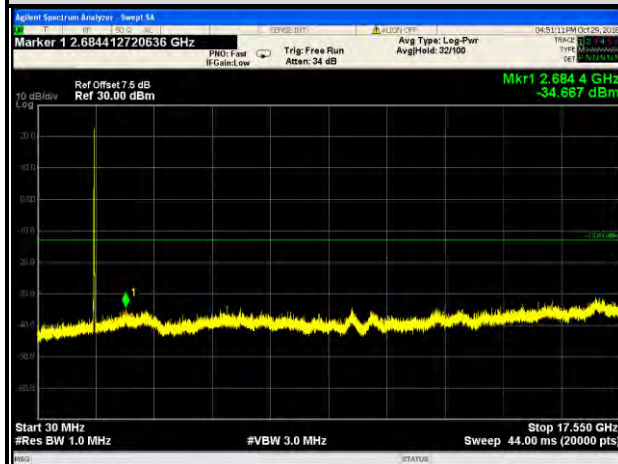
CHANNEL 20175

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 20350

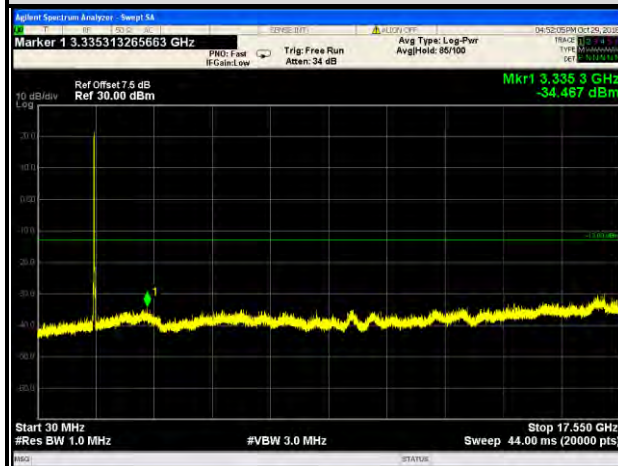
FREQUENCY RANGE : 30MHz~19.1GHz



15MHz / QPSK

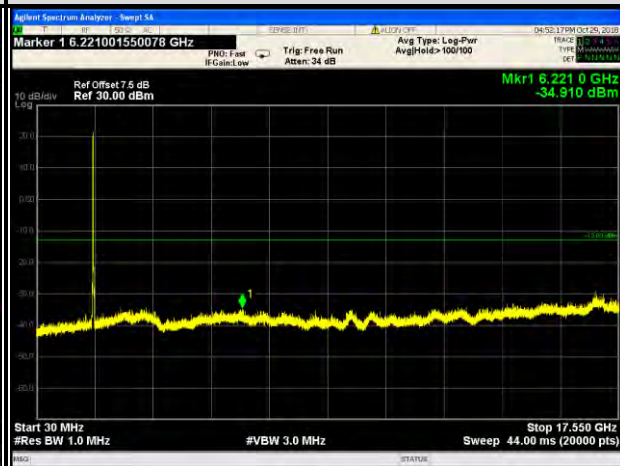
CHANNEL 20025

FREQUENCY RANGE : 30MHz~19.1GHz



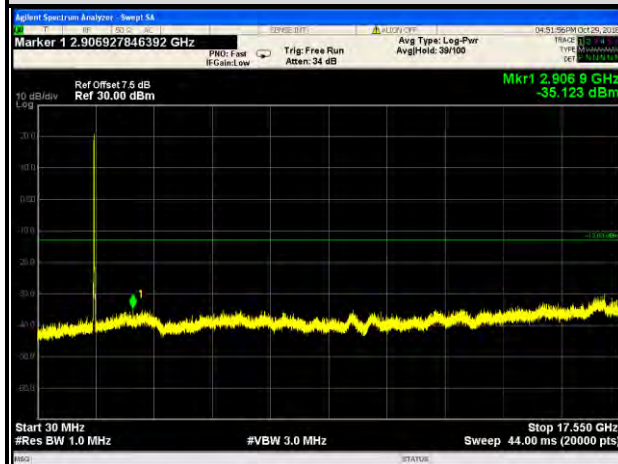
CHANNEL 20175

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 20325

FREQUENCY RANGE : 30MHz~19.1GHz



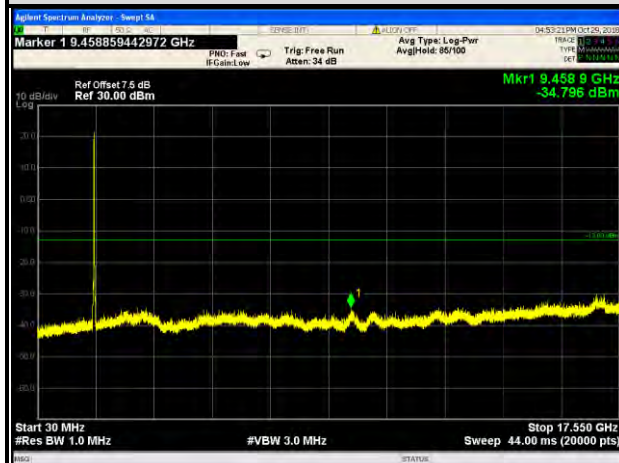


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20MHz / QPSK

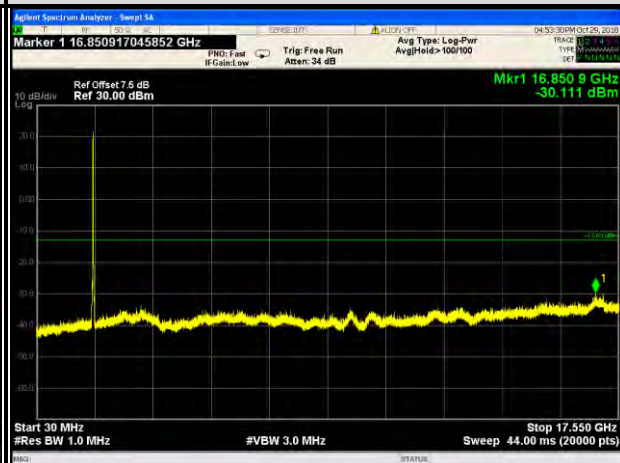
CHANNEL 20050

FREQUENCY RANGE : 30MHz~19.1GHz



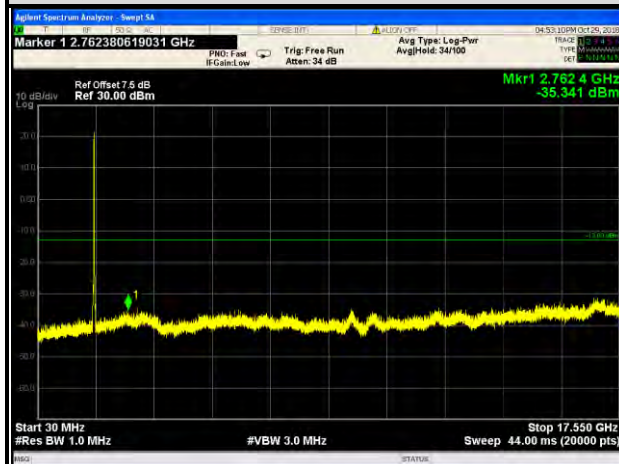
CHANNEL 20175

FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 20300

FREQUENCY RANGE : 30MHz~19.1GHz

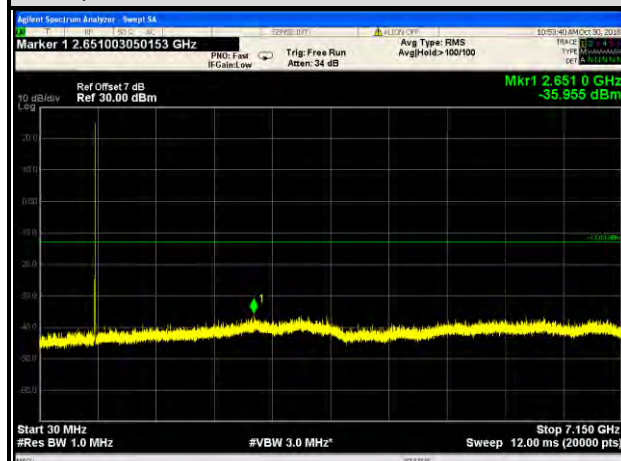


LTE BAND 12

1.4MHz / QPSK

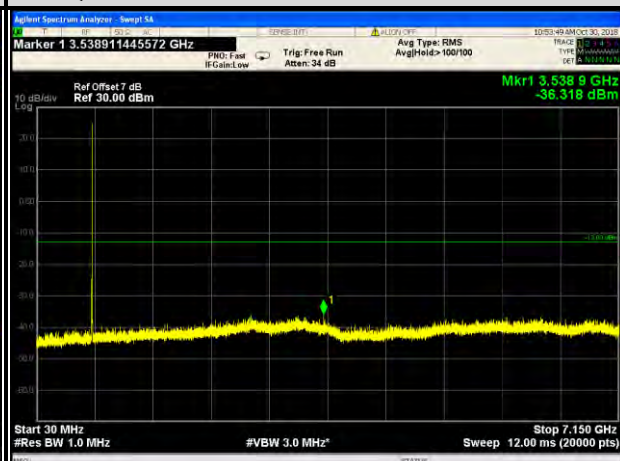
CHANNEL 23017

FREQUENCY RANGE : 30MHz~9GHz



CHANNEL 23095

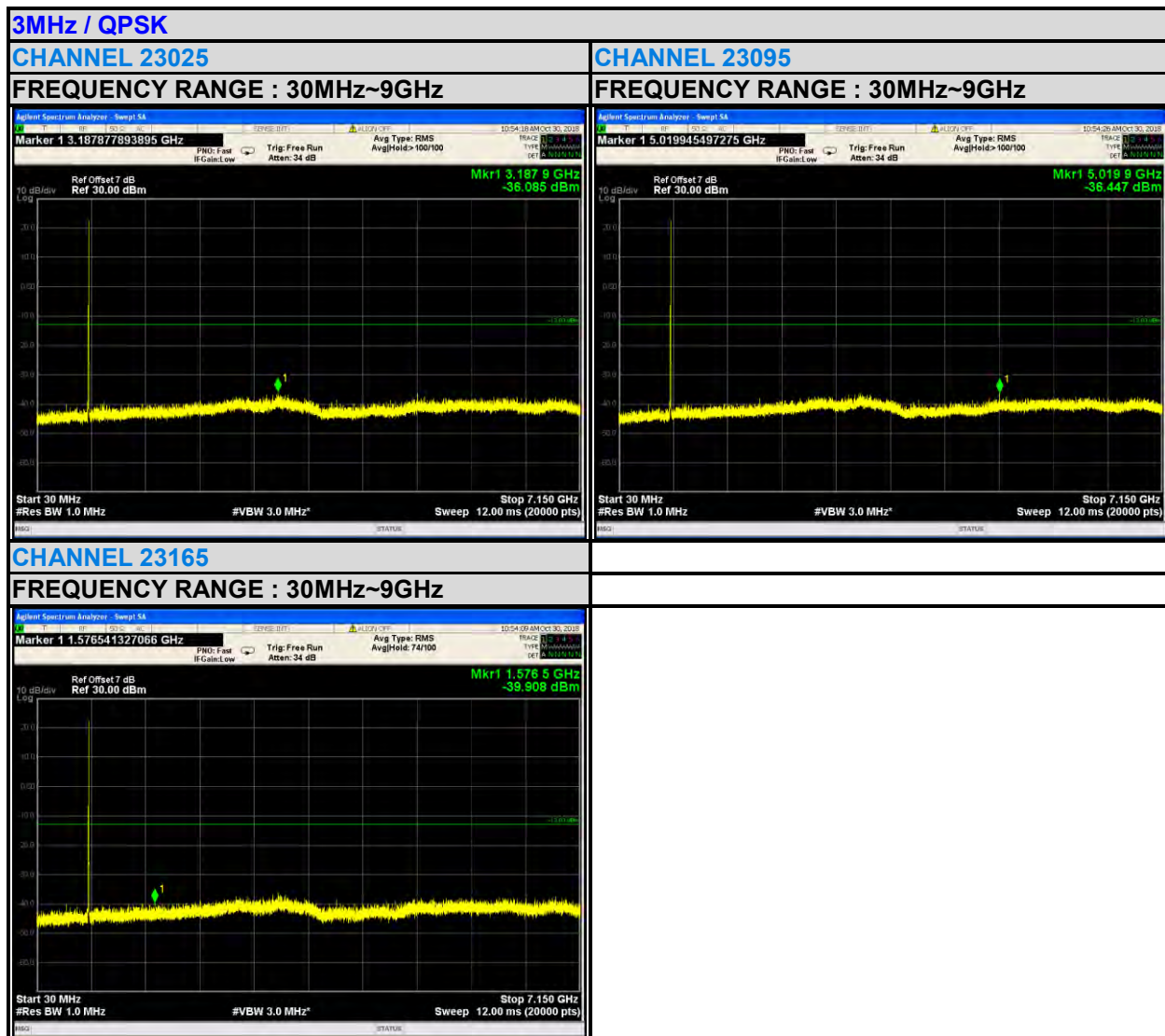
FREQUENCY RANGE : 30MHz~9GHz



CHANNEL 23173

FREQUENCY RANGE : 30MHz~9GHz

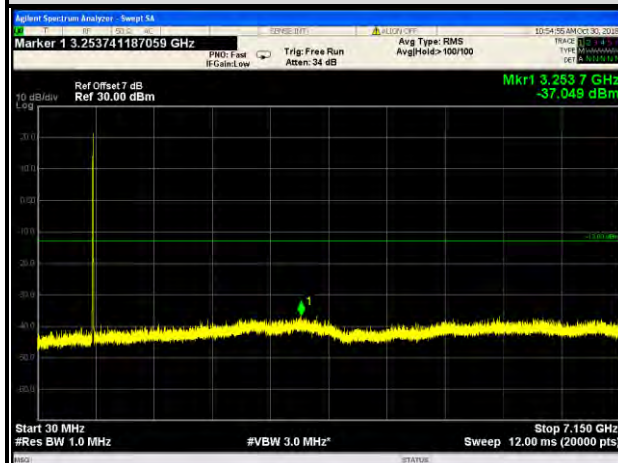




5MHz / QPSK

CHANNEL 23035

FREQUENCY RANGE : 30MHz~9GHz



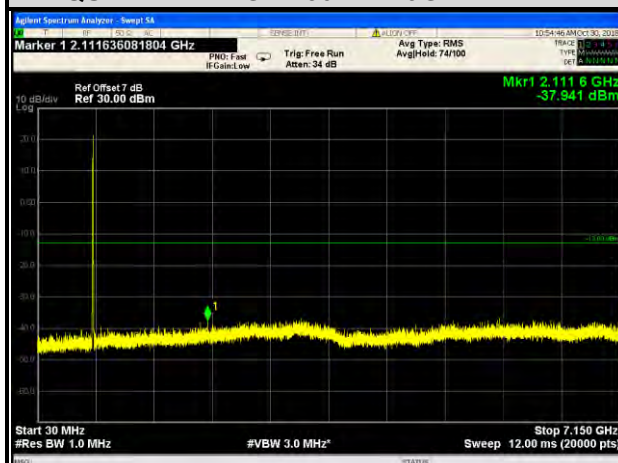
CHANNEL 23095

FREQUENCY RANGE : 30MHz~9GHz



CHANNEL 23155

FREQUENCY RANGE : 30MHz~9GHz



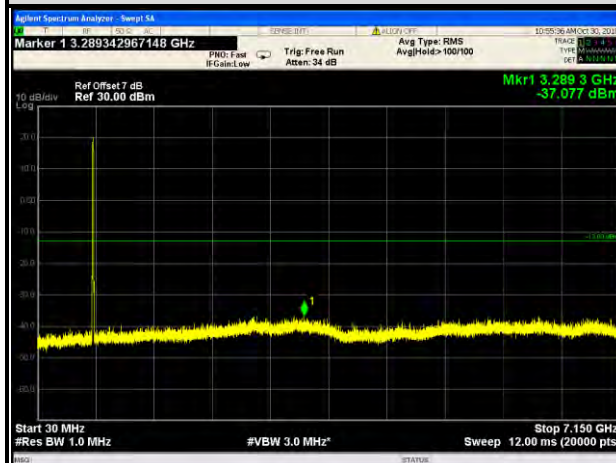


Test Report No.: RF181011N013-5

10MHz / QPSK

CHANNEL 23060

FREQUENCY RANGE : 30MHz~9GHz



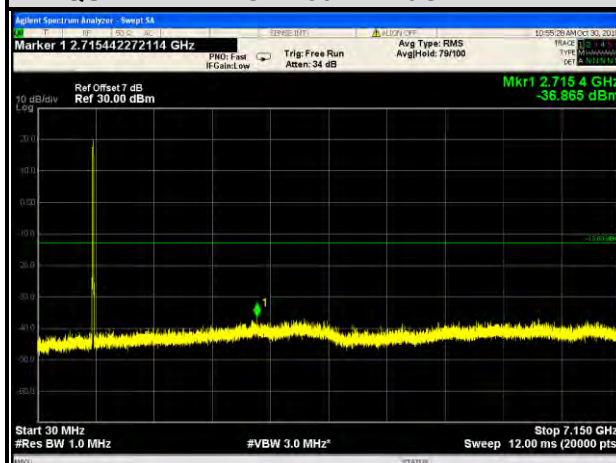
CHANNEL 23095

FREQUENCY RANGE : 30MHz~9GHz



CHANNEL 23130

FREQUENCY RANGE : 30MHz~9GHz



3.7 RADIATED EMISSION MEASUREMENT

3.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

3.7.2 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, $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}.$

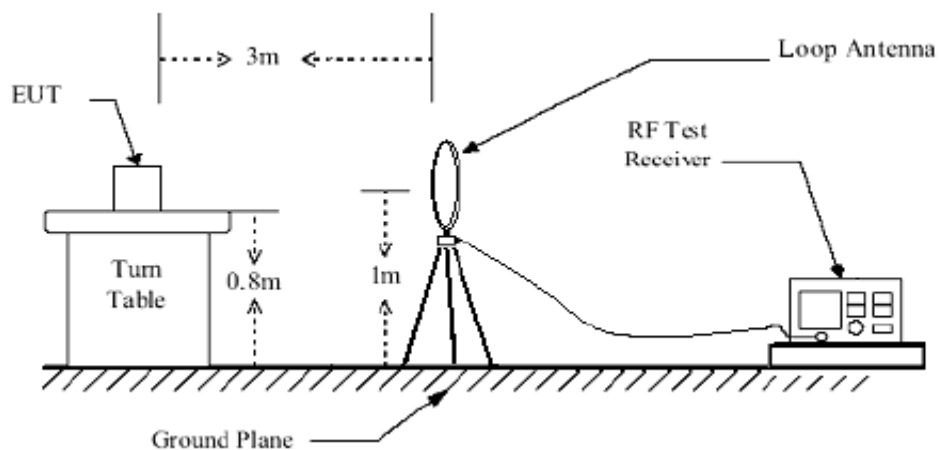
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.7.3 DEVIATION FROM TEST STANDARD

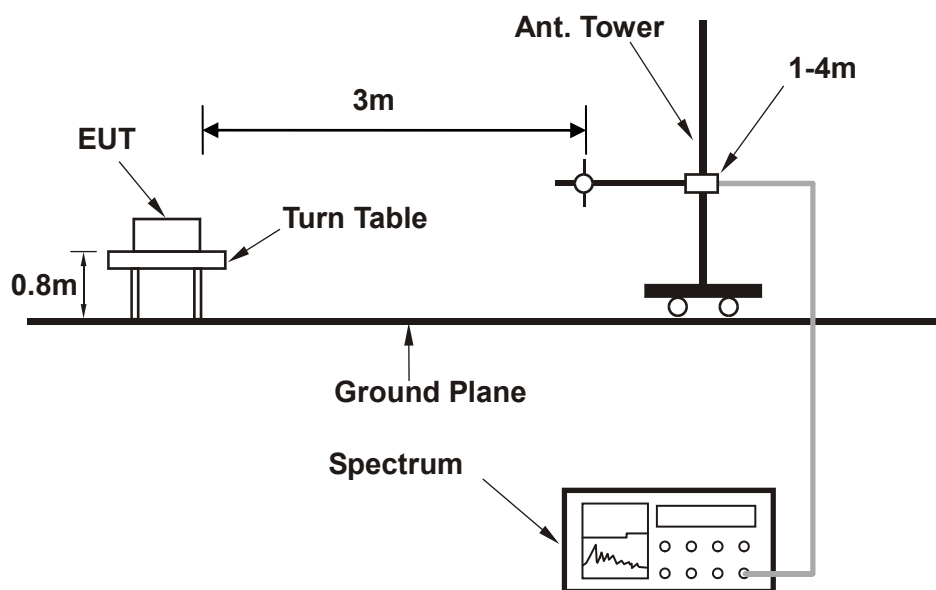
No deviation

3.7.4 TEST SETUP

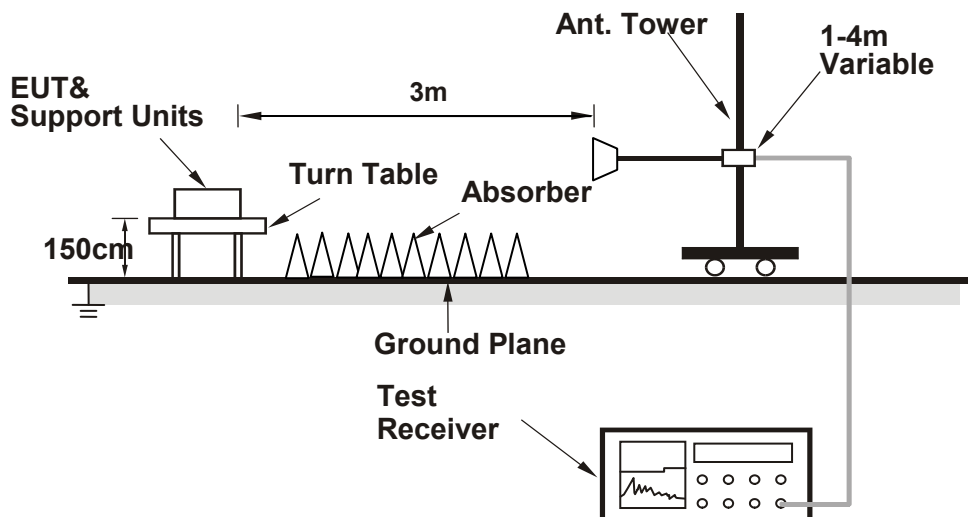
<Below 30MHz>



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.7.5 TEST RESULTS

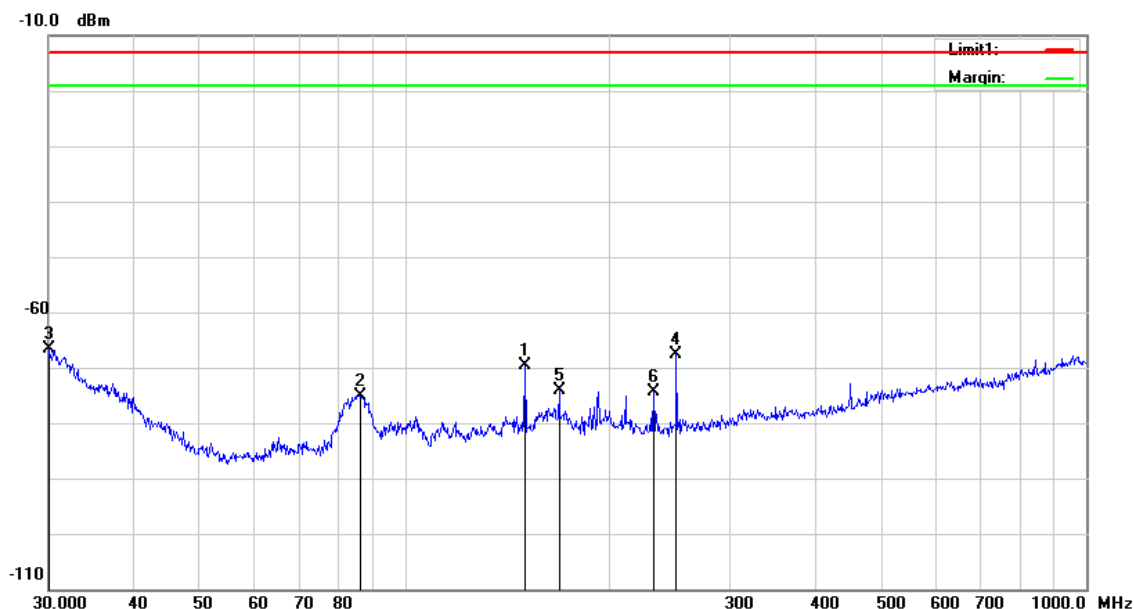
BELOW 1GHz WORST-CASE DATA

9 KHz – 30 KHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

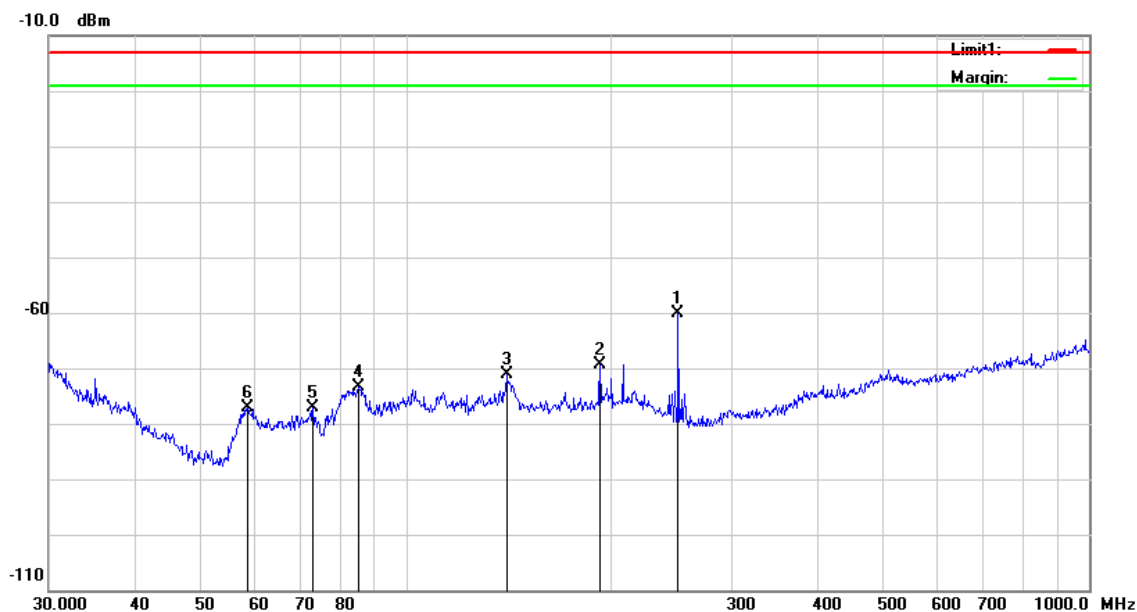
LTE Band 4:

MODE	TX channel 20175	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Simon Lin		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			



No.	Frequency (MHz)	Reading (dBm)	Result (dBm)	Limit (dBm)	Margin (dB)
1	150.0108	-70.31	-69.67	-13.00	-56.67
2	85.8984	-71.81	-75.04	-13.00	-62.04
3	30.0000	-80.74	-66.62	-13.00	-53.62
4	250.3012	-68.58	-67.64	-13.00	-54.64
5	168.4138	-74.56	-74.08	-13.00	-61.08
6	231.7179	-74.92	-74.25	-13.00	-61.25

MODE	TX channel 20175	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Simon Lin		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



No.	Frequency (MHz)	Reading (dBm)	Result (dBm)	Limit (dBm)	Margin (dB)
1	250.3012	-61.94	-60.18	-13.00	-47.18
2	192.4186	-72.99	-69.41	-13.00	-56.41
3	140.3421	-76.09	-71.08	-13.00	-58.08
4	85.2981	-75.21	-73.39	-13.00	-60.39
5	73.1025	-76.03	-77.11	-13.00	-64.11
6	58.6126	-73.58	-77.08	-13.00	-64.08

ABOVE 1GHz DATA

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

LTE BAND 4

CHANNEL BANDWIDTH: 20 MHz / QPSK

Low channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3440	V	-33.61	-13	-20.61
3440	H	-35.7	-13	-22.7

Middle channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3465	V	-38.54	-13	-25.54
3465	H	-31.89	-13	-18.89

High channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3490	V	-29.43	-13	-16.43
3490	H	-36.71	-13	-23.71

Note:

- 1, The testing has been conformed to $10 \times 1754.3 \text{ MHz} = 17,543 \text{ MHz}$
- 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 12

CHANNEL BANDWIDTH: 20 MHz / QPSK

Low channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1408	V	-30.36	-13	-17.36
1408	H	-31.19	-13	-18.19

Middle channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1415	V	-37.67	-13	-24.67
1415	H	-33.18	-13	-20.18

High channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1422	V	-33.93	-13	-20.93
1422	H	-29.59	-13	-16.59

Note:

- 1, The testing has been conformed to $10 \times 815.33 \text{ MHz} = 7,153 \text{ MHz}$
- 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 13

CHANNEL BANDWIDTH: 20 MHz / QPSK

Low channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1559	V	-26.43	-13	-13.43
1559	H	-33.6	-13	-20.6

Middle channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1564	V	-31.24	-13	-18.24
1564	H	-31.39	-13	-18.39

High channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1569	V	-28.77	-13	-15.77
1569	H	-26.21	-13	-13.21

Note:

- 1, The testing has been conformed to $10 \times 784.5 \text{ MHz} = 7,845 \text{ MHz}$
- 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.



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4 INFORMATION ON THE TESTING LABORATORIES

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

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

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Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.dg@cn.bureauveritas.com

Web Site: www.adt.com.tw

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



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

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

---END---