

# FCC TEST REPORT

**Product Name:** Smart Phone

**Trade Mark:** BLU

**Model No.:** X5

**Report Number:** 2308306642RFM-2

**Test Standards:** FCC 47 CFR Part 22  
FCC 47 CFR Part 24  
FCC 47 CFR Part 27

**FCC ID:** YHLBLUX5LL

**Test Result:** PASS

**Date of Issue:** October 18, 2023

Prepared for:

**BLU Products, Inc.**

**8600 NW 36th Street, Suite #200 Doral, FL 33166**

Prepared by:

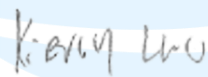
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UTTR-RF-FCC4G-V1.1

**Version**

Version No.	Date	Description
V1.0	October 18, 2023	Original

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A.1	LTE BAND 2 .....	50
A.2	LTE BAND 4 .....	75
A.3	LTE BAND 5 .....	100
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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	BLU Products, Inc.
<b>Address of Applicant:</b>	8600 NW 36th Street, Suite #200 Doral, FL 33166
<b>Manufacturer:</b>	BLU Products, Inc.
<b>Address of Manufacturer:</b>	8600 NW 36th Street, Suite #200 Doral, FL 33166

### 1.2 EUT INFORMATION

#### 1.2.1 General Description of EUT

<b>Product Name:</b>	Smart Phone		
<b>Model No.:</b>	X5		
<b>Trade Mark:</b>	BLU		
<b>DUT Stage:</b>	Identical Prototype		
<b>EUT Supports Function:</b> (Provided by the customer)	GSM Bands:	GSM850/PCS 1900	
	UTRA Bands:	WCDMA Band II/ Band IV/ Band V	
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7/ Band 17 TDD Band 38	
	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth V4.2	
	RNSS Band:	1559 MHz to 1610 MHz	GPS/ BDS/ GLONASS
	BSR:	VHF Band II	FM
<b>Software Version:</b>	BLU_X0030_V13.0.G.01.01_GENERIC_23-08-2023_1252 (Provided by the customer)		
<b>Hardware Version:</b>	FS170-76G (Provided by the customer)		
<b>Sample Received Date:</b>	August 29, 2023		
<b>Sample Tested Date:</b>	August 29, 2023 to September 27, 2023		
<b>Remark:</b>	The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.		

#### 1.2.2 Description of Accessories

Adapter	
<b>Model No.:</b>	US-AR-1001
<b>Input:</b>	100-240 V~50/60 Hz 0.2 A
<b>Output:</b>	5.0 V $\equiv$ 1000 mA

Battery	
<b>Model No.:</b>	C775850200L
<b>Battery Type:</b>	Lithium-ion Battery
<b>Rated Voltage:</b>	3.7 Vdc
<b>Limited Charge Voltage:</b>	4.2 Vdc
<b>Rated Capacity:</b>	2000 mAh

Cable	
<b>Connector:</b>	USB Cable
<b>Cable Type:</b>	Unshielded without ferrite
<b>Length:</b>	1.0 Meter

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### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

<b>Support Networks:</b>	Single Carrier: LTE Band 2/4/5/7/17/38	
<b>Type of Modulation:</b>	QPSK, 16QAM	
<b>Antenna Type:</b> (Provided by the customer)	FPCB Antenna	
<b>Antenna Gain:</b> (Provided by the customer)	LTE Band 2:	-0.15 dBi
	LTE Band 4:	-0.45 dBi
	LTE Band 5:	-3.25 dBi
	LTE Band 7:	2.32 dBi
	LTE Band 17:	-3.98 dBi
	LTE Band 38:	2.32 dBi
<b>Sample No.:</b>	Radiated: S202308292041-ZJA02/6	
	Conducted: S202308292041-ZJA01/6	
<b>Normal Test Voltage:</b>	3.7 Vdc	
<b>Extreme Test Voltage:</b>	3.4 to 4.2Vdc	
<b>Extreme Test Temperature:</b>	-10 °C to +60 °C	

Summary of Results:									
Bands	BW	Modulation	Frequency Range	Max RF Output Power (dBm)		ERP/EIRP	99% BW	Emission Designator	
	(MHz)		(MHz)	Conducted (Average)	ERP/EIRP (Average)	(W)	(MHz)		
2	1.4	QPSK	1850.7-1909.3	22.95	22.80	0.1905	1.0815	1M08G7D	
		16QAM		22.53	22.38	0.1730	1.0781	1M08W7D	
	3	QPSK	1851.5-1908.5	22.83	22.68	0.1854	2.6918	2M69G7D	
		16QAM		22.54	22.39	0.1734	2.6865	2M69W7D	
	5	QPSK	1852.5-1907.5	23.04	22.89	0.1945	4.4679	4M47G7D	
		16QAM		21.92	21.77	0.1503	4.4634	4M46W7D	
	10	QPSK	1855.0-1905.0	22.94	22.79	0.1901	8.9425	8M94G7D	
		16QAM		22.60	22.45	0.1758	8.9453	8M95W7D	
	15	QPSK	1857.5-1902.5	23.02	22.87	0.1936	13.431	13M4G7D	
		16QAM		22.59	22.44	0.1754	13.439	13M4W7D	
	20	QPSK	1860.0-1900.0	23.11	22.96	0.1977	17.918	17M9G7D	
		16QAM		22.62	22.47	0.1766	17.938	17M9W7D	
	4	1.4	QPSK	1710.7-1754.3	22.99	22.54	0.1795	1.0805	1M08G7D
			16QAM		22.04	21.59	0.1442	1.0765	1M08W7D
3		QPSK	1711.5-1753.5	23.00	22.55	0.1799	2.6859	2M69G7D	
		16QAM		22.65	22.20	0.1660	2.6865	2M69W7D	
5		QPSK	1712.5-1752.5	23.02	22.57	0.1807	4.4639	4M46G7D	
		16QAM		21.83	21.38	0.1374	4.4618	4M46W7D	
10		QPSK	1715-1750	22.95	22.50	0.1778	8.9405	8M94G7D	
		16QAM		22.74	22.29	0.1694	8.9390	8M94W7D	
15		QPSK	1717.5-1747.5	22.95	22.50	0.1778	13.414	13M4G7D	
		16QAM		22.69	22.24	0.1675	13.420	13M4W7D	
20		QPSK	1720-1745	23.05	22.60	0.1820	17.894	17M9G7D	
		16QAM		22.77	22.32	0.1706	17.894	17M9W7D	
5		1.4	QPSK	824.7-848.3	22.90	17.50	0.0562	1.0804	1M08G7D
			16QAM		22.11	16.71	0.0469	1.0801	1M08W7D
	3	QPSK	825.5-847.5	22.91	17.51	0.0564	2.6897	2M69G7D	
		16QAM		21.88	16.48	0.0445	2.6830	2M68W7D	
	5	QPSK	826.5-846.5	22.90	17.50	0.0562	4.4669	4M47G7D	
		16QAM		21.86	16.46	0.0443	4.4669	4M47W7D	
	10	QPSK	829-844	23.02	17.62	0.0578	8.9397	8M94G7D	
		16QAM		22.28	16.88	0.0488	8.9474	8M95W7D	

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Bands	BW	Modulation	Frequency Range	Max RF Output Power (dBm)		ERP/EIRP (W)	99% BW (MHz)	Emission Designator
	(MHz)		(MHz)	Conducted (Average)	ERP/EIRP (Average)			
7	5	QPSK	2502.5-2567.5	20.40	22.72	0.1871	4.4645	4M46G7D
		16QAM		19.88	22.20	0.1660	4.4581	4M46W7D
	10	QPSK	2505-2565	20.48	22.80	0.1905	8.9456	8M95G7D
		16QAM		20.40	22.72	0.1871	8.9405	9M94W7D
	15	QPSK	2507.5-2562.5	20.44	22.76	0.1888	13.438	13M4G7D
		16QAM		20.23	22.55	0.1799	13.461	13M5W7D
20	QPSK	2510-2560	20.72	23.04	0.2014	17.932	17M9G7D	
	16QAM		20.46	22.78	0.1897	17.900	17M9W7D	
17	5	QPSK	706.5-713.5	22.66	16.53	0.0450	4.4617	4M46G7D
		16QAM		21.39	15.26	0.0336	4.4707	4M47W7D
	10	QPSK	709-711	22.73	16.60	0.0457	8.9405	8M94G7D
		16QAM		21.74	15.61	0.0364	8.9500	8M95W7D
38	5	QPSK	2572.5-2617.5	22.78	25.10	0.3236	4.464	4M46G7D
		16QAM		22.32	24.64	0.2911	4.457	4M46W7D
	10	QPSK	2575-2615	22.82	25.14	0.3266	8.9460	8M95G7D
		16QAM		22.02	24.34	0.2716	8.9476	8M95W7D
	15	QPSK	2577.5-2612.5	22.75	25.07	0.3214	13.428	13M4G7D
		16QAM		22.15	24.47	0.2799	13.420	13M4W7D
20	QPSK	2580-2610	22.84	25.16	0.3281	17.916	17M9G7D	
	16QAM		22.48	24.80	0.3020	17.904	17M9W7D	

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## 1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

### 1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
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### 2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.1 Meter	UnionTrust

## 1.5 TEST LOCATION

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## 1.6 TEST FACILITY

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The test facility is recognized, certified, or accredited by the following organizations:

### CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

### A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

### FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

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## 1.7 DEVIATION FROM STANDARDS

None.

## 1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

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### 1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

### 1.10 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted Output Power	±0.7 dB
2	99%&26dB Bandwidth	±1.86 %
3	Emission Mask	±2.7 dBm
4	Spurious emissions at antenna terminals	±2.7 dBm
5	Field strength of spurious radiation	30 MHz-1 GHz: ±4.9 dB 1 GHz-18 GHz: ±4.8 dB 18 GHz-40 GHz: ±5.1 dB
6	Frequency stability	±6.5 x 10 <sup>-8</sup>
7	Humidity	±3.9 %
8	Temperature	±0.62 °C
9	DC Voltages	±0.68 %

## 2. TEST SUMMARY

FCC 47 CFR Part 24 Test Cases (Band 2)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 24.232(d)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 24.238(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 27 Test Cases (LTE Band 4)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(h)(1)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 22 Test Cases (Band 5)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 22.913(a)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 22.917(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 22.355	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 27 Test Cases (LTE Band 17)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(c)(10)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(c)(10)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

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UTTR-RF-FCC4G-V1.1

FCC 47 CFR Part 27 Test Cases (LTE Band 7& Band 38)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(h)(2)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(h)(2)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(m)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(m)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(m)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

**Disclaimer and Explanations:**

The declared of product specification and data (e.g. antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.

### 3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
<input checked="" type="checkbox"/>	3m SAC	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	3-Nov-2022	2-Nov-2023
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	13-Dec-2022	12-Dec-2023
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	13-Dec-2022	12-Dec-2023
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	1-Nov-2022	31-Oct-2023
<input checked="" type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	16-Apr-2023	15-Apr-2025
<input checked="" type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	00118385	00201874	1-Nov-2022	31-Oct-2023
<input checked="" type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	21-Nov-2022	20-Nov-2023
<input checked="" type="checkbox"/>	Pre-amplifier	ETS-LINDGREN	00118384	00202652	21-Nov-2022	20-Nov-2023
<input checked="" type="checkbox"/>	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
<input checked="" type="checkbox"/>	Test Software	Audix	e3	Software Version: 9.160323		

RF Conducted Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
<input checked="" type="checkbox"/>	EXA Signal Analyzer	KEYSIGHT	N9010B	MY62060155	19-Apr-2023	18-Apr-2024
<input checked="" type="checkbox"/>	DC Source	KIKUSUI	PWR400L	LK003024	N/A	N/A
<input checked="" type="checkbox"/>	Digital multimeter	FLUKE	15B+	30701460WS15	02-Nov-2022	01-Nov-2023
<input checked="" type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	58566133290020	14-Apr-2023	13-Apr-2024
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	119583	14-Apr-2023	13-Apr-2024
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	120932	14-Apr-2023	13-Apr-2024

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UTTR-RF-FCC4G-V1.1



#### 4. TEST CONFIGURATION

##### 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

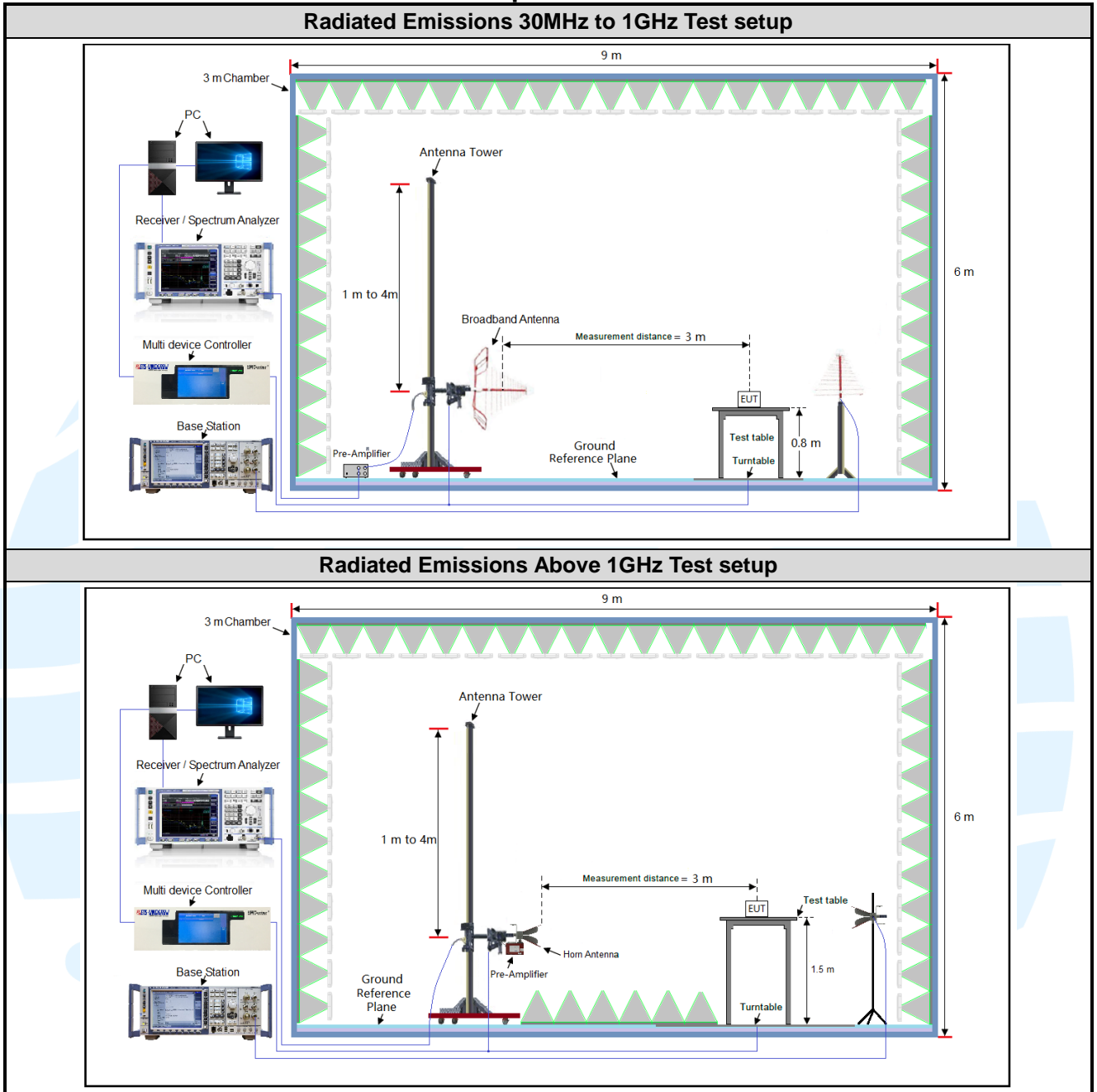
Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.7	20 to 75
TL/VL	-10	3.4	20 to 75
TH/VL	+60	3.4	20 to 75
TL/VH	-10	4.2	20 to 75
TH/VH	+60	4.2	20 to 75

**Remark:**

- 1) The EUT just work in such extreme temperature of -10 °C to +60 °C and the extreme voltage of 3.4 V to 4.2 V, so here the EUT is tested in the temperature of -10 °C to +60 °C and the voltage of 3.4 V to 4.2 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;  
 TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;  
 VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

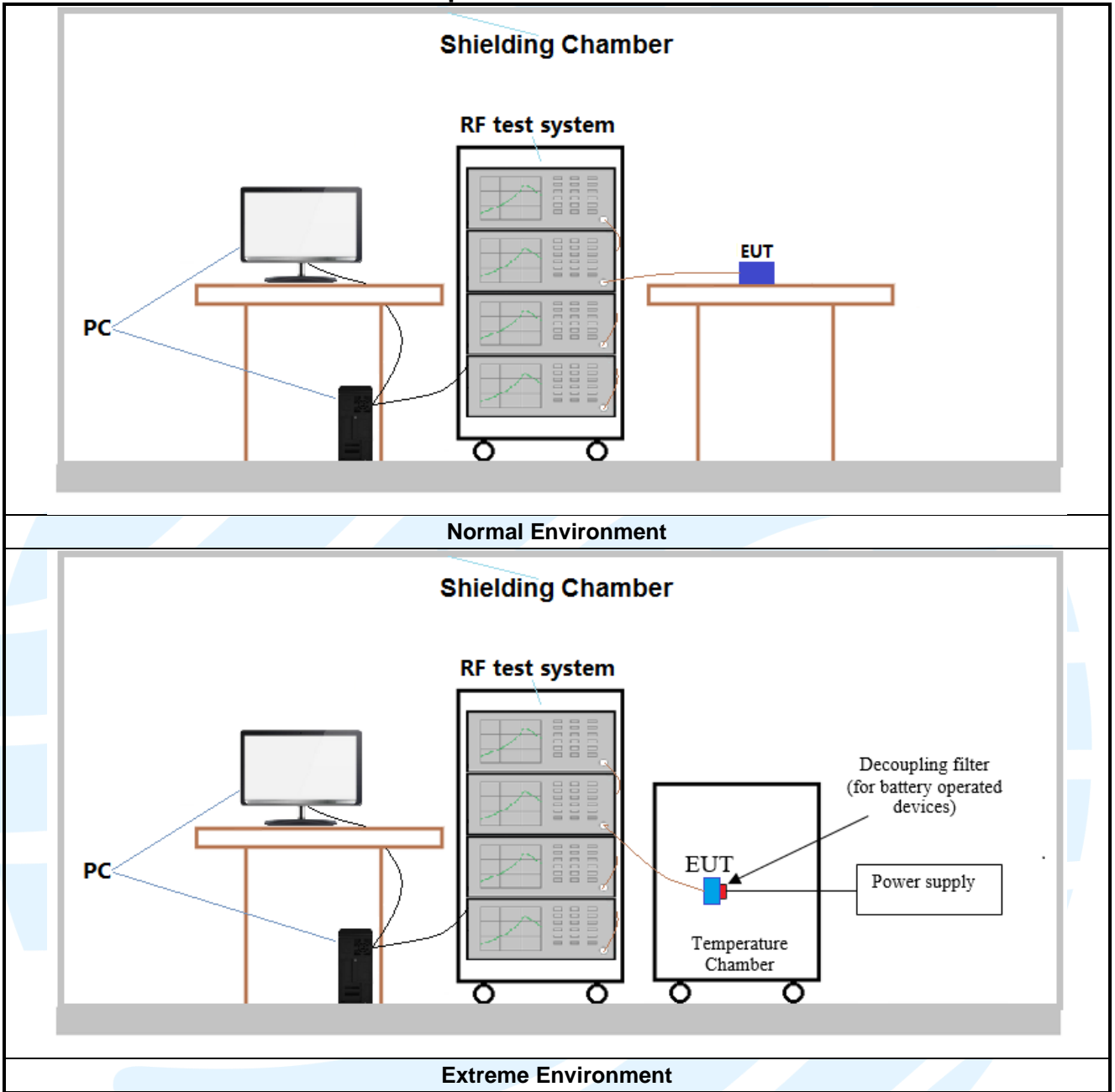
## 4.2 TEST SETUP

### 4.2.1 For Radiated Emissions test setup





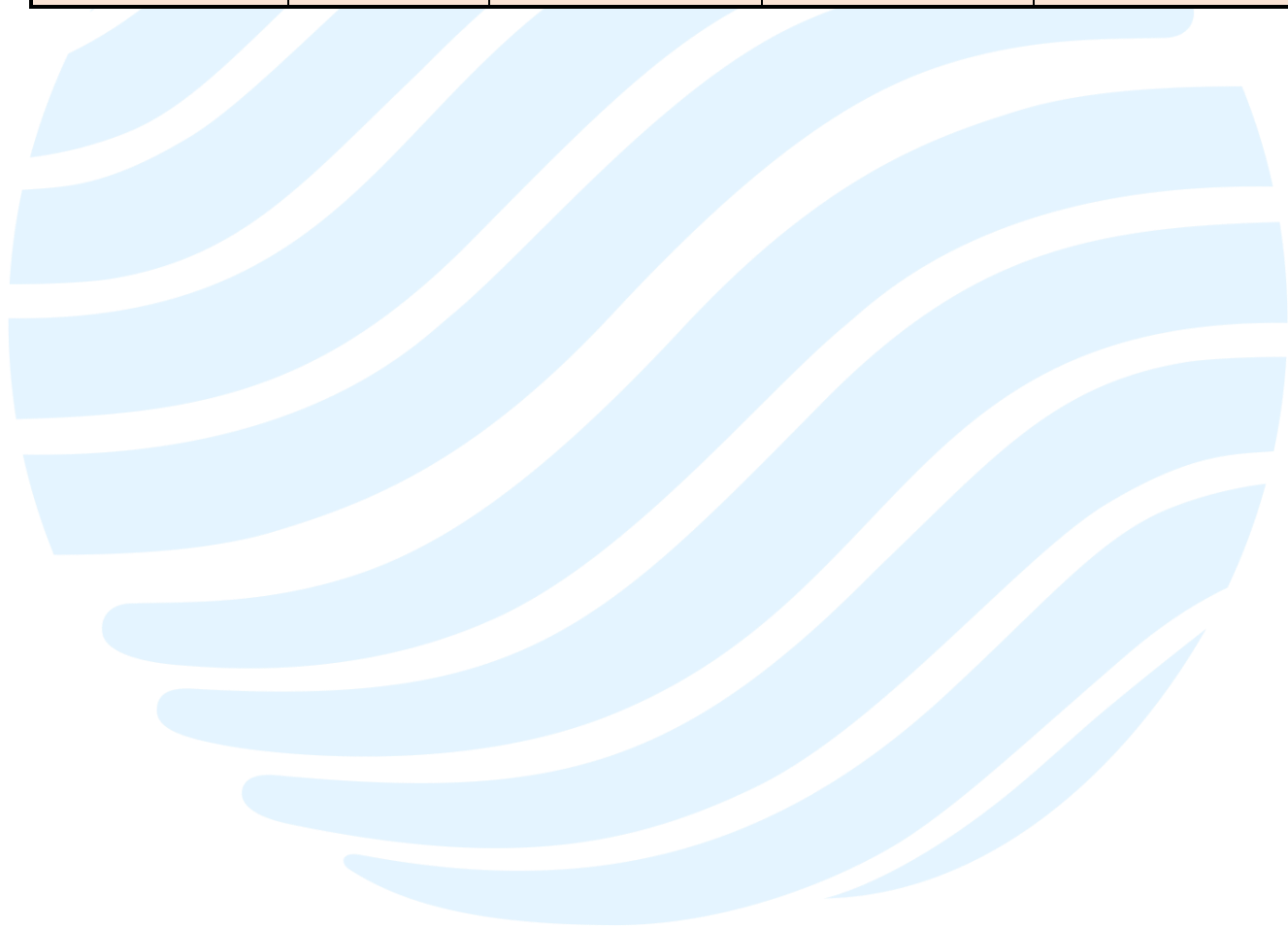
4.2.2 For Conducted RF test setup



### 4.3 TEST CHANNELS

Band	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink (MHz)	
LTE Band 2 TX: 1850-1910MHz	Low Range	1.4	18607	1850.7	
		3	18615	1851.5	
		5	18625	1852.5	
		10	18650	1855	
		15	18675	1857.5	
		20	18700	1860	
	Middle Range	1.4/3/5/10/15/20	18900	1880	
	High Range	1.4	19193	1909.3	
		3	19185	1908.5	
		5	19175	1907.5	
		10	19150	1905	
		15	19125	1902.5	
		20	19100	1900	
	LTE Band 4 TX: 1710-1755MHz	Low Range	1.4	19957	1710.7
3			19965	1711.5	
5			19975	1712.5	
10			20000	1715	
15			20025	1717.5	
20			20050	1720	
Middle Range		1.4/3/5/10/ 15/20	20175	1732.5	
High Range		1.4	20393	1754.3	
		3	20385	1753.5	
		5	20375	1752.5	
		10	20350	1750	
		15	20325	1747.5	
		20	20300	1745	
LTE band 5 TX: 824–849MHz		Low Range	1.4	20407	824.7
	3		20415	825.5	
	5		20425	826.5	
	10		20450	829	
	Middle Range	1.4/3/5/10	20525	836.5	
	High Range	1.4	20643	848.3	
		3	20635	847.5	
		5	20625	846.5	
		10	20600	844	
		LTE Band 7 TX: 2500-2570MHz	Low Range	5	20775
10				20800	2505
15	20825			2507.5	
20	20850			2510	
Middle Range	5/10/15/20		21100	2535	
High Range	5		21425	2567.5	
	10		21400	2565	
	15	21375	2562.5		

		20	21350	2560
LTE Band 17 TX:704-716MHz	Low Range	5	23755	706.5
		10	23780	709
	Middle Range	5/10	23790	710
	High Range	5	23825	713.5
		10	23800	711
LTE Band 38 TX: 2570-2620MHz	Low Range	5	37775	2572.5
		10	37800	2575
		15	37825	2577.5
		20	37850	2580
	Middle Range	5/10/ 15/20	38000	2595
	High Range	5	38225	2617.5
		10	38200	2615
		15	38175	2612.5
		20	38150	2610



#### 4.4 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.7Vdc battery. Only the worst case data were recorded in this test report.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X/Y/Z axis, and antenna ports.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

### 4.5 PRE-SCAN

Pre-scan all bandwidth and RB, find worse case mode are chosen to the report, the LTE worse case mode applicability and tested channel detail as below:

Item	Band	Bandwidth(MHz)						Modulation			RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Conducted output power	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☒	☒	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	17	-	-	☒	☒	-	-	☒	☒	☐	☒	☒	☒	☒	☒	☒
	38	-	-	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
99%&26dB Bandwidth	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☐	☐	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	17	-	-	☒	☒	-	-	☒	☒	☐	☐	☐	☒	☒	☒	☒
	38	-	-	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
peak-to-average ratio	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☐	☒	☐
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☐	☒	☐
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☐	☐	☒	☐	☒	☐
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☐	☒	☐
	17	-	-	☒	☒	-	-	☒	☒	☐	☐	☐	☒	☐	☒	☐
	38	-	-	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒

Item	Band	Bandwidth(MHz)						Modulation			RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
<b>Band Edge at antenna terminals</b>	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	--	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	7	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	17	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	38	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Spurious emissions at antenna terminals</b>	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	--	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	7	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	38	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Field strength of spurious radiation</b>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	--	--	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	7	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	38	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Frequency stability</b>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	--	--	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	7	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	17	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	38	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Remark: The mark "☒" means is chosen for testing; The mark "☐" means is not chosen for testing; The mark "-" means is not supported bandwidth																

## 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

### 5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 22	Public Mobile Services
3	FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
4	FCC 47 CFR Part 24	Personal Communications Services
5	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
6	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

### 5.2 CONDUCTED OUTPUT POWER

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
**LTE Band 2:** FCC 47 CFR Part 24.232(c)  
**LTE Band 4:** FCC 47 CFR Part 27.50(d)(4)  
**LTE Band 5:** FCC 47 CFR Part 22.913(a)  
**LTE Band 7 & Band 38:** FCC 47 CFR Part 27.50(h)(2)  
**LTE Band 17:** FCC 47 CFR Part 27.50(c)(10)

**Test Method:** KDB 971168 D01v03r01 & ANSI C63.26-2015

**Limit:**

**FCC 47 CFR Part 22.913(a):**

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

**FCC 47 CFR Part 24.232(c):**

Mobile and portable stations are limited to 2 watts EIRP.

**FCC 47 CFR Part 27.50(d)(4):**

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

**FCC 47 CFR Part 27.50(c)(10):**

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

**FCC 47 CFR Part 27.50(h)(2):**

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

**Test Procedure:**

The EUT was set up for the maximum power with CMW500, and 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.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**5.2.1 LTE Band 2**

			Conducted Power(dBm)					
Modulation			QPSK			16QAM		
Band	Bandwidth	RB	18607	18900	19193	18607	18900	19193
	(MHz)		1850.7	1880	1909.3	1850.7	1880	1909.3
2	1.4	1@0	22.77	22.67	22.80	21.86	22.50	21.25
		1@3	22.76	22.74	22.85	21.87	22.46	21.17
		1@5	22.68	22.65	22.84	21.87	22.53	21.18
		3@0	22.80	22.88	22.90	21.74	22.06	21.95
		3@1	22.85	22.95	22.82	21.99	21.82	21.97
		3@3	22.91	22.88	22.81	21.78	22.08	21.94
		6@0	21.83	21.79	21.92	20.44	20.53	20.51
Band	Bandwidth	RB	18615	18900	19185	18615	18900	19185
	(MHz)		1851.5	1880	1908.5	1851.5	1880	1908.5
2	3	1@0	22.68	22.72	22.77	22.30	22.50	21.73
		1@8	22.71	22.70	22.81	22.28	22.54	21.71
		1@14	22.65	22.73	22.83	22.28	22.53	21.79
		8@0	21.80	21.86	21.88	20.70	20.50	20.63
		8@4	21.78	21.80	21.78	20.35	20.48	20.53
		8@7	21.69	21.76	21.77	20.69	20.40	20.67
		15@0	21.85	21.80	21.94	20.49	20.40	20.49
Band	Bandwidth	RB	18625	18900	19175	18625	18900	19175
	(MHz)		1852.5	1880	1907.5	1852.5	1880	1907.5
2	5	1@0	22.77	23.00	23.04	20.99	21.85	21.87
		1@12	22.80	22.99	22.90	20.92	21.87	21.85
		1@24	22.82	22.96	22.92	20.95	21.92	21.91
		12@0	21.82	21.82	21.93	20.39	20.40	20.43
		12@7	21.68	21.88	21.95	20.43	20.46	20.45
		12@13	21.86	21.85	21.91	20.37	20.40	20.40
		25@0	21.69	21.85	21.81	20.48	20.36	20.54
Band	Bandwidth	RB	18650	18900	19150	18650	18900	19150
	(MHz)		1855	1880	1905	1855	1880	1905
2	10	1@0	22.66	22.90	22.81	22.12	22.60	21.68
		1@25	22.69	22.77	22.73	22.27	21.93	21.13
		1@49	22.70	22.94	22.84	22.13	22.56	21.73
		25@0	21.79	21.72	21.84	20.41	20.58	20.59
		25@12	21.71	21.79	21.90	20.42	20.49	20.58
		25@25	21.66	21.70	21.94	20.43	20.54	20.61
		50@0	21.78	21.88	21.88	20.46	20.37	20.49
Band	Bandwidth	RB	18675	18900	19125	18675	18900	19125
	(MHz)		1857.5	1880	1902.5	1857.5	1880	1902.5
2	15	1@0	22.63	22.89	22.97	22.14	22.59	21.74
		1@37	22.66	22.71	22.48	22.32	21.95	21.97
		1@74	22.67	22.90	23.02	22.11	22.57	21.80
		36@0	21.68	21.85	21.96	20.33	20.51	20.40
		36@20	21.84	21.87	21.88	20.34	20.56	20.41
		36@39	21.71	21.78	21.90	20.37	20.53	20.38
		75@0	21.69	21.90	21.78	20.44	20.44	20.46
Band	Bandwidth	RB	18700	18900	19100	18700	18900	19100
	(MHz)		1860	1880	1900	1860	1880	1900
2	20	1@0	23.11	22.78	22.75	21.81	21.89	22.62
		1@49	23.01	22.80	22.80	21.81	21.88	22.62
		1@99	22.94	22.83	22.76	21.79	21.88	22.59
		50@0	21.74	21.73	21.76	20.35	20.43	20.51
		50@24	21.71	21.69	21.86	20.45	20.36	20.36
		50@50	21.84	21.84	21.83	20.49	20.50	20.47
		100@0	21.77	21.74	21.76	20.41	20.39	20.46



**5.2.2 LTE Band 4**

			Conducted Power(dBm)					
Modulation			QPSK			16QAM		
Band	Bandwidth	RB	19957	20175	20393	19957	20175	20393
	(MHz)		1710.7	1732.5	1754.3	1710.7	1732.5	1754.3
4	1.4	1@0	22.76	22.82	22.98	21.78	21.94	21.42
		1@3	22.73	22.70	22.99	21.79	21.93	21.36
		1@5	22.71	22.78	22.94	21.77	21.93	21.49
		3@0	22.80	22.77	22.79	21.69	21.98	21.72
		3@1	22.79	22.76	22.81	22.04	21.80	21.76
		3@3	22.86	22.85	22.78	21.67	21.98	21.69
		6@0	21.69	21.78	21.85	20.34	20.58	20.58
Band	Bandwidth	RB	19965	20175	20385	19965	20175	20385
	(MHz)		1711.5	1732.5	1753.5	1711.5	1732.5	1753.5
4	3	1@0	22.75	22.79	23.00	22.35	22.65	21.77
		1@8	22.72	22.80	22.95	22.29	22.64	21.75
		1@14	22.70	22.76	22.97	22.38	22.62	21.75
		8@0	21.93	21.81	21.72	20.68	20.50	20.63
		8@4	21.90	21.75	21.74	20.28	20.74	20.46
		8@7	21.80	21.79	21.82	20.73	20.41	20.61
		15@0	21.73	21.81	21.71	20.47	20.40	20.40
Band	Bandwidth	RB	19975	20175	20375	19975	20175	20375
	(MHz)		1712.5	1732.5	1752.5	1712.5	1732.5	1752.5
4	5	1@0	22.91	22.95	22.81	21.16	21.74	21.17
		1@12	22.75	22.67	22.63	20.95	21.80	21.80
		1@24	22.90	23.02	22.85	21.03	21.83	21.26
		12@0	21.73	21.82	21.82	20.38	20.38	20.39
		12@7	21.80	21.87	21.79	20.37	20.42	20.40
		12@13	21.79	21.79	21.83	20.31	20.37	20.32
		25@0	21.72	21.82	21.80	20.39	20.36	20.46
Band	Bandwidth	RB	20000	20175	20350	20000	20175	20350
	(MHz)		1715	1732.5	1750	1715	1732.5	1750
4	10	1@0	22.78	22.95	22.74	22.09	22.74	21.51
		1@25	22.65	22.77	22.82	22.33	21.88	21.24
		1@49	22.76	22.92	22.75	22.14	22.72	21.61
		25@0	21.79	21.73	21.87	20.38	20.45	20.47
		25@12	21.80	21.78	21.76	20.38	20.46	20.58
		25@25	21.75	21.83	21.79	20.39	20.57	20.50
		50@0	21.90	21.79	21.79	20.49	20.47	20.50
Band	Bandwidth	RB	20025	20175	20325	20025	20175	20325
	(MHz)		1717.5	1732.5	1747.5	1717.5	1732.5	1747.5
4	15	1@0	22.77	22.95	22.88	22.47	22.62	21.95
		1@37	22.71	22.83	22.53	22.11	21.92	22.12
		1@74	22.79	22.93	22.92	22.41	22.69	21.89
		36@0	21.83	21.84	21.87	20.45	20.48	20.40
		36@20	21.78	21.71	21.67	20.24	20.50	20.39
		36@39	21.70	21.87	21.72	20.49	20.52	20.41
		75@0	21.73	21.84	21.86	20.42	20.48	20.32
Band	Bandwidth	RB	20050	20175	20300	20050	20175	20300
	(MHz)		1720	1732.5	1745	1720	1732.5	1745
4	20	1@0	22.80	22.92	22.84	22.63	21.80	22.17
		1@49	22.82	22.97	22.84	22.64	21.82	22.09
		1@99	22.83	23.05	22.81	22.77	21.82	22.18
		50@0	21.80	21.81	21.90	20.35	20.50	20.45
		50@24	21.72	21.79	21.85	20.27	20.47	20.42
		50@50	21.75	21.82	21.81	20.36	20.50	20.50
		100@0	21.91	21.87	21.83	20.42	20.45	20.40

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### 5.2.3 LTE Band 5

		Conducted Power(dBm)						
Modulation		QPSK			16QAM			
Band	Bandwidth (MHz)	RB	20407	20525	20643	20407	20525	20643
			824.7	836.5	848.3	824.7	836.5	848.3
5	1.4	1@0	22.78	22.78	22.71	22.11	21.93	21.43
		1@3	22.80	22.80	22.72	21.79	21.90	21.20
		1@5	22.66	22.78	22.85	22.05	21.94	21.47
		3@0	22.80	22.90	22.83	21.68	21.81	21.60
		3@1	22.84	22.76	22.89	21.77	21.90	21.67
		3@3	22.73	22.85	22.86	21.99	21.71	21.98
		6@0	21.76	21.83	21.84	20.30	20.45	20.85
Band	Bandwidth (MHz)	RB	20415	20525	20635	20415	20525	20635
			825.5	836.5	847.5	825.5	836.5	847.5
5	3	1@0	22.77	22.78	22.75	21.76	21.88	21.37
		1@8	22.73	22.87	22.80	21.82	21.81	21.34
		1@14	22.72	22.80	22.91	21.87	21.84	21.44
		8@0	21.87	21.92	21.78	20.52	20.34	20.89
		8@4	21.69	21.84	21.77	20.13	20.44	20.67
		8@7	21.86	21.77	21.80	20.59	20.38	20.96
		15@0	21.74	21.84	21.76	20.31	20.30	20.69
Band	Bandwidth (MHz)	RB	20425	20525	20625	20425	20525	20625
			826.5	836.5	846.5	826.5	836.5	846.5
5	5	1@0	22.81	22.79	22.82	21.00	21.84	21.70
		1@12	22.90	22.71	22.84	21.08	21.80	21.64
		1@24	22.84	22.80	22.89	21.42	21.86	21.78
		12@0	21.71	21.89	21.80	20.18	20.24	20.31
		12@7	21.80	21.85	21.75	20.25	20.35	20.69
		12@13	21.85	21.73	21.81	20.21	20.36	20.73
		25@0	21.83	21.84	21.72	20.44	20.29	20.78
Band	Bandwidth (MHz)	RB	20450	20525	20600	20450	20525	20600
			829	836.5	844	829	836.5	844
5	10	1@0	22.60	23.00	22.97	21.51	22.19	21.90
		1@25	22.84	22.97	22.92	21.98	22.25	21.81
		1@49	22.78	23.02	22.93	21.97	22.28	21.81
		25@0	21.78	21.90	21.90	20.57	20.31	20.42
		25@12	22.32	21.72	21.87	20.93	20.22	20.43
		25@25	21.79	21.92	21.78	20.89	20.25	20.81
		50@0	22.21	21.73	21.86	20.80	20.35	20.45

**5.2.4 LTE Band 7**

			Conducted Power(dBm)					
Modulation			QPSK			16QAM		
Band	Bandwidth	RB	20775	21100	21425	20775	21100	21425
	(MHz)		2502.5	2535	2567.5	2502.5	2535	2567.5
7	5	1@0	20.40	20.29	20.37	19.16	19.61	19.45
		1@12	20.18	20.29	20.39	19.55	19.88	19.78
		1@24	20.26	20.22	20.36	18.92	19.12	19.05
		12@0	20.09	20.30	20.24	18.47	18.70	18.69
		12@7	20.12	20.30	20.27	18.68	18.88	18.87
		12@13	19.98	20.01	19.99	18.43	18.51	18.57
		25@0	20.03	20.17	20.11	18.55	18.63	18.56
Band	Bandwidth	RB	20800	21100	21400	20800	21100	21400
	(MHz)		2505	2535	2565	2505	2535	2565
7	10	1@0	20.12	20.48	20.39	20.02	19.60	19.40
		1@25	20.27	20.45	20.38	20.11	19.55	19.68
		1@49	20.21	20.43	20.45	20.40	19.23	19.43
		25@0	18.94	20.01	19.85	18.69	18.98	19.06
		25@12	18.97	19.92	19.90	18.79	18.80	19.16
		25@25	19.09	19.78	19.85	18.99	18.70	19.01
		50@0	19.00	19.90	19.85	18.85	18.81	18.98
Band	Bandwidth	RB	20825	21100	21375	20825	21100	21375
	(MHz)		2507.5	2535	2562.5	2507.5	2535	2562.5
7	15	1@0	20.10	20.30	20.32	19.90	19.37	19.75
		1@37	19.92	20.28	20.34	19.80	18.99	19.94
		1@74	20.08	20.40	20.44	20.23	18.20	19.42
		36@0	18.92	20.29	20.12	18.72	19.15	19.08
		36@20	18.85	20.20	20.08	18.74	18.84	19.05
		36@39	19.08	19.88	19.98	19.05	18.46	18.97
		75@0	18.99	20.24	20.03	18.92	18.79	19.00
Band	Bandwidth	RB	20850	21100	21350	20850	21100	21350
	(MHz)		2510	2535	2560	2510	2535	2560
7	20	1@0	20.61	20.68	20.61	19.89	19.48	19.63
		1@49	20.69	20.72	20.66	19.91	18.90	19.86
		1@99	20.66	20.69	20.64	20.46	18.79	20.04
		50@0	17.71	19.82	19.13	18.74	19.09	18.93
		50@24	17.90	19.57	19.32	19.01	18.77	19.14
		50@50	18.64	19.34	19.50	19.62	18.60	19.27
		100@0	19.24	19.58	19.30	19.18	18.84	19.14

**5.2.6 LTE Band 17**

			Conducted Power(dBm)					
Modulation			QPSK			16QAM		
Band	Bandwidth	RB	23755	23790	23825	23755	23790	23825
	(MHz)		706.5	710	713.5	706.5	710	713.5
17	5	1@0	22.66	22.53	22.56	20.45	21.23	21.39
		1@12	22.60	22.52	22.47	20.56	21.27	21.37
		1@24	22.58	22.48	22.64	20.62	21.30	21.39
		12@0	21.42	21.42	21.56	19.78	19.96	20.05
		12@7	21.58	21.54	21.46	20.00	19.96	19.79
		12@13	21.44	21.41	21.46	20.04	19.95	20.49
		25@0	21.56	21.37	21.44	19.97	19.95	19.98
Band	Bandwidth	RB	23780	23790	23800	23780	23790	23800
	(MHz)		709	710	711	709	710	711
17	10	1@0	22.34	22.31	22.71	21.03	21.37	21.69
		1@25	22.30	22.33	22.73	21.14	21.48	21.62
		1@49	22.45	22.40	22.63	21.13	21.51	21.74
		25@0	21.52	21.40	21.48	20.12	20.04	20.03
		25@12	21.48	21.45	21.55	20.18	19.93	19.92
		25@25	21.54	21.52	21.55	20.08	19.99	20.00
		RB	21.44	21.47	21.63	20.05	20.02	19.96

**5.2.7 LTE Band 38**

			Conducted Power(dBm)					
Modulation			QPSK			16QAM		
Band	Bandwidth	RB	37775	38000	38225	37775	38000	38225
	(MHz)		2572.5	2595	2617.5	2572.5	2595	2617.5
38	5	1@0	22.65	22.46	22.49	21.73	22.27	21.63
		1@12	22.59	22.69	22.55	21.75	22.26	21.73
		1@24	22.78	22.63	22.54	21.73	22.32	21.68
		12@0	21.61	21.57	21.68	20.17	20.09	20.24
		12@7	21.64	21.64	21.62	20.06	20.05	20.32
		12@13	21.61	21.69	21.62	20.18	20.09	20.28
		25@0	21.61	21.65	21.61	20.33	20.36	20.09
Band	Bandwidth	RB	37800	38000	38200	37800	38000	38200
	(MHz)		2575	2595	2615	2575	2595	2615
38	10	1@0	22.73	22.71	22.53	21.63	21.90	21.56
		1@25	22.82	22.59	22.49	21.73	22.02	21.77
		1@49	22.77	22.65	22.48	21.71	21.92	21.98
		25@0	21.53	21.58	21.57	20.05	20.24	20.34
		25@12	21.65	21.53	21.61	20.22	20.04	20.26
		25@25	21.69	21.61	21.61	20.10	20.23	20.38
		50@0	21.69	21.55	21.61	20.21	20.18	20.23
Band	Bandwidth	RB	37825	38000	38175	37825	38000	38175
	(MHz)		2577.5	2595	2612.5	2577.5	2595	2612.5
38	15	1@0	22.57	22.71	22.32	21.47	22.01	21.67
		1@37	22.48	22.71	22.45	21.45	21.99	21.69
		1@74	22.58	22.75	22.41	21.47	22.15	21.68
		36@0	21.62	21.46	21.63	20.13	20.23	20.19
		36@20	21.65	21.58	21.61	20.18	20.22	20.12
		36@39	21.59	21.65	21.70	20.12	20.25	20.25
		75@0	21.52	21.50	21.62	20.21	20.14	20.24
Band	Bandwidth	RB	37850	38000	38150	37850	38000	38150
	(MHz)		2580	2595	2610	2580	2595	2610
38	20	1@0	22.70	22.56	22.53	22.48	22.20	21.59
		1@49	22.80	22.65	22.62	22.35	22.23	21.57
		1@99	22.84	22.62	22.70	22.43	22.29	21.58
		50@0	21.54	21.60	21.52	20.20	20.34	20.26
		50@24	21.53	21.68	21.57	20.25	20.18	20.14
		50@50	21.65	21.70	21.54	20.28	20.36	20.36
		100@0	21.55	21.61	21.64	20.27	20.26	20.30

### 5.3 ERP OR EIRP

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
**LTE Band 2:** FCC 47 CFR Part 24.232(c)  
**LTE Band 4:** FCC 47 CFR Part 27.50(d)(4)  
**LTE Band 5:** FCC 47 CFR Part 22.913(a)  
**LTE Band 7 & Band 38:** FCC 47 CFR Part 27.50(h)(2)  
**LTE Band 17:** FCC 47 CFR Part 27.50(c)(10)

**Test Method:** KDB 971168 D01v03r01 Section 5.6 & ANSI C63.26-2015

**Limit:**

**FCC 47 CFR Part 22.913(a):**

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

**FCC 47 CFR Part 24.232(c):**

Mobile and portable stations are limited to 2 watts EIRP.

**FCC 47 CFR Part 27.50(d)(4):**

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

**FCC 47 CFR Part 27.50(c)(10):**

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

**FCC 47 CFR Part 27.50(h)(2):**

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

**Test Procedure:**

According to KDB 412172 D01 Power Approach,

- **ERP or EIRP =  $P_T + G_T - L_c$**
- **ERP = EIRP - 2.15**

where

- **$P_T$**  = transmitter output power, expressed in dBW, dBm, or PSD;
- **$G_T$**  = 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.**

**Test Setup:** Refer to section 4.2.1 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** See table below

**Note:** The maximum ERP/EIRP is calculated from max output power and antenna gain, the antenna gain provided by the customer, and the customer takes all the responsibilities for the accuracy of antenna gain.

5.3.1 LTE Band 2

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
<b>Channel Bandwidth: 1.4MHz</b>							
Lowest	22.76	21.84	33.01	0.1888	0.1528	2	Pass
Middle	22.80	22.38	33.01	0.1905	0.1730	2	Pass
Highest	22.75	21.82	33.01	0.1884	0.1521	2	Pass
<b>Channel Bandwidth: 3MHz</b>							
Lowest	22.56	22.15	33.01	0.1803	0.1641	2	Pass
Middle	22.58	22.39	33.01	0.1811	0.1734	2	Pass
Highest	22.68	21.64	33.01	0.1854	0.1459	2	Pass
<b>Channel Bandwidth: 5MHz</b>							
Lowest	22.67	20.84	33.01	0.1849	0.1213	2	Pass
Middle	22.85	21.77	33.01	0.1928	0.1503	2	Pass
Highest	22.89	21.76	33.01	0.1945	0.1500	2	Pass
<b>Channel Bandwidth: 10MHz</b>							
Lowest	22.55	22.12	33.01	0.1799	0.1629	2	Pass
Middle	22.79	22.45	33.01	0.1901	0.1758	2	Pass
Highest	22.69	21.58	33.01	0.1858	0.1439	2	Pass
<b>Channel Bandwidth: 15MHz</b>							
Lowest	22.52	22.17	33.01	0.1786	0.1648	2	Pass
Middle	22.75	22.44	33.01	0.1884	0.1754	2	Pass
Highest	22.87	21.82	33.01	0.1936	0.1521	2	Pass
<b>Channel Bandwidth: 20MHz</b>							
Lowest	22.96	21.66	33.01	0.1977	0.1466	2	Pass
Middle	22.68	21.74	33.01	0.1854	0.1493	2	Pass
Highest	22.65	22.47	33.01	0.1841	0.1766	2	Pass

5.3.2 LTE Band 4

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
<b>Channel Bandwidth: 1.4MHz</b>							
Lowest	22.41	21.59	30.00	0.1742	0.1442	1	Pass
Middle	22.40	21.53	30.00	0.1738	0.1422	1	Pass
Highest	22.54	21.31	30.00	0.1795	0.1352	1	Pass
<b>Channel Bandwidth: 3MHz</b>							
Lowest	22.30	21.93	30.00	0.1698	0.1560	1	Pass
Middle	22.35	22.20	30.00	0.1718	0.1660	1	Pass
Highest	22.55	21.32	30.00	0.1799	0.1355	1	Pass
<b>Channel Bandwidth: 5MHz</b>							
Lowest	22.46	20.71	30.00	0.1762	0.1178	1	Pass
Middle	22.57	21.38	30.00	0.1807	0.1374	1	Pass
Highest	22.40	21.35	30.00	0.1738	0.1365	1	Pass
<b>Channel Bandwidth: 10MHz</b>							
Lowest	22.33	21.88	30.00	0.1710	0.1542	1	Pass
Middle	22.50	22.29	30.00	0.1778	0.1694	1	Pass
Highest	22.37	21.16	30.00	0.1726	0.1306	1	Pass
<b>Channel Bandwidth: 15MHz</b>							
Lowest	22.34	22.02	30.00	0.1714	0.1592	1	Pass
Middle	22.50	22.24	30.00	0.1778	0.1675	1	Pass
Highest	22.47	21.67	30.00	0.1766	0.1469	1	Pass
<b>Channel Bandwidth: 20MHz</b>							
Lowest	22.38	22.32	30.00	0.1730	0.1706	1	Pass
Middle	22.60	21.37	30.00	0.1820	0.1371	1	Pass
Highest	22.39	21.73	30.00	0.1734	0.1489	1	Pass



### 5.3.3 LTE Band 5

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
<b>Channel Bandwidth: 1.4MHz</b>							
Lowest	17.44	16.71	38.45	0.0555	0.0469	7	Pass
Middle	17.50	16.54	38.45	0.0562	0.0451	7	Pass
Highest	17.49	16.58	38.45	0.0561	0.0455	7	Pass
<b>Channel Bandwidth: 3MHz</b>							
Lowest	17.37	16.47	38.45	0.0546	0.0444	7	Pass
Middle	17.47	16.48	38.45	0.0558	0.0445	7	Pass
Highest	17.51	16.04	38.45	0.0564	0.0402	7	Pass
<b>Channel Bandwidth: 5MHz</b>							
Lowest	17.50	16.02	38.45	0.0562	0.0400	7	Pass
Middle	17.40	16.46	38.45	0.0550	0.0443	7	Pass
Highest	17.49	16.38	38.45	0.0561	0.0435	7	Pass
<b>Channel Bandwidth: 10MHz</b>							
Lowest	17.44	16.58	38.45	0.0555	0.0455	7	Pass
Middle	17.62	16.88	38.45	0.0578	0.0488	7	Pass
Highest	17.57	16.50	38.45	0.0571	0.0447	7	Pass

### 5.3.1 LTE Band 7

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
<b>Channel Bandwidth: 5MHz</b>							
Lowest	22.72	21.87	33.01	0.1871	0.1538	2	Pass
Middle	22.62	22.20	33.01	0.1828	0.1660	2	Pass
Highest	22.71	22.10	33.01	0.1866	0.1622	2	Pass
<b>Channel Bandwidth: 10MHz</b>							
Lowest	22.59	22.72	33.01	0.1816	0.1871	2	Pass
Middle	22.80	21.92	33.01	0.1905	0.1556	2	Pass
Highest	22.77	22.00	33.01	0.1892	0.1585	2	Pass
<b>Channel Bandwidth: 15MHz</b>							
Lowest	22.42	22.55	33.01	0.1746	0.1799	2	Pass
Middle	22.72	21.69	33.01	0.1871	0.1476	2	Pass
Highest	22.76	22.26	33.01	0.1888	0.1683	2	Pass
<b>Channel Bandwidth: 20MHz</b>							
Lowest	23.01	22.78	33.01	0.2000	0.1897	2	Pass
Middle	23.04	21.80	33.01	0.2014	0.1514	2	Pass
Highest	22.98	22.36	33.01	0.1986	0.1722	2	Pass

### 5.3.2 LTE Band 17

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
<b>Channel Bandwidth: 5MHz</b>							
Lowest	16.53	14.49	34.77	0.0450	0.0281	3	Pass
Middle	16.40	15.17	34.77	0.0437	0.0329	3	Pass
Highest	16.51	15.26	34.77	0.0448	0.0336	3	Pass
<b>Channel Bandwidth: 10MHz</b>							
Lowest	16.32	15.01	34.77	0.0429	0.0317	3	Pass
Middle	16.27	15.38	34.77	0.0424	0.0345	3	Pass
Highest	16.60	15.61	34.77	0.0457	0.0364	3	Pass

### 5.3.3 LTE Band 38

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
<b>Channel Bandwidth: 5MHz</b>							
Lowest	25.10	24.07	30.00	0.3236	0.2553	2	Pass
Middle	25.01	24.64	30.00	0.3170	0.2911	2	Pass
Highest	24.87	24.05	30.00	0.3069	0.2541	2	Pass
<b>Channel Bandwidth: 10MHz</b>							
Lowest	25.14	24.05	30.00	0.3266	0.2541	2	Pass
Middle	25.03	24.34	30.00	0.3184	0.2716	2	Pass
Highest	24.85	24.30	30.00	0.3055	0.2692	2	Pass
<b>Channel Bandwidth: 15MHz</b>							
Lowest	24.90	23.79	30.00	0.3090	0.2393	2	Pass
Middle	25.07	24.47	30.00	0.3214	0.2799	2	Pass
Highest	24.77	24.01	30.00	0.2999	0.2518	2	Pass
<b>Channel Bandwidth: 20MHz</b>							
Lowest	25.16	24.80	30.00	0.3281	0.3020	2	Pass
Middle	24.97	24.61	30.00	0.3141	0.2891	2	Pass
Highest	25.02	23.91	30.00	0.3177	0.2460	2	Pass

## 5.4 PEAK-TO-AVERAGE RATIO

<b>Test Requirement:</b>	<b>LTE Band 2:</b> FCC 47 CFR Part 24.232(d)
	<b>LTE Band 4 :</b> FCC 47 CFR Part 27.50(d)(5)
	<b>LTE Band 5:</b> FCC 47 CFR Part 22.913(a)
	<b>LTE Band 7 &amp; Band 38:</b> FCC 47 CFR Part 27.50(d)(5)
<b>Test Method:</b>	<b>LTE Band 17:</b> FCC 47 CFR Part 27.50(d)(5)
	KDB 971168 D01v03r01 Section 5.7
<b>Limit:</b>	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

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

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

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A

## 5.5 99%&26DB BANDWIDTH

**Test Requirement:** FCC 47 CFR Part 2.1049(h)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 4

**Limit:** No Limit, for reporting purposes only.

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A

## 5.6 BAND EDGE AT ANTENNA TERMINALS

**Test Requirement:** LTE Band 2: FCC 47 CFR Part 24.238(a)  
LTE Band 4: FCC 47 CFR Part 27.53(h)(1)  
LTE Band 5: FCC 47 CFR Part 22.917(a)  
LTE Band 7 & Band 38: FCC 47 CFR Part 27.53(m)(4)  
LTE Band 17: FCC 47 CFR Part 27.53(g)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limit:**

**FCC 47 CFR Part 24.238(a), 27.53(h)(1), 22.917(a):**

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

**FCC 47 CFR Part 27.53(g):**

For operations in the 600 MHz band and the 698-746 MHz band, 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.

**FCC 47 CFR Part 27.53(m)(4):**

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

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

For each band edge measurement:

- 1) Set the spectrum analyzer span to include the block edge frequency.
- 2) Set a marker to point the corresponding band edge frequency in each test case.
- 3) Set display line at -13 dBm
- 4) Set resolution bandwidth to at least 1% of emission bandwidth.
- 5) Set spectrum analyzer with RMS detector.
- 6) Record the max trace plot into the test report

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A

## 5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

**Test Requirement:** LTE Band 2: FCC 47 CFR Part 24.238(a)  
LTE Band 4: FCC 47 CFR Part 27.53(h)  
LTE Band 5: FCC 47 CFR Part 22.917(a)  
LTE Band 7 & Band 38: FCC 47 CFR Part 27.53(m)(4)  
LTE Band 17: FCC 47 CFR Part 27.53(g)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limit:**

**FCC 47 CFR Part 24.238(a), 27.53(h)(1), 22.917(a), 27.53(g):**

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

**FCC 47 CFR Part 27.53(m)(4):**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log(P)$  dB. The emission limit equal to -25 dBm.

**Test Procedure:**

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** Please refer to Appendix A

### 5.8 FIELD STRENGTH OF SPURIOUS RADIATION

**Test Requirement:** LTE Band 2: FCC 47 CFR Part 24.238(a)  
 LTE Band 4: FCC 47 CFR Part 27.53(h)  
 LTE Band 5: FCC 47 CFR Part 22.917(a)  
 LTE Band 7 & Band 38: FCC 47 CFR Part 27.53(m)(4)  
 LTE Band 17: FCC 47 CFR Part 27.53(g)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Receiver Setup:**

Frequency	Detector	RBW	VBW	Remark
0.009 MHz-30 MHz	Peak	10 kHz	30 KHz	Peak
30 MHz-1 GHz	Quasi-peak	100 kHz	300 KHz	Peak
Above 1 GHz	Peak	1 MHz	3 MHz	Peak

**Limits:**

**FCC 47 CFR Part 24.238(a), 27.53(h)(1), 22.917(a), 27.53(g):**

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

**FCC 47 CFR Part 27.53(m)(4):**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log(P)$  dB. The emission limit equal to -25 dBm.

**Test Setup:** Refer to section 4.2.1 for details.

**Test Procedures:** KDB 971168 D01v03r01 Section 7

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

**The worst measurement data as follows:**



**5.8.1 LTE Band 2**

LTE Band 2_ 20 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
<b>Lowest Channel</b>							
1	809.924	-80.8	12.7	-68.1	-13.0	-55.1	Horizontal
2	938.714	-81.2	14.7	-66.5	-13.0	-53.5	Horizontal
3	992.997	-81.1	14.8	-66.2	-13.0	-53.2	Horizontal
4	3720	-64.9	8.7	-56.2	-13.0	-43.2	Horizontal
5	5580	-67.5	12.1	-55.4	-13.0	-42.4	Horizontal
6	693.91	-79.8	11.9	-67.9	-13.0	-54.9	Vertical
7	815.635	-80.1	12.7	-67.4	-13.0	-54.4	Vertical
8	972.283	-80.5	14.6	-65.9	-13.0	-52.9	Vertical
9	3720	-65.4	8.7	-56.7	-13.0	-43.7	Vertical
10	5580	-67.3	12.1	-55.3	-13.0	-42.3	Vertical
<b>Middle Channel</b>							
1	804.252	-80.0	12.9	-67.1	-13.0	-54.1	Horizontal
2	833.013	-80.3	13.1	-67.2	-13.0	-54.2	Horizontal
3	919.132	-81.1	14.5	-66.6	-13.0	-53.6	Horizontal
4	3760	-62.8	8.8	-54.1	-13.0	-41.1	Horizontal
5	5640	-68.0	12.0	-56.0	-13.0	-43.0	Horizontal
6	815.635	-79.6	12.7	-66.9	-13.0	-53.9	Vertical
7	919.132	-80.8	14.5	-66.2	-13.0	-53.2	Vertical
8	992.997	-81.3	14.8	-66.4	-13.0	-53.4	Vertical
9	3760	-62.9	8.8	-54.1	-13.0	-41.1	Vertical
10	5640	-67.7	12.0	-55.7	-13.0	-42.7	Vertical
<b>Highest Channel</b>							
1	850.76	-80.4	13.1	-67.3	-13.0	-54.3	Horizontal
2	887.398	-80.3	13.9	-66.4	-13.0	-53.4	Horizontal
3	938.714	-80.6	14.7	-65.9	-13.0	-52.9	Horizontal
4	3800	-61.7	8.9	-52.9	-13.0	-39.9	Horizontal
5	5700	-68.3	11.9	-56.3	-13.0	-43.3	Horizontal
6	809.924	-80.6	12.7	-67.9	-13.0	-54.9	Vertical
7	875.013	-80.2	14.0	-66.2	-13.0	-53.2	Vertical
8	932.141	-80.4	14.9	-65.6	-13.0	-52.6	Vertical
9	3800	-67.0	8.9	-58.1	-13.0	-45.1	Vertical
10	5700	-68.4	11.9	-56.5	-13.0	-43.5	Vertical



**5.8.2 LTE Band 4**

LTE Band 4_ 20 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
<b>Lowest Channel</b>							
1	655.977	-79.8	11.1	-68.7	-13.0	-55.7	Horizontal
2	698.804	-80.7	12.0	-68.7	-13.0	-55.7	Horizontal
3	925.613	-81.2	14.7	-66.4	-13.0	-53.4	Horizontal
4	3440	-57.5	7.6	-49.9	-13.0	-36.9	Horizontal
5	5160	-60.2	10.8	-49.4	-13.0	-36.4	Horizontal
6	693.91	-80.1	11.9	-68.2	-13.0	-55.2	Vertical
7	787.475	-80.4	12.9	-67.5	-13.0	-54.5	Vertical
8	945.334	-80.4	14.4	-65.9	-13.0	-52.9	Vertical
9	3440	-59.9	7.6	-52.3	-13.0	-39.3	Vertical
10	5160	-62.1	10.8	-51.3	-13.0	-38.3	Vertical
<b>Middle Channel</b>							
1	628.894	-79.0	10.5	-68.4	-13.0	-55.4	Horizontal
2	693.91	-80.2	11.9	-68.3	-13.0	-55.3	Horizontal
3	875.013	-80.7	14.0	-66.7	-13.0	-53.7	Horizontal
4	3465	-64.0	7.7	-56.3	-13.0	-43.3	Horizontal
5	5197.5	-63.4	10.9	-52.5	-13.0	-39.5	Horizontal
6	793.028	-80.3	13.0	-67.3	-13.0	-54.3	Vertical
7	856.76	-80.1	13.1	-67.0	-13.0	-54.0	Vertical
8	986.044	-80.5	14.7	-65.8	-13.0	-52.8	Vertical
9	3465	-64.1	7.7	-56.3	-13.0	-43.3	Vertical
10	5197.5	-63.4	10.9	-52.5	-13.0	-39.5	Vertical
<b>Highest Channel</b>							
1	693.91	-80.8	11.9	-69.0	-13.0	-56.0	Horizontal
2	781.961	-80.7	12.8	-67.9	-13.0	-54.9	Horizontal
3	925.613	-80.5	14.7	-65.8	-13.0	-52.8	Horizontal
4	3490	-59.8	7.9	-51.9	-13.0	-38.9	Horizontal
5	5235	-62.2	11.1	-51.1	-13.0	-38.1	Horizontal
6	798.62	-80.2	13.0	-67.2	-13.0	-54.2	Vertical
7	887.398	-81.3	13.9	-67.4	-13.0	-54.4	Vertical
8	958.714	-81.6	14.5	-67.1	-13.0	-54.1	Vertical
9	3490	-59.8	7.9	-51.9	-13.0	-38.9	Vertical
10	5235	-61.0	11.1	-50.0	-13.0	-37.0	Vertical

**5.8.3 LTE Band 5**

LTE Band 5_ 10 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
<b>Lowest Channel</b>							
1	35.762	-77.1	32.7	-44.4	-13.0	-31.4	Horizontal
2	925.613	-87.4	43.2	-44.2	-13.0	-31.2	Horizontal
3	986.044	-86.4	43.1	-43.4	-13.0	-30.4	Horizontal
4	1658	-55.6	0.1	-55.5	-13.0	-42.5	Horizontal
5	2487	-48.7	4.1	-44.6	-13.0	-31.6	Horizontal
6	35.762	-72.9	32.7	-40.2	-13.0	-27.2	Vertical
7	787.475	-86.0	41.7	-44.3	-13.0	-31.3	Vertical
8	925.613	-85.3	43.2	-42.1	-13.0	-29.1	Vertical
9	1658	-59.7	0.1	-59.6	-13.0	-46.6	Vertical
10	2487	-53.8	4.1	-49.7	-13.0	-36.7	Vertical
<b>Middle Channel</b>							
1	35.511	-82.3	32.8	-49.5	-13.0	-36.5	Horizontal
2	36.524	-82.5	32.4	-50.1	-13.0	-37.1	Horizontal
3	972.283	-86.0	43.0	-43.1	-13.0	-30.1	Horizontal
4	1673	-51.7	0.2	-51.6	-13.0	-38.6	Horizontal
5	2509.5	-53.7	4.2	-49.5	-13.0	-36.5	Horizontal
6	36.014	-77.7	32.7	-45.0	-13.0	-32.0	Vertical
7	809.924	-85.9	41.5	-44.4	-13.0	-31.4	Vertical
8	925.613	-86.7	43.2	-43.5	-13.0	-30.5	Vertical
9	1673	-60.2	0.2	-60.0	-13.0	-47.0	Vertical
10	2509.5	-61.5	4.2	-57.3	-13.0	-44.3	Vertical
<b>Highest Channel</b>							
1	35.762	-78.1	32.7	-45.4	-13.0	-32.4	Horizontal
2	815.635	-86.6	41.5	-45.1	-13.0	-32.1	Horizontal
3	925.613	-86.9	43.2	-43.7	-13.0	-30.7	Horizontal
4	1688	-60.3	0.2	-60.0	-13.0	-47.0	Horizontal
5	2532	-54.1	4.2	-49.8	-13.0	-36.8	Horizontal
6	35.762	-79.9	32.7	-47.2	-13.0	-34.2	Vertical
7	952.000	-86.1	42.9	-43.2	-13.0	-30.2	Vertical
8	992.997	-86.4	43.2	-43.2	-13.0	-30.2	Vertical
9	1688	-59.2	0.2	-59.0	-13.0	-46.0	Vertical
10	2532	-55.7	4.2	-51.4	-13.0	-38.4	Vertical

5.8.1 LTE Band 7

LTE Band 7_ 20 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
<b>Lowest Channel</b>							
1	833.013	-80.3	13.1	-67.2	-25.0	-42.2	Horizontal
2	932.141	-81.7	14.9	-66.8	-25.0	-41.8	Horizontal
3	992.997	-81.1	14.8	-66.2	-25.0	-41.2	Horizontal
4	5020	-61.8	10.5	-51.3	-25.0	-26.3	Horizontal
5	7530	-64.8	14.2	-50.6	-25.0	-25.6	Horizontal
6	804.252	-80.0	12.9	-67.1	-25.0	-42.1	Vertical
7	868.886	-80.2	13.7	-66.5	-25.0	-41.5	Vertical
8	972.283	-80.6	14.6	-66.0	-25.0	-41.0	Vertical
9	5020	-64.3	10.5	-53.8	-25.0	-28.8	Vertical
10	7530	-68.7	14.2	-54.5	-25.0	-29.5	Vertical
<b>Middle Channel</b>							
1	781.961	-80.7	12.8	-67.9	-25.0	-42.9	Horizontal
2	952.000	-80.4	14.5	-65.9	-25.0	-40.9	Horizontal
3	992.997	-80.4	14.8	-65.6	-25.0	-40.6	Horizontal
4	5070	-60.9	10.6	-50.3	-25.0	-25.3	Horizontal
5	7605	-62.9	14.4	-48.5	-25.0	-23.5	Horizontal
6	881.184	-80.2	13.7	-66.6	-25.0	-41.6	Vertical
7	932.141	-81.2	14.9	-66.3	-25.0	-41.3	Vertical
8	992.997	-80.6	14.8	-65.8	-25.0	-40.8	Vertical
9	5070	-62.3	10.6	-51.7	-25.0	-26.7	Vertical
10	7605	-61.8	14.4	-47.5	-25.0	-22.5	Vertical
<b>Highest Channel</b>							
1	781.961	-79.5	12.8	-66.7	-25.0	-41.7	Horizontal
2	881.184	-79.7	13.7	-66.0	-25.0	-41.0	Horizontal
3	925.613	-80.3	14.7	-65.6	-25.0	-40.6	Horizontal
4	5120	-64.5	10.7	-53.8	-25.0	-28.8	Horizontal
5	7680	-67.5	14.5	-53.0	-25.0	-28.0	Horizontal
6	739.214	-79.9	11.8	-68.1	-25.0	-43.1	Vertical
7	809.924	-80.3	12.7	-67.6	-25.0	-42.6	Vertical
8	986.044	-80.3	14.7	-65.6	-25.0	-40.6	Vertical
9	5120	-65.2	10.7	-54.5	-25.0	-29.5	Vertical
10	7680	-66.0	14.5	-51.5	-25.0	-26.5	Vertical

**5.8.2 LTE Band 17**

LTE Band 17_ 10 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
<b>Lowest Channel</b>							
1	35.762	-75.2	32.7	-42.5	-13.0	-29.5	Horizontal
2	875.013	-86.5	42.6	-43.8	-13.0	-30.8	Horizontal
3	972.283	-86.6	43.0	-43.6	-13.0	-30.6	Horizontal
4	2127	-44.7	2.0	-42.7	-13.0	-29.7	Horizontal
5	3545	-37.1	8.1	-29.1	-13.0	-16.1	Horizontal
6	35.762	-78.9	32.7	-46.2	-13.0	-33.2	Vertical
7	787.475	-86.4	41.7	-44.7	-13.0	-31.7	Vertical
8	952.000	-86.9	42.9	-44.0	-13.0	-31.0	Vertical
9	2127	-50.2	2.0	-48.3	-13.0	-35.3	Vertical
10	3545	-39.6	8.1	-31.5	-13.0	-18.5	Vertical
<b>Middle Channel</b>							
1	35.762	-78.2	32.7	-45.5	-13.0	-32.5	Horizontal
2	809.924	-86.7	41.5	-45.3	-13.0	-32.3	Horizontal
3	945.334	-86.9	42.9	-44.0	-13.0	-31.0	Horizontal
4	2130	-42.8	2.0	-40.9	-13.0	-27.9	Horizontal
5	3550	-40.4	8.1	-32.3	-13.0	-19.3	Horizontal
6	36.781	-81.8	32.3	-49.5	-13.0	-36.5	Vertical
7	509.356	-85.7	36.5	-49.2	-13.0	-36.2	Vertical
8	952.000	-86.3	42.9	-43.4	-13.0	-30.4	Vertical
9	2130	-51.2	2.0	-49.2	-13.0	-36.2	Vertical
10	3550	-42.9	8.1	-34.8	-13.0	-21.8	Vertical
<b>Highest Channel</b>							
1	35.762	-83.0	32.7	-50.3	-13.0	-37.3	Horizontal
2	932.141	-86.9	43.3	-43.6	-13.0	-30.6	Horizontal
3	979.139	-86.4	43.2	-43.2	-13.0	-30.2	Horizontal
4	2133	-46.2	2.0	-44.2	-13.0	-31.2	Horizontal
5	3555	-40.3	8.1	-32.2	-13.0	-19.2	Horizontal
6	36.014	-79.2	32.7	-46.5	-13.0	-33.5	Vertical
7	809.924	-86.9	41.5	-45.4	-13.0	-32.4	Vertical
8	925.613	-87.5	43.2	-44.3	-13.0	-31.3	Vertical
9	2133	-47.3	2.0	-45.3	-13.0	-32.3	Vertical
10	3555	-38.9	8.1	-30.7	-13.0	-17.7	Vertical

**5.8.3 LTE Band 38**

LTE Band 38_ 20 MHz_ QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>Lowest Channel</b>							
1	793.028	-81.0	13.0	-68.0	-25.0	-43.0	Horizontal
2	821.387	-80.2	12.7	-67.6	-25.0	-42.6	Horizontal
3	919.132	-81.0	14.5	-66.5	-25.0	-41.5	Horizontal
4	5160	-66.3	10.8	-55.5	-25.0	-30.5	Horizontal
5	7740	-69.8	14.6	-55.2	-25.0	-30.2	Horizontal
6	765.648	-80.5	12.4	-68.1	-25.0	-43.1	Vertical
7	881.184	-80.5	13.7	-66.9	-25.0	-41.9	Vertical
8	925.613	-80.8	14.7	-66.1	-25.0	-41.1	Vertical
9	5160	-65.9	10.8	-55.1	-25.0	-30.1	Vertical
10	7740	-70.6	14.6	-56.0	-25.0	-31.0	Vertical
<b>Middle Channel</b>							
1	815.635	-80.3	12.7	-67.5	-25.0	-42.5	Horizontal
2	932.141	-81.3	14.9	-66.5	-25.0	-41.5	Horizontal
3	958.714	-80.8	14.5	-66.3	-25.0	-41.3	Horizontal
4	7785	-64.8	14.7	-50.1	-25.0	-25.1	Horizontal
5	10380	-60.9	19.0	-42.0	-25.0	-17.0	Horizontal
6	760.287	-80.8	12.3	-68.5	-25.0	-43.5	Vertical
7	875.013	-81.6	14.0	-67.6	-25.0	-42.6	Vertical
8	986.044	-81.2	14.7	-66.5	-25.0	-41.5	Vertical
9	7785	-66.7	14.7	-52.0	-25.0	-27.0	Vertical
10	10380	-62.0	19.0	-43.0	-25.0	-18.0	Vertical
<b>Highest Channel</b>							
1	781.961	-80.7	12.8	-67.9	-25.0	-42.9	Horizontal
2	919.132	-81.1	14.5	-66.6	-25.0	-41.6	Horizontal
3	972.283	-81.1	14.6	-66.6	-25.0	-41.6	Horizontal
4	10440	-60.4	19.0	-41.4	-25.0	-16.4	Horizontal
5	13050	-64.3	23.0	-41.3	-25.0	-16.3	Horizontal
6	798.62	-81.2	13.0	-68.2	-25.0	-43.2	Vertical
7	850.76	-80.1	13.1	-67.0	-25.0	-42.0	Vertical
8	938.714	-81.3	14.7	-66.6	-25.0	-41.6	Vertical
9	10440	-61.2	19.0	-42.3	-25.0	-17.3	Vertical
10	13050	-66.6	23.0	-43.5	-25.0	-18.5	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

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### 5.9 FREQUENCY STABILITY

**Test Requirement:** FCC 47 CFR Part 2.1055 &  
 FCC 47 CFR Part 22.355 &  
 FCC 47 CFR Part 24.235 &  
 FCC 47 CFR Part 27.54

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limits:**  
**FCC 47 CFR Part 22.355, FCC 47 CFR Par 90.213**  
 The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

**FCC 47 CFR Part 24.235, FCC 47 CFR Part 27.54**  
 The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**Test Setup:** Refer to section 4.2.2 for details.

**Test Procedures:**

- 1) Use CMW 500 with Frequency Error measurement capability.
  - a) Temp. =  $-30^{\circ}$  to  $+50^{\circ}$ Ca
  - b) Voltage =low voltage, 3.4 Vdc, Normal, 3.7 Vdc and High voltage, 4.2 Vdc.
- 2) Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to  $20^{\circ}$ C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}$ C is reached.

- 3) Frequency Stability vs Voltage:  
 The peak frequency error is recorded (worst-case).

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	( $^{\circ}$ C)	(Hz)	(ppm)	(ppm)	
<b>LTE Band 2 / 20MHz / Full RB</b>							
QPSK	18900 / 1880.0	VL	TN	5.15	0.0027	Note 1	Pass
		VN		4.21	0.0022		Pass
		VH		6.73	0.0036		Pass
		VN	50	8.44	0.0045		Pass
			40	7.23	0.0038		Pass
			30	6.31	0.0034		Pass
			20	4.21	0.0022		Pass
			10	7.26	0.0039		Pass
			0	5.31	0.0028		Pass
			-10	7.37	0.0039		Pass
			-20	5.47	0.0029		Pass
			-30	5.18	0.0028		Pass



Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>LTE Band 4 / 20MHz / Full RB</b>							
QPSK	20175 / 1732.5	VL	TN	6.16	0.0036	Note 1	Pass
		VN		12.61	0.0073		Pass
		VH		10.17	0.0059		Pass
		VN	50	-3.19	-0.0018		Pass
			40	4.35	0.0025		Pass
			30	9.53	0.0055		Pass
			20	12.61	0.0073		Pass
			10	10.15	0.0059		Pass
			0	5.22	0.0030		Pass
			-10	-3.18	-0.0018		Pass
			-20	4.31	0.0025		Pass
			-30	-5.35	-0.0031		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>LTE Band 5 / 10MHz / Full RB</b>							
QPSK	20525 / 836.5	VL	TN	3.18	0.0038	± 2.5	Pass
		VN		2.26	0.0027	± 2.5	Pass
		VH		4.25	0.0051	± 2.5	Pass
		VN	50	-3.91	-0.0047	± 2.5	Pass
			40	5.15	0.0062	± 2.5	Pass
			30	4.75	0.0057	± 2.5	Pass
			20	2.26	0.0027	± 2.5	Pass
			10	-3.35	-0.0040	± 2.5	Pass
			0	2.99	0.0036	± 2.5	Pass
			-10	4.83	0.0058	± 2.5	Pass
			-20	-3.25	-0.0039	± 2.5	Pass
			-30	-4.91	-0.0059	± 2.5	Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>LTE Band 7 / 20MHz / Full RB</b>							
QPSK	21100 / 2535	VL	TN	-11.36	-0.0066	N/A	Pass
		VN		-12.25	-0.0071		Pass
		VH		-10.61	-0.0061		Pass
		VN	50	-10.38	-0.0060		Pass
			40	-12.15	-0.0070		Pass
			30	-10.93	-0.0063		Pass
			20	-12.25	-0.0071		Pass
			10	-12.65	-0.0073		Pass
			0	-14.95	-0.0086		Pass
			-10	-13.07	-0.0075		Pass
			-20	-13.61	-0.0079		Pass
			-30	-12.83	-0.0074		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>LTE Band 17 / 10MHz / Full RB</b>							
QPSK	23790 / 710	VL	TN	3.61	0.0051	Note 1	Pass
		VN		2.31	0.0033		Pass
		VH		4.34	0.0061		Pass
		VN	50	4.28	0.0060		Pass
			40	3.82	0.0054		Pass
			30	3.59	0.0051		Pass
			20	2.31	0.0033		Pass
			10	3.45	0.0049		Pass
			0	1.94	0.0027		Pass
			-10	4.37	0.0062		Pass
			-20	2.95	0.0042		Pass
			-30	3.83	0.0054		Pass

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Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>LTE Band 38/ 20MHz / Full RB</b>							
QPSK	37850 / 2580	VL	TN	-4.52	-0.0017	Note 1	Pass
		VN		-3.65	-0.0014		Pass
		VH		-5.41	-0.0021		Pass
		VN	50	-3.25	-0.0013		Pass
			40	-4.96	-0.0019		Pass
			30	-4.19	-0.0016		Pass
			20	-3.33	-0.0013		Pass
			10	-3.79	-0.0015		Pass
			0	-5.84	-0.0023		Pass
			-10	-3.81	-0.0015		Pass
			-20	-4.36	-0.0017		Pass
			-30	-5.49	-0.0021		Pass

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## APPENDIX A RF TEST DATA

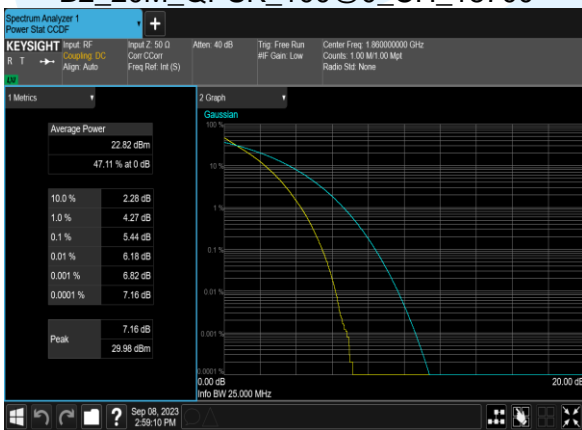
### A.1 LTE BAND 2

#### Peak to Average Ratio

Band	Bandwidth (MHz)	Channel	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
2	20.0	18700	1860.0	QPSK	100@0	5.44	13	PASS
2	20.0	18700	1860.0	16QAM	100@0	6.15	13	PASS
2	20.0	18900	1880.0	QPSK	100@0	5.41	13	PASS
2	20.0	18900	1880.0	16QAM	100@0	6.10	13	PASS
2	20.0	19100	1900.0	QPSK	100@0	5.20	13	PASS
2	20.0	19100	1900.0	16QAM	100@0	5.91	13	PASS
2	15.0	18675	1857.5	QPSK	75@0	5.29	13	PASS
2	15.0	18675	1857.5	16QAM	75@0	6.04	13	PASS
2	15.0	18900	1880.0	QPSK	75@0	5.24	13	PASS
2	15.0	18900	1880.0	16QAM	75@0	6.01	13	PASS
2	15.0	19125	1902.5	QPSK	75@0	5.08	13	PASS
2	15.0	19125	1902.5	16QAM	75@0	5.87	13	PASS
2	10.0	18650	1855.0	QPSK	50@0	5.46	13	PASS
2	10.0	18650	1855.0	16QAM	50@0	6.15	13	PASS
2	10.0	18900	1880.0	QPSK	50@0	5.35	13	PASS
2	10.0	18900	1880.0	16QAM	50@0	6.08	13	PASS
2	10.0	19150	1905.0	QPSK	50@0	5.24	13	PASS
2	10.0	19150	1905.0	16QAM	50@0	5.95	13	PASS
2	5.0	18625	1852.5	QPSK	25@0	5.36	13	PASS
2	5.0	18625	1852.5	16QAM	25@0	6.03	13	PASS
2	5.0	18900	1880.0	QPSK	25@0	5.32	13	PASS
2	5.0	18900	1880.0	16QAM	25@0	6.04	13	PASS
2	5.0	19175	1907.5	QPSK	25@0	5.14	13	PASS
2	5.0	19175	1907.5	16QAM	25@0	5.81	13	PASS
2	3.0	18615	1851.5	QPSK	15@0	5.42	13	PASS
2	3.0	18615	1851.5	16QAM	15@0	6.12	13	PASS
2	3.0	18900	1880.0	QPSK	15@0	5.25	13	PASS
2	3.0	18900	1880.0	16QAM	15@0	6.06	13	PASS
2	3.0	19185	1908.5	QPSK	15@0	5.11	13	PASS
2	3.0	19185	1908.5	16QAM	15@0	5.83	13	PASS
2	1.4	18607	1850.7	QPSK	6@0	5.29	13	PASS
2	1.4	18607	1850.7	16QAM	6@0	5.97	13	PASS
2	1.4	18900	1880.0	QPSK	6@0	5.25	13	PASS
2	1.4	18900	1880.0	16QAM	6@0	6.02	13	PASS
2	1.4	19193	1909.3	QPSK	6@0	4.82	13	PASS
2	1.4	19193	1909.3	16QAM	6@0	5.56	13	PASS

#### Test Graphs

B2\_20M\_QPSK\_100@0\_CH\_18700



B2\_20M\_16QAM\_100@0\_CH\_18700



B2\_20M\_QPSK\_100@0\_CH\_18900



B2\_20M\_16QAM\_100@0\_CH\_18900



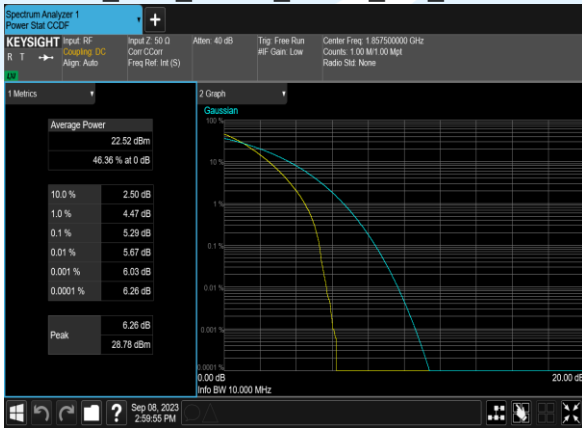
B2\_20M\_QPSK\_100@0\_CH\_19100



B2\_20M\_16QAM\_100@0\_CH\_19100



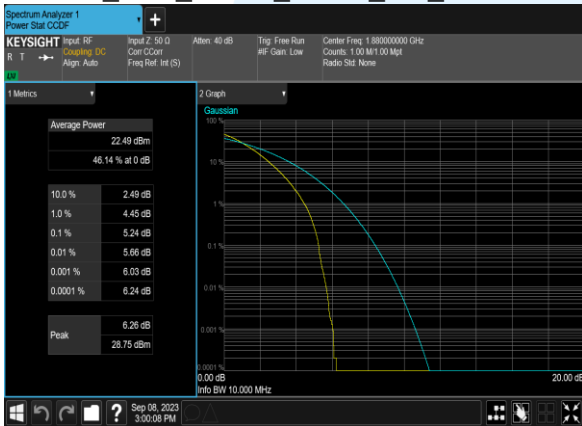
B2\_15M\_QPSK\_75@0\_CH\_18675



B2\_15M\_16QAM\_75@0\_CH\_18675



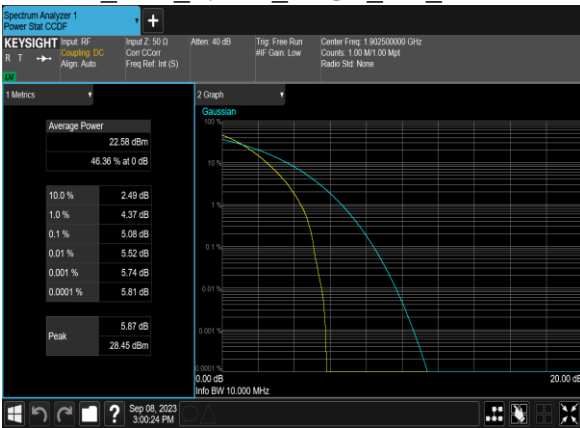
B2\_15M\_QPSK\_75@0\_CH\_18900



B2\_15M\_16QAM\_75@0\_CH\_18900



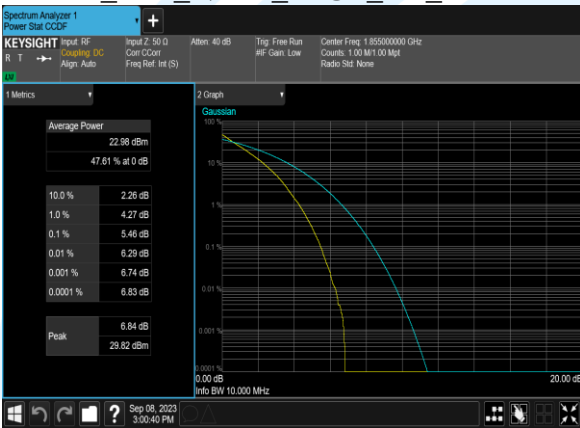
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B2\_15M\_16QAM\_75@0\_CH\_19125



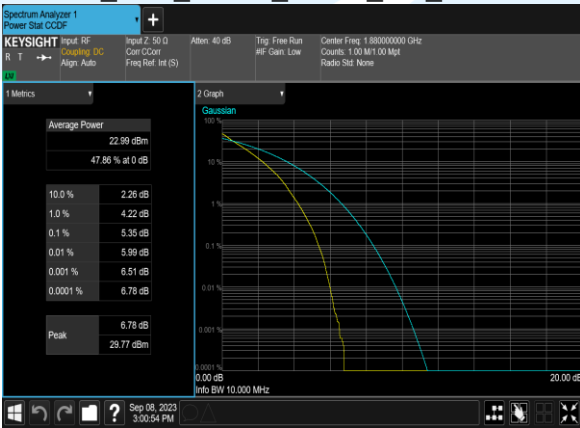
B2\_10M\_QPSK\_50@0\_CH\_18650



B2\_10M\_16QAM\_50@0\_CH\_18650



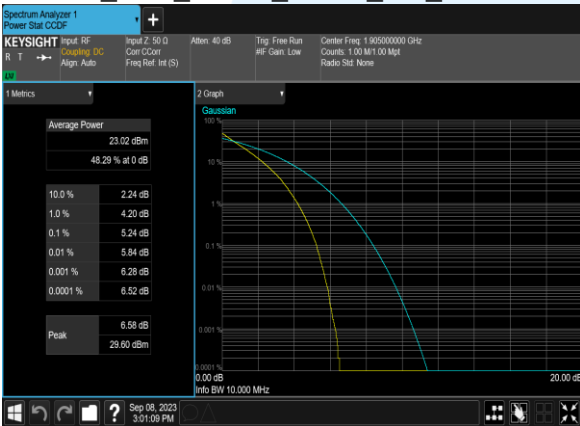
B2\_10M\_QPSK\_50@0\_CH\_18900



B2\_10M\_16QAM\_50@0\_CH\_18900



B2\_10M\_QPSK\_50@0\_CH\_19150



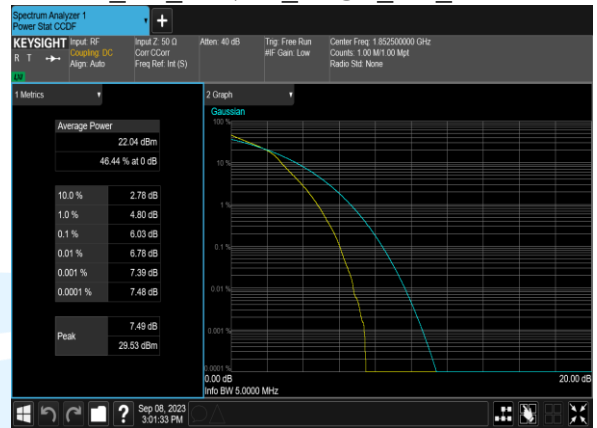
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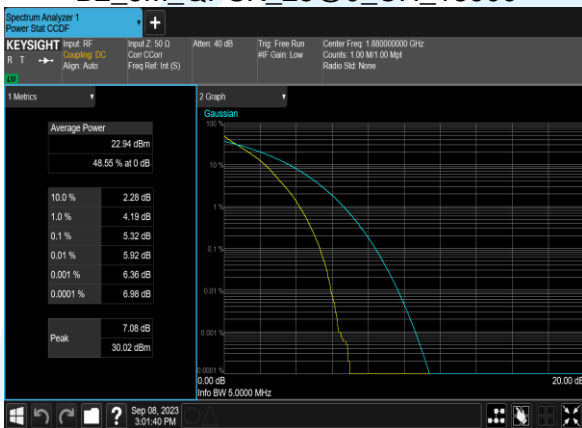
B2\_5M\_QPSK\_25@0\_CH\_18625



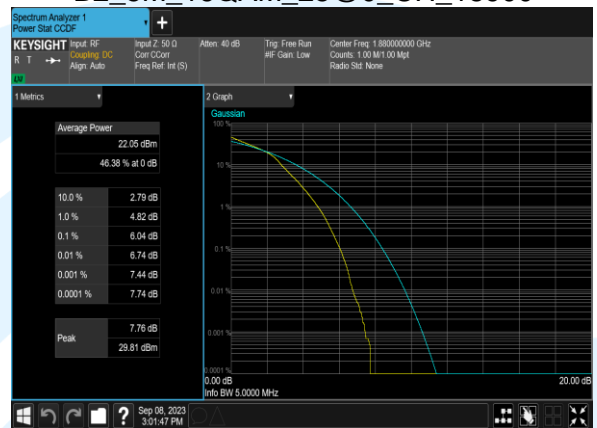
B2\_5M\_16QAM\_25@0\_CH\_18625



B2\_5M\_QPSK\_25@0\_CH\_18900



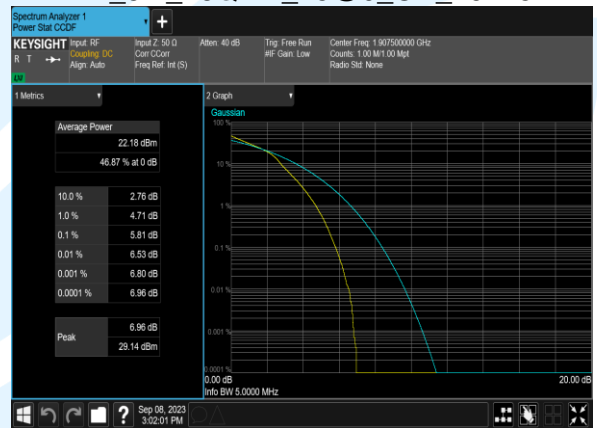
B2\_5M\_16QAM\_25@0\_CH\_18900



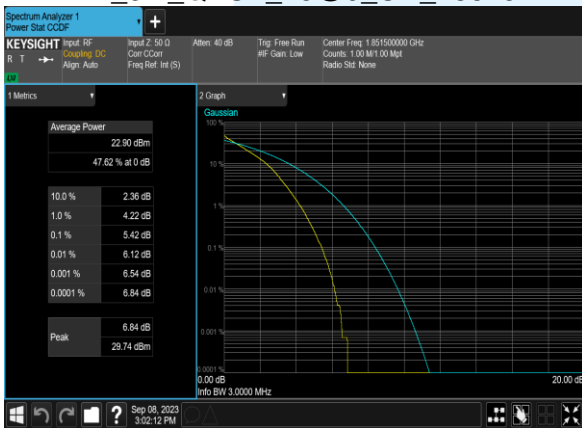
B2\_5M\_QPSK\_25@0\_CH\_19175



B2\_5M\_16QAM\_25@0\_CH\_19175



B2\_3M\_QPSK\_15@0\_CH\_18615



B2\_3M\_16QAM\_15@0\_CH\_18615



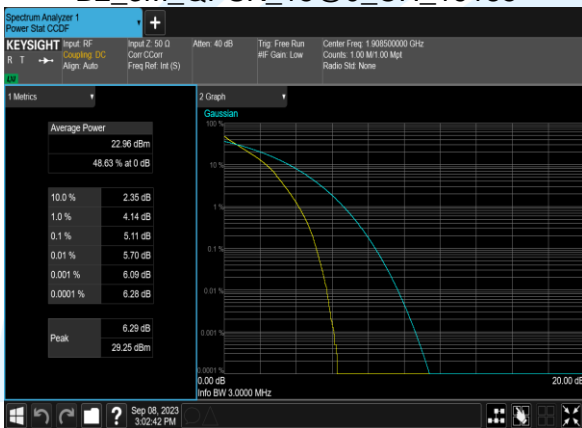
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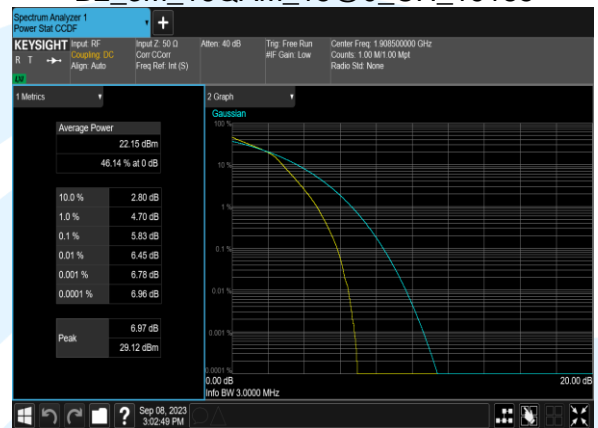
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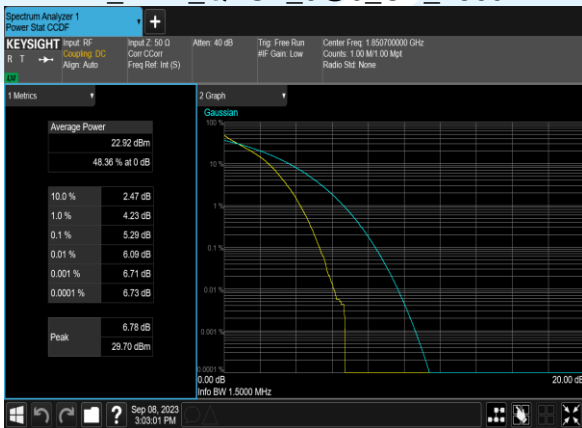
B2\_3M\_QPSK\_15@0\_CH\_19185



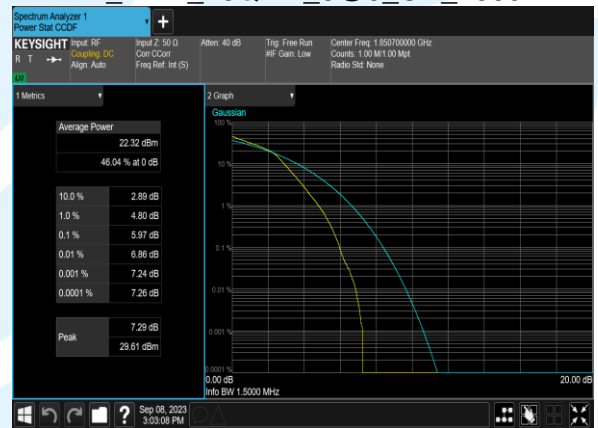
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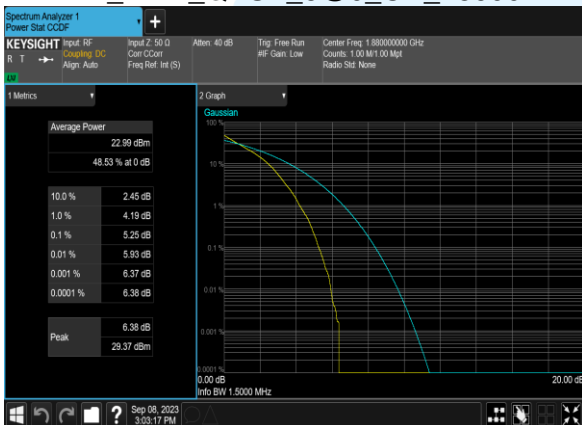
B2\_1.4M\_QPSK\_6@0\_CH\_18607



B2\_1.4M\_16QAM\_6@0\_CH\_18607



B2\_1.4M\_QPSK\_6@0\_CH\_18900



B2\_1.4M\_16QAM\_6@0\_CH\_18900



B2\_1.4M\_QPSK\_6@0\_CH\_19193



B2\_1.4M\_16QAM\_6@0\_CH\_19193



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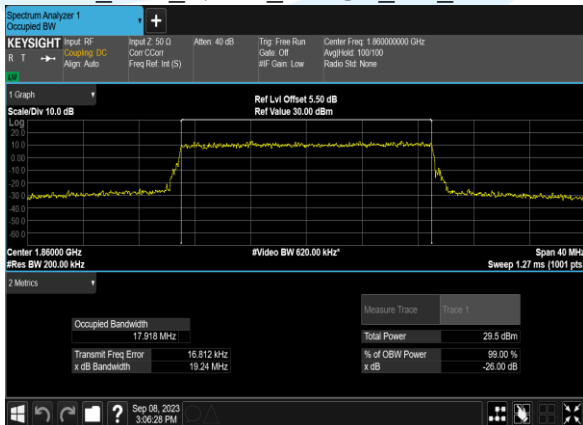
UTTR-RF-FCC4G-V1.1

## Occupied Bandwidth

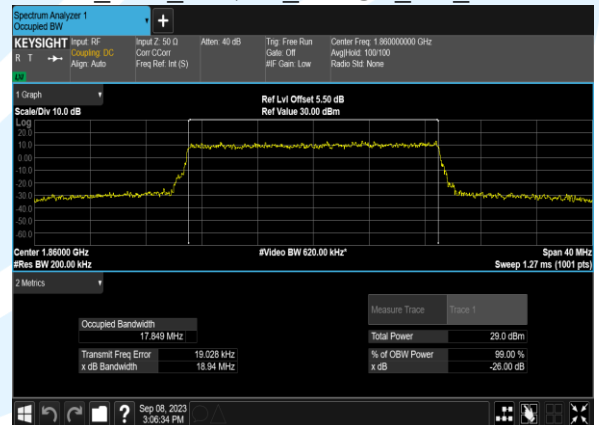
Band	Bandwidth (MHz)	Channel	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
2	20.0	18700	1860.0	QPSK	100@0	17.918	19.24
2	20.0	18700	1860.0	16QAM	100@0	17.849	18.94
2	20.0	18900	1880.0	QPSK	100@0	17.860	19.21
2	20.0	18900	1880.0	16QAM	100@0	17.938	19.29
2	20.0	19100	1900.0	QPSK	100@0	17.889	19.19
2	20.0	19100	1900.0	16QAM	100@0	17.910	19.02
2	15.0	18675	1857.5	QPSK	75@0	13.413	14.58
2	15.0	18675	1857.5	16QAM	75@0	13.400	14.39
2	15.0	18900	1880.0	QPSK	75@0	13.402	14.50
2	15.0	18900	1880.0	16QAM	75@0	13.436	14.50
2	15.0	19125	1902.5	QPSK	75@0	13.431	14.27
2	15.0	19125	1902.5	16QAM	75@0	13.439	14.41
2	10.0	18650	1855.0	QPSK	50@0	8.9425	9.616
2	10.0	18650	1855.0	16QAM	50@0	8.9453	9.615
2	10.0	18900	1880.0	QPSK	50@0	8.9315	9.518
2	10.0	18900	1880.0	16QAM	50@0	8.9426	9.595
2	10.0	19150	1905.0	QPSK	50@0	8.9344	9.647
2	10.0	19150	1905.0	16QAM	50@0	8.9379	9.691
2	5.0	18625	1852.5	QPSK	25@0	4.4662	4.872
2	5.0	18625	1852.5	16QAM	25@0	4.4524	4.888
2	5.0	18900	1880.0	QPSK	25@0	4.4679	4.902
2	5.0	18900	1880.0	16QAM	25@0	4.4542	4.873
2	5.0	19175	1907.5	QPSK	25@0	4.4667	4.874
2	5.0	19175	1907.5	16QAM	25@0	4.4634	4.839
2	3.0	18615	1851.5	QPSK	15@0	2.6918	2.961
2	3.0	18615	1851.5	16QAM	15@0	2.6845	2.937
2	3.0	18900	1880.0	QPSK	15@0	2.6880	2.985
2	3.0	18900	1880.0	16QAM	15@0	2.6865	2.958
2	3.0	19185	1908.5	QPSK	15@0	2.6840	2.975
2	3.0	19185	1908.5	16QAM	15@0	2.6835	2.961
2	1.4	18607	1850.7	QPSK	6@0	1.0790	1.218
2	1.4	18607	1850.7	16QAM	6@0	1.0775	1.223
2	1.4	18900	1880.0	QPSK	6@0	1.0794	1.224
2	1.4	18900	1880.0	16QAM	6@0	1.0742	1.216
2	1.4	19193	1909.3	QPSK	6@0	1.0815	1.226
2	1.4	19193	1909.3	16QAM	6@0	1.0781	1.228

## Test Graphs

B2\_20M\_QPSK\_100@0\_CH\_18700



B2\_20M\_16QAM\_100@0\_CH\_18700





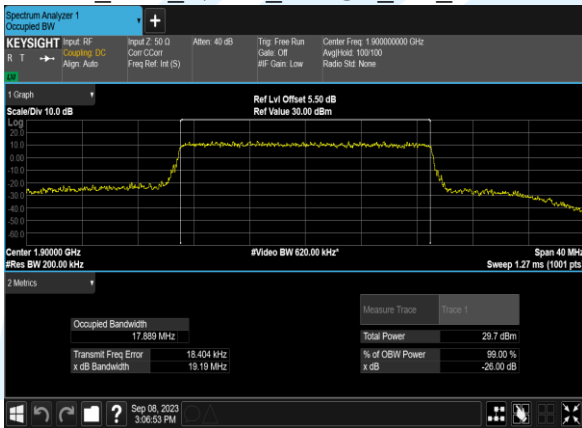
B2\_20M\_QPSK\_100@0\_CH\_18900



B2\_20M\_16QAM\_100@0\_CH\_18900



B2\_20M\_QPSK\_100@0\_CH\_19100



B2\_20M\_16QAM\_100@0\_CH\_19100



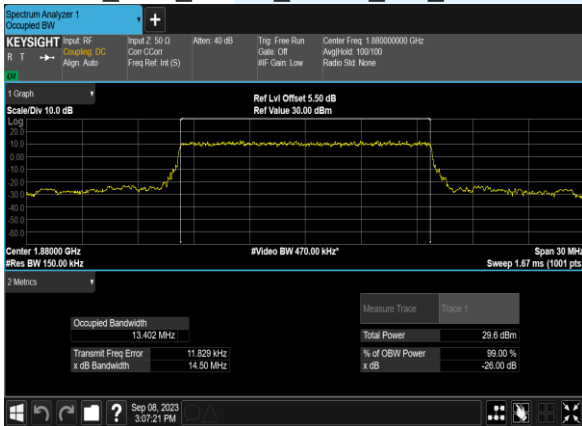
B2\_15M\_QPSK\_75@0\_CH\_18675



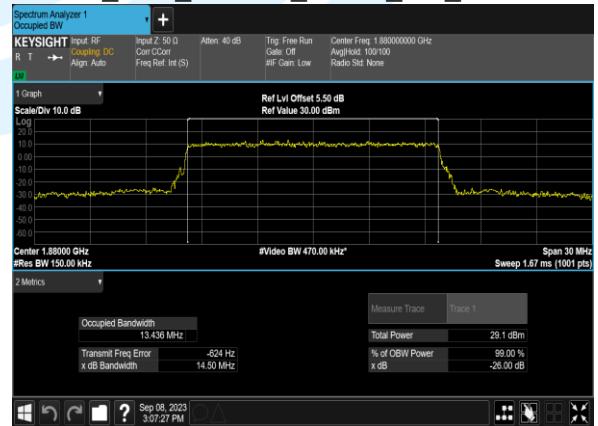
B2\_15M\_16QAM\_75@0\_CH\_18675



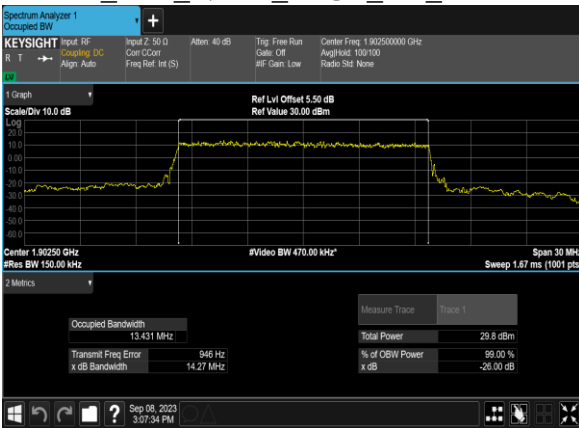
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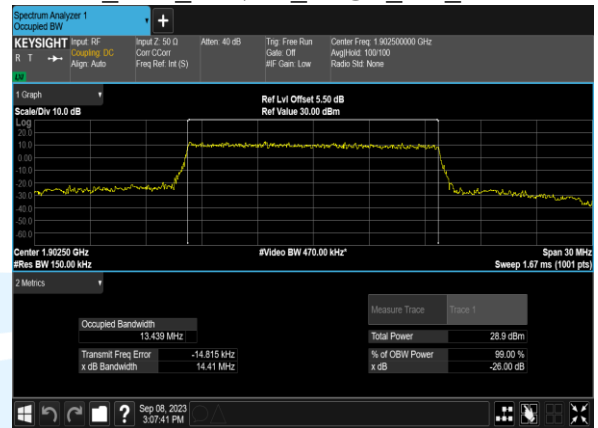
B2\_15M\_16QAM\_75@0\_CH\_18900



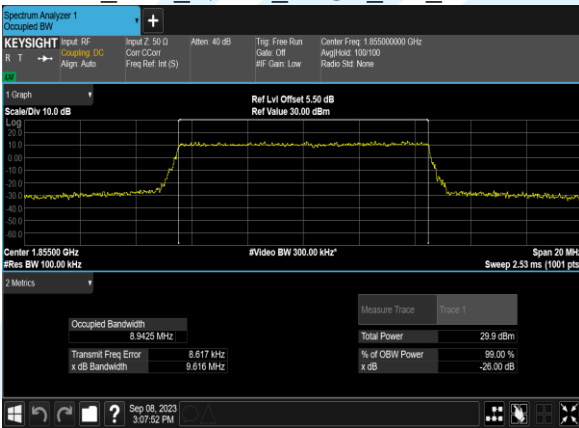
B2\_15M\_QPSK\_75@0\_CH\_19125



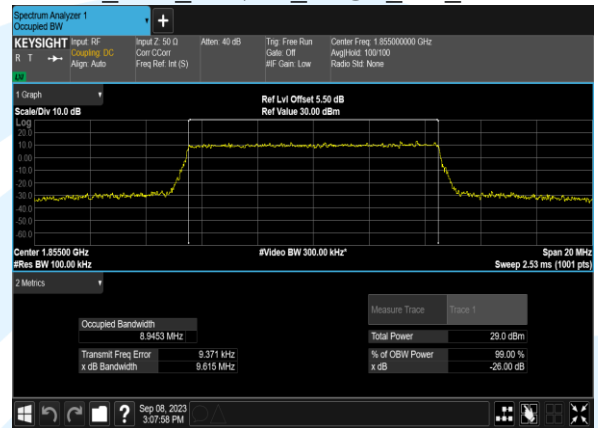
B2\_15M\_16QAM\_75@0\_CH\_19125



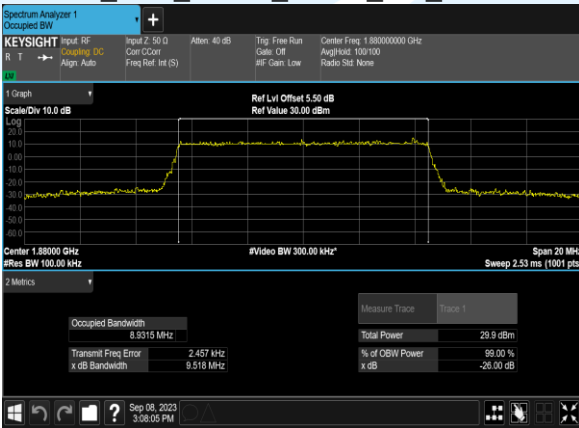
B2\_10M\_QPSK\_50@0\_CH\_18650



B2\_10M\_16QAM\_50@0\_CH\_18650



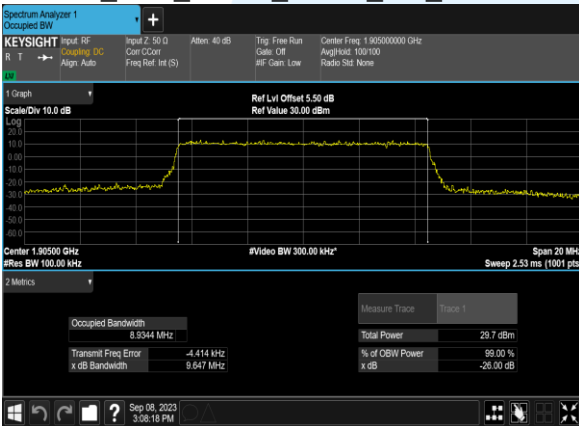
B2\_10M\_QPSK\_50@0\_CH\_18900



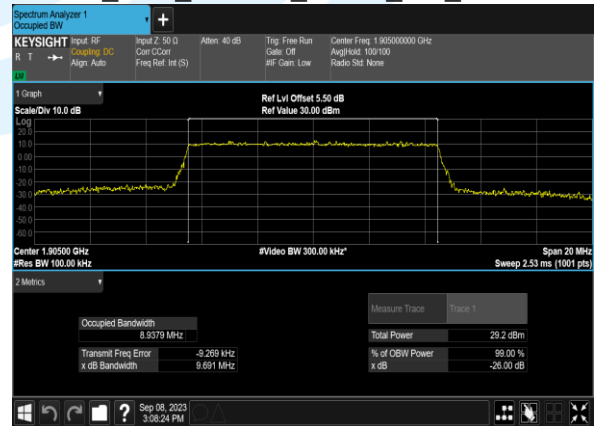
B2\_10M\_16QAM\_50@0\_CH\_18900



B2\_10M\_QPSK\_50@0\_CH\_19150



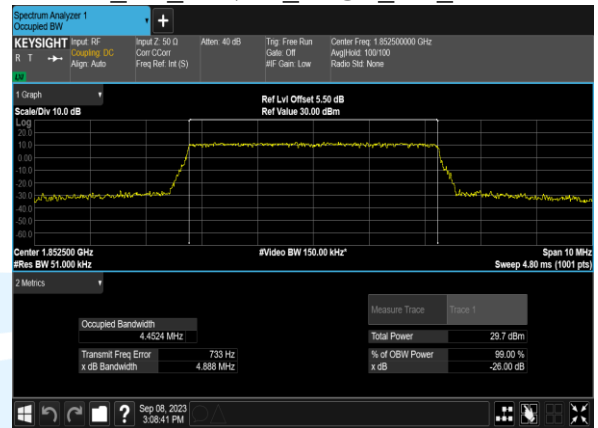
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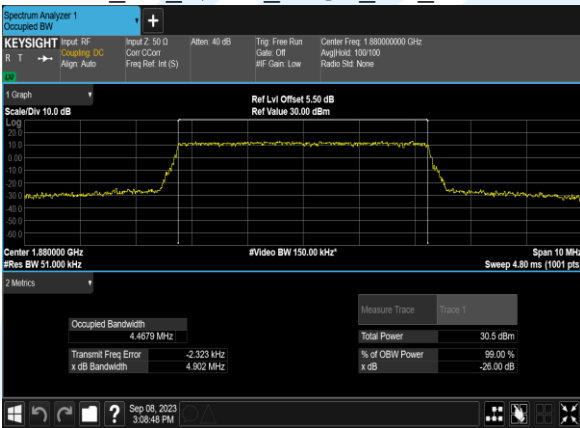
B2\_5M\_QPSK\_25@0\_CH\_18625



B2\_5M\_16QAM\_25@0\_CH\_18625



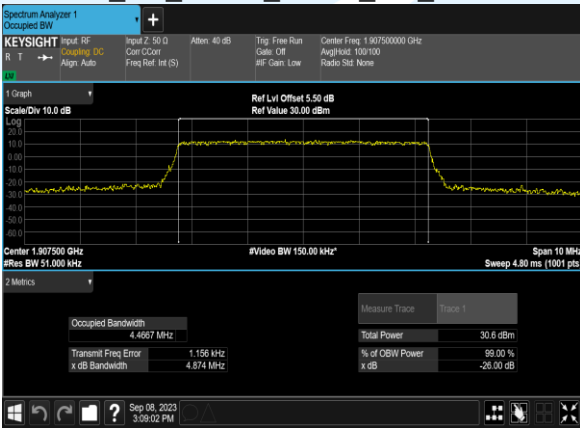
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B2\_5M\_16QAM\_25@0\_CH\_18900



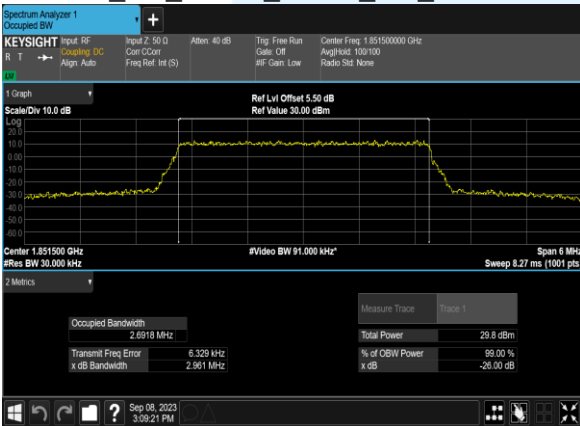
B2\_5M\_QPSK\_25@0\_CH\_19175



B2\_5M\_16QAM\_25@0\_CH\_19175



B2\_3M\_QPSK\_15@0\_CH\_18615



B2\_3M\_16QAM\_15@0\_CH\_18615

