

# FCC TEST REPORT

**Product Name:** Module  
**Trade Mark:** CINTERION  
**Model No.:** PLS83-W  
**Report Number:** 210809036RFM-1  
**Test Standards:** FCC 47 CFR Part 27 P  
**FCC ID:** QIPPLS83-W  
**Test Result:** PASS  
**Date of Issue:** August 26, 2021

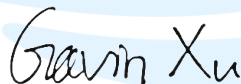
Prepared for:

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UTTR-RF-FCC4G-V1.1

**Version**

Version No.	Date	Description
V1.0	August 26, 2021	Original



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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	THALES DIS AIS Deutschland GmbH
<b>Address of Applicant:</b>	Siemensdamm 50, 13629 Berlin, Germany
<b>Manufacturer:</b>	Thales DIS AIS Deutschland GmbH
<b>Address of Manufacturer:</b>	Werinherstr. 81, 81541 Munich, Germany

### 1.2 EUT INFORMATION

#### 1.2.1 General Description of EUT

<b>Product Name:</b>	Module	
<b>Model No.:</b>	PLS83-W	
<b>Trade Mark:</b>	CINTERION	
<b>DUT Stage:</b>	Production Unit	
<b>EUT Supports Function:</b>	GSM Bands:	GSM850/1900
	UTRA Bands:	Band II/ Band IV/ Band V
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7/Band 8/ Band 12/ Band 13/ Band 26/ Band 66
		TDD Band 38/ Band 41
<b>Sample Received Date:</b>	August 10, 2021	
<b>Sample Tested Date:</b>	August 10, 2021 to August 17, 2021	

#### 1.2.2 Description of Accessories

None.

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

<b>Support Networks:</b>	LTE	
<b>Type of Modulation:</b>	LTE Band 8:	QPSK, 16QAM
<b>Antenna Type:</b>	External Antenna	
<b>Antenna Gain:</b>	LTE Band 8:	50 ohm terminal (0dBi)
<b>Normal Test Voltage:</b>	3.8 Vdc	
<b>Extreme Test Voltage:</b>	3.2 to 4.5Vdc	
<b>Extreme Test Temperature:</b>	-30 °C to +65 °C	

Summary of Results:								
Bands	BW	Modulation	Frequency Range	Max RF Output Power (dBm)		EIRP (W)	99% BW (MHz)	Emission Designator
	(MHz)		(MHz)	Conducted (Average)	ERP/EIRP (Average)			
8	1.4	QPSK	897.5-900.5	24.15	24.15	0.26002	1.1056	1M11G7D
		16QAM		23.05	23.05	0.20184	1.1050	1M11W7D
	3	QPSK	897.5-900.5	24.20	24.20	0.26303	2.7185	2M72G7W
		16QAM		23.28	23.28	0.21281	2.7043	2M70D7W

### 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
Adaptor	N/A	CD139	20359	Applicant
PCB board	N/A	DSB75	--	Applicant
PCB board	N/A	AH8	--	Applicant
50 ohm terminal	N/A	N/A	N/A	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.1 Meter	UnionTrust
2	RF Cable	SMA	0.8 Meter	UnionTrust
3	RF Cable	SMA	0.8 Meter	UnionTrust

### 1.5 TEST LOCATION

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China  
 Telephone: +86 (0) 755 2823 0888  
 Fax: +86 (0) 755 2823 0886

### 1.6 TEST FACILITY

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.

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

**ISED Wireless Device Testing Laboratories**

CAB identifier: CN0032

**FCC Accredited Lab.**

Designation Number: CN1194

Test Firm Registration Number: 259480

**1.7 DEVIATION FROM STANDARDS**

None.

**1.8 ABNORMALITIES FROM STANDARD CONDITIONS**

None.

**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 emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated spurious emissions 30MHz-1GHz	± 4.9 dB
4	Radiated spurious emissions 1GHz-18GHz	± 4.8 dB
5	Radiated spurious emissions 18GHz-40GHz	± 5.1 dB
6	Occupied Bandwidth	± 1.86 %
7	DC Supply Voltages	± 0.68 %
8	Temperature	± 0.62 °C
9	Humidity	± 3.9 %
10	Conducted spurious emissions	± 2.7 dB
11	DC Supply Voltages	± 0.68 %
12	AC Supply Voltages	± 1.2 %
13	Radio Frequency	± 6.5 x 10 <sup>-8</sup>
14	RF Power, Conducted	± 0.9 dB

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## 2. TEST SUMMARY

FCC 47 CFR Part 27 Test Cases (LTE Band 8 )			
Test Item	Test Requirement	Test Method	Result
Equivalent Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.1507(a)(3)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.1507(a)(3)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.1507(d)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 27.1506	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.1509(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.1509(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.1509(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

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### 3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	3m SAC	ETS-LINDGREN	3M	N/A	Jan. 22, 2021	Jan. 21, 2024
<input type="checkbox"/>	Loop Antenna	ETS-Lindgren	6502	00202525	Nov. 14, 2020	Nov. 13, 2021
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 18, 2020	Nov. 17, 2021
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 14, 2020	Nov. 13, 2021
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 14, 2020	Nov.13, 2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2020	Nov. 9, 2021
<input checked="" type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	Apr. 30, 2021	Apr. 29, 2022
<input checked="" type="checkbox"/>	Pre-amplifier	ETS-Lindgren	00118385	00201874	Nov. 10, 2020	Nov. 9, 2021
<input type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 14, 2020	Nov. 13, 2021
<input type="checkbox"/>	Pre-amplifier	ETS-Lindgren	00118384	00202652	Nov. 14, 2020	Nov. 13, 2022
<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 Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	Spectrum Analyzer	R&S	FSV40-N	101653	Apr. 22, 2021	Apr. 21, 2022
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 10, 2020	Nov. 9, 2021
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	120932	Apr. 22, 2021	Apr. 21, 2022
<input type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	119583	Apr. 22, 2021	Apr. 21, 2022
<input checked="" type="checkbox"/>	DC Source	KIKUSUI	PWR400L	LK003024	N/A	N/A
<input checked="" type="checkbox"/>	Digital multimeter	FLUKE	15B+	30701460WS15	Nov. 12, 2020	Nov. 11, 2021
<input checked="" type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Apr. 22, 2021	Apr. 21, 2022



#### 4. TEST CONFIGURATION

##### 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

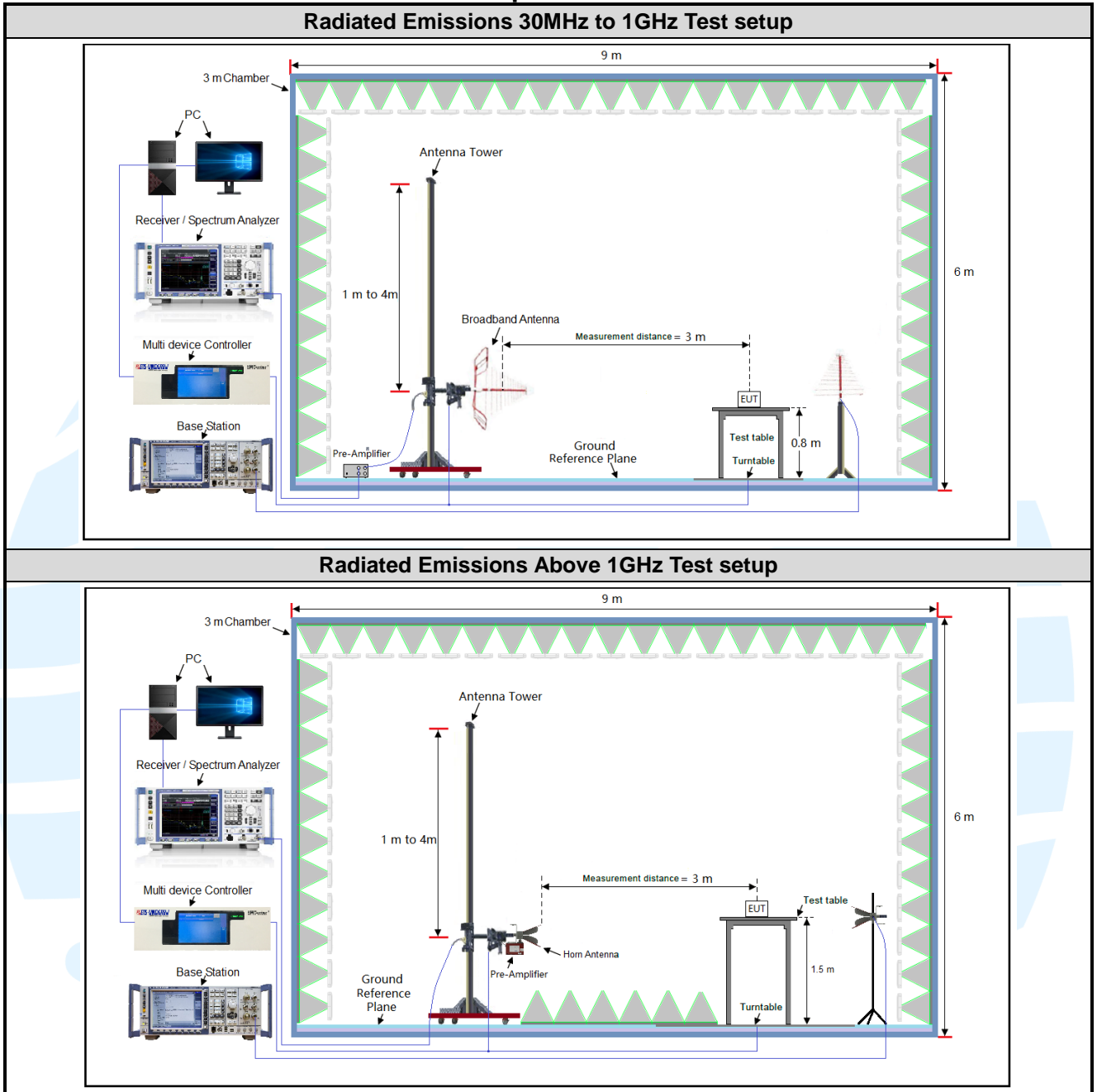
Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.8	20 to 75
TL/VL	-30	3.2	20 to 75
TH/VL	+65	3.2	20 to 75
TL/VH	-30	4.5	20 to 75
TH/VH	+65	4.5	20 to 75

**Remark:**

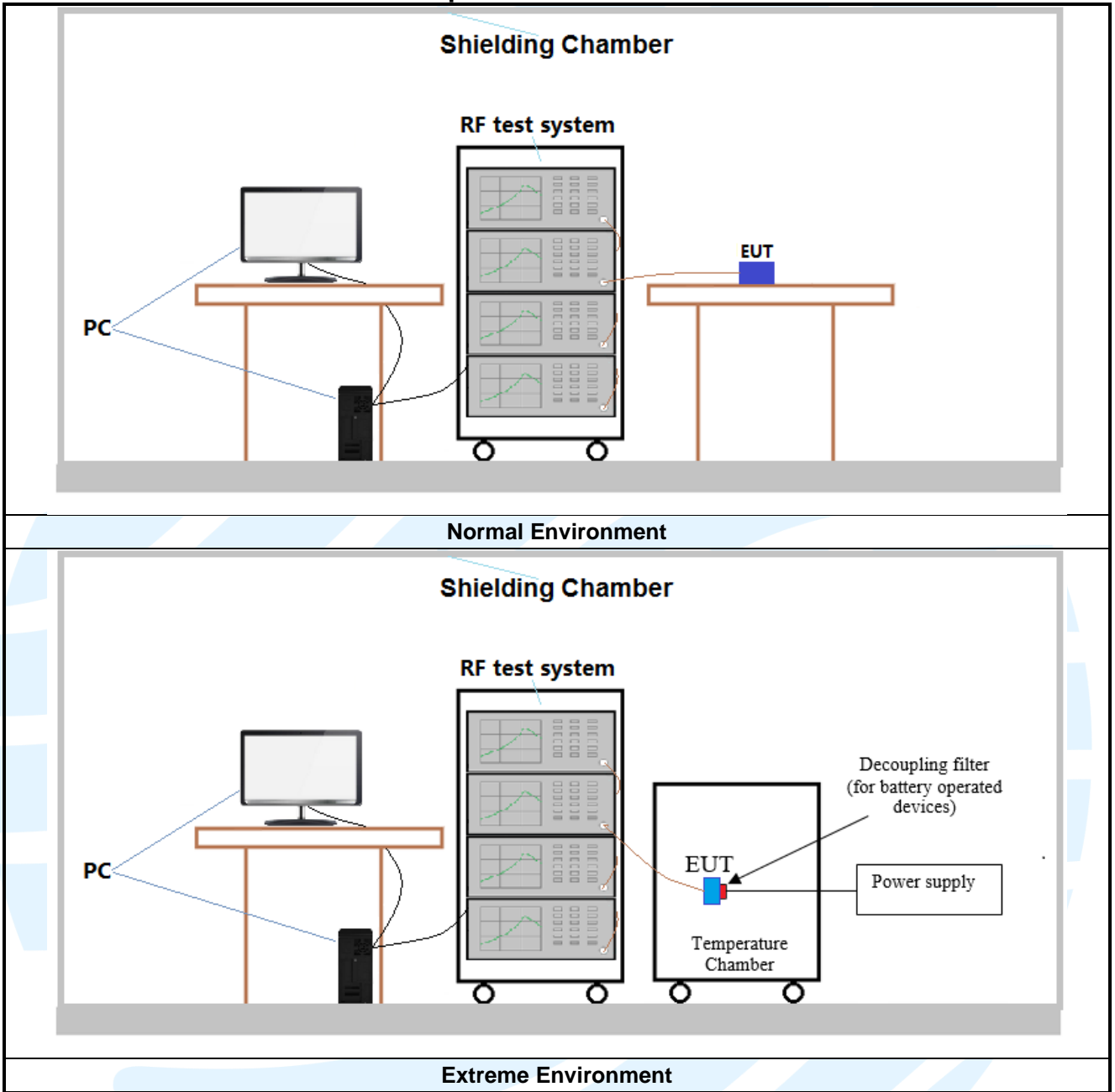
- 1) The EUT just work in such extreme temperature of -30 °C to +65 °C and the extreme voltage of 3.2 V to 4.5 V, so here the EUT is tested in the temperature of -30 °C to +65 °C and the voltage of 3.2 V to 4.5 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;  
 TL: Low Extreme Test Temperature; TH: 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 8 TX: 897.5-900.5MHz	Low Range	1.4	21632	898.2
	Middle Range	1.4/3	21640	899
	High Range	1.4	21648	899.8



### 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. 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.

The worst case was found when positioned as the table below.

Band	Mode	Antenna Port	Worst-case axis positioning
LTE Band 8	1TX	Chain 0	Z axis

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 under all rate at lowest middle and highest channel, find the transmitter power as below.

#### LTE Band 8

LTE Band 8 Maximum Average Power (dBm)										
Modulation	RB		Test Channel			RB		Test Channel		
	Size	Offset	Low	Mid	High	Size	Offset	Low	Mid	High
Channel Bandwidth: 1.4 MHz						Channel Bandwidth: 3 MHz				
QPSK	1	0	23.65	24.04	23.60	1	0	/	24.11	/
	1	3	23.85	23.97	23.92	1	8	/	24.20	/
	1	5	23.76	24.15	23.82	1	14	/	23.94	/
	6	0	22.86	22.94	22.66	15	0	/	22.98	/
16QAM	1	0	22.61	23.01	22.86	1	0	/	22.99	/
	1	3	22.98	23.05	22.80	1	8	/	22.98	/
	1	5	22.74	22.91	22.81	1	14	/	23.28	/
	6	0	21.85	21.86	21.58	15	0	/	22.09	/

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	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
ERP/EIRP	8	<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"/>
Conducted output power	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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"/>
99%&26dB Bandwidth	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
peak-to-average ratio	8	<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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Band Edge at antenna terminals	8	<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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Spurious emissions at antenna terminals	8	<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"/>
Field strength of spurious radiation	8	<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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Frequency stability	8	<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 27	Miscellaneous Wireless Communications Services

### 5.2 ERP

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
**LTE Band 8 :** FCC 47 CFR Part 27.1507(a)(3)

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

**Limit:**

**FCC 47 CFR Part 27.1507(a)(3):**

Mobile, control and auxiliary test stations. Mobile, control and auxiliary test stations must not exceed 10 watts ERP.

**Test Procedure:**

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

where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P<sub>Meas</sub>, typically dBW or dBm);

P<sub>Meas</sub> = measured transmitter output power or PSD, in dBm or dBW;

G<sub>T</sub> = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

1) L<sub>C</sub> = 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



**LTE Band 8**

LTE Band 8 Maximum EIRP (dBm)					
Channel	QPSK; RB:1	16QAM; RB:1	64QAM; RB:1	Limit (dBm)	Result
<b>Channel Bandwidth: 1.4MHz</b>					
Lowest	23.85	22.98	/	40	Pass
Middle	24.15	23.05	/	40	Pass
Highest	23.92	22.86	/	40	Pass
<b>Channel Bandwidth: 3MHz</b>					
Middle	24.20	23.28	/	40	Pass



### 5.3 CONDUCTED OUTPUT POWER

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
**LTE Band 8:** FCC 47 CFR Part 27.1507(a)(3)  
**Test Method:** KDB 971168 D01v03r01 & ANSI C63.26-2015

**Limit:**

**FCC 47 CFR Part 27.1507(a)(3):**

Mobile, control and auxiliary test stations. Mobile, control and auxiliary test stations must not exceed 10 watts ERP.

**Test Procedure:**

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

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:** [The full result refer to section 4.5 for details.](#)

### 5.4 PEAK-TO-AVERAGE RATIO

**Test Requirement:** LTE Band 8: FCC 47 CFR Part 27.1507(d)  
**Test Method:** KDB 971168 D01v03r01 Section 5.7  
**Limit:** PAR limit. The peak-to-average ratio (PAR) of the transmission must 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.

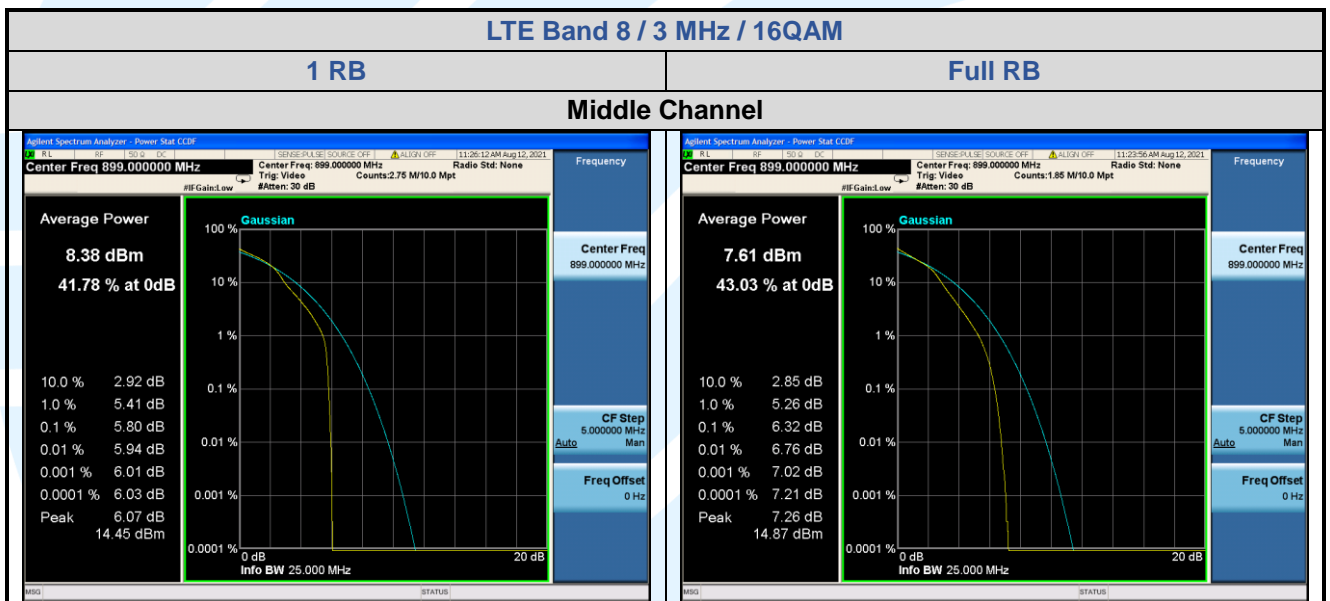
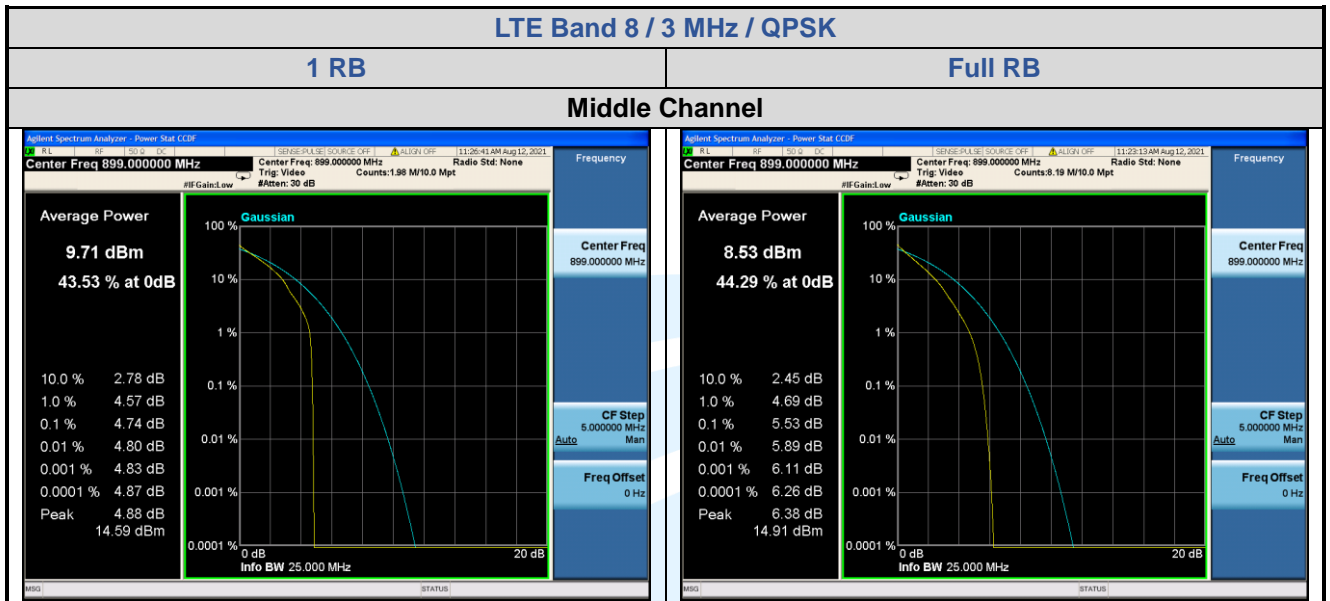
- a) Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth
- b) Set the number of counts to a value that stabilizes the measured CCDF curve
- c) Record the maximum PAPR level associated with a probability of 0.1 %

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:** See table below

#### LTE Band 8

LTE Band 8 Peak-to-average ratio (dB)						
Channel	RB Configuration	Channel Bandwidth: 3 MHz			Limit (dB)	Result
		QPSK	16QAM	64QAM		
Middle	1 RB	4.74	5.80	/	13	Pass
	Full RB	5.53	6.32	/	13	Pass



### 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:**

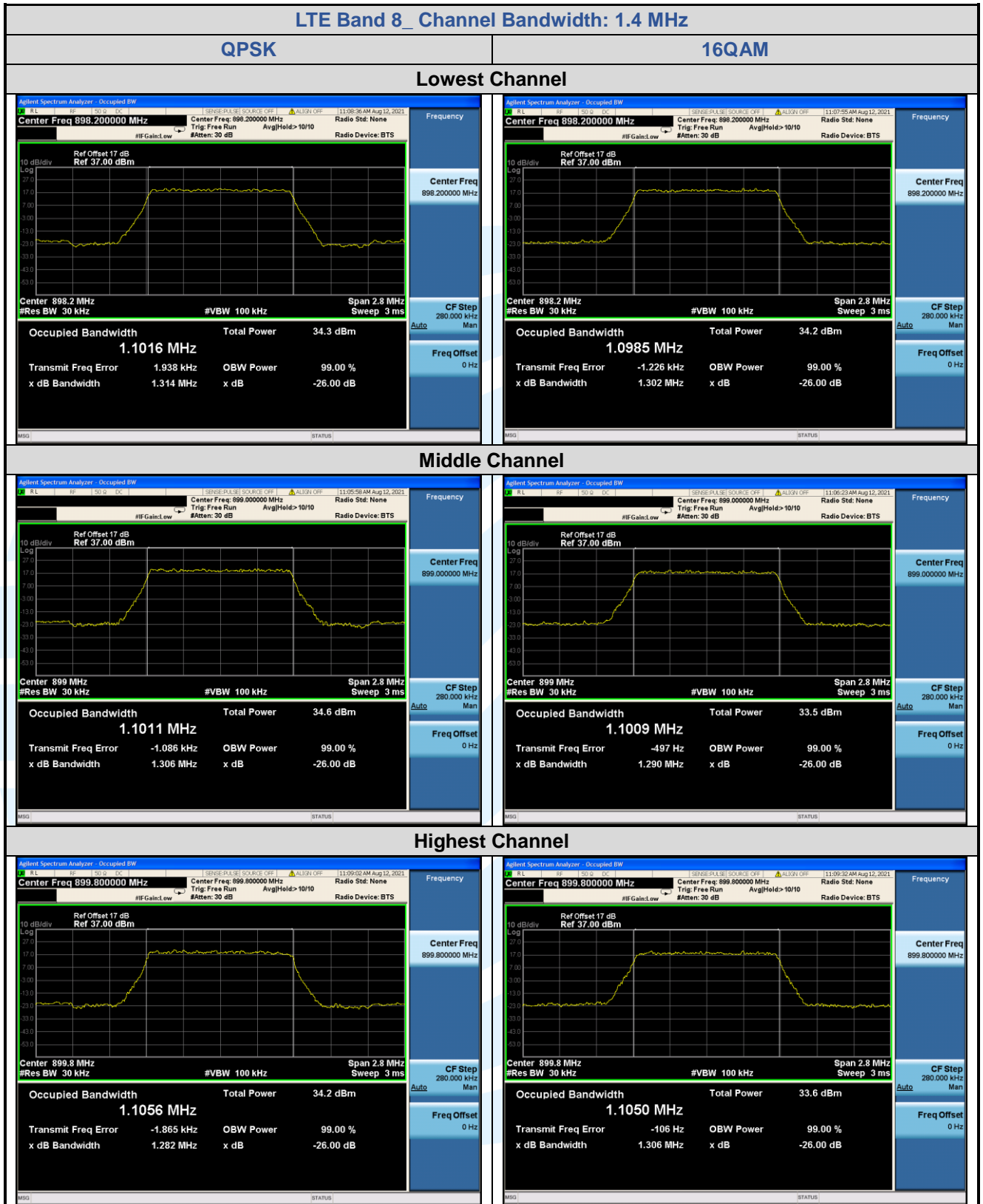
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured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

#### LTE Band 8

LTE Band 8								
Channel	RB Configuration		26 dB BW (MHz)			99% BW (MHz)		
	Size	Offset	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
<b>Channel Bandwidth: 1.4 MHz</b>								
Lowest	6	0	1.314	1.302	/	1.1016	1.0985	/
Middle	6	0	1.306	1.290	/	1.1011	1.1009	/
Highest	6	0	1.282	1.306	/	1.1056	1.1050	/
<b>Channel Bandwidth: 3 MHz</b>								
Middle	15	0	2.999	2.991	/	2.7185	2.7043	/



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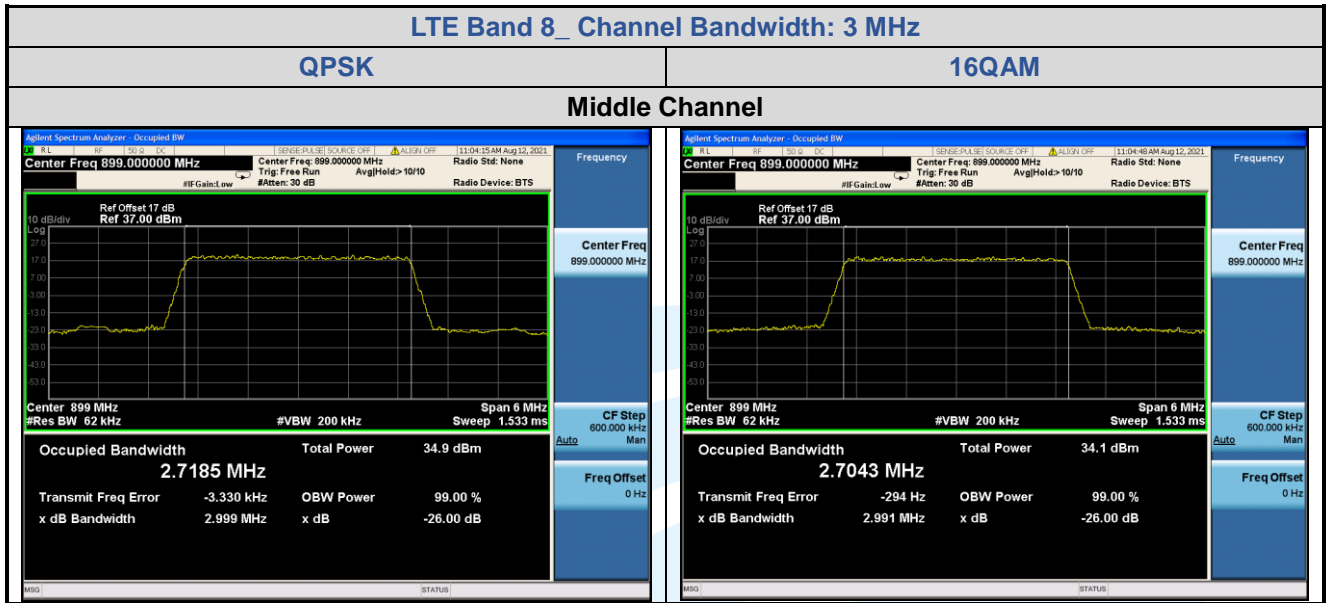
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## 5.6 BAND EDGE AT ANTENNA TERMINALS

**Test Requirement:** LTE Band 8: FCC 47 CFR Part 27.1509(a)

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

**Limit:**

**FCC 47 CFR Part 27.1509(a):**

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) in watts by at least the following amounts:

(a) For 900 MHz broadband operations in 897.5-900.5 MHz band by at least  $43 + 10 \log (P)$  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.

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.

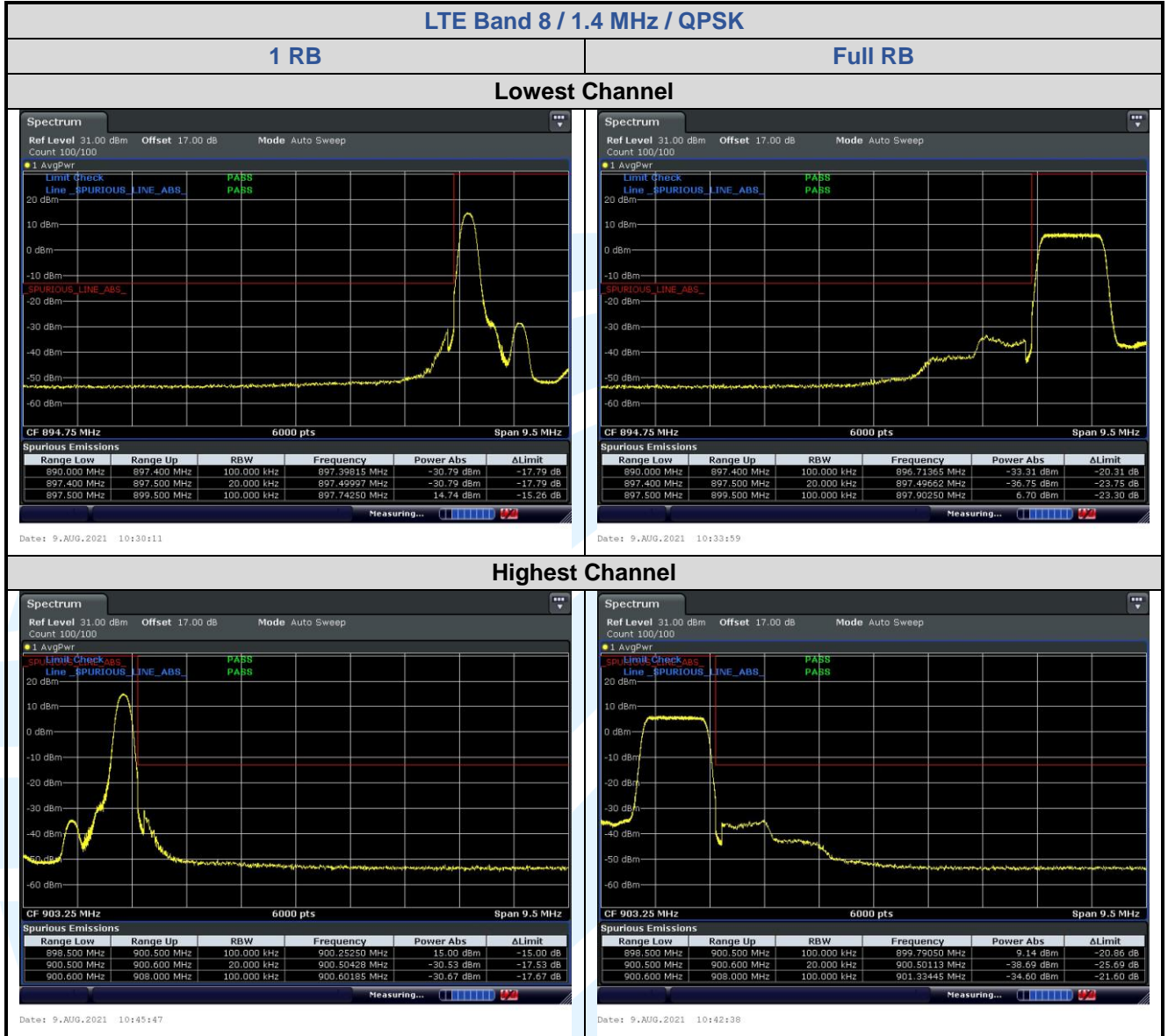
**Instruments Used:** Refer to section 3 for details

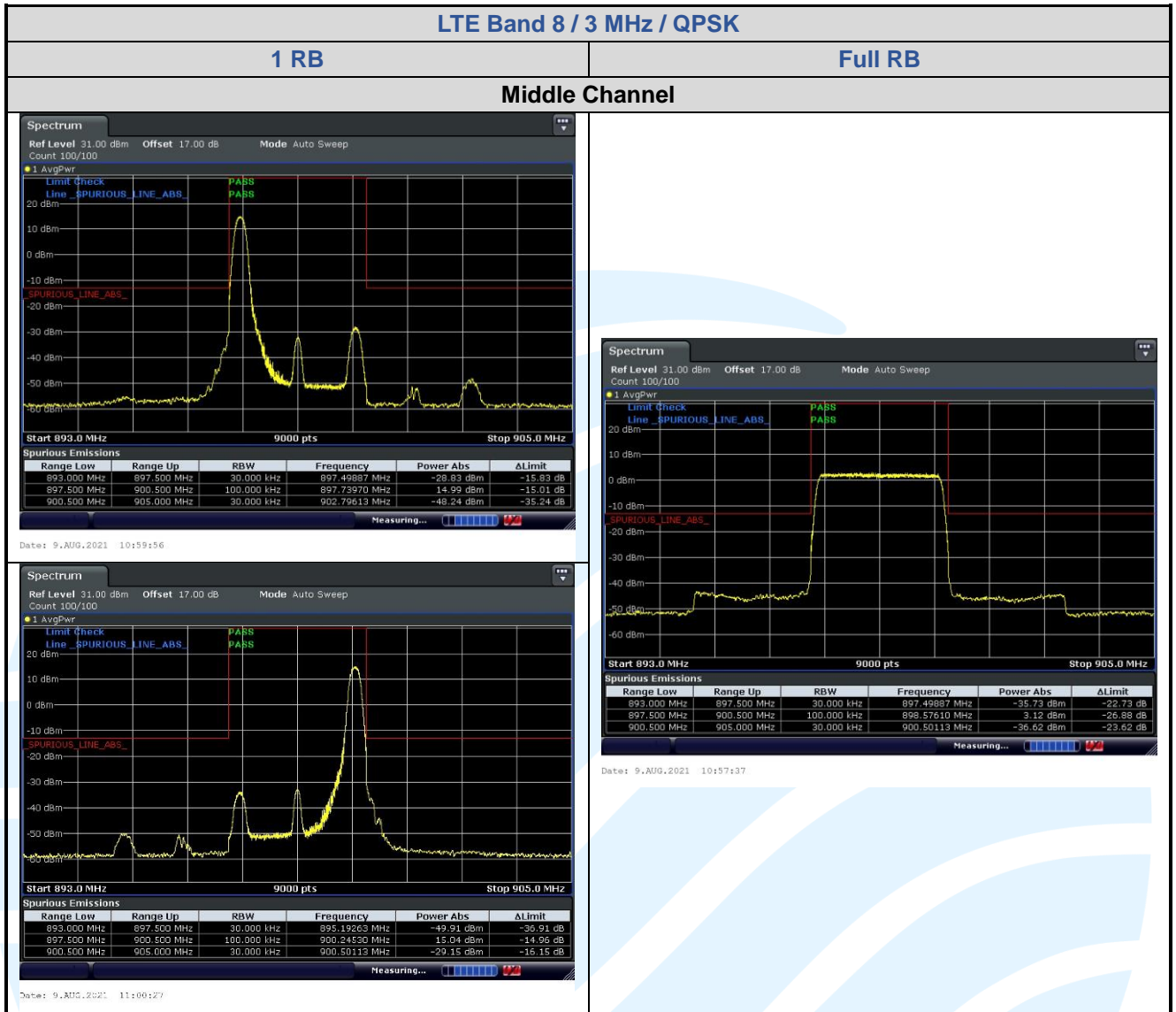
**Test Mode:** Link mode

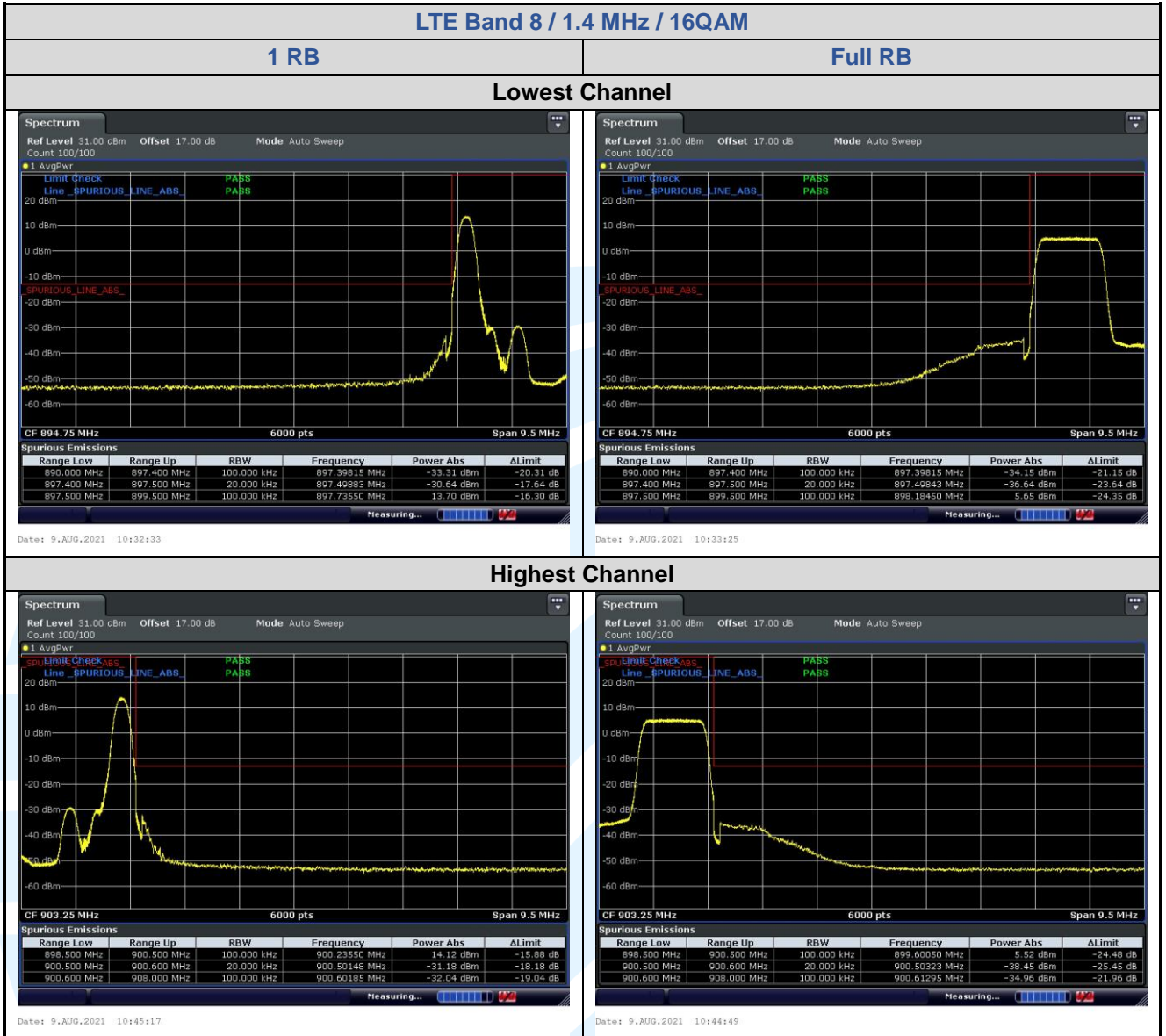
**Test Results:** Pass

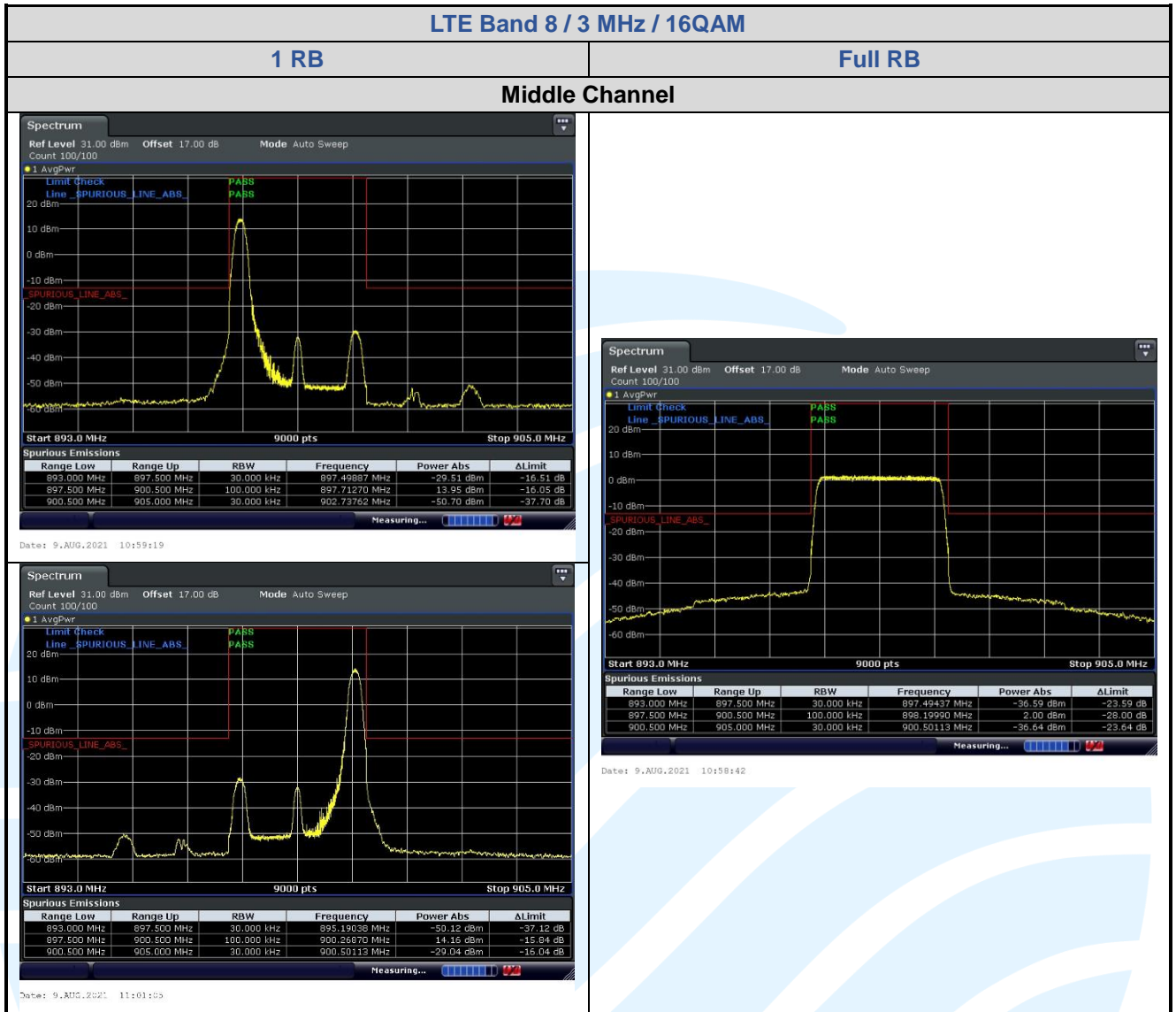


## LTE Band 8









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## 5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

**Test Requirement:** LTE Band 8: FCC 47 CFR Part 27.1509(a)

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

**Limit:**

**FCC 47 CFR Part 27.1509(a):**

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) in watts by at least the following amounts:

(a) For 900 MHz broadband operations in 897.5-900.5 MHz band by at least  $43 + 10 \log (P)$  dB.

**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.

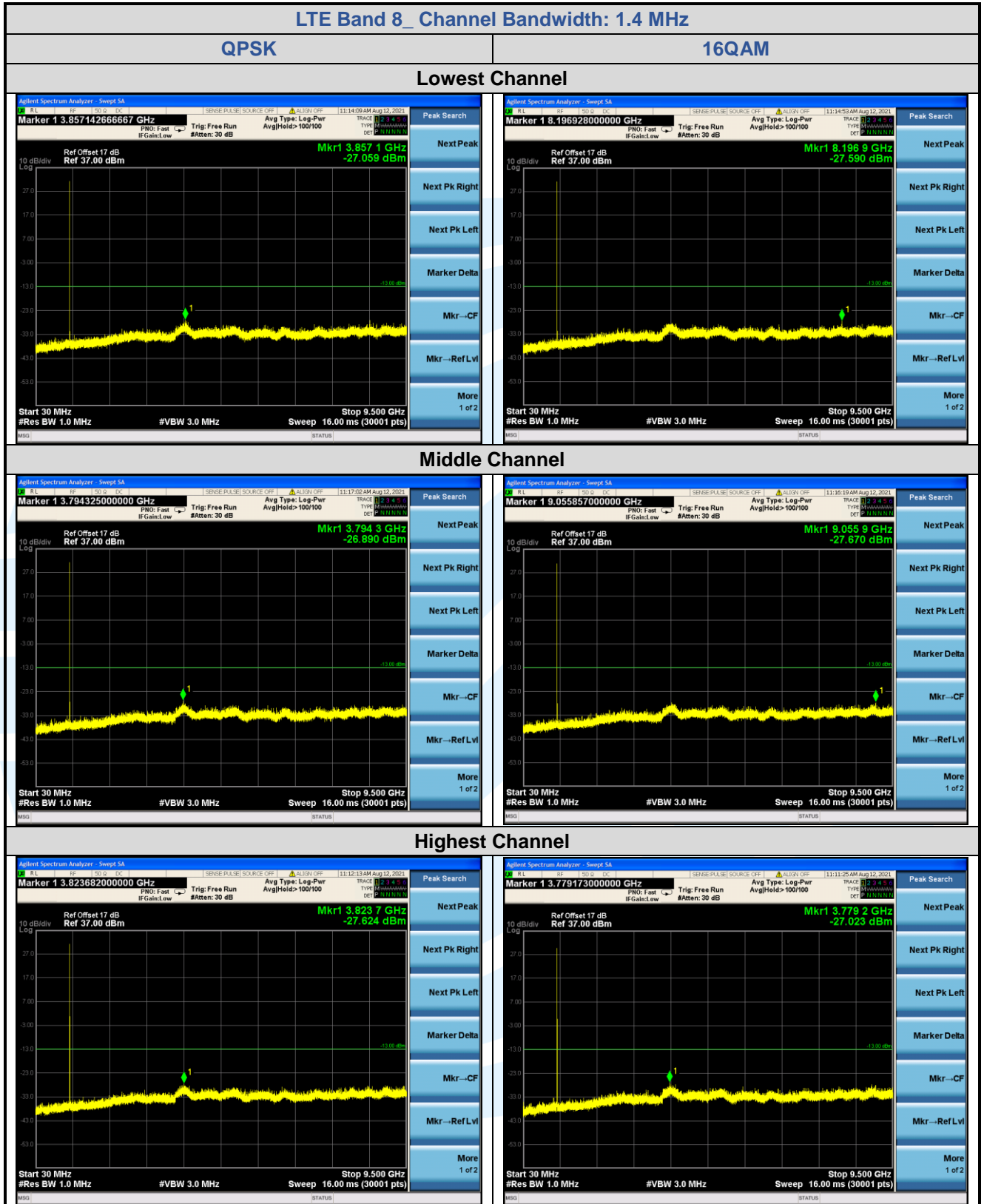
**Test Setup:** Refer to section 4.2.2 for details.

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

**Test Mode:** Link mode

**Test Results:** Pass

## LTE Band 8



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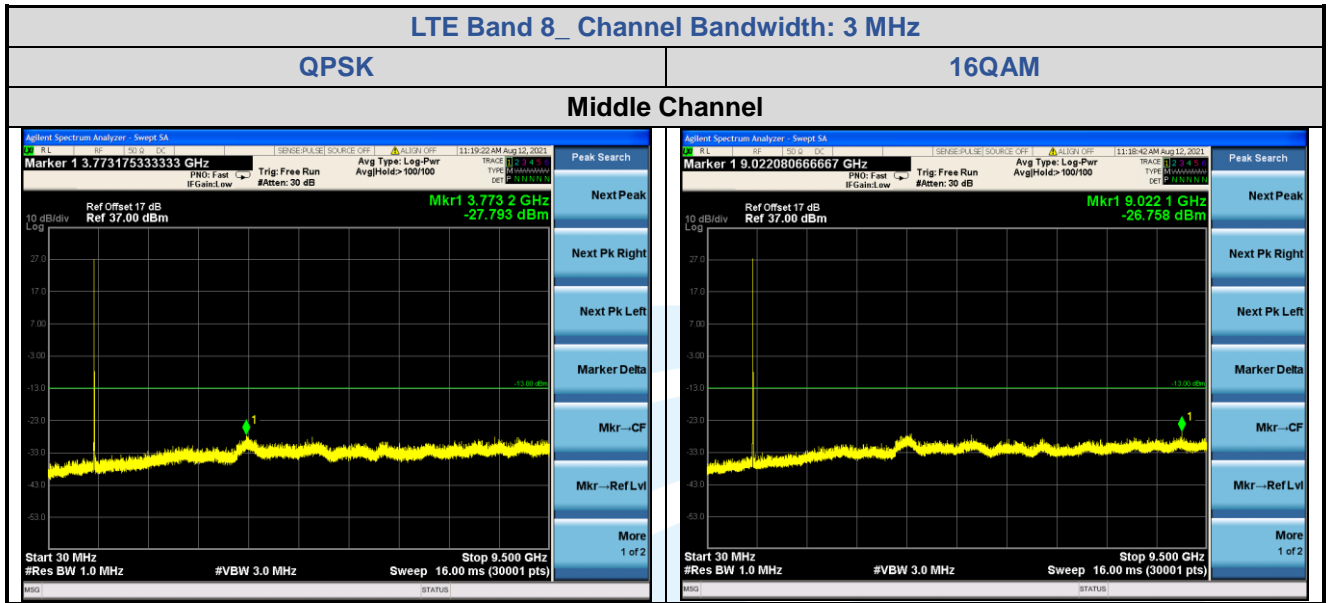
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**Remark:**

1) All the above radiation data, the fundamental frequency is not marked, it may exceed the limit, please ignore it.

### 5.8 FIELD STRENGTH OF SPURIOUS RADIATION

**Test Requirement:** LTE Band 8: FCC 47 CFR Part 27.1509(a)

**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 27.1509(a):**

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) in watts by at least the following amounts:

(a) For 900 MHz broadband operations in 897.5-900.5 MHz band by at least  $43 + 10 \log (P)$  dB.

**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 measurement data as follows:**



**LTE Band 8**

LTE Band 8_ 1.4 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	615.774	-89.69	39.12	-50.57	-13.00	-37.57	Horizontal
2	713.692	-89.44	40.45	-48.99	-13.00	-35.99	Horizontal
3	804.252	-88.16	41.43	-46.73	-13.00	-33.73	Horizontal
4	1796.400	-65.24	0.94	-64.30	-13.00	-51.30	Horizontal
5	2694.600	-63.89	3.38	-60.51	-13.00	-47.51	Horizontal
6	586.217	-89.97	38.06	-51.91	-13.00	-38.91	Vertical
7	718.725	-89.61	39.47	-50.14	-13.00	-37.14	Vertical
8	815.635	-89.24	40.99	-48.25	-13.00	-35.25	Vertical
9	1796.400	-63.11	0.27	-62.84	-13.00	-49.84	Vertical
10	2694.600	-63.89	2.82	-61.07	-13.00	-48.07	Vertical
<b>Middle Channel</b>							
1	615.774	-89.06	39.12	-49.94	-13.00	-36.94	Horizontal
2	698.804	-88.87	40.73	-48.14	-13.00	-35.14	Horizontal
3	958.714	-87.98	43.49	-44.49	-13.00	-31.49	Horizontal
4	1798.000	-67.25	0.95	-66.30	-13.00	-53.30	Horizontal
5	2697.000	-63.88	3.38	-60.50	-13.00	-47.50	Horizontal
6	502.247	-88.90	36.88	-52.02	-13.00	-39.02	Vertical
7	728.897	-88.01	39.32	-48.69	-13.00	-35.69	Vertical
8	938.714	-87.85	42.24	-45.61	-13.00	-32.61	Vertical
9	1798.000	-64.30	0.29	-64.01	-13.00	-51.01	Vertical
10	2697.000	-64.42	2.83	-61.59	-13.00	-48.59	Vertical
<b>Highest Channel</b>							
1	535.038	-89.45	37.47	-51.98	-13.00	-38.98	Horizontal
2	689.051	-88.99	40.52	-48.47	-13.00	-35.47	Horizontal
3	945.334	-87.68	43.54	-44.14	-13.00	-31.14	Horizontal
4	1799.600	-65.56	0.96	-64.60	-13.00	-51.60	Horizontal
5	2699.400	-65.05	3.40	-61.65	-13.00	-48.65	Horizontal
6	535.038	-89.41	37.57	-51.84	-13.00	-38.84	Vertical
7	844.803	-88.64	41.01	-47.63	-13.00	-34.63	Vertical
8	938.714	-87.63	42.24	-45.39	-13.00	-32.39	Vertical
9	1799.600	-66.73	0.30	-66.43	-13.00	-53.43	Vertical
10	2699.400	-65.54	2.84	-62.70	-13.00	-49.70	Vertical

LTE Band 8_ 3 MHz_ QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>Middle Channel</b>							
1	562.014	-89.33	37.42	-51.91	-13.00	-38.91	Horizontal
2	674.677	-88.81	40.21	-48.60	-13.00	-35.60	Horizontal
3	804.252	-89.08	41.43	-47.65	-13.00	-34.65	Horizontal
4	1798.000	-65.50	0.95	-64.55	-13.00	-51.55	Horizontal
5	2697.000	-63.91	3.38	-60.53	-13.00	-47.53	Horizontal
6	582.112	-90.16	38.18	-51.98	-13.00	-38.98	Vertical
7	821.387	-88.25	41.12	-47.13	-13.00	-34.13	Vertical
8	932.141	-88.69	42.26	-46.43	-13.00	-33.43	Vertical
9	1798.000	-64.75	0.29	-64.46	-13.00	-51.46	Vertical
10	2697.000	-65.28	2.83	-62.45	-13.00	-49.45	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

### 5.9 FREQUENCY STABILITY

**Test Requirement:** FCC 47 CFR Part 2.1055 &

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

**Limits:**

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 or CMU 200 with Frequency Error measurement capability.
  - a) Temp. = -30° to + 50°C
  - b) Voltage =low voltage, 3.2 Vdc, Normal, 3.8 Vdc and High voltage, 4.5 Vdc.
- 2) Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20°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°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

#### LTE Band 8

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperatur e (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
<b>LTE Band 8 / 3MHz / Full RB</b>							
QPSK	21640 / 899.0	VL	TN	-0.01	0.0000	N/A	Pass
		VN		-0.51	-0.0003		Pass
		VH		-0.43	-0.0002		Pass
		VN	50	-0.64	-0.0003		Pass
			40	-0.29	-0.0002		Pass
			30	-0.04	0.0000		Pass
			20	-0.37	-0.0002		Pass
			10	-0.23	-0.0001		Pass
			0	-0.16	-0.0001		Pass
			-10	0.19	0.0001		Pass
			-20	0.63	0.0003		Pass
			-30	0.78	0.0004		Pass

## APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

\*\*\* End of Report \*\*\*

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The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.

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