



Certificate #4312.01

TEST REPORT

Product Name: Module
Trade Mark: CINTERION
Model No. / HVIN: PLS83-X-B
Report Number: 220730733RFM-1
Test Standards: FCC 47 CFR Part 22 Subpart H
FCC 47 CFR Part 24 Subpart E
FCC 47 CFR Part 27 Subpart L
RSS-132 Issue 3, RSS-133 Issue 6
RSS-139 Issue 3, RSS-Gen Issue 5
FCC ID: QIPPLS83-X-B
IC: 7830A-PLS83XB
Test Result: PASS
Date of Issue: October 26, 2022

Prepared for:

Thales DIS AIS Deutschland GmbH
Siemensdamm 50, 13629 Berlin, Germany

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October 26, 2022

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Version

Version No.	Date	Description
V1.0	October 26, 2022	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

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

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Module	
Model No. / HVIN:	PLS83-X-B	
Trade Mark:	CINTERION	
DUT Stage:	Production Unit	
EUT Supports Function:	UTRA Bands:	Band II/ Band IV/ Band V
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 12/ Band 13/ Band 14/ Band 25/ Band 26/ Band 66/ Band 71
Sample Received Date:	August 25, 2020	
Sample Tested Date:	September 1, 2020 to September 21, 2020	
EUT identification	200722022-A01/2	
Firmware number	MDM9607.TX.1.0-00097-STD.PROD-1.366947.1.367976.1	

1.2.2 Description of Accessories

None

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	WCDMA, HSDPA, HSUPA, DC-HSDPA	
Type of Modulation:	WCDMA	BPSK
	HSDPA/DC-HSDPA:	QPSK
	HSUPA:	QPSK
	DC-HSDPA:	64QAM
Frequency Range:	WCDMA Band II:	1852.4-1907.6 MHz
	WCDMA Band IV:	1712.4-1752.6 MHz
	WCDMA Band V:	826.4-846.6 MHz
Max RF Output Power:	WCDMA Band II:	24.30dBm
	WCDMA Band IV:	24.60dBm
	WCDMA Band V:	24.16dBm
Emission Designator:	WCDMA Band II:	4M14F9W
	WCDMA Band IV:	4M14F9W
	WCDMA Band V:	4M15F9W
Antenna Type:	External Antenna	
Antenna Gain:	WCDMA Band II:	50 ohm terminal (0 dBi)
	WCDMA Band IV:	50 ohm terminal (0 dBi)
	WCDMA Band V:	50 ohm terminal (0 dBi)
Normal Test Voltage:	3.8 Vdc	
Extreme Test Voltage:	3.2 to 4.5Vdc	
Extreme Test Temperature:	-30 °C to +65 °C	

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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
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
--	--	--	--	--

1.5 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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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.

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.

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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 ⁻⁸
14	RF Power, Conducted	± 0.9 dB

2. TEST SUMMARY

FCC 47 CFR Part 22 Subpart H Test Cases			
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) RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a) RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Peak-to-average ratio	FCC 47 CFR Part 22.913(a) RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a) RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)(b) RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 22.917(a)(b) RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 22.355 RSS-132 Issue 3, Section 5.3	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Note: 1) This report is based on the previous report that changed the software version. The main change is that the module only supports data services. Please refer to declaration of difference for more details. After the evaluation, all technical data is referred to previous report no. 200722022RFM-1 dated February 3, 2021.			

FCC 47 CFR Part 24 Subpart E Test Cases			
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) RSS-133 Issue 6, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c) RSS-133 Issue 6, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Peak-to-average ratio	FCC 47 CFR Part 24.232(d) RSS-133 Issue 6, Section 6.4	KDB 971168 D01v03r01	Pass (SEE NOTE 1)
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b) RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a) RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)(b) RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 24.238(a)(b) RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235 RSS-133 Issue 6, Section 6.3	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Note:			

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- 1) This report is based on the previous report that changed the software version. The main change is that the module only supports data services. Please refer to declaration of difference for more details. After the evaluation, all technical data is referred to previous report no. 200722022RFM-1 dated February 3, 2021.

FCC 47 CFR Part 27 Subpart L Test Cases			
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) RSS-139 Issue 3, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4) RSS-139 Issue 3, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5) RSS-139 Issue 3, Section 6.5	KDB 971168 D01v03r01	Pass (SEE NOTE 1)
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) FCC 47 CFR Part 27.53(h) RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(h)(1) RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(h) RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(h) RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54 RSS-139 Issue 3, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	Pass (SEE NOTE 1)
Note:			
1) This report is based on the previous report that changed the software version. The main change is that the module only supports data services. Please refer to declaration of difference for more details. After the evaluation, all technical data is referred to previous report no. 200722022RFM-1 dated February 3, 2021.			

Test Plan:

- 1) According to the difference description, PLS83-X-B shares the same data from the PLS83-X original report (Report No.: 200722022RFM-1).
- 2) This report is based on the report of 200722022RFM-1, just verified the conducted output power.
- 3) The difference is defined by the applicant and the referenced data complies with FCC/ISED regulations, and the applicant assumes full responsibility.
- 4) The data of PLS83-X-B was used for PLS83-X as bellow:

Band	Test Item	Description
WCDMA Band II/ IV / V	Equivalent Radiated Power (ERP) Equivalent Isotropic Radiated Power (EIRP)	Reuse
	Conducted Output Power	Verification
	Peak-to-average ratio	Reuse
	99%&26dB Bandwidth	Reuse
	Band Edge at antenna terminals	Reuse
	Spurious emissions at antenna terminals	Reuse
	Field strength of spurious radiation	Reuse
	Frequency stability	Reuse

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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 Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 24, 2019	Nov. 23, 2020
<input type="checkbox"/>	Loop Antenna	ETS-LINDGREN	6502	00202525	Nov. 16, 2019	Nov. 15, 2020
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 16, 2019	Nov. 15, 2020
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 16, 2019	Nov. 15, 2020
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 16, 2019	Nov. 15, 2020
<input type="checkbox"/>	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May. 30, 2020	May. 29, 2021
<input type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2019	Nov. 23, 2020
<input type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3117	00164202	Nov. 24, 2019	Nov. 23, 2020
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May. 30, 2020	May. 29, 2021
<input type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jun. 19, 2020	Jun. 18, 2021
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 16, 2019	Nov. 15, 2020
<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"/>	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2019	Nov. 23, 2020
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2019	Nov. 23, 2020
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	119583	Jul. 20, 2020	Jul. 19, 2021
<input type="checkbox"/>	Universal Radio Communication Tester	R&S	CMU200	114713	Nov. 24, 2019	Nov. 23, 2020
<input checked="" type="checkbox"/>	DC Source	KIKUSUI	PWR400L	LK003024	N/A	N/A
<input checked="" type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	58566133290020	May. 11, 2020	May. 10, 2021

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4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

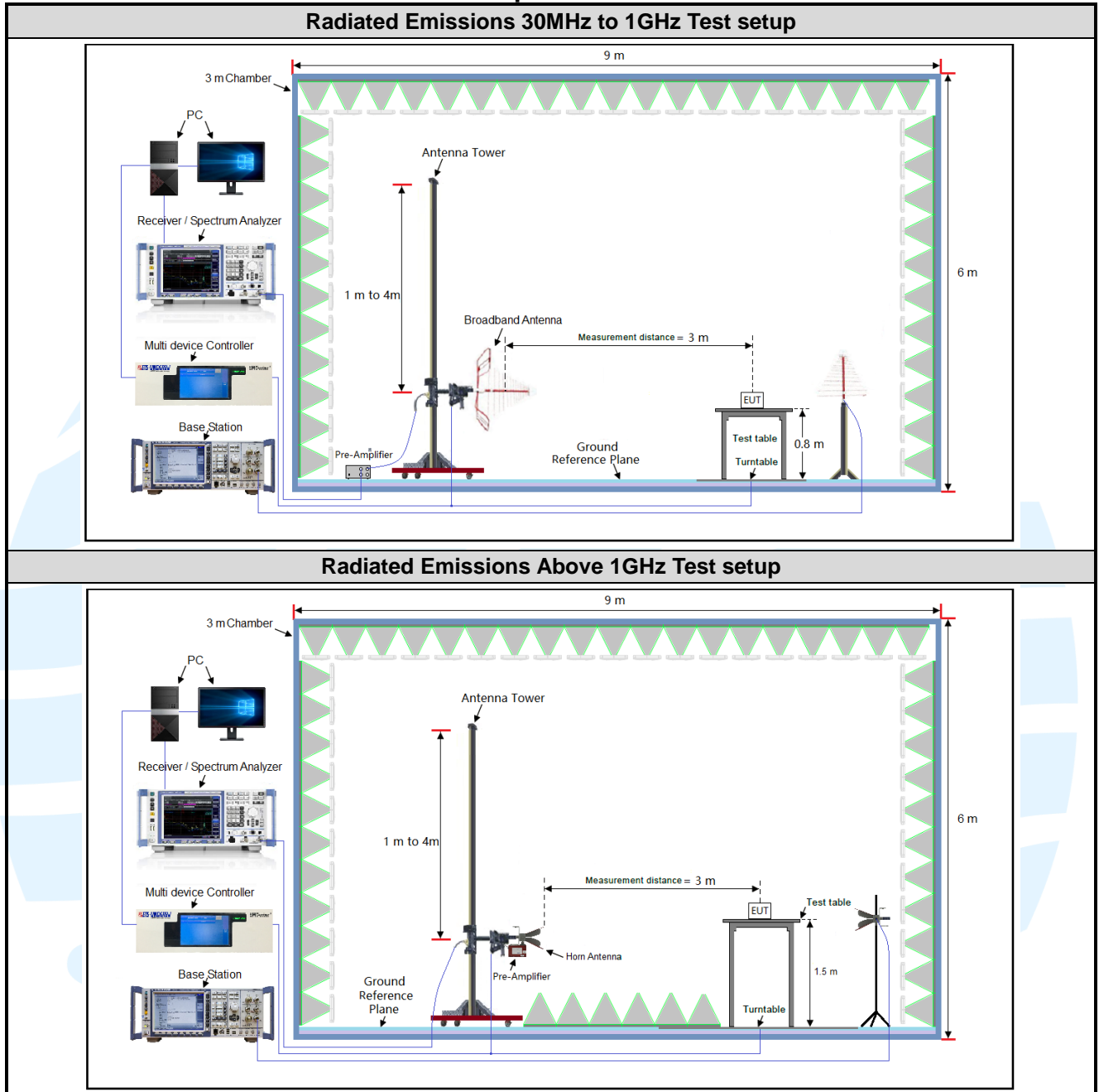
Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.8	20 to 75
TL/VL	-30	3.2	20 to 75
TH/VL	+65	3.2	20 to 75
TL/VH	-30	4.5	20 to 75
TH/VH	+65	4.5	20 to 75

Remark:

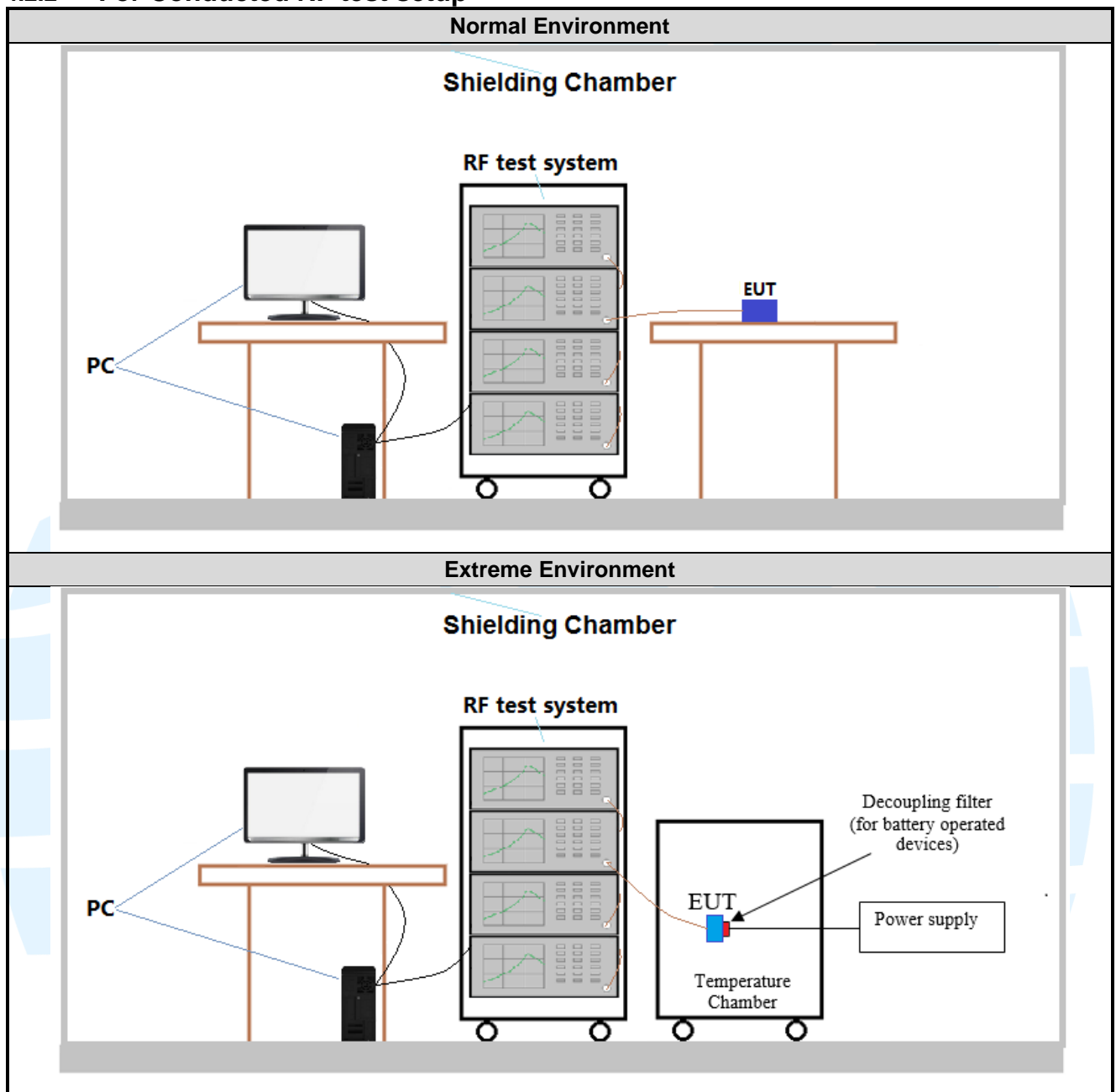
- 1) The EUT just work in such extreme temperature of -30 °C to +65 °C and the extreme voltage of 3.22 V to 4.55 V, so here the EUT is tested in the temperature of -30 °C to +65 °C and the voltage of 3.22 V to 4.55 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;
TL: Low Extreme Test Temperature; 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

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
WCDMA band V	Tx (824 MHz ~ 849 MHz)	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
WCDMA Band II	Tx (1850 MHz-1910 MHz)	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
WCDMA Band IV	Tx (1710 MHz-1755 MHz)	Channel 1312	Channel 1412	Channel 1513
		1712.4 MHz	1732.4 MHz	1752.6 MHz

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.

Bands	Mode	Antenna Port	Worst-case axis positioning
WCDMA Band II	1TX	Chain 0	Z axis
WCDMA Band IV	1TX	Chain 0	Z axis
WCDMA Band V	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:

WCDMA Band II Maximum Average Power (dBm)			
Channel	9262	9400	9538
Frequency(MHz)	1852.4 MHz	1880.0 MHz	1907.6 MHz
AMR	23.52	23.56	23.33
RMC 12.2K	24.30	24.24	24.17
HSDPA Subtest-1	22.83	22.88	22.77
HSDPA Subtest-2	22.67	22.81	22.66
HSDPA Subtest-3	22.68	22.66	22.37
HSDPA Subtest-4	22.42	22.39	22.36
DC-HSDPA Subtest-1	23.23	23.21	23.36
DC-HSDPA Subtest-2	22.79	22.83	22.67
DC-HSDPA Subtest-3	21.95	22.34	21.83
DC-HSDPA Subtest-4	22.38	22.35	22.41
HSUPA Subtest-1	23.22	23.11	23.12
HSUPA Subtest-2	22.52	22.33	22.44
HSUPA Subtest-3	22.43	22.35	22.55
HSUPA Subtest-4	23.12	23.14	23.07
HSUPA Subtest-5	23.13	23.06	22.97

WCDMA Band IV Maximum Average Power (dBm)			
Channel	1312	1412	1513
Frequency(MHz)	1712.4 MHz	1732.4 MHz	1752.6 MHz
AMR	23.75	23.68	23.76
RMC 12.2K	24.59	24.52	24.60
HSDPA Subtest-1	23.14	23.07	22.89
HSDPA Subtest-2	23.05	23.04	23.06
HSDPA Subtest-3	23.11	23.08	23.16
HSDPA Subtest-4	23.04	22.92	23.11
DC-HSDPA Subtest-1	23.13	22.99	23.10
DC-HSDPA Subtest-2	23.08	23.12	22.88
DC-HSDPA Subtest-3	23.02	23.11	23.11
DC-HSDPA Subtest-4	22.96	22.67	23.05
HSUPA Subtest-1	23.05	23.16	23.04
HSUPA Subtest-2	22.43	22.42	22.37
HSUPA Subtest-3	22.07	22.16	22.32
HSUPA Subtest-4	22.82	22.59	22.88
HSUPA Subtest-5	23.52	23.53	23.45

WCDMA Band V Maximum Average Power (dBm)			
Channel	4132	4182	4233
Frequency(MHz)	826.4 MHz	836.4 MHz	846.6 MHz
AMR	24.03	24.09	24.01
RMC 12.2K	24.05	24.16	24.08
HSDPA Subtest-1	22.98	23.11	23.07
HSDPA Subtest-2	22.51	22.56	22.50
HSDPA Subtest-3	22.43	22.52	22.49
HSDPA Subtest-4	22.43	22.51	22.55
DC-HSDPA Subtest-1	22.94	23.07	23.04
DC-HSDPA Subtest-2	22.47	22.54	22.45
DC-HSDPA Subtest-3	22.42	22.51	22.43
DC-HSDPA Subtest-4	22.39	22.48	22.50
HSUPA Subtest-1	22.80	22.79	22.67
HSUPA Subtest-2	21.93	21.90	21.91
HSUPA Subtest-3	21.80	21.78	21.79
HSUPA Subtest-4	22.64	22.54	22.56
HSUPA Subtest-5	23.02	22.99	23.09

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

Band	Radiated	Conducted
WCDMA Band II/IV/V	RMC 12.2kbps Link	RMC 12.2kbps Link

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Spot-check test data included for the variants based on worst-case results reported in the original FCC ID: QIPPLS83-X and IC: 7830A-PLS83X.

Spot Check Test Data Sample Received Date: September 7, 2022

Spot Check Test Data Sample Test Date: September 15, 2022 to September 16, 2022

Test Sample: S20220907479-ZJA01/1

Test Equipment:

Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	119583	Apr. 15, 2022	Apr. 14, 2023

WCDMA Band II Maximum Average Power (dBm)			
Channel	9262	9400	9538
Frequency(MHz)	1852.4 MHz	1880.0 MHz	1907.6 MHz
RMC 12.2K	24.32	24.34	24.40

WCDMA Band IV Maximum Average Power (dBm)			
Channel	1312	1412	1513
Frequency(MHz)	1712.4 MHz	1732.4 MHz	1752.6 MHz
RMC 12.2K	24.23	24.11	24.16

WCDMA Band V Maximum Average Power (dBm)			
Channel	4132	4182	4233
Frequency(MHz)	826.4 MHz	836.4 MHz	846.6 MHz
RMC 12.2K	24.45	24.34	24.39

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	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
6	RSS-132 Issue 3	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
7	RSS-133 Issue 6	2 GHz Personal Communications Services Aussi disponible
8	RSS-139 Issue 3	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
9	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
10	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

5.2 MAXIMUM ERP/EIRP

Test Requirement: FCC 47 CFR Part 2.1046(a),
FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),
FCC 47 CFR Part 27.50(d)(4)
RSS-132 Issue 3, Section 5.4,
RSS-133 Issue 6, Section 6.4,
RSS-139 Issue 3, Section 6.5

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..

RSS-132 Issue 3, Section 5.4,

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

RSS-133 Issue 6, Section 6.4

The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

RSS-139 Issue 3, Section 6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Test Procedure:

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

where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas}, typically dBW or dBm);

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

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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

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	ERP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
WCDMA Band V (824-849 MHz)	RMC 12.2kbps	24.16	0.00	7.0	22.01	0.158855	Pass
	HSUPA	23.09	0.00		20.94	0.124165	Pass
	HSDPA	23.11	0.00		20.96	0.124738	Pass

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	EIRP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
WCDMA Band II (1850-1910 MHz)	RMC 12.2kbps	24.30	0.00	2.0	24.30	0.269153	Pass
	HSUPA	23.22	0.00		23.22	0.209894	Pass
	HSDPA	22.88	0.00		22.88	0.194089	Pass
WCDMA Band IV (1710-1755 MHz)	RMC 12.2kbps	24.60	0.00	1.0	24.60	0.288403	Pass
	HSUPA	23.45	0.00		23.45	0.221309	Pass
	HSDPA	23.16	0.00		23.16	0.207014	Pass

5.3 CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 2.1046(a),
FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),
FCC 47 CFR Part 27.50(d)(4)
RSS-132 Issue 3, Section 5.4,
RSS-133 Issue 6, Section 6.4,
RSS-139 Issue 3, Section 6.5

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.

RSS-132 Issue 3, Section 5.4,

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

RSS-133 Issue 6, Section 6.4

The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

RSS-139 Issue 3, Section 6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Test Procedure:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA2000, 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

Test Data: The full result refer to section 4.5 for details.

5.4 PEAK-TO-AVERAGE RATIO

Test Requirement: FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),
FCC 47 CFR Part 27.50(d)(5)
RSS-132 Issue 3, Section 5.4,
RSS-133 Issue 6, Section 6.4,
RSS-139 Issue 3, Section 6.5

Test Method: KDB 971168 D01v03r01 Section 5.7

Limit: 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 EUT was connected to Spectrum Analyzer and Base Station via power divider. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Some regulatory requirements specify a PAPR limit when the output power limits are specified in terms of average power. If it becomes necessary to provide measurement data to demonstrate compliance to a PAPR limit, then the appropriate procedure from those provided in 5.2.3 shall be utilized to determine the peak power (or peak PSD) and the appropriate procedure from those provided in 5.2.4 shall be used to determine the average power (or average PSD). The data from these measurements is then used in Equation (2) to determine the PAPR of a narrowband CW-like signal. See 5.2.3.4 for guidance on determining the PAPR of a broadband noise-like signal.

$$\text{PAPR (dB)} = \text{PPk (dBm or dBW)} - \text{PAvg (dBm or dBW)}$$

where:

PAPR peak-to-average power ratio, in dB;

PPk measured peak power or peak PSD level, in dBm or dBW;

PAvg measured average power or average PSD level, in dBm or dBW.

OR

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

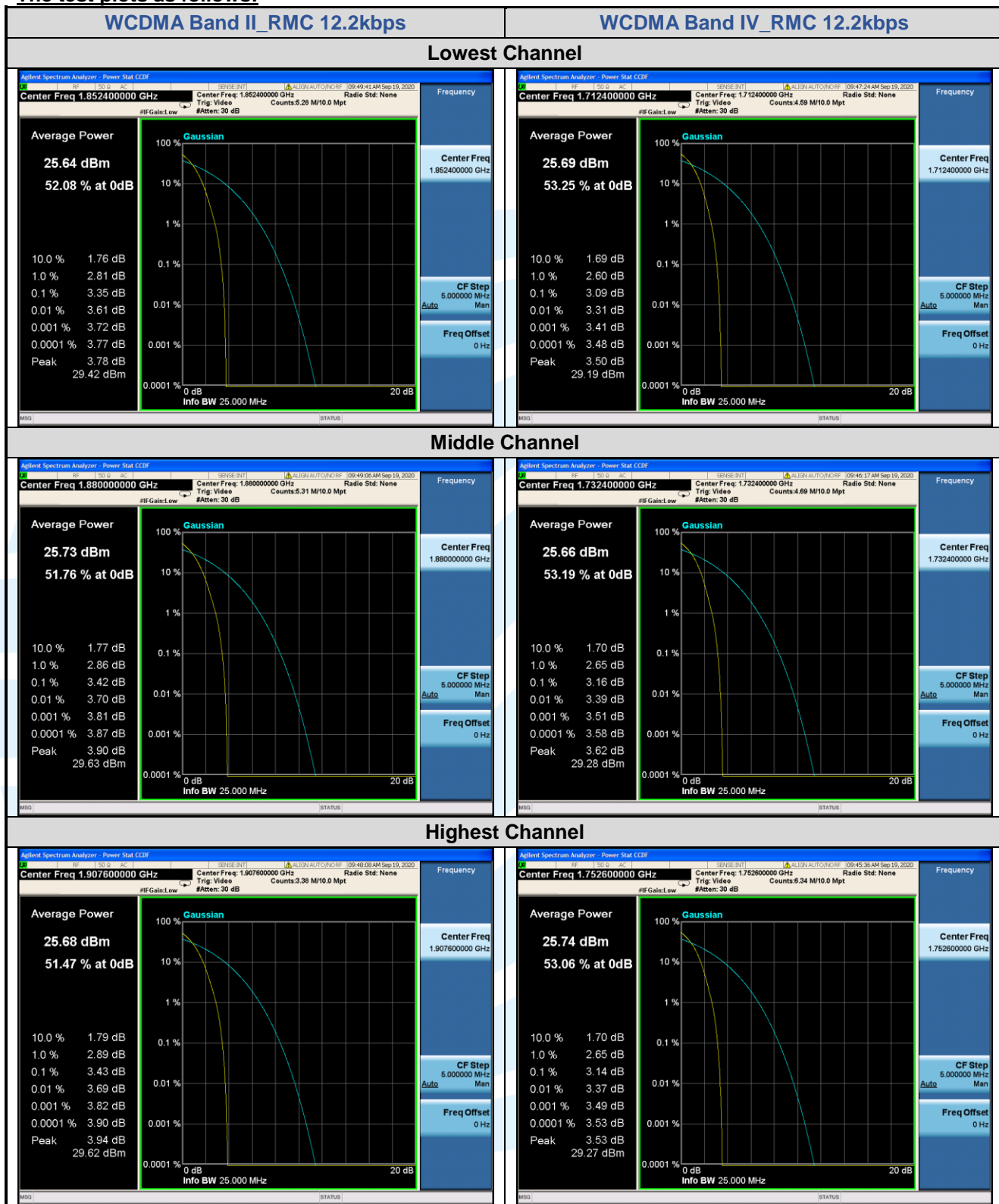
Test Mode: Link mode

Test Results: Pass

Test Data: See table below

Bands	Modulation	Peak-to-average ratio (dB)			Limit (dB)	Result
		Lowest	Middle	Highest		
WCDMA Band II	RMC 12.2kbps	3.35	3.42	3.43	13	Pass
WCDMA Band IV	RMC 12.2kbps	3.09	3.16	3.14	13	Pass
WCDMA Band V	RMC 12.2kbps	3.13	2.85	2.74	13	Pass

The test plots as follows:



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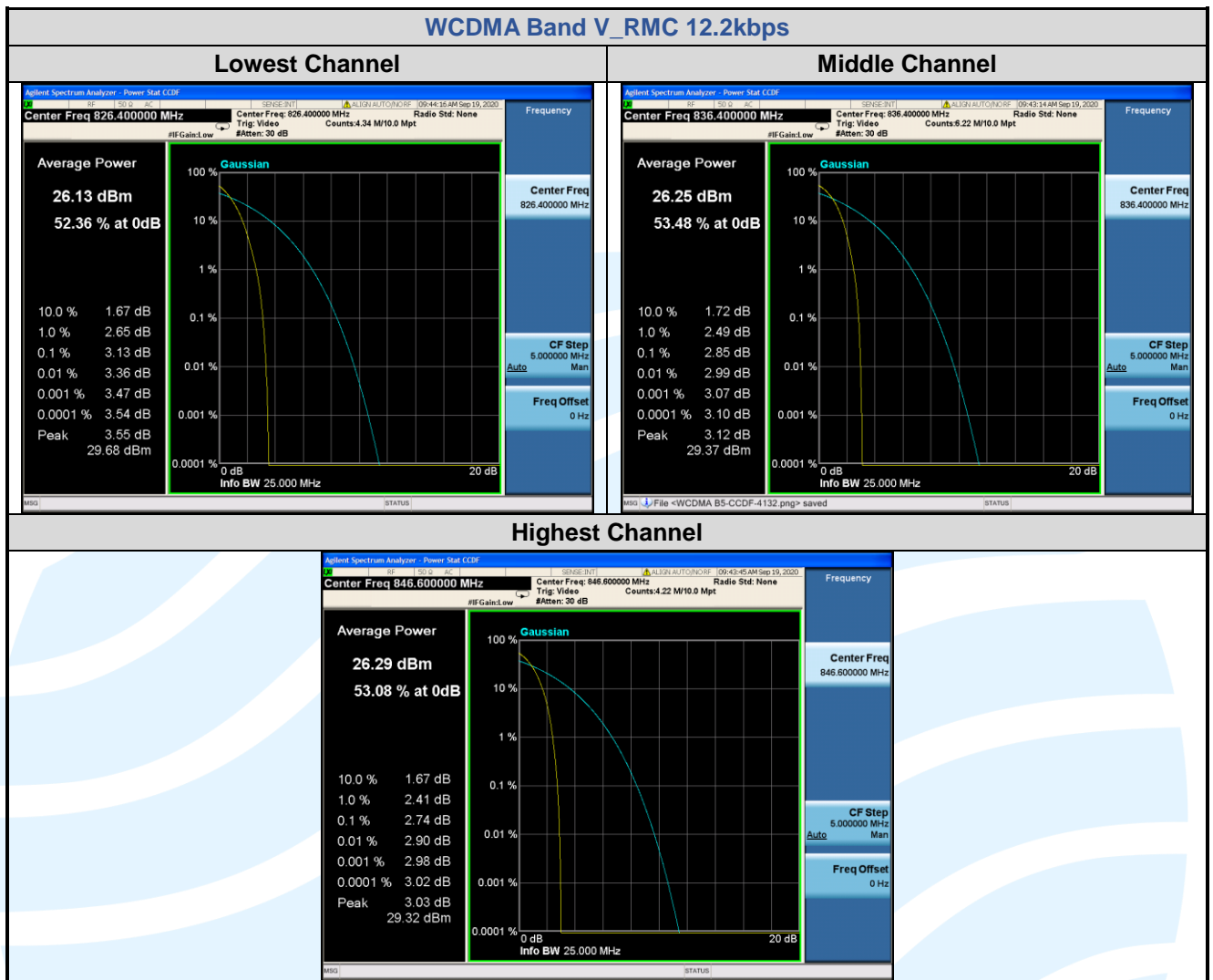
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5.5 99%&26DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 2.1049(h),
FCC 47 CFR Part 22.917(b),
FCC 47 CFR Part 24.238(b),
FCC 47 CFR Part 27.53(h)
RSS-Gen Issue 5, Section 6.7

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

Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (kHz)	99% BW (kHz)
WCDMA Band II	RMC 12.2kbps	9262	1852.4	4.713	4.1354
		9400	1880.0	4.716	4.1321
		9538	1907.6	4.718	4.1332
WCDMA Band IV	RMC 12.2kbps	1312	1712.4	4.734	4.1439
		1412	1732.4	4.726	4.1273
		1513	1752.6	4.723	4.1411
WCDMA Band V	RMC 12.2kbps	4132	826.4	4.724	4.1361
		4182	836.4	4.721	4.1319
		4233	846.6	4.718	4.1532

The test plots as follows:



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5.6 BAND EDGE AT ANTENNA TERMINALS

Test Requirement: FCC 47 CFR Part 2.1051,
FCC 47 CFR Part 22.917(a),
FCC 47 CFR Part 24.238(a),
FCC 47 CFR Part 27.53(h)(1)
RSS-132 Issue 3, Section 5.5,
RSS-133 Issue 6, Section 6.5,
RSS-139 Issue 3, Section 6.6

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

Limit:

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

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.

RSS-132 Issue 3, Section 5.5,

In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS-133 Issue 6, Section 6.5,

In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS-139 Issue 3, Section 6.6,

In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) 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.

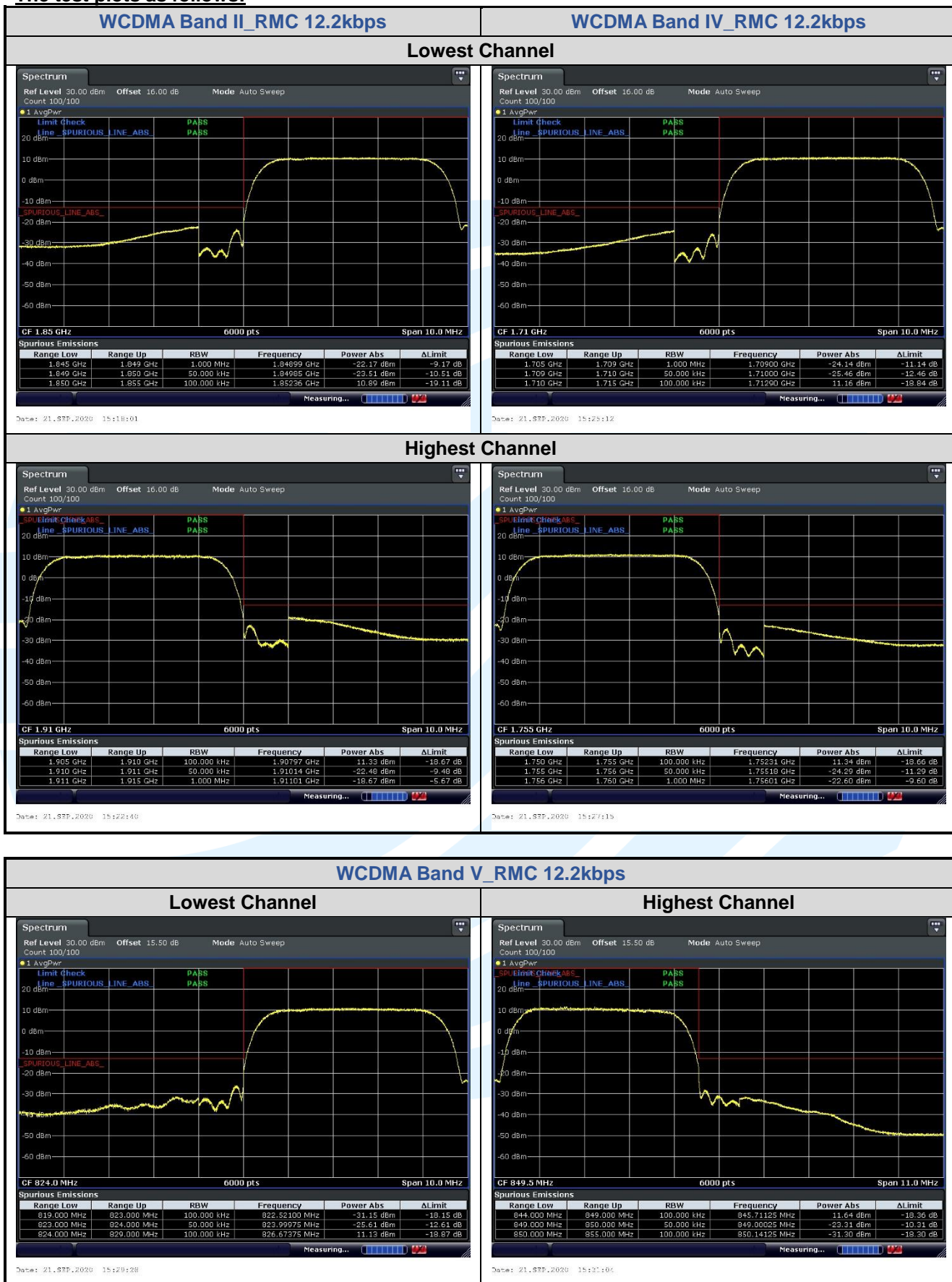
Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

The test plots as follows:



5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: FCC 47 CFR Part 2.1051,
FCC 47 CFR Part 22.917(a)(b),
FCC 47 CFR Part 24.238(a)(b),
FCC 47 CFR Part 27.53(h)(1)
RSS-132 Issue 3, Section 5.5,
RSS-133 Issue 6, Section 6.5,
RSS-139 Issue 3, Section 6.6

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

Limit:

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

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.

RSS-132 Issue 3, Section 5.5, RSS-133 Issue 6, Section 6.6, RSS-139 Issue 3, Section 6.5,

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.

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.

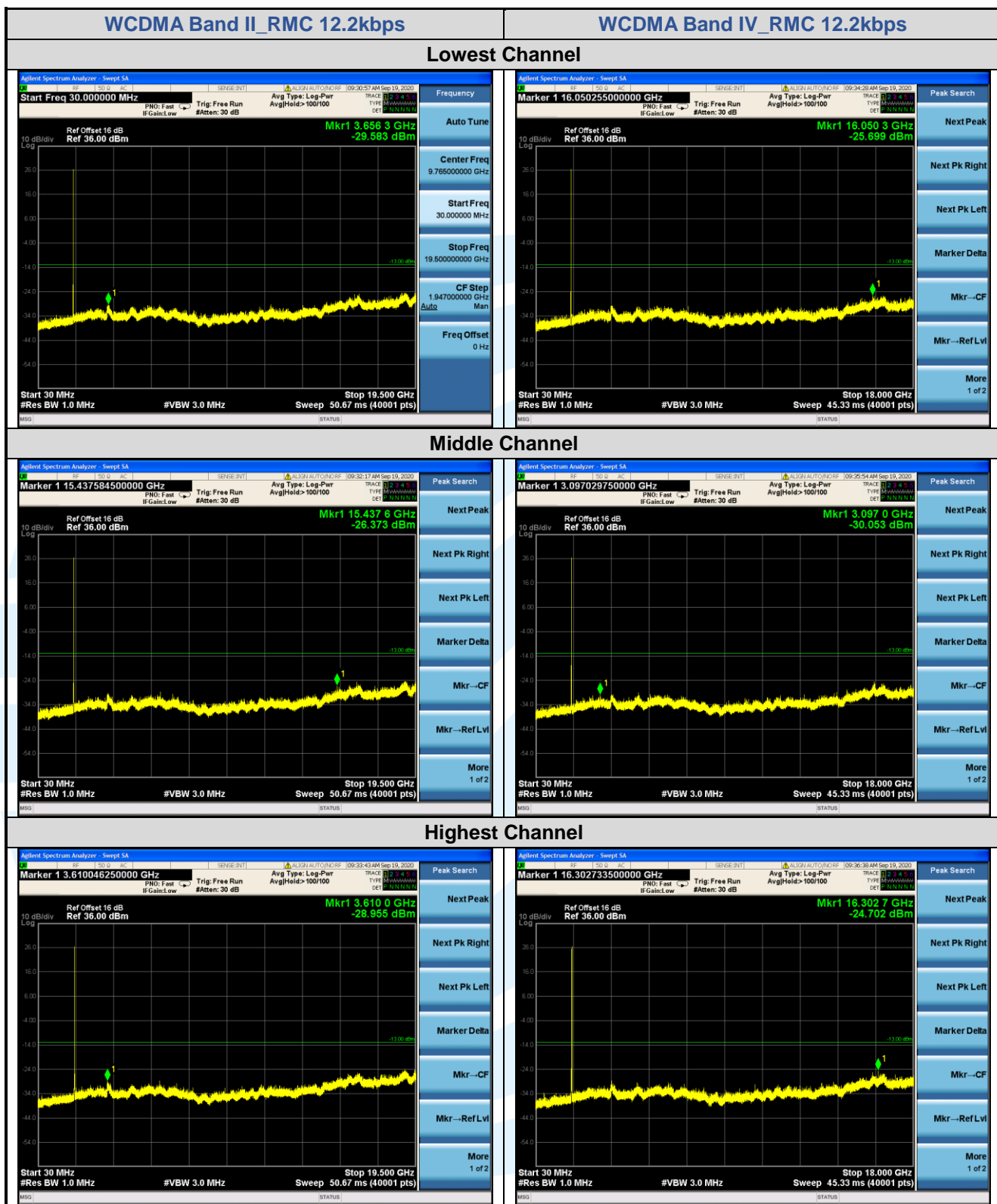
Test Setup: Refer to section 4.2.2 for details.

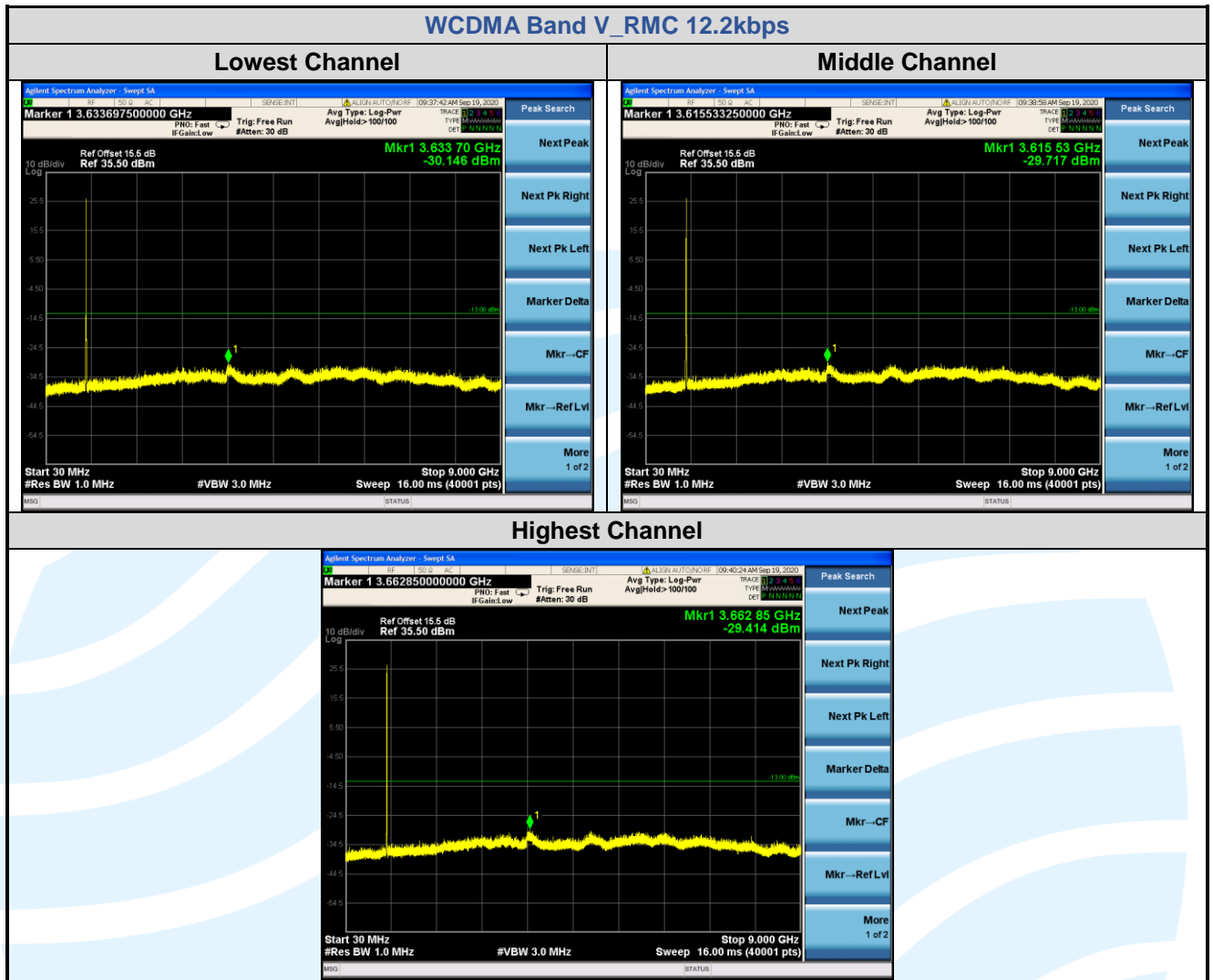
Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

The test plots as follows:





5.8 FIELD STRENGTH OF SPURIOUS RADIATION

Test Requirement: FCC 47 CFR Part 2.1053,
FCC 47 CFR Part 22.917(a)(b),
FCC 47 CFR Part 24.238(a)(b),
FCC 47 CFR Part 27.53(h)(1)
RSS-132 Issue 3, Section 5.5,
RSS-133 Issue 6, Section 6.5,
RSS-139 Issue 3, Section 6.6

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 7

Limits:

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

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.

RSS-132 Issue 3, Section 5.5, RSS-133 Issue 6, Section 6.6, RSS-139 Issue 3, Section 6.5,

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.

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:

WCDMA Band II_ Below 1G							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
RMC 12.2kbps_ Lowest Channel							
1	34.045	-91.78	24.51	-67.27	-13.00	-54.27	Horizontal
2	228.617	-89.86	24.27	-65.59	-13.00	-52.59	Horizontal
3	972.283	-87.50	38.97	-48.53	-13.00	-35.53	Horizontal
4	53.379	-58.15	-11.09	-69.24	-13.00	-56.24	Vertical
5	126.693	-61.20	-7.85	-69.05	-13.00	-56.05	Vertical
6	776.485	-67.04	7.07	-59.97	-13.00	-46.97	Vertical
RMC 12.2kbps_ Middle Channel							
1	32.184	-90.44	25.63	-64.81	-13.00	-51.81	Horizontal
2	246.990	-90.05	25.08	-64.97	-13.00	-51.97	Horizontal
3	972.283	-87.33	38.97	-48.36	-13.00	-35.36	Horizontal
4	30.855	-92.43	26.97	-65.46	-13.00	-52.46	Vertical
5	535.038	-87.83	33.10	-54.73	-13.00	-41.73	Vertical
6	965.474	-87.85	38.91	-48.94	-13.00	-35.94	Vertical
RMC 12.2kbps_ Highest Channel							
1	53.756	-65.33	-5.81	-71.14	-13.00	-58.14	Horizontal
2	127.586	-67.88	-2.25	-70.13	-13.00	-57.13	Horizontal
3	809.924	-75.41	13.70	-61.71	-13.00	-48.71	Horizontal
4	32.184	-91.65	26.08	-65.57	-13.00	-52.57	Vertical
5	376.523	-88.26	29.11	-59.15	-13.00	-46.15	Vertical
6	986.044	-87.12	39.05	-48.07	-13.00	-35.07	Vertical

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WCDMA Band II _ Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	3704.800	-60.51	6.79	-53.72	-13.00	-40.72	Horizontal
2	5557.200	-61.97	10.87	-51.10	-13.00	-38.10	Horizontal
3	3704.800	-61.71	6.77	-54.94	-13.00	-41.94	Vertical
4	5557.200	-63.10	11.36	-51.74	-13.00	-38.74	Vertical
RMC 12.2kbps_ Middle Channel							
1	3760.000	-60.43	6.93	-53.50	-13.00	-40.50	Horizontal
2	5640.000	-63.02	10.84	-52.18	-13.00	-39.18	Horizontal
3	3760.000	-60.14	6.93	-53.21	-13.00	-40.21	Vertical
4	5640.000	-62.58	11.32	-51.26	-13.00	-38.26	Vertical
RMC 12.2kbps_ Highest Channel							
1	3815.200	-61.76	7.07	-54.69	-13.00	-41.69	Horizontal
2	5722.800	-62.89	10.83	-52.06	-13.00	-39.06	Horizontal
3	3815.200	-61.93	7.10	-54.83	-13.00	-41.83	Vertical
4	5722.800	-61.62	11.28	-50.34	-13.00	-37.34	Vertical

WCDMA Band IV_ Below 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	32.184	-91.41	25.63	-65.78	-13.00	-52.78	Horizontal
2	292.364	-88.83	26.10	-62.73	-13.00	-49.73	Horizontal
3	938.714	-86.99	38.69	-48.30	-13.00	-35.30	Horizontal
4	31.959	-91.44	26.23	-65.21	-13.00	-52.21	Vertical
5	210.129	-89.73	23.10	-66.63	-13.00	-53.63	Vertical
6	958.714	-87.53	39.01	-48.52	-13.00	-35.52	Vertical
RMC 12.2kbps_ Middle Channel							
1	32.184	-92.06	25.63	-66.43	-13.00	-53.43	Horizontal
2	284.261	-89.92	25.97	-63.95	-13.00	-50.95	Horizontal
3	972.283	-87.86	38.97	-48.89	-13.00	-35.89	Horizontal
4	37.830	-90.92	22.28	-68.64	-13.00	-55.64	Vertical
5	379.178	-89.45	29.20	-60.25	-13.00	-47.25	Vertical
6	809.924	-87.65	37.27	-50.38	-13.00	-37.38	Vertical
RMC 12.2kbps_ Highest Channel							
1	30.639	-92.42	26.56	-65.86	-13.00	-52.86	Horizontal
2	231.853	-89.24	24.41	-64.83	-13.00	-51.83	Horizontal
3	952.000	-87.22	38.94	-48.28	-13.00	-35.28	Horizontal
4	30.855	-91.01	26.97	-64.04	-13.00	-51.04	Vertical
5	223.848	-89.16	23.76	-65.40	-13.00	-52.40	Vertical
6	958.714	-87.08	39.01	-48.07	-13.00	-35.07	Vertical

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WCDMA Band IV_ Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	3424.800	-61.38	5.88	-55.50	-13.00	-42.50	Horizontal
2	5137.200	-62.46	9.09	-53.37	-13.00	-40.37	Horizontal
3	3424.800	-60.96	5.67	-55.29	-13.00	-42.29	Vertical
4	5137.200	-62.42	9.44	-52.98	-13.00	-39.98	Vertical
RMC 12.2kbps_ Middle Channel							
1	3464.800	-61.59	6.02	-55.57	-13.00	-42.57	Horizontal
2	5197.200	-62.82	9.30	-53.52	-13.00	-40.52	Horizontal
3	3464.800	-61.95	5.87	-56.08	-13.00	-43.08	Vertical
4	5197.200	-62.57	9.68	-52.89	-13.00	-39.89	Vertical
RMC 12.2kbps_ Highest Channel							
1	3505.200	-60.66	6.16	-54.50	-13.00	-41.50	Horizontal
2	5257.800	-62.19	9.62	-52.57	-13.00	-39.57	Horizontal
3	3505.200	-61.70	6.07	-55.63	-13.00	-42.63	Vertical
4	5257.800	-62.17	10.02	-52.15	-13.00	-39.15	Vertical

WCDMA Band V _Below 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	30.855	-87.58	26.43	-61.15	-13.00	-48.15	Horizontal
2	286.265	-84.30	26.00	-58.30	-13.00	-45.30	Horizontal
3	527.571	-83.54	33.40	-50.14	-13.00	-37.14	Horizontal
4	31.073	-85.21	26.83	-58.38	-13.00	-45.38	Vertical
5	200.043	-82.89	22.61	-60.28	-13.00	-47.28	Vertical
6	952.000	-81.42	39.11	-42.31	-13.00	-29.31	Vertical
RMC 12.2kbps_ Middle Channel							
1	31.292	-84.51	26.17	-58.34	-13.00	-45.34	Horizontal
2	373.886	-82.83	28.13	-54.70	-13.00	-41.70	Horizontal
3	965.474	-81.25	38.96	-42.29	-13.00	-29.29	Horizontal
4	31.292	-84.51	26.68	-57.83	-13.00	-44.83	Vertical
5	288.284	-83.17	25.85	-57.32	-13.00	-44.32	Vertical
6	965.474	-81.25	38.91	-42.34	-13.00	-29.34	Vertical
RMC 12.2kbps_ Highest Channel							
1	34.285	-84.81	24.37	-60.44	-13.00	-47.44	Horizontal
2	535.038	-82.98	33.34	-49.64	-13.00	-36.64	Horizontal
3	958.714	-81.45	38.95	-42.50	-13.00	-29.50	Horizontal
4	30.425	-86.78	27.27	-59.51	-13.00	-46.51	Vertical
5	70.210	-82.72	17.69	-65.03	-13.00	-52.03	Vertical
6	938.714	-81.25	38.89	-42.36	-13.00	-29.36	Vertical

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WCDMA Band V _Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	1652.800	-60.55	0.07	-60.48	-13.00	-47.48	Horizontal
2	2479.200	-60.24	2.74	-57.50	-13.00	-44.50	Horizontal
3	1652.800	-60.94	-0.71	-61.65	-13.00	-48.65	Vertical
4	2479.200	-61.99	2.34	-59.65	-13.00	-46.65	Vertical
RMC 12.2kbps_ Middle Channel							
1	3464.800	-61.59	6.02	-55.57	-13.00	-42.57	Horizontal
2	5197.200	-62.82	9.30	-53.52	-13.00	-40.52	Horizontal
3	3464.800	-61.95	5.87	-56.08	-13.00	-43.08	Vertical
4	5197.200	-62.57	9.68	-52.89	-13.00	-39.89	Vertical
RMC 12.2kbps_ Highest Channel							
1	3505.200	-60.66	6.16	-54.50	-13.00	-41.50	Horizontal
2	5257.800	-62.19	9.62	-52.57	-13.00	-39.57	Horizontal
3	3505.200	-61.70	6.07	-55.63	-13.00	-42.63	Vertical
4	5257.800	-62.17	10.02	-52.15	-13.00	-39.15	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
RSS-132 Issue 3, Section 5.3,
RSS-133 Issue 6, Section 6.3,
RSS-139 Issue 3, Section 6.4

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

Limits:

FCC 47 CFR Part 22.355,

The carrier frequency shall not depart from the reference frequency in excess of ± 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.

RSS-132 Issue 3, Section 5.3,

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ± 1.5 ppm for base stations

RSS-133 Issue 6, Section 6.3,

The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

RSS-139 Issue 3, Section 6.4,

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test Setup: Refer to section 4.2.2 for details.

Test Procedures:

- 1) Use CMW 500 with Frequency Error measurement capability.
 - a) Temp. = -30° to $+50^{\circ}\text{C}$
 - b) Voltage = low voltage, 3.2 Vdc, Normal, 3.8 Vdc and High voltage, 4.55 Vdc.

2) Frequency Stability vs Temperature:

The EUT is placed 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 $+50^{\circ}\text{C}$ 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 (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band II							
RMC 12.2kbps	9400 / 1880.0	VL	TN	-13	-0.0069	N/A	Pass
		VN		-19	-0.0101		Pass
		VH		-19	-0.0101		Pass
		VN	50	-17	-0.0090		Pass
			40	-16	-0.0085		Pass
			30	-17	-0.0090		Pass
			20	-15	-0.0080		Pass
			10	-18	-0.0096		Pass
			0	-10	-0.0053		Pass
			-10	-16	-0.0085		Pass
			-20	-15	-0.0080		Pass
			-30	-18	-0.0096		Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band IV							
RMC 12.2kbps	1412 / 1732.4	VL	TN	-12	-0.0069	N/A	Pass
		VN		-13	-0.0075		Pass
		VH		-16	-0.0092		Pass
		VN	50	-13	-0.0075		Pass
			40	-18	-0.0104		Pass
			30	-13	-0.0075		Pass
			20	-15	-0.0087		Pass
			10	-10	-0.0058		Pass
			0	-16	-0.0092		Pass
			-10	-16	-0.0092		Pass
			-20	-14	-0.0081		Pass
			-30	-19	-0.0110		Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band V							
RMC 12.2kbps	4182 / 836.4	VL	TN	-16.00	-0.0191	± 2.5	Pass
		VN		-10	-0.0120	± 2.5	Pass
		VH		-8	-0.0096	± 2.5	Pass
		VN	50	-10	-0.0120	± 2.5	Pass
			40	-2	-0.0024	± 2.5	Pass
			30	-6	-0.0072	± 2.5	Pass
			20	-12	-0.0143	± 2.5	Pass
			10	-13	-0.0155	± 2.5	Pass
			0	-11	-0.0132	± 2.5	Pass
			-10	-10	-0.0120	± 2.5	Pass
			-20	-9	-0.0108	± 2.5	Pass
			-30	-12	-0.0143	± 2.5	Pass

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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 ***

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.
