

TEST REPORT

Product Name: Vitals360 Multi-vitals Mobile Monitor
Trade Mark: Vitals360
Model No. / HVIN: VC-001
Add. Model No. / HVIN: N/A
Report Number: 190518003RFM-1
Test Standards: FCC 47 CFR Part 22 Subpart H,
 FCC 47 CFR Part 24 Subpart E,
 FCC 47 CFR Part 27 Subpart L,
FCC ID: 2AUBA-VC19VTLS09081
Test Result: PASS
Date of Issue: August 28, 2019

Prepared for:

VoCare Inc
4950 Turkey Foot Road, Zionsville Indiana 46077, USA

Prepared by:

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Date: August 28, 2019

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Version

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V1.0	August 28, 2019	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	VoCare Inc
Address of Applicant:	4950 Turkey Foot Road, Zionsville Indiana 46077, USA
Manufacturer:	Linktop Technology Co.Lt
Address of Manufacturer:	North 5F, Huoju Plaza, No.56-58, Huoju Road, Huli district, Xiamen city, Fujian province, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Vitals360 Multi-vitals Mobile Monitor		
Model No. / HVIN:	VC-001		
Add. Model No. / HVIN:	N/A		
Trade Mark:	Vitals360		
DUT Stage:	Identical Prototype		
EUT Supports Function:	GSM Bands:	Not support	
	UTRA Bands:	Band II/ Band IV/ Band V	
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 12/ Band 13/ Band 17	
	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth V4.0	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n
5 725 MHz to 5 850 MHz		IEEE 802.11a/n	
RNSS Bands:	1559 MHz to 1610 MHz	GPS/GLONASS/Beidou	
Sample Received Date:	July 23, 2019		
Sample Tested Date:	July 25, 2019 to August 16, 2019		

1.2.2 Description of Accessories

Adapter	
Model No.:	LXCP12-005200XFG
Input:	100-240 V~50/60 Hz 0.5 A Max
Output:	5.0 V $\overline{=}$ 2 A
AC Cable:	N/A
DC Cable:	N/A

Battery	
Model No.:	E103737
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Rated Capacity:	1500 mAh

Cable (1)	
Description:	USB Changing Cable
Cable Type:	Shielded without ferrite
Length:	1.0 Meter

Cable (2)	
Description:	USB Changing Cable
Cable Type:	Shielded without ferrite
Length:	0.8 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	WCDMA, HSDPA, HSUPA, DC-HSDPA	
Type of Modulation:	WCDMA	BPSK
	HSDPA	QPSK
	HSUPA:	QPSK
	DC-HSDPA:	16QAM
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:	25.55dBm
	WCDMA Band IV:	25.72dBm
	WCDMA Band V:	22.70dBm
Emission Designator:	WCDMA Band II:	4M18F9W
	WCDMA Band IV:	4M17F9W
	WCDMA Band V:	4M15F9W
Antenna Type:	Integral Antenna	
Antenna Gain:	WCDMA Band II:	2 dBi
	WCDMA Band IV:	2 dBi
	WCDMA Band V:	-1 dBi
GPRS/EDGE Class:	Class 3	
Normal Test Voltage:	3.7 Vdc	
Extreme Test Voltage:	3.5 to 4.25Vdc	
Extreme Test Temperature:	-20 °C to +50 °C	

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
--	--	--	--	--

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.3 Meter	Applicant

1.5 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109

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/EN 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: 2005 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.

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	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 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)	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)	ANSI C63.26-2015 & 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 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)	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 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)	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

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, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
<input type="checkbox"/>	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 18, 2019	May 18, 2020
<input type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2018	Nov. 24, 2019
<input type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 18, 2019	May 18, 2020
<input type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jun. 23, 2019	Jun. 23, 2020
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 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: 9.160333		

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, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY57471561	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	119583	Jun. 07, 2019	Jun. 07, 2020
<input type="checkbox"/>	Universal Radio Communication Tester	R&S	CMU200	114713	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 18, 2018	Sep. 18, 2019
<input checked="" type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Jun. 05, 2018	Jun. 05, 2020

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

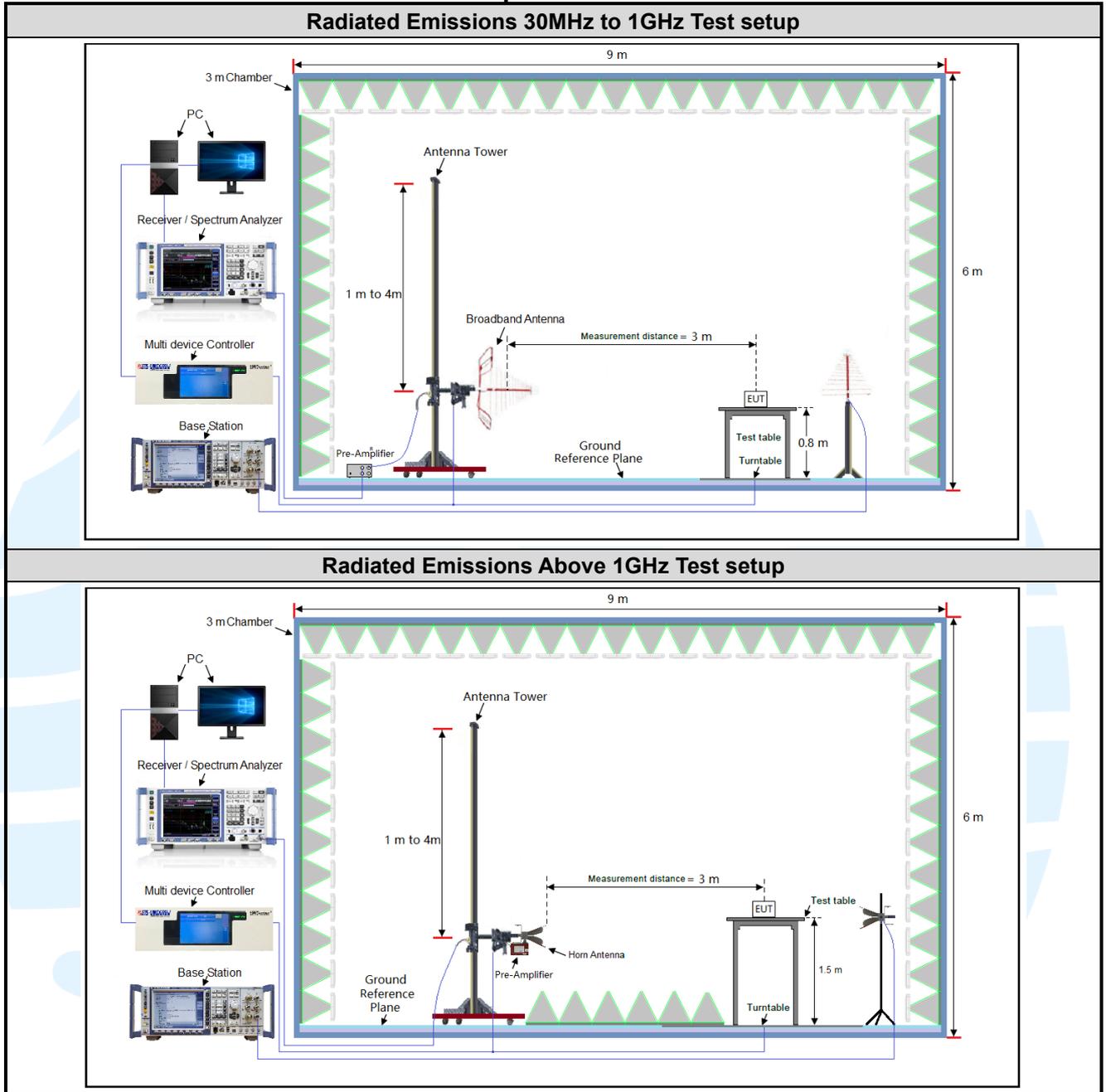
Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.7	20 to 75
TL/VL	-20	3.5	20 to 75
TH/VL	+50	3.5	20 to 75
TL/VH	-20	4.25	20 to 75
TH/VH	+50	4.25	20 to 75

Remark:

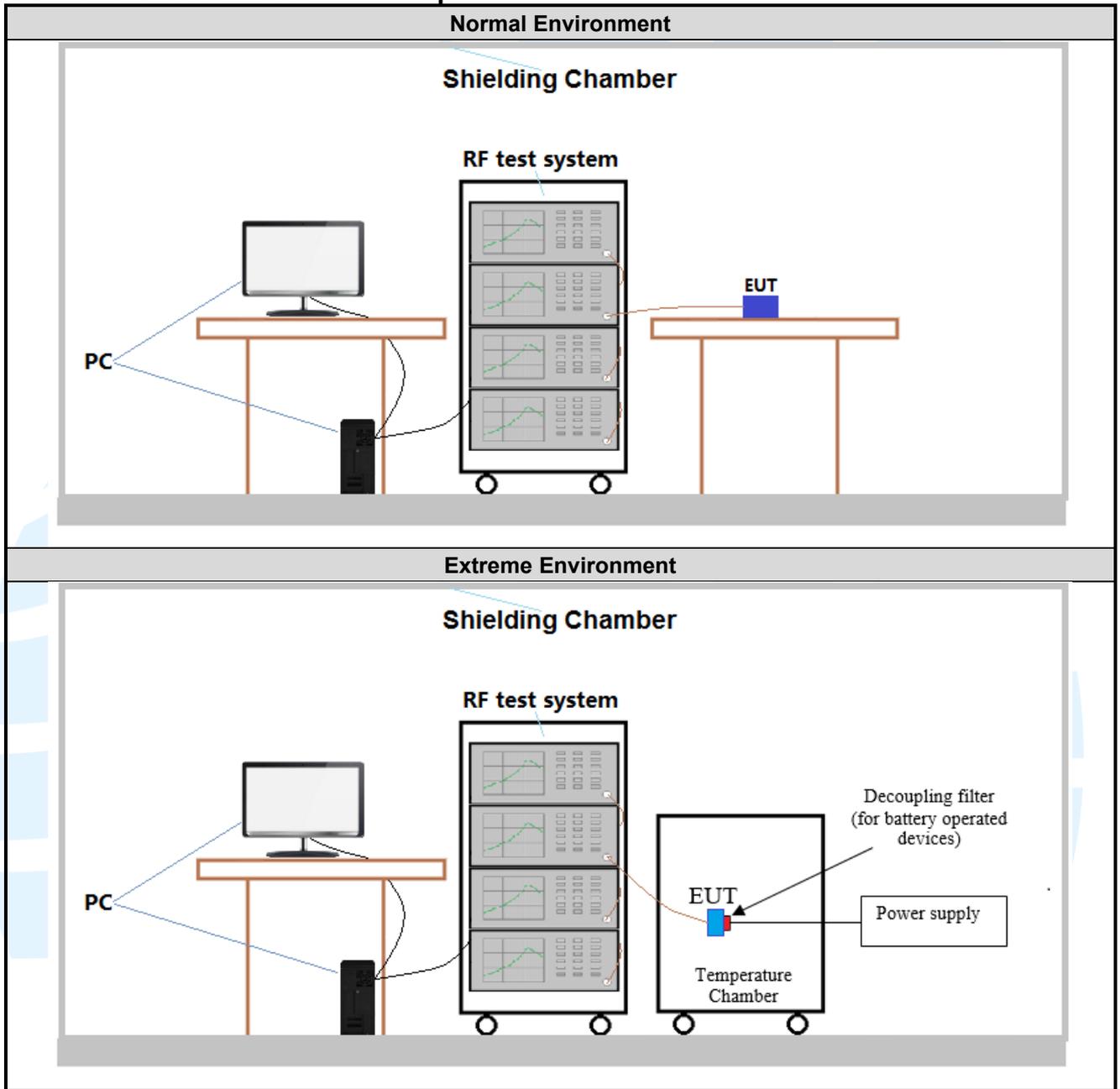
- 1) The EUT just work in such extreme temperature of -20 °C to +50 °C and the extreme voltage of 3.5 V to 4.25 V, so here the EUT is tested in the temperature of -20 °C to +50 °C and the voltage of 3.5 V to 4.25 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;
 TL: Low Extreme Test Temperature; TH: 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. It was powered by a 3.7V 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.

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	X axis
WCDMA Band IV	1TX	Chain 0	X axis
WCDMA Band V	1TX	Chain 0	X 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:

SIM 1 Card Conducted transmitter power measurement result.

WCDMA Band II Maximum Average Power (dBm)			
Channel	9262	9400	9538
Frequency (MHz)	1852.4 MHz	1880.0 MHz	1907.6 MHz
RMC 12.2kbps	23.49	23.54	23.55
HSDPA Subtest-1	22.39	22.37	22.50
HSDPA Subtest-2	22.43	22.41	22.47
HSDPA Subtest-3	21.90	21.92	21.94
HSDPA Subtest-4	21.96	21.94	21.93
HSUPA Subtest-1	22.38	22.19	22.30
HSUPA Subtest-2	22.29	22.22	22.38
HSUPA Subtest-3	21.88	21.85	21.79
HSUPA Subtest-4	21.84	21.77	21.84
HSUPA Subtest-5	22.16	22.20	22.45
DC-HSDPA Subtest-1	21.25	21.44	21.33
DC-HSDPA Subtest-2	21.20	21.25	21.20
DC-HSDPA Subtest-3	21.62	21.66	21.68
DC-HSDPA Subtest-4	22.00	21.99	22.04

WCDMA Band IV Maximum Average Power (dBm)			
Channel	1312	1412	1513
Frequency (MHz)	1712.4 MHz	1732.4 MHz	1752.6 MHz
RMC 12.2kbps	23.72	23.47	23.48
HSDPA Subtest-1	22.65	22.38	22.51
HSDPA Subtest-2	22.67	22.36	22.49
HSDPA Subtest-3	22.14	22.16	22.14
HSDPA Subtest-4	22.13	22.14	22.17
HSUPA Subtest-1	22.53	22.27	22.44
HSUPA Subtest-2	22.66	22.28	22.40
HSUPA Subtest-3	22.04	21.96	22.03
HSUPA Subtest-4	21.97	22.14	22.03
HSUPA Subtest-5	22.06	22.35	21.68
DC-HSDPA Subtest-1	21.30	21.32	21.09
DC-HSDPA Subtest-2	21.63	21.66	21.64
DC-HSDPA Subtest-3	21.51	21.53	21.54
DC-HSDPA Subtest-4	22.25	21.94	21.97

WCDMA Band V Maximum Average Power (dBm)			
Channel	4132	4182	4233
Frequency (MHz)	826.4 MHz	836.4 MHz	846.6 MHz
RMC 12.2kbps	23.64	23.69	23.70
HSDPA Subtest-1	22.69	22.55	22.73
HSDPA Subtest-2	22.62	22.51	22.70
HSDPA Subtest-3	22.18	22.13	22.25
HSDPA Subtest-4	22.05	22.07	22.16
HSUPA Subtest-1	22.64	22.36	22.58
HSUPA Subtest-2	22.47	22.50	22.70
HSUPA Subtest-3	22.05	22.05	22.24
HSUPA Subtest-4	21.91	21.87	21.99
HSUPA Subtest-5	22.33	22.38	22.13
DC-HSDPA Subtest-1	21.68	21.65	21.64
DC-HSDPA Subtest-2	21.64	21.74	21.73
DC-HSDPA Subtest-3	22.17	22.14	22.19
DC-HSDPA Subtest-4	22.24	22.09	22.27

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

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 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)

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.

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_{Meas}, typically dBW or dBm);

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

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

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

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	FCC Limit	RSS Limit	ERP		Result
		(dBm)	(dBi)	(W)	(W)	(dBm)	(W)	
WCDMA Band V (824-849 MHz)	RMC 12.2kbps	23.70	-1.00	7.0	11.5	22.70	0.186209	Pass
	HSUPA	22.70	-1.00			21.70	0.147911	Pass
	HSDPA	22.73	-1.00			21.73	0.148936	Pass
	DC-HSDPA	22.70	-1.00					Pass

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	FCC Limit	RSS Limit	EIRP		Result
		(dBm)	(dBi)	(W)	(W)	(dBm)	(W)	
WCDMA Band II (1850-1910 MHz)	RMC 12.2kbps	23.55	2.00	2.0	2.0	25.55	0.358922	Pass
	HSUPA	22.38	2.00			24.38	0.274157	Pass
	HSDPA	22.50	2.00			24.50	0.281838	Pass
	DC-HSDPA	22.04	2.00			24.04	0.253513	Pass
WCDMA Band IV (1710-1755 MHz)	RMC 12.2kbps	23.72	2.00	1.0	1.0	25.72	0.373250	Pass
	HSUPA	22.66	2.00			24.66	0.292415	Pass
	HSDPA	22.67	2.00			24.67	0.293089	Pass
	DC-HSDPA	21.66	2.00			23.66	0.232274	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),

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.

Test Procedure:

The EUT was set up for the maximum power with WCDMA , 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),

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 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

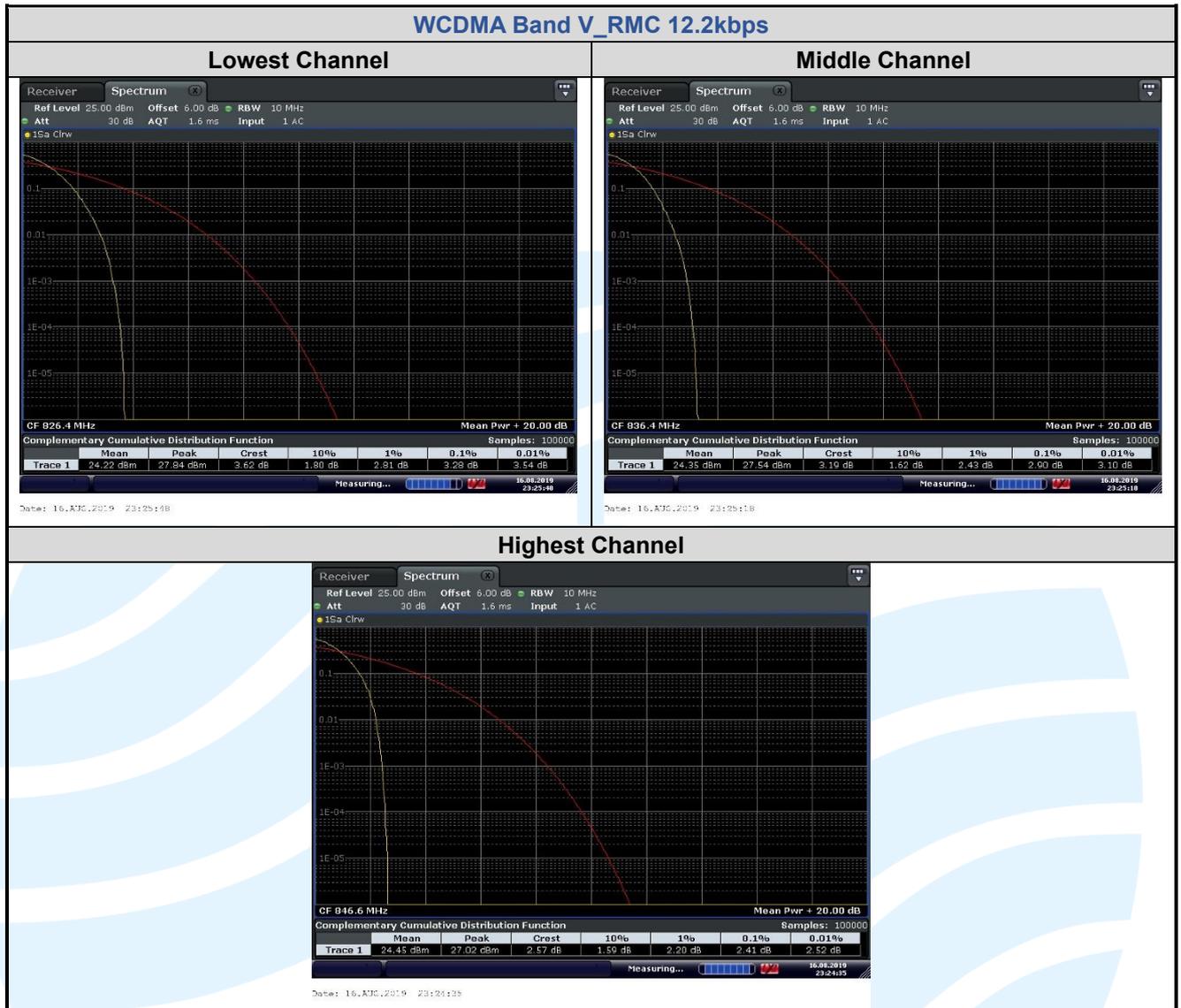
Test Results: Pass

Test Data: See table below

Bands	Modulation	Peak-to-average ratio (dB)			Limit (dBm)	Result
		Lowest	Middle	Highest		
WCDMA Band II	RMC 12.2kbps	2.20	3.22	2.93	13	Pass
WCDMA Band IV	RMC 12.2kbps	2.52	2.93	2.87	13	Pass
WCDMA Band V	RMC 12.2kbps	3.28	2.90	2.41	13	Pass

The test plots as follows:





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)

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

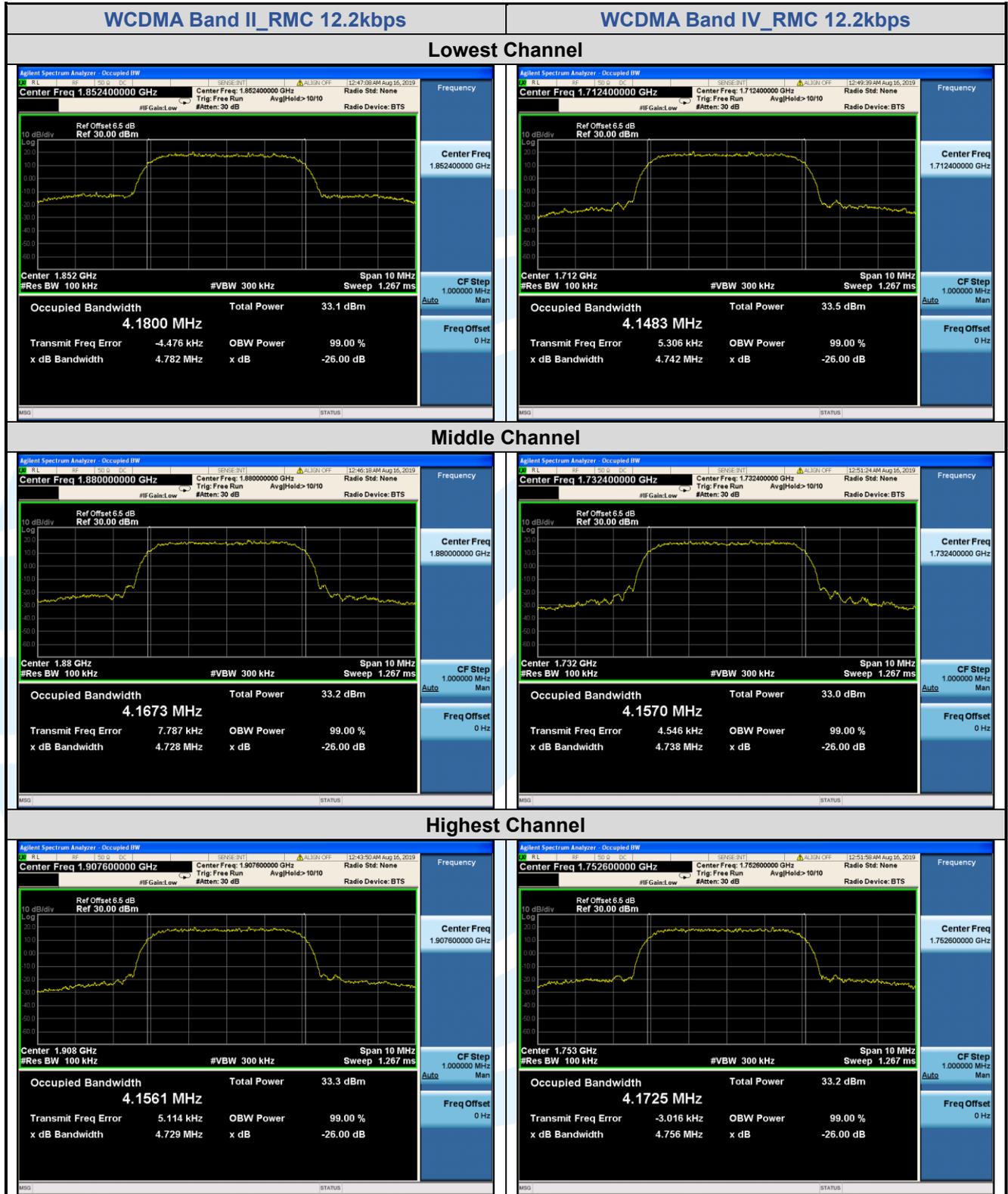
Test Mode: Link mode

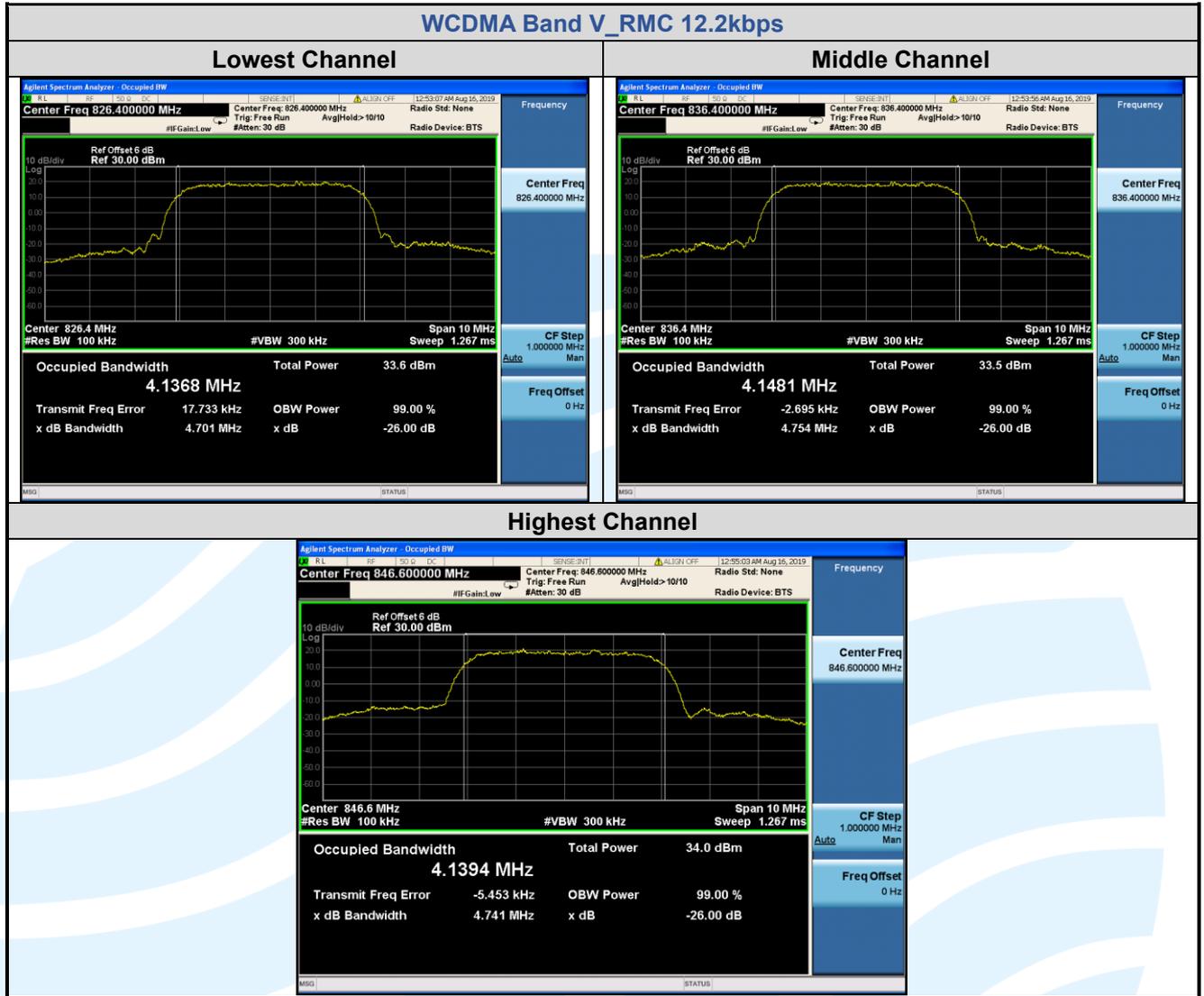
Test Results: Pass

Test Data: See table below

Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
WCDMA Band II	RMC 12.2kbps	9262	1852.4	4.78	4.18
		9400	1880.0	4.73	4.17
		9538	1907.6	4.73	4.16
WCDMA Band IV	RMC 12.2kbps	1312	1712.4	4.74	4.15
		1412	1732.4	4.74	4.16
		1513	1752.6	4.76	4.17
WCDMA Band V	RMC 12.2kbps	4132	826.4	4.70	4.14
		4182	836.4	4.75	4.15
		4233	846.6	4.74	4.14

The test plots as follows:





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),

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.

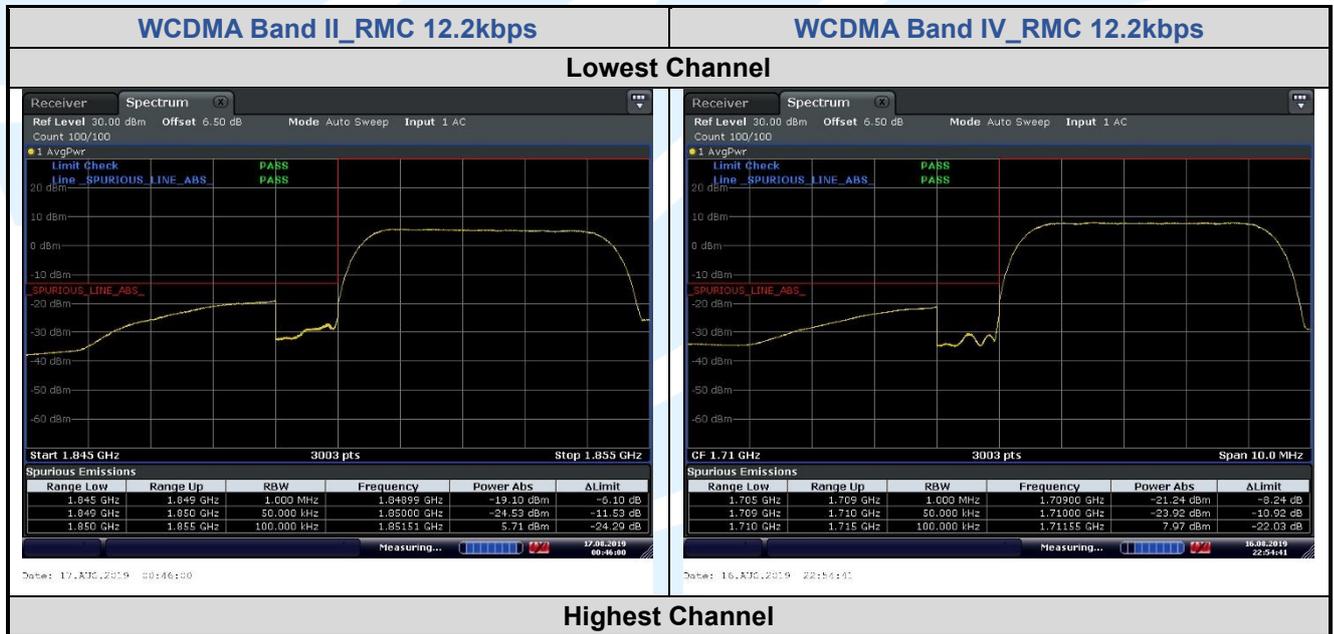
Test Procedure:
 The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

- 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:





WCDMA Band V_RMC 12.2kbps

Lowest Channel



Highest Channel



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),

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.

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.

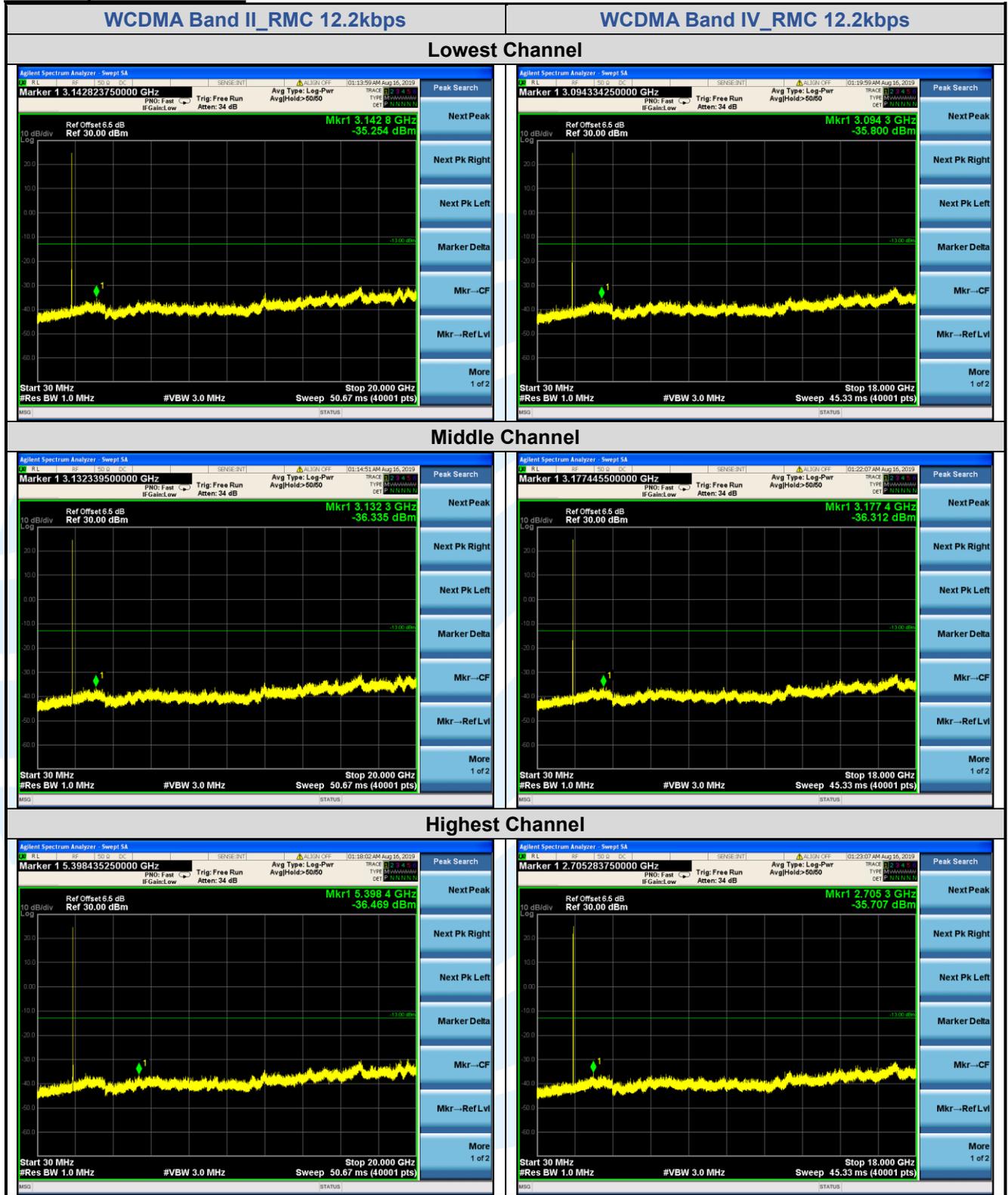
Test Setup: Refer to section 4.2.2 for details.

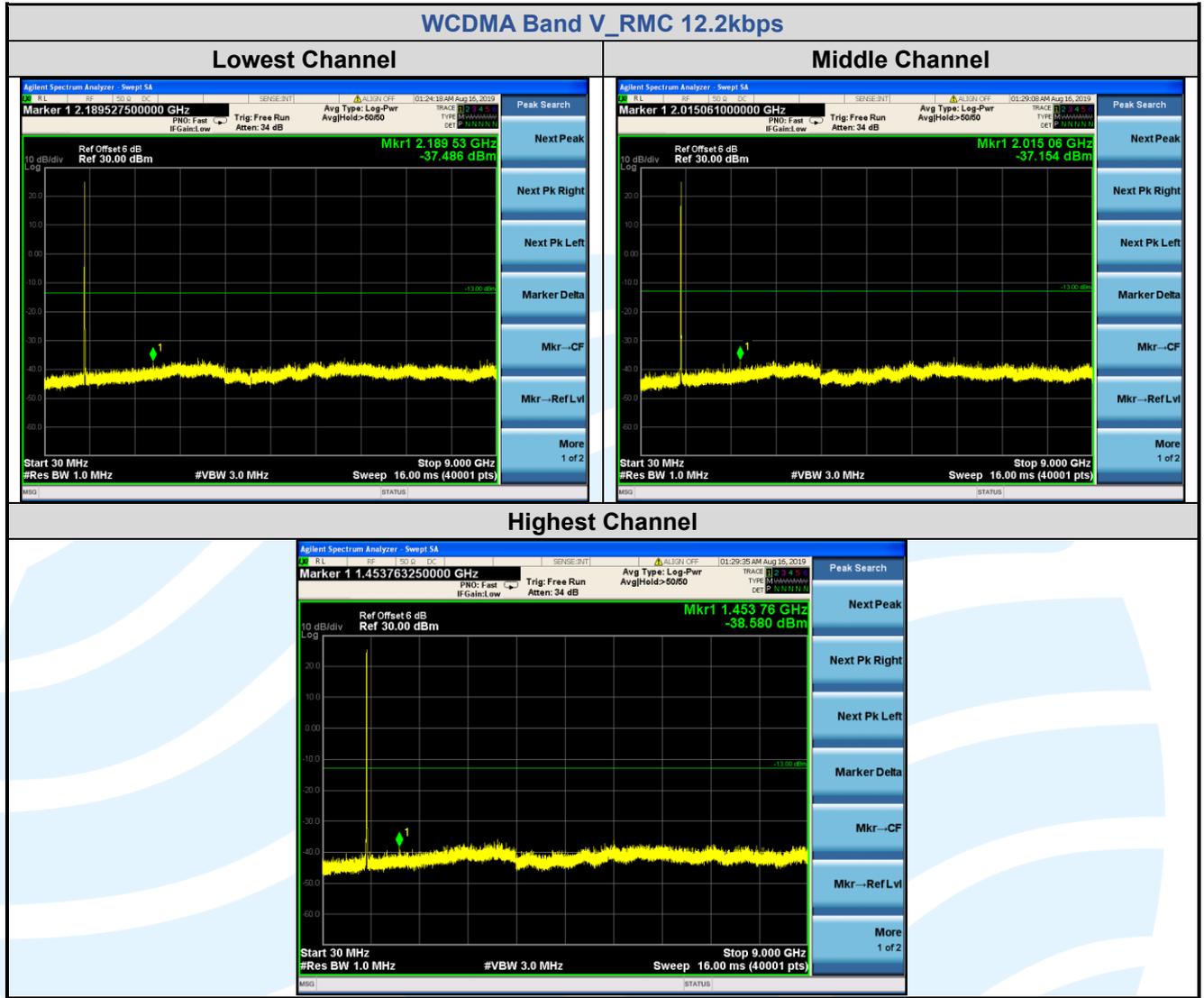
Instruments Used: Refer to section 3 for details

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),

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.

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							
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	-68.55	13.78	-54.77	-13.00	-41.77	Horizontal
2	5557.200	-66.12	16.01	-50.11	-13.00	-37.11	Horizontal
3	3704.800	-68.75	15.14	-53.61	-13.00	-40.61	Vertical
4	5557.200	-66.75	16.90	-49.85	-13.00	-36.85	Vertical
RMC 12.2kbps_ Middle Channel							
1	3760.000	-67.46	13.87	-53.59	-13.00	-40.59	Horizontal
2	5640.000	-71.19	16.10	-55.09	-13.00	-42.09	Horizontal
3	3760.000	-67.21	15.28	-51.93	-13.00	-38.93	Vertical
4	5640.000	-67.26	16.97	-50.29	-13.00	-37.29	Vertical
RMC 12.2kbps_ Highest Channel							
1	3815.200	-67.60	13.97	-53.63	-13.00	-40.63	Horizontal
2	5722.800	-71.59	16.35	-55.24	-13.00	-42.24	Horizontal
3	3815.200	-66.48	15.43	-51.05	-13.00	-38.05	Vertical
4	5722.800	-67.12	17.21	-49.91	-13.00	-36.91	Vertical

WCDMA Band IV							
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	-67.94	12.45	-55.49	-13.00	-42.49	Horizontal
2	5137.200	-68.24	16.11	-52.13	-13.00	-39.13	Horizontal
3	3424.800	-66.73	13.70	-53.03	-13.00	-40.03	Vertical
4	5137.200	-66.46	17.08	-49.38	-13.00	-36.38	Vertical
RMC 12.2kbps_ Middle Channel							
1	3464.800	-67.53	12.74	-54.79	-13.00	-41.79	Horizontal
2	5197.200	-68.53	16.21	-52.32	-13.00	-39.32	Horizontal
3	3464.800	-66.48	13.97	-52.51	-13.00	-39.51	Vertical
4	5197.200	-66.61	17.17	-49.44	-13.00	-36.44	Vertical
RMC 12.2kbps_ Highest Channel							
1	3505.200	-67.28	13.03	-54.25	-13.00	-41.25	Horizontal
2	5257.800	-68.60	16.20	-52.40	-13.00	-39.40	Horizontal
3	3505.200	-66.87	14.24	-52.63	-13.00	-39.63	Vertical
4	5257.800	-66.17	17.15	-49.02	-13.00	-36.02	Vertical

WCDMA Band V							
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	-67.40	2.43	-64.97	-13.00	-51.97	Horizontal
2	2479.200	-65.66	9.16	-56.50	-13.00	-43.50	Horizontal
3	1652.800	-67.98	4.08	-63.90	-13.00	-50.90	Vertical
4	2479.200	-65.08	11.48	-53.60	-13.00	-40.60	Vertical
RMC 12.2kbps_ Middle Channel							
1	1672.800	-67.48	2.59	-64.89	-13.00	-51.89	Horizontal
2	2509.200	-61.90	9.17	-52.73	-13.00	-39.73	Horizontal
3	1672.800	-68.85	4.31	-64.54	-13.00	-51.54	Vertical
4	2509.200	-60.52	11.46	-49.06	-13.00	-36.06	Vertical
RMC 12.2kbps_ Highest Channel							
1	1692.800	-68.53	2.75	-65.78	-13.00	-52.78	Horizontal
2	2539.200	-66.67	9.21	-57.46	-13.00	-44.46	Horizontal
3	1692.800	-66.37	4.54	-61.83	-13.00	-48.83	Vertical
4	2539.200	-66.76	11.45	-55.31	-13.00	-42.31	Vertical

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,

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.

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, 3.5 Vdc, Normal, 3.7 Vdc and High voltage, 4.25 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	Temperature	Deviation	Deviation	Limit	Result
		(Vdc)	($^{\circ}\text{C}$)	(Hz)	(ppm)	(ppm)	
WCDMA Band II							
RMC 12.2kbps	9400 / 1880.0	VL	TN	15	0.0080	N/A	Pass
		VN		13	0.0069		Pass
		VH		14	0.0074		Pass
		VN	50	20	0.0106		Pass
			40	18	0.0096		Pass
			30	14	0.0074		Pass
			20	14	0.0074		Pass
			10	12	0.0064		Pass
			0	12	0.0064		Pass
			-10	15	0.0080		Pass
			-20	16	0.0085		Pass
			-30	25	0.0133		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
WCDMA Band IV							
RMC 12.2kbps	1412 / 1732.4	VL	TN	-16	-0.0092	N/A	Pass
		VN		-15	-0.0087		Pass
		VH		-15	-0.0087		Pass
		VN	50	-22	-0.0127		Pass
			40	-20	-0.0115		Pass
			30	-16	-0.0092		Pass
			20	-15	-0.0087		Pass
			10	-14	-0.0081		Pass
			0	-16	-0.0092		Pass
			-10	-18	-0.0104		Pass
			-20	-20	-0.0115		Pass
			-30	-24	-0.0139		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
WCDMA Band V							
RMC 12.2kbps	4182 / 836.4	VL	TN	19	0.0227	± 2.5	Pass
		VN		15	0.0179	± 2.5	Pass
		VH		14	0.0167	± 2.5	Pass
		VN	50	18	0.0215	± 2.5	Pass
			40	17	0.0203	± 2.5	Pass
			30	17	0.0203	± 2.5	Pass
			20	15	0.0179	± 2.5	Pass
			10	15	0.0179	± 2.5	Pass
			0	16	0.0191	± 2.5	Pass
			-10	18	0.0215	± 2.5	Pass
			-20	20	0.0239	± 2.5	Pass
			-30	26	0.0311	± 2.5	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 ***

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.
