

FCC TEST REPORT

Product Name: COSMO
Trade Mark: N/A
Model No.: COSMO COMMUNICATOR VE
Add. Model No.: N/A
Report Number: 19070205RFM-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: 2A07Q-COSMOVE
Test Result: PASS
Date of Issue: August 29, 2019

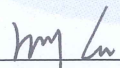
Prepared for:

Planet Computers Limited
Suite #9, 56 Sloane Square, London, SW1W 8AX, United Kingdom

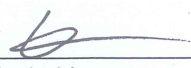
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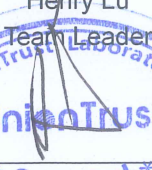
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Version

Version No.	Date	Description
V1.0	August 29, 2019	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Planet Computers Limited
Address of Applicant:	Suite #9, 56 Sloane Square, London, SW1W 8AX, United Kingdom
Manufacturer:	Planet Computers Limited
Address of Manufacturer:	Suite #9, 56 Sloane Square, London, SW1W 8AX, United Kingdom

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	COSMO		
Model No.:	COSMO COMMUNICATOR VE		
Add. Model No.:	N/A		
Trade Mark:	N/A		
DUT Stage:	Production Unit		
EUT Supports Function:	GSM Bands:	GSM850/ PCS 1900	
	UTRA Bands:	Band II/ Band V	
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7/ Band 12/ Band 13/ Band 17/ Band 66/	
		TDD Band 41	
	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/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac
		1559 MHz to 1610 MHz	GPS
BSR:	VHF Band II	FM	
NFC:	13.553 MHz to 13.567 MHz		
Sample Received Date:	July 22, 2019		
Sample Tested Date:	July 25, 2019 to August 29, 2019		

Remark:

The model number COSMO COMMUNICATOR has finished testing, the report number is "190725019RFM-1" this device model number is COSMO COMMUNICATOR VE, COSMO COMMUNICATOR and COSMO COMMUNICATOR VE only different in LTE frequency bands that change by software, other are same, for detailed differences please refer to the difference declaration

1.2.2 Description of Accessories

Adapter	
Model No.:	TPA-10120125UU-MTK
Input:	100-240 V~50/60 Hz 0.6A
Output:	5.0 V $\equiv$ 2 A / 7.0 V $\equiv$ 1.67 A / 9.0 V $\equiv$ 1.67A / 12 V $\equiv$ 1.25 A
AC Cable:	NA
DC Cable:	NA

Battery	
Model No.:	Gemini Standard Battery
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.85 Vdc
Limited Charge Voltage:	4.4 Vdc
Rated Capacity:	4220 mAh

Cable	
Model No.:	N/A
Description:	USB Type-C Plug Cable
Cable Type:	Shielded without ferrite
Length:	0.8 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA	
Type of Modulation:	GSM/GPRS:	GMSK
	EDGE:	GMSK, 8PSK
	WCDMA	BPSK
	HSDPA	QPSK, 16QAM
	HSUPA:	QPSK
Frequency Range:	GSM/GPRS/EDGE 850:	824.2-848.8 MHz
	GSM/GPRS/EDGE 1900:	1850.2-1909.8 MHz
	WCDMA Band II:	1852.4-1907.6 MHz
	WCDMA Band V:	826.4-846.6 MHz
Max RF Output Power:	GSM/GPRS 850:	32.31dBm
	EDGE 850:	26.43dBm
	GSM/GPRS 1900:	29.04dBm
	EDGE 1900:	25.23dBm
	WCDMA Band II:	19.15dBm
	WCDMA Band V:	22.61dBm
Emission Designator:	GSM/GPRS 850:	246KGXW
	EDGE 850:	247KG7W
	GSM/GPRS 1900:	247KGXW
	EDGE 1900:	244KG7W
	WCDMA Band II:	4M17F9W
	WCDMA Band V:	4M17F9W
Antenna Type:	MONOPOLE Antenna	
Antenna Gain:	GSM 850:	-4.1 dBi
	PCS 1900:	2.1 dBi
	WCDMA Band II:	2.1 dBi
	WCDMA Band V:	-4.1 dBi
GPRS/EDGE Class:	Class 12	
Normal Test Voltage:	3.85 Vdc	
Extreme Test Voltage:	3.5 to 4.35Vdc	
Extreme Test Temperature:	-30 °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	0.30 Meter	UnionTrust

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	Note1
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1
Peak-to-average ratio	FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1
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	Note1
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	Note1
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	Note1
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 22.355	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1

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	Note1
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1
Peak-to-average ratio	FCC 47 CFR Part 24.232(d)	KDB 971168 D01v03r01	Note1
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1
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	Note1
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	Note1
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	Note1
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235	ANSI C63.26-2015 & KDB 971168 D01v03r01	Note1

Note1: These results copy from the report number of "190725019RFM-1", for detailed differences please refer to the difference declaration.

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)
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
☒	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 18, 2019	May 18, 2020
☒	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2018	Nov. 24, 2019
☒	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 18, 2019	May 18, 2020
☐	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jun. 23, 2019	Jun. 23, 2020
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 2020
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	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)
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2018	Nov. 24, 2019
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019
☒	Wideband Radio Communication Tester	R&S	CMW500	119583	Jun. 07, 2019	Jun. 07, 2020
☐	Wideband Radio Communication Tester	R&S	CMW500	120932	Jun. 07, 2018	Jun. 07, 2019
☐	Universal Radio Communication Tester	R&S	CMU200	114713	Nov. 24, 2018	Nov. 24, 2019
☒	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 18, 2018	Sep. 18, 2019
☐	Temp & Humidity chamber	Espec	GL(U)04K A(W)	16921H201P3	Sep. 20, 2018	Sep. 20, 2019
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Jun. 05, 2018	Jun. 05, 2020

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

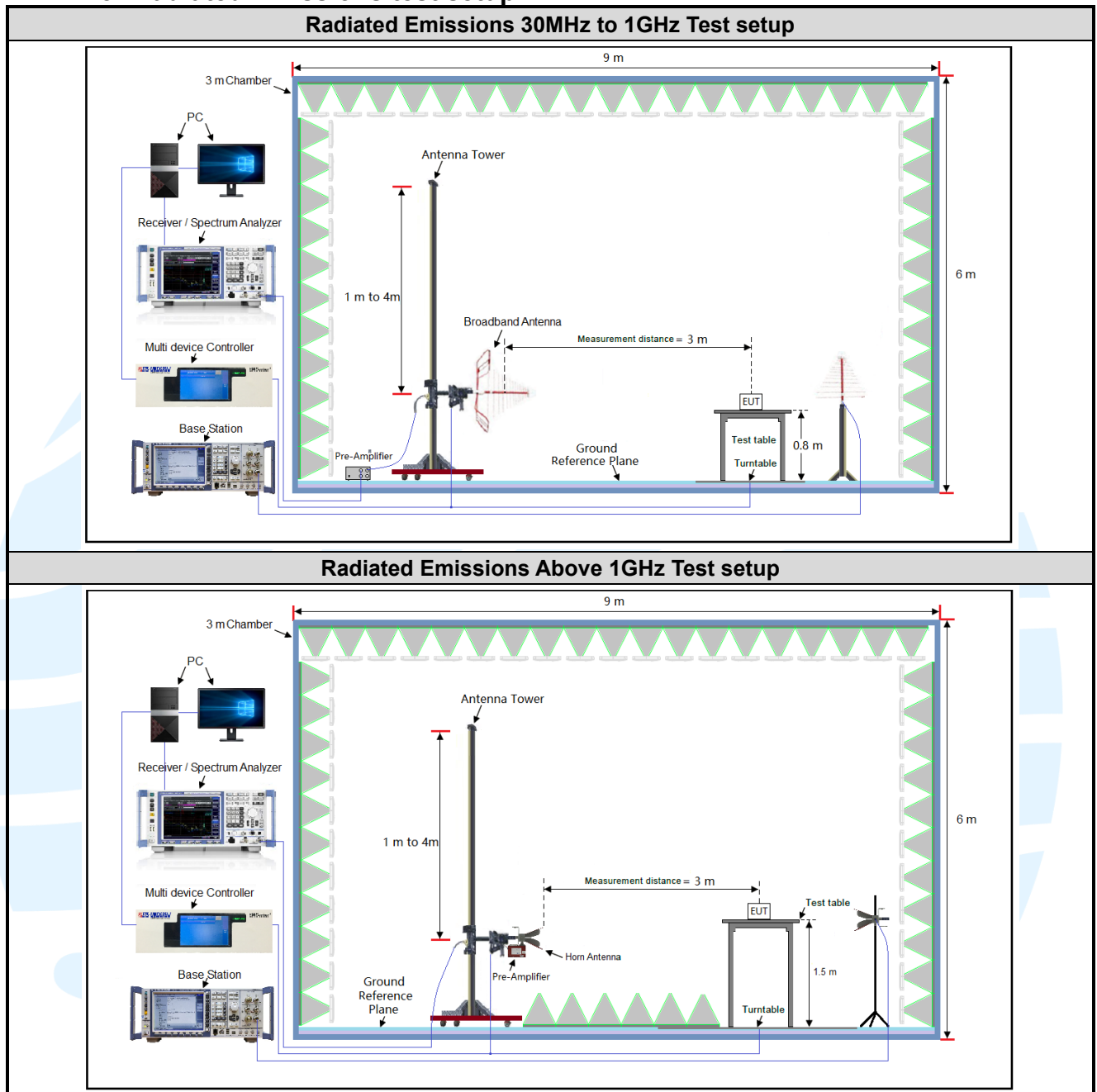
Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.85	20 to 75
TL/VL	-30	3.5	20 to 75
TH/VL	+50	3.5	20 to 75
TL/VH	-30	4.35	20 to 75
TH/VH	+50	4.35	20 to 75

Remark:

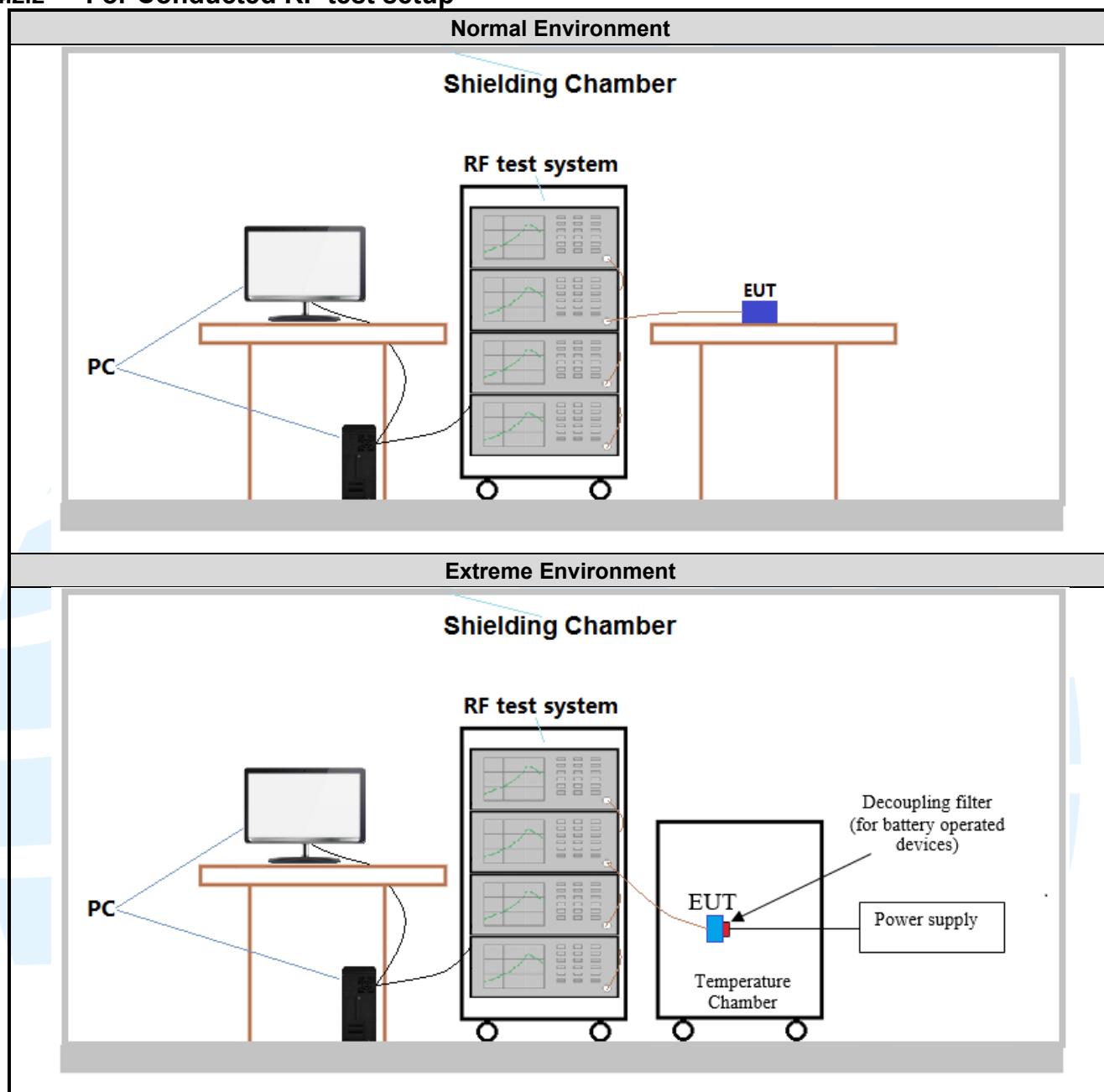
- 1) The EUT just work in such extreme temperature of -30 °C to +50 °C and the extreme voltage of 3.5 V to 4.35 V, so here the EUT is tested in the temperature of -30 °C to +50 °C and the voltage of 3.5 V to 4.35 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;
TL: Low Extreme Test Temperature; TH: 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)
GSM/GPRS/ EDGE850	Tx (824 MHz ~ 849 MHz)	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
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)
GSM/GPRS/ EDGE1900	Tx (1850 MHz-1910 MHz)	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
WCDMA Band II	Tx (1850 MHz-1910 MHz)	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 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 3.85Vdc rechargeable Li-on 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
GSM 850	1TX	Chain 0	Y axis
PCS 1900	1TX	Chain 0	Y axis
WCDMA Band II	1TX	Chain 0	Y axis
WCDMA Band V	1TX	Chain 0	Y 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.

GSM 850 Maximum Average Power (dBm)			
Channel	128	190	251
Frequency (MHz)	824.2 MHz	836.6 MHz	848.8 MHz
GSM (GMSK, 1Tx-slot)	32.28	32.31	32.30
GPRS (GMSK, 1Tx-slot)	32.27	32.30	32.29
GPRS (GMSK, 2Tx-slot)	31.43	31.45	31.42
GPRS (GMSK, 3Tx-slot)	29.50	29.52	29.51
GPRS (GMSK, 4Tx-slot)	28.36	28.37	28.38
EDGE (8PSK, 1Tx-slot)	26.39	26.43	26.42
EDGE (8PSK, 2Tx-slot)	25.21	25.12	25.14
EDGE (8PSK, 3Tx-slot)	22.87	22.78	22.85
EDGE (8PSK, 4Tx-slot)	21.52	21.44	21.42

PCS 1900 Maximum Average Power (dBm)			
Channel	512	661	810
Frequency(MHz)	1850.2 MHz	1880.0 MHz	1909.8 MHz
GSM (GMSK, 1Tx-slot)	29.04	28.93	29.00
GPRS (GMSK, 1Tx-slot)	29.04	28.94	29.01
GPRS (GMSK, 2Tx-slot)	28.22	28.12	28.21
GPRS (GMSK, 3Tx-slot)	26.17	26.05	26.17
GPRS (GMSK, 4Tx-slot)	24.75	24.66	24.74
EDGE (8PSK, 1Tx-slot)	25.23	24.84	24.72
EDGE (8PSK, 2Tx-slot)	24.22	23.94	23.87
EDGE (8PSK, 3Tx-slot)	22.26	22.09	22.04
EDGE (8PSK, 4Tx-slot)	21.37	20.94	20.91

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	18.95	19.08	19.15
HSDPA Subtest-1	17.99	18.14	18.20
HSDPA Subtest-2	18.00	18.12	18.23
HSDPA Subtest-3	17.53	17.65	17.75
HSDPA Subtest-4	17.52	17.63	17.72
HSUPA Subtest-1	17.54	17.67	18.22
HSUPA Subtest-2	18.03	18.14	18.23
HSUPA Subtest-3	17.06	17.16	17.27
HSUPA Subtest-4	18.03	18.15	18.23
HSUPA Subtest-5	17.03	17.15	17.23

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	22.58	22.61	22.59
HSDPA Subtest-1	21.68	21.62	21.67
HSDPA Subtest-2	22.43	22.36	22.42
HSDPA Subtest-3	21.14	21.12	21.17
HSDPA Subtest-4	21.09	21.07	21.12
HSUPA Subtest-1	19.60	19.59	19.62
HSUPA Subtest-2	19.64	19.62	19.67
HSUPA Subtest-3	20.58	20.56	20.59
HSUPA Subtest-4	19.14	19.15	19.18
HSUPA Subtest-5	21.19	21.18	21.24

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
GSM/GPRS/ EDGE 850/1900	1) GSM (GMSK, 1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link	1) GSM (GMSK,1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link
WCDMA Band II/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
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),

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.

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;

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)	
GSM 850 (824-849 MHz)	GSM	32.31	-4.10	7.0	26.06	0.403645	Pass
	EDGE	26.43	-4.10		20.18	0.104232	Pass
WCDMA Band V (824-849 MHz)	RMC 12.2kbps	22.61	-4.10	7.0	16.36	0.043251	Pass
	HSUPA	21.24	-4.10		14.99	0.031550	Pass
	HSDPA	22.43	-4.10		16.18	0.041495	Pass
Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	EIRP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
PCS 1900 (1850-1910 MHz)	GSM	29.04	2.10	2.0	31.14	1.300170	Pass
	EDGE	25.23	2.10		27.33	0.540754	Pass
WCDMA Band II (1850-1910 MHz)	RMC 12.2kbps	19.15	2.10	2.0	21.25	0.133352	Pass
	HSUPA	18.23	2.10		20.33	0.107895	Pass
	HSDPA	18.23	2.10		20.33	0.107895	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),
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.

Test Procedure:

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

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.

- 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

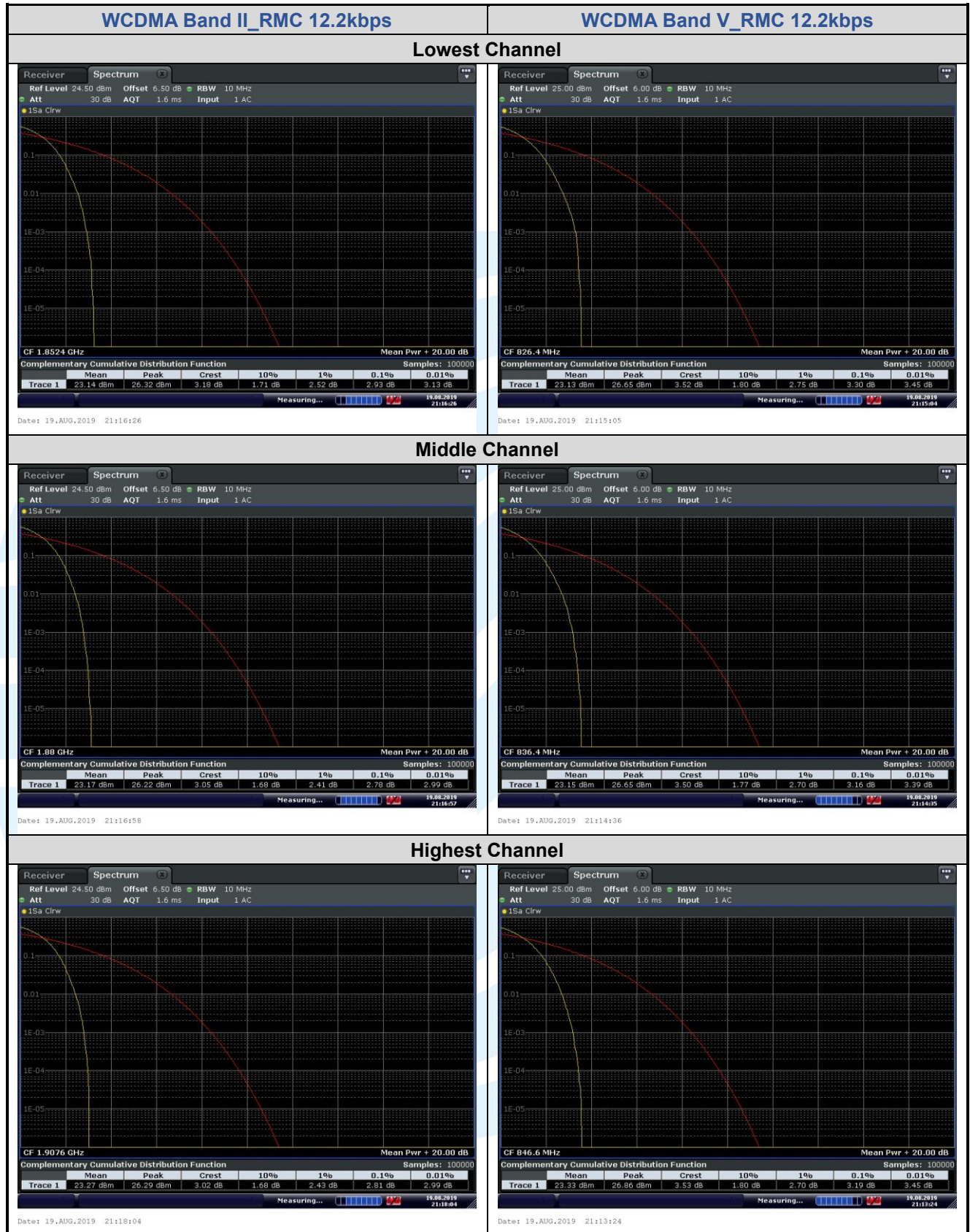
Test Data: See table below

Bands	Modulation	Peak-to-average ratio (dB)			Limit (dBm)	Result
		Lowest	Middle	Highest		
GSM 850	GSM	0.27	0.26	0.27	13	Pass
	EDGE	0.28	0.28	0.28	13	Pass
PCS 1900	GSM	0.28	0.28	0.28	13	Pass
	EDGE	0.29	0.30	0.29	13	Pass
WCDMA Band II	RMC 12.2kbps	2.93	2.78	2.81	13	Pass
WCDMA Band V	RMC 12.2kbps	3.30	3.16	3.19	13	Pass

The test plots as follows:







5.599%&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),

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

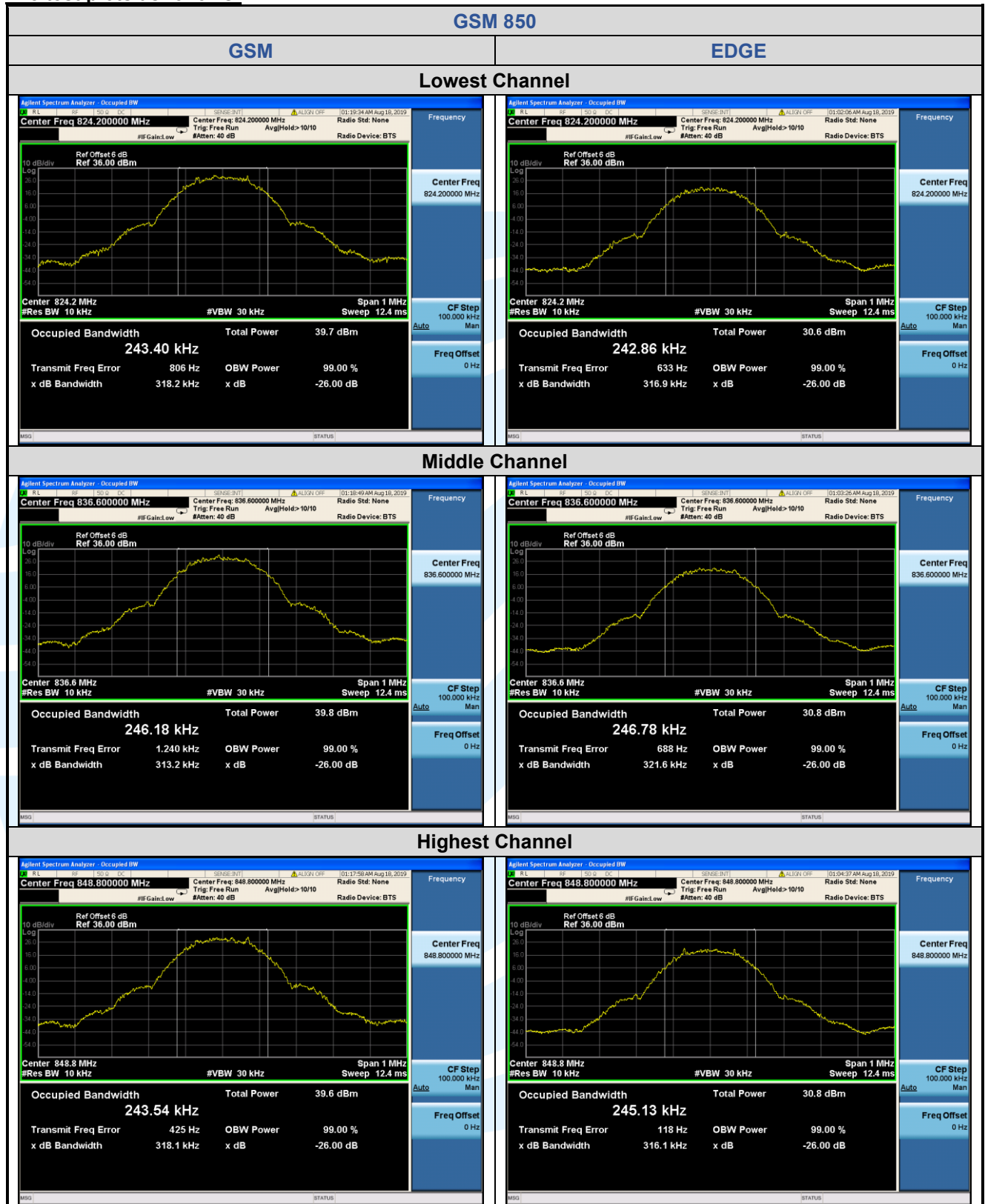
Test Results: Pass

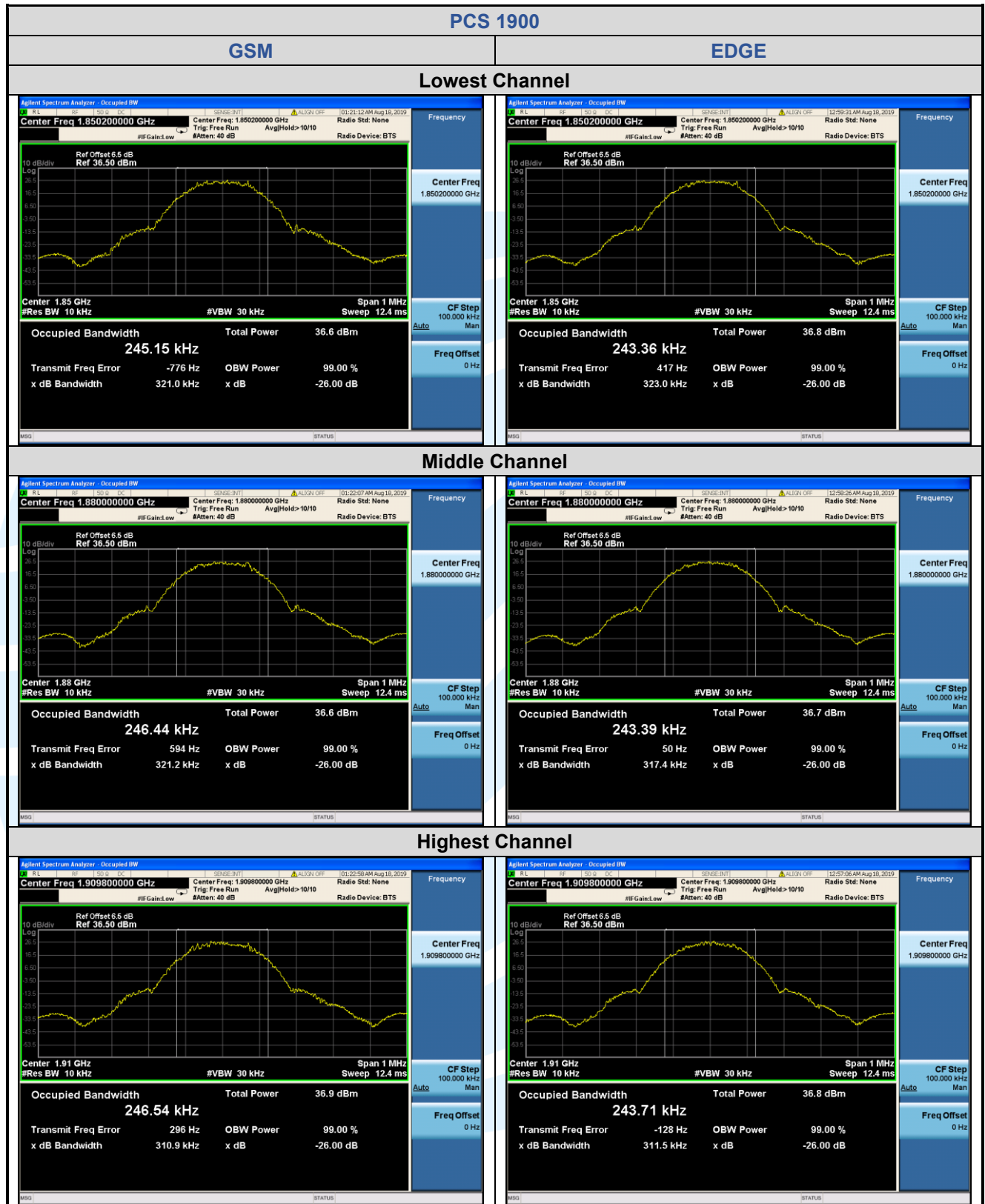
Test Data: See table below

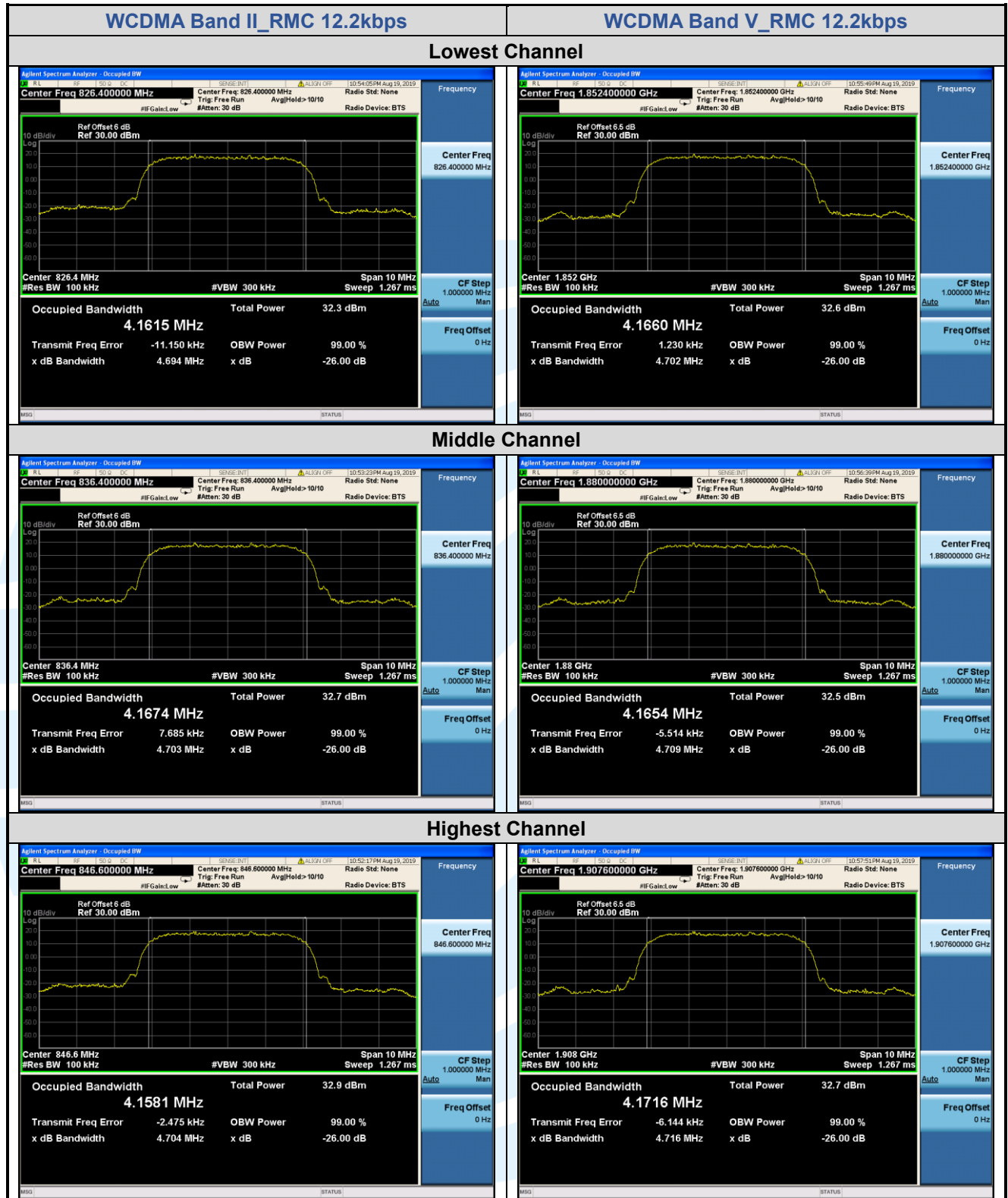
Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (kHz)	99% BW (kHz)
GSM 850	GSM	128	824.2	318.2	243.40
		190	836.6	313.2	246.18
		251	848.8	318.1	243.54
	EDGE	128	824.2	316.9	242.86
		190	836.6	321.6	246.78
		251	848.8	316.1	245.13
PCS 1900	GSM	512	1850.2	321.0	245.15
		661	1880.0	321.2	246.44
		810	1909.8	310.9	246.54
	EDGE	512	1850.2	323.0	243.36
		661	1880.0	317.4	243.39
		810	1909.8	311.5	243.71

Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
WCDMA Band II	RMC 12.2kbps	9262	1852.4	4.694	4.1615
		9400	1880.0	4.703	4.1674
		9538	1907.6	4.704	4.1581
WCDMA Band V	RMC 12.2kbps	4132	826.4	4.702	4.1660
		4182	836.4	4.709	4.1654
		4233	846.6	4.716	4.1716

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

Limit:

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

Lowest Channel

GSM

Ref Level 36.00 dBm Offset 6.00 dB Mode Auto Sweep Input 1 AC
Count 50/50

Start 820.0 MHz 3003 pts Stop 824.5 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.98651 MHz	-38.18 dBm	-25.18 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.99900 MHz	-13.39 dBm	-2.39 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.19037 MHz	25.62 dBm	-9.38 dB

Ready 18.08.2019 01:17:10

EDGE

Ref Level 36.00 dBm Offset 6.00 dB Mode Auto Sweep Input 1 AC
Count 50/50

Start 820.0 MHz 3003 pts Stop 824.5 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	821.32617 MHz	-42.88 dBm	-29.88 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.98104 MHz	-23.92 dBm	-12.92 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.18105 MHz	16.43 dBm	-18.57 dB

Measuring... 18.08.2019 01:13:07

Highest Channel

GSM

Ref Level 36.00 dBm Offset 6.00 dB Mode Auto Sweep Input 1 AC
Count 50/50

Start 848.5 MHz 3003 pts Stop 855.0 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.80095 MHz	23.44 dBm	-11.56 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.02295 MHz	-16.39 dBm	-3.39 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.00833 MHz	-36.77 dBm	-23.77 dB

Measuring... 18.08.2019 01:18:50

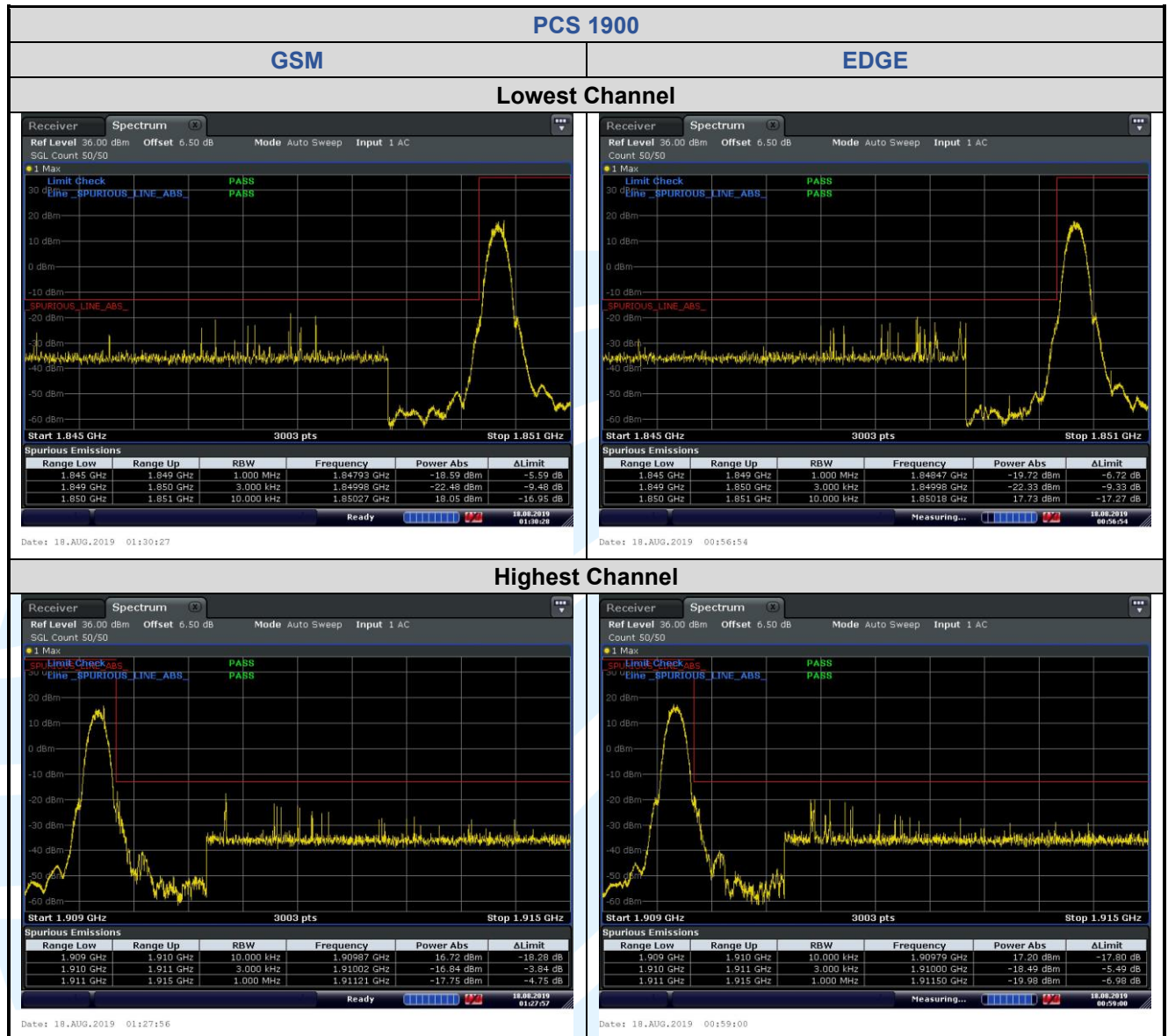
EDGE

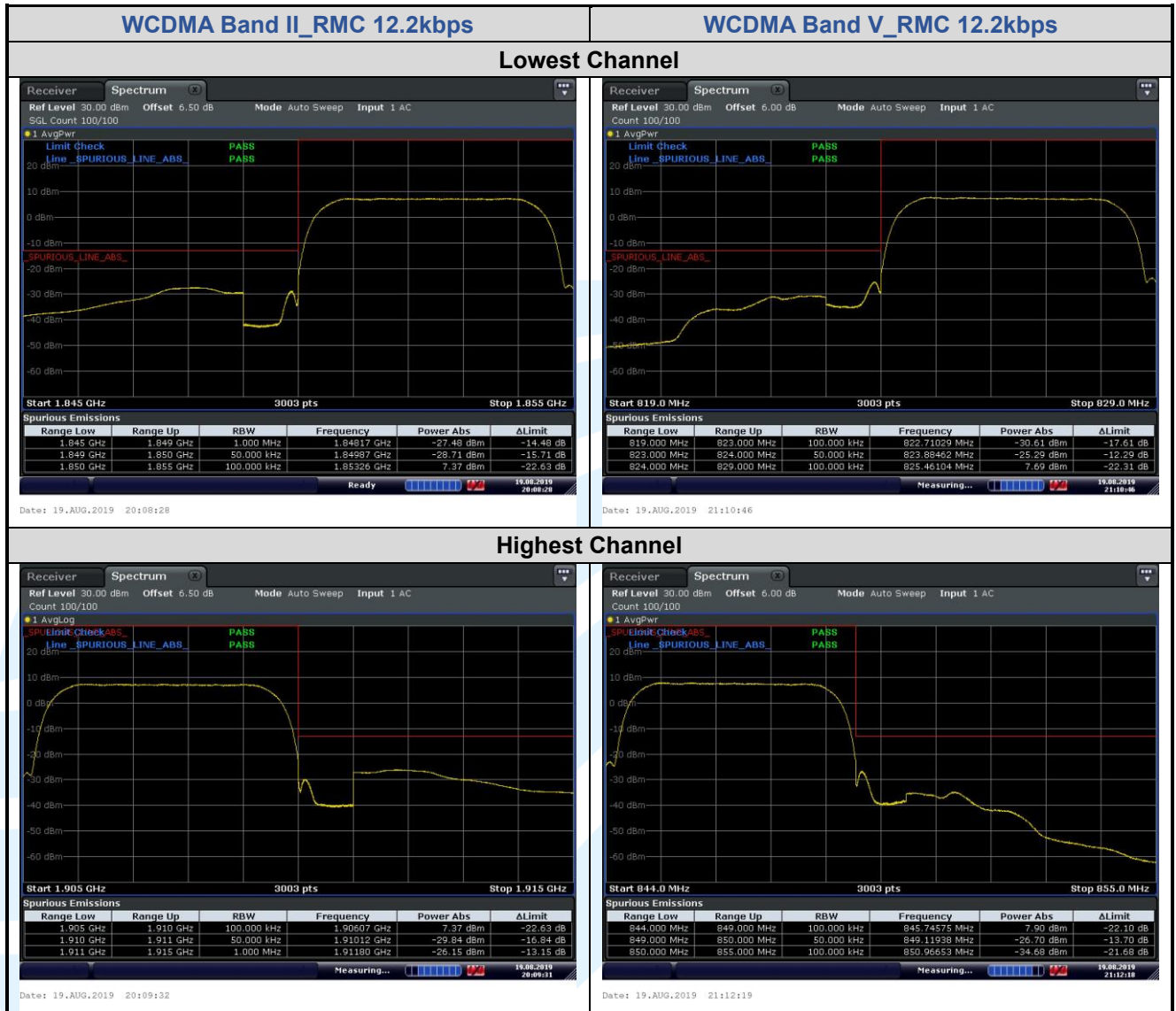
Ref Level 36.00 dBm Offset 6.00 dB Mode Auto Sweep Input 1 AC
Count 50/50

Start 848.5 MHz 3003 pts Stop 855.0 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.78596 MHz	14.22 dBm	-20.78 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.01497 MHz	-26.59 dBm	-13.59 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.00167 MHz	-40.31 dBm	-27.31 dB

Measuring... 18.08.2019 01:18:49





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

Limit:

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