

# RF TEST REPORT

**Report No.:** SET2023-02193

Product Name: PoC Radio

Model No.: iTALK-310, iTALK-300

FCC ID: 2A2II-ITALK310

**Applicant:** iTALKPTT Corporation

Address: 6905 S 1300 E #450, Cottonwood Heights, UT 84047-1817, USA

**Dates of Testing:** 02/14/2023 - 03/22/2023

**Issued by:** CCIC Southern Testing Co., Ltd.

Electronic Testing Building, No. 43 Shahe Road, Xili Street,

Lab Location:

Nanshan District, Shenzhen, Guangdong, China.

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# **Test Report**

Product...... PoC Radio

Brand Name....: iTALKPTT

Trade Name .....: iTALKPTT

Applicant....: iTALKPTT Corporation

Applicant Address.....: 6905 S 1300 E #450, Cottonwood Heights, UT

84047-1817, USA

Manufacturer...... Shenzhen VTU Systems Co., Ltd.

Manufacturer Address.....: 6/F, Building A, Ganghongji High-tech Intelligent

Industrial Park, No. 1008, Songbai Road, Nanshan

District, Shenzhen 518055, P.R. China

Test Standards.....: 47 CFR Part 2/22/24/27

Test Result.....: Pass

Chuiwang Zhang, Test Engineer

Chris You, Senior Engineer

Approved by.....: 2023.03.23

Yang Fan, Manager





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	(	Change History
Issue	Date	Reason for change
1.0	2023.03.23	First edition



### 1. GENERAL INFORMATION

# 1.1. EUT Description

Product Name	PoC Radio				
Model No.	iTALK-310, iTALK-300				
Hardware Version	IT330_MB_V1.0				
Software Version	iTALK310_V1.0				
EUT supports Radios	GSM/GPRS/EDGE/WCDMA/HSPA				
application	GSM/GPRS/EDGE/WCDMA/HSPA				
	GSM 850:	Tx: 824.2 - 848.8MHz (at intervals of 200kHz);			
	GSW 650.	Rx: 869.2 - 893.8MHz (at intervals of 200kHz)			
Frequency Range	PCS 1900:	Tx: 1850.2 - 1909.8MHz (at intervals of 200kHz);			
	1 CB 1700.	Rx: 1930.2 - 1989.8MHz (at intervals of 200kHz)			
	WCDMA 850:	Tx: 826.4 - 846.6MHz (at intervals of 200kHz);			
	WCDIVITY 030.	Rx: 871.4 - 891.6MHz (at intervals of 200kHz)			
	WCDMA 1700:	Tx: 1712.4 - 1752.6MHz (at intervals of 200kHz);			
	WCDMA 1700.	Rx: 2112.4 - 2152.6MHz (at intervals of 200kHz)			
	WCDMA 1000	Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);			
	WCDMA 1900:	Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)			
	GSM: 850: 32.98dBm, EDGE 850: 27.33dBm				
Maximum Output Power to	PCS: 1900: 30.87dBm, EDGE 1900: 26.32dBm				
Antenna	WCDMA 850: 23.38dBm				
Antenna	WCDMA 1700: 23.51dBm				
	WCDMA 1900: 23.65dBm				
	GSM / GPRS: GMSK				
	EDGE: GMSK / 8PSK				
Type of Modulation	WCDMA: QPSK	· -			
	HSDPA: QPSK(Uplink)				
	HSUPA: QPSK(Uplink)				
Antenna Type	External Antenna				
Antenna gain	GSM 850/1900: 2	2.0dBi			
monna gam	WCDMA 850/17	00/1900: 2.0dBi			
Power supply	Rechargeable Li-	ion Polymer Battery DC3.8V/4000mAh			

Note 1: Model No.: iTALK-310 and iTALK-300 are same in circuit board and specification, the samefrequency range, antenna, modulation method, and RF output power. The difference is the Screen and keys, iTALK-310 with screen and keys, while iTALK-300 does not.

Note 2: Both the iTALK-310 and iTALK-300 were tested, iTALK-310 was found to have the worst test results, only the worst cases are recorded in this report.



# 1.2. Maximum ERP/EIRP, Frequency Tolerance and Emission Designator

System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP (W)
GSM 850	GMSK	246KGXW	0.0071	1.919
EDGE 850	8PSK	244KG7W	0.0069	0.522
WCDMA 850	QPSK	4M16F9W	0.0067	0.210

System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum EIRP (W)
PCS 1900	GMSK	248KGXW	0.0068	1.936
EDGE 1900	8PSK	247KG7W	0.0066	0.679
WCDMA 1900	QPSK	4M16F9W	0.0068	0.376
WCDMA 1700	QPSK	4M18F9W	0.0072	0.356



# 1.3. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC certification standards:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General
1	47 CFR Fait 2	Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services
4	47 CFR Part 27	Miscellaneous Wireless Communications Services
5	KDB 971168 D01 Power Meas License Digital Systems v03r01	Measurement Guidance For Certification of Licensed Digital Transmitters
6	KDB 412172 D01 Determining ERP and EIRP v01r01	Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) of an RF Transmitting Systems
7	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
8	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services



Test detailed items/section required by FCC rules and results are as below:

No.	FCC Rule	Description	Limit	Result
1	2.1046	Conducted Output Power	Reporting Only	PASS
	22.913(a)(5)	Effective Radiated Power (GSM850/W850)	ERP < 7Watts	PASS
2	24.232 (c)	Equivalent Isotropic Radiated Power (GSM1900/W1900)	EIRP < 2Watts	PASS
	27.50(d)(4)	Equivalent Isotropic Radiated Power(W1700)	EIRP < 1 Watts	PASS
3	22.913(d) 24.232(d) 27.50(d)(5)	Peak to Average Radio	< 13dBm	PASS
4	2.1049	Occupied Bandwidth	Reporting Only	PASS
5	2.1055 Frequency Stability (GSM850/W850)		<±2.5ppm	PASS
3	24.235 27.54	Frequency Stability (PCS1900/W1700/W1900)	Within the Authorized Band	PASS
6	2.1051 22.917 24.238 27.53	Conducted Spurious Emission and Conducted Band Edge	< 43+10log <sub>10</sub> (P[Watts])	PASS
7	2.1053 22.917 24.238 27.53	Radiated Spurious Emissions	< 43+10log <sub>10</sub> (P[Watts])	PASS

### Remark:

- 1. All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



# 1.4. Test Configuration of Equipment Under Test

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

- 1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
- 2. 30 MHz to 20000 MHz for PCS1900 and WCDMA Band II.
- 3. 30 MHz to 18000 MHz for WCDMA Band IV.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

	Test Modes					
Band	Radiated TCs	Conducted TCs				
GSM 850	GSM Link, EDGE Link	GSM Link, EDGE Link				
PCS 1900	GSM Link, EDGE Link	GSM Link, EDGE Link				
WCDMA Band V	RMC 12.2kbps Link	RMC 12.2kbps Link				
WCDMA Band II	RMC 12.2kbps Link	RMC 12.2kbps Link				
WCDMA Band IV	RMC 12.2kbps Link	RMC 12.2kbps Link				

Note: The maximum power levels are chosen to test as the worst case configuration as follows:

GSM mode for GMSK modulation,

EDGE multi-slot class 8 mode for 8PSK modulation,

RMC 12.2kbps mode for WCDMA band V,

RMC 12.2kbps mode for WCDMA band II,

RMC 12.2kbps mode for WCDMA band IV, only these modes were used for all tests.

# 1.5. Measurement Results Explanation Example

#### For all conduction test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + Power Splitter + attenuator factor..

Following shows an offset computation example with cable loss 1dB, 3dB Power Splitter, 10dB attenuator.

Example: Offset (dB) = RF cable loss(dB) + Power Splitter(dB) + attenuator factor(dB).

$$= 1 + 3 + 10 = 14$$
 (dB)



### 1.6. Laboratory Facilities

### FCC-Registration No.: 406086

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until April 19th, 2023.

### ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Jun. 30th, 2023.

### **A2LA Code: 5721.01**

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

### 1.7. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15℃-35℃
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa



# 2. 47 CFR Part 2 Requirements

### 2.1. Conducted Output Power and ERP/EIRP

### 2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

The EIRP of mobile transmitters must not exceed 2 Watts for PCS1900 and W1900.

The EIRP of mobile transmitters must not exceed 1 Watts for W1700.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850 and W850.

According to KDB 412172 D01 Determining ERP and EIRP v01r01.

$$EIRP = P_T + G_T - L_C$$
,  $ERP = EIRP - 2.15$ , where

 $P_T$  = transmitter output power in dBm;

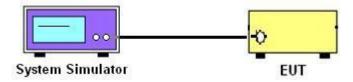
 $G_T$  = gain of the transmitting antenna in dBi;

 $L_C$  = signal attenuation in the connecting cable between the transmitter and antenna in dB.

### 2.1.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.1.3. Test Setup



#### 2.1.4. Test Procedures

- 1. The transmitter output port was connected to the system simulator.
- 2. Set EUT at maximum power through system simulator.
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Measure and record the power level from the system simulator.



# 2.1.5. Test Results of Conducted Output Power and ERP/EIRP

	GSM 850							
		Average power (dBm)			Ant.	Max.	ERP	
EUT	EUT Mode		190	251	Gain	ERP	Limit	
		824.2MHz	836.6MHz	848.8MHz	(dBi)	(dBm)	(dBm)	
GSM	Voice	32.98	32.95	32.94				
	Slot 1	32.87	32.82	32.86				
GPRS	Slot 2	32.19	32.12	32.14		32.83		
GFRS	Slot 3	29.97	29.94	29.91				
	Slot 4	28.97	28.85	28.89	2.00		38.45	
	Slot 1	27.33	27.21	27.16				
EGPRS	Slot 2	26.76	26.72	26.69		27.18		
EGPRS	Slot 3	24.80	24.76	24.62		21.10		
	Slot 4	23.74	23.65	23.57				
			PCS	1900				
		Ave	rage power (d	Bm)	Ant.	Max.	EIRP	
EUT	Mode	512	661	810	Gain	EIRP	Limit	
		1850.2MHz	1880.0MHz	1909.8MHz	(dBi)	(dBm)	(dBm)	
GSM	Voice	30.68	30.87	30.80				
	Slot 1	30.41	30.31	30.52				
GPRS	Slot 2	29.54	29.43	29.38		32.87		
GFRS	Slot 3	27.09	27.05	27.10				
	Slot 4	26.03	25.88	26.00	2.00		33.00	
	Slot 1	26.32	26.09	26.17				
EGPRS	Slot 2	25.23	24.99	25.07		28.32		
EGPKS	Slot 3	23.45	23.24	23.32		20.32		
	Slot 4	22.34	22.14	22.30				



WCDMA 850							
		Ave	Average power (dBm)			Max.	ERP
EUT	EUT Mode		4132 4183 4233		Gain	ERP	Limit
		826.4MHz	836.6MHz	846.6MHz	(dBi)	(dBm)	(dBm)
RMC	12.2 kbps	23.38	23.15	23.21			
	Subtest 1	23.36	23.14	23.20			
HSDPA	Subtest 2	22.59	22.62	22.77			
ПООРА	Subtest 3	22.23	22.21	22.28			
	Subtest 4	22.15	22.24	22.21	2	23.23	38.45
	Subtest 1	22.10	22.21	22.24	2	23.23	
	Subtest 2	20.47	20.68	20.73			
HSUPA	Subtest 3	21.25	21.12	21.22			
	Subtest 4	21.53	21.66	21.74			
	Subtest 5		20.74	20.81			
			WCDMA 1	900			
		Ave	erage power (d	Bm)	Ant.	Max.	EIRP
EUT	Mode	9262	9400	9538	Gain	EIRP	Limit
		1852.4MHz	1880.0MHz	1907.6MHz	(dBi)	(dBm)	(dBm)
RMC	12.2 kbps	23.50	23.65	23.64			
	Subtest 1	23.48	23.64	23.65			
HSDPA	Subtest 2	22.55	22.51	22.35			
ПЭДРА	Subtest 3	22.16	22.04	21.81			
	Subtest 4	21.86	21.96	21.72	2	25.65	33
	Subtest 1	21.91	21.91	21.81	2	25.05	აა
	Subtest 2	20.42	20.43	20.27			
HSUPA	Subtest 3	21.07	20.97	20.81			
	Subtest 4	21.51	21.51	21.33			
	Subtest 5	20.53	20.45	20.31			



WCDMA 1700								
		Ave	erage power (di	Bm)	Ant.	Max.	EIRP	
EUT	ΓMode	1312	1413	1513	Gain	EIRP	Limit	
		1712.4MHz	1732.6MHz	1752.6MHz	(dBi)	(dBm)	(dBm)	
RMC	12.2 kbps	23.51	23.30	23.46				
	Subtest 1	23.50	23.28	23.43				
HSDPA	Subtest 2	22.10	22.22	22.17				
ПЭДРА	Subtest 3	21.65	21.77	21.71				
	Subtest 4	21.57	21.71	21.62	2	25.51	30.00	
	Subtest 1	21.51	21.64	21.61	2	25.51	30.00	
	Subtest 2	20.10	20.22	20.17				
HSUPA	Subtest 3	20.55	20.71	20.64				
	Subtest 4	21.04	21.23	21.13				
	Subtest 5	20.11	20.22	20.15				



### 2.2. Peak-to-average power ratio (PAPR)

### 2.2.1. Requirement

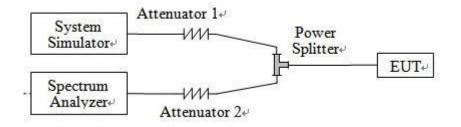
Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth.

In measuring transmissions in this band using an average power technique, the Peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB.

### 2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.2.3. Test Description



#### 2.2.4. Test Procedures

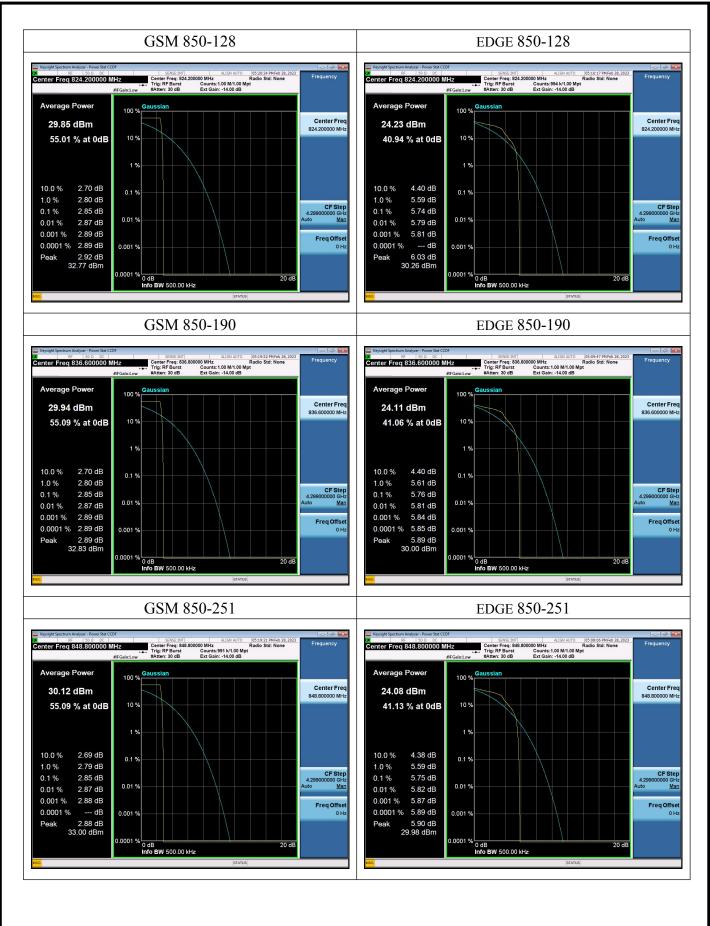
- 1. The testing follows the of KDB 971168 D01 v03r01 Section 5.7.2 and ANSI C63.26-2015 Section 5.2.3.4.
- 2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
- 3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
- 4. Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth.
- 5. Set the number of counts to a value that stabilizes the measured CCDF curve.
- 6. Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.
- 7. Repeat step 3~6 at other frequency and modulations.

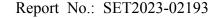


# 2.2.5. Test Results of Peak-to-average power ratio (PAPR)

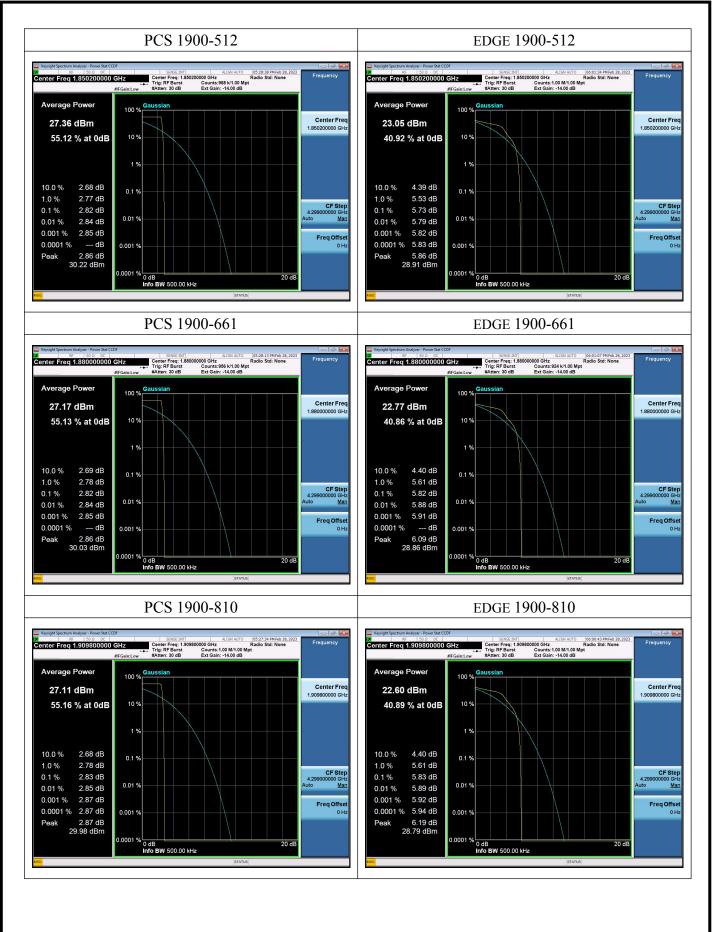
Band	Channel	Frequency (MHz)	Peak to Average radio dB	Limit dB	Verdict
GSM 850	128	824.2	2.85		PASS
	190	836.6 2.85		13	PASS
	251	848.8	2.85		PASS
EDGE 850	128	824.2	5.74		PASS
	190	836.6	836.6 5.76		PASS
	251	848.8	5.75		PASS
PCS 1900	512	1850.2	2.82		PASS
	661	1880.0	30.0 2.82		PASS
	810	1909.8	2.83		PASS
EDGE 1900	512	1850.2	5.73		PASS
	661	1 1880.0 5.82		13	PASS
	810	1909.8	5.83		PASS
WCDMA 850	4132	826.4	2.98	13	PASS
	4183	836.6	2.96		PASS
	4233	846.6	2.86		PASS
WCDMA 1900	9262	1852.4	3.03		PASS
	9400	1880.0	3.04	13	PASS
	9538	1907.6	7.6 2.89		PASS
WCDMA 1700	1312	1712.4	2.83		PASS
	1413	1732.6	2.86	13	PASS
	1513	1752.6	2.73		PASS





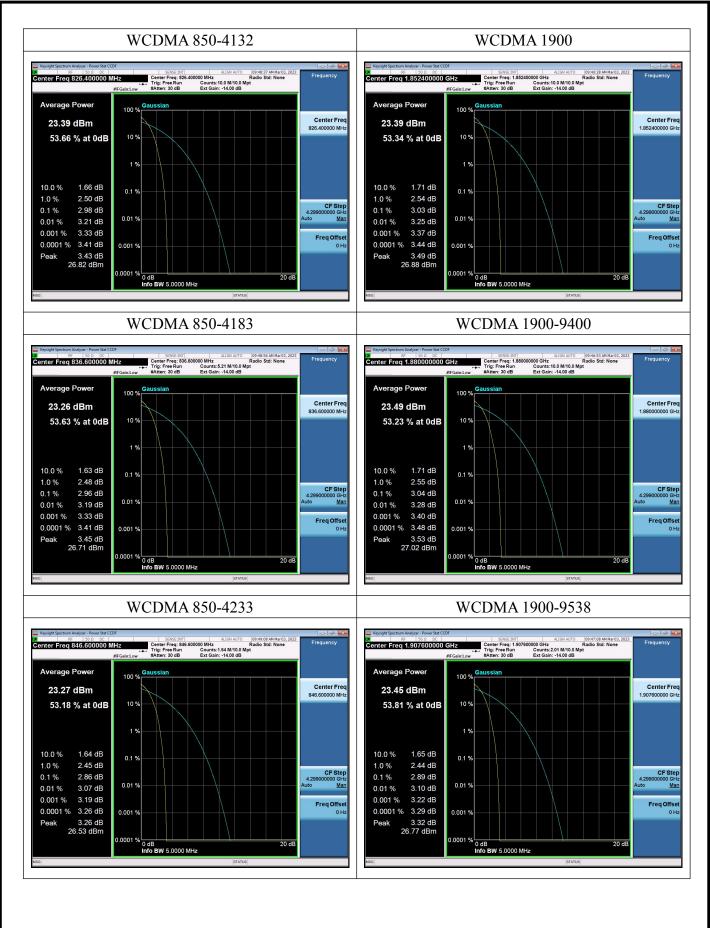






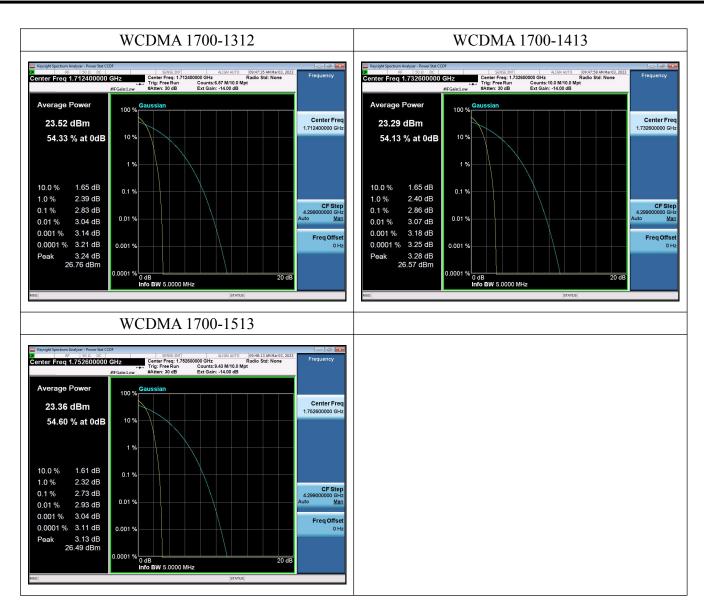














### 2.3. 99% Occupied Bandwidth and 26dB Emission Bandwidth

### 2.3.1. Requirement

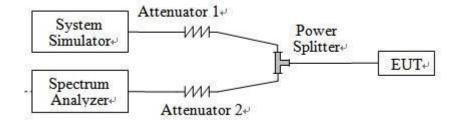
The Occupied Bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

### 2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.3.3. Test Setup



#### 2.3.4. Test Procedures

- 1. The testing follows the of KDB 971168 D01 v03r01 Section 4 and ANSI C63.26-2015 Section 5.4.
- 2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
- 3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.
- 4. Set span to be approximately 1.5 to 5 times the OBW.
- 5. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW.
- 6. Set VBW  $\geq$  3 × RBW.
- 7. Set Detection mode = peak.
- 8. Set Trace mode = max hold.
- 9. Allow trace to stabilize.
- 10. Repeat step 3~9 at other frequency and modulations.

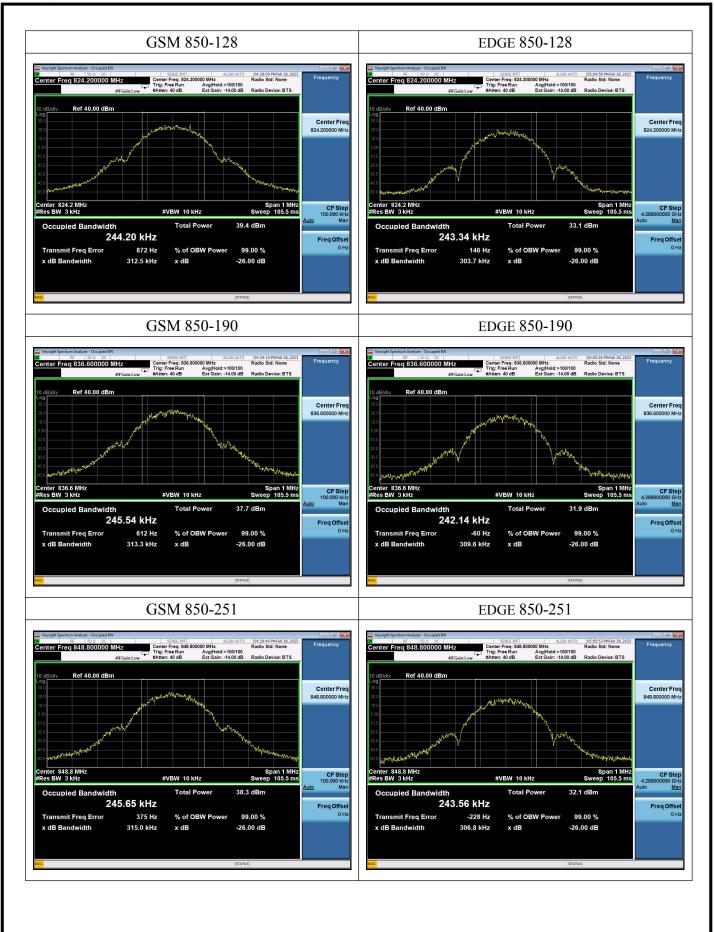


# 2.3.5. Test Result of 99% Occupied Bandwidth and 26dB Emission Bandwidth

Band	Channel	Frequency (MHz)	26dB EBW (kHz)	99% OBW (kHz)	Verdict
		,	,	, ,	
GSM 850	128	824.2	312.5	244.20	PASS
	190	836.6	313.3	245.54	PASS
	251	848.8	315.0	245.65	PASS
EDGE 850	128	824.2	303.7	243.34	PASS
	190	836.6	309.6	242.14	PASS
	251	848.8	306.8	243.56	PASS
PCS 1900	512	1850.2	307.7	244.17	PASS
	661	1880.0	311.3	243.75	PASS
	810	1909.8	318.9	247.00	PASS
EDGE 1900	512	1850.2	307.6	247.17	PASS
	661	1880.0	305.2	246.18	PASS
	810	1909.8	315.7	242.44	PASS

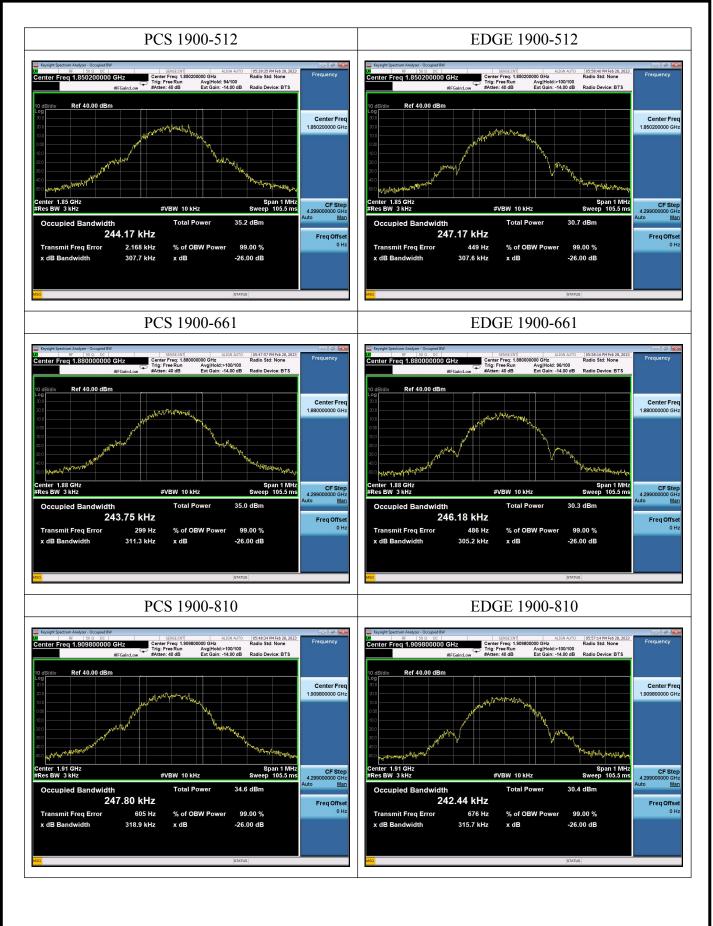
Band	Channel	Frequency (MHz)	26dB EBW (MHz)	99% OBW (MHz)	Verdict
WCDMA 850	4132	826.4	4.710	4.1616	PASS
	4183	836.6	4.707	4.1380	PASS
	4233	846.6	4.710	4.1394	PASS
WCDMA 1700	1312	1712.4	4.739	4.1645	PASS
	1412	1732.4	4.730	4.1593	PASS
	1513	1752.6	4.754	4.1769	PASS
WCDMA 1900	9262	1852.4	4.715	4.1546	PASS
	9400	1880.0	4.714	4.1527	PASS
	9538	1907.6	4.714	4.1577	PASS





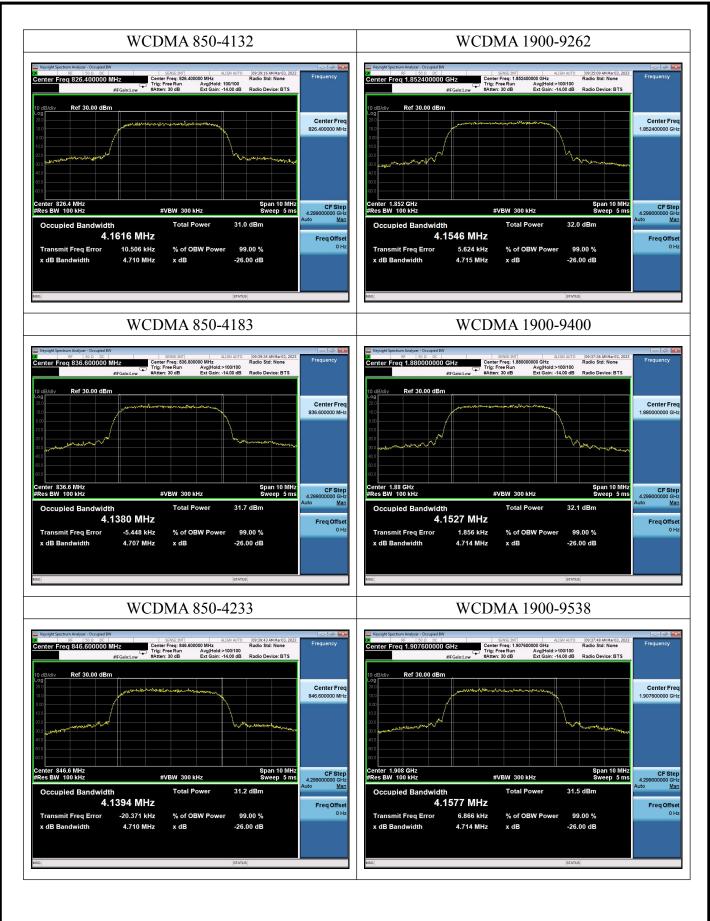






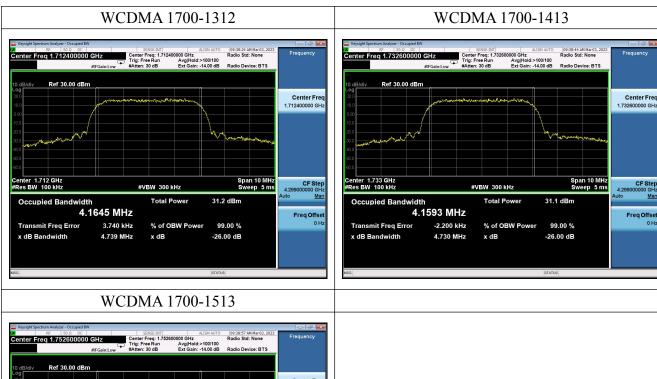


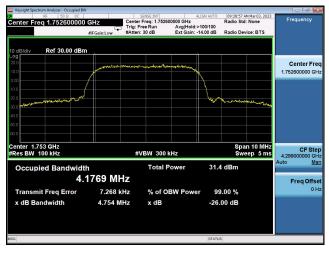














### 2.4. Conducted Band Edge

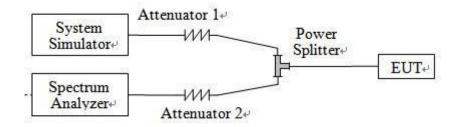
### 2.4.1. Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ .

### 2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.4.3. Test Setup



#### 2.4.4. Test Procedures

- 1. The testing follows the of KDB 971168 D01 v03r01 Section 6 and ANSI C63.26-2015 Section 5.7.
- 2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
- 3. Span was set large enough so as to capture all out of band emissions near the Channel Edge.
- 4. Use RBW  $\geq$  1% EBW in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, and use RBW = 1 MHz outside 1 MHz of the authorized frequency channel.
- 5. Set VBW  $\geq$  3 × RBW
- 6. Set Detector = power averaging (rms).
- 7. Set the number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- 8. Set sweep trigger to "free run."
- 9. Set the Sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time).
- 10. Perform a trace average of at least 100 traces.
- 11. Repeat step 3~10 at other frequency and modulations.



# 2.4.5. Test Result of Conducted Band Edge

