RF TEST REPORT

For

Shenzhen Mirasso Innovation intelligent Technology Co., LTD
Product Name: Smart watch
Test Model(s): H99

Report Reference No.	:	**DACE250103004RL003**
FCC ID	:	**2BOCU-H99**
Applicant's Name	:	Shenzhen Mirasso Innovation intelligent Technology Co., LTD
Address	:	601, Building 3, 1970 Science Park, Minzhi Community, Minzhi Street, Longhua District, Shenzhen
Testing Laboratory	:	Shenzhen DACE Testing Technology Co., Ltd.
Address	:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Test Specification Standard	:	**47 CFR Part 24E** **47 CFR Part 22H**
Date of Receipt	:	January 3, 2025
Date of Test	:	January 3, 2025 to March 19, 2025
Data of Issue	:	March 19, 2025
Result	:	**Pass**

Apply for company information

Applicant's Name	:	Shenzhen Mirasso Innovation intelligent Technology Co., LTD
Address	:	601, Building 3, 1970 Science Park, Minzhi Community, Minzhi Street, Longhua District, Shenzhen
Product Name	:	Smart watch
Test Model(s)	:	H99
Series Model(s)	:	H10, H11, H16, H18, H19, H20, H80, H90, H100
Test Specification Standard(s)	:	47 CFR Part 24E 47 CFR Part 22H

NOTE1:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:	Supervised by:	Approved by:
Keren Huang	Ben Tang	Machael Mo
Keren Huang / Test Engineer	Ben Tang / Project Engineer	Machael Mo / Manager
March 19, 2025	March 19, 2025	March 19, 2025

Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	DACE250103004RL003	March 19, 2025

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 24E: Personal Communications Services - Broadband PCS
47 CFR Part 22H: Public Mobile Services - Cellular Radiotelephone Service

1.2 Summary of Test Result

Item	Standard	Method	Requirement	Result
Effective (Isotropic) Radiated Power Output	47 CFR Part 24E&47 CFR Part 22H	ANSI C63.26-2015, Section 5.2.4.2	47 CFR Part 2.1046, Part 24.232 & 47 CFR Part 2.1046, Part 22.913	Pass
Peak To Average Ratio	47 CFR Part 24E&47 CFR Part 22H	ANSI C63.26-2015, Section 5.2.3.4	47 CFR Part 2.1046, Part 24.232(d) & 47 CFR Part 2.1046, Part 22.913 (d)	Pass
Bandwidth	47 CFR Part 24E&47 CFR Part 22H	ANSI C63.26-2015, Section 5.4	47 CFR Part 2.1049(h) & 47 CFR Part 2.1049(h)	Pass
Out of Band Emission	47 CFR Part 24E&47 CFR Part 22H	47 CFR Part 24.238(b) ANSI C63.26-2015, Section 5.7.3	47 CFR Part 2.1051, Part 24.238(a) & 47 CFR Part 2.1051, Part 22.917(a)	Pass
Spurious Unwanted Emission	47 CFR Part 24E&47 CFR Part 22H	47 CFR Part 24.238(b) ANSI C63.26-2015, Section 5.7.3	47 CFR Part 2.1051, Part 24.238(a) & 47 CFR Part 2.1051, Part 22.917(a)	Pass
Field Strength of Radiated Emission	47 CFR Part 24E&47 CFR Part 22H	ANSI C63.26-2015, Section 5.5.3	47 CFR Part 2.1053, Part 24.238(a) & 47 CFR Part 2.1053, Part 22.917(a)	Pass
Frequency Stability	47 CFR Part 24E&47 CFR Part 22H	ANSI C63.26-2015, Section 5.6	47 CFR Part 2.1055, Part 24.235 & 47 CFR Part 2.1055, Part 22.355	Pass

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name	:	Shenzhen Mirasso Innovation intelligent Technology Co., LTD
Address	:	601, Building 3, 1970 Science Park, Minzhi Community, Minzhi Street, Longhua District, Shenzhen
Manufacturer	:	Shenzhen Mirasso Innovation intelligent Technology Co., LTD
Address	:	601, Building 3, 1970 Science Park, Minzhi Community, Minzhi Street, Longhua District, Shenzhen

2.2 Description of Device (EUT)

Product Name:	Smart watch
Model/Type reference:	H99
Series Model:	H10, H11, H16, H18, H19, H20, H80, H90, H100
Model Difference:	There are multiple models of the product, with differences in the color of the appearance and customer requirements for different models in the market, resulting in multiple models. However, the internal circuit boards, PCBs, BOMs, and other electrical structures of these models are the same, and these differences will not affect RF&EMC performance. Therefore, the selected test model is:H99 .
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	-0.6dBi,
3G	
Support Networks:	WCDMA
Support Band:	WCDMA Band 2, WCDMA Band 4, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
Type of Modulation:	BPSK,QPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: -0.6dBi, WCDMA Band 5: -1dBi

Support Networks:	WCDMA
Support Band:	WCDMA Band 2, WCDMA Band 5

(Remark:The Antenna Gain is supplied by the customer.DACE is not responsible for This data and the related calculations associated with it)

2.3 Description of Test Modes

No	Title	Description
TM1	GPRS	Low, Middle, High Channels
TM2	GSM	Low, Middle, High Channels
TM3	EGPRS	Low, Middle, High Channels
TM4	WCDMA Band 2	Low, Middle, High Channels
TM5	WCDMA Band 5	Low, Middle, High Channels

2.4 Test frequency list

Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
	RX	Channel 128	Channel 190	Channel 251
		869.2 MHz	881.6 MHz	893.8 MHz
Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz

Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
WCDMA850	TX	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.6 MHz	846.6 MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4 MHz	881.4 MHz	891.6 MHz
Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
WCDMA1900	TX	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz
	RX	Channel 9662	Channel 9800	Channel 9938
		1932.4 MHz	1960.0 MHz	1987.6 MHz

2.5 Description of Support Units

Title	Manufacturer	Model No.	Serial No.
AC-DC adapter	HUAWEI TECHNOLOGY	HW100400C01	

2.6 Equipments Used During The Test

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Test Software	Tachoy Information Technology(shenzhen) Co.,Ltd.	RTS-01	V1.0.0	/	/
Power divider	MIDEWEST	PWD-2533	SMA-79	2023-05-11	2026-05-10
RF Sensor Unit	Tachoy Information Technology(shenzhen) Co.,Ltd.	TR1029-2	000001	/	/
Wideband radio communication tester	R&S	CMW500	113410	2024-06-12	2025-06-11
Vector Signal Generator	Keysight	N5181A	MY50143455	2024-12-06	2025-12-05
Signal Generator	Keysight	N5182A	MY48180415	2024-12-06	2025-12-05
Spectrum Analyzer	Keysight	N9020A	MY53420323	2024-12-06	2025-12-05

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Cable(HF)2	SCHWARZ BECK	50Ω	/	2024-05-20	2025-05-19
Cable(HF)1	SCHWARZ BECK	50Ω	/	2024-05-20	2025-05-19
Cable(LF)2	SCHWARZ BECK	50Ω	/	2024-05-20	2025-05-19
Cable(LF)1	SCHWARZ BECK	50Ω	/	2024-05-20	2025-05-19
control	MF	MF-7802	MF780208362	2024-12-09	2025-12-08
Test Receiver	Rohde & Schwarz	ESPI TEST RECEIVER	ID:1164.6607K03-102109-MH	2024-06-12	2025-06-11
EMI Test software	Farad	EZ -EMC	V1.1.42	/	/
Positioning Controller	MF	MF-7802	/	/	/
Amplifier(18-40G)	COM-POWER	AH-1840	10100008-1	2023-05-19	2025-05-18
Horn antenna	COM-POWER	AH-1840 (18-40G)	10100008	2023-05-19	2025-05-18
Loop antenna	ZHINAN	ZN30900C	ZN30900C	2024-06-14	2026-06-13
Power amplifier(LF)	Schwarzbeck	BBV9743	9743-151	2024-06-12	2025-06-11
Power amplifier(HF)	Schwarzbeck	BBV9718	9718-282	2024-06-12	2025-06-11
Test Receiver	R&S	ESCI 3	1166.5950K03-101431-Jq	2024-06-13	2025-06-12
Horn Antenna	Sunol Sciences	DRH-118	A091114	2023-05-13	2025-05-12
Broadband Antenna	Sunol Sciences	JB6 Antenna	A090414	2024-09-28	2026-09-27

2.7 Statement Of The Measurement Uncertainty

Test Item	Measurement Uncertainty
RF conducted power	±0.733dB
Occupied Bandwidth	±3.63%
RF power density	±0.234%
Radiated Emission (Above 1GHz)	±5.46dB
Radiated Emission (Below 1GHz)	±5.79dB
Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

2.8 Identification of Testing Laboratory

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Connunity, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252

Identification of the Responsible Testing Location

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Connunity, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252
Designation Number:	CN1342
Test Firm Registration Number:	778666
A2LA Certificate Number:	6270.01

2.9 Announcement

(1) The test report reference to the report template version v0.
(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
(3) The test report is invalid if there is any evidence and/or falsification.
(4) This document may not be altered or revised in any way unless done so by DACE and all revisions are duly noted in the revisions section.
(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

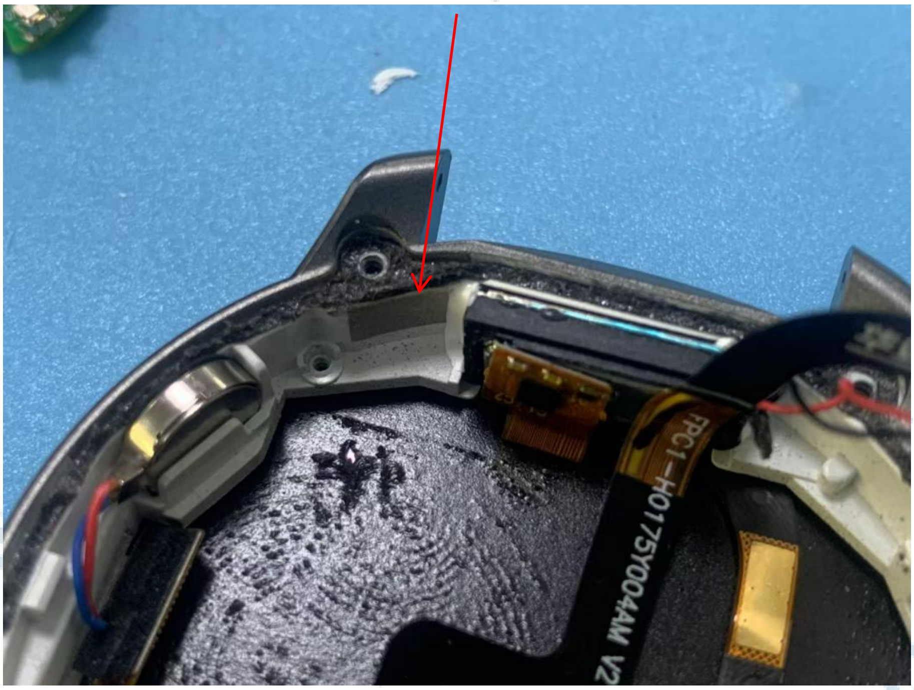
3 Evaluation Results (Evaluation)

3.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.1.1 Conclusion:

2G/3G/4G-ANT



4 Radio Spectrum Matter Test Results (RF)

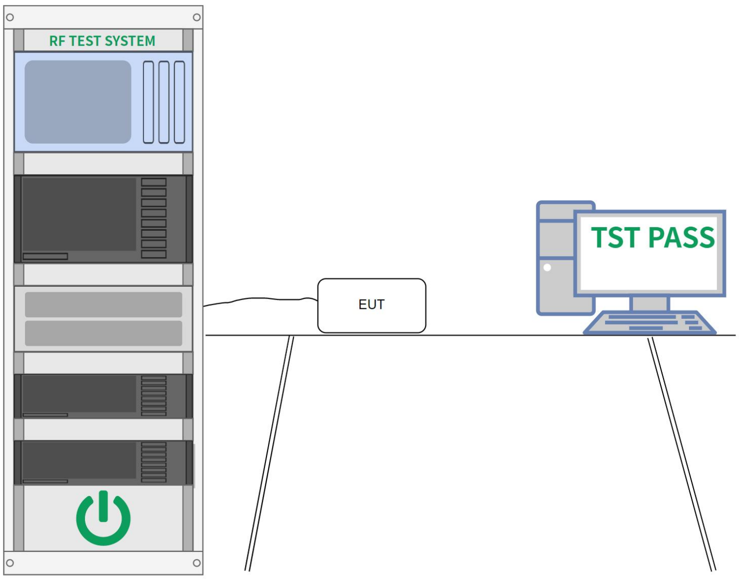
4.1 Effective (Isotropic) Radiated Power Output

Test Requirement:	47 CFR Part 2.1046, Part 24.232 & 47 CFR Part 2.1046, Part 22.913
Test Limit:	Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
Test Method:	ANSI C63.26-2015, Section 5.2.4.2
Procedure:	If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98%), then the following options can be implemented to facilitate measurement of the average power with an average power meter: a) A gated average power meter can be used to perform the measurement if the gating parameters can be adjusted such that the power is measured only during active transmission bursts at maximum output power levels. b) A conventional average power meter with no signal gating capability can also be used if the measured burst duty cycle is constant (i.e., duty cycle variations are less than or equal to ±2%) by performing the measurement over the on/off burst cycles and then correcting (increasing) the measured level by a factor equal to [10 log (1/duty cycle)]. See 5.2.4.3.4 for guidance with respect to measuring the transmitter duty cycle.

4.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM2,TM3,TM4,TM5				

4.1.2 Test Setup Diagram:



4.1.3 Test Data:

Please Refer to Appendix for Conducted Power.

Radiated Power Output

Mode	Channel	Antenna Polar	ERP (dBm)	Limit (dBm)	Result
GSM850	Low	V	31.40	<38.45	Pass
		H	30.75		
	Mid	V	32.10		
		H	32.05		
	High	V	31.95		
		H	31.85		
GPRS850	Low	V	31.51	<38.45	Pass
		H	31.77		
	Mid	V	31.39		
		H	31.84		
	High	V	30.82		
		H	31.98		
EGPRS850	Low	V	31.42	<38.45	Pass
		H	31.97		
	Mid	V	32.02		
		H	31.64		
	High	V	31.96		
		H	31.87		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	Low	V	29.09	<33.00	Pass
		H	28.96		
	Mid	V	28.37		
		H	28.74		
	High	V	28.48		
		H	29.07		
GPRS1900	Low	V	28.63	<33.00	Pass
		H	28.43		
	Mid	V	28.51		
		H	29.27		
	High	V	29.01		
		H	28.52		

EGPRS1900	Low	V	28.93	<33.00	Pass
		H	28.49		
	Mid	V	29.30		
		H	28.97		
	High	V	29.14		
		H	28.91		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band II	Low	V	22.90	<33.00	Pass
		H	23.23		
	Mid	V	22.92		
		H	23.27		
	High	V	22.42		
		H	23.33		

Mode	Channel	Antenna Polar	ERP	Limit (dBm)	Result
WCDMA Band V	Low	V	23.01	<38.45	Pass
		H	22.41		
	Mid	V	23.11		
		H	23.31		
	High	V	22.88		
		H	22.53		

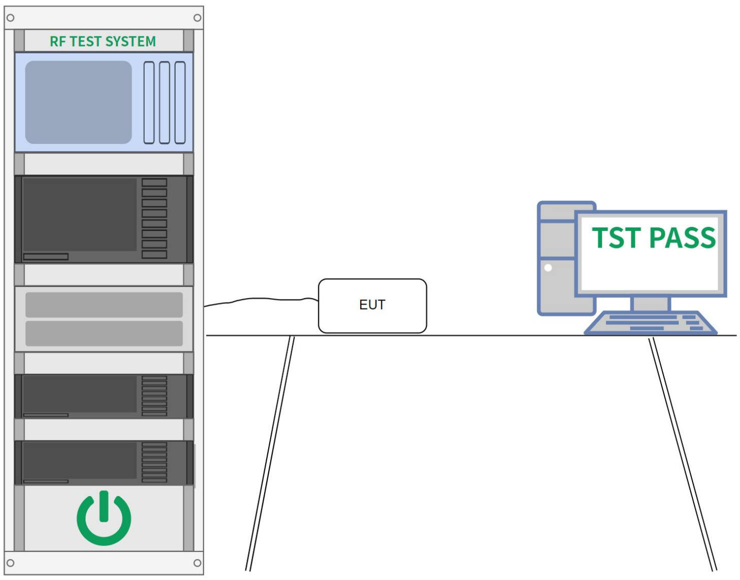
4.2 Peak To Average Ratio

Test Requirement:	47 CFR Part 2.1046, Part 24.232(d) & 47 CFR Part 2.1046, Part 22.913 (d)
Test Limit:	The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.
Test Method:	ANSI C63.26-2015, Section 5.2.3.4
Procedure:	a) Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth. b) Set the number of counts to a value that stabilizes the measured CCDF curve. c) Set the measurement interval as follows: 1) For continuous transmissions, set to the greater of [10 × (number of points in sweep) ×(transmission symbol period)] or 1 ms. 2) For burst transmissions, employ an external trigger that is synchronized with the EUT bursttiming sequence, or use the internal burst trigger with a trigger level that allows the burst tostabilize. Set the measurement interval to a time that is less than or equal to the burst duration. 3) If there are several carriers in a single antenna port, the peak power shall be determined foreach individual carrier (by disabling the other carriers while measuring the required carrier)and the total peak power calculated from the sum of the individual carrier peak powers. d) Record the maximum PAPR level associated with a probability of 0.1%. e) The peak power level is calculated form the sum of the PAPR value from step d) to the measured average power.

4.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM2,TM3,TM4,TM5				

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Please Refer to Appendix for Details.

4.3 Bandwidth

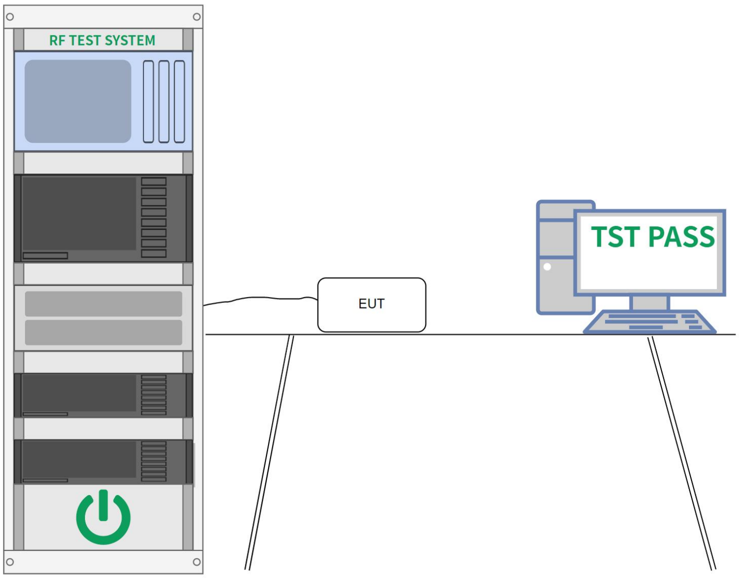
Test Requirement:	47 CFR Part 2.1049(h)
Test Limit:	OBW: No limit, only for report use. EBW: No limit, only for report use.
Test Method:	ANSI C63.26-2015, Section 5.4
Procedure:	OBW: a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of 1.5 × OBW is sufficient). b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW. c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances. d) Set the detection mode to peak, and the trace mode to max-hold. e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies. f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s). EBW: a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement. b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW. c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances. d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "-X dB" requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level. e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold. f) Determine the reference value by either of the following: 1) Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier. g) Determine the "-X dB amplitude" as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function. h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on,then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i). i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "-X

	dB amplitude" determined in step f). If a marker is below this "-X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.The spectral envelope can cross the "-X dB amplitude" at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "-X dB amplitude." j) The OBW shall be reported by providing plot(s) of the measuring instrument display, to includemarkers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM2,TM3,TM4,TM5				

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Please Refer to Appendix for Details.

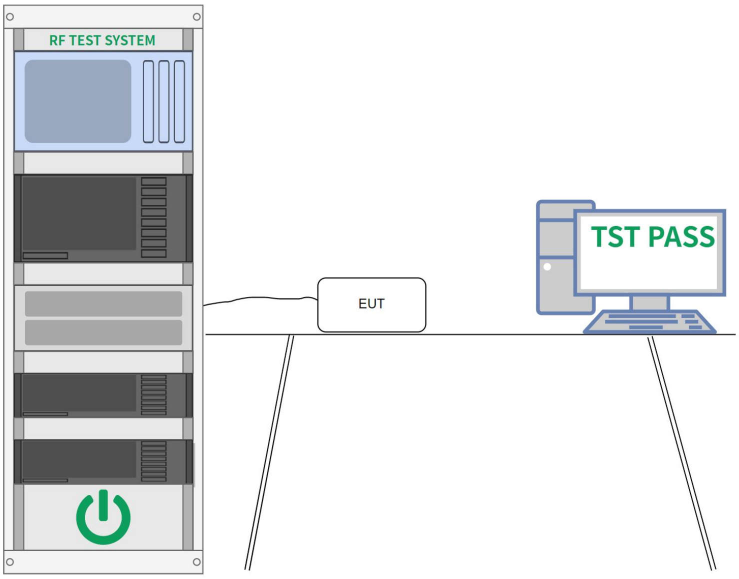
4.4 Out of Band Emission

Test Requirement:	47 CFR Part 2.1051, Part 24.238(a) & 47 CFR Part 2.1051, Part 22.917(a)
Test 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.
Test Method:	47 CFR Part 24.238(b) ANSI C63.26-2015, Section 5.7.3 47 CFR Part 22.917(b) ANSI C63.26-2015, Section 5.7.3
Procedure:	Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (a) Set the spectrum analyzer center frequency to the block, band, or channel edge frequency. b) Set the span wide enough to capture the fundamental emission closest to the authorized block or band edge, and to include all modulation products that spill into the immediately adjacent frequency band. In some cases, it may be possible to set the center frequency and span so as to encompass the fundamental emission and the unwanted out-of-band (band-edge) emissions on either side of the authorized block, band, or channel. This can be accomplished with a single (slow) sweep, if adequate overload protection and sufficient dynamic range can be maintained. c) Set the number of points in sweep ≥ 2 × span / RBW. d) Sweep time should be auto for peak detection. For rms detection the sweep time should be set as follows: 1) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) × (symbol period) (e.g., by a factor of 10 × symbol period × number of points). Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols 2) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) × (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time. 3) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%). 4) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%),set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time <(transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold are necessary to ensure that the maximum power is measured. e) The test report shall include the plots of the measuring instrument display and the measured data. f) See Annex I for example emission mask plots.

4.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM2,TM3,TM4,TM5				

4.4.2 Test Setup Diagram:



4.4.3 Test Data:

Please Refer to Appendix for Details.

4.5 Spurious Unwanted Emission

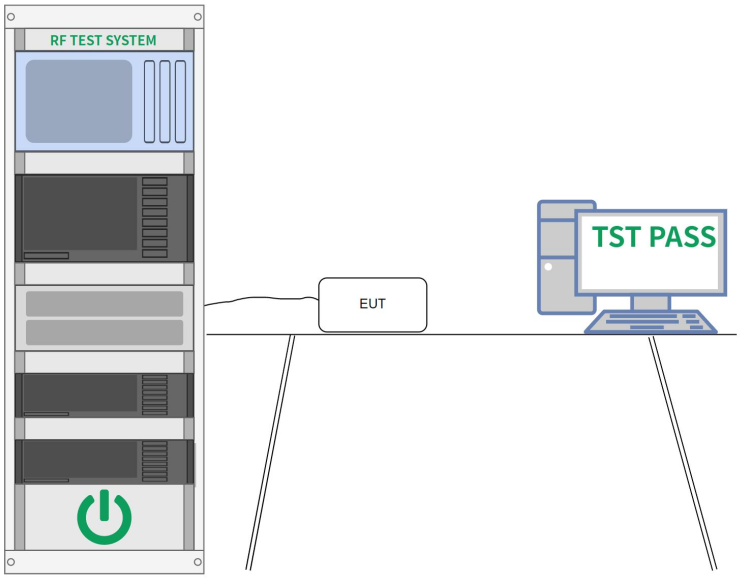
Test Requirement:	47 CFR Part 2.1051, Part 24.238(a) &
Test Limit:	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
Test Method:	47 CFR Part 24.238(b) ANSI C63.26-2015, Section 5.7.3 47 CFR Part 22.917(b) ANSI C63.26-2015, Section 5.7.3
Procedure:	Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (a) Set the spectrum analyzer center frequency to the block, band, or channel edge frequency. b) Set the span wide enough to capture the fundamental emission closest to the authorized block or band edge, and to include all modulation products that spill into the immediately adjacent frequency band. In some cases, it may be possible to set the center frequency and span so as to encompass the fundamental emission and the unwanted out-of-band (band-edge) emissions on either side of the authorized block, band, or channel. This can be accomplished with a single (slow) sweep, if adequate overload protection and sufficient dynamic range can be maintained. c) Set the number of points in sweep ≥ 2 × span / RBW. d) Sweep time should be auto for peak detection. For rms detection the sweep time should be set as follows: 1) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) × (symbol period) (e.g., by a factor of 10 × symbol period × number of points). Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols 2) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) × (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time. 3) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%). 4) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%),set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time <(transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold are necessary to ensure that the maximum power is measured. e) The test report shall include the plots of the measuring instrument display and the measured data. f) See Annex I for example emission mask plots.

4.5.1 E.U.T. Operation:

Operating Environment:

Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM2,TM3,TM4,TM5				

4.5.2 Test Setup Diagram:



4.5.3 Test Data:

Please Refer to Appendix for Details.

4.6 Field Strength of Radiated Emission

Test Requirement:	47 CFR Part 2.1053, Part 24.238(a) & 47 CFR Part 2.1053, Part 22.917(a)
Test 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.
Test Method:	ANSI C63.26-2015, Section 5.5.3
Procedure:	a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency. b) Each emission under consideration shall be evaluated: 1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height. 2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position. 3) Return the turntable to the azimuth where the highest emission amplitude level was observed. 4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude. 5) Record the measured emission amplitude level and frequency using the appropriate RBW. c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude. d) Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement. e) Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna. f) Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor. g) For each emission that was detected and measured in the initial test [i.e., in step b) and step c)]: 1) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude. 2) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step b) and step c). 3) Record the output power level of the signal generator when equivalence is achieved in step 2). h) Repeat step e) through step g) with the measurement antenna oriented in the opposite polarization. i) Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:Pe = Ps(dBm) - cable loss (dB) + antenna gain (dBd) where Pe = equivalent emission power in dBm Ps = source (signal generator) power in dBm NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole. j) Correct the antenna gain of the substitution antenna if necessary to reference the emission power to

	a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from: gain (dBd) = gain (dBi) - 2.15 dB. If necessary, the antenna gain can be calculated from calibrated antenna factor information k) Provide the complete measurement results as a part of the test report.

4.6.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM4				

4.6.2 Test Data:

Please Refer to Appendix for Details.

Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	Reading (dBm)	Factor (dB)	Level (dBm)		
GSM850	Low	226.22	Vertical	-39.89	-6.68	-46.57	-13.00	PASS
		2243.28	V	-49.89	-3.42	-53.31		
		3890.08	V	-51.06	-1.42	-52.48		
		214.23	Horizontal	-39.67	-6.68	-46.35	-13.00	PASS
		1549.84	H	-48.42	-3.42	-51.84		
		3561.82	H	-52.94	-1.42	-54.36		
	Mid	280.97	Vertical	-40.09	-6.68	-46.77	-13.00	PASS
		2409.45	V	-47.61	-3.42	-51.03		
		3510.70	V	-52.16	-1.42	-53.58		
		235.68	Horizontal	-39.60	-6.68	-46.28	-13.00	PASS
		1729.47	H	-49.99	-3.42	-53.41		
		3170.32	H	-51.95	-1.42	-53.37		
	High	208.68	Vertical	-40.27	-6.68	-46.95	-13.00	PASS
		2495.81	V	-48.10	-3.42	-51.52		
		3020.39	V	-52.66	-1.42	-54.08		
		293.65	Horizontal	-37.93	-6.68	-44.61	-13.00	PASS
		2417.68	H	-48.01	-3.42	-51.43		
		3955.04	H	-52.18	-1.42	-53.60		

WCDMA Band II	Low	257.95	Vertical	-38.24	-6.68	-44.92	- 13.00	PASS
		1910.13	V	-47.99	-3.42	-51.41		
		3263.96	V	-51.14	-1.42	-52.56		
		281.20	Horizontal	-38.55	-6.68	-45.23	- 13.00	PASS
		2217.81	H	-48.48	-3.42	-51.90		
		3775.20	H	-52.22	-1.42	-53.64		
	Mid	283.19	Vertical	-38.71	-6.68	-45.39	- 13.00	PASS
		2349.23	V	-48.75	-3.42	-52.17		
		3550.36	V	-53.07	-1.42	-54.49		
		254.34	Horizontal	-38.75	-6.68	-45.43	- 13.00	PASS
		1576.24	H	-47.93	-3.42	-51.35		
		3743.30	H	-51.37	-1.42	-52.79		
	High	211.76	Vertical	-39.71	-6.68	-46.39	- 13.00	PASS
		2376.72	V	-50.00	-3.42	-53.42		
		3924.01	V	-53.01	-1.42	-54.43		
		265.62	Horizontal	-40.24	-6.68	-46.92	- 13.00	PASS
		1959.51	H	-47.79	-3.42	-51.21		
		3003.49	H	-50.77	-1.42	-52.19		

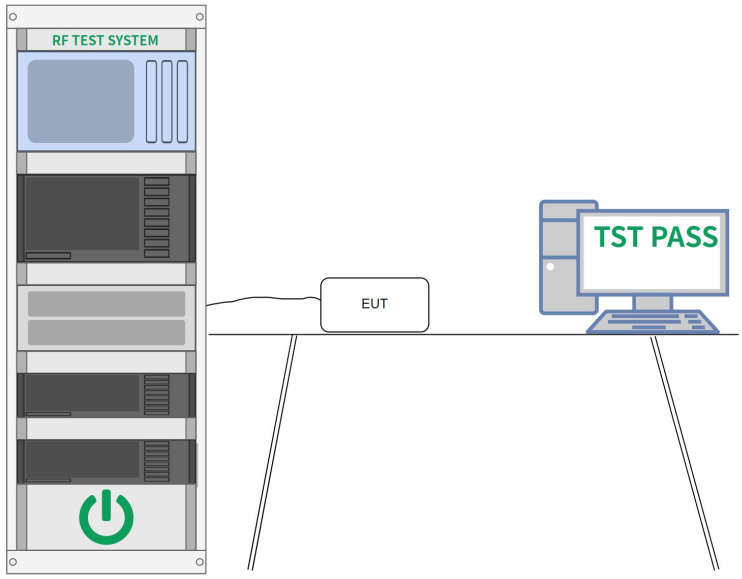
4.7 Frequency Stability

Test Requirement:	47 CFR Part 2.1055, Part 24.235 & 47 CFR Part 2.1055, Part 22.355
Test Limit:	The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. +/- 2.5ppm
Test Method:	ANSI C63.26-2015, Section 5.6
Procedure:	In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU500 DIGITAL RADIO COMMUNICATION TESTER. 1. Measure the carrier frequency at room temperature; 2. Subject the EUT to overnight soak at -30℃; 3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on middle channel of PCS 1900 and GSM850, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming; 4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 0.5 hours at each temperature, unpowered, before making measurements; 5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 0.5 hours unpowered, to allow any self-heating to stabilize, before continuing; 6. Subject the EUT to overnight soak at +50℃; 7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming; 8. Repeat the above measurements at 10℃ increments from +50℃ to -30℃. Allow at least 0.5 hours at each temperature, unpowered, before making measurements; 9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure;

4.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.2 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5				
Final test mode:	TM1,TM2,TM3,TM4,TM5				

4.7.2 Test Setup Diagram:



4.7.3 Test Data:

Please Refer to Appendix for Details.

5 TEST SETUP PHOTOS

Refer to Appendix - EUT Photos for DACE250103004RL001

6 PHOTOS OF THE EUT

Refer to Appendix - EUT Photos for DACE250103004RL001

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