

FCC TEST REPORT
FOR
SingularXYZ Intelligent Technology Ltd.
GNSS Receiver
Test Model: Xbase
Additional Model No.: Qbase, EBase

Prepared for	: SingularXYZ Intelligent Technology Ltd.
Address	: Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China
Prepared by	: Guangzhou LCS Compliance Testing Laboratory Ltd.
Address	: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel	: (+86) 020-39166689
Fax	: (+86) 020-39166619
Web	: www.LCS-cert.com
Mail	: webmaster@LCS-cert.com
Date of receipt of test sample	: July 08, 2026
Number of tested samples	: 2
Sample No.	: C260629007-1, C260629007-2
Serial number	: Prototype
Date of Test	: July 08, 2026 ~ September 18, 2026
Date of Report	: September 20, 2026

FCC TEST REPORT	
FCC Part 22 /Part 24	
Report Reference No.	LCSC05256009EG
Date of Issue.	September 20, 2026
Testing Laboratory Name	Guangzhou LCS Compliance Testing Laboratory Ltd.
Address	No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Applicant's name	SingularXYZ Intelligent Technology Ltd.
Address	Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China
Test specification	
Standard	FCC Part 22: Public Mobile Services FCC Part 24: Personal Communication Services
TRF Originator	Guangzhou LCS Compliance Testing Laboratory Ltd.
Master TRF	Dated 2011-03
Guangzhou LCS Compliance Testing Laboratory Ltd. All rights reserved. This publication may be reproduced in whole or in part for non-commercial purposes as long as the Guangzhou LCS Compliance Testing Laboratory Ltd. is acknowledged as copyright owner and source of the material. Guangzhou LCS Compliance Testing Laboratory Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.	
Test item description	GNSS Receiver
Trade Mark	SingularXYZ
Test Model	Xbase
Ratings	Please Refer to Page 7
Frequency	GSM 850MHz; PCS 1900MHz
Result	Pass

Compiled by:



Lifeng Le / Administrator

Supervised by:



Justin Zhu/ Technique Director

Approved by:



Gavin Liang/ Manager

TEST REPORT

Test Report No. :	LCSC05256009EG	September 20, 2026
		Date of issue

Test Model.....	: Xbase
EUT.....	: GNSS Receiver
Applicant.....	: SingularXYZ Intelligent Technology Ltd.
Address.....	: Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: SingularXYZ Intelligent Technology Ltd.
Address.....	: Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China
Telephone.....	: /
Fax.....	: /
Factory.....	: SingularXYZ Intelligent Technology Ltd.
Address.....	: Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China
Telephone.....	: /
Fax.....	: /

Test Result:	Pass
---------------------	-------------

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Report Version	Issue Date	Revision Content	Revised By
000	September 20, 2026	Initial Issue	---

Contents

<u>1</u>	<u>TEST STANDARDS</u>	<u>6</u>
<u>2</u>	<u>SUMMARY</u>	<u>7</u>
2.1	Product Description	7
2.2	Equipment under Test	10
2.3	Short description of the Equipment under Test (EUT)	10
2.4	Support equipment List	10
2.5	External I/O Cable	10
2.6	Normal Accessory setting	10
2.7	Test Sample	11
2.8	EUT configuration	11
2.9	Related Submittal(s) / Grant (s)	11
2.10	Modifications	11
2.11	General Test Conditions/Configurations	11
<u>3</u>	<u>TEST ENVIRONMENT</u>	<u>12</u>
3.1	Address of the test laboratory	12
3.2	Test Facility	12
3.3	Environmental conditions	12
3.4	Test Description	13
3.5	Equipments Used during the Test	14
3.6	Measurement uncertainty	15
<u>4</u>	<u>TEST CONDITIONS AND RESULTS</u>	<u>16</u>
4.1	Output Power	16
4.2	Radiated Spurious Emssion	20
4.3	Occupied Bandwidth and Emission Bandwidth	24
4.4	Band Edge Complicance	28
4.5	Spurious Emission on Antenna Port	31
4.6	Frequency Stability Test	42
4.7	Peak-to-Average Ratio (PAR)	45
<u>5</u>	<u>TEST SETUP PHOTOGRAPHS OF EUT</u>	<u>50</u>
<u>6</u>	<u>EXTERIOR PHOTOGRAPHS OF THE EUT</u>	<u>50</u>
<u>7</u>	<u>INTERIOR PHOTOGRAPHS OF THE EUT</u>	<u>50</u>

1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 22 \(10-1-16 Edition\)](#): Cellular Radiotelephone Service.

[FCC Part 24\(10-1-16 Edition\)](#): Broadband PCS.

[ANSI/TIA-603-E-2016](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[47 CFR FCC Part 15 Subpart B](#): Unintentional Radiators.

[FCC Part 2](#): Frequency Allocations And Radio Treaty Matters: General Rules And Regulations.

[ANSI C63.4:2014](#): Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

[ANSI C63.26-2015](#): Compliance Testing of Transmitters Used in Licensed Radio Services.

[FCC KDB971168 D01](#) Power Meas License Digital Systems v03r01.

2 SUMMARY

2.1 Product Description

The **SingularXYZ Intelligent Technology Ltd.**'s Model: GNSS Receiver or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

EUT	: GNSS Receiver
Test Model	: Xbase
Additional Model No.	: Qbase, EBase
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Ratings	: Input: DC 9-24V Nominal Voltage: 7.2V Nominal Capacity: 13.2Ah/95.04Wh Rated Capacity: 12.8Ah/92.16Wh
Hardware Version	: /
Software Version	: /
Bluetooth	:
Frequency Range	: 2402MHz~2480MHz
Channel Number	: 79 channels for Bluetooth V4.0 (DSS)
Channel Spacing	: 1MHz for Bluetooth V4.0 (DSS)
Modulation Type	: GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.0 (DSS)
Bluetooth Version	: V4.0
Antenna Description	: Internal Antenna, 3.7dBi(Max.)
WIFI(5.2G Band)	:
Frequency Range	: 5150MHz~5250MHz
Channel Number	: 4 Channels for 20MHz bandwidth(5180MHz~5240MHz) 2 channels for 40MHz bandwidth(5190MHz~5230MHz) 1 channels for 80MHz bandwidth(5210MHz)
Modulation Type	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Internal Antenna, 4.2dBi(Max.)
WIFI(5.3G Band)	:
Frequency Range	: 5250MHz~5350MHz
Channel Number	: 4 Channels for 20MHz bandwidth(5260MHz~5320MHz) 2 channels for 40MHz bandwidth(5270MHz~5310MHz) 1 channels for 80MHz bandwidth(5290MHz)
Modulation Type	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Internal Antenna, 4.2dBi(Max.)
WIFI(5.5G Band)	:
Frequency Range	: 5470MHz~5725MHz
Channel Number	: 11 Channels for 20MHz bandwidth(5500MHz~5700MHz) 5 Channels for 40MHz bandwidth(5510MHz~5670MHz) 2 Channels for 80MHz bandwidth(5530MHz, 5610MHz)
Modulation Type	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Internal Antenna, 2.3dBi(Max.)

WIFI(5.8G Band)	:
Frequency Range	: 5725MHz~5850MHz
Channel Number	: 5 channels for 20MHz bandwidth(5745MHz~5825MHz) 2 channels for 40MHz bandwidth(5755MHz~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Modulation Type	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Internal Antenna, 1.5dBi(Max.)
PMR	:
Operating Frequency	: 410~470MHz
Channel Separation	: 12.5KHz
Modulation Type	: GMSK
Emission Designator	: 7K60G1D for GMSK Modulation at 12.5KHz Channel Separation
Antenna Type	: External Antenna
Antenna Gain	: 2.15dBi(max.) for PMR
2G	:
Support Band	: ☒ GSM 850 (U.S.-Band) ☒ PCS 1900 (U.S.-Band)
Release Version	: R99
GPRS Class	: Class 12
EGPRS Class	: Class 12
Type Of Modulation	: GMSK for GPRS; GMSK/8PSK for EGPRS
Antenna Description	: Internal Antenna 0.5dBi (max.) For GSM 850 -0.4dBi (max.) For PCS 1900
3G	:
Support Band	: ☒ WCDMA Band II (U.S.-Band) ☒ WCDMA Band IV (U.S.-Band) ☒ WCDMA Band V (U.S.-Band)
Release Version	: R7&R8
Type Of Modulation	: QPSK/16QAM
Antenna Description	: Internal Antenna -0.4dBi (max.) For WCDMA Band II 4.7dBi (max.) For WCDMA Band IV 0.5dBi (max.) For WCDMA Band V
LTE	:
Support Band	: ☒ E-UTRA Band 2(U.S.-Band) ☒ E-UTRA Band 4(U.S.-Band) ☒ E-UTRA Band 5(U.S.-Band) ☒ E-UTRA Band 7(U.S.-Band) ☒ E-UTRA Band 12(U.S.-Band) ☒ E-UTRA Band 13(U.S.-Band) ☒ E-UTRA Band 25(U.S.-Band) ☒ E-UTRA Band 26(U.S.-Band) ☒ E-UTRA Band 38(U.S.-Band) ☒ E-UTRA Band 41(U.S.-Band)
LTE Release Version	: R11
Type Of Modulation	: QPSK/16QAM
Antenna Description	: Internal Antenna -0.4dBi (max.) For E-UTRA Band 2 4.7dBi (max.) For E-UTRA Band 4 0.5dBi (max.) For E-UTRA Band 5

1.1dBi (max.) For E-UTRA Band 7
-1.6dBi (max.) For E-UTRA Band 12
-1.6dBi (max.) For E-UTRA Band 13
-0.4dBi (max.) For E-UTRA Band 25
0.5dBi (max.) For E-UTRA Band 26
-1.9dBi (max.) For E-UTRA Band 38
1.2dBi (max.) For E-UTRA Band 41

Power Class : Class 3

GPS Function : Support and only RX

Extreme temp. : -30°C to +65°C

Tolerance

Extreme vol. Limits : 6.12VDC to 8.28VDC (nominal: 7.2VDC)

Note: For a more detailed antenna description, please refer to the antenna specifications or the antenna report provided by the customer.

2.2 Equipment under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		●	7.2 V DC	○	24 V DC
		○	Other (specified in blank below)		

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)
PCS1900	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

2.3 Short description of the Equipment under Test (EUT)

2.3.1 General Description

GNSS Receiver is subscriber equipment in the BT/5.2GWIFI/5.3GWIFI/5.5GWIFI/5.8GWIFI//PMR GSM/WCDMA/LTE system. GPRS/EGPRS frequency band is Band II/V. The HSPA/UMTS frequency band is Band II/IV/V. LTE frequency band is band 2/4/5/7/12/13/25/26/38/41. The GNSS Receiver implements such functions as RF signal receiving/transmitting, GPRS/EGPRS/ HSPA/UMTS/LTE protocol processing, video MMS service and etc. Externally it provides SIM card interface.

2.4 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
SHENZHEN TIANYIN ELECTRONICS CO., LTD	Power Adapter	TPA-46050200UU	--	FCC

Note: The adapter is supplied by lab and only use tested.

2.5 External I/O Cable

I/O Port Description	Quantity	Cable
--	--	N/A

2.6 Normal Accessory setting

Fully charged battery was used during the test.

2.7 Test Sample

The application provides 2 samples to meet requirement;

Sample Number	Description
Sample 1(C260629007-1)	Engineer sample – continuous transmit
Sample 2(C260629007-2)	Normal sample – Intermittent transmit

2.8 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

○ Power Cable	Length (m) :	/
	Shield :	/
	Detachable :	/
○ Multimeter	Manufacturer :	/
	Model No. :	/

2.9 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2A4O3-XBASE** filing to comply with FCC Part 22 and Part 24 Rules.

2.10 Modifications

No modifications were implemented to meet testing criteria.

2.11 General Test Conditions/Configurations

2.11.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
GSM/TM1	GSM system, GPRS, GMSK modulation
GSM/TM2	GSM system, EDGE, GMSK, 8PSK modulation

Note:

1. As GSM and GPRS with the same emission designator, test result recorded in this report at the worst case GSM/TM1 only after exploratory scan.

2.11.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	DC 6.12V
	VN	DC 7.2V
	VH	DC 8.28V

NOTE: VL=lower extreme test voltage VN=nominal voltage
VH=upper extreme test voltage TN=normal temperature

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Guangzhou LCS Compliance Testing Laboratory Ltd.

No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.4 (2014) and CISPR Publication 22.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Site Description

EMC Lab. : CNAS Registration Number is L11555
A2LA Certificate Number: 5099.01
FCC Designation Number is CN1379
Test Firm Registration Number: 729882

3.3 Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

3.4.1 Cellular Band (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §22.913	FCC: ERP $\leq$ 7W.	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §22.917	$\leq$ -13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	$\leq$ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	$\leq$ -13dBm/100kHz.	Pass
Frequency Stability	§2.1055, §22.355	$\leq$ $\pm$ 2.5ppm.	Pass
Peak-Average Ratio	§22.913	FCC:Limit $\leq$ 13dB	N/A
Receiver Spurious Emissions	N/A	--	Pass

NOTE 1: For the verdict, the "N/A" denotes "not applicable", the "N/T" de notes "not tested".

3.4.2 PCS Band (1850-1910MHz paired with 1930-1990MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §24.232	EIRP $\leq$ 2W	Pass
Peak-Average Ratio	§2.1046, §24.232	$\leq$ 13dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §24.238	$\leq$ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	$\leq$ -13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238	$\leq$ -13dBm/1MHz.	Pass
Frequency Stability	§2.1055, §24.235	$\leq$ $\pm$ 2.5ppm.	Pass
Peak-Average Ratio	§24.232	FCC:Limit $\leq$ 13dB	Pass
Receiver Spurious Emissions	N/A	--	Pass

NOTE 1: For the verdict, the "N/A" denotes "not applicable", the "N/T" de notes "not tested".

Remark: The measurement uncertainty is not included in the test result.

3.5 Equipments Used during the Test

Item	Equipment	Manufacturer	Model No.	Equipment No.	Cal Date	Due Date
1	Power Meter	Keysight	E4417A	GLCS-E-279	2026-04-07	2027-04-06
2	Power Sensor	Keysight	E9304A	GLCS-E-280	2026-04-07	2027-04-06
3	Power Sensor	Keysight	E9304A	GLCS-E-281	2026-04-07	2027-04-06
4	LTE Test Software	Tonscend	JS1120-1	GLCS-E-368	N/A	N/A
5	RF Control Unit	Tonscend	JS0806-1	GLCS-E-367	N/A	N/A
6	MXA Signal Analyzer	Keysight	N9020A	GLCS-E-361	2025-08-18 2026-07-15	2026-08-17 2027-07-14
7	DC Power Supply	Keysight	E3642A	GLCS-E-362	2025-08-18 2026-07-15	2026-08-17 2027-07-14
8	Signal Analyzer	Keysight	N5182A	GLCS-E-358	2025-08-18 2026-07-15	2026-08-17 2027-07-14
9	Signal Analyzer	Keysight	N5173B	GLCS-E-359	2025-08-18 2026-07-15	2026-08-17 2027-07-14
10	WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	GLCS-E-360	2025-08-18 2026-07-15	2026-08-17 2027-07-14
11	EMI Test Software	Farad	EZ-EMC(Ver.FA-03A2 RE+)	GLCS-E-012	N/A	N/A
12	Semi Anechoic Chamber#1	Maorui	966	GLCS-E-001	2024-04-21	2027-04-20
13	Positioning Controller	Max-Full	MF-7802	GLCS-E-015	N/A	N/A
14	Active Loop Antenna	TESEQ	HLA 6121	GLCS-E-155	2025-07-19 2026-07-17	2026-07-18 2027-07-16
15	By-log Antenna	SCHWARZBECK	VULB9163	GLCS-E-352	2025-08-16	2028-08-15
16	Low-frequency amplifier	Sonoma	310N	GLCS-E-036	2026-04-07	2027-04-06
17	Horn Antenna	SCHWARZBECK	BBHA 9120D	GLCS-E-060	2025-07-19 2026-07-17	2026-07-18 2027-07-16
18	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	GLCS-E-348	2025-08-18	2028-08-17
19	Broadband Preamplifier	Cesheng Technology	LNPA_30M06G-40(18GHz)	GLCS-E-286	2026-04-07	2027-04-06
20	Broadband Preamplifier	Cesheng Technology	LNPA 30M06G-40(40GHz)	GLCS-E-287	2026-04-10	2027-04-09
21	EMI Test Receiver	R&S	ESR 7	GLCS-E-192	2026-04-07	2027-04-06
22	RS SPECTRUM ANALYZER	R&S	FSP40	GLCS-E-213	2026-08-05	2027-08-04
23	6dB Attenuator	/	100W/6dB	GLCS-E-350	2025-08-13 2026-07-15	2026-08-12 2027-07-14
24	3dB Attenuator	/	2N-3dB	GLCS-E-351	2025-08-13 2026-07-09	2026-08-12 2027-07-08
25	Temperature & Humidity Chamber	GREATER TESTING	GR-HWS-225L	GLCS-E-369	2025-12-31 2026-07-15	2026-12-30 2027-07-14
26	EMI Test Receiver	ROHDE & SCHWARZ	ESR7	GLCS-E-158	2026-04-07	2027-04-06
27	Artificial Mains Network	ROHDE & SCHWARZ	ESH2-Z5	GLCS-E-011	2026-01-14	2027-01-13
28	EMI Test Software	Farad	EZ-EMC(Ver.FA-03A2 RE+)	GLCS-E-017	N/A	N/A
29	Antenna Mast	Maorui	BK-4AT-BS	GLCS-E-249	N/A	N/A
30	Pulse Limiter	SCHWARZBECK	VTSD 9561-F	GLCS-E-080	2026-04-07	2027-04-06

3.6 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to ETSI TR 100 028 “ Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics” and is documented in the Guangzhou LCS Compliance Testing Laboratory Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Guangzhou LCS Compliance Testing Laboratory Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.80 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occuiped Bandwidth	9KHz~40GHz	-	(1)

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

4 TEST CONDITIONS AND RESULTS

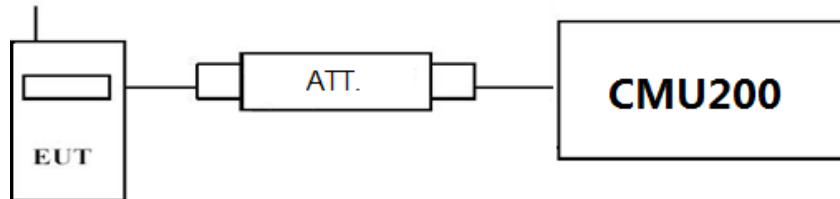
4.1 Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMU200) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1 Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a CMU200 by an Att.
- EUT Communicate with CMU200 then selects a channel for testing.
- Add a correction factor to the display CMU200, and then test.

TEST RESULTS

GSM 850		Burst Average Conducted power (dBm)		
		Channel/Frequency(MHz)		
		128/824.2	190/836.6	251/848.8
GPRS (GMSK)	1TX slot	32.39	32.38	32.39
	2TX slot	32.33	32.30	32.33
	3TX slot	30.98	30.97	31.03
	4TX slot	29.50	29.48	29.52
EDGE (8PSK)	1TX slot	28.02	27.99	27.97
	2TX slot	25.98	26.01	26.02
	3TX slot	24.50	24.52	24.53
	4TX slot	23.00	23.00	23.01

PCS 1900		Burst Average Conducted power (dBm)		
		Channel/Frequency(MHz)		
		512/1850.2	661/1880	810/1909.8
GPRS (GMSK)	1TX slot	29.40	29.43	29.39
	2TX slot	27.99	27.97	28.03
	3TX slot	26.50	26.50	26.49
	4TX slot	25.02	24.98	25.02
EDGE (8PSK)	1TX slot	25.49	25.51	25.53
	2TX slot	23.97	23.98	23.98
	3TX slot	22.47	22.52	22.49
	4TX slot	21.01	20.98	20.99

4.1.2 Radiated Output Power

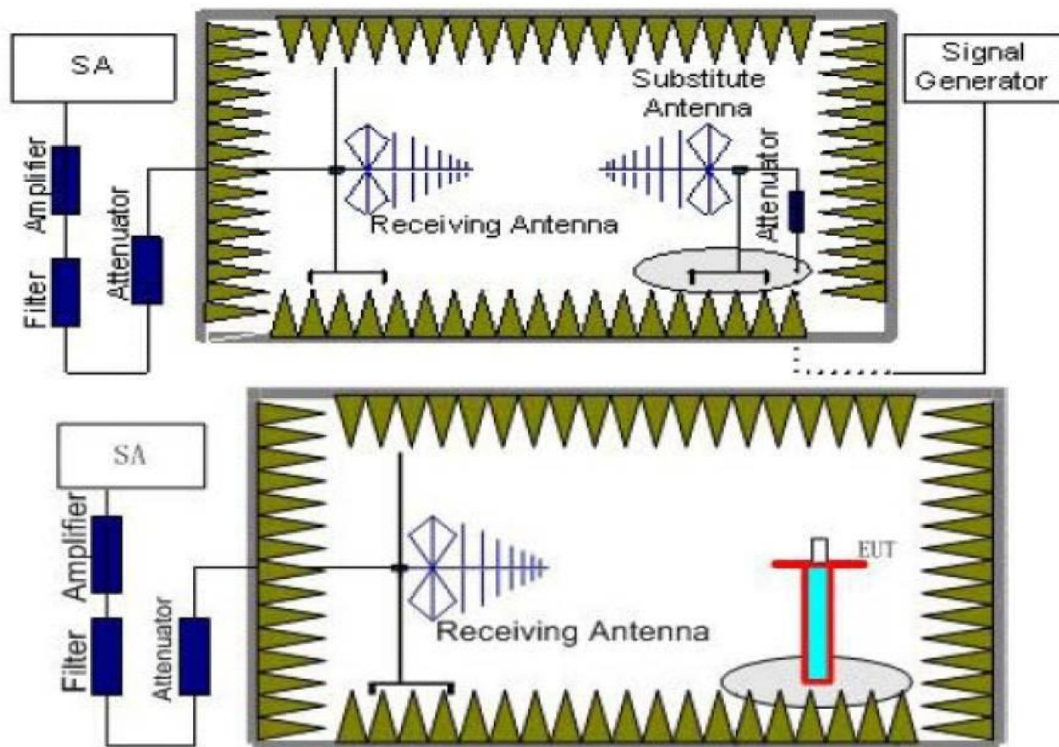
TEST DESCRIPTION

This is the test for the maximum radiated power from the EUT.

Per rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(e) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Per rule Part 22.913(a) specifies "The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the

previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.

TEST LIMIT

According to 22.913(a), 24.232(c), the ERP should be not exceed following table limits:

GSM850(GPRS850,EDGE850)		
Function	Power Step	Burst Average ERP (dBm)
GPRS	3	FCC: $\leq 38.45\text{dBm}$ (7W)
EDGE	8	FCC: $\leq 38.45\text{dBm}$ (7W)

PCS1900(GPRS1900,EDGE1900)		
Function	Power Step	Burst Average EIRP (dBm)
GPRS	3	$\leq 33.01\text{dBm}$ (2W)
EDGE	2	$\leq 33.01\text{dBm}$ (2W)

TEST RESULTS

Remark:

1. We were tested all Configuration refer 3GPP TS151 010.
2. $\text{EIRP} = P_{Mea}(\text{dBm}) - P_{cl}(\text{dB}) + P_{Ag}(\text{dB}) + G_a(\text{dBi})$
3. $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ as EIRP by subtracting the gain of the dipole.
4. Margin = Emission Level - Limit
5. We tested the worst-case records for H and V directions, and only the worst-case records for V direction were recorded in the report.

GSM/TM1/GPRS850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Burst Average ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-6.96	4.46	9.46	3.16	34.80	29.68	38.45	-8.77	V
836.60	-7.04	4.5	9.46	3.16	34.86	29.62	38.45	-8.83	V
848.80	-6.96	4.56	9.37	3.16	34.89	29.58	38.45	-8.87	V

GSM/TM2/EDGE850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Burst Average ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-12.03	4.46	9.46	3.16	33.79	23.60	38.45	-14.85	V
836.60	-12.05	4.5	9.46	3.16	33.85	23.60	38.45	-14.85	V
848.80	-12.09	4.56	9.37	3.16	33.88	23.44	38.45	-15.01	V

GSM/TM1/GPRS1900

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Aq} (dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-12.15	5.04	9.39	36.52	28.72	33.01	-4.29	V
1880.00	-12.18	5.09	9.34	36.57	28.64	33.01	-4.37	V
1909.80	-12.22	5.15	9.27	36.64	28.54	33.01	-4.47	V

GSM/TM2/EDGE1900

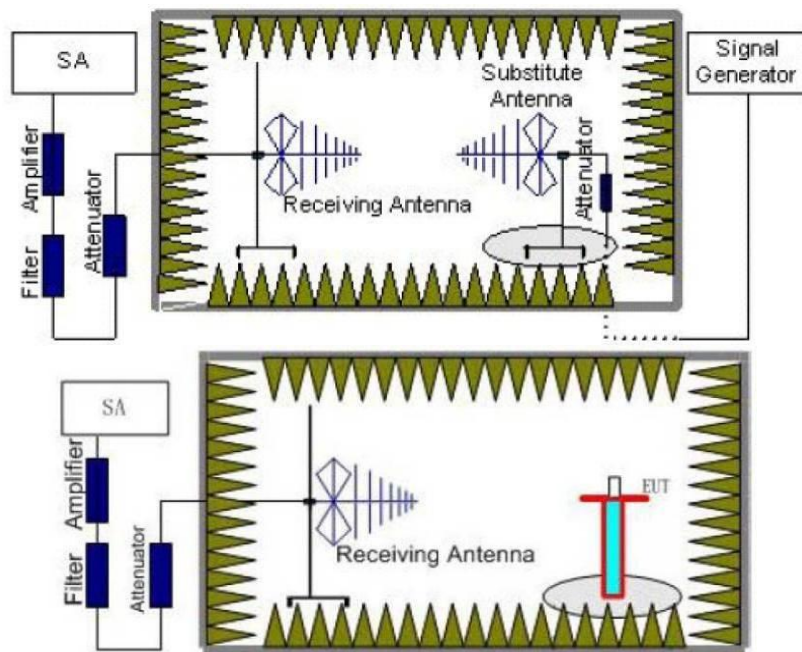
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Aq} (dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-16.94	5.04	9.39	36.52	23.93	33.01	-9.08	V
1880.00	-17.05	5.09	9.34	36.57	23.77	33.01	-9.24	V
1909.80	-17.07	5.15	9.27	36.64	23.69	33.01	-9.32	V

4.2 Radiated Spurious Emission

TEST APPLICABLE

According to the TIA/EIA 603D:2010 and FCC Part 2.1033 test method, The Receiver or Spectrum was scanned from lowest frequency frequency generated within the equipment to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238, Part 22.917, RSS-132 §5.5 and RSS-133 §6.5. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{\text{Mea}} + P_{\text{Ag}} - P_{\text{cl}} + G_a$$

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.
8. In order to make sure test results more clearly, we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
TM1/GSM 850	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
TM1/PCS 1900	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

TEST LIMITS

According to 24.238 and 22.917 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Frequency	Channel	Frequency Range	Verdict
TM1/GSM 850	Low	9KHz -10GHz	PASS
	Middle	9KHz -10GHz	PASS
	High	9KHz -10GHz	PASS
TM1/PCS 1900	Low	9KHz -20GHz	PASS
	Middle	9KHz -20GHz	PASS
	High	9KHz -20GHz	PASS

TEST RESULTS

Remark:

1. We were tested all refer 3GPP TS151 010.
2. $\text{EIRP} = P_{\text{Mea}}(\text{dBm}) - P_{\text{cl}}(\text{dB}) + G_a(\text{dBi})$
3. We were not recorded other points as values lower than limits.
4. $\text{Margin} = \text{EIRP} - \text{Limit}$

GSM/TM1/GPRS850_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1648.40	-43.23	4.87	3.00	9.57	-38.53	-13.00	-25.53	H
2472.60	-44.11	5.30	3.00	7.99	-41.42	-13.00	-28.42	H
1648.40	-39.61	4.87	3.00	9.57	-34.91	-13.00	-21.91	V
2472.60	-42.14	5.30	3.00	7.99	-39.45	-13.00	-26.45	V

GSM/TM1/GPRS850_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.20	-41.91	4.91	3.00	9.59	-37.23	-13.00	-24.23	H
2509.80	-46.50	5.33	3.00	7.81	-44.02	-13.00	-31.02	H
1673.20	-37.55	4.91	3.00	9.59	-32.87	-13.00	-19.87	V
2509.80	-43.38	5.33	3.00	7.81	-40.90	-13.00	-27.90	V

GSM/TM1/GPRS850_ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.60	-46.91	4.92	3.00	10.07	-41.76	-13.00	-28.76	H
2546.40	-49.87	5.33	3.00	7.66	-47.54	-13.00	-34.54	H
1697.60	-43.02	4.92	3.00	10.07	-37.87	-13.00	-24.87	V
2546.40	-45.02	5.33	3.00	7.66	-42.69	-13.00	-29.69	V

GSM/TM2/EDGE850_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1648.40	-45.10	4.87	3.00	9.57	-40.40	-13.00	-27.40	H
2472.60	-46.79	5.30	3.00	7.99	-44.10	-13.00	-31.10	H
1648.40	-42.00	4.87	3.00	9.57	-37.30	-13.00	-24.30	V
2472.60	-44.18	5.30	3.00	7.99	-41.49	-13.00	-28.49	V

GSM/TM2/EDGE850_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.20	-43.72	4.91	3.00	9.59	-39.04	-13.00	-26.04	H
2509.80	-48.61	5.33	3.00	7.81	-46.13	-13.00	-33.13	H
1673.20	-39.83	4.91	3.00	9.59	-35.15	-13.00	-22.15	V
2509.80	-45.32	5.33	3.00	7.81	-42.84	-13.00	-29.84	V

GSM/TM2/EDGE850_ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.60	-48.88	4.92	3.00	10.07	-43.73	-13.00	-30.73	H
2546.40	-51.83	5.33	3.00	7.66	-49.50	-13.00	-36.50	H
1697.60	-45.15	4.92	3.00	10.07	-40.00	-13.00	-27.00	V
2546.40	-47.31	5.33	3.00	7.66	-44.98	-13.00	-31.98	V

GSM/TM1/GPRS1900_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3700.40	-45.01	6.27	3.00	10.89	-40.39	-13.00	-27.39	H
5550.60	-46.33	7.12	3.00	12.37	-41.08	-13.00	-28.08	H
3700.40	-41.97	6.27	3.00	10.89	-37.35	-13.00	-24.35	V
5550.60	-43.75	7.12	3.00	12.37	-38.50	-13.00	-25.50	V

GSM/TM1/GPRS1900_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-44.22	6.33	3.00	11.04	-39.51	-13.00	-26.51	H
5640.00	-48.29	7.20	3.00	12.42	-43.07	-13.00	-30.07	H
3760.00	-39.55	6.33	3.00	11.04	-34.84	-13.00	-21.84	V
5640.00	-44.73	7.20	3.00	12.42	-39.51	-13.00	-26.51	V

GSM/TM1/GPRS1900_ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.60	-48.86	6.37	3.00	10.63	-44.60	-13.00	-31.60	H
5729.40	-51.42	7.25	3.00	12.47	-46.20	-13.00	-33.20	H
3819.60	-45.41	6.37	3.00	10.63	-41.15	-13.00	-28.15	V
5729.40	-46.74	7.25	3.00	12.47	-41.52	-13.00	-28.52	V

GSM/TM2/EDGE1900_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3700.40	-47.25	6.27	3.00	10.89	-42.63	-13.00	-29.63	H
5550.60	-48.43	7.12	3.00	12.37	-43.18	-13.00	-30.18	H
3700.40	-43.82	6.27	3.00	10.89	-39.20	-13.00	-26.20	V
5550.60	-45.77	7.12	3.00	12.37	-40.52	-13.00	-27.52	V

GSM/TM2/EDGE1900_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-45.52	6.33	3.00	11.04	-40.81	-13.00	-27.81	H
5640.00	-50.80	7.20	3.00	12.42	-45.58	-13.00	-32.58	H
3760.00	-41.53	6.33	3.00	11.04	-36.82	-13.00	-23.82	V
5640.00	-47.13	7.20	3.00	12.42	-41.91	-13.00	-28.91	V

GSM/TM2/EDGE1900_ High Channel

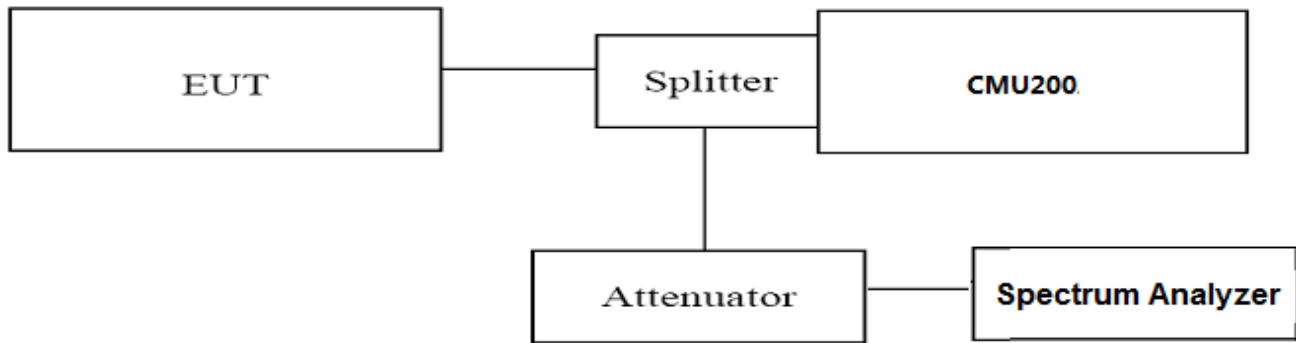
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.60	-51.18	6.37	3.00	10.63	-46.92	-13.00	-33.92	H
5729.40	-53.16	7.25	3.00	12.47	-47.94	-13.00	-34.94	H
3819.60	-47.66	6.37	3.00	10.63	-43.40	-13.00	-30.40	V
5729.40	-49.33	7.25	3.00	12.47	-44.11	-13.00	-31.11	V

4.3 Occupied Bandwidth and Emission Bandwidth

TEST APPLICABLE

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. The table below lists the measured 99% Bandwidth and -26dBc Bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

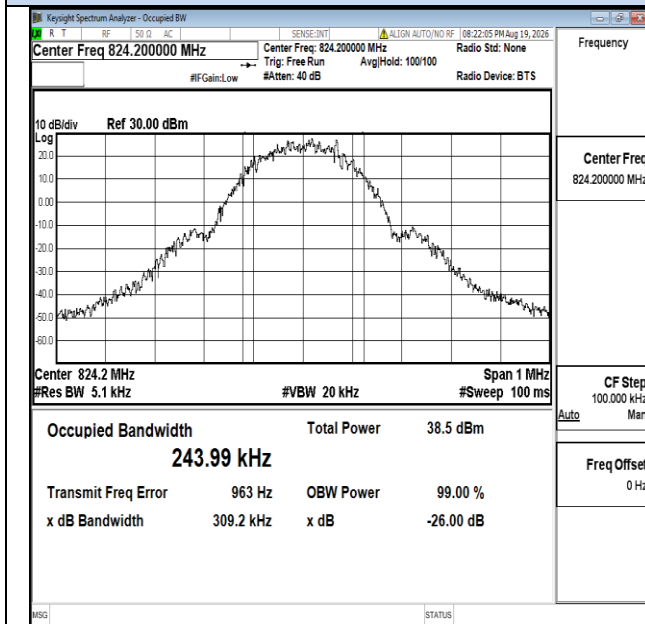
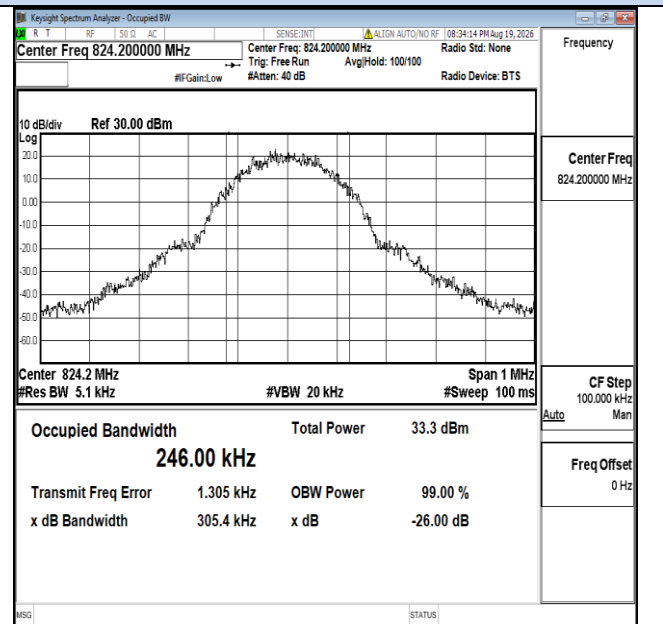
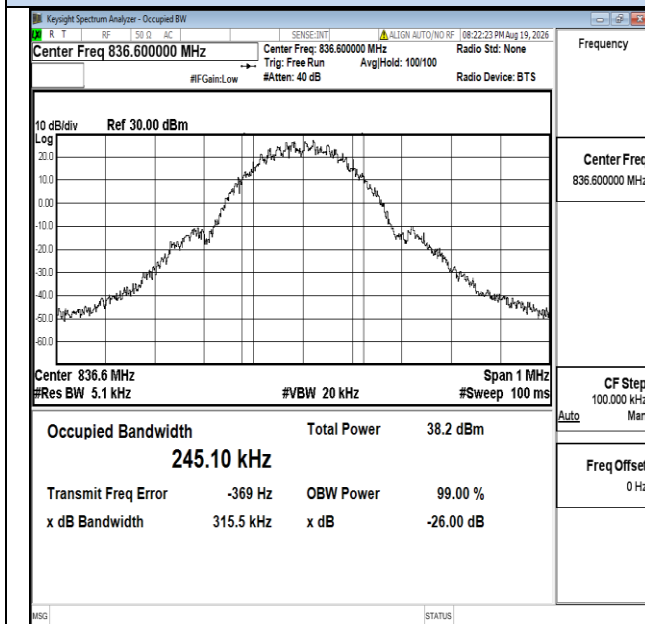
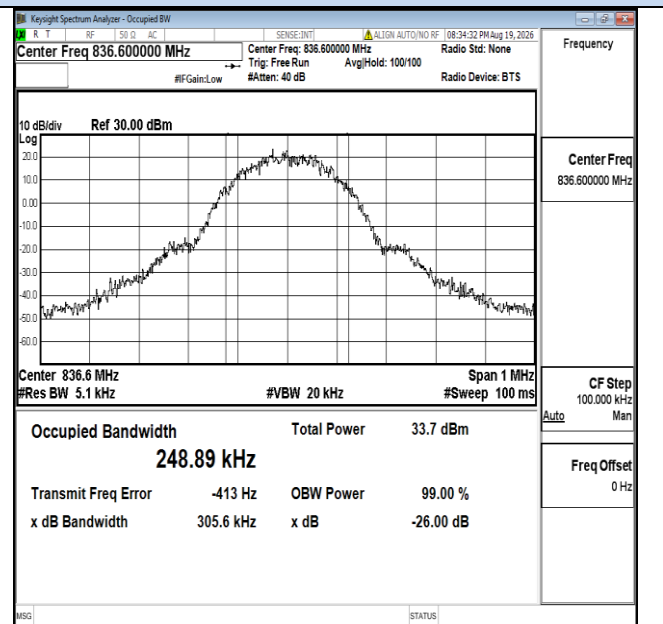
1. The EUT was set up for the max output power with pseudo random data modulation;
2. The Occupied bandwidth and Emission Bandwidth were measured with Spectrum Analyzer N9020A;
3. Set RBW=5.1KHz, VBW=15KHz, Span=1MHz, SWT=Auto;
4. Set SPA Max hold and View, Set 99% Occupied Bandwidth/ Set -26dBc Occupied Bandwidth
5. These measurements were done at 3 frequencies, 1850.20 MHz, 1880.00 MHz and 1909.80 MHz for PCS1900 band; 824.20MHz, 836.60 MHz and 848.80 MHz for GSM850 band. (Low, middle and high of operational frequency range).

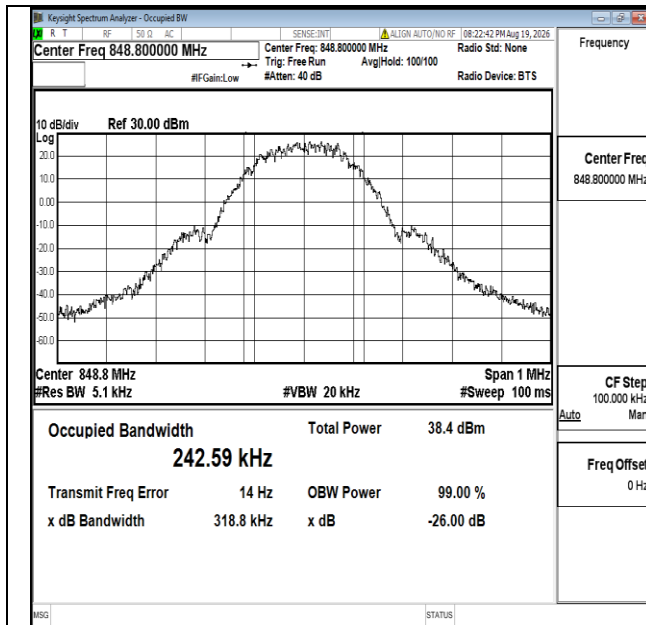
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (99% BW) (KHz)	Emission Bandwidth (-26 dBc BW) (KHz)	Verdict
GSM/TM1 /GRPS850	128	824.2	243.99	309.2	PASS
	190	836.6	245.10	315.5	PASS
	251	848.8	242.59	318.8	PASS
GSM/TM2 /EDGE850	128	824.2	246.00	305.4	PASS
	190	836.6	248.89	305.6	PASS
	251	848.8	245.65	307.4	PASS
GSM/TM1 /GPRS1900	512	1850.2	242.17	309.5	PASS
	661	1880.0	244.16	319.2	PASS
	810	1909.8	243.61	312.1	PASS
GSM/TM2 /EDGE1900	512	1850.2	251.22	319.7	PASS
	661	1880.0	249.70	321.2	PASS
	810	1909.8	247.54	316.9	PASS

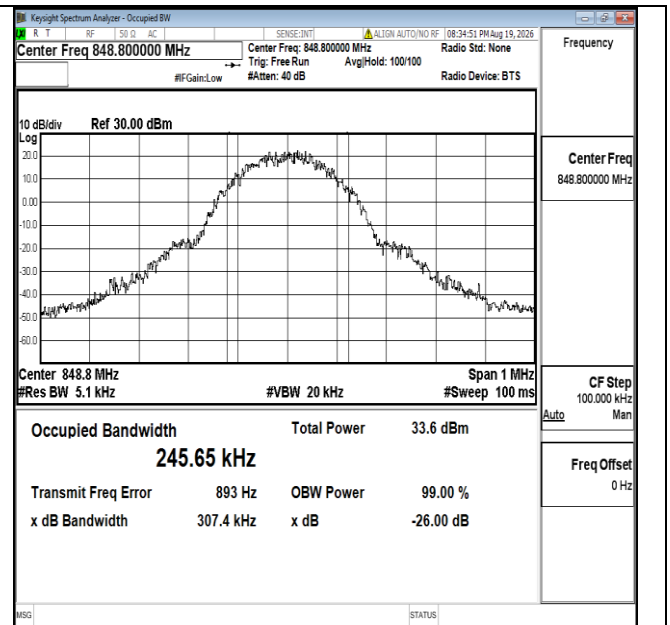
Remark:

1. Test results including cable loss;
2. Please refer to following plots;

Occupied Bandwidth and Emission Bandwidth**GSM/TM1/GPRS850****GSM/TM2/EDGE850****Channel 128 / 824.2 MHz****Channel 128 / 824.2 MHz****Channel 190 / 836.6 MHz****Channel 190 / 836.6 MHz**



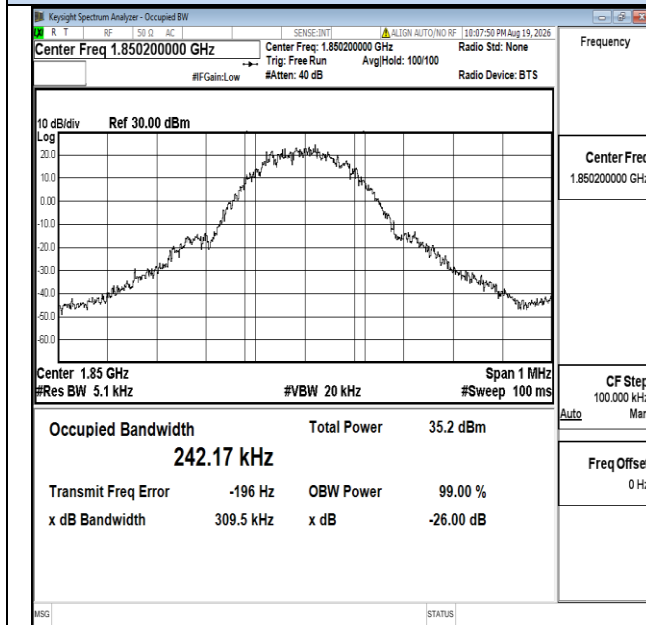
Channel 251 / 848.8 MHz



Channel 251 / 848.8 MHz

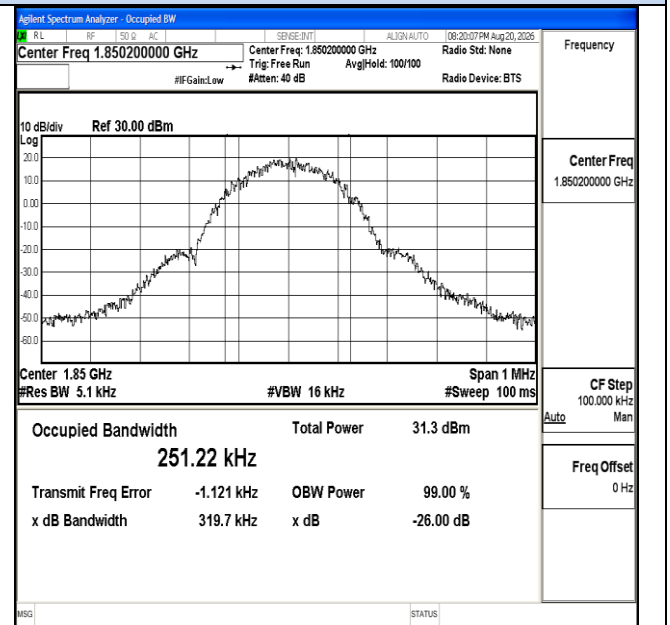
Occupied Bandwidth and Emission Bandwidth

GSM/TM1/GPRS1900

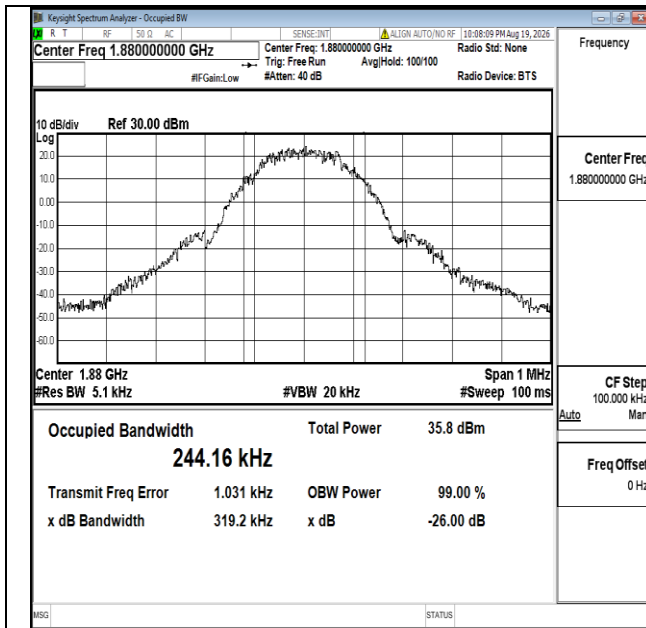


Channel 512 / 1850.2 MHz

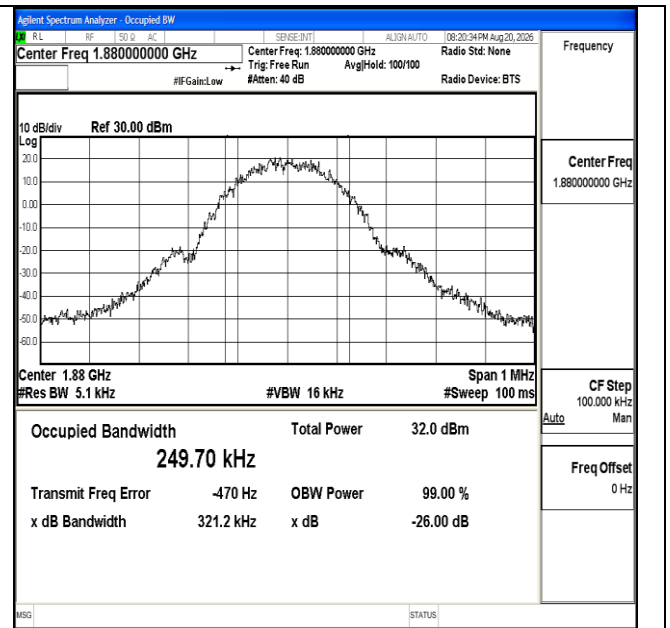
GSM/TM2/EDGE1900



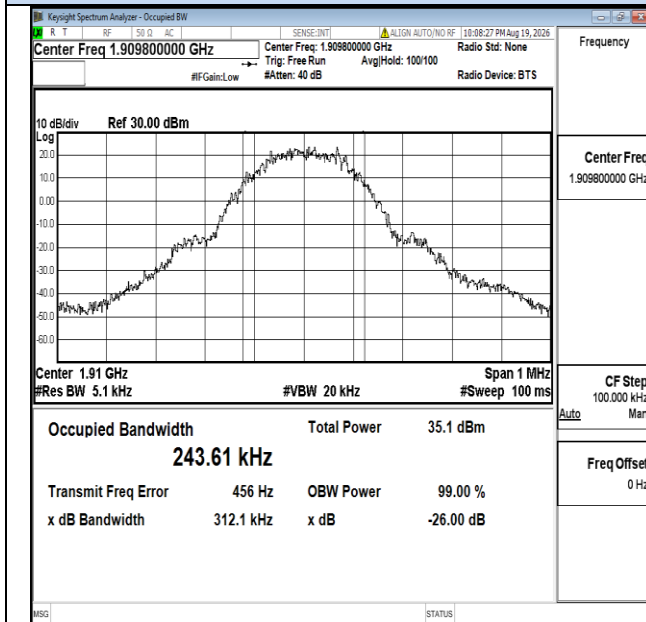
Channel 512 / 1850.2 MHz



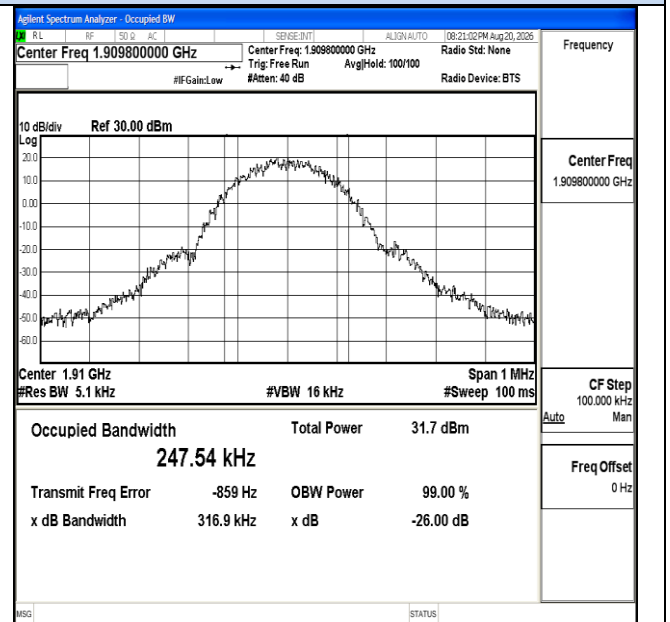
Channel 661 / 1880.0MHz



Channel 661 / 1880.0MHz



Channel 810 / 1909.8 MHz



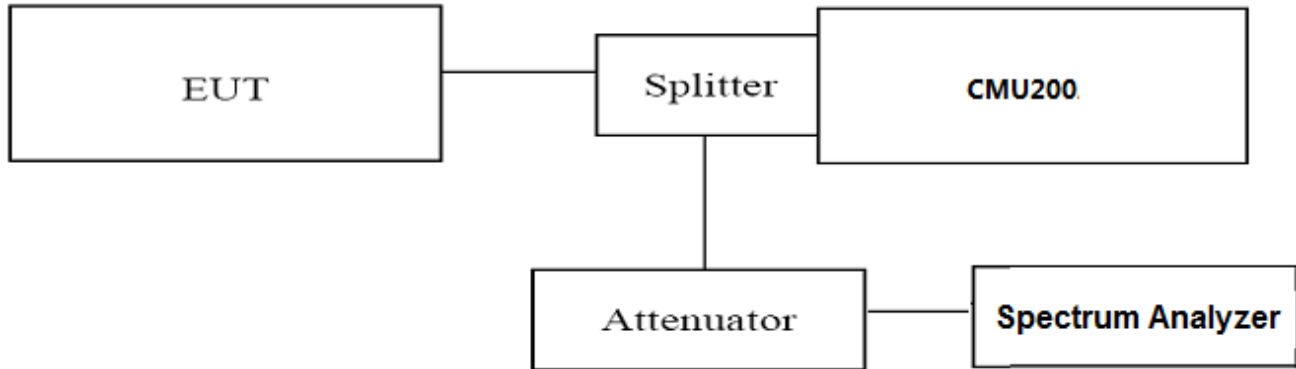
Channel 810 / 1909.8 MHz

4.4 Band Edge Compliance

TEST APPLICABLE

During the process of testing, the EUT was controlled via Digital Radio Communication tester (CMU200) to ensure max power transmission and proper modulation.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The power was measured with Spectrum Analyzer N9020A;
3. Set RBW=5.1KHz,VBW=15KHz,Span=2MHz,SWT=Auto, Detector: RMS;
1. These measurements were done at 2 frequencies, 1850.20 MHz and 1909.80 MHz for PCS1900 band; 824.20 MHz and 848.80 MHz for GSM850 band. (bottom and top of operational frequency range).

TEST RESULTS

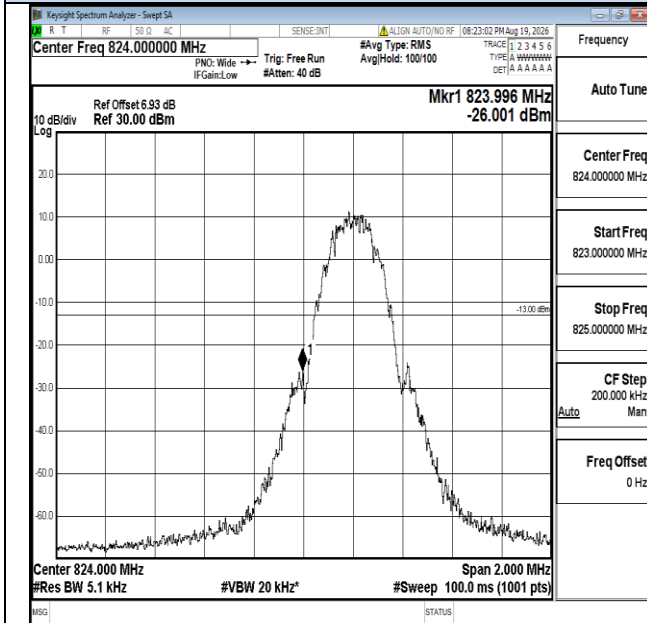
Test Mode	Channel	Frequency (MHz)	Band Edg Compliance (dBm)	Limits (dBm)	Verdict
GSM/TM1/GPRS850	128	824.2	<-13dBm	-13dBm	PASS
	251	848.8	<-13dBm	-13dBm	
GSM/TM2/EDGE850	128	824.2	<-13dBm	-13dBm	PASS
	251	848.8	<-13dBm	-13dBm	
GSM/TM1/GPRS1900	512	1850.2	<-13dBm	-13dBm	PASS
	810	1909.8	<-13dBm	-13dBm	
GSM/TM2/EDGE1900	512	1850.2	<-13dBm	-13dBm	PASS
	810	1909.8	<-13dBm	-13dBm	

Remark:

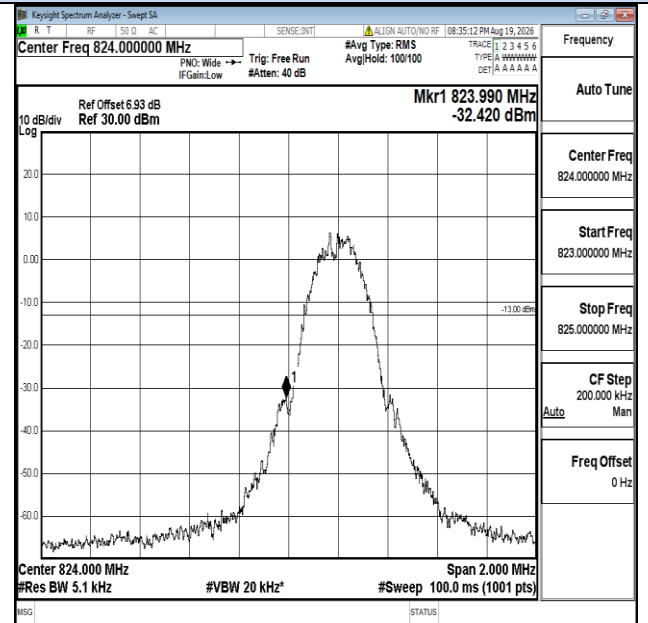
1. Test results including cable loss;
2. Please refer to following plots;

Band-edge Compliance

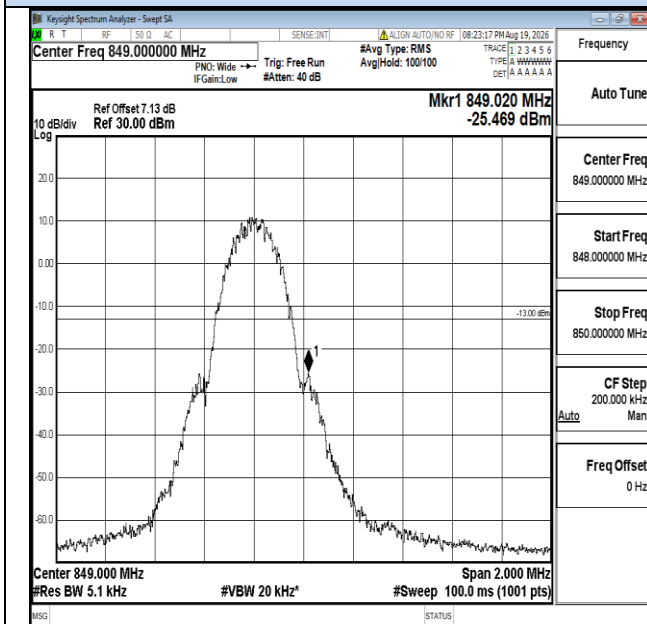
GSM/TM1/GPRS850



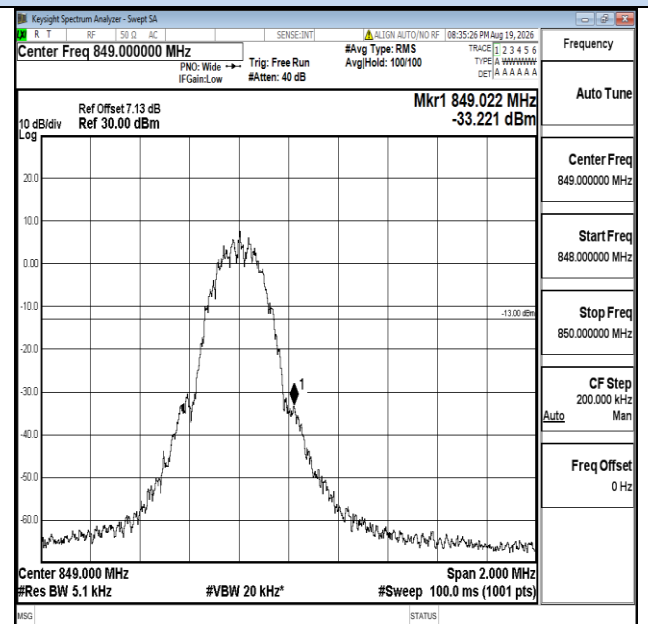
GSM/TM2/EDGE850



Channel 128 / 824.2 MHz



Channel 128 / 824.2 MHz



Channel 251 / 848.8 MHz

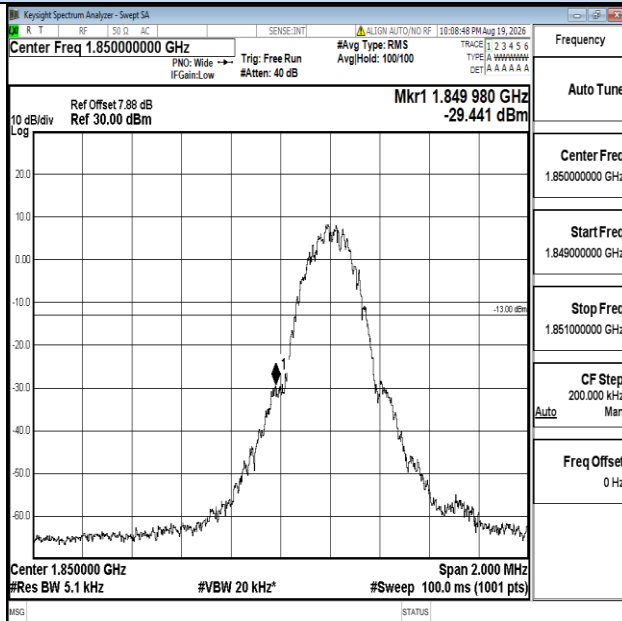
Channel 251 / 848.8 MHz

TRF-4-E-151 A/O

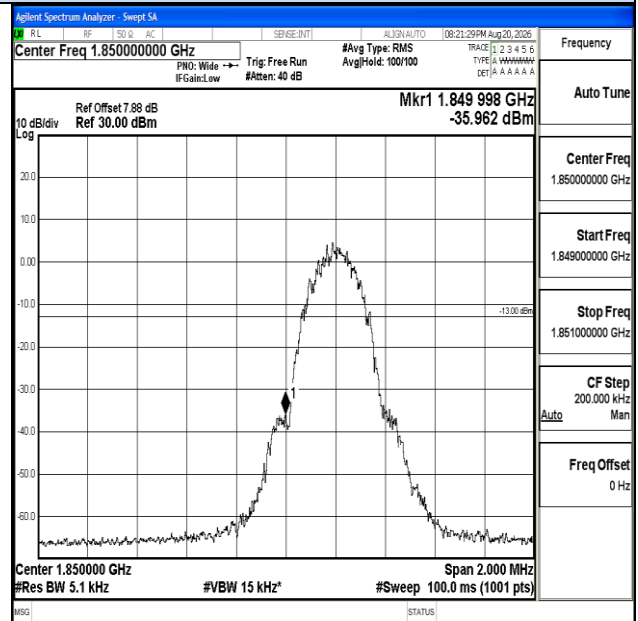
Guangzhou LCS Compliance Testing Laboratory Ltd.
Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Band-edge Compliance

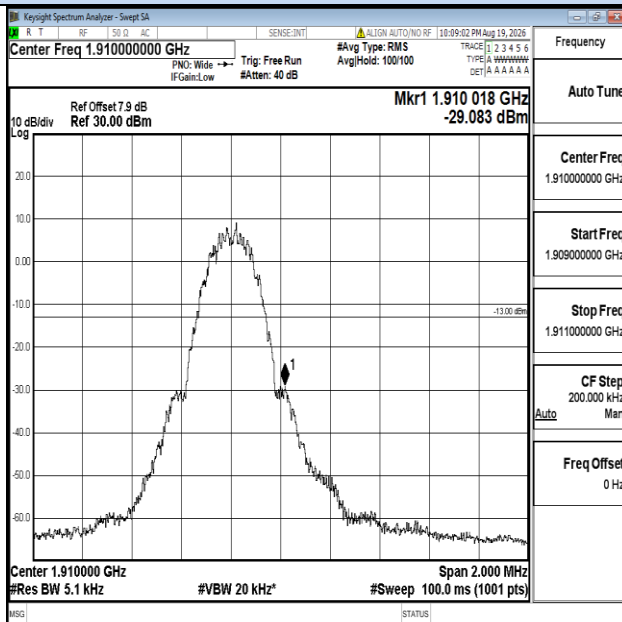
GSM/TM1/GPRS1900



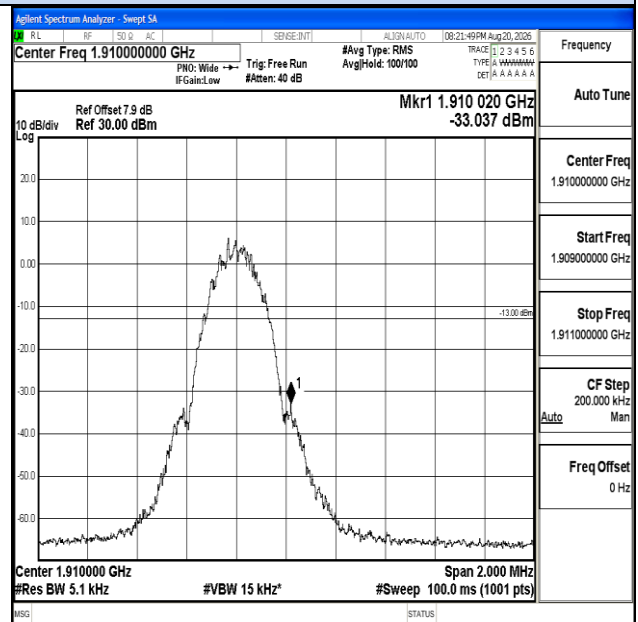
GSM/TM2/EDGE1900



Channel 512 / 1850.2 MHz



Channel 512 / 1850.2 MHz



Channel 810 / 1909.8 MHz

Channel 810 / 1909.8 MHz

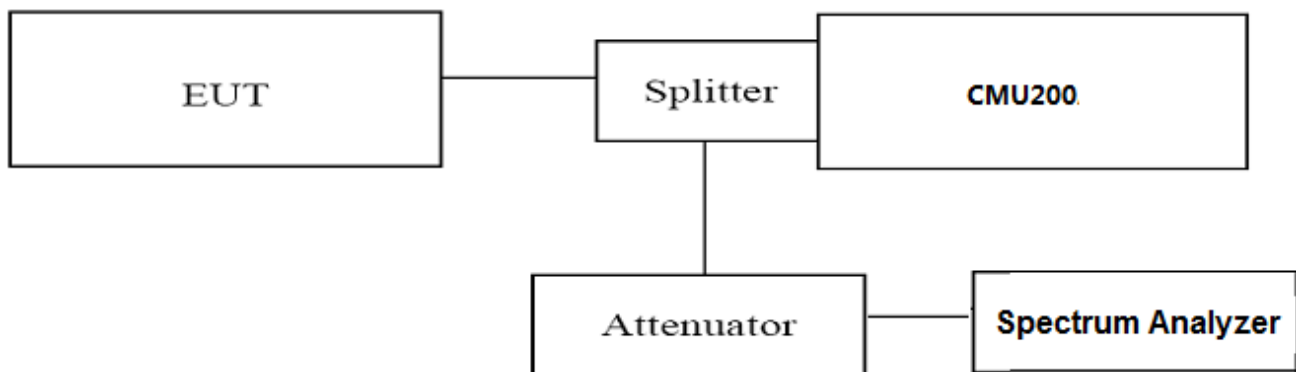
4.5 Spurious Emission on Antenna Port

TEST APPLICABLE

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 and RSS-GEN the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 9 KHz to 20 GHz, data taken from 30 MHz to 20 GHz. For GSM850, this equates to a frequency range of 9 KHz to 9 GHz, data taken from 30 MHz to 9 GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; if the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give an optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
The trace mode is set to MaxHold to get the highest signal at each frequency;
Wait 25 seconds;
Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The power was measured with Spectrum Analyzer N9020A;
3. These measurements were done at 3 frequencies, 1850.20 MHz, 1880.00 MHz and 1909.80 MHz for PCS1900 band; 824.20 MHz, 836.60 MHz and 848.80 MHz for GSM850 band. (Low, middle and high of operational frequency range).

TEST LIMIT

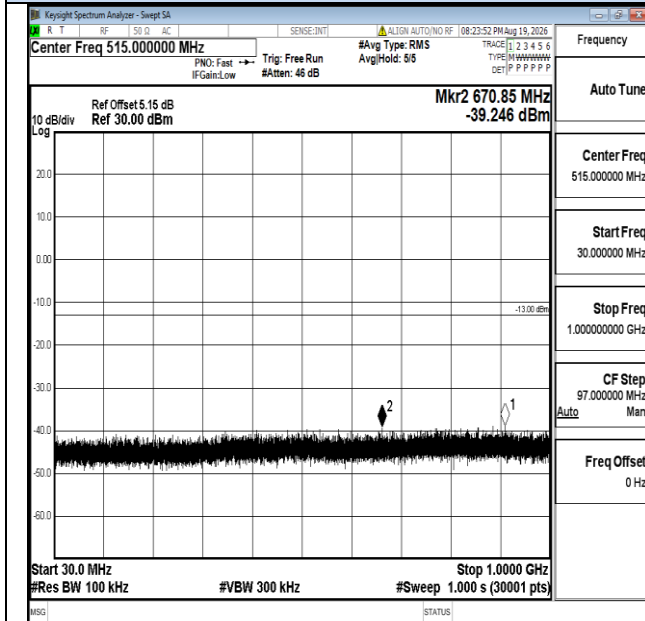
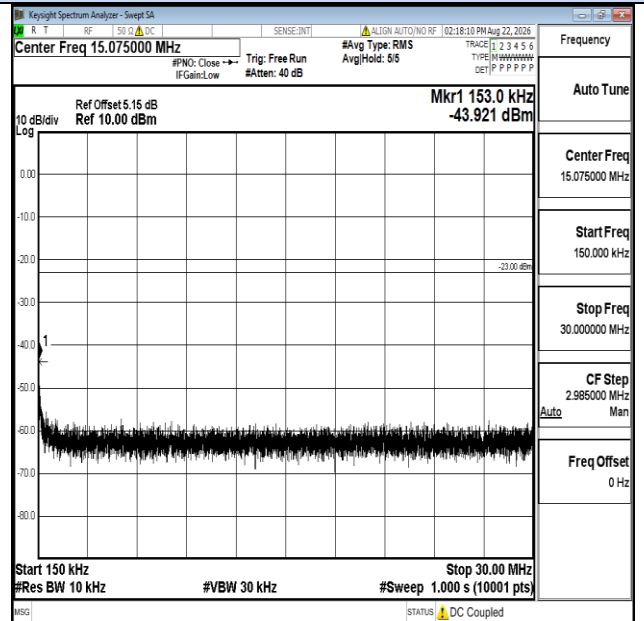
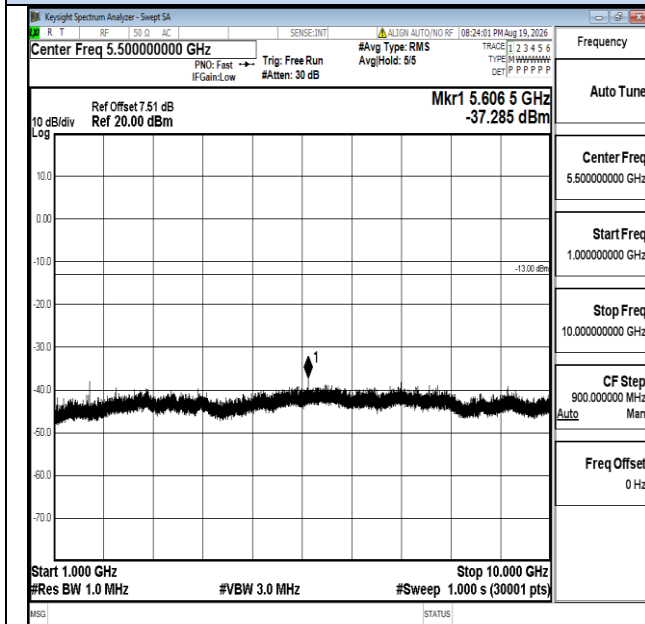
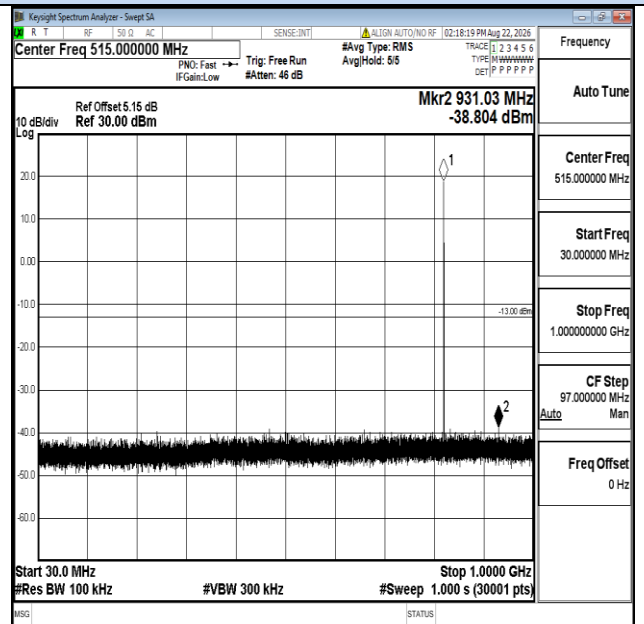
Part 24.238, Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBm)	Limits (dBm)	Verdict
GSM/TM1/GPRS850	128	824.2	<-13dBm	-13dBm	PASS
	190	836.6	<-13dBm	-13dBm	
	251	848.8	<-13dBm	-13dBm	
GSM/TM2/EDGE850	128	824.2	<-13dBm	-13dBm	PASS
	190	836.6	<-13dBm	-13dBm	
	251	848.8	<-13dBm	-13dBm	
GSM/TM1/GPRS1900	512	1850.2	<-13dBm	-13dBm	PASS
	661	1880.0	<-13dBm	-13dBm	
	810	1909.8	<-13dBm	-13dBm	
GSM/TM2/EDGE1900	512	1850.2	<-13dBm	-13dBm	PASS
	661	1880.0	<-13dBm	-13dBm	
	810	1909.8	<-13dBm	-13dBm	

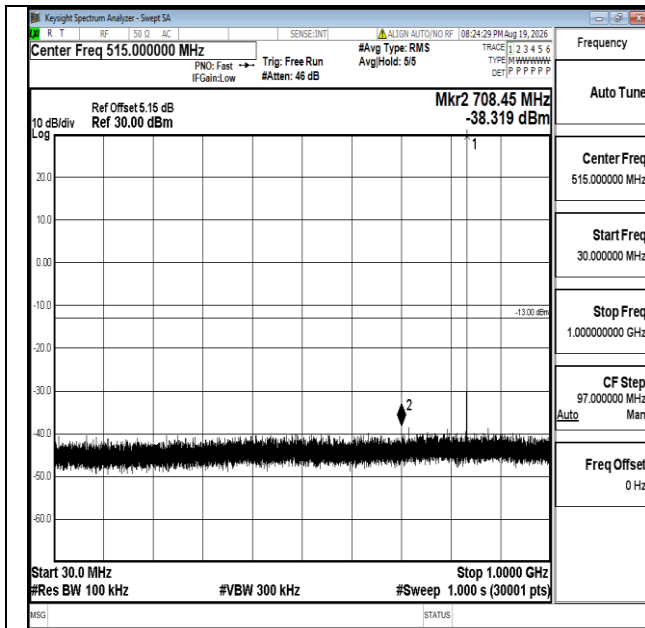
Remark:

1. Test results including cable loss;
2. Please refer to following plots;
3. Not reorded test plots from 9 KHz to 30 MHz as emission levels 20dB lower than emission limit;

Spurious Emission on Antenna Port**GSM/TM1/GPRS850****Channel 128 / 824.2 MHz****GSM/TM2/EDGE850****Channel 128 / 824.2 MHz****30 MHz – 1 GHz****30 MHz – 1GHz****1 GHz – 10 GHz****Channel 190 / 836.6 MHz****1 GHz – 10 GHz****Channel 190 / 836.6 MHz**

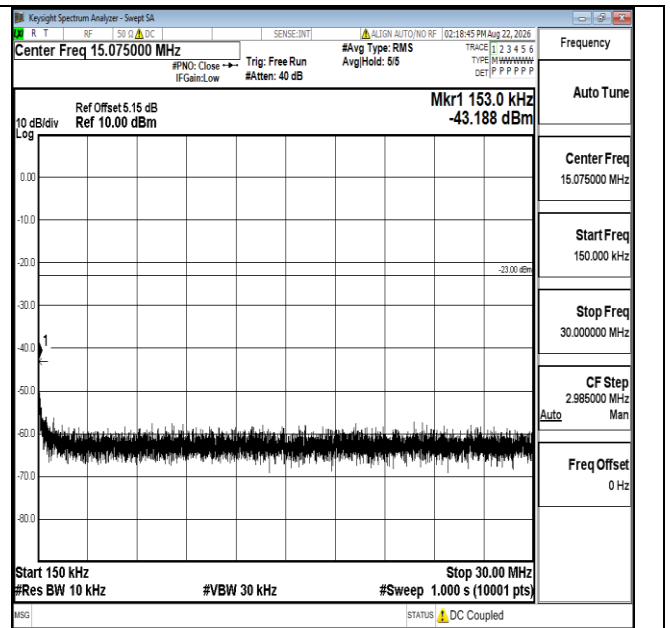
TRF-4-E-151 A/O

Guangzhou LCS Compliance Testing Laboratory Ltd.
Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com



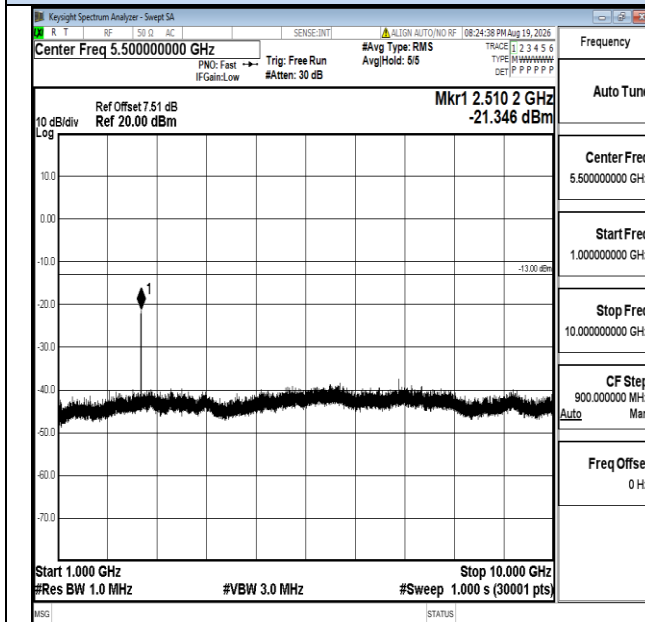
30 MHz – 1 GHz

Channel 190 / 836.6 MHz



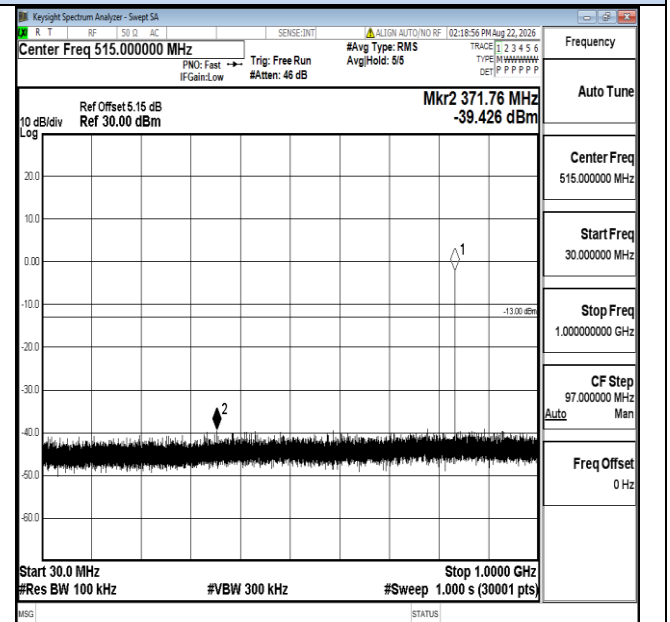
30 MHz – 1 GHz

Channel 190 / 836.6 MHz



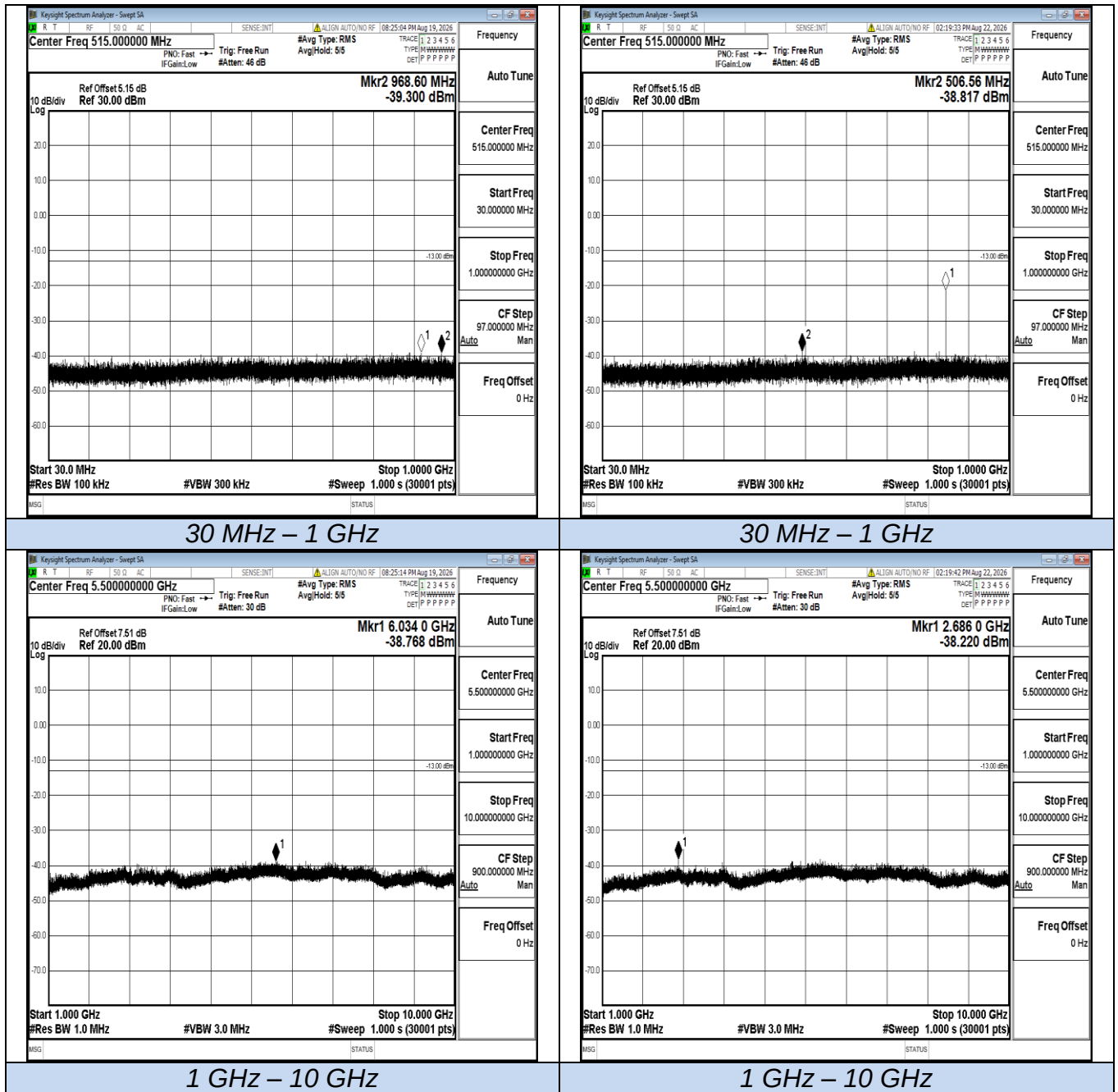
1 GHz – 10 GHz

Channel 251 / 848.8 MHz



1 GHz – 10 GHz

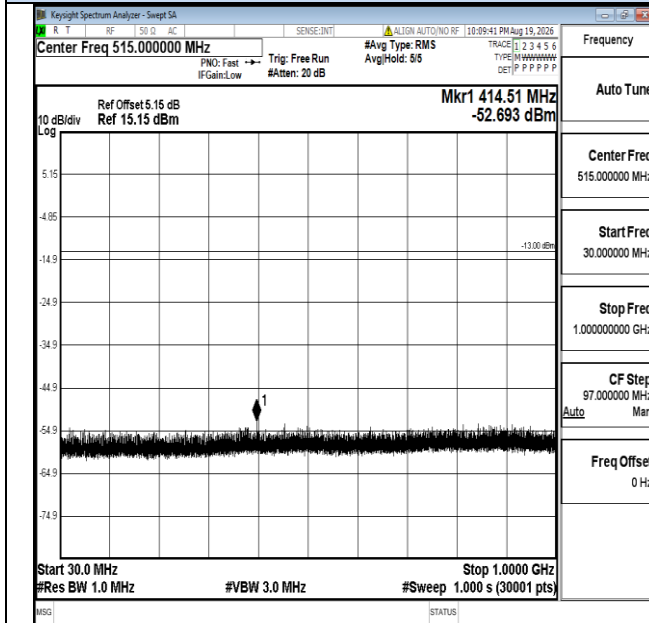
Channel 251 / 848.8 MHz



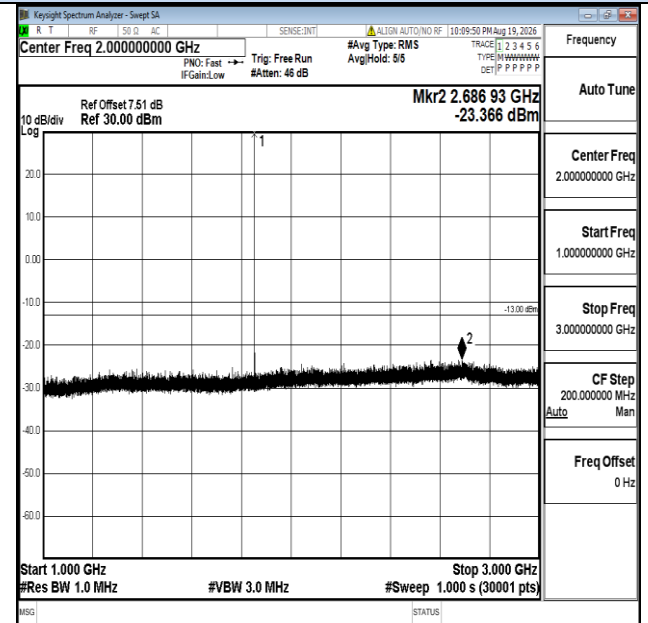
Spurious Emission on Antenna Port

GSM/TM1/GPRS1900

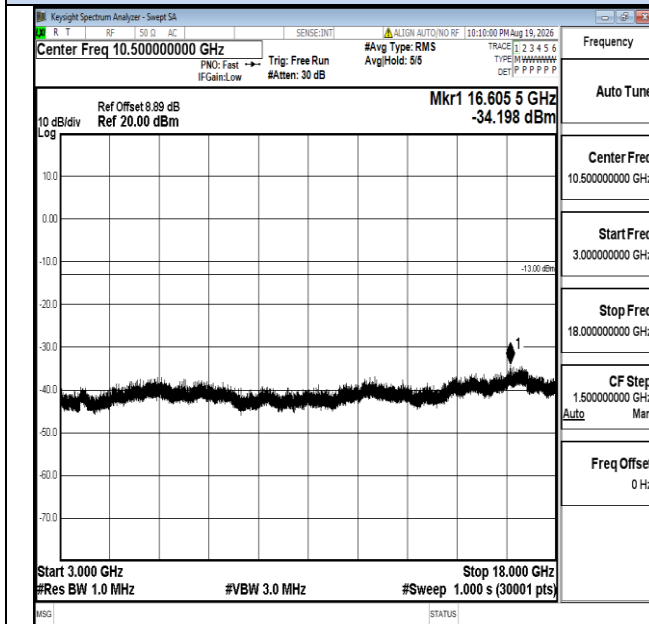
Channel 512 / 1850.2 MHz



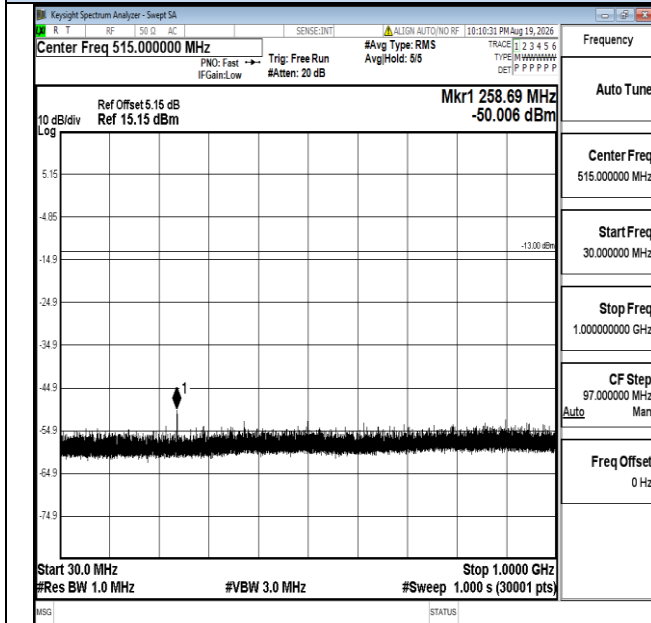
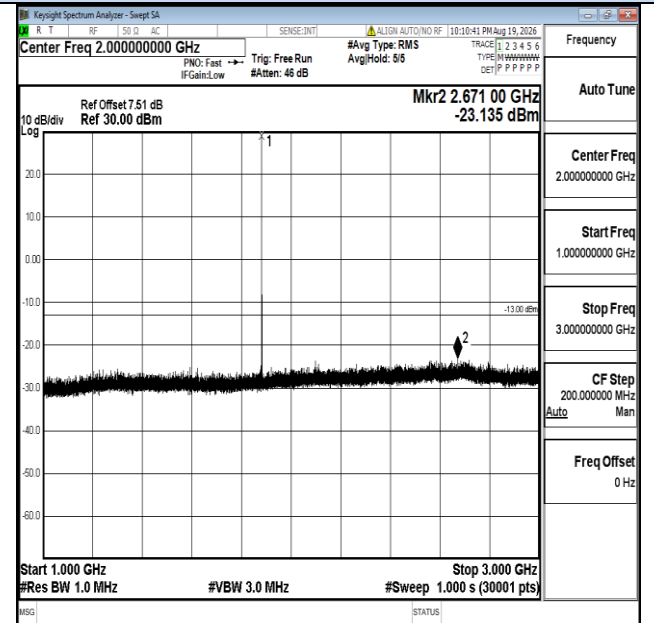
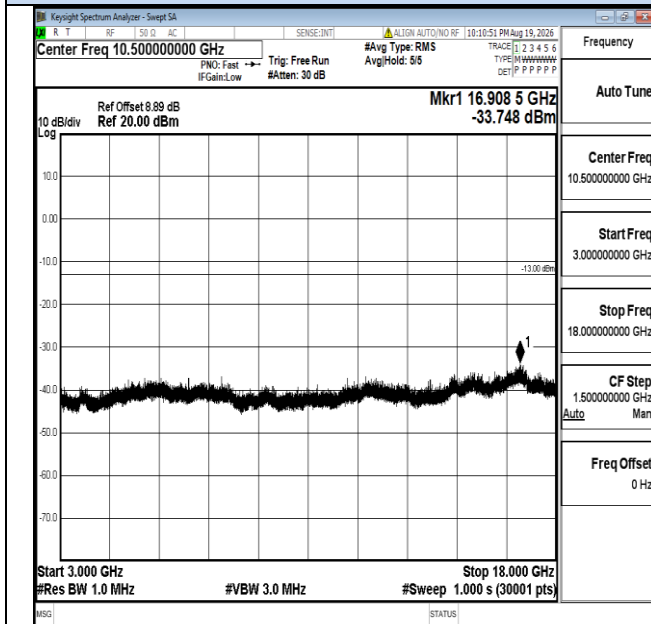
30 MHz – 1 GHz



1 GHz – 3 GHz



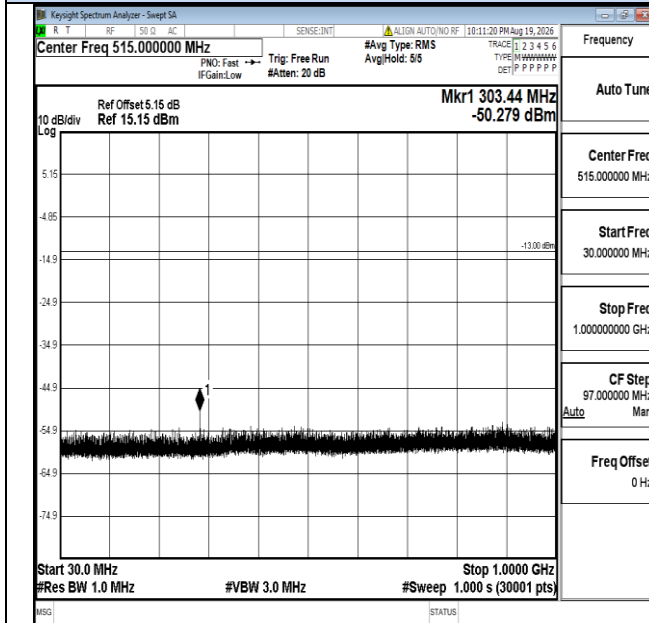
3 GHz – 18 GHz

Spurious Emission on Antenna Port**GSM/TM1/GPRS1900****Channel 661 / 1880 MHz****30 MHz – 1 GHz****1 GHz – 3 GHz****3 GHz – 18 GHz**

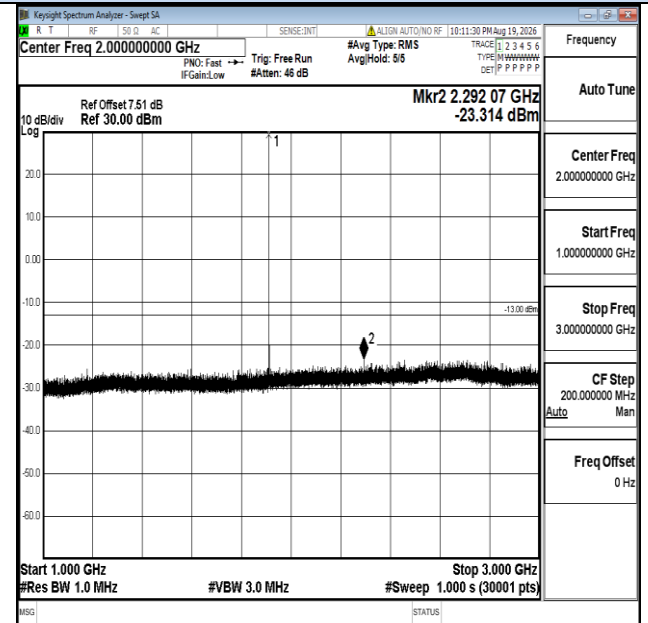
Spurious Emission on Antenna Port

GSM/TM1/GPRS1900

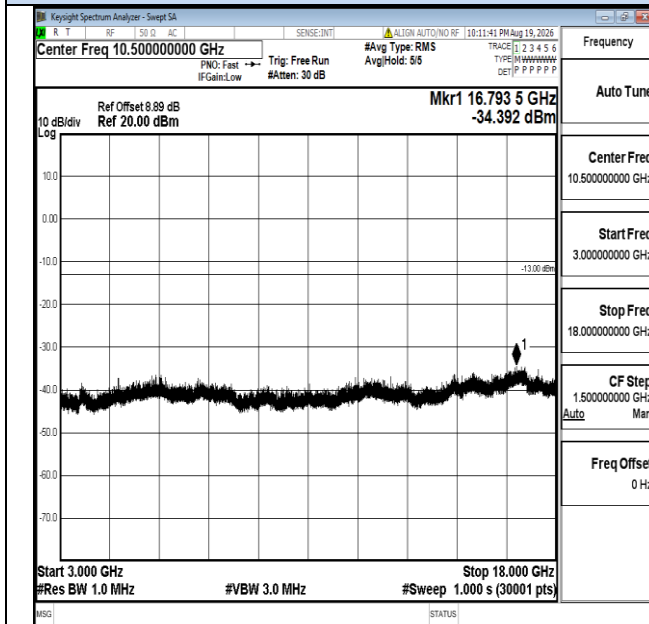
Channel 810 / 1909.8 MHz



30 MHz – 1 GHz



1 GHz – 3 GHz

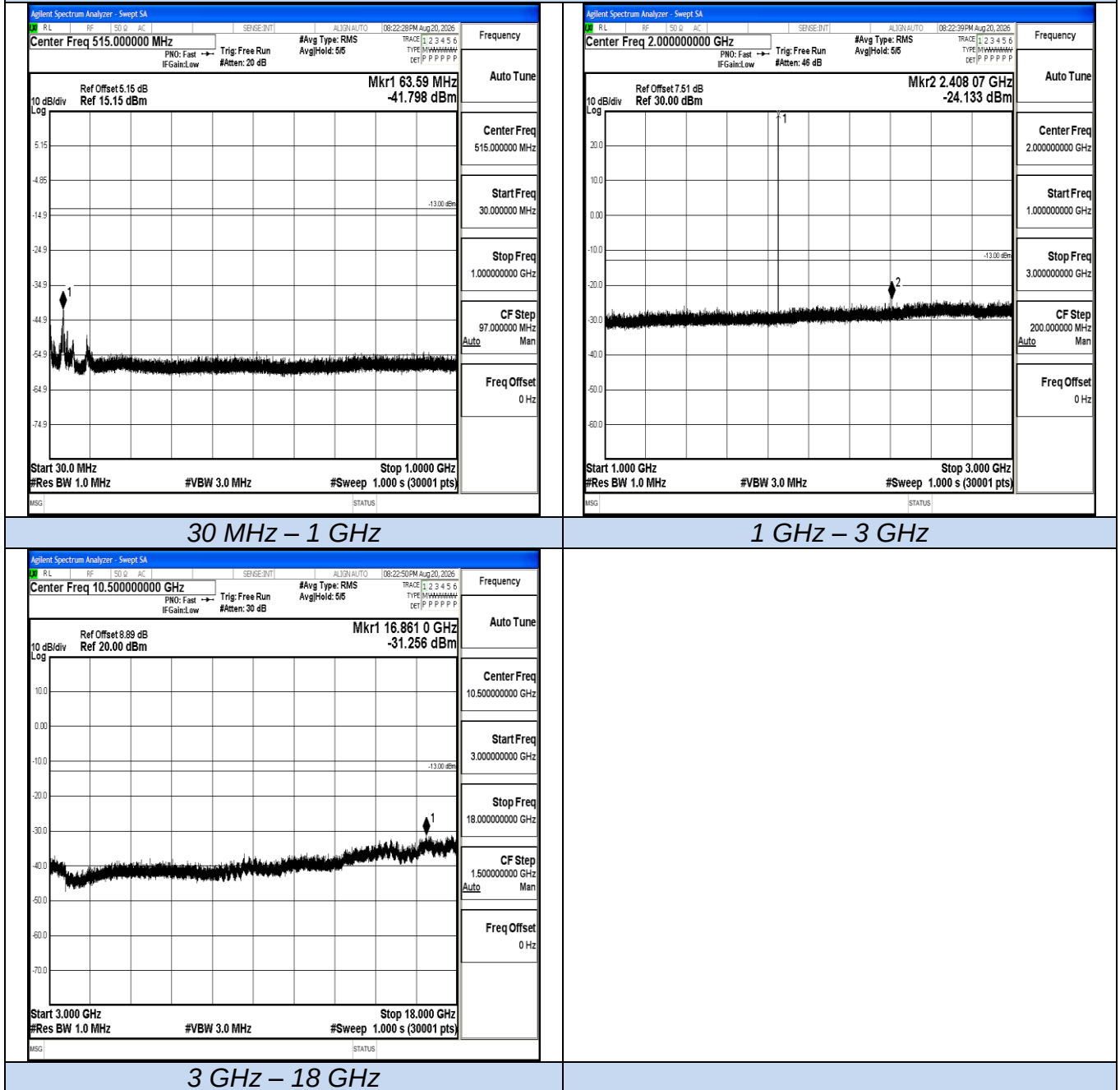


3 GHz – 18 GHz

Spurious Emission on Antenna Port

GSM/TM2/EDGE1900

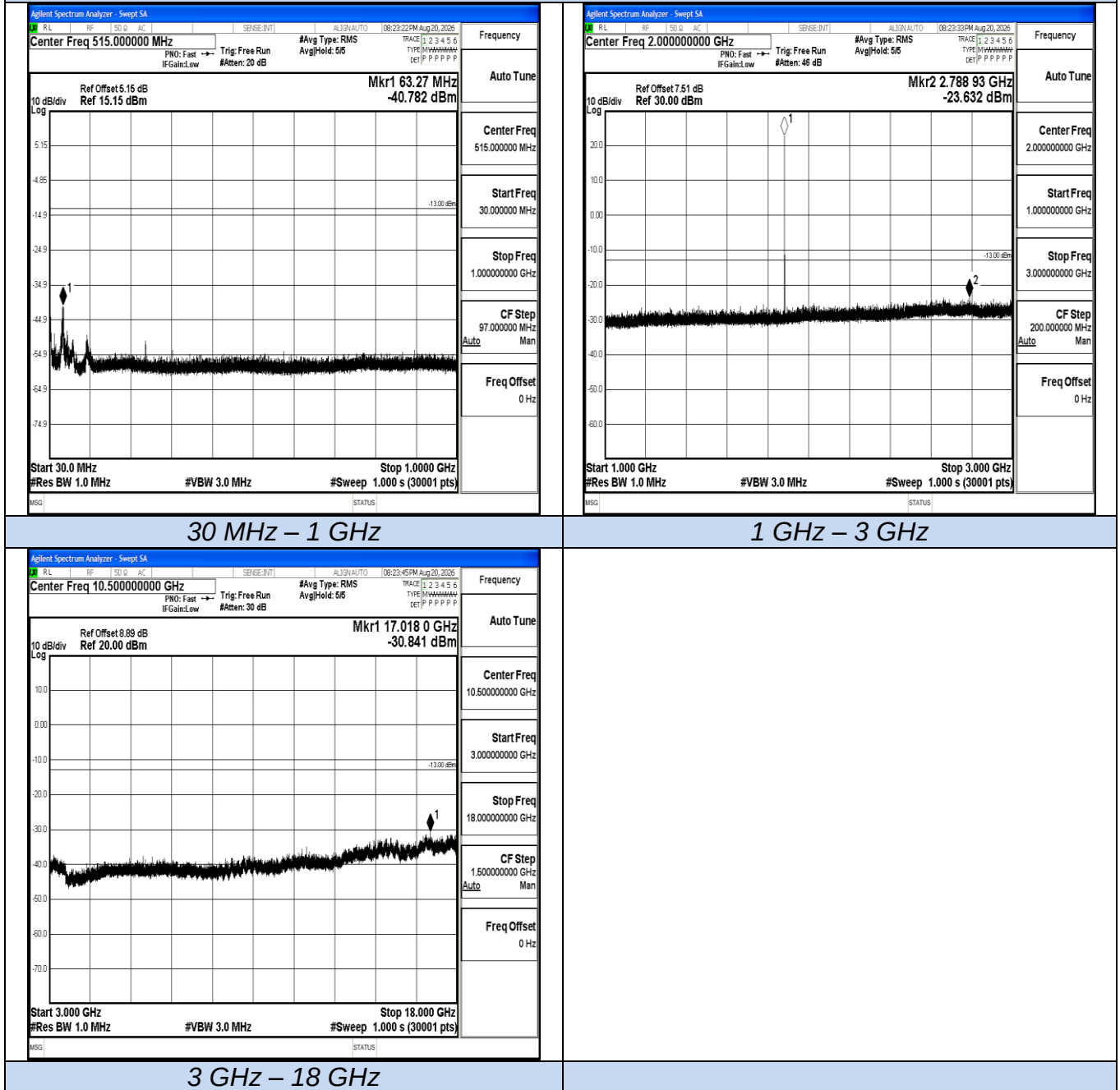
Channel 512 / 1850.2 MHz



Spurious Emission on Antenna Port

GSM/TM2/EDGE1900

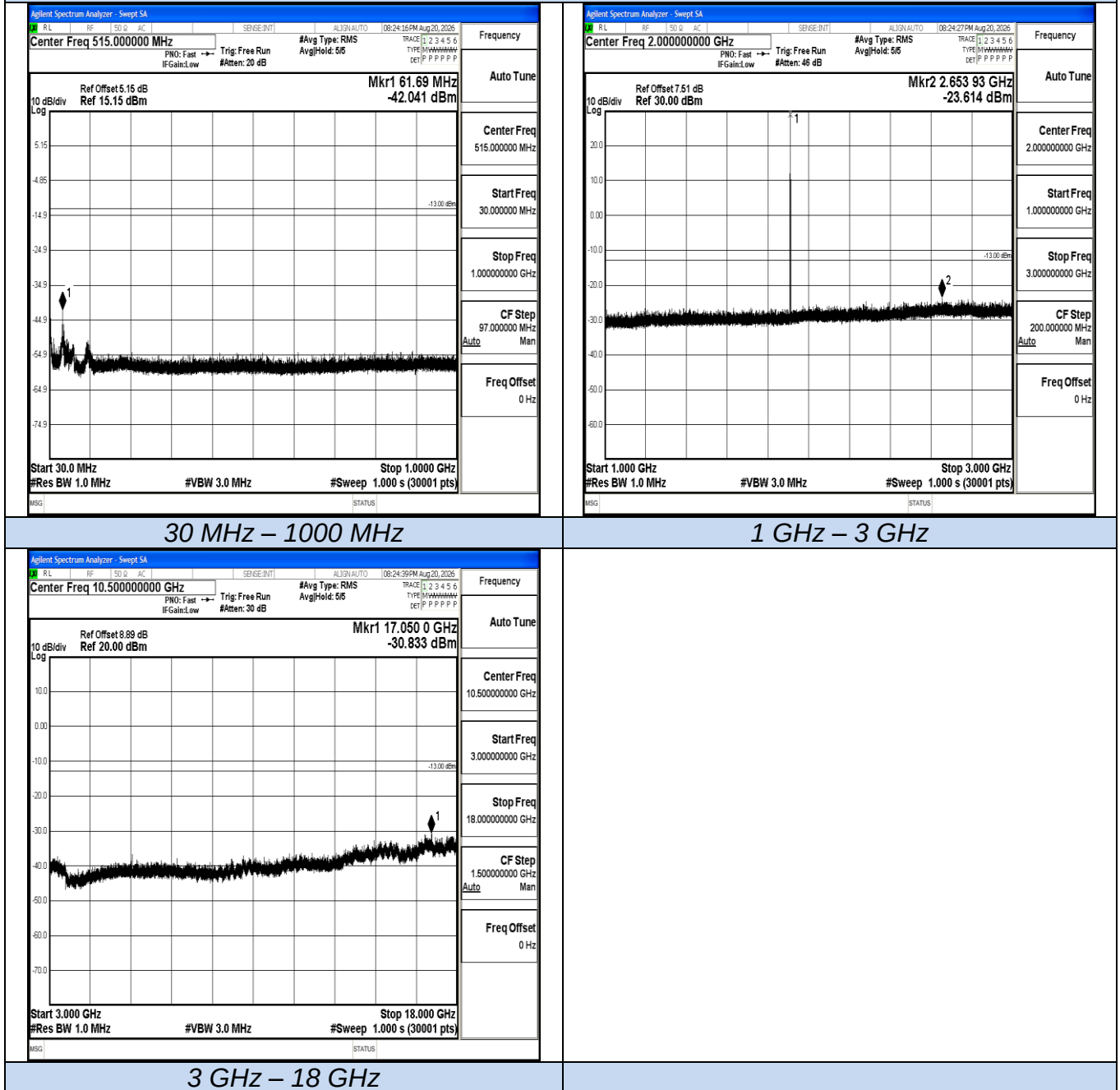
Channel 661 / 1880 MHz



Spurious Emission on Antenna Port

GSM/TM2/EDGE1900

Channel 810 / 1909.8 MHz



4.6 Frequency Stability Test

TEST APPLICABLE

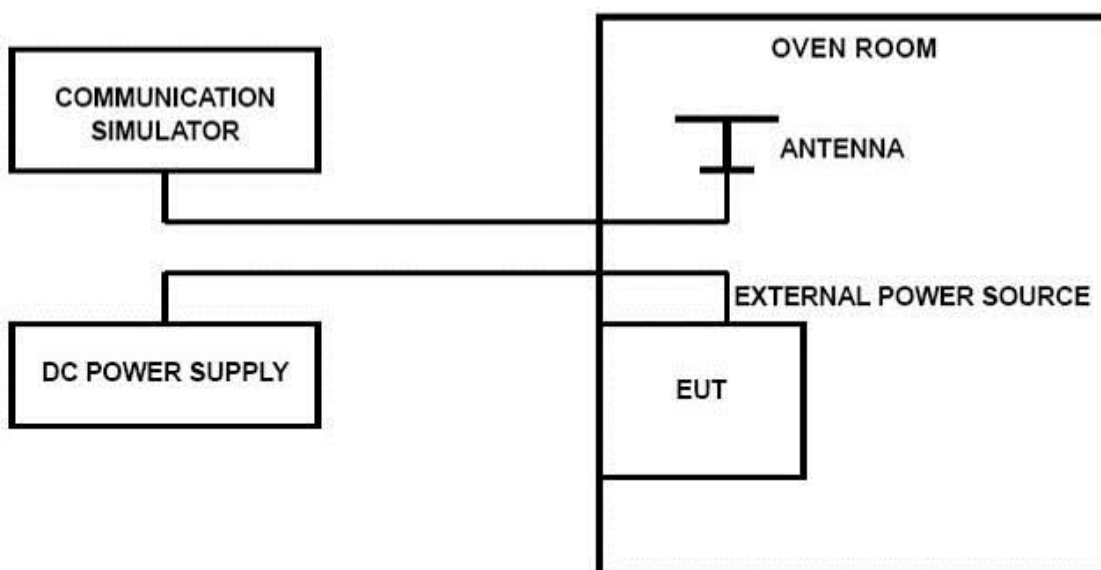
1. According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30°C to +50°C centigrade.
2. According to FCC Part 2 Section 2.1055 (E) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried voltage equipment and the end voltage point was 3.3V.

TEST 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 CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature;
2. Subject the EUT to overnight soak at -30°C;
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°C increments from -30°C to +50°C. 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°C;
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°C increments from +50°C to -30°C. Allow at least 0.5 hours at each temperature, unpowered, before making measurements;
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure;

TEST CONFIGURATION



TEST LIMITS***For Hand carried battery powered equipment***

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.3VDC and 4.35VDC, with a nominal voltage of 3.8DC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

TEST RESULTS

GSM/TM1/GPRS850					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	31	0.038	±2.50	PASS
VN	25	-27	-0.033	±2.50	PASS
VH	25	-15	-0.018	±2.50	PASS
VN	-30	-1	-0.001	±2.50	PASS
VN	-20	3	0.004	±2.50	PASS
VN	-10	-18	-0.022	±2.50	PASS
VN	0	8	0.010	±2.50	PASS
VN	10	47	0.057	±2.50	PASS
VN	20	29	0.035	±2.50	PASS
VN	30	18	0.022	±2.50	PASS
VN	40	-24	-0.029	±2.50	PASS
VN	50	33	0.040	±2.50	PASS

GSM/TM2/EDGE850					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	31	0.038	±2.50	PASS
VN	25	-27	-0.033	±2.50	PASS
VH	25	-15	-0.018	±2.50	PASS
VN	-30	-1	-0.001	±2.50	PASS
VN	-20	3	0.004	±2.50	PASS
VN	-10	-18	-0.022	±2.50	PASS
VN	0	8	0.010	±2.50	PASS
VN	10	47	0.057	±2.50	PASS
VN	20	29	0.035	±2.50	PASS
VN	30	18	0.022	±2.50	PASS
VN	40	-24	-0.029	±2.50	PASS
VN	50	33	0.040	±2.50	PASS

GSM/TM1/GPRS1900					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	21	0.011	±2.50	PASS
VN	25	40	0.021	±2.50	PASS
VH	25	-5	-0.003	±2.50	PASS
VN	-30	36	0.019	±2.50	PASS
VN	-20	18	0.010	±2.50	PASS
VN	-10	50	0.027	±2.50	PASS
VN	0	18	0.010	±2.50	PASS
VN	10	-1	-0.001	±2.50	PASS
VN	20	-21	-0.011	±2.50	PASS
VN	30	50	0.027	±2.50	PASS
VN	40	3	0.002	±2.50	PASS
VN	50	-15	-0.008	±2.50	PASS

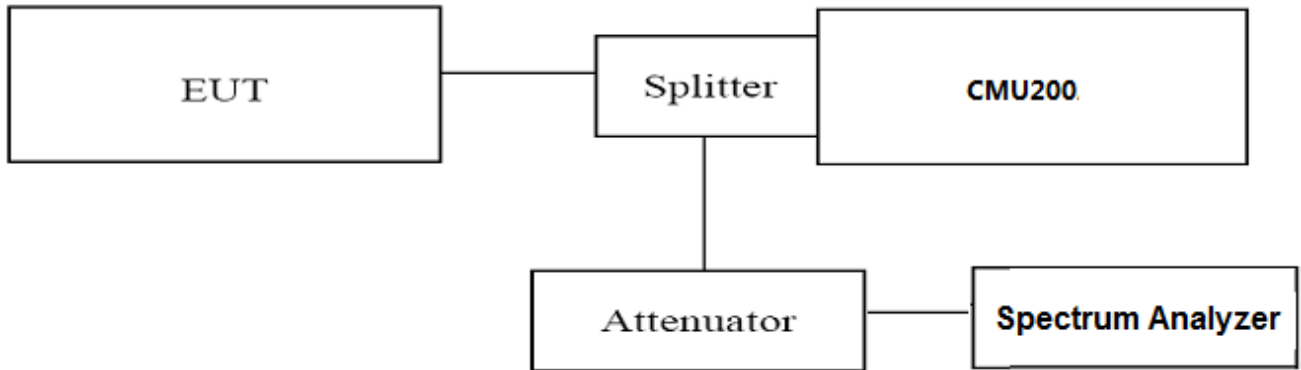
GSM/TM2/EDGE1900					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	16	0.009	±2.50	PASS
VN	25	2	0.001	±2.50	PASS
VH	25	11	0.006	±2.50	PASS
VN	-30	43	0.023	±2.50	PASS
VN	-20	-37	-0.020	±2.50	PASS
VN	-10	-9	-0.005	±2.50	PASS
VN	0	41	0.022	±2.50	PASS
VN	10	-23	-0.012	±2.50	PASS
VN	20	-24	-0.013	±2.50	PASS
VN	30	29	0.015	±2.50	PASS
VN	40	35	0.019	±2.50	PASS
VN	50	35	0.019	±2.50	PASS

4.7 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

Use spectrum to measure the total peak power and record as P_{Pk} . Use spectrum to measure the total average power and record as P_{Avg} . Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm).

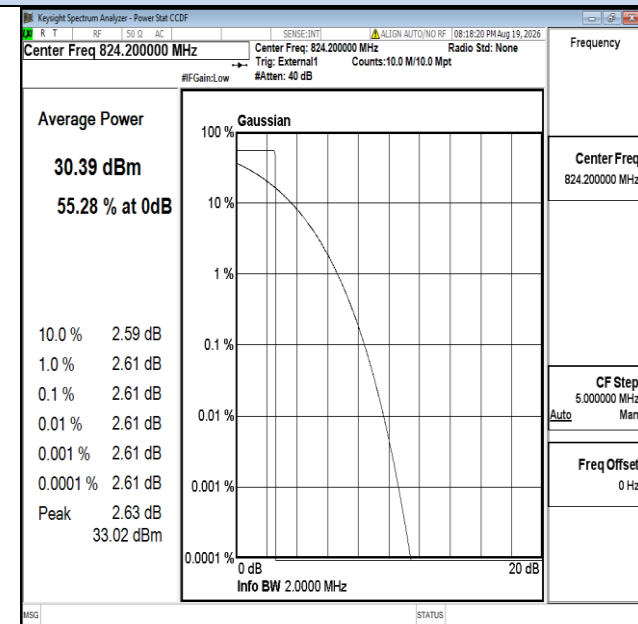
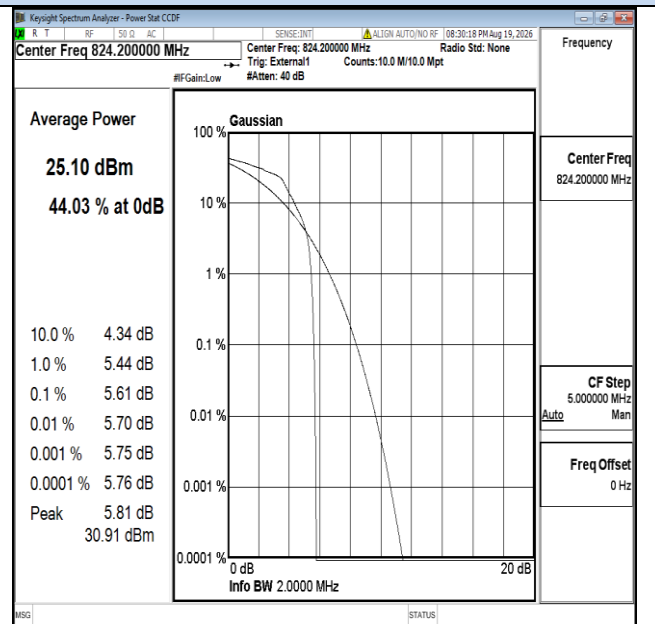
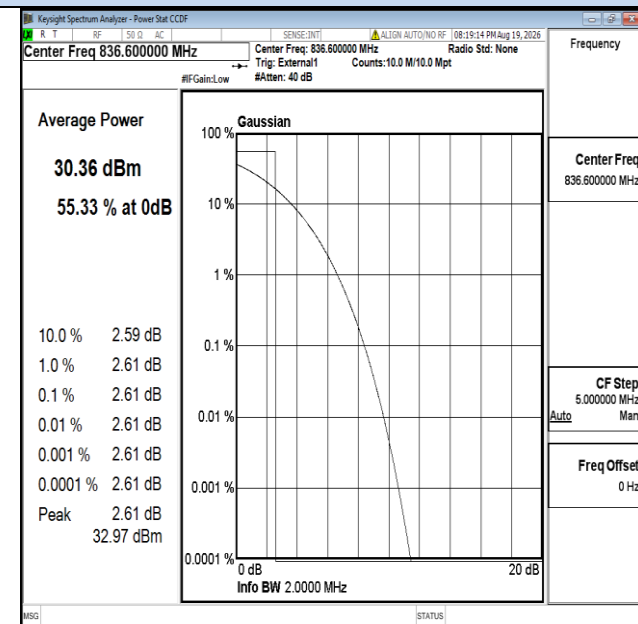
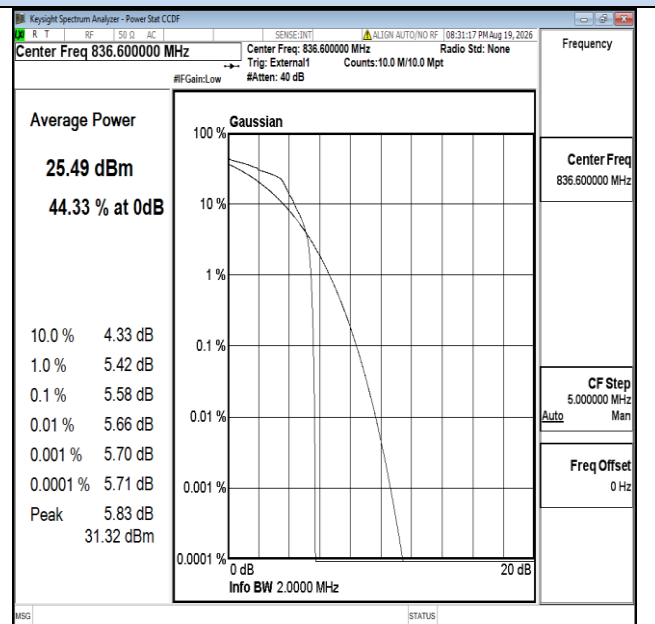
Determine the PAPR from:

$$\text{PAPR (dB)} = P_{Pk} \text{ (dBm)} - P_{Avg} \text{ (dBm)}.$$

Record the maximum PAPR level associated with a probability of 0.1%.

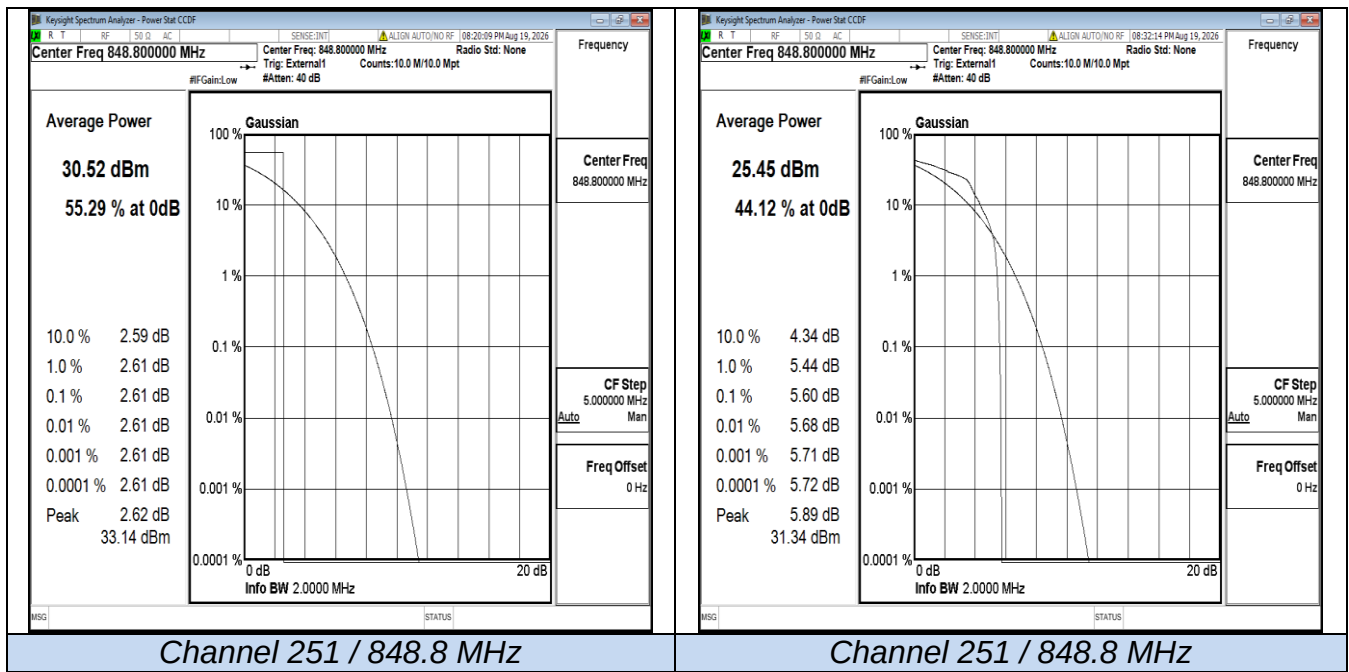
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	PAPR Value (dB)	Limits (dB)	Verdict
GSM/TM1/GPRS850	128	824.2	2.61	13.0	PASS
	190	836.6	2.61	13.0	
	251	848.8	2.61	13.0	
GSM/TM2/EDGE850	128	824.2	5.61	13.0	PASS
	190	836.6	5.58	13.0	
	251	848.8	5.60	13.0	
GSM/TM1/GPRS1900	512	1850.20	2.61	13.0	PASS
	661	1880.00	2.62	13.0	
	810	1909.80	2.62	13.0	
GSM/TM2/EDGE1900	512	1850.20	5.58	13.0	PASS
	661	1880.00	5.61	13.0	
	810	1909.80	5.50	13.0	

Peak-to-Average Ratio (PAR)**GSM/TM1/GPRS850****GSM/TM2/EDGE850****Channel 128 / 824.2 MHz****Channel 128 / 824.2 MHz****Channel 190 / 836.6 MHz****Channel 190 / 836.6 MHz**

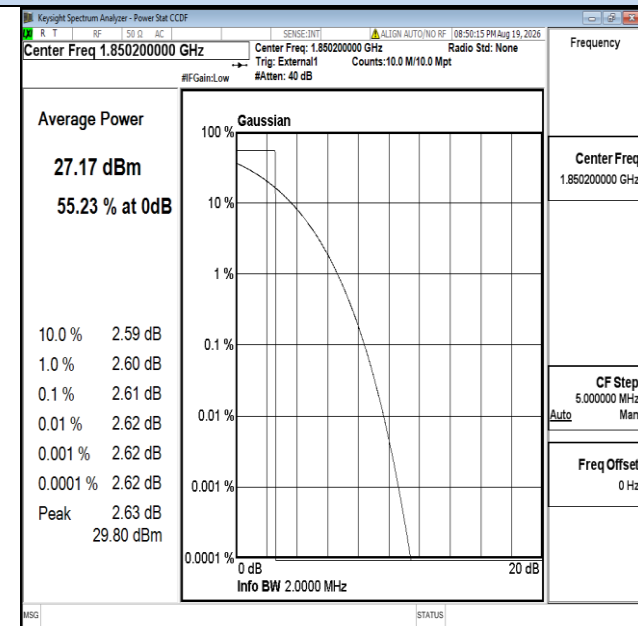
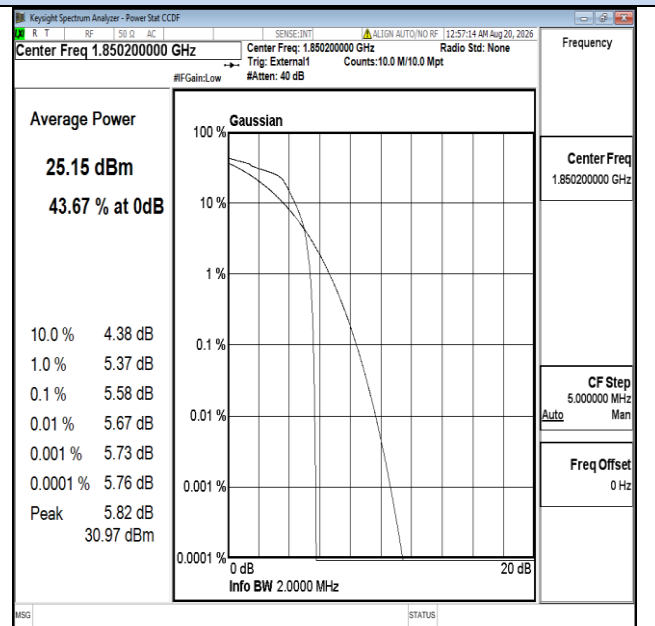
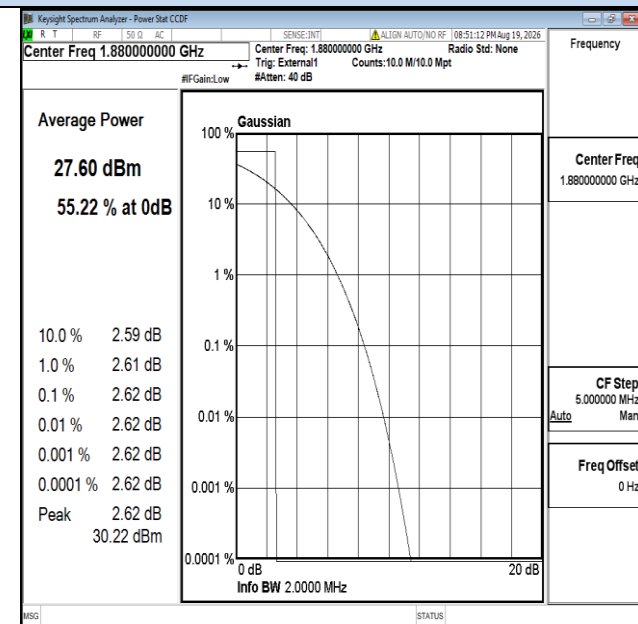
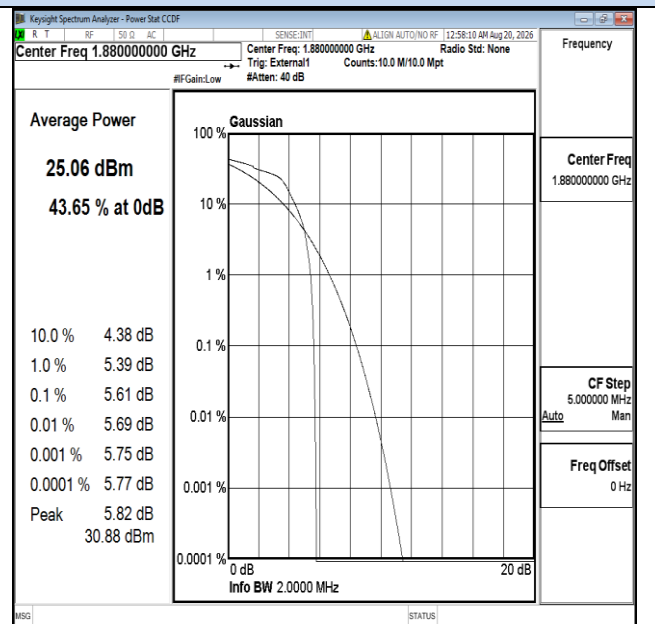
TRF-4-E-151 A/0

Guangzhou LCS Compliance Testing Laboratory Ltd.
Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com



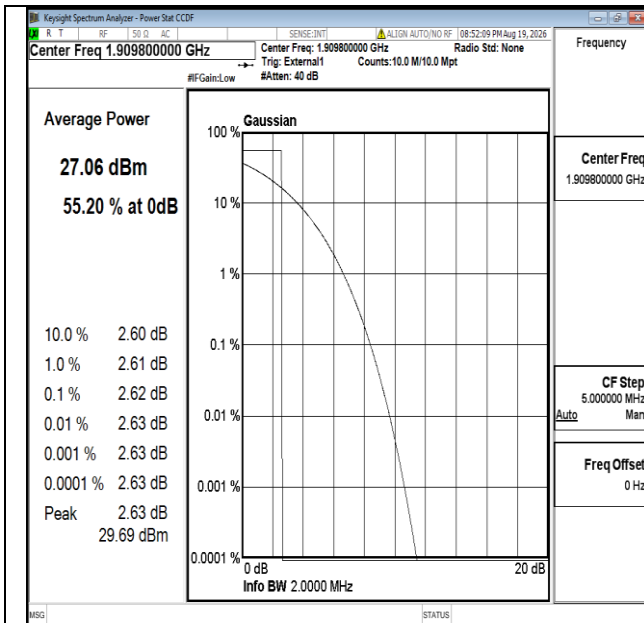
TRF-4-E-151 A/O

Guangzhou LCS Compliance Testing Laboratory Ltd.
Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

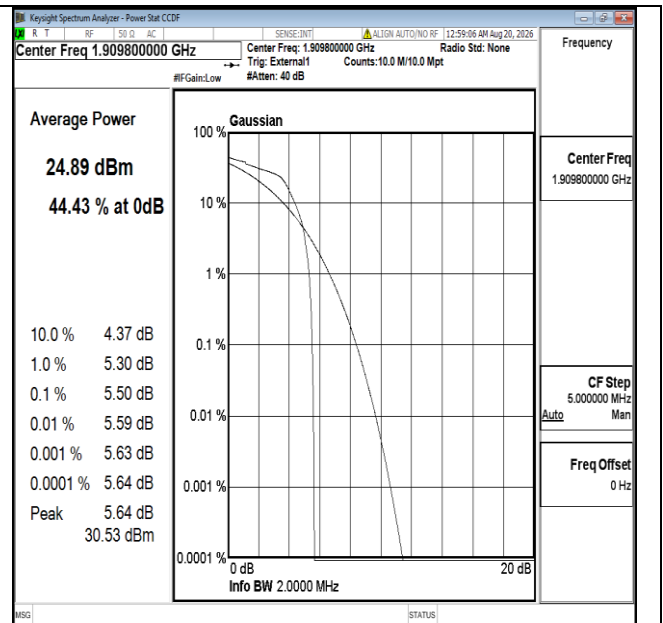
Peak-to-Average Ratio (PAR)**GSM/TM1/GPRS1900****GSM/TM2/EDGE1900****Channel 512 / 1850.2 MHz****Channel 512 / 1850.2 MHz****Channel 661 / 1880 MHz****Channel 661 / 1880 MHz**

TRF-4-E-151 A/O

Guangzhou LCS Compliance Testing Laboratory Ltd.
Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com



Channel 810 / 1909.8 MHz



Channel 810 / 1909.8 MHz

TRF-4-E-151 A/O

Guangzhou LCS Compliance Testing Laboratory Ltd.
Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

5 TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

6 EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

7 INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF TEST REPORT-----