FCC TEST REPORT

FCC ID: 2BN8Y-GF60L

On Behalf of

Huizhou Cantrack Technology Co., ltd.

4G GPS Tracker

Model No.: GF40L, GF60L, GF70L, GF200LS, G08L, G09L, G900LS, G900LM, G500L, G06L, TK903, YG119, V20, P02L, P60L, TF220, S01, S02

Prepared for	:	Huizhou Cantrack Technology Co., ltd.
Address	:	FL5, BLDG B, Lianxing Industrial Park, JiangJun Rd, Qiuchang, HuiYang District, Huizhou, Guangdong, China, 516221

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2502176-C02-R01
Date of Receipt	:	February 26, 2025
Date of Test	:	February 26, 2025 – March 14, 2025
Date of Report	:	March 15, 2025
Version Number	:	V0
Test Result	:	**Pass**

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TEST REPORT DECLARATION

Applicant	:	Huizhou Cantrack Technology Co., ltd.
Address	:	FL5, BLDG B, Lianxing Industrial Park, JiangJun Rd, Qiuchang, HuiYang District, Huizhou, Guangdong, China, 516221
Manufacturer	:	Huizhou Cantrack Technology Co., ltd.
Address	:	FL5, BLDG B, Lianxing Industrial Park, JiangJun Rd, Qiuchang, HuiYang District, Huizhou, Guangdong, China, 516221
EUT Description	:	4G GPS Tracker

	(A)	Model No.	: GF40L, GF60L, GF70L, GF200LS, G08L, G09L, G900LS, G900LM, G500L, G06L, TK903, YG119, V20, P02L, P60L, TF220, S01, S02
	(B)	Trademark	: N/A

Measurement Standard Used:

FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 22 Subpart H
FCC CFR Title 47 Part 24 Subpart E

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature)........:	Yannis Wen Project Engineer	_Yannis Wen_
Approved by (name + signature).......:	Jack Xu Project Manager	_Jack Xu_

Date of issue…… ……………….: March 15, 2025

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 15, 2025	Initial released Issue	Yannis Wen

1   Test Summary

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c)	Pass
Peak-to-Average Ratio	Part 2.1046 Part 22.913(d) Part 24.232 (d)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

Note: 1. Pass: The EUT complies with the essential requirements in the standard.

2. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2   General Information

2.1 General Description of EUT

Description/PMN	:	Geodetic GNSS Receiver
Model No./HVIN	:	GF40L, GF60L, GF70L, GF200LS, G08L, G09L, G900LS, G900LM, G500L, G06L, TK903, YG119, V20, P02L, P60L, TF220, S01, S02
DIFF.	:	There is no difference except the name of the model. All tests are made with the GF60L model.
Test Voltage	:	DC 5V from Type-C port and DC 3.7V from battery
Support Networks	:	GPRS, EGPRS
Support Bands	:	GSM850, PCS1900
TX Frequency	:	GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
GPRS Class	:	33
EGPRS Class	:	33
Modulation type	:	GPRS: GMSK EGPRS: GMSK/8PSK
Antenna type	:	Internal antenna
Antenna gain	:	Maximum Gain is 0.42dBi for GSM 850 Maximum Gain is -0.14dBi for PCS1900 (Antenna information is provided by applicant.)
Software version	:	V1.0
Hardware version/FVIN	:	V1.0

Remark: 1. The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 2G function, and there is no other transmitter involved.

Operation Frequency List:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
129	824.40	513	1850.40
⋮	⋮	⋮	⋮
189	836.40	660	1879.80
190	836.60	661	1880.00
191	836.80	662	1880.20
⋮	⋮	⋮	⋮
250	848.60	809	1909.60
251	848.80	810	1909.80

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Final test channel:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
190	836.60	661	1880.00
251	848.80	810	1909.80

2.2   Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 2, Part 22 subpart H, Part 24 subpart E of the FCC CFR 47, KDB 971168 D01 v03r01 and ANSI C63.26.

2.3   Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 ANSI C63.26 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

2.4   Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 15, 2019 Certificated by IC
Registration Number: 12135A
CAB identifier: CN0085

2.5   Accessories of Device (EUT)

Accessories   :   N/A
Manufacturer   :   N/A
Model   :   N/A
Ratings   :   N/A

2.6   Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
1	Notebook PC	Lenovo	ThinkPad E14	/	/

2.7   Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.8 Measurement Uncertainty

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31 dB(Polarize: V)
	4.30 dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8}GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

3   Test Instruments list

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.18	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2024.08.08	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2024.08.08	1Year
Geodetic GNSS Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2024.08.08	1Year
Geodetic GNSS Receiver	R&S	ESCI	4.42 SP1	101165	2024.08.08	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2024.08.08	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2024.08.08	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2024.08.08	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2024.08.08	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2024.08.08	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2024.08.08	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2024.08.08	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	2Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2024.08.08	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2024.08.08	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2024.08.08	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2024.08.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2024.08.08	1 Year
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	EZ	Alpha-3A1
CE	EZ-EMC	EZ	Alpha-3A1

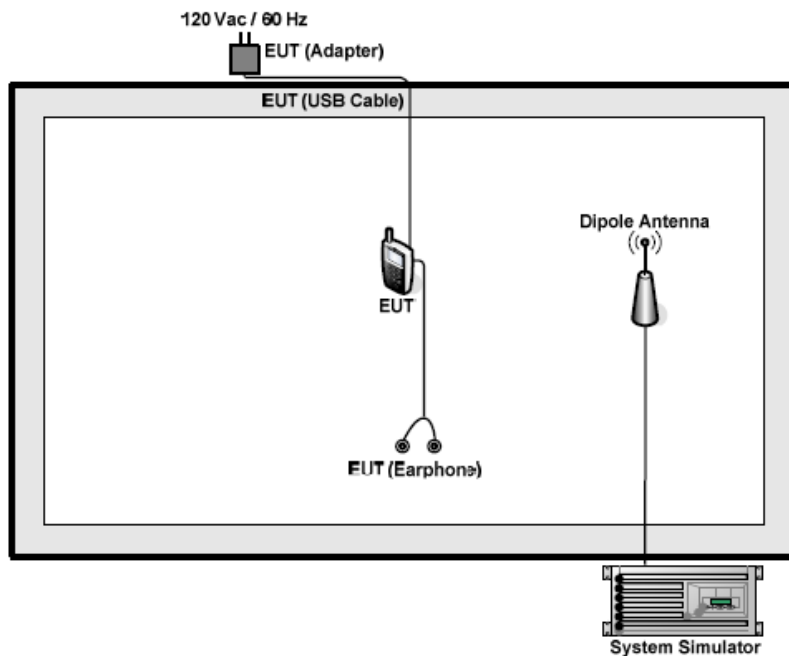# 4 System test configuration

4.1 Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.
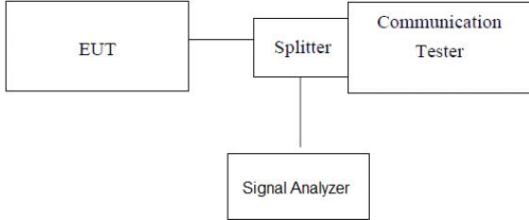
Test modes		
Band	Radiated	Conducted
GSM 850	☐ GSM link ■ GPRS 1 link ■ EPRS 1 link	☐ GSM link ■ GPRS 1 link ■ EGPRS 1 link
PCS 1900	☐ GSM link ■ GPRS 1 link ■ EGPRS 1 link	☐ GSM link ■ GPRS 1 link ■ EGPRS 1 link

Note: The maximum power levels are GSM mode for GMSK link, GPRS multi-slot class 8 mode for GMSK link, EGPRS multi-slot class 8 mode for 8PSK link, RMC12.2Kbps mode for WCDMA Band V/II. only these modes were used for all tests.
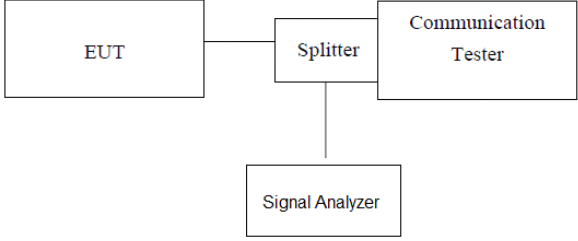
4.2 Configuration of Tested System

4.3 Conducted AV Output Power

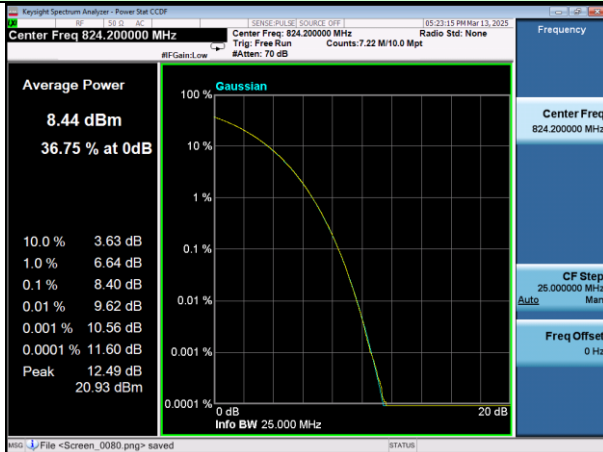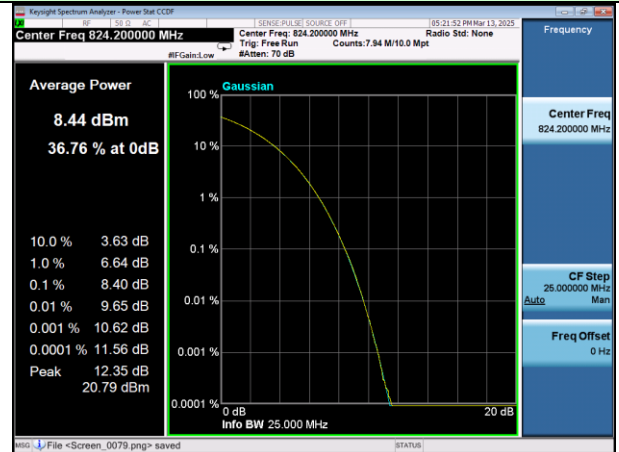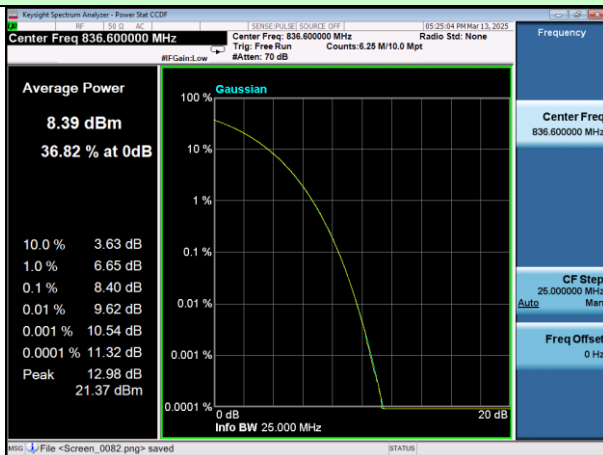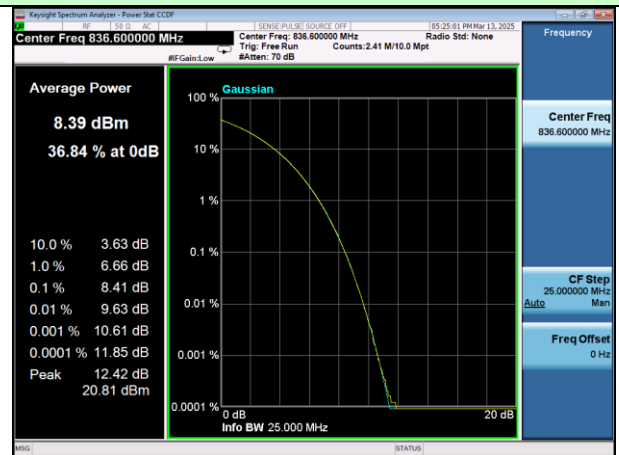|	
Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part2.1046
Limit:	GSM850, WCDMA Band V: 7W(38.45dbm)
	PCS1900, WCDMA Band II: 2W(33.01dbm)
Test setup:	Note: Measurement setup for testing on Antenna connector
Test Procedure:	1. The transmitter output port was connected to base station.
	2. The RF output of EUT was connected to the Signal Analyzer by RF cable and attenuator, the path loss was compensated to the results for each measurement.
	3. Set EUT at maximum power through base station.
	4. Select lowest, middle, and highest channels for each band and different modulation.
	5. Measure the maximum burst average power.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

Conducted Burst Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GPRS (GMSK, 1 TX slot)	**32.08**	31.89	31.91	**32.00**	31.92	31.87
GPRS (GMSK, 2 TX slot)	30.73	31.07	30.97	30.86	30.73	30.88
GPRS (GMSK, 3 TX slot)	29.72	30.16	30.05	30.19	30.17	30.13
GPRS (GMSK, 4 TX slot)	28.79	29.13	28.74	28.93	28.78	29.17
EGPRS (8PSK, 1 TX slot)	**31.93**	31.92	31.72	31.94	**32.04**	31.85
EGPRS (8PSK, 2 TX slot)	30.93	31.13	30.91	30.81	30.91	31.06
EGPRS (8PSK, 3 TX slot)	29.81	29.94	30.08	29.80	29.87	30.15
EGPRS (8PSK, 4 TX slot)	28.86	29.17	29.20	28.71	29.19	29.18

4.4 Peak-to-Average Ratio
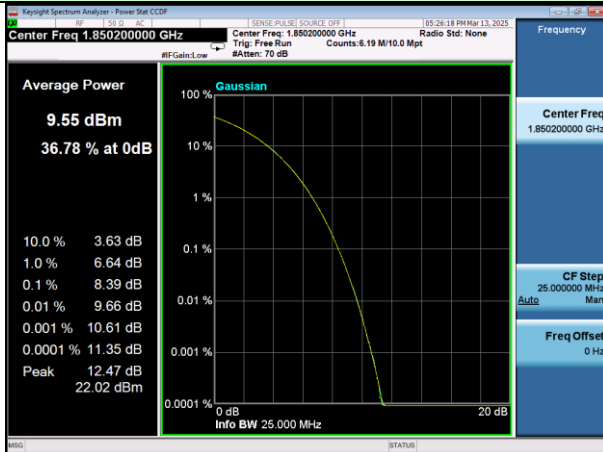
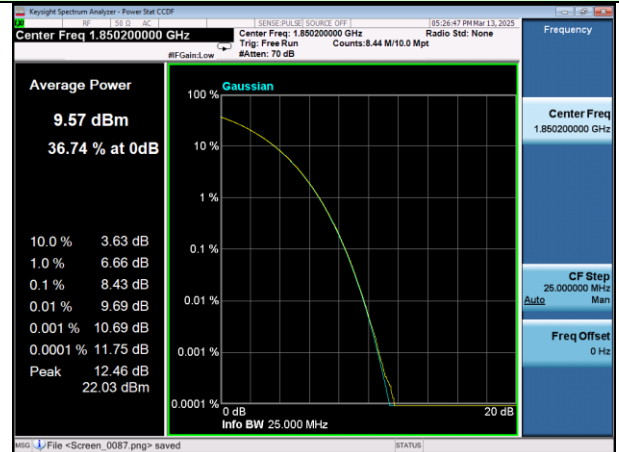|	
Test Requirement:	Part 22.913(d), FCC part24.232(d)
Test Method:	FCC part2.1046
Limit:	13db
Test setup:	Note: Measurement setup for testing on Antenna connector
Test Procedure:	1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the Signal Analyzer by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power. 6. Record the maximum peak-to-average ratio value.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement data

Test mode	Peak to Average Ratio （dB）			Limit （dB）	Result
	Low Ch.	Middle Ch.	High Ch.		
GSM 850 (GPRS 1 link)	8.40	8.40	8.41	13	PASS
GSM 850 (EGPRS 1 link)	8.40	8.41	8.37	13	PASS
PCS 1900 (GPRS 1 link)	8.39	8.43	8.41	13	PASS
PCS 1900 (EGPRS 1 link)	8.43	8.40	8.41	13	PASS

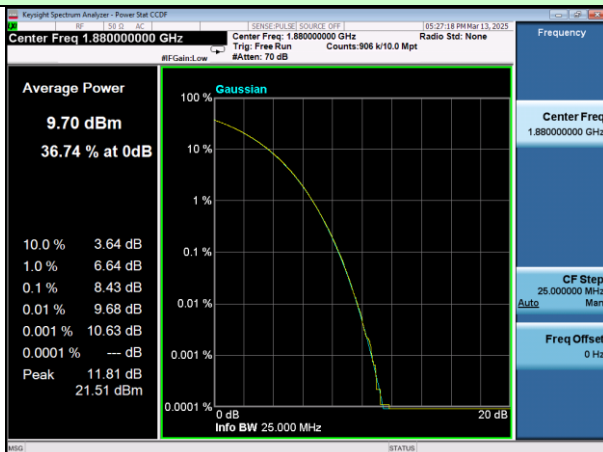| Test Mode: GSM 850 (GPRS 1 link) Low Ch.	Test Mode: GSM 850 (EGPRS 1 link) Low Ch.
Middle Ch.	Middle Ch.
High Ch.	High Ch.
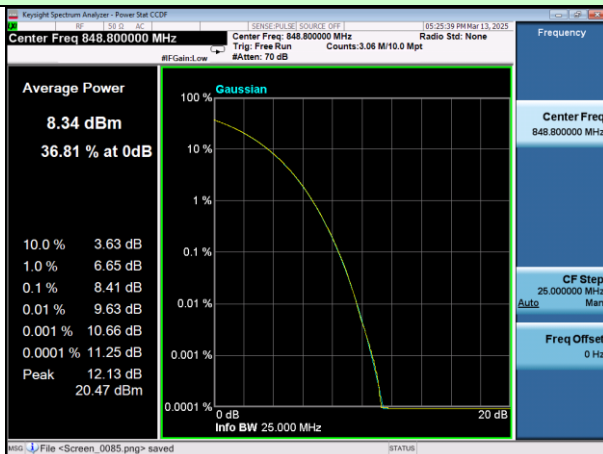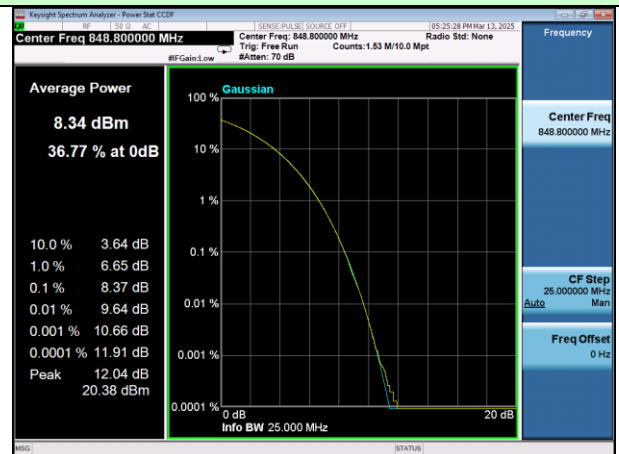
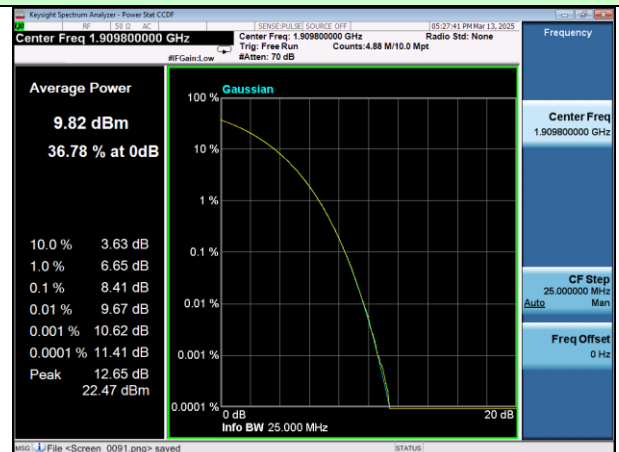| Test Mode: PCS 1900 (GPRS 1 link) Low Ch.	Test Mode: PCS 1900 (EGPRS 1 link) Low Ch.

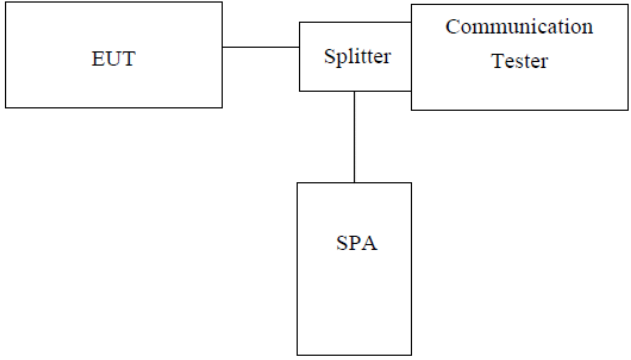**Low Ch. (GPRS)** — Keysight Spectrum Analyzer - Power Stat CCDF
Center Freq 1.850200000 GHz — Counts:6.19 M/10.0 Mpt — 05:26:18 PM Mar 13, 2025

Average Power
9.55 dBm
36.78 % at 0dB

10.0 %	3.63 dB
1.0 %	6.64 dB
0.1 %	8.39 dB
0.01 %	9.66 dB
0.001 %	10.61 dB
0.0001 %	11.35 dB
Peak	12.47 dB
	22.02 dBm

Info BW 25.000 MHz

Low Ch. (EGPRS) — Keysight Spectrum Analyzer - Power Stat CCDF
Center Freq 1.850200000 GHz — Counts:8.44 M/10.0 Mpt — 05:26:47 PM Mar 13, 2025

Average Power
9.57 dBm
36.74 % at 0dB

10.0 %	3.63 dB
1.0 %	6.66 dB
0.1 %	8.43 dB
0.01 %	9.69 dB
0.001 %	10.69 dB
0.0001 %	11.75 dB
Peak	12.46 dB
	22.03 dBm

Info BW 25.000 MHz

Middle Ch.	Middle Ch.

Middle Ch. (GPRS) — Center Freq 1.880000000 GHz — Counts:906 k/10.0 Mpt — 05:27:18 PM Mar 13, 2025

Average Power
9.70 dBm
36.74 % at 0dB

10.0 %	3.64 dB
1.0 %	6.64 dB
0.1 %	8.43 dB
0.01 %	9.68 dB
0.001 %	10.63 dB
0.0001 %	--- dB
Peak	11.81 dB
	21.51 dBm

Info BW 25.000 MHz

Middle Ch. (EGPRS) — Center Freq 1.880000000 GHz — Counts:5.03 M/10.0 Mpt — 05:27:21 PM Mar 13, 2025

Average Power
9.71 dBm
36.81 % at 0dB

10.0 %	3.63 dB
1.0 %	6.64 dB
0.1 %	8.40 dB
0.01 %	9.65 dB
0.001 %	10.67 dB
0.0001 %	11.59 dB
Peak	11.99 dB
	21.70 dBm

Info BW 25.000 MHz

High Ch.	High Ch.

High Ch. (GPRS) — Center Freq 1.909800000 GHz — Counts:2.88 M/10.0 Mpt — 05:27:39 PM Mar 13, 2025

Average Power
9.82 dBm
36.77 % at 0dB

10.0 %	3.63 dB
1.0 %	6.65 dB
0.1 %	8.41 dB
0.01 %	9.66 dB
0.001 %	10.58 dB
0.0001 %	11.34 dB
Peak	11.64 dB
	21.46 dBm

Info BW 25.000 MHz

High Ch. (EGPRS) — Center Freq 1.909800000 GHz — Counts:4.88 M/10.0 Mpt — 05:27:41 PM Mar 13, 2025

Average Power
9.82 dBm
36.78 % at 0dB

10.0 %	3.63 dB
1.0 %	6.65 dB
0.1 %	8.41 dB
0.01 %	9.67 dB
0.001 %	10.62 dB
0.0001 %	11.41 dB
Peak	12.65 dB
	22.47 dBm

Info BW 25.000 MHz

4.5 Occupy Bandwidth

Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part2.1049
Test setup:	Note: Measurement setup for testing on Antenna connector
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. -26dBc Geodetic GNSS Receiver line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the Geodetic GNSS Receiver line intersects the signal trace.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
GSM 850 (GPRS 1 link)	128	824.20	244.88	322.1
	190	836.60	250.09	324
	251	848.80	235.61	310.5
GSM 850 (EGPRS 1 link)	128	824.20	237.75	310.7
	190	836.60	245.44	310.8
	251	848.80	245.59	325.1
PCS 1900 (GPRS 1 link)	512	1850.20	241.95	316
	661	1880.00	236.51	306.5
	810	1909.80	239.54	297.5
PCS 1900 (EGPRS 1 link)	512	1850.20	239.29	312.5
	661	1880.00	245.41	318.4
	810	1909.80	245.4	306.2

Test plot as follows:

GSM 850 (EGPRS 1 link)	GSM 850 (GPRS 1 link)
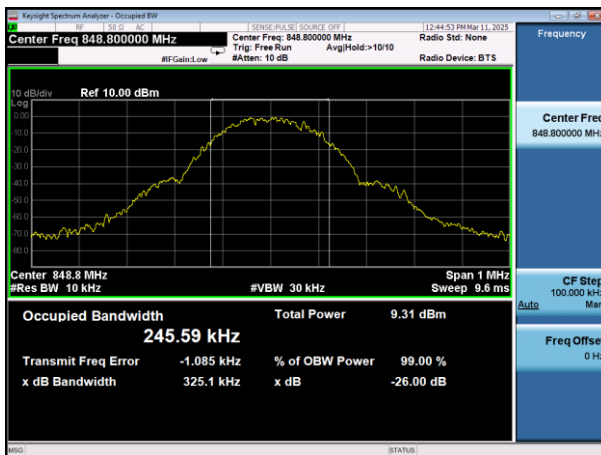
Lowest channel

Lowest channel

Middle channel
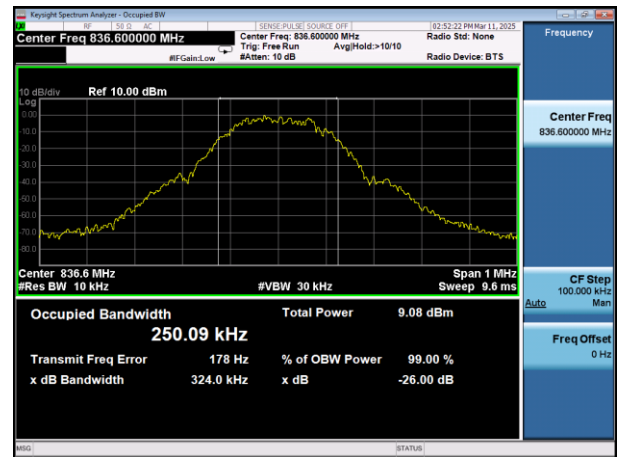
Middle channel
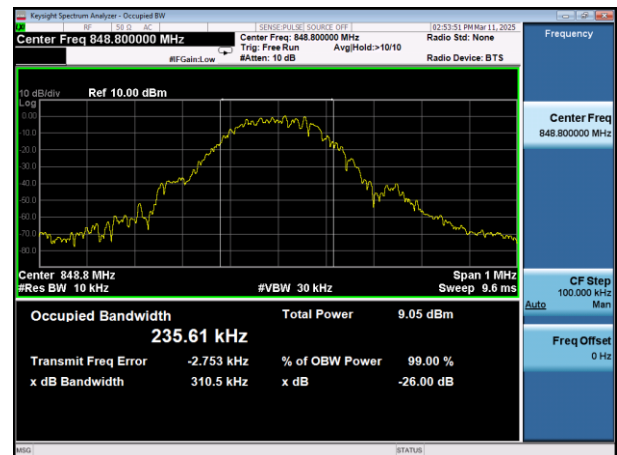
Highest channel

Highest channel
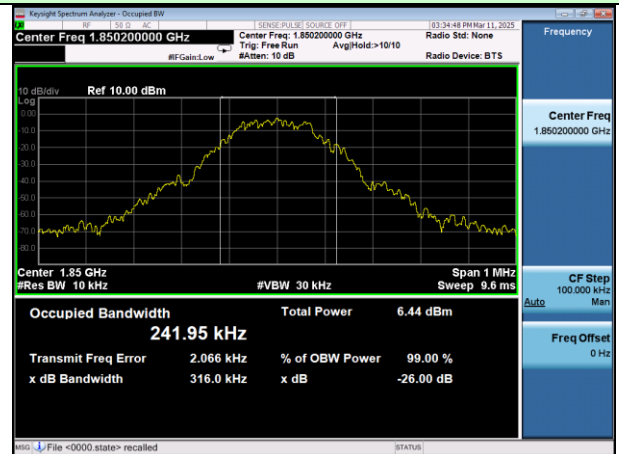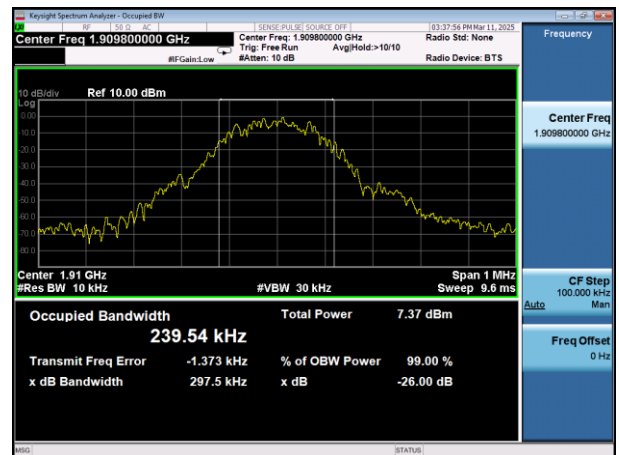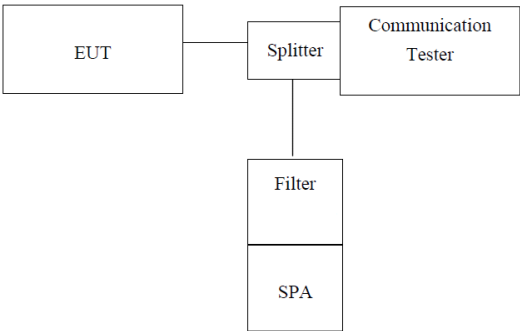
PCS 1900 (EGPRS 1 link)	PCS 1900 (GPRS 1 link)
Lowest channel	Lowest channel
Middle channel	Middle channel
Highest channel	Highest channel

4.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

4.7 Out of band emission at antenna terminals

|	
Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test setup:	*Note:* Measurement setup for testing on Antenna connector
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Test plot as follows:
Note: During the conducted spurious emission test, a band filter was used. The information of the filter is reported at section 6.0 (refer to item 24, 25).
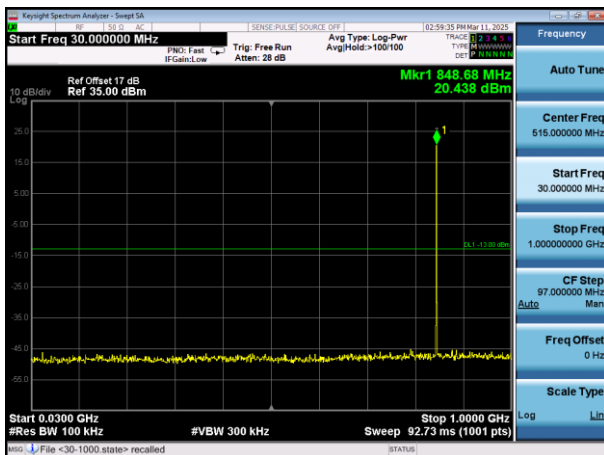
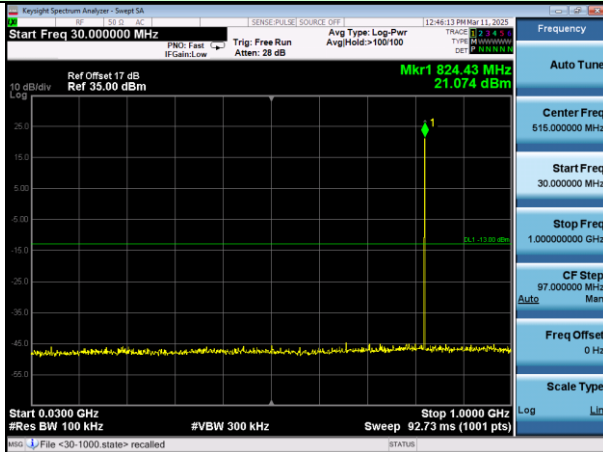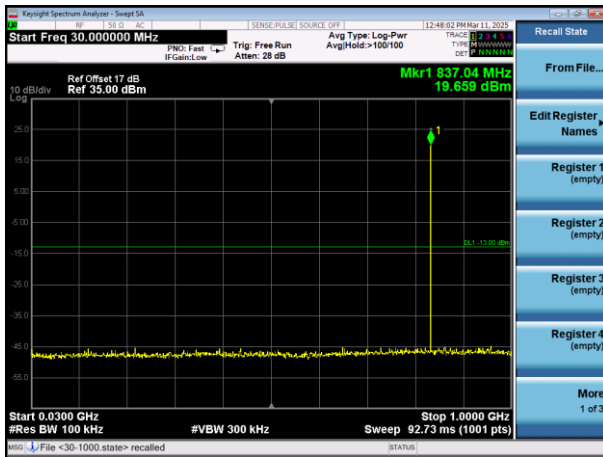| Test Mode: Traffic mode	GSM 850 (GPRS 1 link)
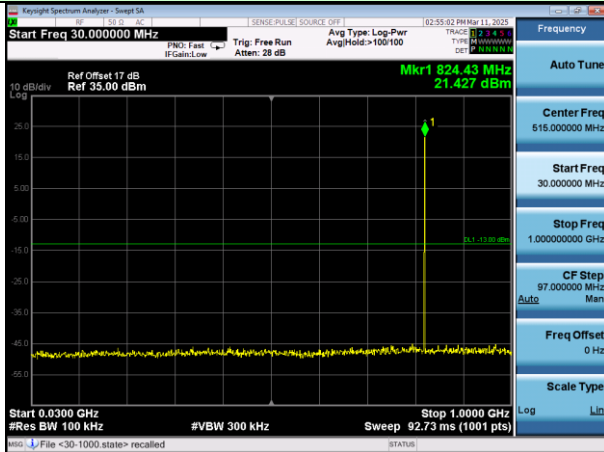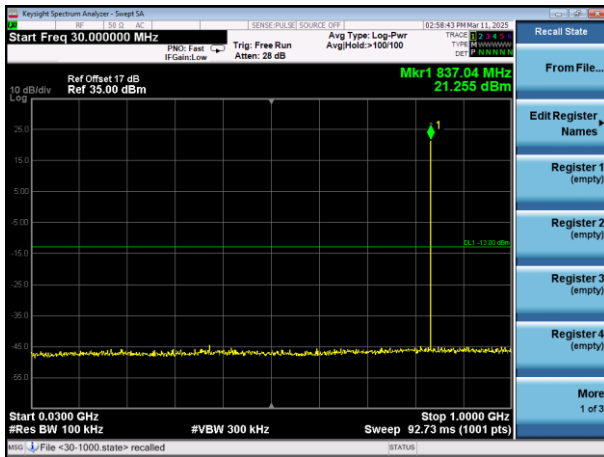
Lowest channel

Middle channel

Highest channel

Test Mode: Traffic mode	GSM 850 (EGPRS 1 link)

Lowest channel

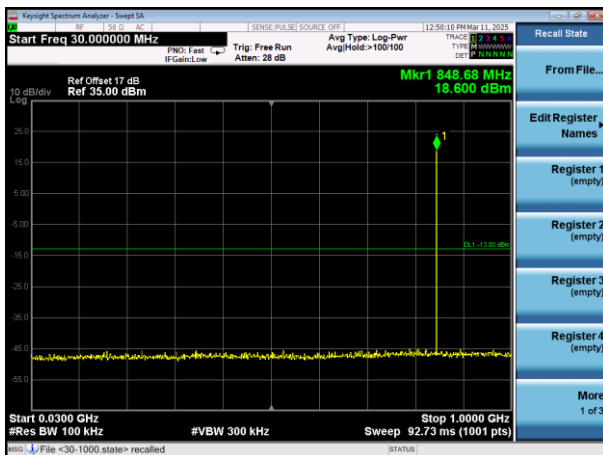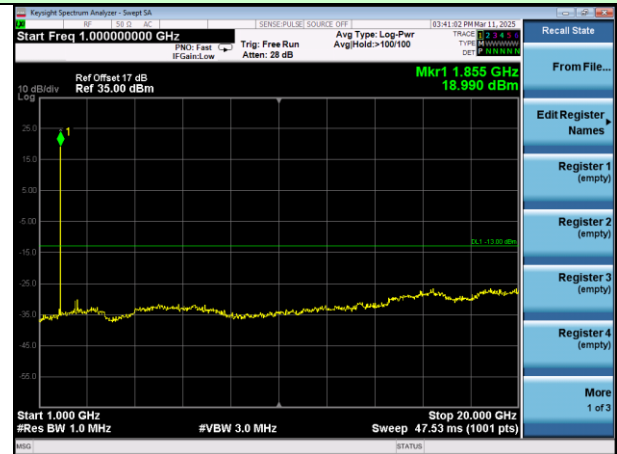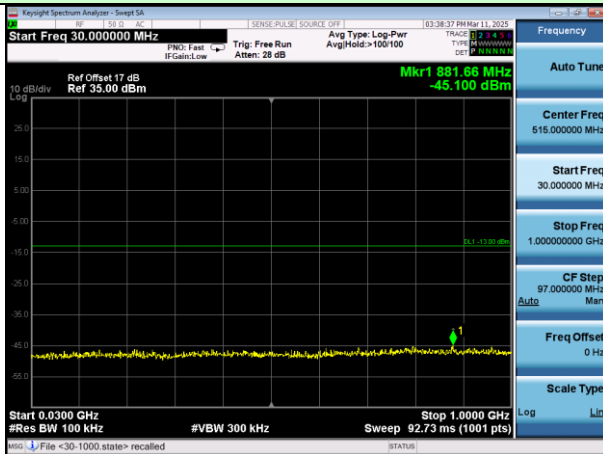Middle channel

Highest channel

Test Mode: Traffic mode	PCS1900 (GPRS 1 link)
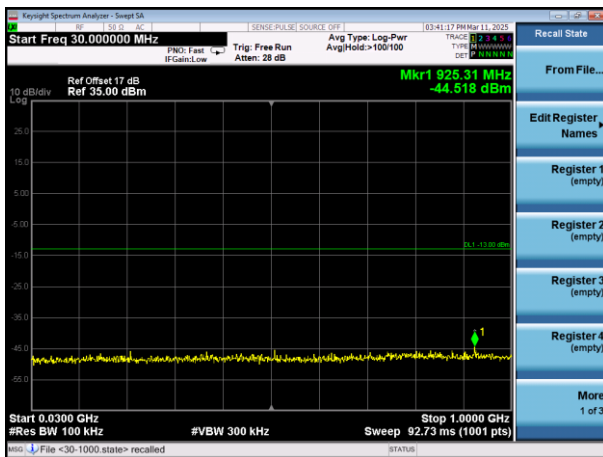
Lowest channel

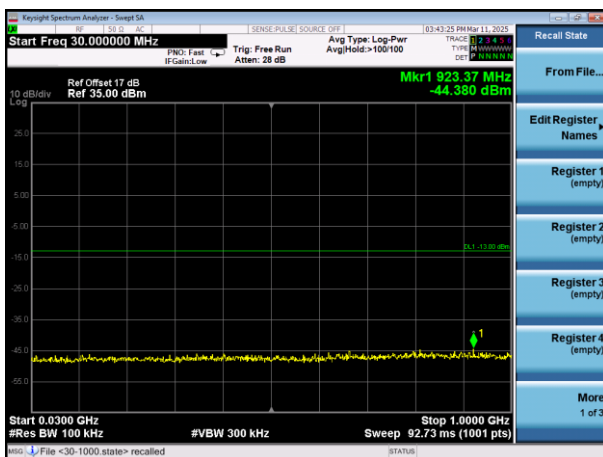Middle channel

Highest channel

Test Mode: Traffic mode	PCS1900 (EGPRS 1 link)
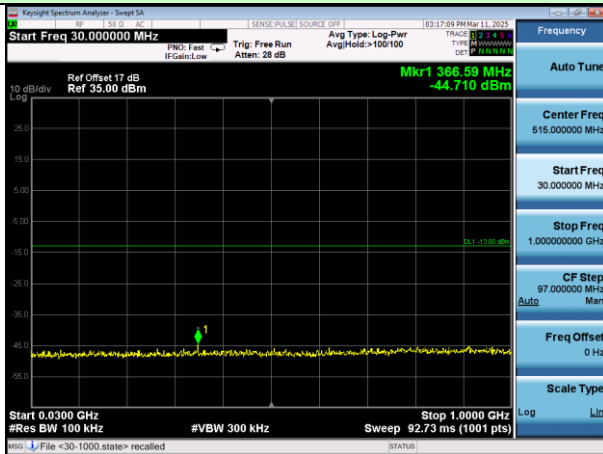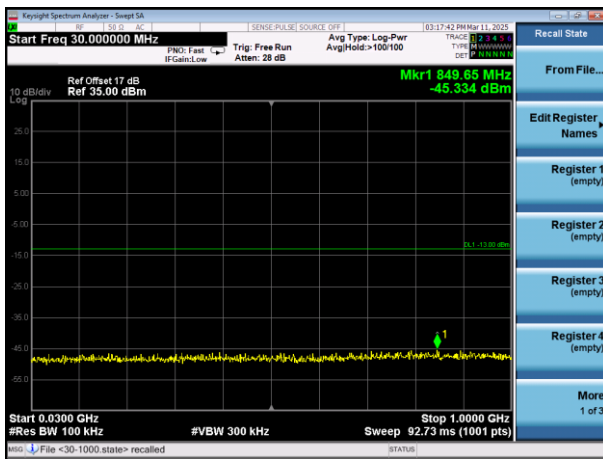
Lowest channel

Middle channel
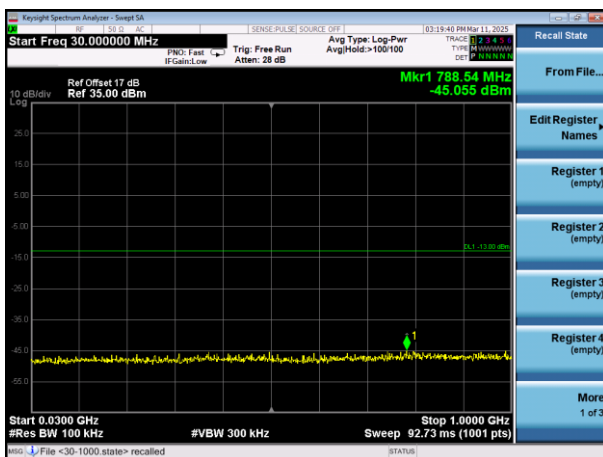
Highest channel

Band Edge:

Test Mode: Traffic mode	GSM850 (GPRS 1 link)
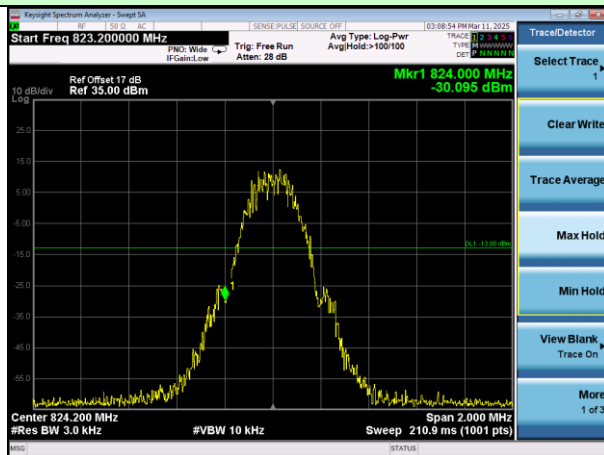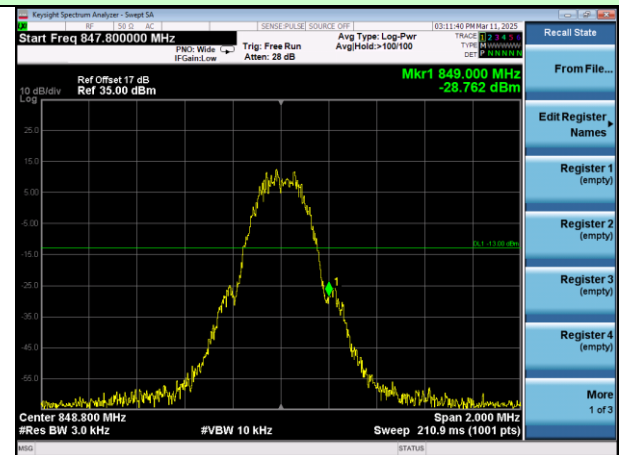
Lowest channel	Highest channel

Test Mode: Traffic mode	GSM850 (EGPRS 1 link)
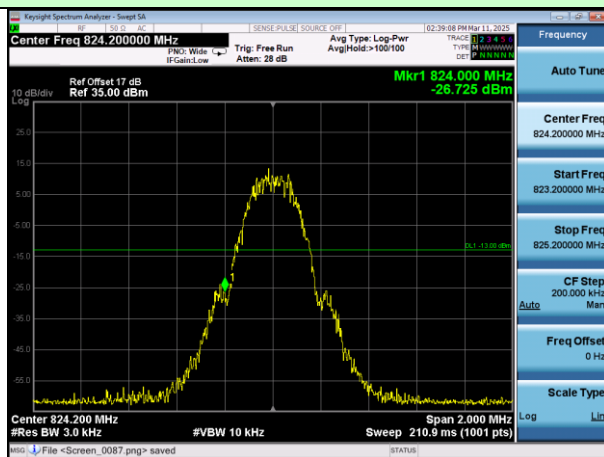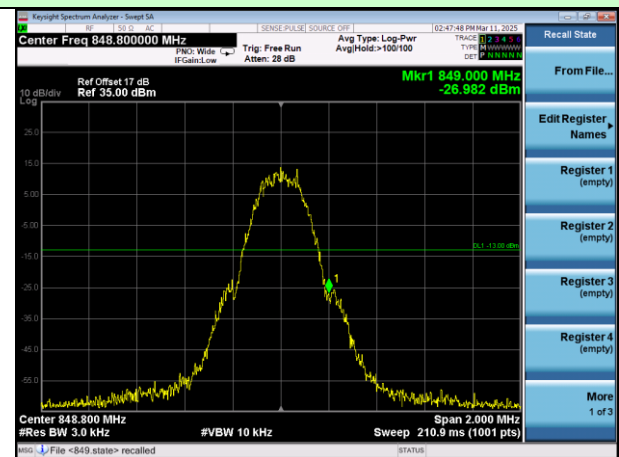
Lowest channel	Highest channel

Test Mode: Traffic mode	PCS1900 (GPRS 1 link)
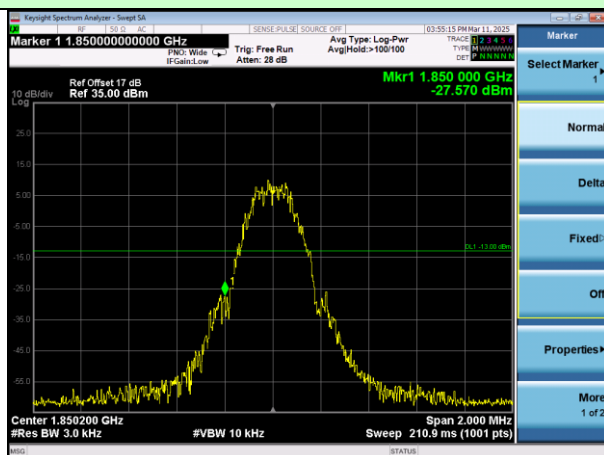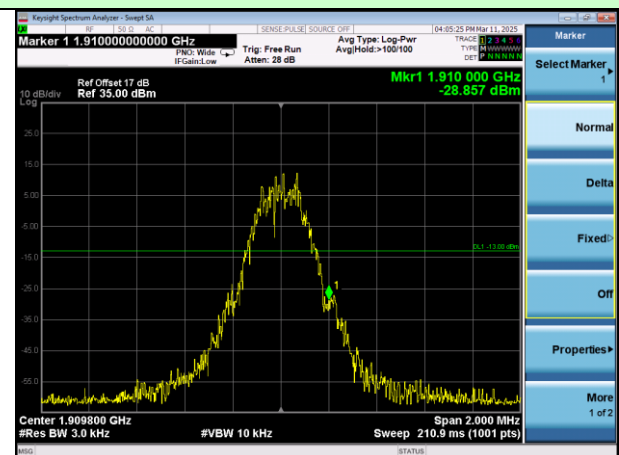
Lowest channel	Highest channel

Test Mode: Traffic mode	PCS1900 (EGPRS 1 link)
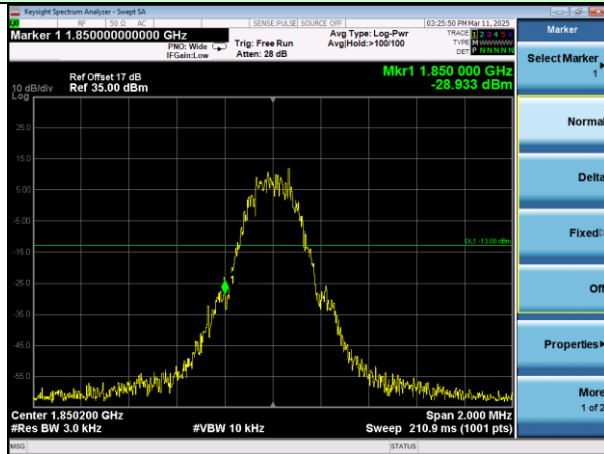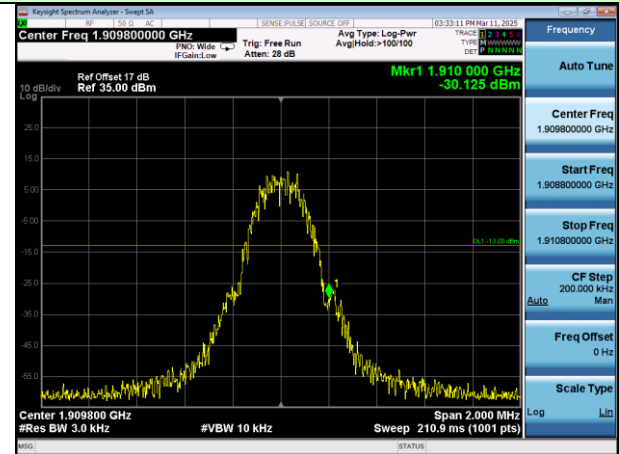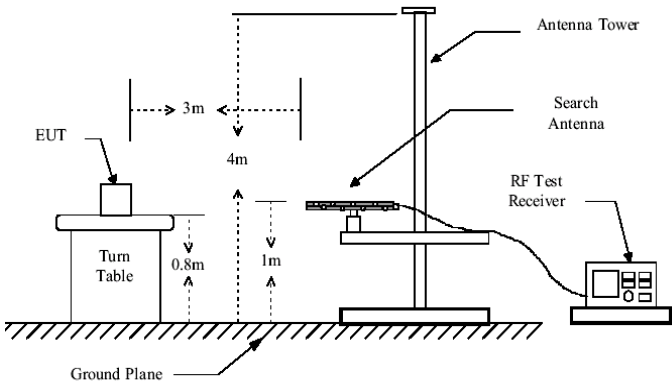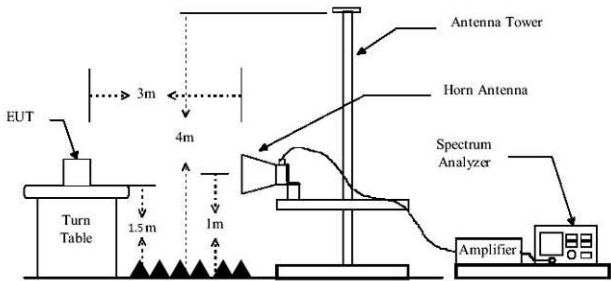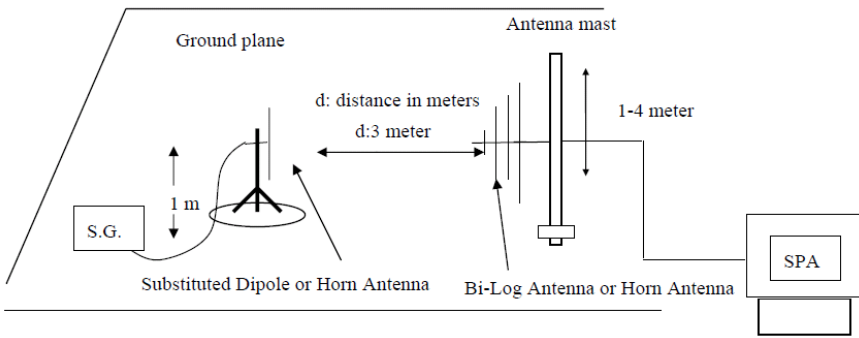
Lowest channel

Highest channel

4.8   ERP, EIRP Measurement

Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part2.1046
Limit:	GSM850: 7W
	PCS1900: 2W
Test setup:	Below 1GHz
	Above 1GHz
	Substituted method:

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
	2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
	3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows:
	ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)
	4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:
	EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data
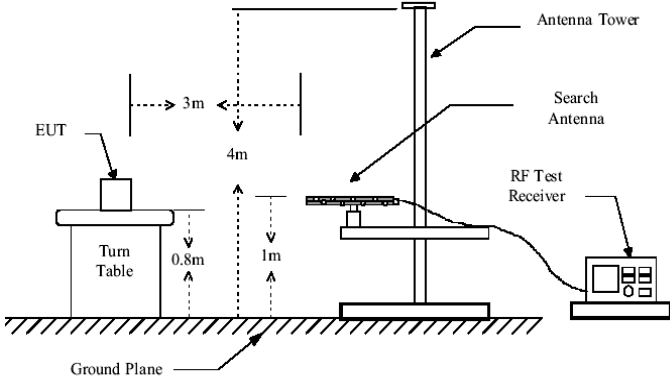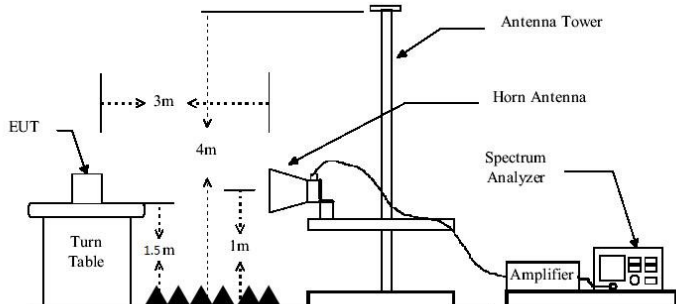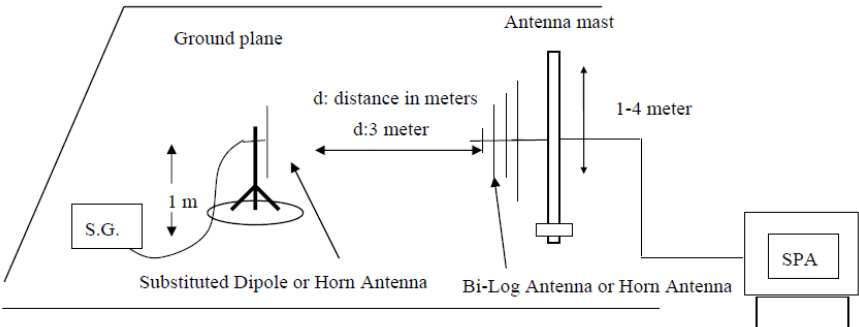
EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (GPRS 1 link)	Lowest	H	V	24.64	38.45	Pass
			H	27.32		
		E1	V	25.63		
			H	25.29		
		E2	V	24.59		
			H	26.77		
	Middle	H	V	27.22	38.45	Pass
			H	24.14		
		E1	V	26.80		
			H	26.00		
		E2	V	25.69		
			H	26.88		
	Highest	H	V	27.08	38.45	Pass
			H	25.34		
		E1	V	23.78		
			H	**27.77**		
		E2	V	26.39		
			H	27.49		

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (EGPRS 1 link)	Lowest	H	V	23.06	38.45	Pass
			H	23.31		
		E1	V	24.04		
			H	23.49		
		E2	V	23.12		
			H	23.17		
	Middle	H	V	23.57	38.45	Pass
			H	23.23		
		E1	V	24.28		
			H	23.48		
		E2	V	22.43		
			H	23.36		
	Highest	H	V	24.87	38.45	Pass
			H	**25.55**		
		E1	V	23.97		
			H	23.82		
		E2	V	22.54		
			H	24.97		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GPRS 1 link)	Lowest	H	V	26.57	33.01	Pass
			H	26.89		
		E1	V	28.55		
			H	25.23		
		E2	V	25.62		
			H	**28.98**		
	Middle	H	V	28.95	33.01	Pass
			H	25.65		
		E1	V	28.85		
			H	24.94		
		E2	V	28.40		
			H	27.66		
	Highest	H	V	25.97	33.01	Pass
			H	25.40		
		E1	V	28.33		
			H	26.56		
		E2	V	27.60		
			H	25.03		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (EGPRS 1 link)	Lowest	H	V	25.15	33.01	Pass
			H	25.40		
		E1	V	25.70		
			H	24.31		
		E2	V	23.53		
			H	23.88		
	Middle	H	V	24.95	33.01	Pass
			H	24.93		
		E1	V	26.04		
			H	23.39		
		E2	V	24.75		
			H	24.80		
	Highest	H	V	24.37	33.01	Pass
			H	**27.19**		
		E1	V	24.89		
			H	24.59		
		E2	V	24.00		
			H	26.55		

4.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1053
Limit:	-13dBm
Test setup:	Below 1GHz Above 1GHz Substituted method:

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
	2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.
	3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.
	4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

Test mode:	GPRS850		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
236.11	V	-38.82		
585.06	V	-34.59		
1648.49	V	-39.12		
2472.52	V	-37.42	-13.00	Pass
3296.47	V	-35.51		
4121.12	V	-33.21		
4945.29	V	-31.31		
250.94	H	-36.57		
596.71	H	-39.39		
1648.43	H	-38.89		
2472.67	H	-36.95	-13.00	Pass
3296.63	H	-35.43		
4120.61	H	-32.87		
4945.05	H	-29.54		
Test mode:	EGPRS850		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
236.10	V	-38.75		
584.83	V	-34.28		
1697.72	V	-39.35		
2546.18	V	-37.23	-13.00	Pass
3395.32	V	-35.58		
4243.96	V	-33.04		
5092.65	V	-31.11		
250.82	H	-36.61		
596.76	H	-39.07		
1697.32	H	-39.10		
2546.28	H	-36.92	-13.00	Pass
3395.22	H	-35.45		
4243.97	H	-32.94		
5092.47	H	-29.51		

Remark：
1. The emission behaviour belongs to narrowband spurious emission.
2. The above table only shows the worst case channel of each mode.

Test mode:	GPRS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
235.92	V	-38.59	-13.00	Pass
585.07	V	-34.53		
3700.47	V	-39.05		
5550.27	V	-37.14		
7400.61	V	-35.29		
9251.00	V	-33.33		
11101.31	V	-31.25		
250.73	H	-36.68	-13.00	Pass
596.95	H	-39.29		
3700.51	H	-38.69		
5550.25	H	-37.29		
7400.94	H	-35.62		
9250.89	H	-33.00		
11101.09	H	-29.51		
Test mode:	EGPRS1900		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
235.86	V	-38.52	-13.00	Pass
584.74	V	-34.33		
3819.75	V	-39.18		
5729.32	V	-37.19		
7639.16	V	-35.27		
9548.73	V	-32.93		
11458.84	V	-31.02		
250.75	H	-36.61	-13.00	Pass
597.00	H	-39.27		
3819.21	H	-38.92		
5729.56	H	-37.26		
7638.87	H	-35.71		
9549.04	H	-32.55		
11458.73	H	-29.46		

Remark：
1. The emission behaviour belongs to narrowband spurious emission.
2. The above table only shows the worst case channel of each mode.

4.10 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	2.5ppm
Test setup:

Note : Measurement setup for testing on Antenna connector |
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12	-20	10	0.0120	2.5	Pass
	-10	16	0.0191		
	0	20	0.0239		
	10	-24	-0.0287		
	20	17	0.0203		
	30	5	0.0060		
	40	-3	-0.0036		
	50	0	0.0000		
	60	11	0.0131		
Reference Frequency: GSM850 (EGPRS 1 link) Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12	-20	15	0.0179	2.5	Pass
	-10	18	0.0215		
	0	16	0.0191		
	10	-27	-0.0323		
	20	19	0.0227		
	30	6	0.0072		
	40	-4	-0.0048		
	50	-3	-0.0036		
	60	17	0.0203		

Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
12	-20	15	0.0080	2.5	Pass
	-10	14	0.0074		
	0	14	0.0074		
	10	-27	-0.0144		
	20	21	0.0112		
	30	5	0.0027		
	40	-4	-0.0021		
	50	1	0.0005		
	60	10	0.0053		
Reference Frequency: PCS1900 (EGPRS 1 link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
12	-20	12	0.0064	2.5	Pass
	-10	16	0.0085		
	0	18	0.0096		
	10	-28	-0.0149		
	20	17	0.0090		
	30	11	0.0059		
	40	2	0.0011		
	50	3	0.0016		
	60	17	0.0090		

4.11 Frequency stability V.S. Voltage measurement
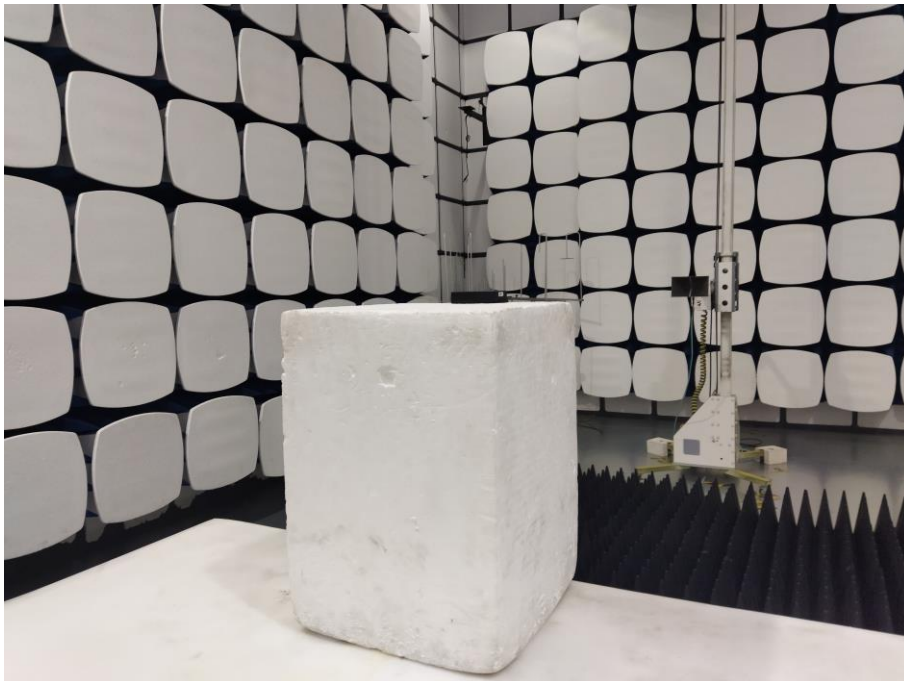
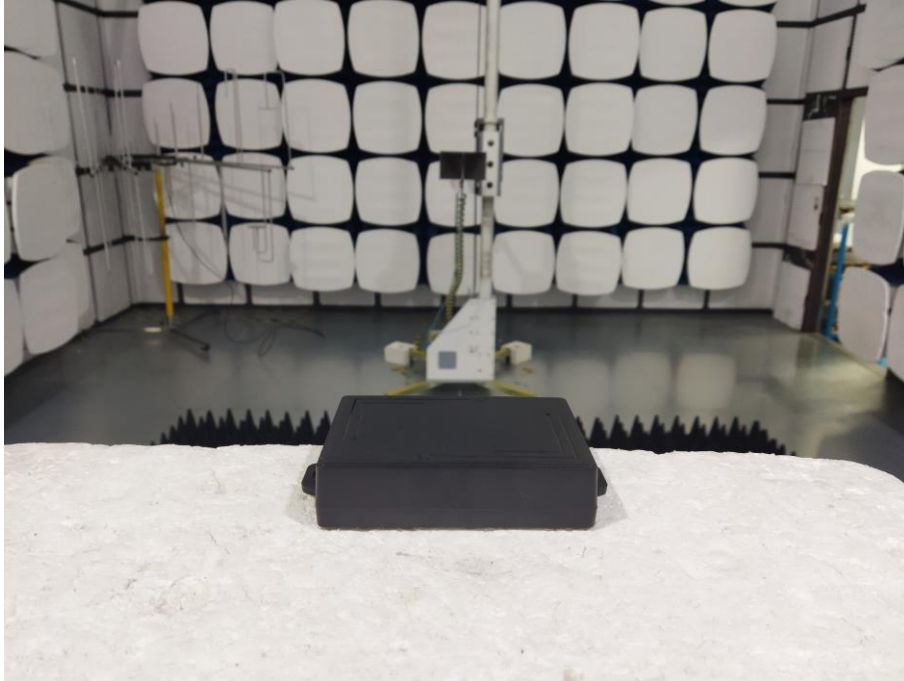|	
Test Requirement:	FCC Part2.1055(d)(1)(2)
Test Method:	FCC Part2.1055(d)(1)(2)
Limit:	2.5ppm
Test setup:	Note : Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	36	15	0.0179	2.5	Pass
	24	18	0.0215		
	9	16	0.0191		

Reference Frequency: GSM850 (EGPRS 1 link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	36	-23	-0.0275	2.5	Pass
	24	22	0.0263		
	9	11	0.0131		

Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	36	16	0.0085	2.5	Pass
	24	21	0.0112		
	9	14	0.0074		

Reference Frequency: PCS1900 (EGPRS 1 link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	36	14	0.0074	2.5	Pass
	24	19	0.0101		
	9	18	0.0096		

5   Test Setup Photo

Radiated Emission

-------END OF REPORT-------