FCC RADIO TEST REPORT

FCC ID	:	**APYHRO00309**
Equipment	:	**Smart phone**
Brand Name	:	**SHARP**
Model Name	:	**APYHRO00309**
Applicant	:	**SHARP CORPORATION** **1 Takumi-cho, Sakai-ku, Sakai City Osaka, Japan 590-8522**
Manufacturer	:	**SHARP CORPORATION** **1 Takumi-Cho, Sakai-Ku, Sakai-Shi, Osaka 590-8522, Japan**
Standard	:	**FCC 47 CFR Part 2, 22(H), 24(E)**

The product was received on Jan. 14, 2022 and testing was performed from Jan. 25, 2022 to Feb. 17, 2022. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issue Date
FG211502A	01	Initial issue of report	Mar. 10, 2022
FG211502A	02	Revise Applicant Address	Mar. 18, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Pass	-
	§22.913 (a)(5)	Effective Radiated Power (GSM850) (WCDMA Band V)		
	§24.232 (c)	Equivalent Isotropic Radiated Power (GSM1900) (WCDMA Band II)		
3.3	§24.232 (d)	Peak-to-Average Ratio	Pass	
3.4	§2.1049 §22.917 (b) §24.238 (b)	Occupied Bandwidth (GSM850) (WCDMA Band V) (GSM1900) (WCDMA Band II)	Pass	-
3.5	§2.1051 §22.917 (a) §24.238 (a)	Band Edge Measurement (GSM850) (WCDMA Band V) (GSM1900) (WCDMA Band II)	Pass	-
3.6	§2.1051 §22.917 (a) §24.238 (a)	Conducted Emission (GSM850) (WCDMA Band V) (GSM1900) (WCDMA Band II)	Pass	-
3.7	§2.1055 §22.355 §24.235	Frequency Stability Temperature & Voltage	Pass	-
4.4	§2.1053 §22.917 (a) §24.238 (a)	Field Strength of Spurious Radiation (GSM850) (WCDMA Band V) (GSM1900) (WCDMA Band II)	Pass	28.33 dB under the limit at 2546.000 MHz
Remark: Not required means after assessing, test items are not necessary to carry out.				

Declaration of Conformity:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results. 2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".
Comments and Explanations:
The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Keven Cheng

Report Producer: Amy Chen

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ac, Wi-Fi 5GHz 802.11a/n/ac, NFC, FM Receiver and GNSS

Product Feature	
Antenna Type	WWAN <Ant. 0>: Monopole Antenna <Ant. 1>: PIFA Antenna <Ant. 2>: Monopole Antenna WLAN: Loop Antenna Bluetooth: Loop Antenna GPS / Glonass / BDS / Galileo: PIFA Antenna NFC: Loop Antenna FM: Using earphone as antenna
Antenna Gain	Cellular Band: -5.35 dBi PCS Band: -0.8 dBi

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH03-HY
Test Engineer	Oscar Chi
Temperature (℃)	20~22
Relative Humidity (%)	51~53

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH13-HY (TAF Code: 3786)
Test Engineer	Yuan Lee, Jacky Hong, and Peter Liao
Temperature (℃)	20~25
Relative Humidity (%)	50~60
Remark	The Radiated Test Items subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- ANSI / TIA-603-E
- FCC 47 CFR Part 2, 22(H), 24(E)
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

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

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find Y plane as worst plane.

Radiated emissions were investigated as following frequency range:

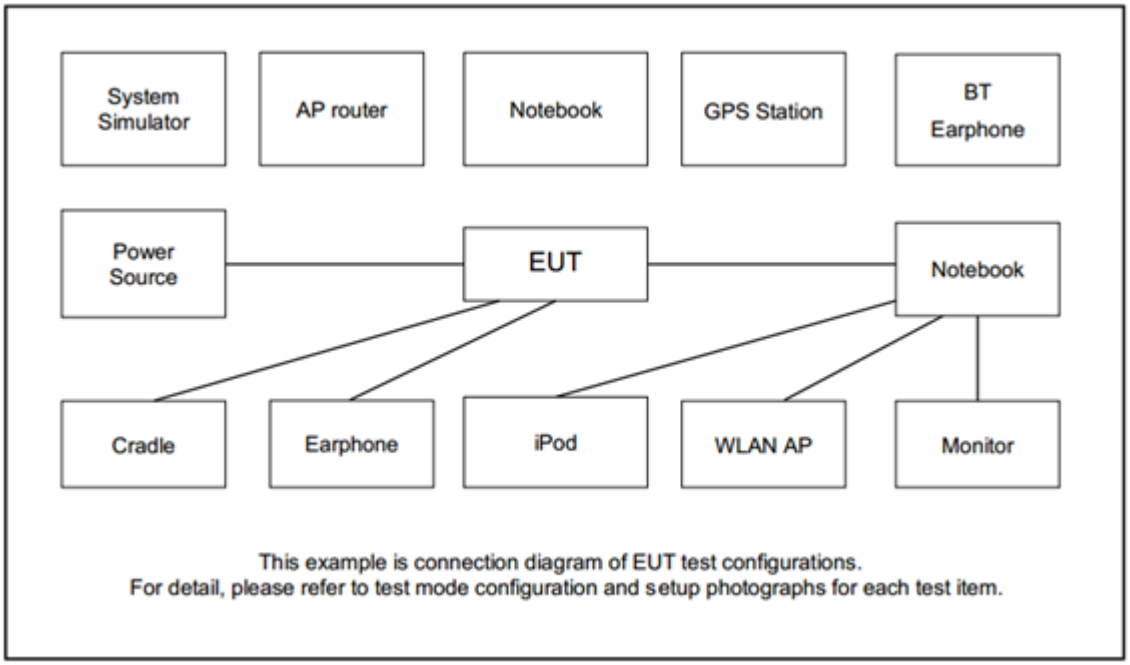
1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V
2. 30 MHz to 19100 MHz for GSM1900 and WCDMA Band II

All modes, data rates and positions were investigated.

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

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM850	■ GPRS Class 8 Link	■ GPRS Class 8 Link
GSM1900	■ GPRS Class 8 Link	■ GPRS Class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Earphone	Nokia	WH-108	N/A	Unshielded, 1.5m	N/A
2.	System Simulator	Anritsu	8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

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

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

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 4.2 dB and a 10 dB attenuator.

Example:

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

Frequency List				
Band	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
GSM850	Channel	128	189	251
	Frequency	824.2	836.4	848.8
WCDMA Band V	Channel	4132	4182	4233
	Frequency	826.4	836.4	846.6
GSM1900	Channel	512	661	810
	Frequency	1850.2	1880.0	1909.8
WCDMA Band II	Channel	9262	9400	9538
	Frequency	1852.4	1880.0	1907.6

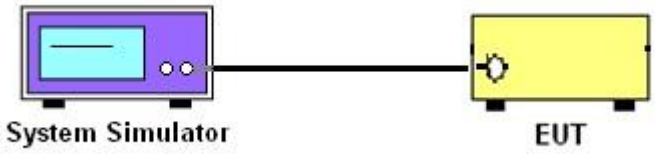
3 Conducted Test Result

3.1 Measuring Instruments

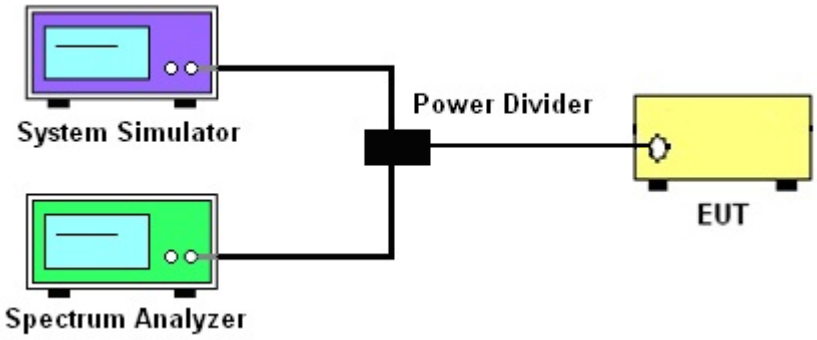
Please refer to the measuring equipment list in this test report.

3.1.1 Test Setup

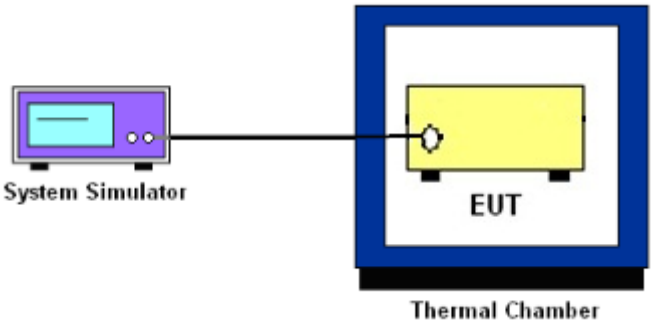
3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and ERP/EIRP

3.2.1 Description of the Conducted Output Power and ERP/EIRP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850 and WCDMA Band V

The EIRP of mobile transmitters must not exceed 2 Watts for GSM1900 and WCDMA Band II

According to KDB 412172 D01 Power Approach,

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

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

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

3.2.2 Test Procedures

1. The transmitter output port is connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select the lowest, middle, and the highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT is connected to spectrum analyzer and system simulator via a power divider.
2. Set EUT to transmit at maximum output power.
3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.
5. Record the maximum PAPR level associated with a probability of 0.1%.

3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT is connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (This is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

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

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT is connected to the spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT is connected to the spectrum analyzer by an RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. The band edges of low and high channels for the highest RF powers are measured.
4. The RF fundamental frequency shall be excluded against the limit line in the operating frequency band.
5. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.6 Conducted Spurious Emission

3.6.1 Description of Conducted Spurious Emission Measurement

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

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT is connected to the spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT is connected to the spectrum analyzer by an RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency is measured.
4. The conducted spurious emission for the whole frequency range is taken.
5. The RF fundamental frequency shall be excluded against the limit line in the operating frequency band.
6. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

22.355

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT is set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature is decreased to -30°C and the EUT is stabilized before testing. Power is applied and the maximum change in frequency is recorded within one minute.
3. With power OFF, the temperature is raised in 10°C steps up to 50°C. The EUT is stabilized at each step for at least half an hour. Power is applied and the maximum frequency change is recorded within one minute.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT is placed in a temperature chamber at 20±5° C and connected with the system simulator.
2. The power supply voltage to the EUT is varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency is measured for the worst case.

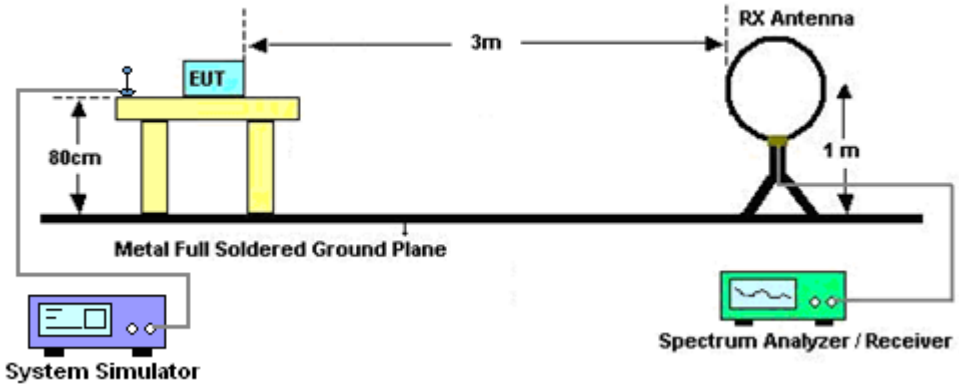
4 Radiated Test Items

4.1 Measuring Instruments

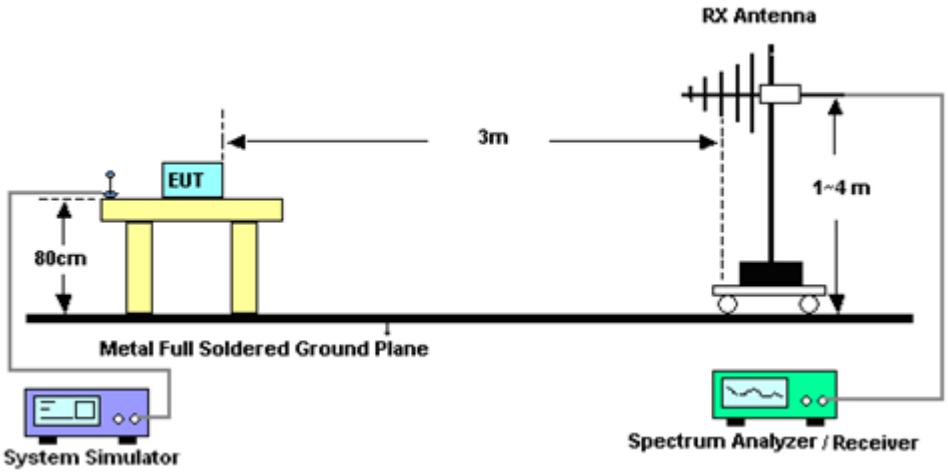
Please refer to the measuring equipment list in this test report.

4.2 Test Setup

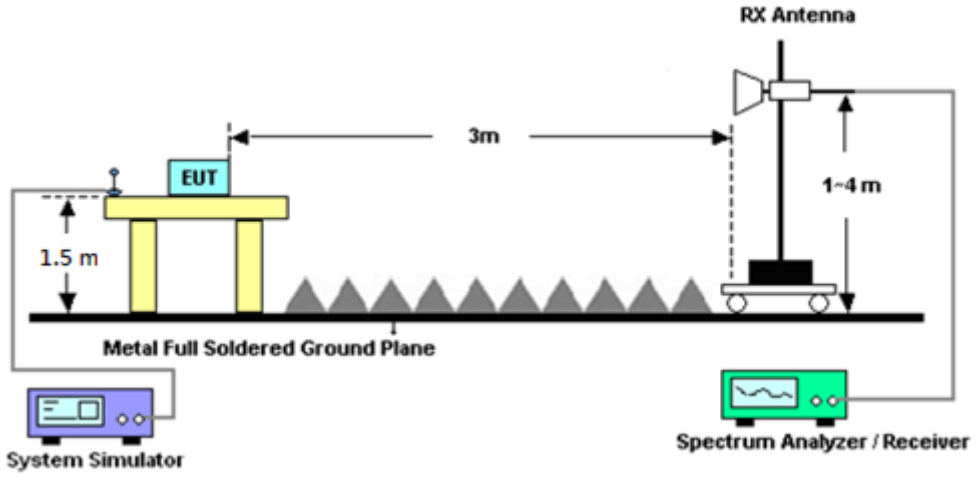
For radiated test below 30MHz



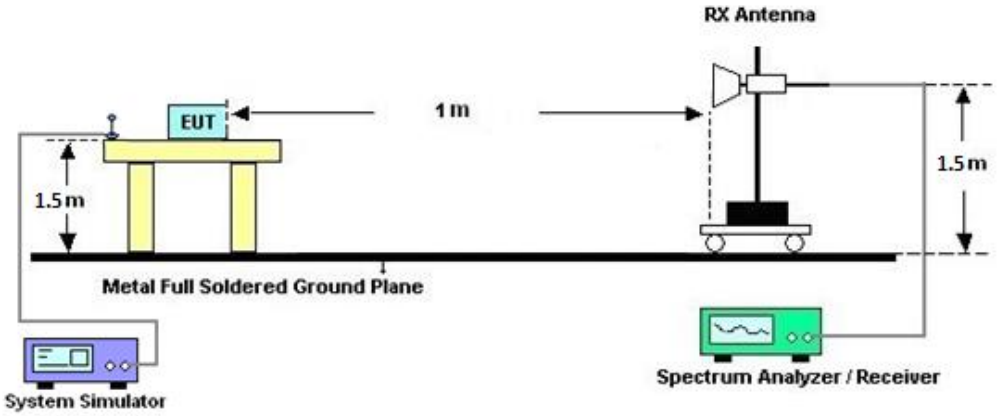
For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



For radiated test above 18GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT is placed on a rotatable wooden table 0.8 meters for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz above the ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1 MHz, VBW = 3 MHz, taking record of maximum spurious emission.
6. A horn antenna is substituted in place of the EUT and is driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Take the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency shall be excluded against the limit line in the operating frequency band.
13. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 01, 2021	Jan. 25, 2022	Feb. 28, 2022	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Sep. 30, 2021	Jan. 25, 2022	Sep. 29, 2022	Conducted (TH03-HY)
Temperature & Humidity Cabinet Chamber	ESPEC	LHU-113	1012005860	-20℃~85℃	Dec. 09, 2021	Jan. 25, 2022	Dec. 08, 2022	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~4A	Oct. 06, 2021	Jan. 25, 2022	Oct. 05, 2022	Conducted (TH03-HY)
Base Station (Measure)	Rohde & Schwarz	CMU200	117995	GSM / GPRS / WCDMA / CDMA	Jul. 13, 2021	Jan. 25, 2022	Jul. 12, 2022	Conducted (TH03-HY)
Power Divider	Warison	WCOU-0.4-26.5S-20	#A	N/A	Nov. 01, 2021	Jan. 25, 2022	Oct. 31, 2022	Conducted (TH03-HY)
Amplifier	SONOMA	310N	187282	9kHz~1GHz	Dec. 15, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Dec. 14, 2022	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	40103 & 07	30MHz~1GHz	Apr. 28, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Apr. 27, 2022	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D&00802N1D01N-06	54682 & AT-N0603	30MHz~1GHz	Sep. 09, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Sep. 08, 2022	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz~18GHz	Jul. 13, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Jul. 12, 2022	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1620	1GHz~18GHz	Oct. 25, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Oct. 24, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 21, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	May 20, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00994	18GHz~40GHz	Nov. 04, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Nov. 03, 2022	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Jun. 21, 2022	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP200889	N/A	Sep. 30, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Sep. 29, 2022	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 18, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	May 17, 2022	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Oct. 26, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Oct. 25, 2022	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 18, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Mar. 17, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN12	1.53GHz Low Pass Filter	Sep. 14, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Sep. 13, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-1080-1200-15000-60SS	SN3	1.2GHz High Pass Filter	Jul. 01, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Jun. 30, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN2	3GHz High Pass Filter	Jul. 12, 2021	Feb. 16, 2022 ~ Feb. 17, 2022	Jul. 11, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30MHz~18GHz	Feb. 09, 2022	Feb. 16, 2022 ~ Feb. 17, 2022	Feb. 08, 2023	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30MHz~18GHz	Feb. 09, 2022	Feb. 16, 2022 ~ Feb. 17, 2022	Feb. 08, 2023	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30MHz~18GHz	Feb. 09, 2022	Feb. 16, 2022 ~ Feb. 17, 2022	Feb. 08, 2023	Radiation (03CH13-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 16, 2022 ~ Feb. 17, 2022	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Feb. 16, 2022 ~ Feb. 17, 2022	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Feb. 16, 2022 ~ Feb. 17, 2022	N/A	Radiation (03CH13-HY)

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.45 dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.73 dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.00 dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power (Average power) & ERP / EIRP

GSM850 Maximum Average Power [dBm] (GT - LC = -5.35 dB)					
Channel	128	189	251	ERP (dBm)	ERP (W)
Frequency	824.2	836.4	848.8		
GSM	32.01	32.00	32.02	24.74	0.2979
GPRS class 8	32.24	32.15	32.24		
GPRS class 10	28.58	28.58	28.82		
GPRS class 11	27.82	27.83	27.73		
GPRS class 12	26.18	26.26	26.17		
Limit	ERP < 7W			Result	Pass

GSM1900 Maximum Average Power [dBm] (GT - LC = -0.8 dB)					
Channel	512	661	810	EIRP (dBm)	EIRP (W)
Frequency	1850.2	1880	1909.8		
GSM	29.60	29.45	29.34	28.83	0.7638
GPRS class 8	29.63	29.48	29.38		
GPRS class 10	27.22	27.48	27.40		
GPRS class 11	26.98	26.81	26.35		
GPRS class 12	25.41	25.54	25.16		
Limit	EIRP < 2W			Result	Pass

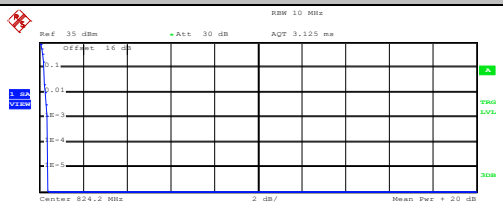
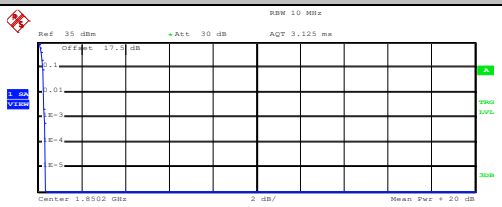
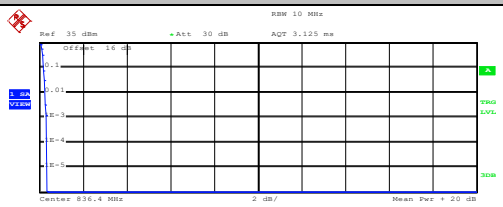
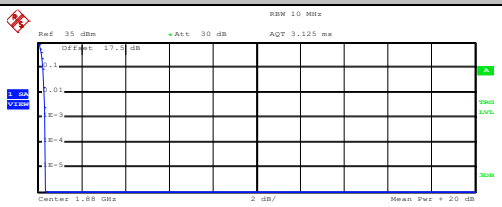
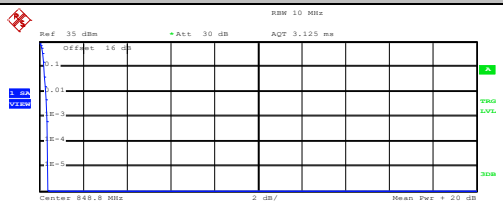
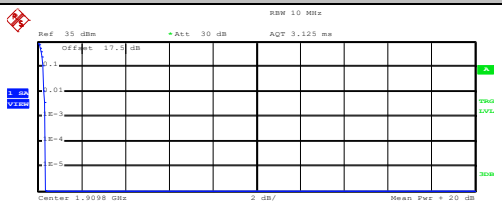
WCDMA Band V Maximum Average Power [dBm] (GT - LC = -5.35 dB)					
Channel	4132	4182	4233	ERP (dBm)	ERP (W)
Frequency	826.4	836.4	846.6		
RMC 12.2K	23.93	23.90	23.83	16.43	0.0440
HSDPA Subtest-1	22.97	22.96	22.86		
HSDPA Subtest-2	22.96	22.97	22.83		
HSDPA Subtest-3	22.46	22.40	22.34		
HSDPA Subtest-4	22.43	22.47	22.33		
HSUPA Subtest-1	22.94	23.00	22.90		
HSUPA Subtest-2	20.90	20.94	20.88		
HSUPA Subtest-3	21.98	21.98	21.87		
HSUPA Subtest-4	20.93	20.97	20.92		
HSUPA Subtest-5	22.90	22.90	22.90		
Limit	ERP < 7W			Result	Pass

WCDMA Band II Maximum Average Power [dBm] (GT - LC = -0.8 dB)					
Channel	9262	9400	9538	EIRP (dBm)	EIRP (W)
Frequency	1852.4	1880	1907.6		
RMC 12.2K	22.70	22.46	22.32	21.90	0.1549
HSDPA Subtest-1	21.83	21.50	21.36		
HSDPA Subtest-2	21.85	21.47	21.34		
HSDPA Subtest-3	21.34	21.01	20.84		
HSDPA Subtest-4	21.34	20.99	20.84		
HSUPA Subtest-1	21.81	21.50	21.40		
HSUPA Subtest-2	19.81	19.54	19.42		
HSUPA Subtest-3	20.86	20.52	20.39		
HSUPA Subtest-4	19.80	19.56	19.37		
HSUPA Subtest-5	21.80	21.60	21.40		
Limit	EIRP < 2W			Result	Pass

A1. GSM

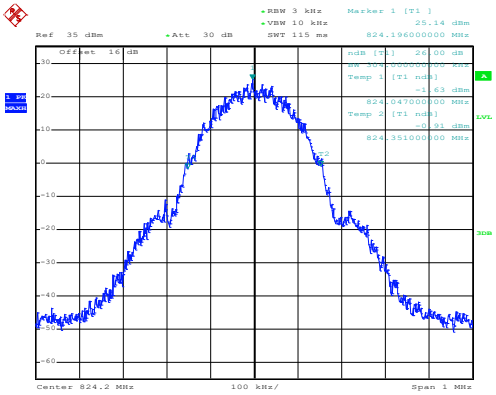
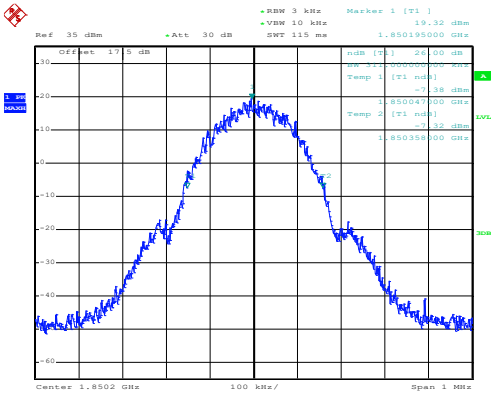
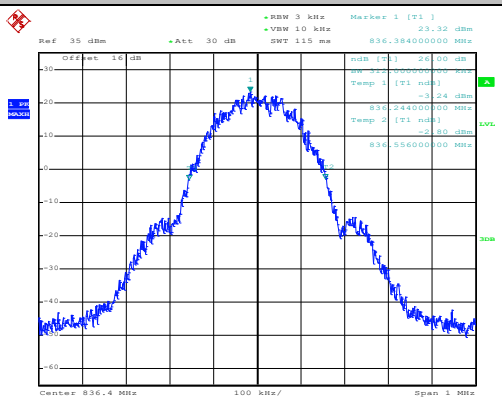
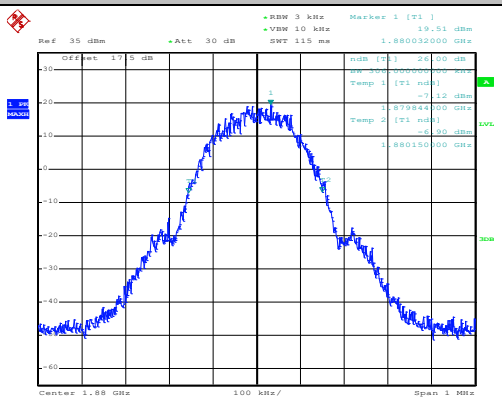
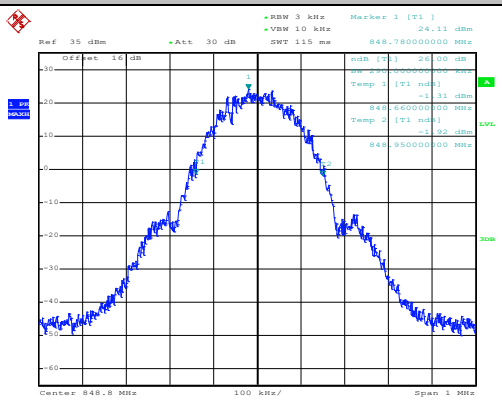
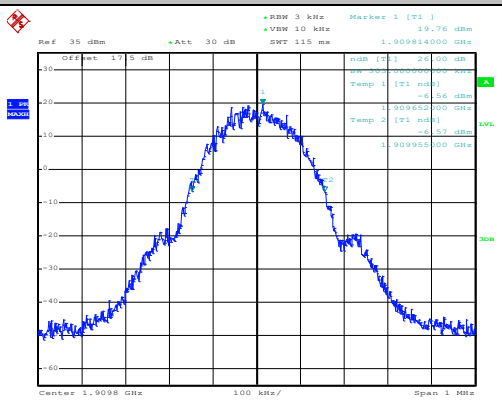
Peak-to-Average Ratio

Mode	GSM850	GSM1900	Limit: 13dB
Mod.	GPRS class 8	GPRS class 8	Result
Lowest CH	0.36	0.32	PASS
Middle CH	0.32	0.36	
Highest CH	0.36	0.36	

GSM850 (GPRS class 8)	GSM1900 (GPRS class 8)
Lowest Channel	**Lowest Channel**
	
Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 31.48 dBm Peak 31.87 dBm Crest 0.38 dB 10 % 0.24 dB 1 % 0.28 dB .1 % 0.36 dB .01 % 0.40 dB	Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 27.02 dBm Peak 27.35 dBm Crest 0.33 dB 10 % 0.24 dB 1 % 0.28 dB .1 % 0.32 dB .01 % 0.36 dB
Date: 25.JAN.2022 10:49:06	Date: 25.JAN.2022 11:25:21
Middle Channel	**Middle Channel**
	
Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 31.31 dBm Peak 31.65 dBm Crest 0.34 dB 10 % 0.20 dB 1 % 0.28 dB .1 % 0.32 dB .01 % 0.36 dB	Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 27.02 dBm Peak 27.35 dBm Crest 0.33 dB 10 % 0.24 dB 1 % 0.28 dB .1 % 0.36 dB .01 % 0.36 dB
Date: 25.JAN.2022 10:49:25	Date: 25.JAN.2022 11:25:37
Highest Channel	**Highest Channel**
	
Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 31.78 dBm Peak 32.15 dBm Crest 0.37 dB 10 % 0.24 dB 1 % 0.32 dB .1 % 0.36 dB .01 % 0.40 dB	Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 26.87 dBm Peak 27.21 dBm Crest 0.34 dB 10 % 0.24 dB 1 % 0.28 dB .1 % 0.36 dB .01 % 0.36 dB
Date: 25.JAN.2022 10:49:42	Date: 25.JAN.2022 11:26:06

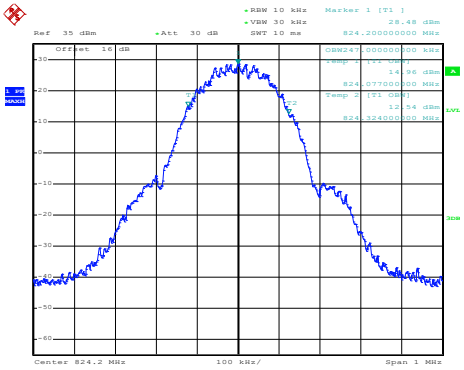
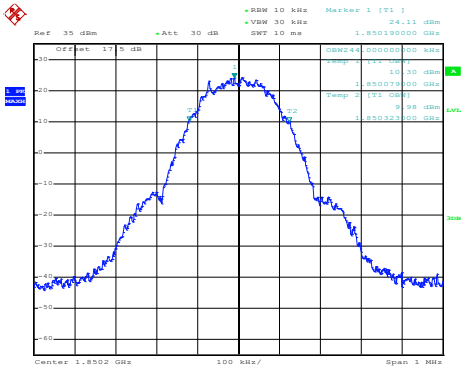
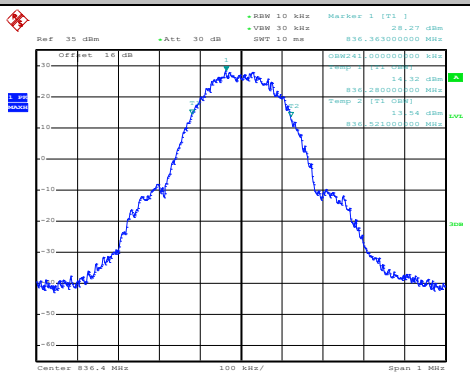
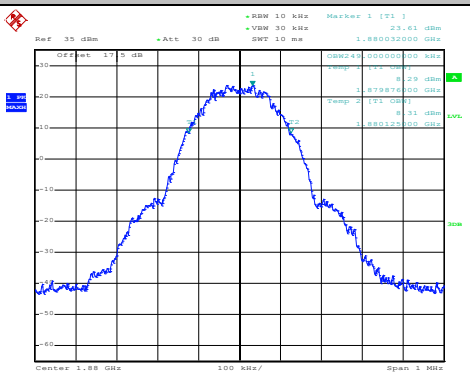
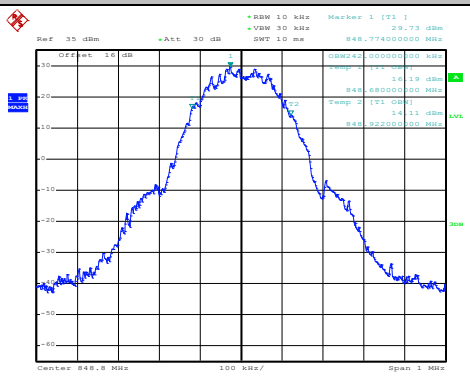
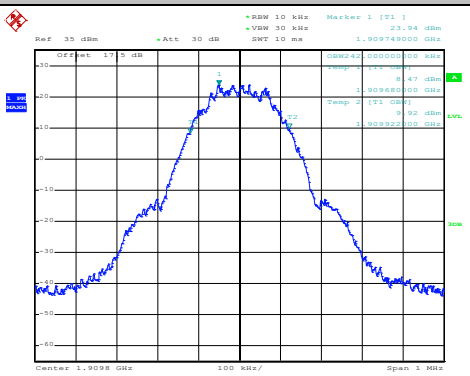
26dB Bandwidth

Mode	GSM850	GSM1900
Mod.	GPRS class 8	GPRS class 8
Lowest CH	0.304	0.310
Middle CH	0.312	0.306
Highest CH	0.290	0.303

GSM850 (GPRS class 8)	GSM1900 (GPRS class 8)
Lowest Channel	**Lowest Channel**
	
Date: 25.JAN.2022 10:37:25	Date: 25.JAN.2022 11:14:45
Middle Channel	**Middle Channel**
	
Date: 25.JAN.2022 10:38:00	Date: 25.JAN.2022 11:15:20
Highest Channel	**Highest Channel**
	
Date: 25.JAN.2022 10:38:33	Date: 25.JAN.2022 11:15:55

Occupied Bandwidth

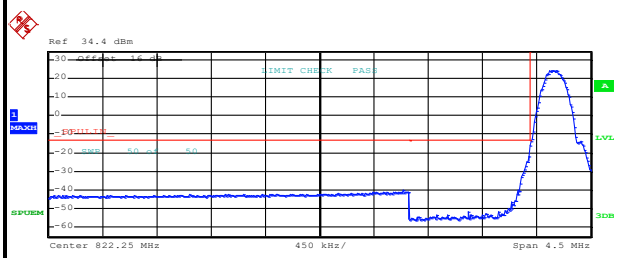
Mode	GSM850	GSM1900
Mod.	GPRS class 8	GPRS class 8
Lowest CH	0.247	0.244
Middle CH	0.241	0.249
Highest CH	0.242	0.242

GSM850 (GPRS class 8)	GSM1900 (GPRS class 8)
Lowest Channel	**Lowest Channel**
	
Date: 25.JAN.2022 10:42:46	Date: 25.JAN.2022 11:19:45
Middle Channel	**Middle Channel**
	
Date: 25.JAN.2022 10:43:59	Date: 25.JAN.2022 11:20:19
Highest Channel	**Highest Channel**
	
Date: 25.JAN.2022 10:44:56	Date: 25.JAN.2022 11:20:52

Conducted Band Edge

GSM850 (GPRS class 8)

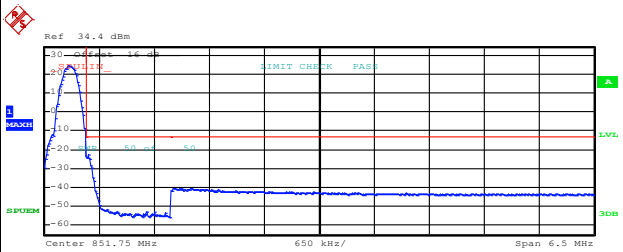
Lowest Band Edge



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
820.000 M	823.000 M	100.00 k	822.943000 M	-40.17	-27.17
823.000 M	824.000 M	3.00 k	823.988000 M	-21.85	-8.85
824.000 M	824.500 M	10.00 k	824.210000 M	24.25	-10.75

Date: 25.JAN.2022 10:46:36

Highest Band Edge

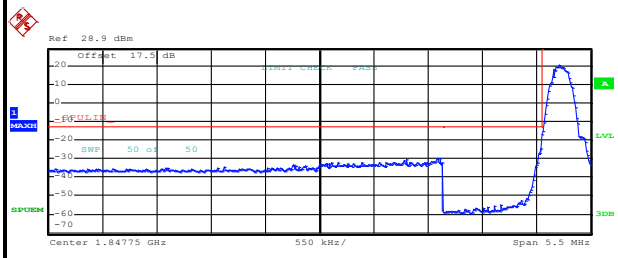


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
848.500 M	849.000 M	10.00 k	848.780500 M	25.04	-9.96
849.000 M	850.000 M	3.00 k	849.020000 M	-22.82	-9.82
850.000 M	855.000 M	100.00 k	850.035000 M	-40.61	-27.61

Date: 25.JAN.2022 10:48:21

GSM1900 (GPRS class 8)

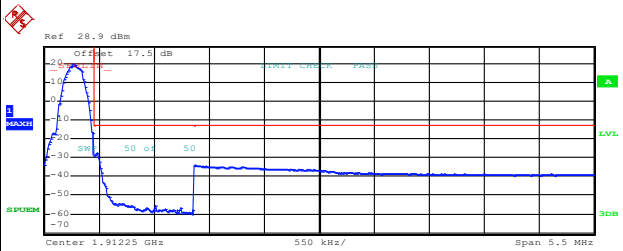
Lowest Band Edge



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.845 G	1.849 G	1.00 M	1.848940 G	-29.97	-16.97
1.849 G	1.850 G	3.00 k	1.849984 G	-26.79	-13.79
1.850 G	1.851 G	10.00 k	1.850180 G	20.27	-14.73

Date: 25.JAN.2022 11:22:29

Highest Band Edge



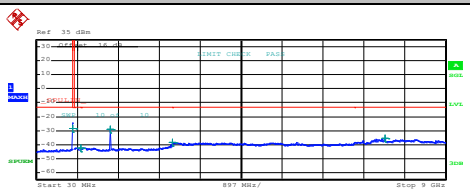
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.910 G	1.910 G	10.00 k	1.909784 G	19.93	-15.07
1.910 G	1.911 G	3.00 k	1.910024 G	-26.99	-13.99
1.911 G	1.915 G	1.00 M	1.911004 G	-34.23	-21.23

Date: 25.JAN.2022 11:24:41

Conducted Spurious Emission

GSM850 (GPRS class 8)

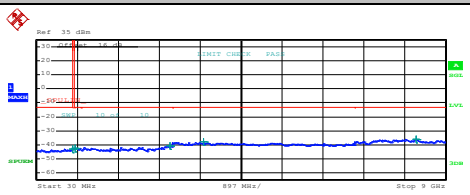
Lowest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	820.000 M	1.00 M	819.822500 M	-28.16	-15.16
855.000 M	1.000 G	1.00 M	992.931260 M	-42.27	-29.27
1.000 G	3.000 G	1.00 M	1.648500 G	-28.76	-15.76
3.000 G	7.000 G	1.00 M	3.014000 G	-38.36	-25.36
7.000 G	9.000 G	1.00 M	7.678500 G	-35.54	-22.54

Date: 25.JAN.2022 10:40:14

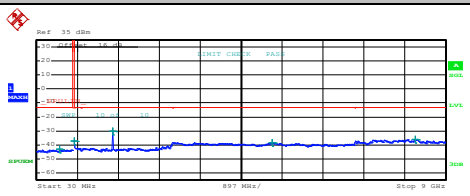
Middle Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	820.000 M	1.00 M	813.482500 M	-43.06	-30.06
855.000 M	1.000 G	1.00 M	866.998751 M	-42.51	-29.51
1.000 G	3.000 G	1.00 M	2.963000 G	-40.83	-27.83
3.000 G	7.000 G	1.00 M	3.688000 G	-38.09	-25.09
7.000 G	9.000 G	1.00 M	8.359000 G	-35.77	-22.77

Date: 25.JAN.2022 10:41:09

Highest Channel

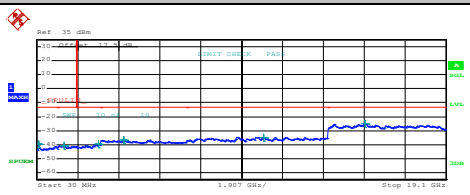


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	820.000 M	1.00 M	530.465000 M	-43.18	-30.18
855.000 M	1.000 G	1.00 M	855.145000 M	-36.94	-23.94
1.000 G	3.000 G	1.00 M	1.698000 G	-30.28	-17.28
3.000 G	7.000 G	1.00 M	5.191000 G	-38.41	-25.41
7.000 G	9.000 G	1.00 M	8.344500 G	-35.88	-22.88

Date: 25.JAN.2022 10:42:04

GSM1900 (GPRS class 8)

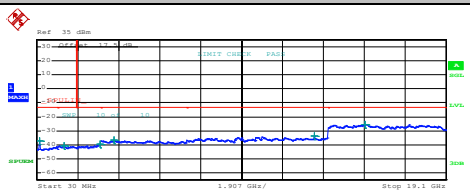
Lowest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	111.965000 M	-39.38	-26.38
1.000 G	1.845 G	1.00 M	1.276949 G	-40.53	-27.53
1.915 G	3.000 G	1.00 M	2.886617 G	-39.33	-26.33
3.000 G	7.000 G	1.00 M	4.089000 G	-36.59	-23.59
7.000 G	13.600 G	1.00 M	10.578850 G	-34.62	-21.62
13.600 G	19.100 G	1.00 M	15.335250 G	-25.10	-12.10

Date: 25.JAN.2022 11:17:09

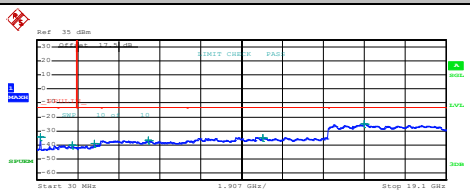
Middle Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	141.792500 M	-37.08	-24.08
1.000 G	1.845 G	1.00 M	1.282441 G	-40.81	-27.81
1.915 G	3.000 G	1.00 M	2.985352 G	-39.29	-26.29
3.000 G	7.000 G	1.00 M	3.604000 G	-36.65	-23.65
7.000 G	13.600 G	1.00 M	12.951550 G	-33.89	-20.89
13.600 G	19.100 G	1.00 M	15.322875 G	-25.35	-12.35

Date: 25.JAN.2022 11:18:04

Highest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	171.620000 M	-34.17	-21.17
1.000 G	1.845 G	1.00 M	1.684239 G	-40.31	-27.31
1.915 G	3.000 G	1.00 M	2.680739 G	-39.05	-26.05
3.000 G	7.000 G	1.00 M	5.205000 G	-36.89	-23.89
7.000 G	13.600 G	1.00 M	10.540900 G	-34.64	-21.64
13.600 G	19.100 G	1.00 M	15.305000 G	-24.94	-11.94

Date: 25.JAN.2022 11:18:59

Frequency Stability

Test Conditions	Middle Channel	GSM850 (GSM)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0096	PASS
40	Normal Voltage	0.0060	
30	Normal Voltage	0.0048	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0036	
0	Normal Voltage	0.0072	
-10	Normal Voltage	0.0084	
-20	Normal Voltage	0.0120	
-30	Normal Voltage	0.0191	
20	Maximum Voltage	0.0024	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0060	

Test Conditions	Middle Channel	GSM1900 (GSM)	Limit Note 2.
Temperature (°C)	**Voltage (Volt)**	**Deviation (ppm)**	**Result**
50	Normal Voltage	0.0053	PASS
40	Normal Voltage	0.0043	
30	Normal Voltage	0.0021	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0043	
0	Normal Voltage	0.0064	
-10	Normal Voltage	0.0085	
-20	Normal Voltage	0.0085	
-30	Normal Voltage	0.0090	
20	Maximum Voltage	0.0021	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0027	

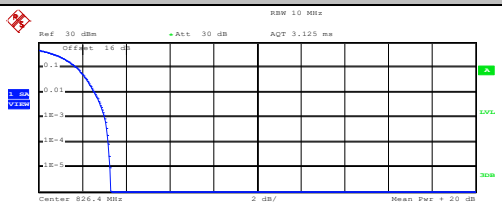
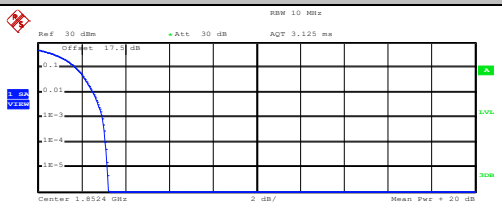
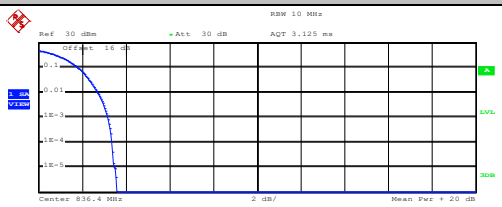
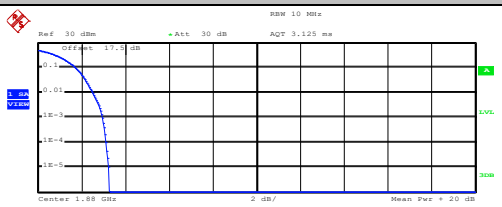
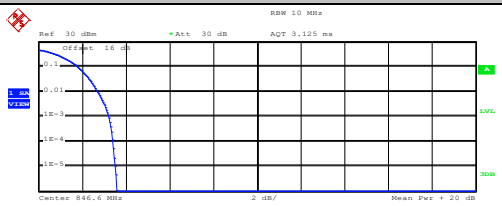
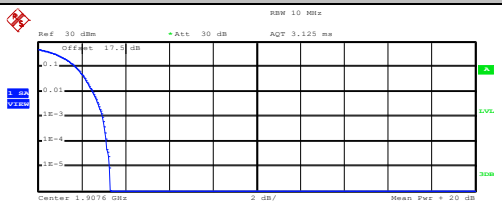
Note:

1. Normal Voltage = 3.87V. ；Battery End Point (BEP) = 3.4 V.；Maximum Voltage =4.2 V
2. The frequency fundamental emissions stay within the authorized frequency block.

WCDMA

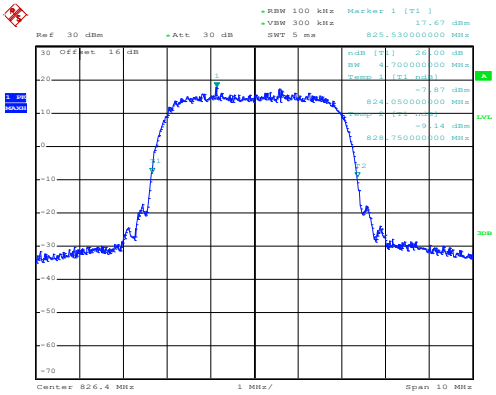
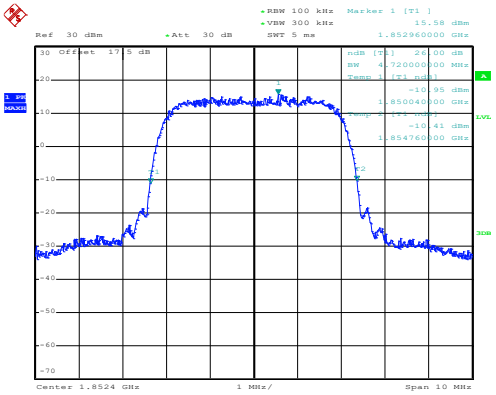
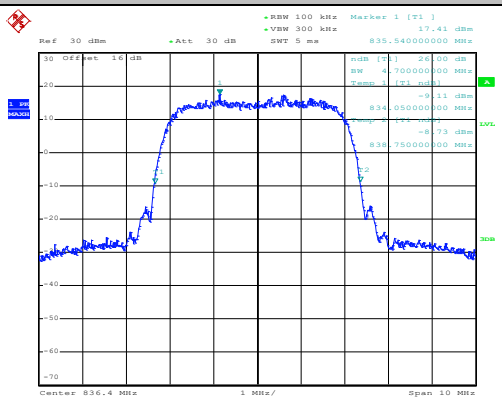
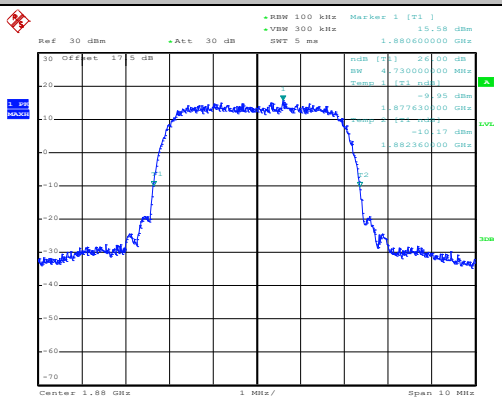
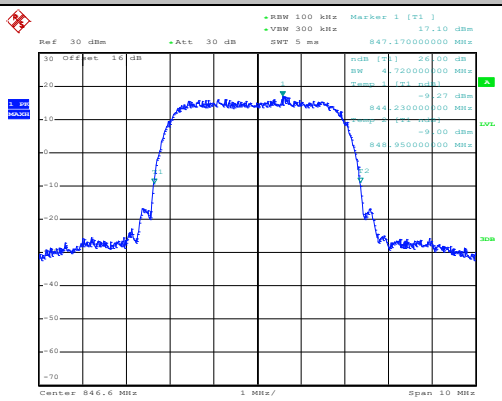
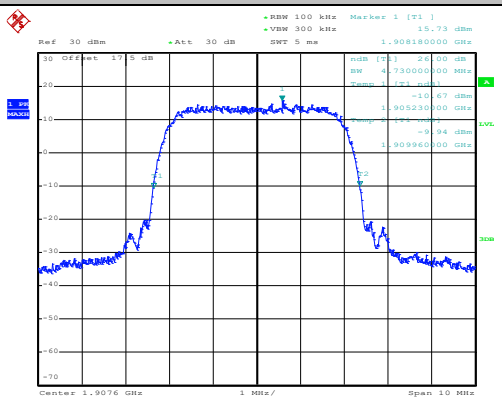
Peak-to-Average Ratio

Mode	WCDMA Band V	WCDMA Band II	Limit: 13dB
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	Result
Lowest CH	3.04	2.96	PASS
Middle CH	3.20	2.96	
Highest CH	3.24	2.96	

WCDMA Band V (RMC 12.2Kbps)	WCDMA Band II (RMC 12.2Kbps)
Lowest Channel	**Lowest Channel**
	
Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 21.44 dBm Peak 24.75 dBm Crest 3.31 dB 10 % 1.76 dB 1 % 2.56 dB .1 % 3.04 dB .01 % 3.20 dB	Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 20.27 dBm Peak 23.48 dBm Crest 3.21 dB 10 % 1.72 dB 1 % 2.52 dB .1 % 2.96 dB .01 % 3.08 dB
Date: 25.JAN.2022 14:21:56	Date: 25.JAN.2022 14:00:45
Middle Channel	**Middle Channel**
	
Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 21.45 dBm Peak 25.03 dBm Crest 3.58 dB 10 % 1.84 dB 1 % 2.72 dB .1 % 3.20 dB .01 % 3.36 dB	Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 20.14 dBm Peak 23.41 dBm Crest 3.27 dB 10 % 1.72 dB 1 % 2.52 dB .1 % 2.96 dB .01 % 3.12 dB
Date: 25.JAN.2022 14:22:15	Date: 25.JAN.2022 14:01:02
Highest Channel	**Highest Channel**
	
Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 21.37 dBm Peak 24.96 dBm Crest 3.59 dB 10 % 1.80 dB 1 % 2.72 dB .1 % 3.24 dB .01 % 3.40 dB	Complementary Cumulative Distribution Function (100000 samples) Trace 1 Mean 19.90 dBm Peak 23.20 dBm Crest 3.29 dB 10 % 1.72 dB 1 % 2.52 dB .1 % 2.96 dB .01 % 3.12 dB
Date: 25.JAN.2022 14:22:34	Date: 25.JAN.2022 14:01:21

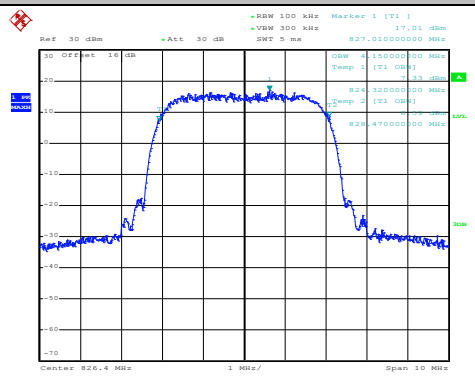
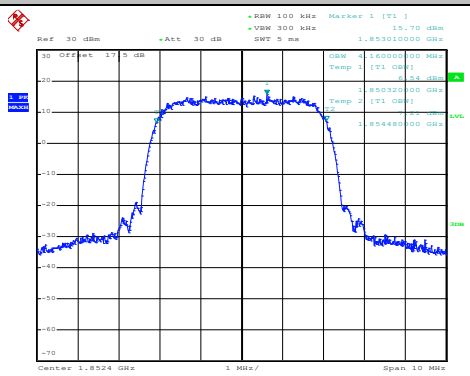
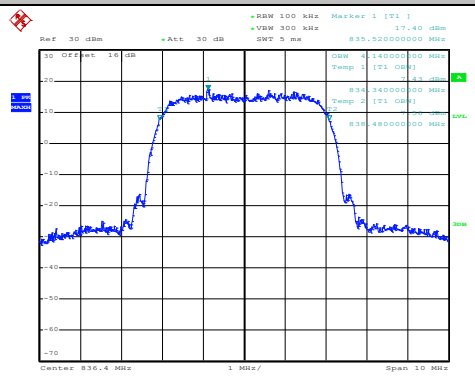
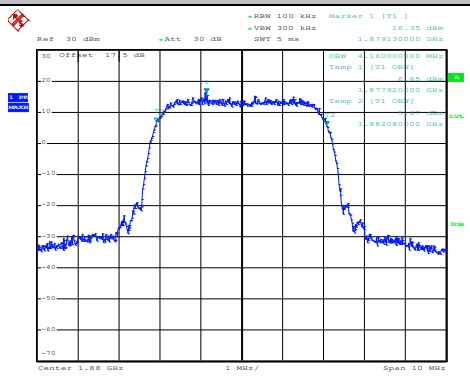
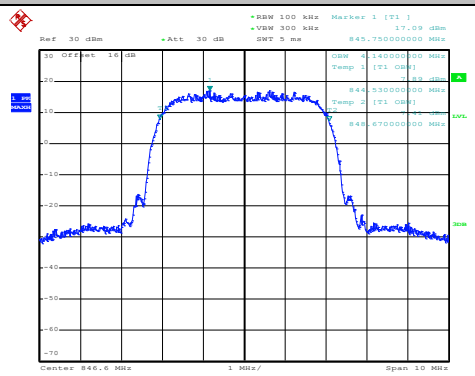
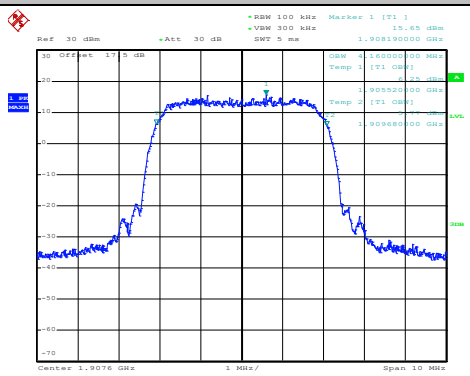
26dB Bandwidth

Mode	WCDMA Band V	WCDMA Band II
Mod.	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.70	4.72
Middle CH	4.70	4.73
Highest CH	4.72	4.73

WCDMA Band V (RMC 12.2Kbps)	WCDMA Band II (RMC 12.2Kbps)
Lowest Channel	**Lowest Channel**
	
Date: 25.JAN.2022 14:05:15	Date: 25.JAN.2022 13:45:02
Middle Channel	**Middle Channel**
	
Date: 25.JAN.2022 14:05:53	Date: 25.JAN.2022 13:45:40
Highest Channel	**Highest Channel**
	
Date: 25.JAN.2022 14:06:30	Date: 25.JAN.2022 13:46:21

Occupied Bandwidth

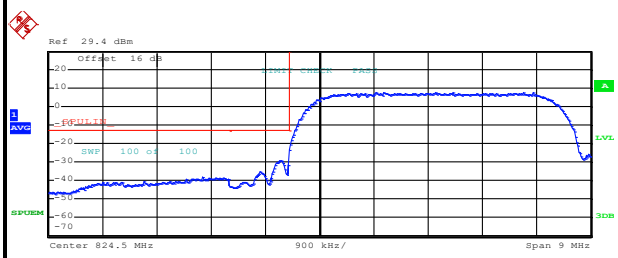
Mode	WCDMA Band V	WCDMA Band II
Mod.	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.15	4.16
Middle CH	4.14	4.16
Highest CH	4.14	4.16

WCDMA Band V (RMC 12.2Kbps)	WCDMA Band II (RMC 12.2Kbps)
Lowest Channel	**Lowest Channel**
	
Date: 25.JAN.2022 14:11:22	Date: 25.JAN.2022 13:52:30
Middle Channel	**Middle Channel**
	
Date: 25.JAN.2022 14:12:00	Date: 25.JAN.2022 13:53:07
Highest Channel	**Highest Channel**
	
Date: 25.JAN.2022 14:12:38	Date: 25.JAN.2022 13:53:44

Conducted Band Edge

WCDMA Band V (RMC 12.2Kbps)

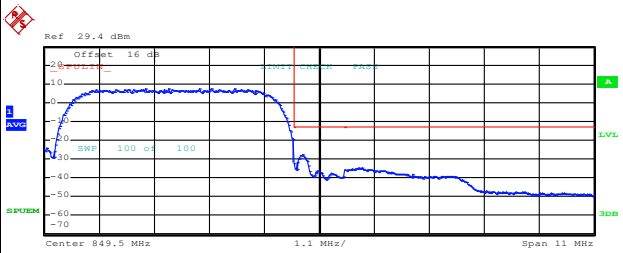
Lowest Band Edge



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
820.000 M	823.000 M	100.00 k	822.550000 M	-38.08	-25.08
823.000 M	824.000 M	50.00 k	823.864000 M	-29.37	-16.37
824.000 M	829.000 M	100.00 k	825.430000 M	7.74	-27.26

Date: 25.JAN.2022 14:17:11

Highest Band Edge

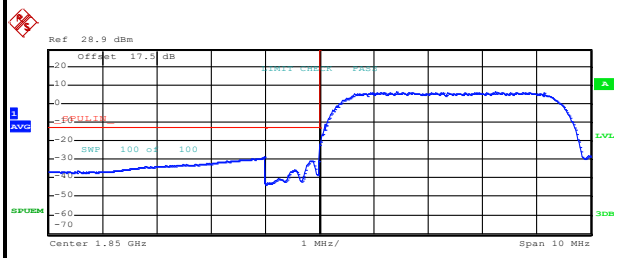


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
844.000 M	849.000 M	100.00 k	847.805000 M	7.69	-27.31
849.000 M	850.000 M	50.00 k	849.172000 M	-27.59	-14.59
850.000 M	855.000 M	100.00 k	850.295000 M	-34.66	-21.66

Date: 25.JAN.2022 14:20:04

WCDMA Band II (RMC 12.2Kbps)

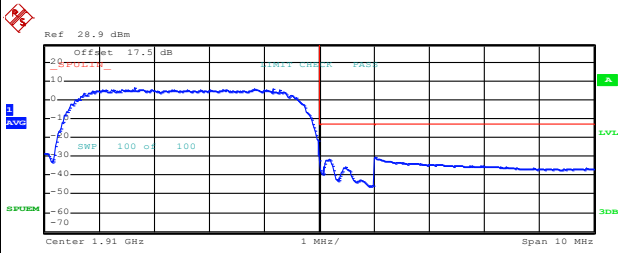
Lowest Band Edge



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.845 G	1.849 G	1.00 M	1.848996 G	-28.91	-15.91
1.849 G	1.850 G	50.00 k	1.849816 G	-30.89	-17.89
1.850 G	1.855 G	100.00 k	1.851410 G	6.62	-28.38

Date: 25.JAN.2022 13:56:53

Highest Band Edge



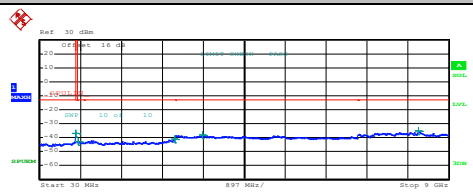
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.905 G	1.910 G	100.00 k	1.906635 G	6.41	-28.59
1.910 G	1.911 G	50.00 k	1.910176 G	-31.84	-18.84
1.911 G	1.915 G	1.00 M	1.911020 G	-30.64	-17.64

Date: 25.JAN.2022 14:00:24

Conducted Spurious Emission

WCDMA Band V (RMC 12.2Kbps)

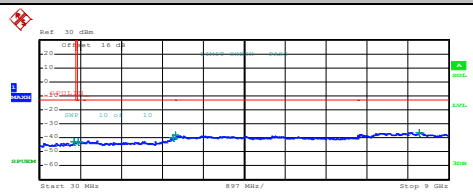
Lowest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	820.000 M	1.00 M	819.625000 M	-36.91	-21.91
855.000 M	1.000 G	1.00 M	865.331251 M	-42.92	-29.92
1.000 G	3.000 G	1.00 M	2.995500 G	-41.34	-28.34
3.000 G	7.000 G	1.00 M	3.603000 G	-38.33	-25.33
7.000 G	9.000 G	1.00 M	8.333500 G	-35.36	-22.36

Date: 25.JAN.2022 14:08:19

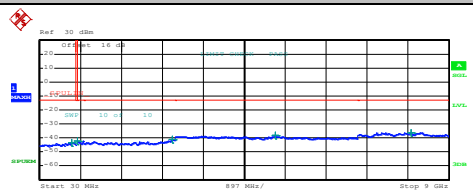
Middle Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	820.000 M	1.00 M	788.795000 M	-43.04	-30.04
855.000 M	1.000 G	1.00 M	872.762501 M	-42.99	-29.99
1.000 G	3.000 G	1.00 M	2.955000 G	-40.13	-27.13
3.000 G	7.000 G	1.00 M	3.015000 G	-38.04	-25.04
7.000 G	9.000 G	1.00 M	8.346500 G	-36.15	-23.15

Date: 25.JAN.2022 14:09:14

Highest Channel

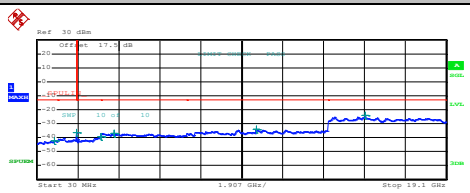


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	820.000 M	1.00 M	729.150000 M	-43.45	-30.45
855.000 M	1.000 G	1.00 M	855.108750 M	-42.07	-29.07
1.000 G	3.000 G	1.00 M	2.929500 G	-41.30	-28.30
3.000 G	7.000 G	1.00 M	5.197000 G	-38.11	-25.11
7.000 G	9.000 G	1.00 M	8.172000 G	-36.17	-23.17

Date: 25.JAN.2022 14:10:09

WCDMA Band II (RMC 12.2Kbps)

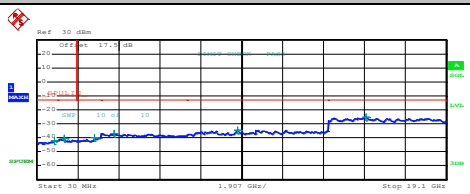
Lowest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	830.007500 M	-42.19	-29.19
1.000 G	1.845 G	1.00 M	1.844789 G	-36.33	-23.33
1.915 G	3.000 G	1.00 M	2.992676 G	-39.30	-26.30
3.000 G	7.000 G	1.00 M	3.605000 G	-36.81	-23.81
7.000 G	13.600 G	1.00 M	10.234000 G	-34.27	-21.27
13.600 G	19.100 G	1.00 M	15.310500 G	-24.27	-11.27

Date: 25.JAN.2022 13:47:25

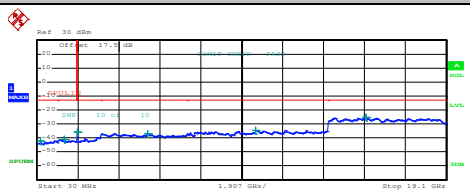
Middle Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	831.220000 M	-41.98	-28.98
1.000 G	1.845 G	1.00 M	1.305679 G	-40.20	-27.20
1.915 G	3.000 G	1.00 M	2.711661 G	-39.70	-26.70
3.000 G	7.000 G	1.00 M	3.620000 G	-37.11	-24.11
7.000 G	13.600 G	1.00 M	9.363625 G	-34.37	-21.37
13.600 G	19.100 G	1.00 M	15.348313 G	-25.43	-12.43

Date: 25.JAN.2022 13:48:20

Highest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	170.165000 M	-41.94	-28.94
1.000 G	1.845 G	1.00 M	1.276949 G	-40.66	-27.86
1.915 G	3.000 G	1.00 M	1.915542 G	-35.87	-22.87
3.000 G	7.000 G	1.00 M	5.189000 G	-36.96	-23.96
7.000 G	13.600 G	1.00 M	10.224100 G	-34.68	-21.68
13.600 G	19.100 G	1.00 M	15.346937 G	-25.06	-12.06

Date: 25.JAN.2022 13:49:16

Frequency Stability

Test Conditions	Middle Channel	WCDMA Band V (RMC 12.2Kbps)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0060	PASS
40	Normal Voltage	0.0036	
30	Normal Voltage	0.0024	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0036	
0	Normal Voltage	0.0179	
-10	Normal Voltage	0.0203	
-20	Normal Voltage	0.0227	
-30	Normal Voltage	0.0275	
20	Maximum Voltage	0.0012	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0048	

Test Conditions	Middle Channel	WCDMA Band II (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0090	PASS
40	Normal Voltage	0.0069	
30	Normal Voltage	0.0048	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0037	
0	Normal Voltage	0.0048	
-10	Normal Voltage	0.0069	
-20	Normal Voltage	0.0080	
-30	Normal Voltage	0.0096	
20	Maximum Voltage	0.0069	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0059	

Note:

1. Normal Voltage = 3.3V. ；Battery End Point (BEP) = 3.0 V.；Maximum Voltage =3.6 V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Appendix B. Test Results of Radiated Test

<Ant. 0>

GPRS 850

GPRS 850									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1651	-41.48	-13	-28.48	-57.44	-42.36	6.35	9.38	H
	2473	-46.27	-13	-33.27	-63.59	-46.46	8.03	10.37	H
	3302	-56.30	-13	-43.30	-76.24	-57.04	9.17	12.06	H
									H
	1651	-45.24	-13	-32.24	-61.19	-46.12	6.35	9.38	V
	2473	-47.87	-13	-34.87	-65.04	-48.06	8.03	10.37	V
	3302	-56.08	-13	-43.08	-76.11	-56.82	9.17	12.06	V
									V
Middle	1673	-44.58	-13	-31.58	-60.8	-45.50	6.39	9.46	H
	2510	-45.12	-13	-32.12	-62.42	-45.36	8.16	10.55	H
	3346	-55.79	-13	-42.79	-75.77	-56.67	9.27	12.30	H
									H
	1673	-50.01	-13	-37.01	-66.2	-50.93	6.39	9.46	V
	2510	-46.19	-13	-33.19	-63.34	-46.43	8.16	10.55	V
	3346	-56.03	-13	-43.03	-76.07	-56.91	9.27	12.30	V
									V
Highest	1698	-42.08	-13	-29.08	-58.61	-43.04	6.43	9.54	H
	2546	-44.41	-13	-31.41	-62.14	-44.90	8.09	10.73	H
	3396	-55.71	-13	-42.71	-75.76	-56.76	9.38	12.58	H
									H
	1698	-46.26	-13	-33.26	-62.74	-47.22	6.43	9.54	V
	2546	-41.33	-13	-28.33	-58.95	-41.82	8.09	10.73	V
	3396	-55.68	-13	-42.68	-75.75	-56.73	9.38	12.58	V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA 850

WCDMA 850									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1653	-59.44	-13	-46.44	-75.43	-60.33	6.35	9.39	H
	2479	-58.36	-13	-45.36	-75.64	-58.54	8.07	10.40	H
	3306	-56.28	-13	-43.28	-76.22	-57.03	9.18	12.08	H
									H
	1653	-59.32	-13	-46.32	-75.3	-60.21	6.35	9.39	V
	2479	-58.45	-13	-45.45	-75.58	-58.63	8.07	10.40	V
	3306	-55.61	-13	-42.61	-75.64	-56.36	9.18	12.08	V
									V
Middle	1672	-58.84	-13	-45.84	-75.05	-59.75	6.39	9.45	H
	2509	-58.07	-13	-45.07	-75.36	-58.31	8.16	10.55	H
	3345	-56.33	-13	-43.33	-76.31	-57.21	9.27	12.30	H
									H
	1672	-59.09	-13	-46.09	-75.27	-60.00	6.39	9.45	V
	2509	-58.79	-13	-45.79	-75.93	-59.03	8.16	10.55	V
	3345	-56.03	-13	-43.03	-76.07	-56.91	9.27	12.30	V
									V
Highest	1693	-58.73	-13	-45.73	-75.19	-59.69	6.42	9.53	H
	2540	-58.24	-13	-45.24	-75.9	-58.69	8.10	10.70	H
	3386	-56.36	-13	-43.36	-76.39	-57.37	9.36	12.52	H
									H
	1693	-58.89	-13	-45.89	-75.31	-59.85	6.42	9.53	V
	2540	-58.23	-13	-45.23	-75.78	-58.68	8.10	10.70	V
	3386	-56.45	-13	-43.45	-76.51	-57.46	9.36	12.52	V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

<Ant. 1>

GPRS 1900

GPRS 1900									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3700	-52.17	-13	-39.17	-73.94	-54.34	9.93	12.10	H
	5550	-44.12	-13	-31.12	-68.36	-43.61	13.66	13.15	H
	7400	-45.65	-13	-32.65	-76.4	-43.13	13.92	11.40	H
									H
	3700	-51.68	-13	-38.68	-73.32	-53.85	9.93	12.10	V
	5550	-43.96	-13	-30.96	-68.75	-43.45	13.66	13.15	V
	7400	-45.41	-13	-32.41	-76.34	-42.89	13.92	11.40	V
									V
Middle	3760	-49.43	-13	-36.43	-71.35	-51.53	10.06	12.16	H
	5640	-45.18	-13	-32.18	-69.36	-44.53	13.89	13.24	H
	7520	-45.89	-13	-32.89	-75.97	-42.34	14.83	11.28	H
									H
	3760	-50.61	-13	-37.61	-72.48	-52.71	10.06	12.16	V
	5640	-43.52	-13	-30.52	-68.21	-42.87	13.89	13.24	V
	7520	-44.71	-13	-31.71	-74.87	-41.16	14.83	11.28	V
									V
Highest	3819	-53.42	-13	-40.42	-75.52	-55.46	10.20	12.24	H
	5729	-47.83	-13	-34.83	-72.18	-47.41	13.75	13.33	H
	7639	-46.50	-13	-33.50	-76.13	-43.09	15.03	11.62	H
									H
	3819	-50.98	-13	-37.98	-73.09	-53.02	10.20	12.24	V
	5729	-41.87	-13	-28.87	-66.75	-41.45	13.75	13.33	V
	7639	-45.49	-13	-32.49	-75.19	-42.08	15.03	11.62	V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA 1900

WCDMA 1900									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3700	-53.77	-13	-40.77	-75.54	-55.94	9.93	12.10	H
	5550	-54.01	-13	-41.01	-77.23	-53.50	13.66	13.15	H
	7400	-46.00	-13	-33.00	-76.75	-43.48	13.92	11.40	H
									H
	3700	-54.50	-13	-41.50	-76.14	-56.67	9.93	12.10	V
	5550	-52.27	-13	-39.27	-77.06	-51.76	13.66	13.15	V
	7400	-46.07	-13	-33.07	-77	-43.55	13.92	11.40	V
									V
Middle	3760	-54.13	-13	-41.13	-76.05	-56.23	10.06	12.16	H
	5640	-52.38	-13	-39.38	-76.56	-51.73	13.89	13.24	H
	7520	-46.51	-13	-33.51	-76.59	-42.96	14.83	11.28	H
									H
	3760	-54.06	-13	-41.06	-75.93	-56.16	10.06	12.16	V
	5640	-51.76	-13	-38.76	-76.45	-51.11	13.89	13.24	V
	7520	-46.16	-13	-33.16	-76.32	-42.61	14.83	11.28	V
									V
Highest	3819	-53.81	-13	-40.81	-75.91	-55.85	10.20	12.24	H
	5729	-52.05	-13	-39.05	-76.4	-51.63	13.75	13.33	H
	7639	-46.24	-13	-33.24	-75.87	-42.83	15.03	11.62	H
									H
	3819	-53.73	-13	-40.73	-75.84	-55.77	10.20	12.24	V
	5729	-51.45	-13	-38.45	-76.33	-51.03	13.75	13.33	V
	7639	-46.32	-13	-33.32	-76.02	-42.91	15.03	11.62	V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.