FCC RF Test Report

APPLICANT	:	SHARP CORPORATION, Mobile Communication B.U.
EQUIPMENT	:	Smart Phone
BRAND NAME	:	SHARP
FCC ID	:	APYHRO00290
STANDARD	:	47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Sep. 02, 2020 and completely tested on Sep. 17, 2020. We, Sporton International (ShenZhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager

ACCREDITED
Cert #5145.01

Sporton International (ShenZhen) Inc.

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People's Republic of China

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APPENDIX B. TEST RESULTS OF RADIATED TEST

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG090204A	Rev. 01	Initial issue of report	Oct. 06, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(5)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.5	§24.232(d)	Peak-to-Average Ratio	< 13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a)	Conducted Emission	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §24.235		Within Authorized Band		
4.4	§2.1053; §22.917(a); §24.238(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 39.08 dB at 7524.00 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

SHARP CORPORATION, Mobile Communication B.U.
2-13-1, Hachihonmatsu-Iida, Higashi-hiroshima-shi, Hiroshima 739-0192, Japan

1.2 Manufacturer

SHARP CORPORATION
1 Takumi-cho, Sakai-ku, Sakai-shi, Osaka 590-8522, Japan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smart Phone
Brand Name	SHARP
FCC ID	APYHRO00290
EUT supports Radios application	GSM/WCDMA/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE FM Receiver/GNSS
IMEI Code	Conducted: 004401117424966 Radiation: 004401117424610
HW Version	DVT
SW Version	A729A
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	**GSM/GPRS:** 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz **WCDMA:** Band V: 826.4 MHz ~ 846.6 MHz
Rx Frequency	**GSM/GPRS:** 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz **WCDMA:** Band V: 871.4 MHz ~ 891.6 MHz
Maximum Output Power to Antenna	**GSM/GPRS:** 850: 32.15 dBm 1900: 29.16 dBm **WCDMA:** Band V: 23.80 dBm
Antenna Type	ILA & IFA Antenna
Antenna Gain	GSM850/WCDMA Band V: -6.30 dBi PCS Band: -3.90 dBi
Type of Modulation	GSM: GMSK GPRS: GMSK WCDMA: BPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)

Note: The Maximum ERP is calculated from Max Output power and Max antenna gain.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22	GSM850 GPRS class 8	GMSK	0.2344	0.0167 ppm	245KGXW
Part 22	WCDMA Band V RMC 12.2Kbps	BPSK	0.0343	0.0136 ppm	4M13F9W
Part 24	GSM1900 GPRS class 8	GMSK	0.3357	0.0156 ppm	243KGXW

1.7 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN1256	421272

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a

1.9 Applicable Standards

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

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

Remark:

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

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.

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

Radiated emissions were investigated as following frequency range:

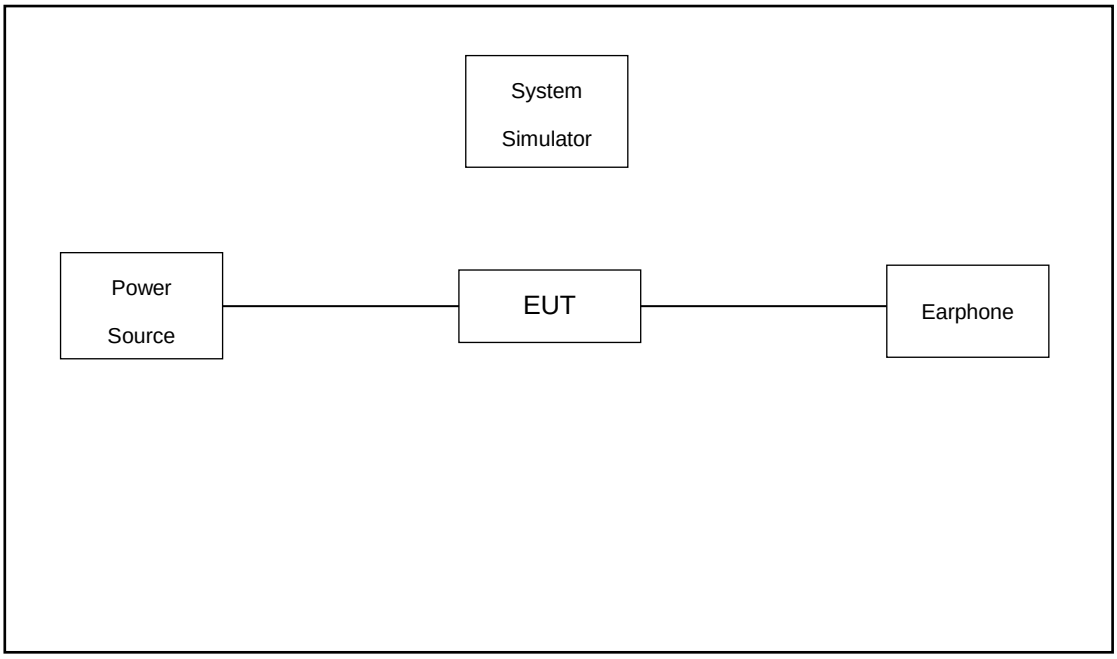
1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 19100 MHz for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated.

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

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GPRS 1 Tx slots Link	■ GPRS 1 Tx slots Link
GSM 1900	■ GPRS 1 Tx slots Link	■ GPRS 1 Tx slots Link
WCDMA Band V	■ 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	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	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 4.0 dB and a 10dB attenuator.

Example :

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

= 4.0 + 10 = 14.0 (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

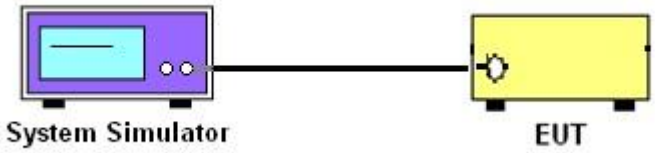
3 Conducted Test Result

3.1 Measuring Instruments

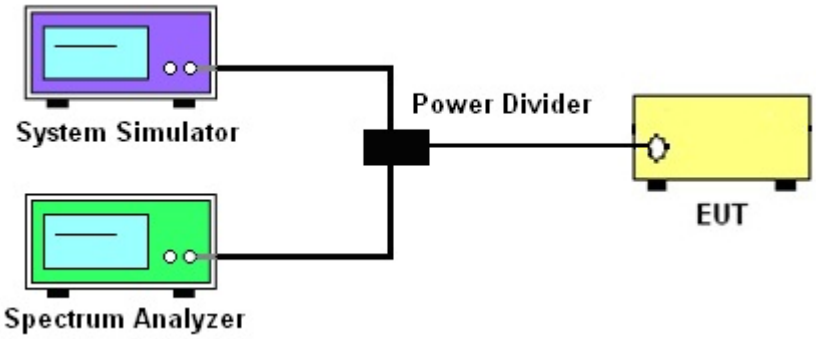
See list of measuring instruments of this test report.

3.2 Test Setup

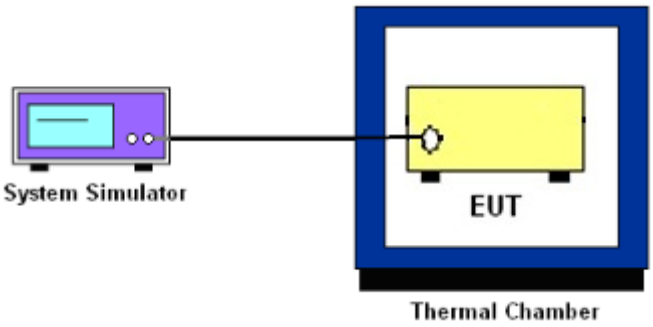
3.2.1 Conducted Output Power



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



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 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.

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

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

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

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.6.1 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.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. 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.
4. 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.
5. Set the detection mode to peak, and the trace mode to max hold.
6. 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)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. 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.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 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.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should 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)

3.8 Conducted Spurious Emission

3.8.1 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 10th harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

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.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

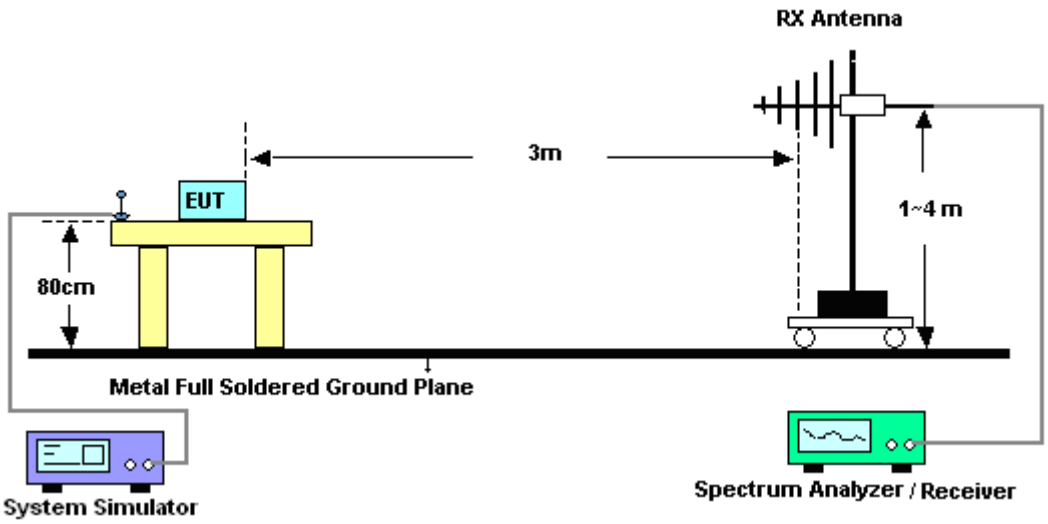
4 Radiated Test Items

4.1 Measuring Instruments

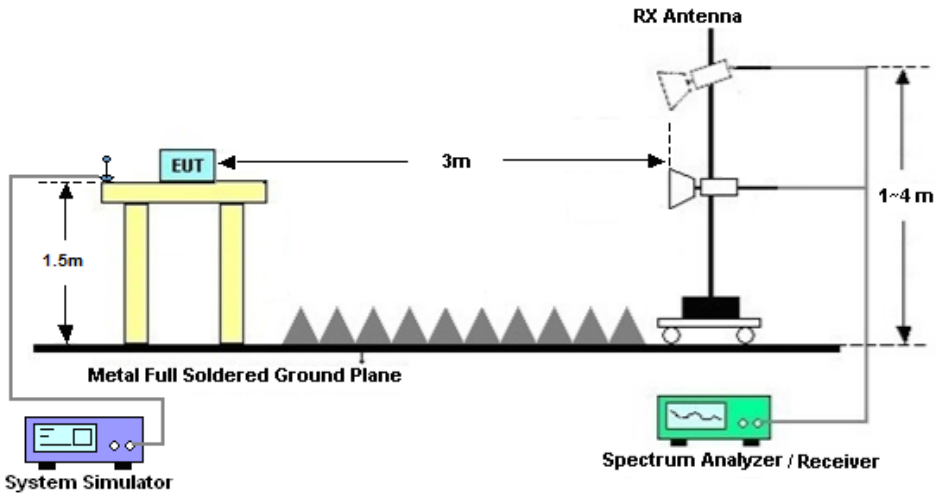
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

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

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. 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.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 17, 2020	Sep. 12, 2020	Apr. 16, 2021	Conducted (TH01-SZ)
DC Power Supply	GWINSTEK	AnritsuGPS-3030D	EM882636	Max 30V	Apr. 17, 2020	Sep. 12, 2020	Apr. 16, 2021	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Dec. 22, 2020	Sep. 12, 2020	Dec. 21, 2021	Conducted (TH01-SZ)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 15, 2020	Sep. 17, 2020	Apr. 14, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jan. 03, 2020	Sep. 17, 2020	Jan. 02, 2021	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 20, 2020	Sep. 17, 2020	Apr. 19, 2021	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Sep. 17, 2020	Nov. 09, 2020	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 03, 2020	Sep. 17, 2020	Jan. 02, 2021	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Sep. 17, 2020	Jan. 07, 2021	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jan. 03, 2020	Sep. 17, 2020	Jan. 02, 2021	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 15, 2019	Sep. 17, 2020	Oct. 14, 2020	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 17, 2020	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 17, 2020	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 17, 2020	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

Conducted Power (*Unit: dBm)						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM	32.13	32.06	32.11	29.11	29.14	28.96
GPRS 1 Tx slots	32.15	32.07	32.15	29.14	29.16	28.97
GPRS 2 Tx slots	29.77	29.51	29.66	26.57	26.52	26.54
GPRS 3 Tx slots	27.75	27.74	27.87	24.91	24.79	24.74
GPRS 4 Tx slots	26.55	26.08	26.22	23.48	23.48	23.41

Conducted Power (*Unit: dBm)			
Band	WCDMA Band V		
Channel	4132	4182	4233
Frequency	826.4	836.4	846.6
AMR 12.2K	23.68	23.73	23.79
RMC 12.2K	23.75	23.74	23.80
HSDPA Subtest-1	22.72	22.73	22.64
HSDPA Subtest-2	22.71	22.77	22.54
HSDPA Subtest-3	22.23	22.24	22.12
HSDPA Subtest-4	22.25	22.18	22.07
DC-HSDPA Subtest-1	22.66	22.65	22.62
DC-HSDPA Subtest-2	22.69	22.69	22.47
DC-HSDPA Subtest-3	22.23	22.14	22.04
DC-HSDPA Subtest-4	22.17	22.16	21.98
HSUPA Subtest-1	22.73	22.73	22.66
HSUPA Subtest-2	20.73	20.75	20.67
HSUPA Subtest-3	21.74	21.75	21.74
HSUPA Subtest-4	20.72	20.74	20.67
HSUPA Subtest-5	22.70	22.80	22.80

ERP/EIRP

GSM850 (G_T - L_C= -6.30 dB)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
Conducted Power (dBm)	32.15	32.07	32.15
Conducted Power (Watts)	1.6406	1.6106	1.6406
ERP(dBm)	23.70	23.62	23.70
ERP(Watts)	0.2344	0.2301	0.2344

GSM1900 (G_T - L_C= -3.90 dB)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
Conducted Power (dBm)	29.14	29.16	28.97
Conducted Power (Watts)	0.8204	0.8241	0.7889
EIRP(dBm)	25.24	25.26	25.07
EIRP(Watts)	0.3342	0.3357	0.3214

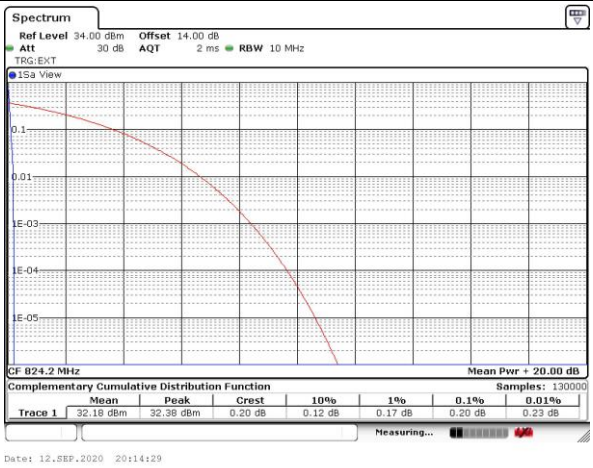
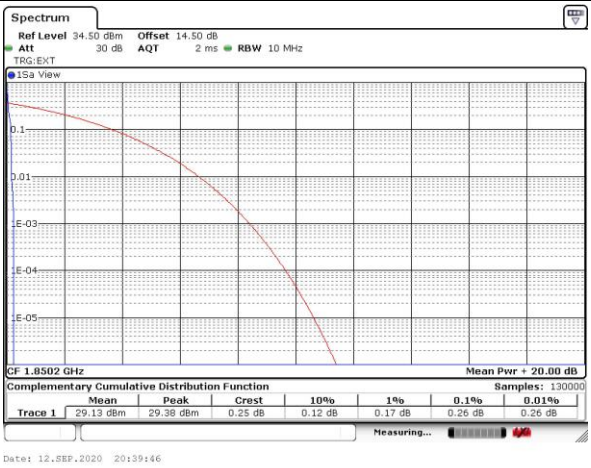
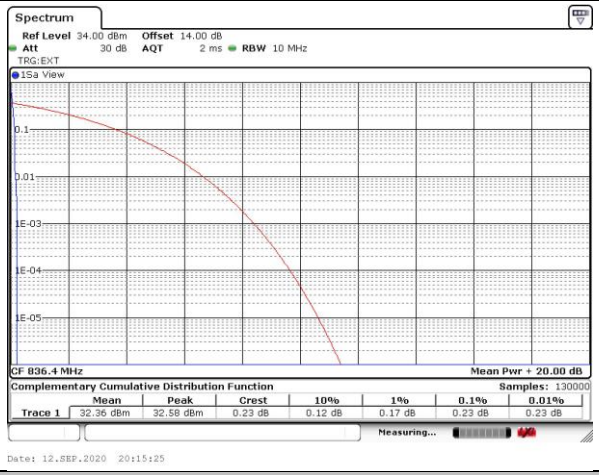
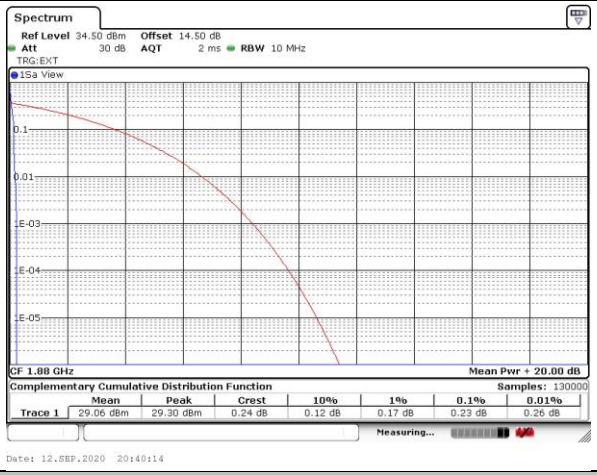
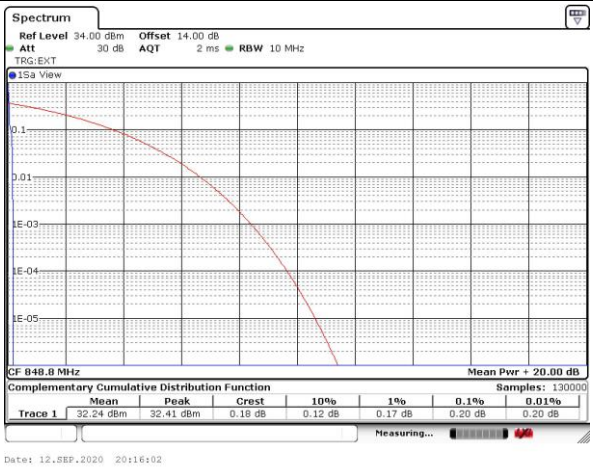
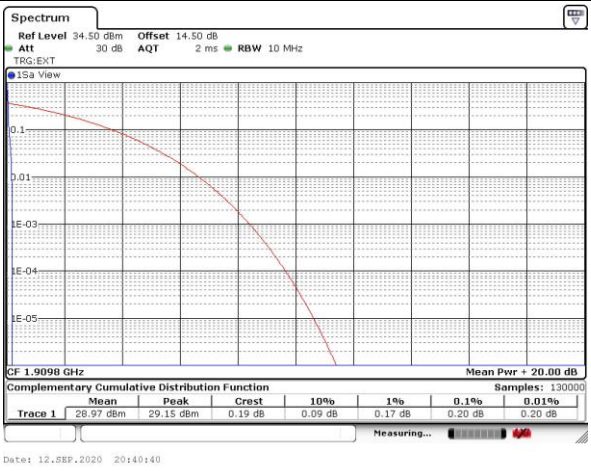
WCDMA Band V (G_T - L_C = -6.30 dB)			
Channel	4132	4182	4233
	(Low)	(Mid)	(High)
Frequency (MHz)	826.4	836.4	846.6
Conducted Power (dBm)	23.75	23.74	23.80
Conducted Power (Watts)	0.2371	0.2366	0.2399
ERP(dBm)	15.30	15.29	15.35
ERP(Watts)	0.0339	0.0338	0.0343

A1. GSM

Peak-to-Average Ratio

Mode	GSM850(dB)	Limit: 13dB
Mod.	GPRS class 8	Result
Lowest CH	0.20	PASS
Middle CH	0.23	
Highest CH	0.20	

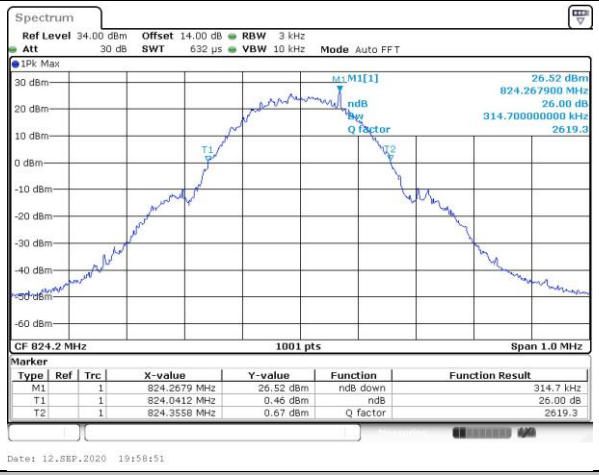
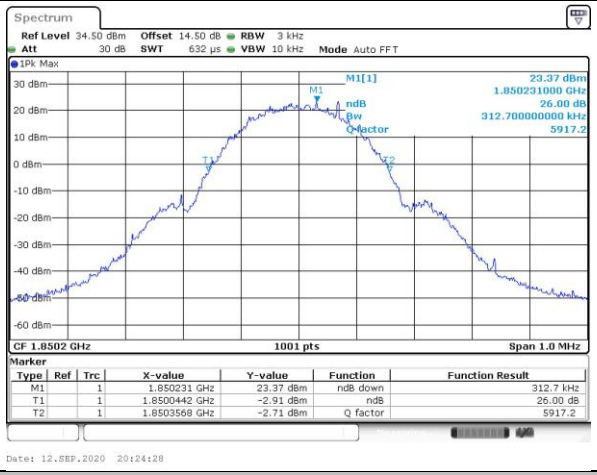
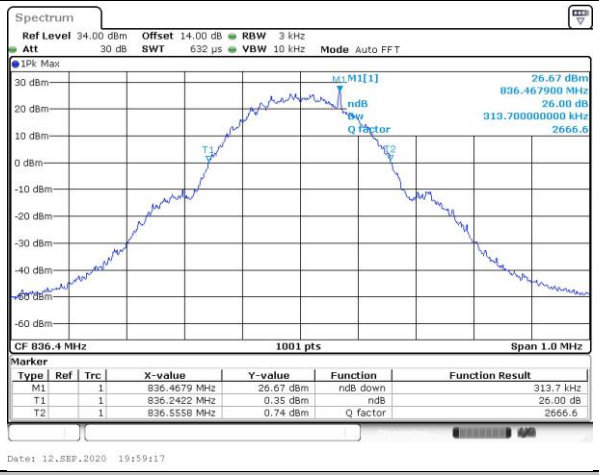
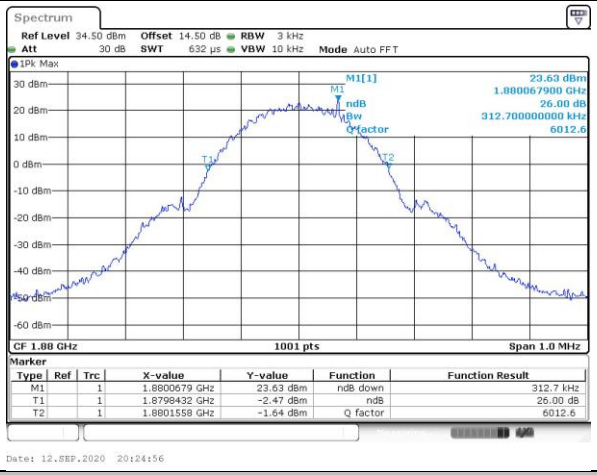
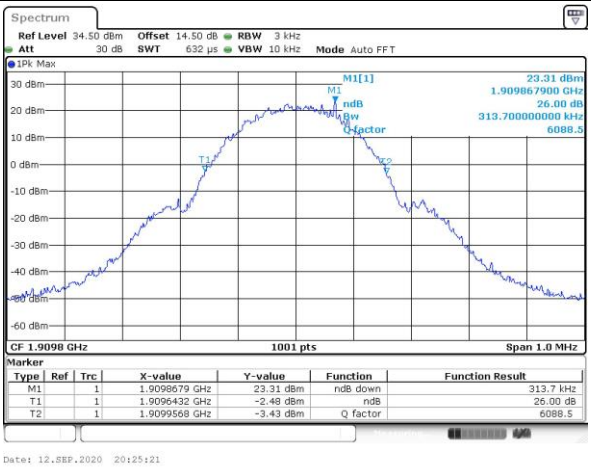
Mode	GSM1900(dB)	Limit: 13dB
Mod.	GPRS class 8	Result
Lowest CH	0.26	PASS
Middle CH	0.23	
Highest CH	0.20	

GSM850 (GPRS class 8)	GSM1900 (GPRS class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

26dB Bandwidth

Mode	GSM850(MHz)
Mod.	GPRS class 8
Lowest CH	0.3147
Middle CH	0.3137
Highest CH	0.3137

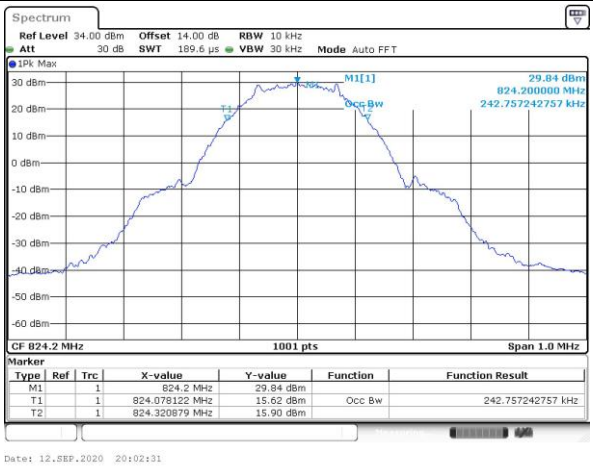
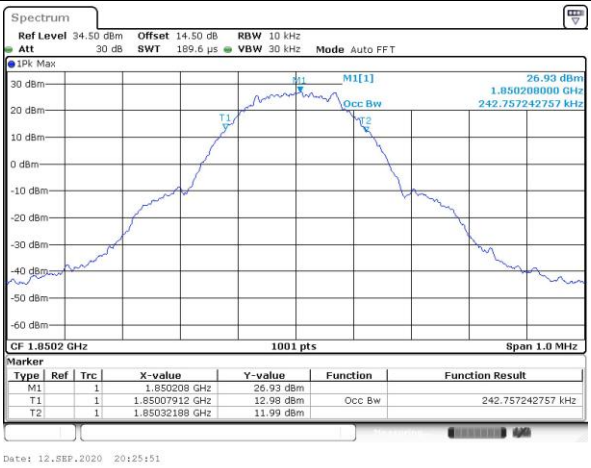
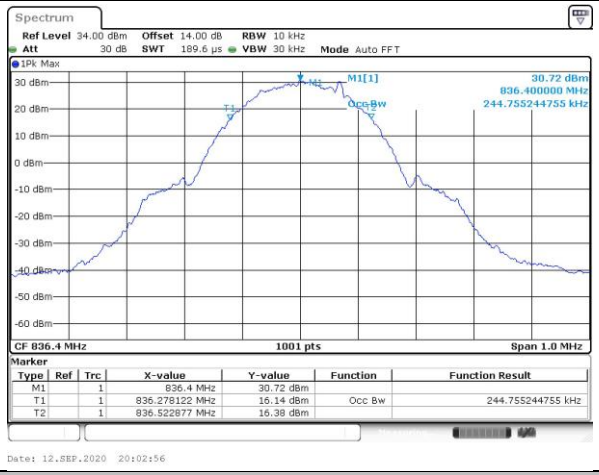
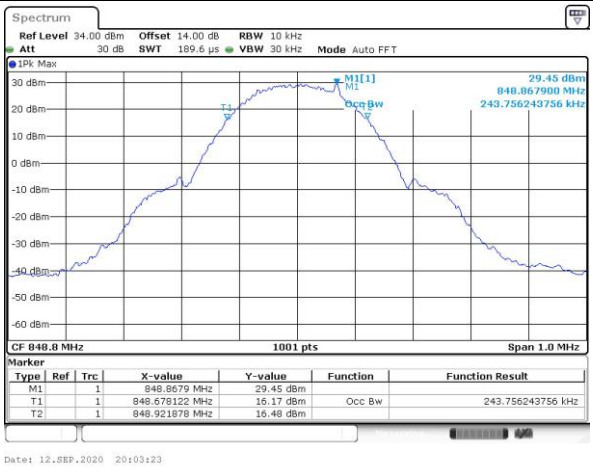
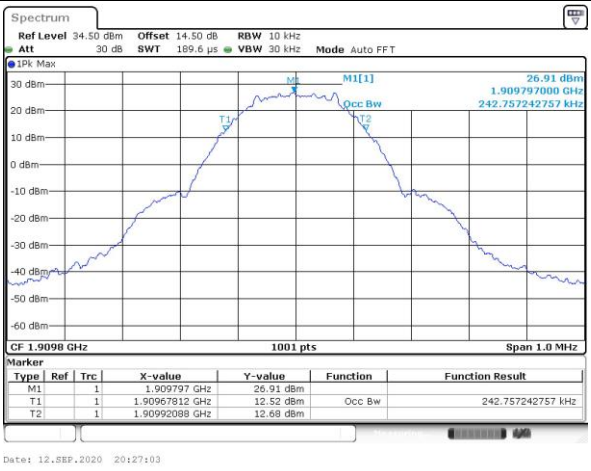
Mode	GSM1900(MHz)
Mod.	GPRS class 8
Lowest CH	0.3127
Middle CH	0.3127
Highest CH	0.3137

GSM850 (GPRS class 8)	GSM1900 (GPRS class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

Occupied Bandwidth

Mode	GSM850(MHz)
Mod.	GPRS class 8
Lowest CH	0.2428
Middle CH	0.2448
Highest CH	0.2438

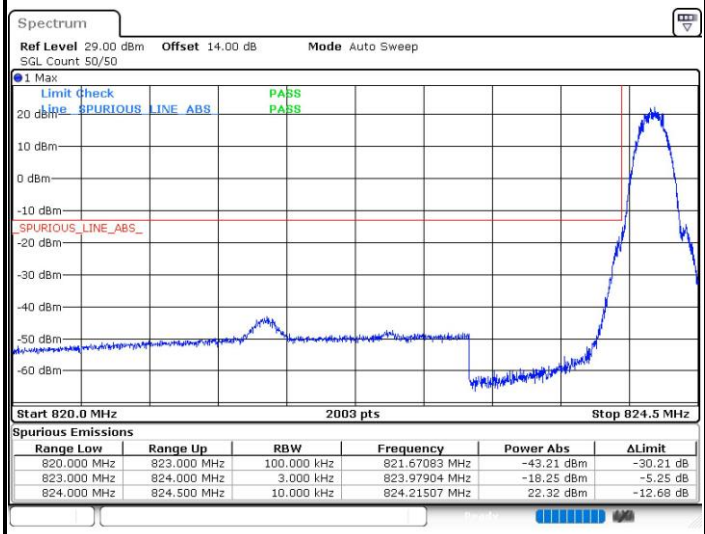
Mode	GSM1900(MHz)
Mod.	GPRS class 8
Lowest CH	0.2428
Middle CH	0.2418
Highest CH	0.2428

GSM850 (GPRS class 8)	GSM1900 (GPRS class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

Conducted Band Edge

GSM850 (GPRS class 8)

Lowest Band Edge

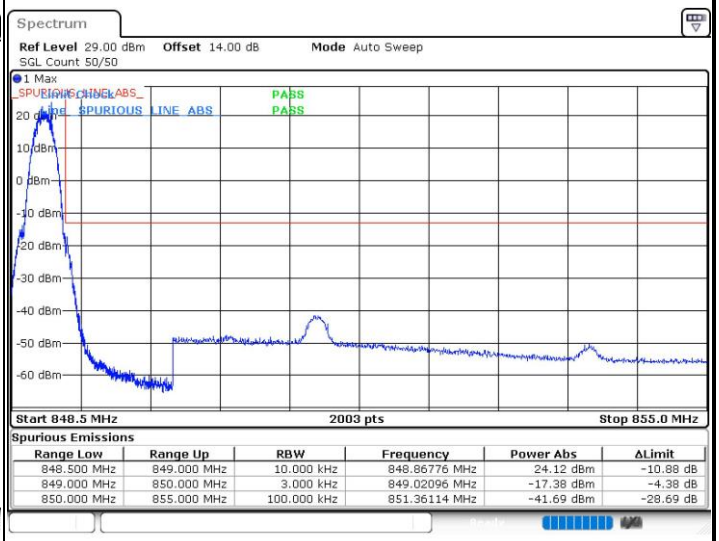


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	821.67083 MHz	-43.21 dBm	-30.21 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.97904 MHz	-18.25 dBm	-5.25 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.21507 MHz	22.32 dBm	-12.68 dB

Date: 12.SEP.2020 20:07:38

Highest Band Edge



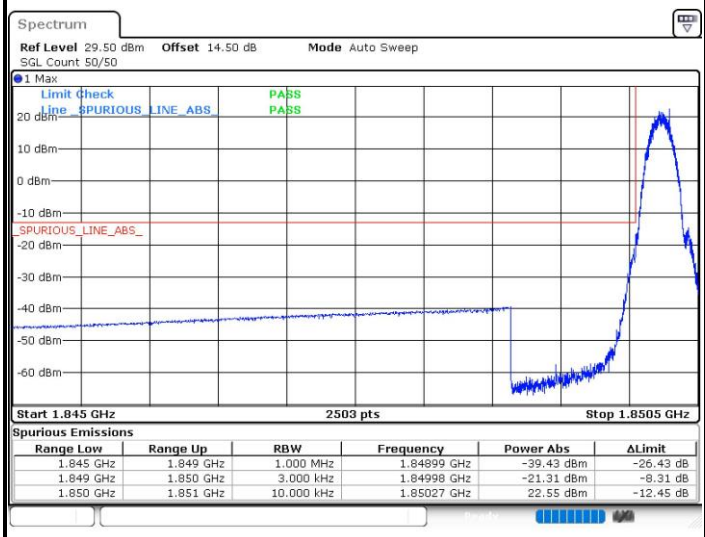
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.86776 MHz	24.12 dBm	-10.88 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.02096 MHz	-17.38 dBm	-4.38 dB
850.000 MHz	855.000 MHz	100.000 kHz	851.36114 MHz	-41.69 dBm	-28.69 dB

Date: 12.SEP.2020 20:10:43

GSM1900 (GPRS class 8)

Lowest Band Edge

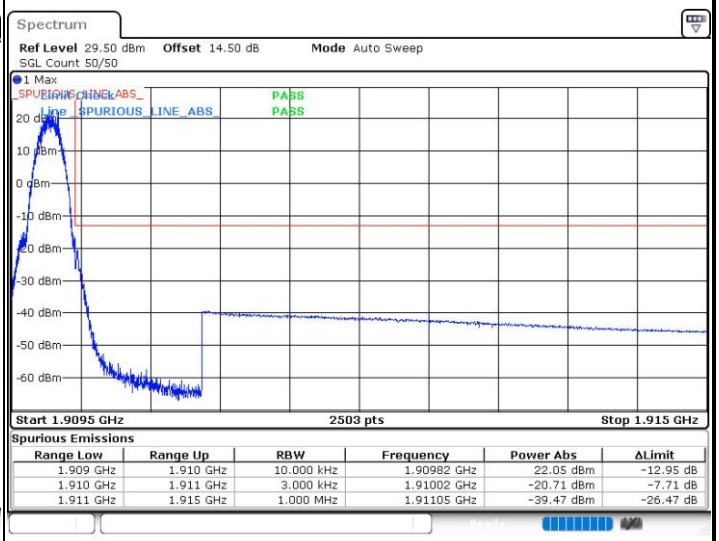


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.845 GHz	1.849 GHz	1.000 MHz	1.84899 GHz	-39.43 dBm	-26.43 dB
1.849 GHz	1.850 GHz	3.000 kHz	1.84998 GHz	-21.31 dBm	-8.31 dB
1.850 GHz	1.851 GHz	10.000 kHz	1.85027 GHz	22.55 dBm	-12.45 dB

Date: 12.SEP.2020 20:29:08

Highest Band Edge



Spurious Emissions

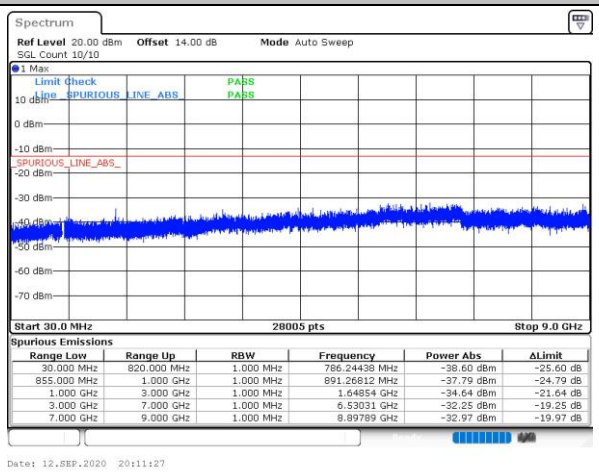
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.909 GHz	1.910 GHz	10.000 kHz	1.90982 GHz	22.05 dBm	-12.95 dB
1.910 GHz	1.911 GHz	3.000 kHz	1.91002 GHz	-20.71 dBm	-7.71 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91105 GHz	-39.47 dBm	-26.47 dB

Date: 12.SEP.2020 20:37:35

Conducted Spurious Emission

GSM850 (GPRS class 8)

Lowest Channel

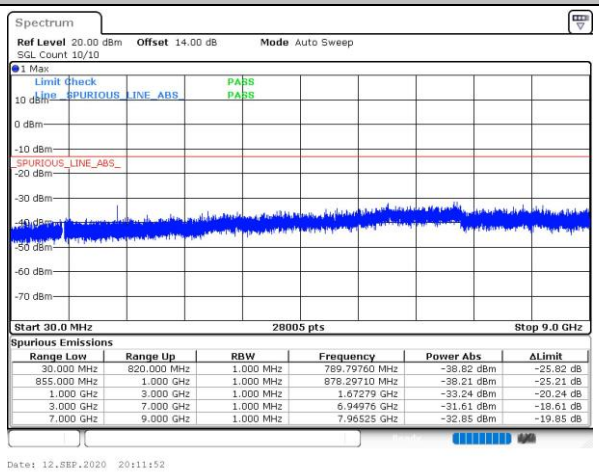


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	786.24438 MHz	-38.60 dBm	-25.60 dB
855.000 MHz	1.000 GHz	1.000 MHz	891.26812 MHz	-37.79 dBm	-24.79 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.54854 GHz	-34.64 dBm	-21.64 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.53031 GHz	-32.25 dBm	-19.25 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.89789 GHz	-32.97 dBm	-19.97 dB

Date: 12.SEP.2020 20:11:27

Middle Channel

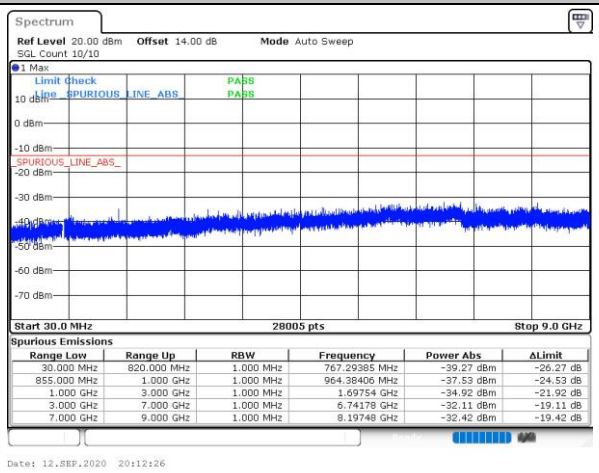


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	789.79760 MHz	-38.82 dBm	-25.82 dB
855.000 MHz	1.000 GHz	1.000 MHz	878.29710 MHz	-38.21 dBm	-25.21 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.67279 GHz	-33.24 dBm	-20.24 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.94976 GHz	-31.61 dBm	-18.61 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.96525 GHz	-32.85 dBm	-19.85 dB

Date: 12.SEP.2020 20:11:52

Highest Channel



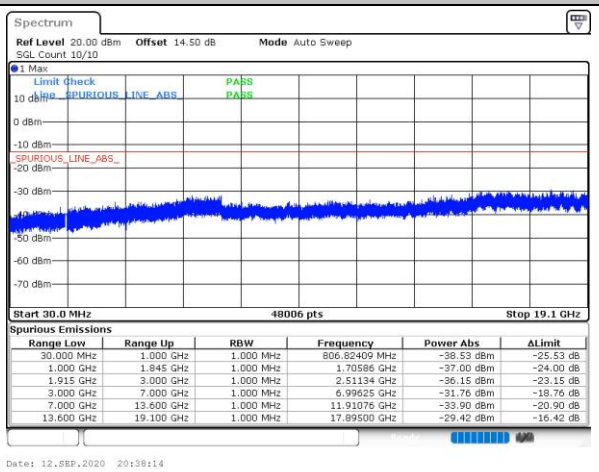
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	767.29385 MHz	-39.27 dBm	-26.27 dB
855.000 MHz	1.000 GHz	1.000 MHz	964.38406 MHz	-37.53 dBm	-24.53 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.69754 GHz	-34.92 dBm	-21.92 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.74178 GHz	-32.11 dBm	-19.11 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.19748 GHz	-32.42 dBm	-19.42 dB

Date: 12.SEP.2020 20:12:26

GSM1900 (GPRS class 8)

Lowest Channel

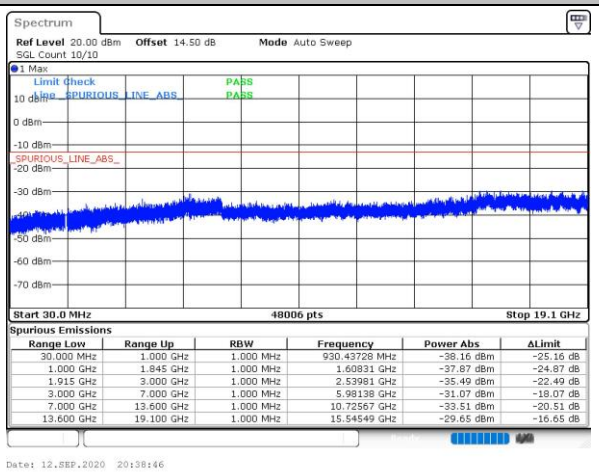


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	806.82409 MHz	-38.53 dBm	-25.53 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.70586 GHz	-37.00 dBm	-24.00 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.51134 GHz	-36.15 dBm	-23.15 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.99625 GHz	-31.76 dBm	-18.76 dB
7.000 GHz	13.600 GHz	1.000 MHz	11.91076 GHz	-33.90 dBm	-20.90 dB
13.600 GHz	19.100 GHz	1.000 MHz	17.89500 GHz	-29.42 dBm	-16.42 dB

Date: 12.SEP.2020 20:38:14

Middle Channel

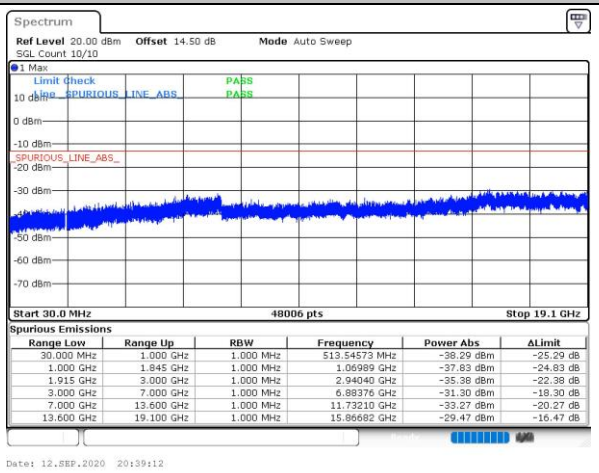


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	930.43728 MHz	-38.16 dBm	-25.16 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.60831 GHz	-37.87 dBm	-24.87 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.53981 GHz	-35.49 dBm	-22.49 dB
3.000 GHz	7.000 GHz	1.000 MHz	5.98138 GHz	-31.07 dBm	-18.07 dB
7.000 GHz	13.600 GHz	1.000 MHz	10.72567 GHz	-33.51 dBm	-20.51 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.54549 GHz	-29.65 dBm	-16.65 dB

Date: 12.SEP.2020 20:38:46

Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	513.54573 MHz	-38.29 dBm	-25.29 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.06989 GHz	-37.83 dBm	-24.83 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.94040 GHz	-35.38 dBm	-22.38 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.88376 GHz	-31.30 dBm	-18.30 dB
7.000 GHz	13.600 GHz	1.000 MHz	11.73210 GHz	-33.27 dBm	-20.27 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.86682 GHz	-29.47 dBm	-16.47 dB

Date: 12.SEP.2020 20:39:12

Frequency Stability

Test Conditions	Middle Channel	GSM850 (GPRS class 8)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0167	PASS
40	Normal Voltage	0.0022	
30	Normal Voltage	0.0025	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0023	
0	Normal Voltage	0.0014	
-10	Normal Voltage	0.0027	
-20	Normal Voltage	0.0001	
-30	Normal Voltage	0.0011	
20	Maximum Voltage	0.0148	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0032	

Test Conditions	Middle Channel	GSM1900 (GPRS class 8)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0139	PASS
40	Normal Voltage	0.0015	
30	Normal Voltage	0.0020	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0156	
0	Normal Voltage	0.0010	
-10	Normal Voltage	0.0004	
-20	Normal Voltage	0.0140	
-30	Normal Voltage	0.0149	
20	Maximum Voltage	0.0145	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0136	

Note:

1. Normal Voltage = 4.0 V. ；Battery End Point (BEP) = 3.7 V.；Maximum Voltage =4.0 V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

A2. WCDMA

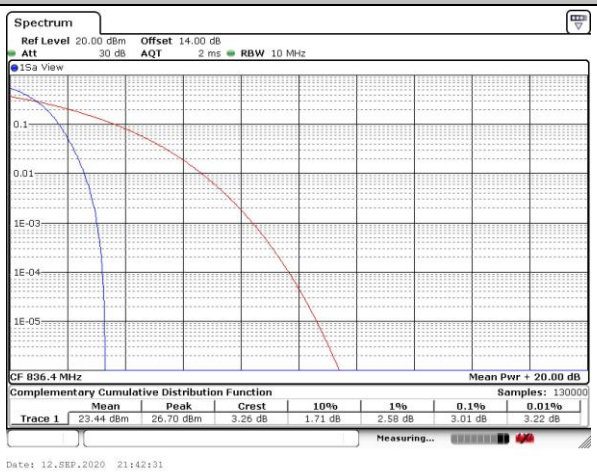
Peak-to-Average Ratio

Mode	WCDMA Band V(dB)	Limit: 13dB
Mod.	RMC 12.2Kbps	Result
Lowest CH	3.07	PASS
Middle CH	3.01	
Highest CH	2.96	

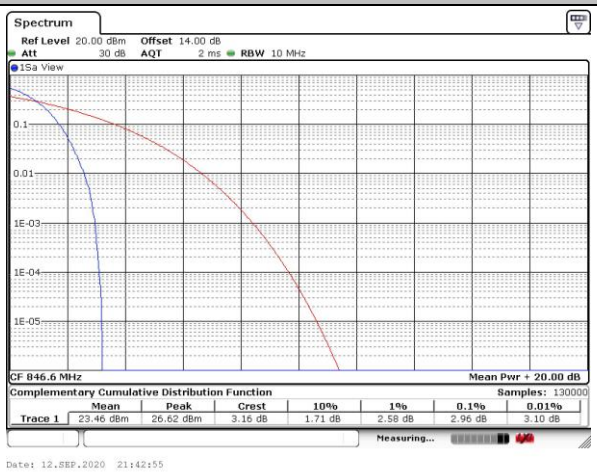
WCDMA Band V (RMC 12.2Kbps)

Lowest Channel

Middle Channel



Highest Channel

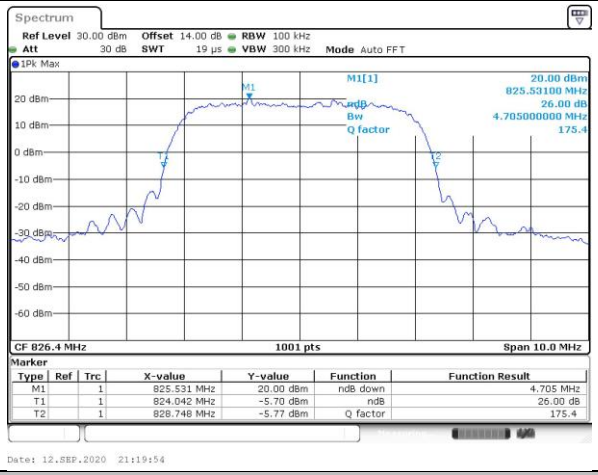


26dB Bandwidth

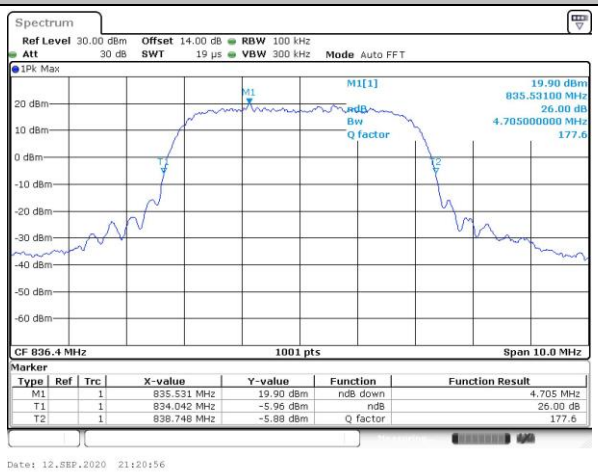
Mode	WCDMA Band V(MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.705
Middle CH	4.705
Highest CH	4.715

WCDMA Band V (RMC 12.2Kbps)

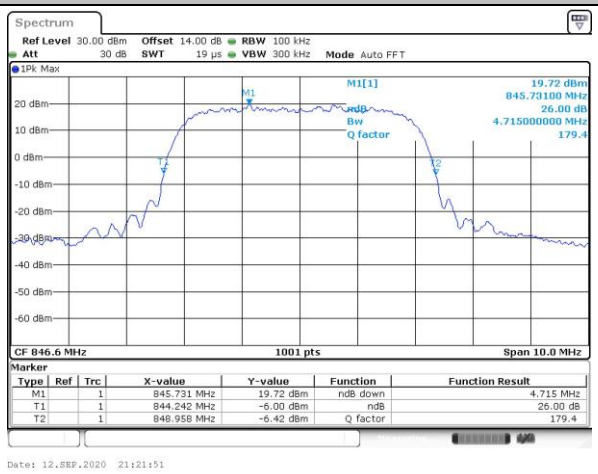
Lowest Channel



Middle Channel



Highest Channel

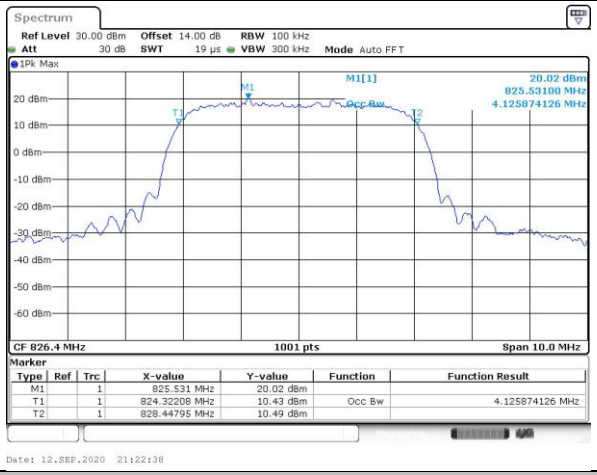


Occupied Bandwidth

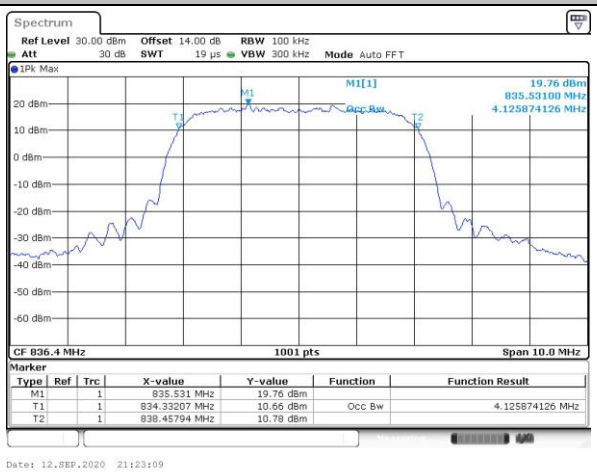
Mode	WCDMA Band V(MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.1259
Middle CH	4.1259
Highest CH	4.1259

WCDMA Band V (RMC 12.2Kbps)

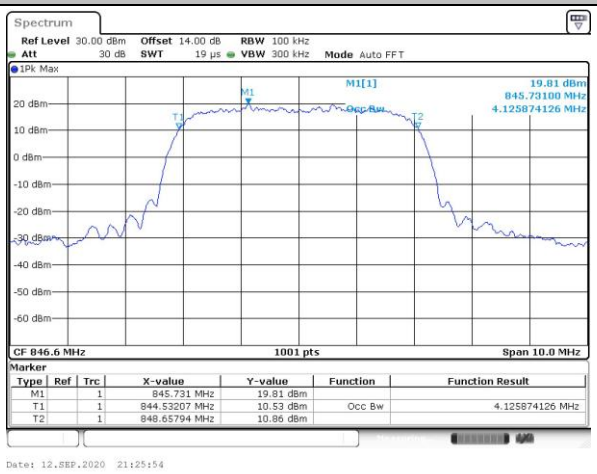
Lowest Channel



Middle Channel

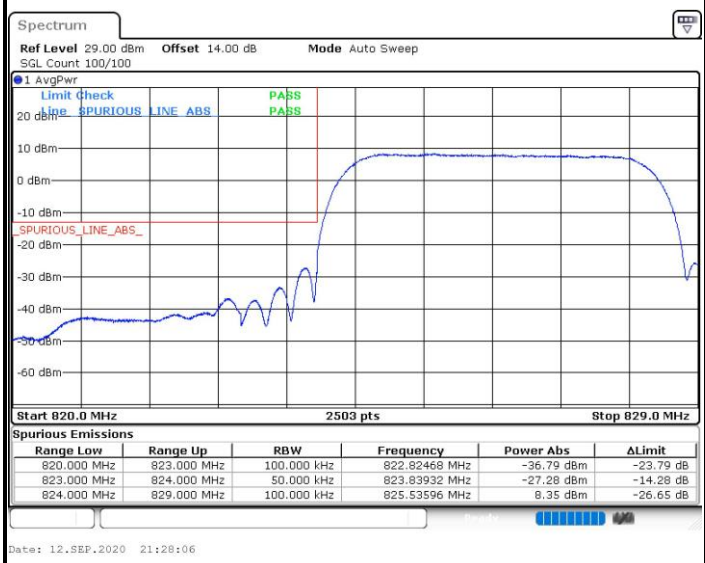


Highest Channel



Conducted Band Edge

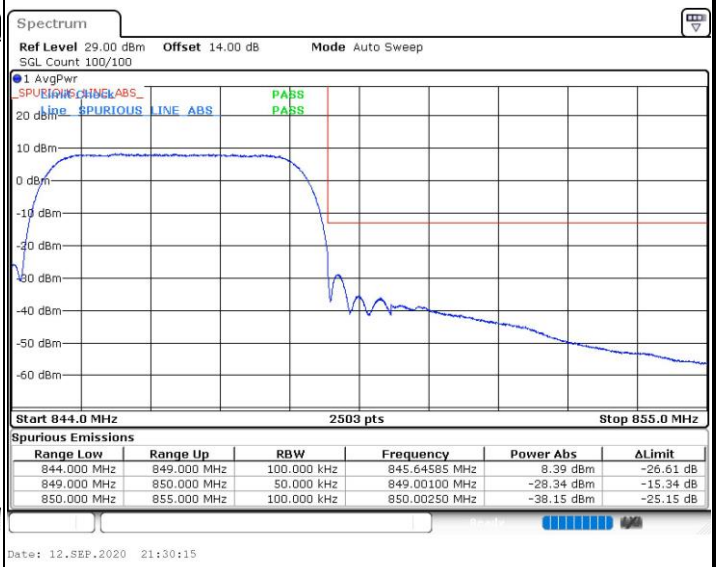
WCDMA Band V (RMC 12.2Kbps)	
Lowest Band Edge	**Highest Band Edge**



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.82468 MHz	-36.79 dBm	-23.79 dB
823.000 MHz	824.000 MHz	50.000 kHz	823.83932 MHz	-27.28 dBm	-14.28 dB
824.000 MHz	829.000 MHz	100.000 kHz	825.53596 MHz	8.35 dBm	-26.65 dB

Date: 12.SEP.2020 21:28:06



Spurious Emissions

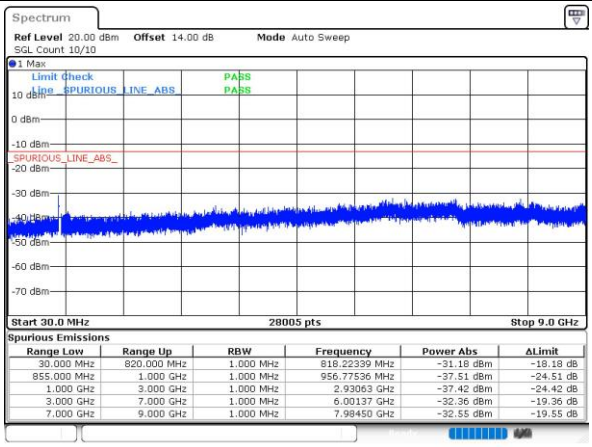
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	845.64585 MHz	8.39 dBm	-26.61 dB
849.000 MHz	850.000 MHz	50.000 kHz	849.00100 MHz	-28.34 dBm	-15.34 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.00250 MHz	-38.15 dBm	-25.15 dB

Date: 12.SEP.2020 21:30:15

Conducted Spurious Emission

WCDMA Band V (RMC 12.2Kbps)

Lowest Channel

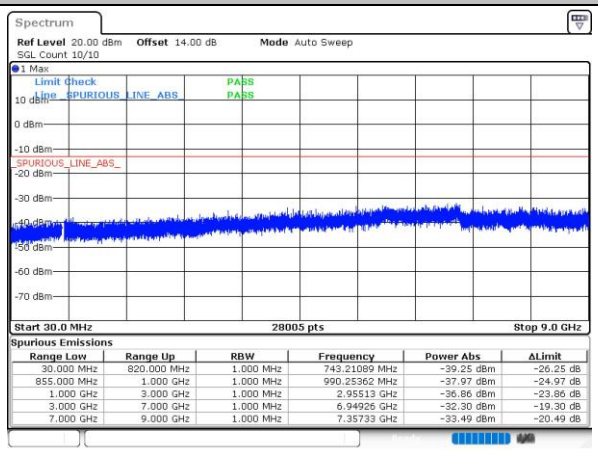


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	818.22339 MHz	-31.18 dBm	-18.18 dB
855.000 MHz	1.000 GHz	1.000 MHz	956.77536 MHz	-37.51 dBm	-24.51 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.93063 GHz	-37.42 dBm	-24.42 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.00137 GHz	-32.36 dBm	-19.36 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.98450 GHz	-32.55 dBm	-19.55 dB

Date: 12.SEP.2020 21:38:34

Middle Channel

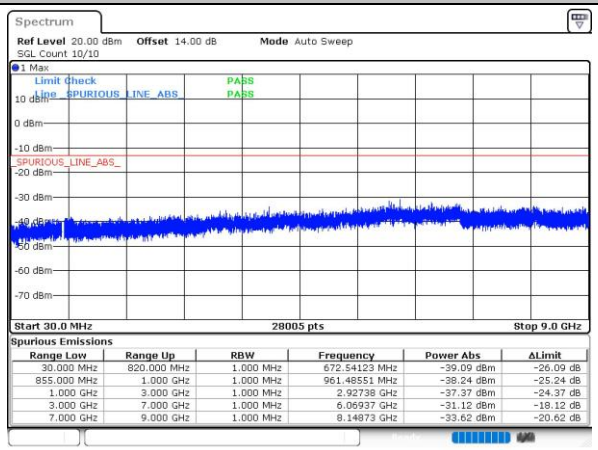


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	743.21089 MHz	-39.25 dBm	-26.25 dB
855.000 MHz	1.000 GHz	1.000 MHz	990.25362 MHz	-37.97 dBm	-24.97 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.95513 GHz	-36.86 dBm	-23.86 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.94926 GHz	-32.30 dBm	-19.30 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.35733 GHz	-33.49 dBm	-20.49 dB

Date: 12.SEP.2020 21:40:18

Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	672.54123 MHz	-39.09 dBm	-26.09 dB
855.000 MHz	1.000 GHz	1.000 MHz	961.48551 MHz	-38.24 dBm	-25.24 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.92738 GHz	-37.37 dBm	-24.37 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.06937 GHz	-31.12 dBm	-18.12 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.14873 GHz	-33.62 dBm	-20.62 dB

Date: 12.SEP.2020 21:40:59

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	0.0136	PASS
40	Normal Voltage	0.0079	
30	Normal Voltage	0.0010	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0008	
0	Normal Voltage	0.0013	
-10	Normal Voltage	0.0020	
-20	Normal Voltage	0.0093	
-30	Normal Voltage	0.0023	
20	Maximum Voltage	0.0012	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0017	

Note: Normal Voltage = 4.0 V. ；Battery End Point (BEP) = 3.7 V.；Maximum Voltage =4.0 V

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

GSM850 (GPRS Class 8)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-63.34	-13	-50.34	-70.31	1.58	10.70	H
	2510	-63.86	-13	-50.86	-72.11	2.102	12.50	H
	3348	-64.05	-13	-51.05	-72.94	2.856	13.90	H
	1672	-63.30	-13	-50.30	-70.27	1.58	10.70	V
	2510	-62.12	-13	-49.12	-70.37	2.10	12.50	V
	3348	-64.18	-13	-51.18	-73.07	2.86	13.90	V

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

GSM1900 (GPRS Class 8)								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3759	-57.04	-13	-44.04	-69.30	2.641	14.90	H
	5640	-56.02	-13	-43.02	-67.88	2.94	14.80	H
	7524	-52.37	-13	-39.37	-62.14	3.39	13.16	H
	3759	-56.53	-13	-43.53	-68.79	2.64	14.90	V
	5640	-53.76	-13	-40.76	-65.62	2.94	14.80	V
	7524	-52.08	-13	-39.08	-61.85	3.39	13.16	V

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

WCDMA Band V(RMC 12.2Kbps)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-68.21	-13	-55.21	-75.18	1.58	10.70	H
	2510	-64.05	-13	-51.05	-72.30	2.102	12.50	H
	3348	-63.72	-13	-50.72	-72.61	2.856	13.90	H
	1672	-67.84	-13	-54.84	-74.81	1.58	10.70	V
	2510	-63.81	-13	-50.81	-72.06	2.10	12.50	V
	3348	-64.41	-13	-51.41	-73.30	2.86	13.90	V

Remark:

1. Spurious emissions within 30-1000MHz were found more than 20dB below limit line.
2. For WCDMA Band V, pre-scanned in two antennas (main antenna and sub antenna), and the worst cases (main antenna) were recorded in this report.