FCC RF Test Report

APPLICANT	:	**Locus Solutions,LLC**
EQUIPMENT	:	**2G Tracker**
BRAND NAME	:	**Emerson**
MODEL NAME	:	**GO Tracker 1.2**
FCC ID	:	**AMH101012**
STANDARD	:	**47 CFR Part 2, 22(H), 24(E)**
CLASSIFICATION	:	**PCS Licensed Transmitter (PCB)**

The product was received on Mar. 25, 2020 and completely tested on Mar. 30, 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.

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG032504	Rev. 01	Initial issue of report	May 08, 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 22.79 dB at 1672.800 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

Locus Solutions,LLC
7121 Fairway Dr. Suite #400, Palm Beach Gardens, FL 33418, USA

1.2 Manufacturer

Konka Smart Technology Co. , Ltd
#5 Workshop, Intelligent Terminal Industrial Park. West Section of Gangyuan Blvd. Yibin lingang Economic and Technologica Development Zone, Sichuan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	2G Tracker
Brand Name	Emerson
Model Name	GO Tracker 1.2
FCC ID	AMH101012
EUT supports Radios application	GSM
IMEI Code	Conducted: 015147006638169 Radiation: 015147006638300
HW Version	TK108_61_V10C
SW Version	M6110_V2.1.0
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT, please refer the product equality declaration exhibit submitted. The sample with the battery1/2 is 1st source which has capacity of 1800mA and the sample with the battery 3/4 is 2nd source which has capacity of 5400mA. According to the difference, we evaluate the sample with battery 2 to perform full test.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	**GPRS:** 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz
Rx Frequency	**GPRS:** 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz
Maximum Output Power to Antenna	**GPRS:** 850: 32.08 dBm 1900: 29.55 dBm
Antenna Type	PIFA Antenna
Antenna Gain	Cellular Band: -1.00 dBi PCS Band: -1.00 dBi
Type of Modulation	GPRS: GMSK

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 22H	GSM850 GPRS 1 Tx slots	GMSK	0.7816	0.0170 ppm	245KGXW
Part 24E	GSM1900 GPRS 1 Tx slots	GMSK	0.7161	0.0154 ppm	244KGXW

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

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24

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:

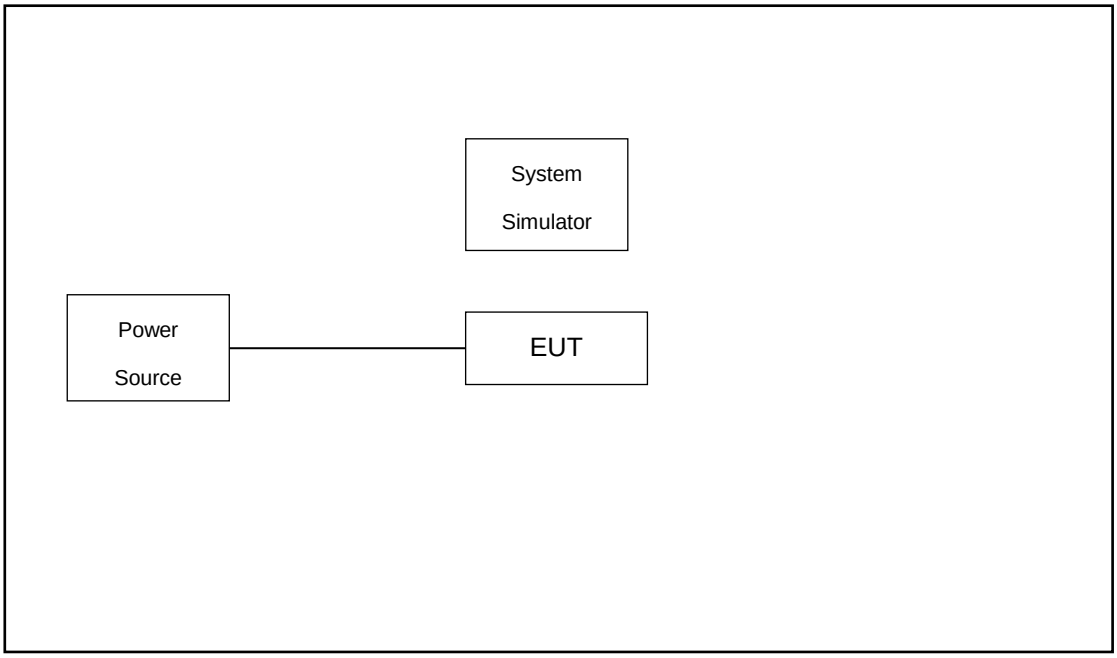
1. 30 MHz to 10th harmonic for GSM850.
2. 30 MHz to 10th harmonic for GSM1900.

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

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.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m
3.	Adapter	N/A	N/A	N/A	N/A	N/A
4.	USB cable	N/A	N/A	N/A	Unshielded,1.2m	N/A

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
GSM1900	Channel	512	661	810
	Frequency	1850.2	1880.0	1909.8

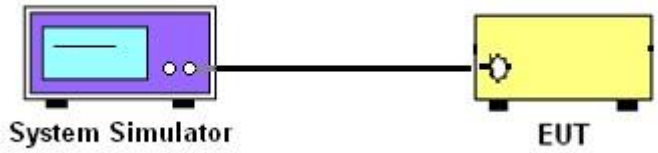
3 Conducted Test Result

3.1 Measuring Instruments

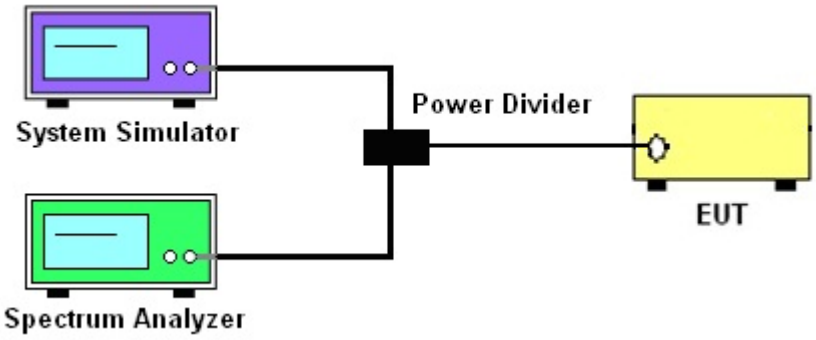
See list of measuring instruments of this test report.

3.2 Test Setup

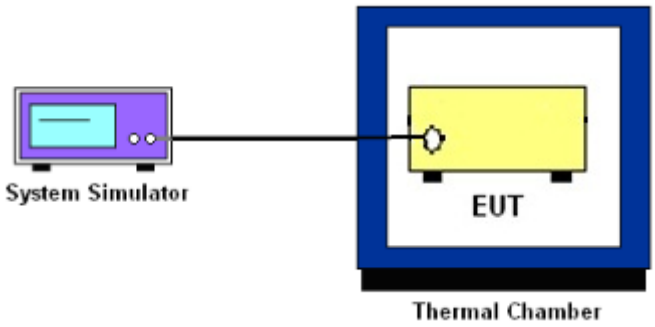
3.2.1 Conducted Output Power



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 .

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 10^{th} 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.

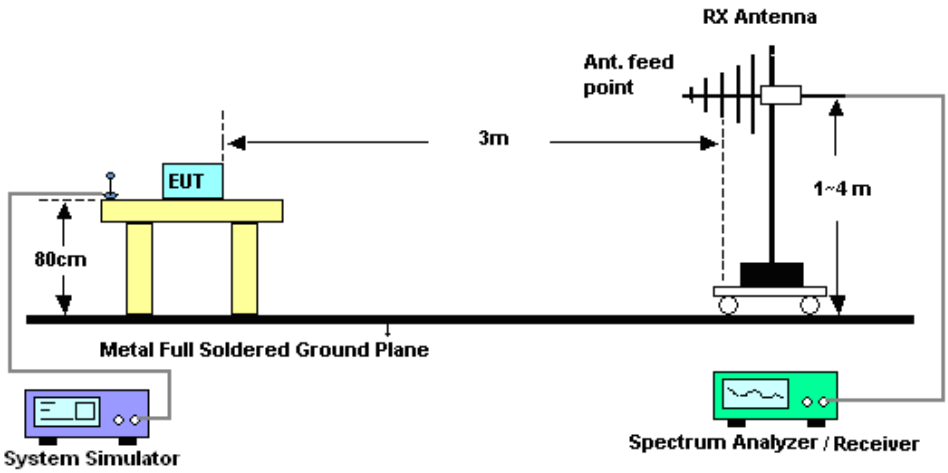
4 Radiated Test Items

4.1 Measuring Instruments

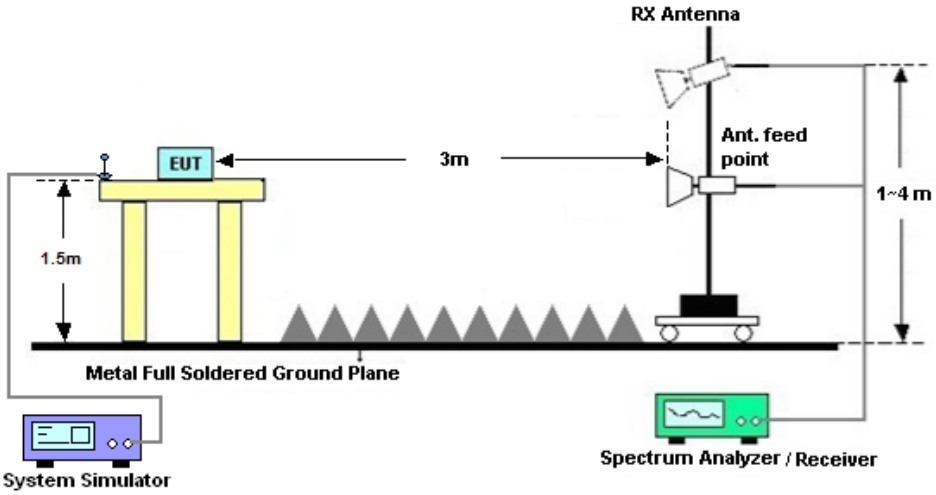
See list of measuring instruments of this test report.

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. 18, 2019	Mar. 27, 2020~ Mar. 30, 2020	Apr. 17, 2020	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Dec. 26, 2019	Mar. 27, 2020~ Mar. 30, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Jul. 22, 2019	Mar. 30, 2020	Jul. 21, 2020	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270104	0.5GHz~26.5Ghz	Dec. 27, 2019	Mar. 30, 2020	Dec. 26, 2020	Radiation (03CH01-SZ
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 19, 2019	Mar. 30, 2020	Jul. 18, 2020	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Aug. 27, 2019	Mar. 30, 2020	Aug. 26, 2020	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 18, 2019	Mar. 30, 2020	Apr. 17, 2020	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 19, 2019	Mar. 30, 2020	Apr. 18, 2020	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 18, 2019	Mar. 30, 2020	Oct. 17, 2020	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 22, 2019	Mar. 30, 2020	Jul. 21, 2020	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Mar. 30, 2020	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Mar. 30, 2020	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Mar. 30, 2020	NCR	Radiation (03CH01-SZ)

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))	**2.5dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.5dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.0dB**

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**
GPRS 1 Tx slots	**32.08**	32.04	31.96	29.47	**29.55**	29.43
GPRS 2 Tx slots	31.26	31.22	31.14	28.62	28.60	28.58
GPRS 3 Tx slots	29.63	29.60	29.50	26.96	27.02	26.96
GPRS 4 Tx slots	28.81	28.76	28.69	26.12	26.20	26.15

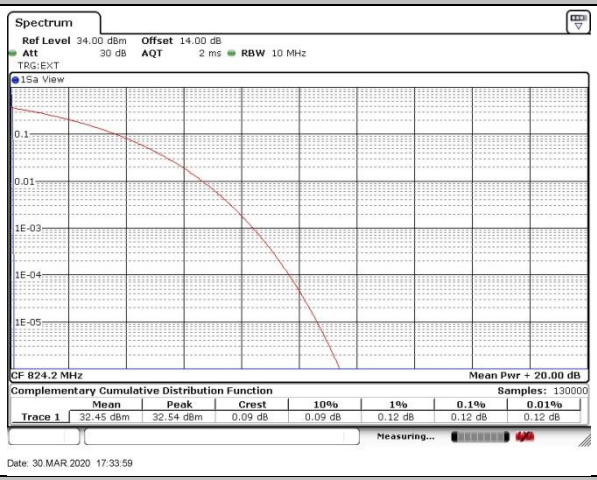
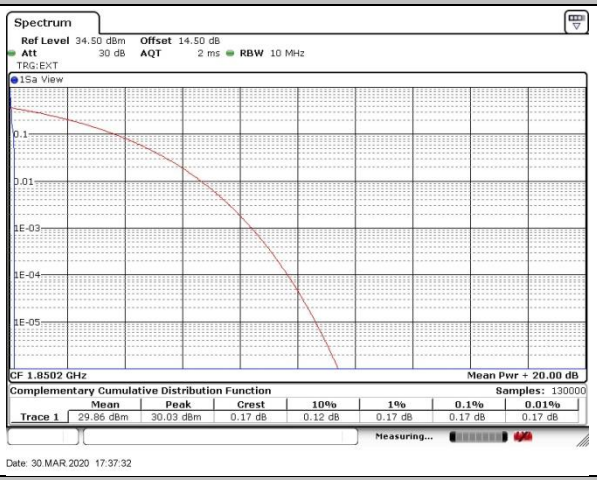
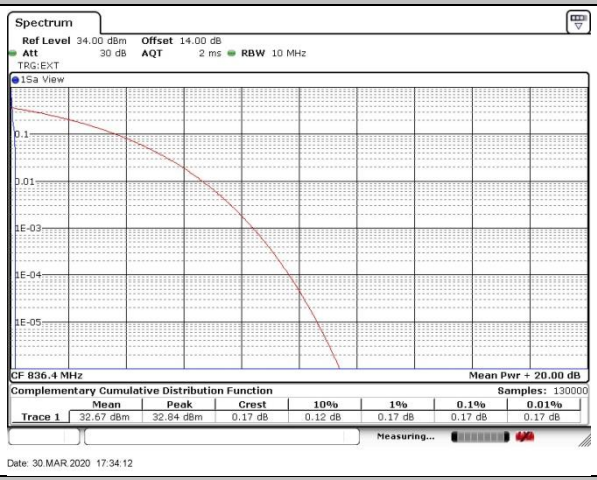
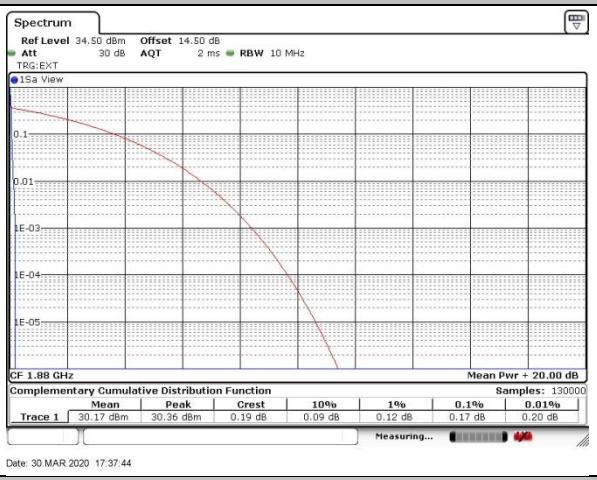
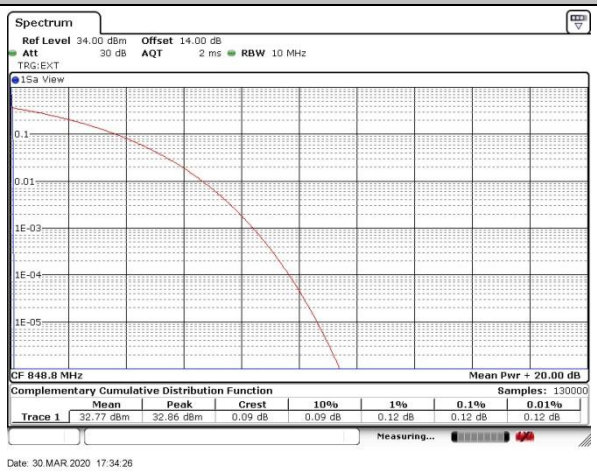
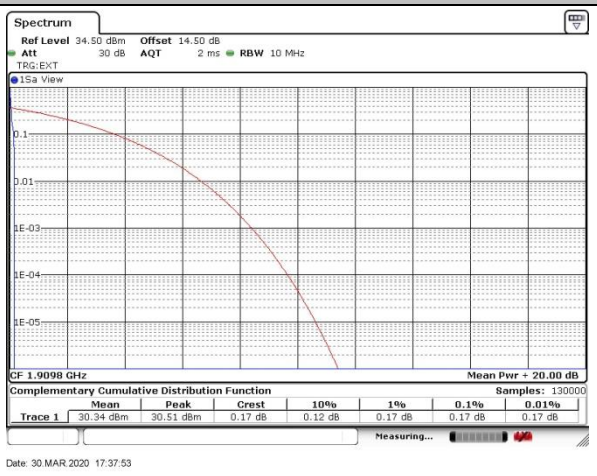
ERP/EIRP

GPRS850 (G_T - L_C= -1.00 dB)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
Conducted Power (dBm)	32.08	32.04	31.96
Conducted Power (Watts)	1.6144	1.5996	1.5704
ERP(dBm)	28.93	28.89	28.81
ERP(Watts)	0.7816	0.7745	0.7603

GPRS1900 (G_T - L_C= -1.00 dB)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
Conducted Power (dBm)	29.47	29.55	29.43
Conducted Power (Watts)	0.8851	0.9016	0.8770
EIRP(dBm)	28.47	28.55	28.43
EIRP(Watts)	0.7031	0.7161	0.6966

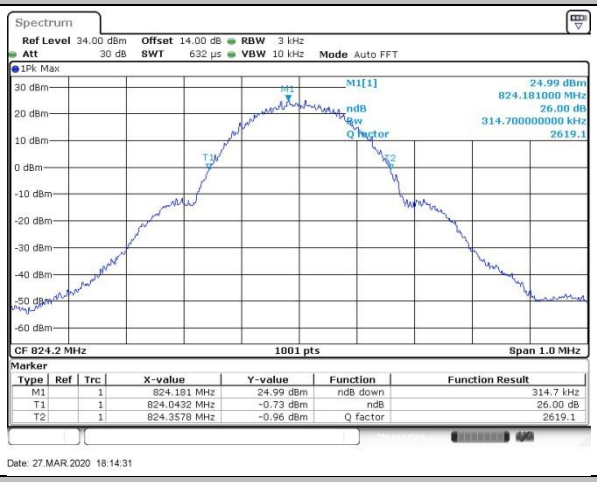
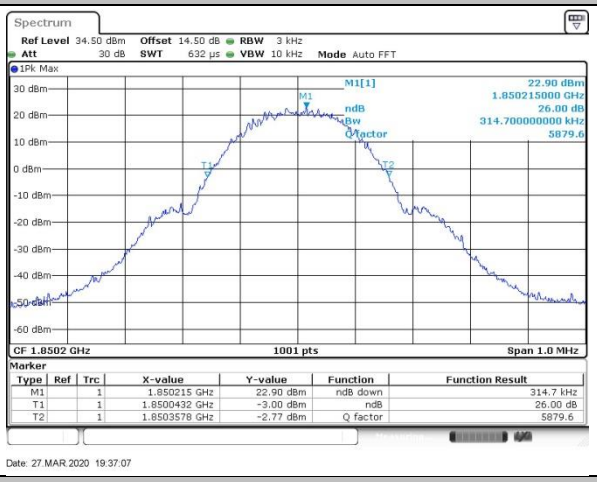
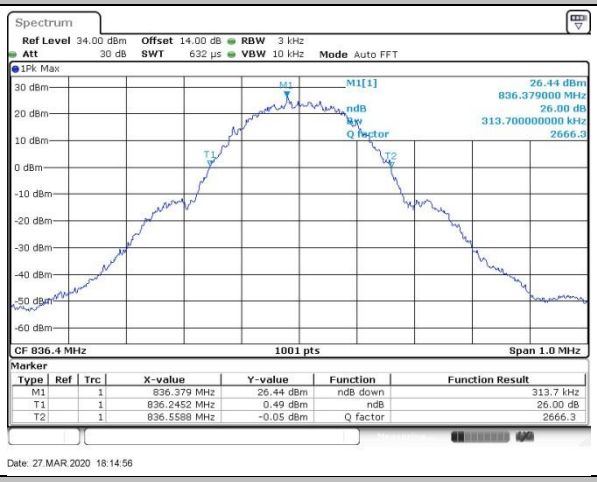
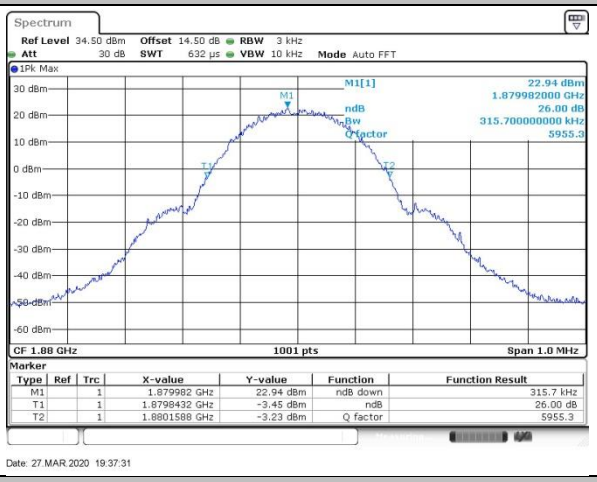
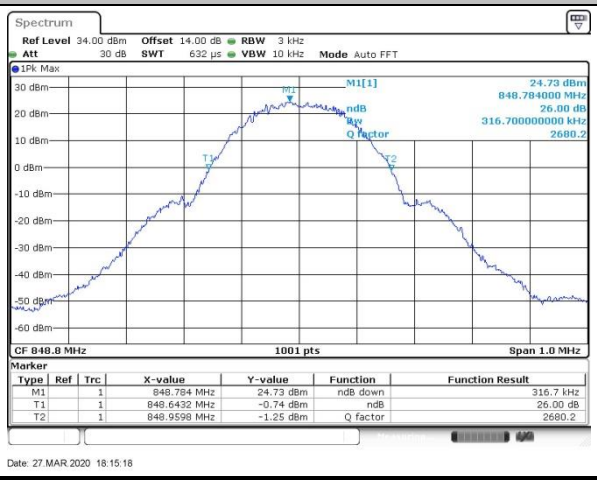
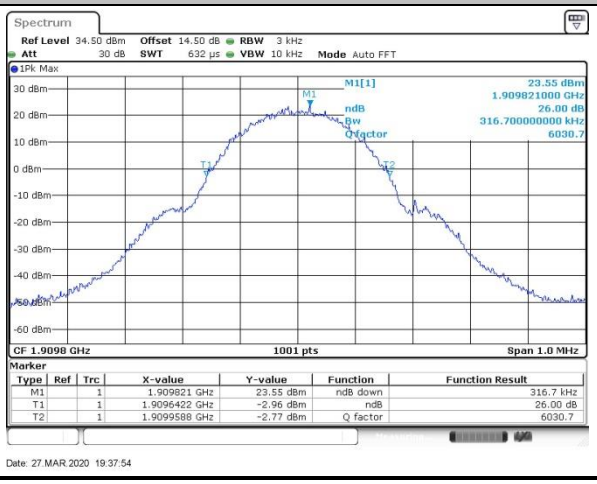
Peak-to-Average Ratio

Mode	GSM850(dB)	GSM1900(dB)	Limit: 13dB
Mod.	GPRS class 8	GPRS class 8	Result
Lowest CH	0.12	0.17	PASS
Middle CH	0.17	0.17	
Highest CH	0.12	0.17	

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

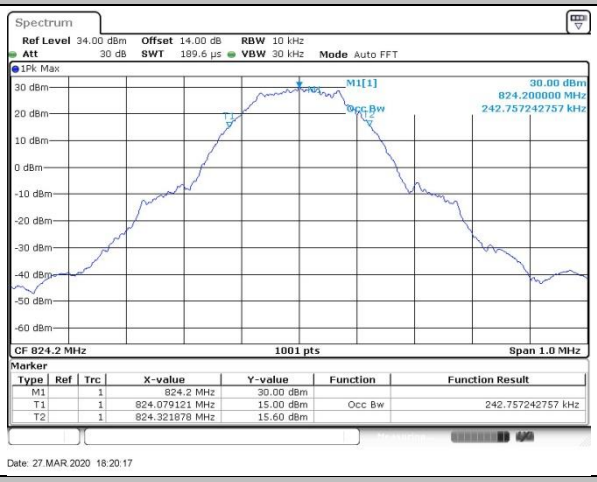
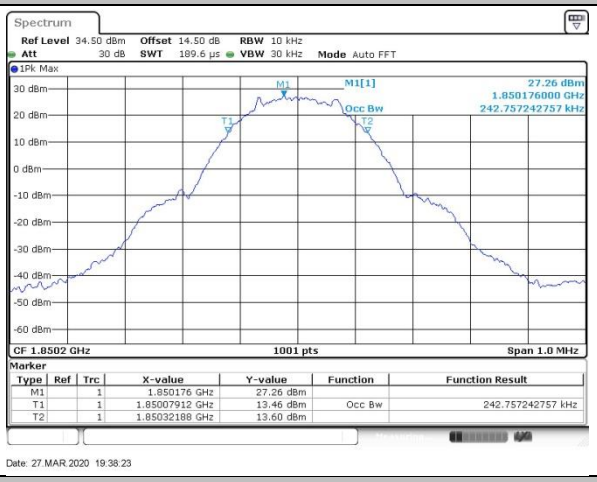
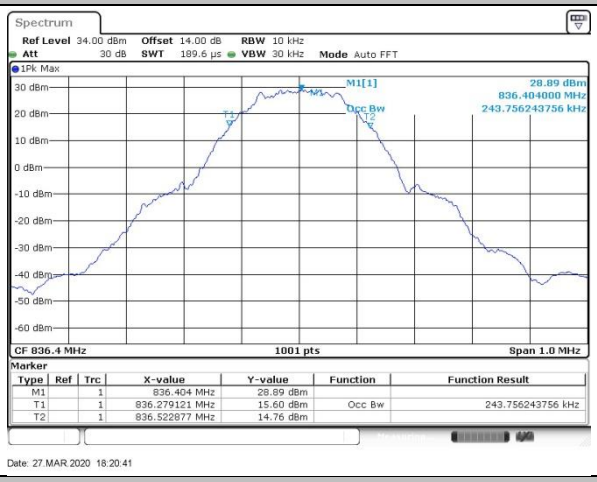
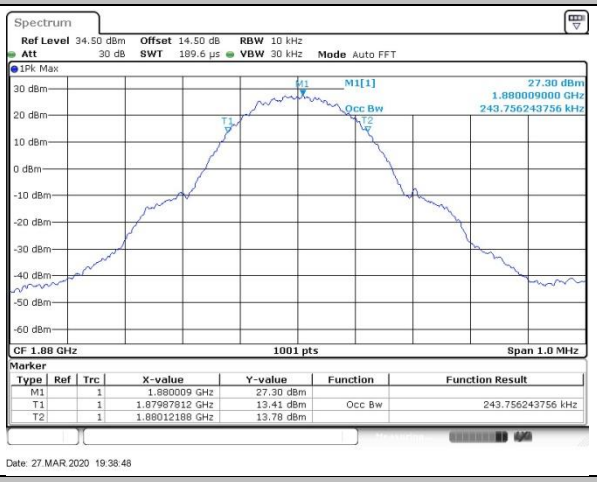
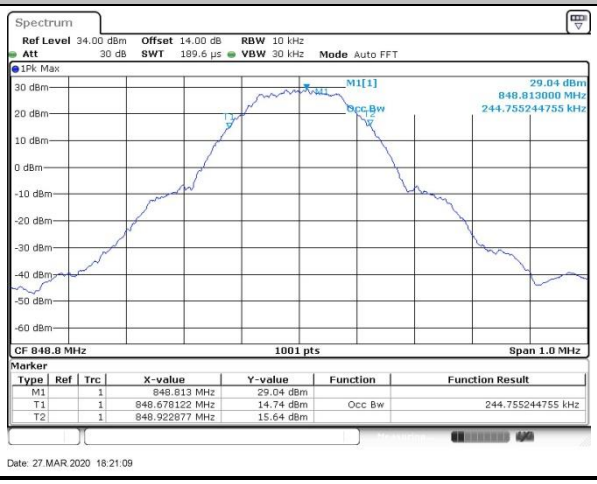
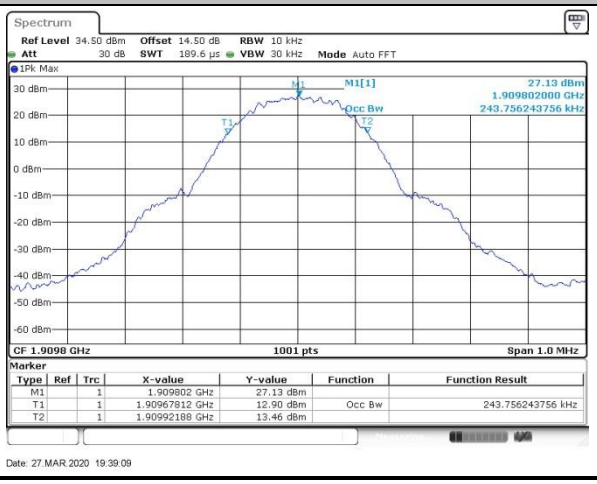
26dB Bandwidth

Mode	GSM850(MHz)	GSM1900(MHz)
Mod.	GPRS class 8	GPRS class 8
Lowest CH	0.315	0.315
Middle CH	0.314	0.316
Highest CH	0.317	0.317

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

Occupied Bandwidth

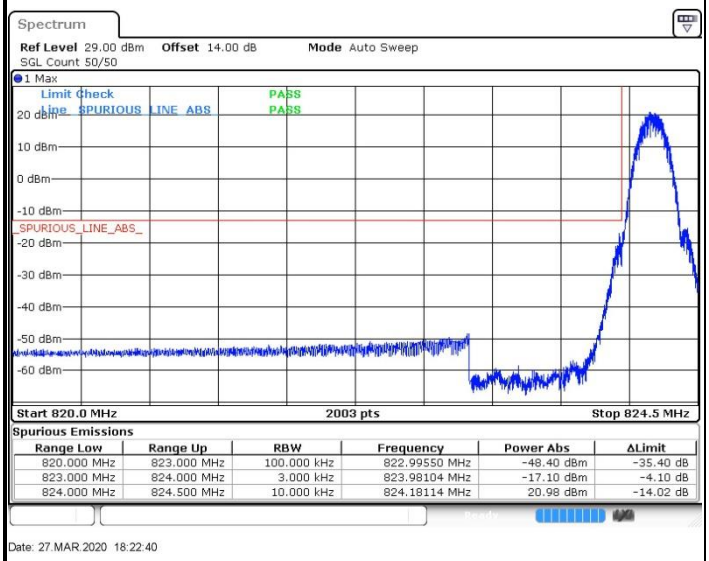
Mode	GSM850(MHz)	GSM1900(MHz)
Mod.	GPRS class 8	GPRS class 8
Lowest CH	0.243	0.243
Middle CH	0.244	0.244
Highest CH	0.245	0.244

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	822.99550 MHz	-48.40 dBm	-35.40 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.98104 MHz	-17.10 dBm	-4.10 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.18114 MHz	20.98 dBm	-14.02 dB

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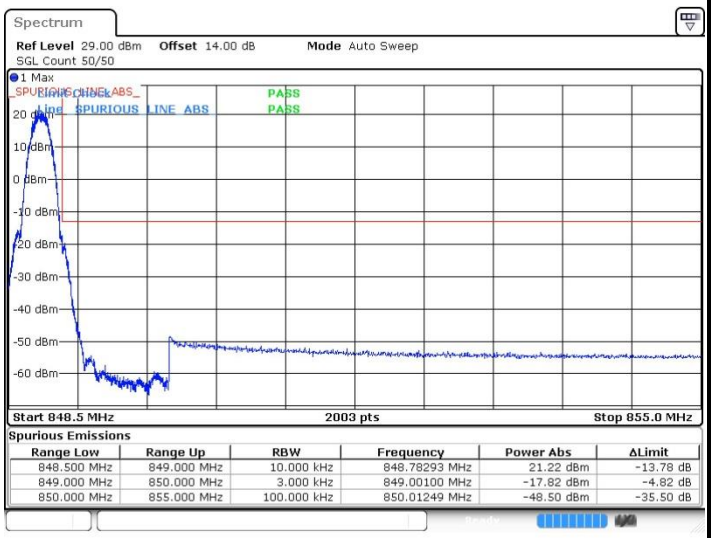
Highest Band Edge



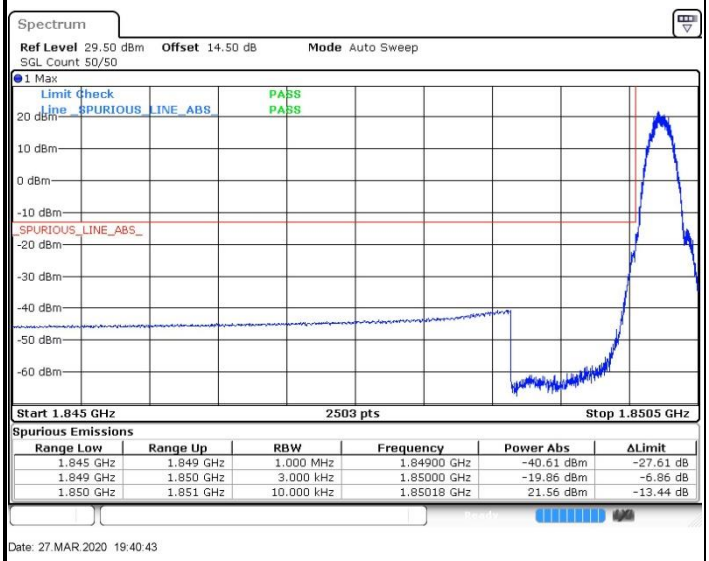
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.78293 MHz	21.22 dBm	-13.78 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.00100 MHz	-17.82 dBm	-4.82 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.01249 MHz	-48.50 dBm	-35.50 dB

Date: 27.MAR.2020 18:24:14

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	1.84900 GHz	-40.61 dBm	-27.61 dB
1.849 GHz	1.850 GHz	3.000 kHz	1.85000 GHz	-19.86 dBm	-6.86 dB
1.850 GHz	1.851 GHz	10.000 kHz	1.85018 GHz	21.56 dBm	-13.44 dB

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Highest Band Edge

Spurious Emissions

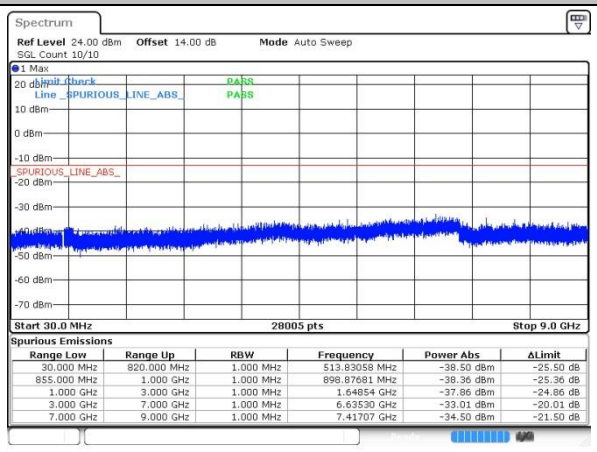
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.909 GHz	1.910 GHz	10.000 kHz	1.90979 GHz	21.63 dBm	-13.37 dB
1.910 GHz	1.911 GHz	3.000 kHz	1.91002 GHz	-20.84 dBm	-7.84 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91101 GHz	-40.03 dBm	-27.03 dB

Date: 27.MAR.2020 19:43:39

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	513.83058 MHz	-38.50 dBm	-25.50 dB
855.000 MHz	1.000 GHz	1.000 MHz	898.87681 MHz	-38.36 dBm	-25.36 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.64854 GHz	-37.86 dBm	-24.86 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.63530 GHz	-33.01 dBm	-20.01 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.41707 GHz	-34.50 dBm	-21.50 dB

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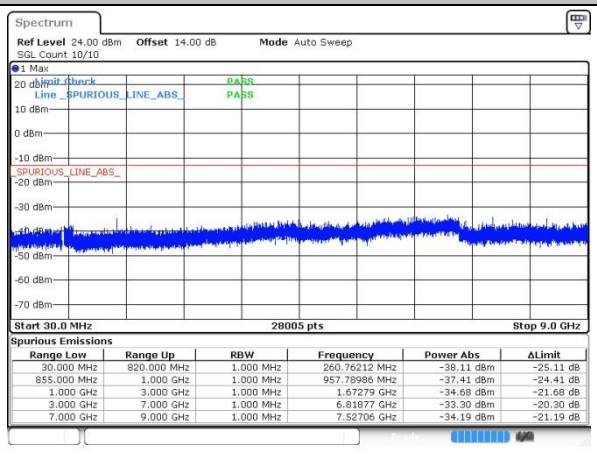
Middle Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	260.76212 MHz	-38.11 dBm	-25.11 dB
855.000 MHz	1.000 GHz	1.000 MHz	957.78986 MHz	-37.41 dBm	-24.41 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.67279 GHz	-34.68 dBm	-21.68 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.81877 GHz	-33.30 dBm	-20.30 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.52706 GHz	-34.19 dBm	-21.19 dB

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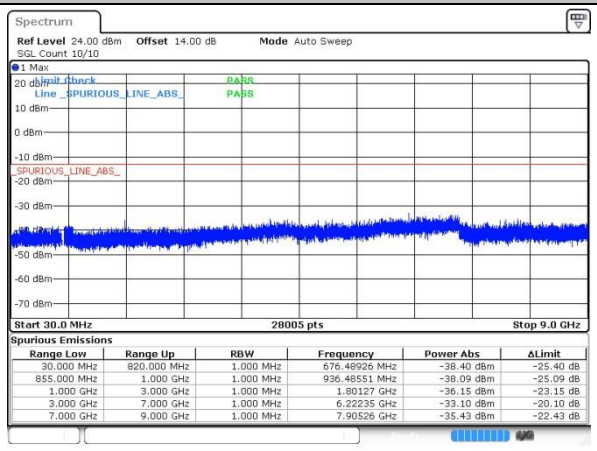
Highest Channel



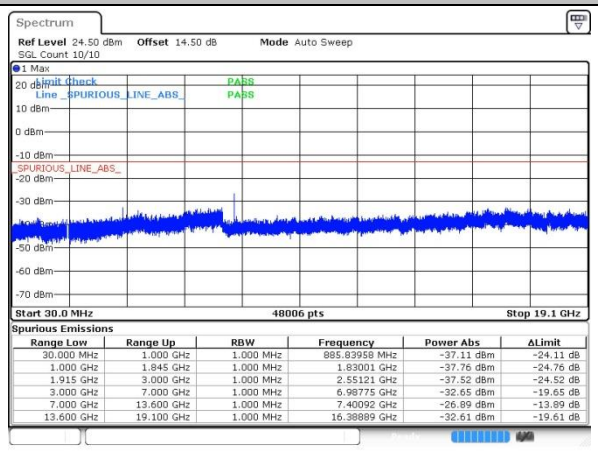
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	676.48926 MHz	-38.40 dBm	-25.40 dB
855.000 MHz	1.000 GHz	1.000 MHz	936.48551 MHz	-38.09 dBm	-25.09 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.80127 GHz	-36.15 dBm	-23.15 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.22235 GHz	-33.10 dBm	-20.10 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.90526 GHz	-35.43 dBm	-22.43 dB

Date: 27.MAR.2020 18:28:09

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	885.83958 MHz	-37.11 dBm	-24.11 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.83001 GHz	-37.76 dBm	-24.76 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.55121 GHz	-37.52 dBm	-24.52 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.98775 GHz	-32.65 dBm	-19.65 dB
7.000 GHz	13.600 GHz	1.000 MHz	7.40092 GHz	-26.89 dBm	-13.89 dB
13.600 GHz	19.100 GHz	1.000 MHz	16.38889 GHz	-32.61 dBm	-19.61 dB

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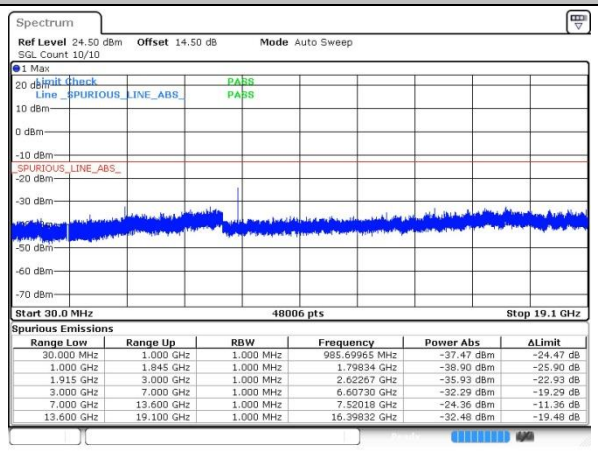
Middle Channel

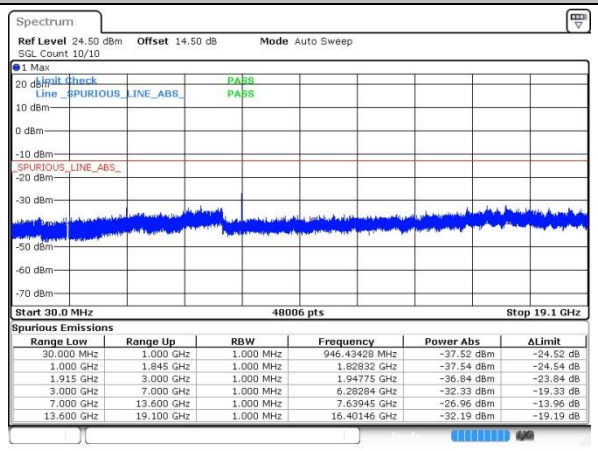


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	985.69965 MHz	-37.47 dBm	-24.47 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.79834 GHz	-38.90 dBm	-25.90 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.62267 GHz	-35.93 dBm	-22.93 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.60730 GHz	-32.29 dBm	-19.29 dB
7.000 GHz	13.600 GHz	1.000 MHz	7.52018 GHz	-24.36 dBm	-11.36 dB
13.600 GHz	19.100 GHz	1.000 MHz	16.39832 GHz	-32.48 dBm	-19.48 dB

Date: 27.MAR.2020 19:52:54

Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	946.43428 MHz	-37.52 dBm	-24.52 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.82832 GHz	-37.54 dBm	-24.54 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.94775 GHz	-36.84 dBm	-23.84 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.28284 GHz	-32.33 dBm	-19.33 dB
7.000 GHz	13.600 GHz	1.000 MHz	7.63945 GHz	-26.96 dBm	-13.96 dB
13.600 GHz	19.100 GHz	1.000 MHz	16.40146 GHz	-32.19 dBm	-19.19 dB

Date: 27.MAR.2020 19:55:19

Frequency Stability

Test Conditions	Middle Channel	GSM850 (GPRS class 8)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0170	PASS
40	Normal Voltage	0.0022	
30	Normal Voltage	0.0026	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0024	
0	Normal Voltage	0.0017	
-10	Normal Voltage	0.0029	
-20	Normal Voltage	0.0004	
-30	Normal Voltage	0.0011	
20	Maximum Voltage	0.0148	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0033	

Note: Normal Voltage = 3.7V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.2 V

Test Conditions	Middle Channel	GSM1900 (GPRS class 8)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0138	PASS
40	Normal Voltage	0.0015	
30	Normal Voltage	0.0019	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0154	
0	Normal Voltage	0.0009	
-10	Normal Voltage	0.0004	
-20	Normal Voltage	0.0140	
-30	Normal Voltage	0.0149	
20	Maximum Voltage	0.0144	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0137	

Note:

1. Normal Voltage = 3.7V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.2 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

Radiated Spurious Emission

GSM850 (GPRS 1 Tx slots)									
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)
Middle	1672.8	-47.27	-13	-34.27	-57.17	-50.52	4.00	9.40	H
	2509.2	-45.50	-13	-32.50	-58.90	-49.07	4.88	10.60	H
	3345.6	-56.45	-13	-43.45	-71.89	-61.38	5.52	12.60	H
	4182	-36.81	-13	-23.81	-55.71	-41.28	6.00	12.62	H
	5018.4	-53.60	-13	-40.60	-75.11	-57.01	7.14	12.70	H
	5854.8	-51.76	-13	-38.76	-74.74	-54.99	7.62	13.00	H
	6691.2	-42.48	-13	-29.48	-66.65	-45.03	8.00	12.70	H
	7527.6	-47.32	-13	-34.32	-72.61	-48.27	8.40	11.50	H
	8364	-51.36	-13	-38.36	-75.83	-52.21	8.60	11.60	H
	1672.8	-35.79	-13	-22.79	-45.18	-39.04	4.00	9.40	V
	2509.2	-42.97	-13	-29.97	-56.20	-46.54	4.88	10.60	V
	3345.6	-52.43	-13	-39.43	-67.43	-57.36	5.52	12.60	V
	4182	-37.07	-13	-24.07	-54.97	-41.54	6.00	12.62	V
	5018.4	-53.23	-13	-40.23	-74.46	-56.64	7.14	12.70	V
	5854.8	-49.67	-13	-36.67	-71.47	-52.90	7.62	13.00	V
	6691.2	-41.59	-13	-28.59	-64.43	-44.14	8.00	12.70	V
	7527.6	-41.69	-13	-28.69	-66.40	-42.64	8.40	11.50	V
	8364	-53.94	-13	-40.94	-78.52	-54.79	8.60	11.60	V

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

GSM1900 (GPRS 1 Tx slots)									
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)
Middle	3760	-40.56	-13	-27.56	-58.41	-47.31	5.85	12.60	H
	5640	-44.71	-13	-31.71	-66.17	-50.51	7.30	13.10	H
	7520	-40.41	-13	-27.41	-65.70	-43.56	8.35	11.50	H
	9400	-46.06	-13	-33.06	-73.63	-48.21	9.85	12.00	H
	11280	-47.31	-13	-34.31	-78.55	-48.21	10.90	11.80	H
	3760	-40.61	-13	-27.61	-57.69	-47.36	5.85	12.60	V
	5640	-46.59	-13	-33.59	-66.99	-52.39	7.30	13.10	V
	7520	-42.56	-13	-29.56	-67.27	-45.71	8.35	11.50	V
	9400	-43.59	-13	-30.59	-72.5	-45.74	9.85	12.00	V
	11280	-47.58	-13	-34.58	-79.03	-48.48	10.90	11.80	V

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