FCC RADIO TEST REPORT

FCC ID	:	**PY7-04605Z**
Equipment	:	**GSM/WCDMA/LTE Phone+Bluetooth, DTS/UNII a/b/g/n/ac and NFC**
Brand Name	:	**Sony**
Applicant	:	**Sony Mobile Communications Inc. 4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan**
Manufacturer	:	**Sony Mobile Communications Inc. 4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan**
Standard	:	**47 CFR Part 2, 22(H), 24(E), 27(L)**

The product was received on Feb. 11, 2019 and testing was started from Apr. 12, 2019 and completed on Apr. 13, 2019. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this spot check data report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Jones Tsai

Approved by: Jones Tsai

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FG921116-01A	01	Initial issue of report	Apr. 25, 2019
FG921116-01A	02	Revising the remark description.	May 13, 2019
FG921116-01A	03	Add the description of accessing spot check test plan in Summary of Test Result	May 17, 2019

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)(2)	Effective Radiated Power		
	§24.232 (c)	Equivalent Isotropic Radiated Power		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power		
3.3		Peak-to-Average Ratio	Reporting only	-
3.4	§2.1049 §27.53 (g)	Occupied Bandwidth	Pass	-
3.5	§2.1051 §27.53 (g)	Band Edge Measurement	Pass	-
3.6	§2.1051 §27.53 (g)	Conducted Emission	Pass	-
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.4	§2.1053 §22.917 (a) §24.238 (a) §27.53 (h)	Field Strength of Spurious Radiation	Pass	Under limit 34.41 dB at 5640.000 MHz

Remark:

1. This is a spot check data report except band 4 was full test in this report. All the test cases were performed on original report which can be referred to Sporton Report Number FG8O2416-02A.
2. The spot-check data performed in this report are chosen from the worst case of the original FCC ID report and the spot-check data summary is included in the another spot check data report.

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.

Reviewed by: Wii Chang

Report Producer: Natasha Hsieh

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, DTS/UNII a/b/g/n/ac, NFC, and GNSS.

Product Specification subjective to this standard	
Antenna Type	Monopole / Loop Antenna

EUT Information List			
HW Version	SW Version	S/N	Performed Test Item
A	0.21	BH9200DGGE	Conducted Measurement
		BH920022GE	Radiated Spurious Emission ERP/EIRP Test

Accessory List	
AC Adapter	Model Name : UCH20
	S/N: 3515W45302521
Earphone 1	Model Name.: STH40D
	S/N : N/A
USB Cable	Model Name.: UCB20
	S/N : N/A

Note:

1. Above EUT list used are electrically identical per declared by manufacturer.
2. Above the accessories list are used to exercise the EUT during test, and the serial number of each type of accessories is listed in each section of this report. .
3. For other wireless features of this EUT, test report will be issued separately.

1.2 Modification of EUT

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

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

FCC Rule	Frequency Range (MHz)	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22	824.2 ~848.8	GSM850 GPRS class 8	GMSK	0.7379	-	-
Part 22	824.2 ~848.8	GSM850 EDGE class 8	8PSK	0.1778	-	-
Part 22	826.4 ~846.6	WCDMA Band V RMC 12.2Kbps	BPSK	0.0665	-	-
Part 24	1850.2 ~1909.8	GSM1900 GPRS class 8	GMSK	0.5623	-	-
Part 24	1850.2 ~1909.8	GSM1900 EDGE class 8	8PSK	0.2924	-	-
Part 27	1712.4 ~ 1752.6	WCDMA Band IV RMC 12.2Kbps	BPSK	0.0847	0.0139 ppm	4M14F9W

1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH03-HY	03CH07-HY

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

FCC Designation No.: TW1190

1.5 Applicable Standards

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

- ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 22(H), 24(E), 27(L)
- 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.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane for Cellular Band and PCS Band, Z plane for AWS Band) were recorded in this report.

Radiated emissions were investigated as following frequency range:

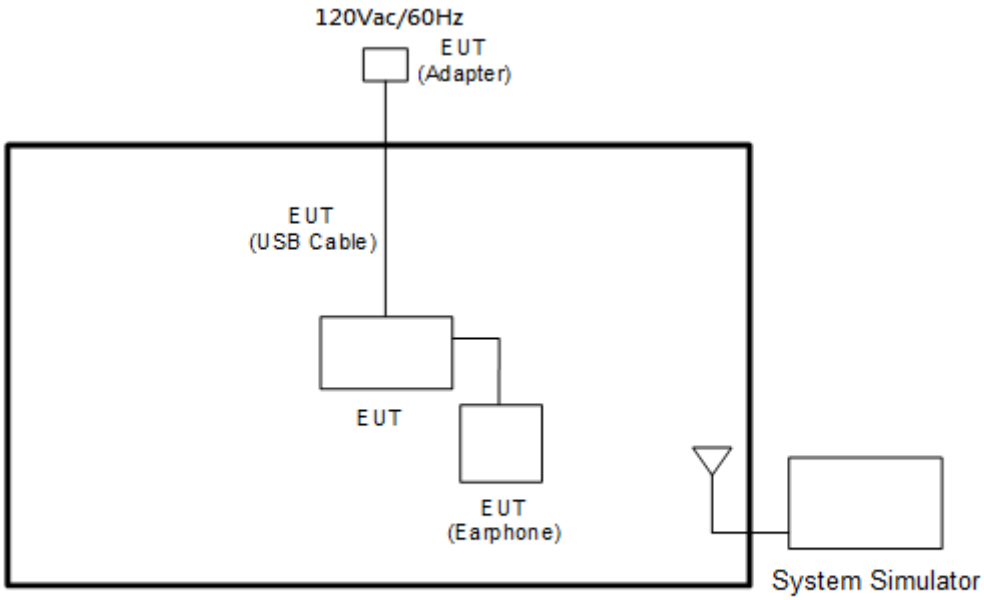
1. 30 MHz to 18000 MHz for WCDMA Band IV.

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	■ GSM Link ■ EDGE Class 8 Link	-
GSM 1900	■ GPRS Class 8 Link ■ EDGE Class 8 Link	-
WCDMA Band V	■ RMC 12.2Kbps Link	-
WCDMA Band IV	■ 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 4.2 dB and a 10dB 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 IV	Channel	1312	1413	1513
	Frequency	1712.4	1732.6	1752.6

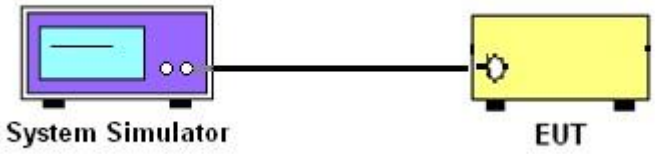
3 Conducted Test Result

3.1 Measuring Instruments

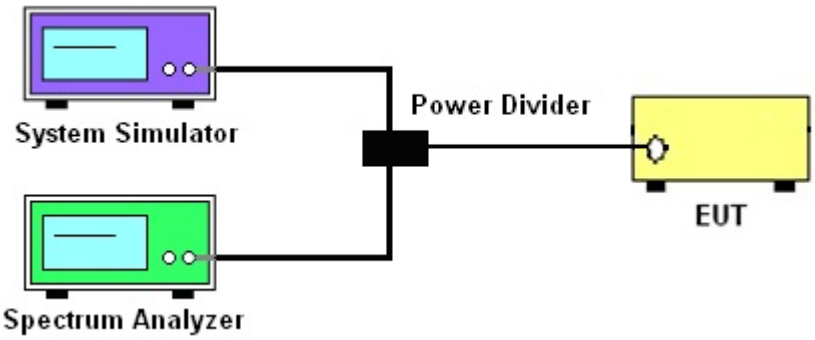
See list of measuring instruments of this test report.

3.1.1 Test Setup

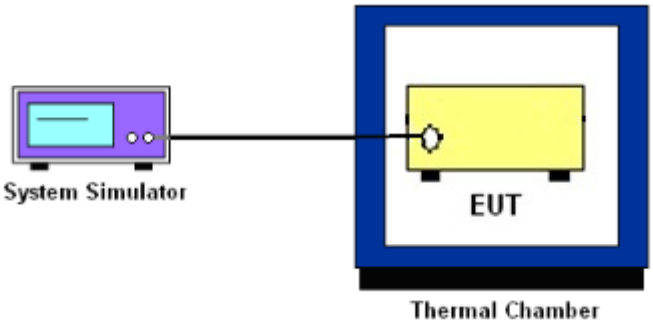
3.1.2 Conducted Output Power



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.

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV.

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 was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and 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 FCC KDB 971168 D01 v03r01 Section 5.7.1

1. The EUT was 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 FCC KDB 971168 D01 v03r01 Section 4.2

1. The EUT was 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 6.0.

1. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
2. 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.
3. The band edges of low and high channels for the highest RF powers were measured.
4. The RF fundamental frequency should 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 6.0.

1. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
2. 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.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
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)

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

27.54

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 was set up in the thermal chamber and connected with the system simulator.
2. 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.
3. With power OFF, the temperature was raised in 10°C steps 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.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

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

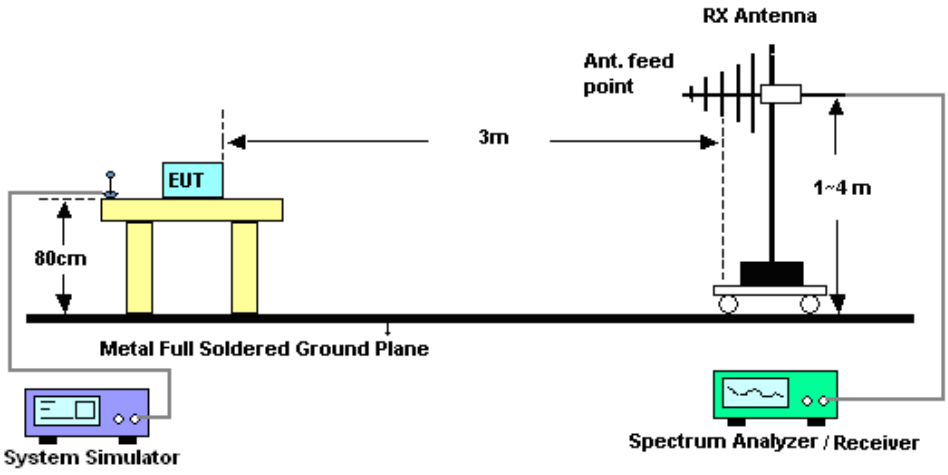
4 Radiated Test Items

4.1 Measuring Instruments

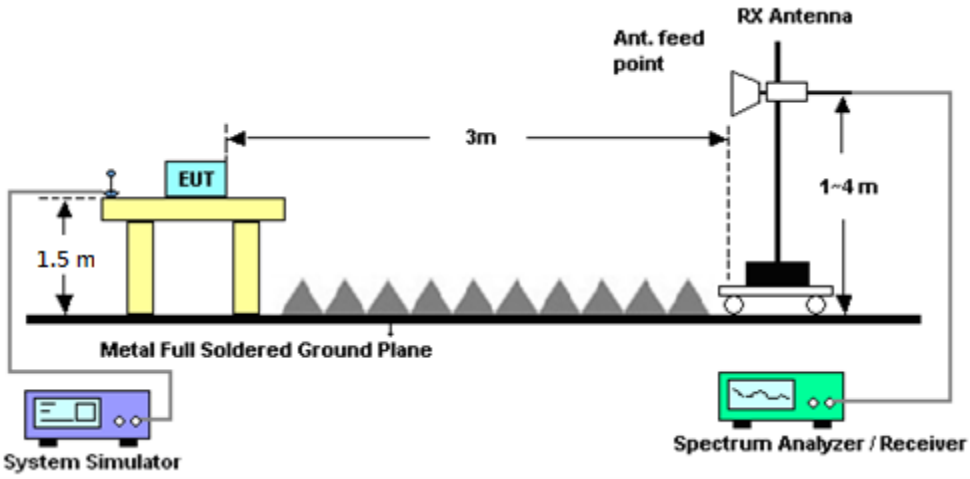
See list of measuring instruments of this test report.

4.2 Test Setup

For radiated test from 30MHz to 1GHz



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

The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI / TIA-603-E Section 2.2.12.

1. 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.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was 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 = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking 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 should 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station (Measure)	Rohde & Schwarz	CMU200	117995	GSM / GPRS / WCDMA / CDMA	Aug. 10, 2018	Apr. 12, 2019	Aug. 09, 2019	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Jun. 29, 2018	Apr. 12, 2019	Jun. 28, 2019	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Dec. 06, 2017	Apr. 12, 2019	Dec. 05, 2019	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL883644	Voltage:0~20V;Current:0~5A	Dec. 06, 2017	Apr. 12, 2019	Dec. 05, 2019	Conducted (TH03-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 07, 2019	Apr. 12, 2019	Mar. 06, 2020	Conducted (TH03-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 22, 2018	Apr. 12, 2019~ Apr. 13, 2019	Nov. 21, 2019	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz to 1GHz	Jan. 10, 2019	Apr. 12, 2019~ Apr. 13, 2019	Jan. 09, 2020	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00066584	1GHz~18GHz	Sep. 17, 2018	Apr. 12, 2019~ Apr. 13, 2019	Sep. 16, 2019	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00211469	1GHz~18GHz	Aug. 06, 2018	Apr. 12, 2019~ Apr. 13, 2019	Aug. 05, 2019	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz- 40GHz	May 08, 2018	Apr. 12, 2019~ Apr. 13, 2019	May 07, 2019	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz- 40GHz	Nov. 20, 2018	Apr. 12, 2019~ Apr. 13, 2019	Nov. 19, 2019	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	May 21, 2018	Apr. 12, 2019~ Apr. 13, 2019	May 20, 2019	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Apr. 12, 2019~ Apr. 13, 2019	Jul. 15, 2019	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 28, 2018	Apr. 12, 2019~ Apr. 13, 2019	May 27, 2019	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 23, 2019	Apr. 12, 2019~ Apr. 13, 2019	Jan. 22, 2020	Radiation (03CH07-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303A	TP157075	N/A	Nov. 05, 2018	Apr. 12, 2019~ Apr. 13, 2019	Nov. 04, 2019	Radiation (03CH07-HY)
Notch Filter	Wainwright	WTRCT5-824-849-20-70-60SSK	SN1	824-849	Mar. 21, 2019	Apr. 12, 2019~ Apr. 13, 2019	Mar. 20, 2020	Radiation (03CH07-HY)
Notch Filter	Wainwright	WRCT10-1920-1980-20-40-40SSK	SN1	1920-1980	May 22, 2018	Apr. 12, 2019~ Apr. 13, 2019	May 21, 2019	Radiation (03CH07-HY)
Notch Filter	Wainwright	WTRCD10-1710-1785-20-40-40SSK	SN1	1710-1785	May 22, 2018	Apr. 12, 2019~ Apr. 13, 2019	May 21, 2019	Radiation (03CH07-HY)
Filter	Wainwright	WLJ4-1000-1530-6000-40ST	SN3	1.53 GHz Lowpass	Mar. 20, 2019	Apr. 12, 2019~ Apr. 13, 2019	Mar. 19, 2020	Radiation (03CH07-HY)
Filter	Microwave	H1G013G1	SN477215	1.0G High Pass	Nov. 02, 2018	Apr. 12, 2019~ Apr. 13, 2019	Nov. 01, 2019	Radiation (03CH07-HY)
Filter	Microwave	H3G018G1	SN477220	3.0G High Pass	Nov. 02, 2018	Apr. 12, 2019~ Apr. 13, 2019	Nov. 01, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 26, 2019	Apr. 12, 2019~ Apr. 13, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 26, 2019	Apr. 12, 2019~ Apr. 13, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2858/2	18GHz~40GHz	Feb. 26, 2019	Apr. 12, 2019~ Apr. 13, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	N/A	Apr. 12, 2019~ Apr. 13, 2019	N/A	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF780208368	Control Ant Mast	N/A	Apr. 12, 2019~ Apr. 13, 2019	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Apr. 12, 2019~ Apr. 13, 2019	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Apr. 12, 2019~ Apr. 13, 2019	N/A	Radiation (03CH07-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May 22, 2018	Apr. 12, 2019~ Apr. 13, 2019	May 21, 2019	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	8050400465 6H	N/A	N/A	Apr. 12, 2019~ Apr. 13, 2019	N/A	Radiation (03CH07-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))	**5.7**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.5**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

Conducted Power (*Unit: dBm)						
<Spotcheck band>						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880	1909.8
GSM	33.13	32.92	32.95	28.32	28.50	28.78
GPRS class 8	33.13	32.94	32.99	28.35	28.53	28.80
GPRS class 10	31.13	30.80	30.88	26.42	26.54	26.83
GPRS class 11	29.08	28.73	28.80	24.38	24.75	24.69
GPRS class 12	27.95	27.71	27.72	23.40	23.54	23.75
EGPRS class 8	26.95	26.81	26.93	25.64	25.63	25.96
EGPRS class 10	25.42	25.38	25.38	24.11	24.31	24.56
EGPRS class 11	23.28	23.15	23.21	22.26	22.25	22.35
EGPRS class 12	22.38	22.22	22.28	21.16	21.06	21.26

Conducted Power (*Unit: dBm)						
<Spotcheck band>				<Fully testing band>		
Band	WCDMA Band V			WCDMA Band IV		
Channel	4132	4182	4233	1312	1413	1513
Frequency	826.4	836.4	846.6	1712.4	1732.6	1752.6
RMC 12.2K	22.68	22.66	22.62	21.28	21.20	21.26
HSDPA Subtest-1	21.67	21.63	21.61	20.24	20.18	20.21
HSDPA Subtest-2	21.71	21.64	21.66	20.28	20.21	20.21
HSDPA Subtest-3	21.27	21.20	21.11	19.78	19.69	19.73
HSDPA Subtest-4	21.20	21.15	20.79	19.80	19.72	19.75
HSUPA Subtest-1	21.69	21.60	21.57	20.29	20.17	20.24
HSUPA Subtest-2	19.68	19.66	19.61	18.30	18.19	18.28
HSUPA Subtest-3	20.66	20.60	20.59	19.23	19.19	19.25
HSUPA Subtest-4	19.67	19.56	19.51	18.26	18.20	18.23
HSUPA Subtest-5	21.60	21.60	21.50	20.30	20.20	20.30

A2. WCDMA

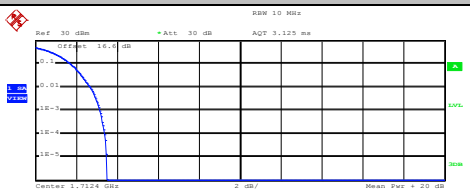
<Fully testing band>

Peak-to-Average Ratio

Mode	WCDMA Band IV	Limit: 13dB
Mod.	RMC 12.2Kbps	Result
Lowest CH	3.16	PASS
Middle CH	3.16	
Highest CH	3.20	

WCDMA Band IV (RMC 12.2Kbps)

Lowest Channel



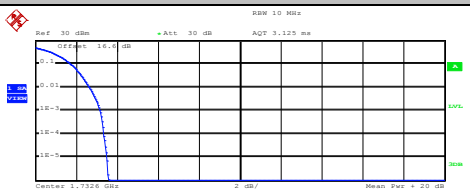
Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean	20.13 dBm
Peak	23.62 dBm
Crest	3.49 dB
10 %	1.72 dB
1 %	2.68 dB
.1 %	3.16 dB
.01 %	3.40 dB

Date: 12.APR.2019 09:29:49

Middle Channel



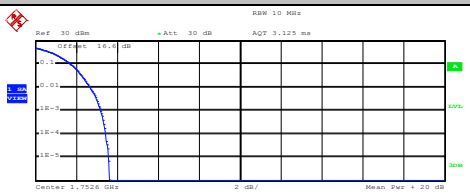
Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean	19.98 dBm
Peak	23.55 dBm
Crest	3.57 dB
10 %	1.76 dB
1 %	2.64 dB
.1 %	3.16 dB
.01 %	3.36 dB

Date: 12.APR.2019 09:30:02

Highest Channel



Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean	20.15 dBm
Peak	23.76 dBm
Crest	3.61 dB
10 %	1.76 dB
1 %	2.68 dB
.1 %	3.20 dB
.01 %	3.44 dB

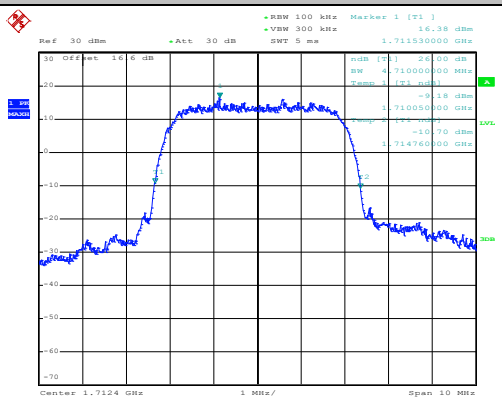
Date: 12.APR.2019 09:30:20

26dB Bandwidth

Mode	WCDMA Band IV 26dB BW(MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.71
Middle CH	4.70
Highest CH	4.70

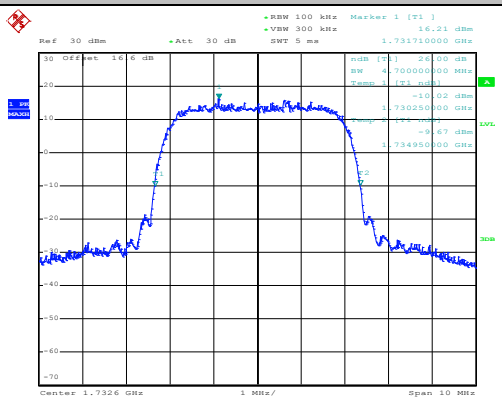
WCDMA Band IV (RMC 12.2Kbps)

Lowest Channel



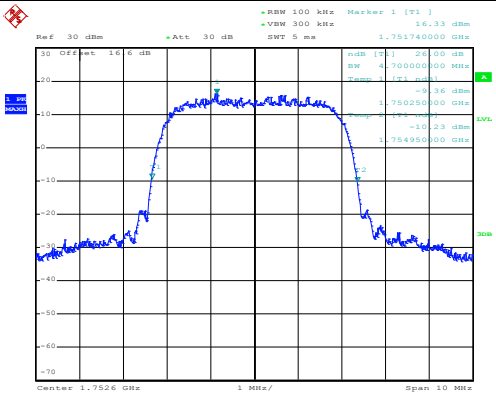
Date: 12.APR.2019 09:07:44

Middle Channel



Date: 12.APR.2019 09:08:27

Highest Channel



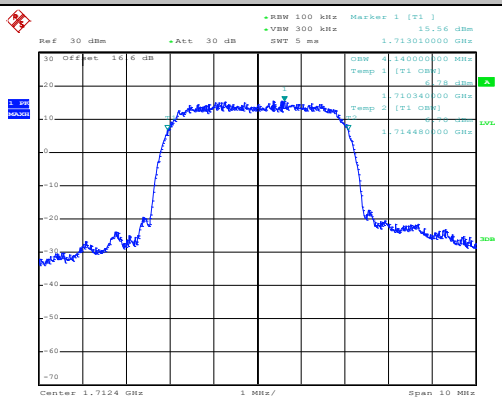
Date: 12.APR.2019 09:09:18

Occupied Bandwidth

Mode	WCDMA Band IV 99%OBW(MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.14
Middle CH	4.14
Highest CH	4.13

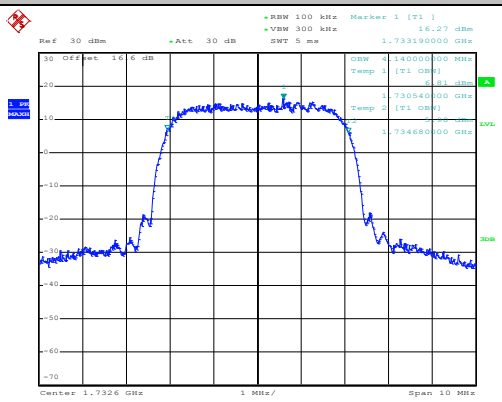
WCDMA Band IV (RMC 12.2Kbps)

Lowest Channel



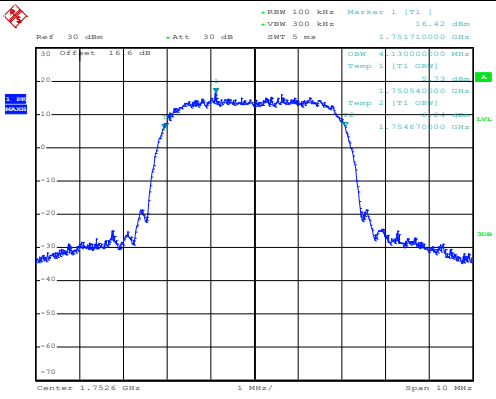
Date: 12.APR.2019 09:10:02

Middle Channel



Date: 12.APR.2019 09:10:40

Highest Channel

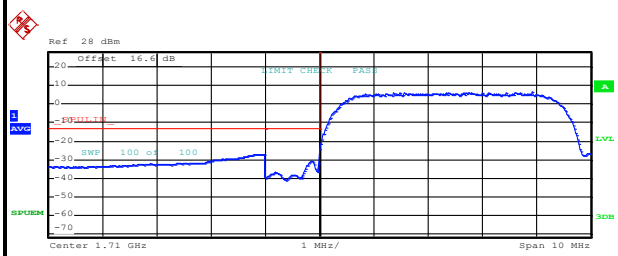


Date: 12.APR.2019 09:11:18

Conducted Band Edge

WCDMA Band IV (RMC 12.2Kbps)

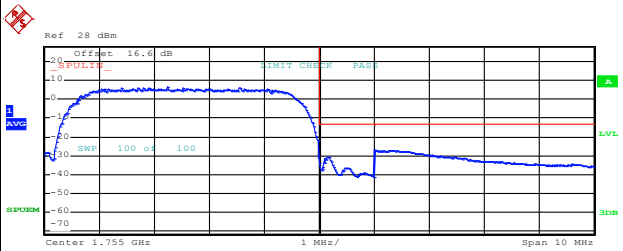
Lowest Band Edge



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.705 G	1.709 G	1.00 M	1.708840 G	-26.99	-13.99
1.709 G	1.710 G	50.00 k	1.709836 G	-30.85	-17.85
1.710 G	1.715 G	100.00 k	1.713910 G	6.71	-28.29

Date: 12.APR.2019 09:22:58

Highest Band Edge



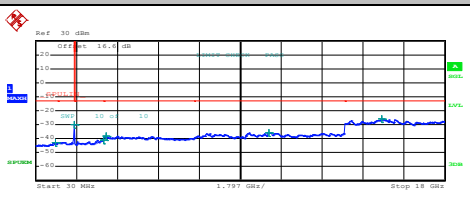
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.750 G	1.755 G	100.00 k	1.752235 G	6.38	-28.62
1.755 G	1.756 G	50.00 k	1.755144 G	-30.84	-17.84
1.756 G	1.760 G	1.00 M	1.756000 G	-26.90	-13.90

Date: 12.APR.2019 09:26:36

Conducted Spurious Emission

WCDMA Band IV (RMC 12.2Kbps)

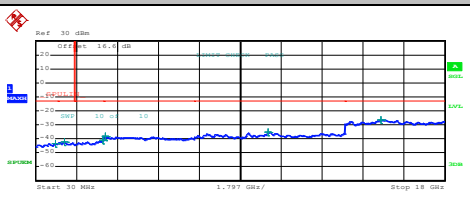
Lowest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	909.790000 M	-42.56	-29.56
1.000 G	1.705 G	1.00 M	1.704824 G	-29.78	-16.78
1.760 G	3.000 G	1.00 M	2.995970 G	-41.13	-28.13
3.000 G	7.000 G	1.00 M	3.112000 G	-38.24	-25.24
7.000 G	13.600 G	1.00 M	10.260400 G	-35.70	-22.70
13.600 G	18.000 G	1.00 M	15.241750 G	-25.93	-12.93

Date: 12.APR.2019 09:27:32

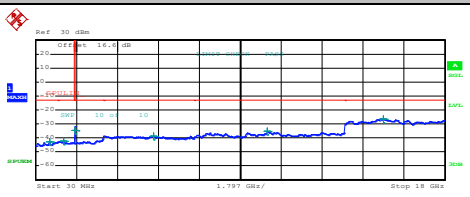
Middle Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	880.447500 M	-43.41	-30.41
1.000 G	1.705 G	1.00 M	1.273716 G	-42.43	-29.43
1.760 G	3.000 G	1.00 M	2.984500 G	-41.10	-28.10
3.000 G	7.000 G	1.00 M	3.094000 G	-38.33	-25.33
7.000 G	13.600 G	1.00 M	10.224925 G	-35.38	-22.38
13.600 G	18.000 G	1.00 M	15.200500 G	-26.54	-13.54

Date: 12.APR.2019 09:28:23

Highest Channel



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	1.00 M	644.495000 M	-42.86	-29.86
1.000 G	1.705 G	1.00 M	1.238466 G	-42.33	-29.33
1.760 G	3.000 G	1.00 M	1.760620 G	-34.51	-21.51
3.000 G	7.000 G	1.00 M	5.211000 G	-38.50	-25.50
7.000 G	13.600 G	1.00 M	10.215850 G	-35.42	-22.42
13.600 G	18.000 G	1.00 M	15.312150 G	-26.52	-13.52

Date: 12.APR.2019 09:29:25

Frequency Stability

Test Conditions	Middle Channel	WCDMA Band IV (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0139	PASS
40	Normal Voltage	0.0075	
30	Normal Voltage	0.0029	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0087	
0	Normal Voltage	0.0127	
-10	Normal Voltage	0.0115	
-20	Normal Voltage	0.0017	
-30	Normal Voltage	0.0040	
20	Maximum Voltage	0.0006	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0000	

Note:

1. Normal Voltage = 3.85V. ；Battery End Point (BEP) = 3.65 V.；Maximum Voltage =4.25 V

2. The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of ERP/EIRP and Radiated Test

ERP/EIRP

<Spotcheck band>

Channel	Mode	Conducted		ERP	
		Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	GSM850	33.13	2.0559	28.68	0.7379
Middle	GSM	32.92	1.9588	28.47	0.7031
Highest	(GT - LC = -2.3 dB)	32.95	1.9724	28.50	0.7079
Lowest	GSM850	26.95	0.4955	22.50	0.1778
Middle	EDGE class 8	26.81	0.4797	22.36	0.1722
Highest	(GT - LC = -2.3 dB)	26.93	0.4932	22.48	0.1770
Lowest	WCDMA Band V	22.68	0.1854	18.23	0.0665
Middle	RMC 12.2Kbps	22.66	0.1845	18.21	0.0662
Highest	(GT - LC = -2.3 dB)	22.62	0.1828	18.17	0.0656
Limit	ERP < 7W	Result		PASS	

Channel	Mode	Conducted		EIRP	
		Power (dBm)	Power (Watts)	EIRP(dBm)	EIRP(W)
Lowest	GSM1900	28.35	0.6839	27.05	0.5070
Middle	GPRS class 8	28.53	0.7129	27.23	0.5284
Highest	(GT - LC = -1.3 dB)	28.80	0.7586	27.50	0.5623
Lowest	GSM1900	25.64	0.3664	24.34	0.2716
Middle	EDGE class 8	25.63	0.3656	24.33	0.2710
Highest	(GT - LC = -1.3 dB)	25.96	0.3945	24.66	0.2924
Limit	EIRP < 2W	Result		PASS	

<Fully testing band>

Channel	Mode	Conducted		EIRP	
		Power (dBm)	Power (Watts)	EIRP(dBm)	EIRP(W)
Lowest	WCDMA Band IV	21.28	0.1343	19.28	0.0847
Middle	RMC 12.2Kbps	21.20	0.1318	19.20	0.0832
Highest	(GT - LC = -2 dB)	21.26	0.1337	19.26	0.0843
Limit	EIRP < 1W	Result		PASS	

Radiated Spurious Emission

<Spotcheck band>

GSM850

GSM 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)
Middle	1672	-47.54	-13	-34.54	-60.05	-49.22	0.99	4.82	H
	2509	-58.77	-13	-45.77	-76.23	-60.73	1.29	5.41	H
	3345	-58.52	-13	-45.52	-78.33	-62.13	1.56	7.32	H
									H
									H
									H
									H
	1672	-48.83	-13	-35.83	-61.77	-50.51	0.99	4.82	V
	2509	-58.33	-13	-45.33	-76.23	-60.29	1.29	5.41	V
	3345	-58.62	-13	-45.62	-78.54	-62.23	1.56	7.32	V
									V
									V
									V
									V

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

EDGE 850

EDGE 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)
Middle	1672	-54.27	-13	-41.27	-66.75	-55.95	0.99	4.82	H
	2512	-50.16	-13	-37.16	-67.6	-52.13	1.29	5.41	H
	3345	-58.81	-13	-45.81	-78.56	-62.42	1.56	7.32	H
									H
									H
									H
									H
	1672	-51.24	-13	-38.24	-64.21	-52.92	0.99	4.82	V
	2512	-49.41	-13	-36.41	-67.6	-51.38	1.29	5.41	V
	33345	-58.14	-13	-45.14	-78.07	-66.15	3.74	13.90	V
									V
									V
									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)
Middle	1672	-63.47	-13	-50.47	-75.99	-65.15	0.99	4.82	H
	2509	-56.02	-13	-43.02	-73.5	-57.98	1.29	5.41	H
	3345	-56.68	-13	-43.68	-76.42	-60.29	1.56	7.32	H
									H
									H
									H
									H
	1672	-62.86	-13	-49.86	-75.86	-64.54	0.99	4.82	V
	2509	-59.43	-13	-46.43	-77.45	-61.39	1.29	5.41	V
	3345	-58.52	-13	-45.52	-78.46	-62.13	1.56	7.32	V
									V
									V
									V
									V

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

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)
Middle	3760	-56.51	-13	-43.51	-77.32	-63.14	1.69	8.31	H
	5640	-48.27	-13	-35.27	-73.59	-55.32	2.71	9.76	H
	7520	-51.18	-13	-38.18	-78.42	-60.57	2.42	11.81	H
									H
									H
									H
									H
	3760	-56.73	-13	-43.73	-77.52	-63.36	1.69	8.31	V
	5640	-50.28	-13	-37.28	-75.63	-57.33	2.71	9.76	V
	7520	-50.96	-13	-37.96	-78.49	-60.35	2.42	11.81	V
									V
									V
									V
									V

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

EDGE1900

EDGE 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)
Middle	3760	-56.79	-13	-43.79	-77.59	-63.42	1.69	8.31	H
	5640	-47.66	-13	-34.66	-73.05	-54.71	2.71	9.76	H
	7520	-51.14	-13	-38.14	-78.41	-60.53	2.42	11.81	H
									H
									H
									H
									H
	3760	-55.18	-13	-42.18	-76.03	-61.81	1.69	8.31	V
	5640	-47.41	-13	-34.41	-72.74	-54.46	2.71	9.76	V
	7520	-50.58	-13	-37.58	-78.05	-59.97	2.42	11.81	V
									V
									V
									V
									V

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

<Fully testing band>

WCDMA 1700

WCDMA 1700									
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	2434	-57.98	-13	-44.98	-78.73	-61.91	1.27	5.20	H
	5137	-53.81	-13	-40.81	-77.82	-61.09	2.42	9.70	H
	6849	-51.76	-13	-38.76	-78.59	-59.74	2.64	10.62	H
									H
									H
									H
									H
	3424	-57.96	-13	-44.96	-78.67	-64.05	1.58	7.67	V
	5137	-54.11	-13	-41.11	-78.02	-61.39	2.42	9.70	V
	6849	-51.67	-13	-38.67	-78.42	-59.65	2.64	10.62	V
									V
									V
									V
									V

Middle	3465	-57.56	-13	-44.56	-78.44	-63.81	1.59	7.85	H
	5197	-53.71	-13	-40.71	-77.95	-60.96	2.45	9.70	H
	6930	-51.54	-13	-38.54	-78.44	-59.64	2.61	10.72	H
									H
									H
									H
									H
	3465	-57.94	-13	-44.94	-78.75	-64.19	1.59	7.85	V
	5197	-53.98	-13	-40.98	-78.14	-61.23	2.45	9.70	V
	6930	-51.48	-13	-38.48	-78.39	-59.58	2.61	10.72	V
									V
									V
									V
									V
Highest	3505	-57.54	-13	-44.54	-78.56	-63.94	1.61	8.01	H
	5257	-53.92	-13	-40.92	-78.31	-61.13	2.49	9.70	H
	7010	-51.11	-13	-38.11	-78.08	-59.34	2.59	10.82	H
									H
									H
									H
									H
	3505	-57.47	-13	-44.47	-78.33	-63.87	1.61	8.01	V
	5257	-53.73	-13	-40.73	-77.96	-60.94	2.49	9.70	V
	7010	-51.14	-13	-38.14	-78.15	-59.37	2.59	10.82	V
									V
									V
									V
									V

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

————THE END————