



FCC RADIO TEST REPORT

FCC ID : PY7-81713C
Equipment : GSM/WCDMA/LTE Phone with BT, DTS/UNII
a/b/g/n/ac, NFC, FM receiver and GNSS
Brand Name : SONY
Applicant : Sony Corporation
1-7-1 Konan Minato-ku Tokyo, 108-0076 Japan
Manufacturer : Sony Corporation
1-7-1 Konan Minato-ku Tokyo, 108-0076 Japan
Standard : FCC 47 CFR Part 2, 22(H), 24(E)
Test Date(s) : Dec. 18, 2021 ~ Dec. 28, 2021

We, Sporton International Inc. (Kunshan), 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.

This report contains data that were produced under subcontract by Sporton International Inc. (Shenzhen)

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

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History of this test report

Report No.	Version	Description	Issued Date
FG1D0403A	01	Initial issue of report	Feb. 18, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Report only	-
	§22.913 (a)(2)	Effective Radiated Power (GSM850) (WCDMA Band V)	Pass	-
	§24.232 (c)	Equivalent Isotropic Radiated Power (GSM1900)	Pass	-
3.3	§24.232 (d)	Peak-to-Average Ratio	Pass	-
3.4	§2.1049 §22.917 (b) §24.238 (b)	Occupied Bandwidth (GSM850) (WCDMA Band V) (GSM1900)	Pass	-
3.5	§2.1051 §22.917 (a) §24.238 (a)	Band Edge Measurement (GSM850) (WCDMA Band V) (GSM1900)	Pass	-
3.6	§2.1051 §22.917 (a) §24.238 (a)	Conducted Emission (GSM850) (WCDMA Band V) (GSM1900)	Pass	-
3.7	§2.1055 §22.355 §24.235	Frequency Stability Temperature & Voltage	Pass	-
4.4	§2.1053 §22.917 (a) §24.238 (a)	Field Strength of Spurious Radiation (GSM850) (WCDMA Band V) (GSM1900)	Pass	Under limit 31.60 dB at 2472.600 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 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Antenna Type	PIFA Antenna
Antenna Gain	Cellular Band: -1.3 dBi PCS Band: -1.3 dBi

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

EUT Information List			
HW Version	SW Version	IMEI Code	Performed Test Item
A	0.386	00440253133924	Conducted Measurement
	0.386	004402543133387	Radiated Spurious Emission
	0.386	004402543133387	ERP/EIRP Test

Note: 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 GSM	GMSK	0.8453	0.0669 ppm	242KGXW
Part 22	824.2 ~848.8	GSM850 EDGE	8PSK	0.2028	0.0332 ppm	242KG7W
Part 22	826.4 ~846.6	WCDMA Band V RMC 12.2Kbps	QPSK	0.1067	0.0413 ppm	4M15F9W
Part 24	1850.2 ~1909.8	GSM1900 GSM	GMSK	0.3622	0.0319 ppm	242KGXW
Part 24	1850.2 ~1909.8	GSM1900 EDGE	8PSK	0.1683	0.0133 ppm	247KG7W



1.4 Testing Location

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

Test Firm	Sporton International Inc. (Kunshan)		
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.
	TH01-KS	CN1257	314309

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

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-SZ	CN1256	421272

Test data subcontracted: conducted test items in section 4 of this report.

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

Remark:

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

Radiated emissions were investigated as following frequency range:

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

All modes, data rates and positions were investigated.

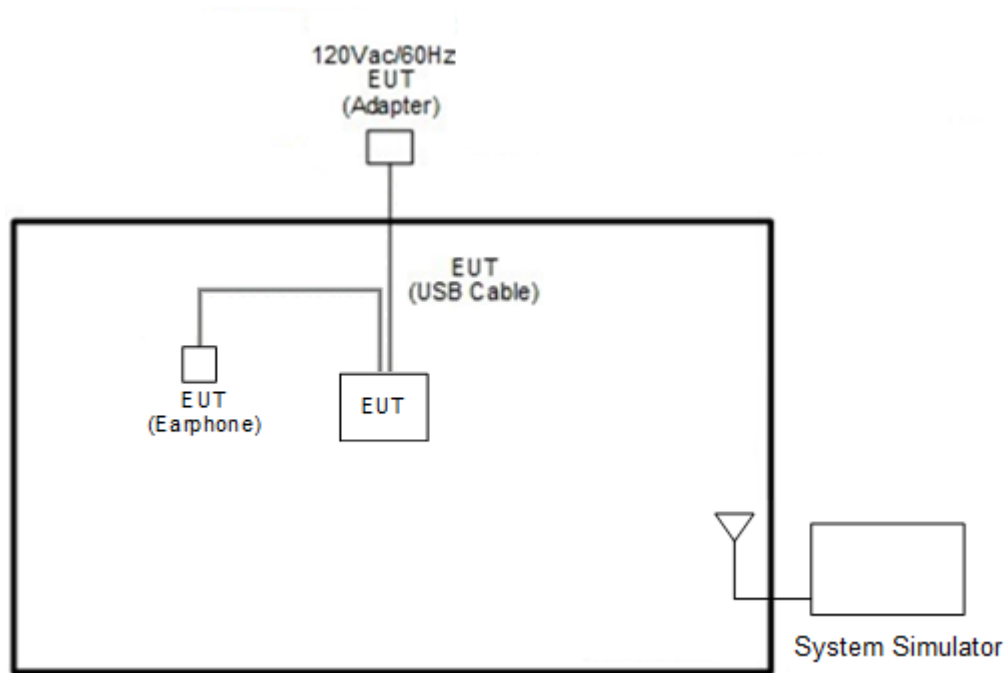
Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM850	■ GSM Link ■ EDGE Link	■ GSM Link ■ EDGE Link
GSM1900	■ GSM Link ■ EDGE Link	■ GSM Link ■ EDGE Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

Remark: We have evaluated simultaneous transmissions modes and determined no new significant emissions are observed.

2.2 Connection Diagram of Test System

<EUT With Accessory>



2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	Fcc DoC	N/A	Unshielded,1.8m

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 4.8 dB and a 10 dB attenuator.

Example:

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

$= 4.8 + 10 = 14.8\ (dB)$

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.

3.1.1 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

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 the lowest, middle, and the highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.



3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

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

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT 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.

3.4.2 Test Procedures

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

1. The EUT 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 6.1.

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 $43 + 10\log(P)$ 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 10th harmonic.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

22.355

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

24.235

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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 $20\pm 5^{\circ}\text{C}$ 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.

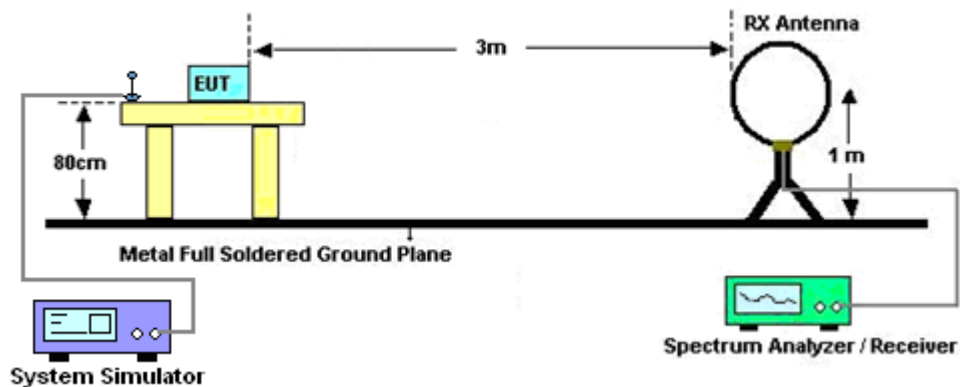
4 Radiated Test Items

4.1 Measuring Instruments

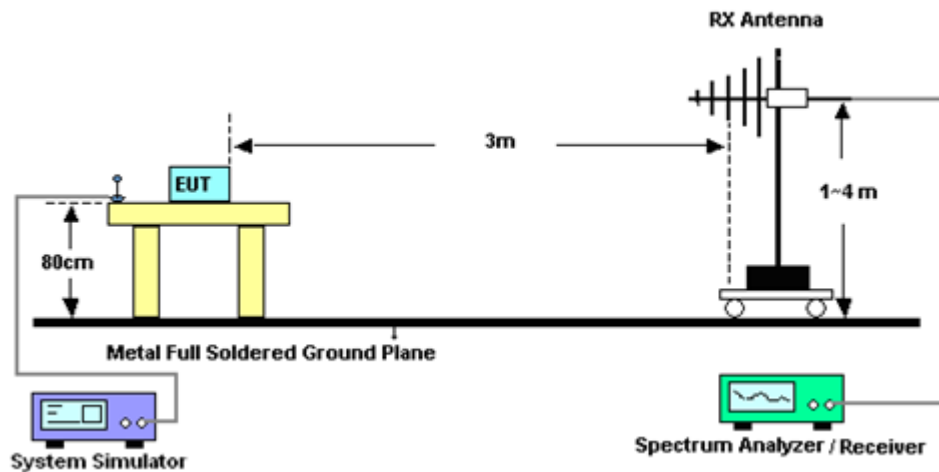
See list of measuring instruments of this test report.

4.2 Test Setup

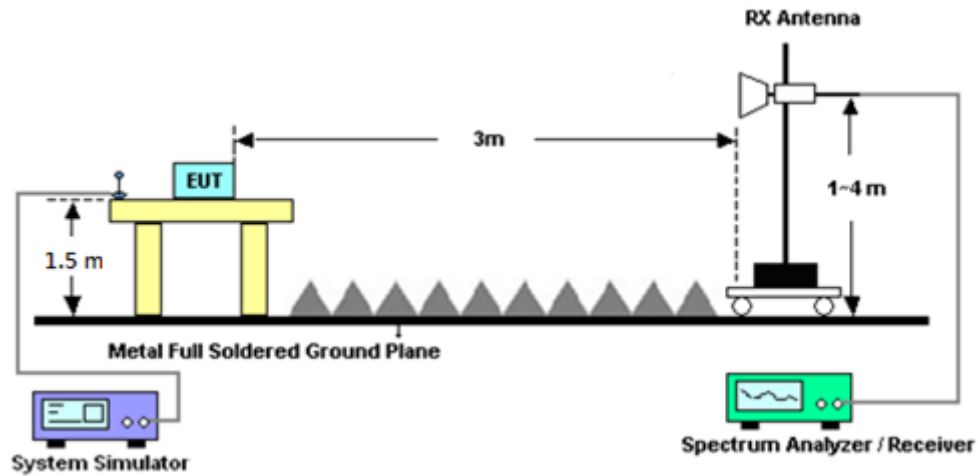
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

Note:

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

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

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

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

4.4.2 Test Procedures

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

1. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz above the ground.
2. The EUT 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 = 1 MHz, VBW = 3 MHz, 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. Take the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from $43 + 10\log(P)$ 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	101040	10Hz~40GHz	Oct. 14, 2021	Dec. 18, 2021~ Dec. 25, 2021	Oct. 13, 2022	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021	Dec. 18, 2021~ Dec. 25, 2021	Aug. 25, 2022	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Dec. 18, 2021~ Dec. 25, 2021	Jul. 11, 2022	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 22, 2021	Dec. 28, 2021	Oct. 21, 2022	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 20, 2021	Dec. 28, 2021	Jul. 19, 2022	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2020	Dec. 28, 2021	Jun. 21, 2022	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	Oct. 22, 2021	Dec. 28, 2021	Oct. 21, 2022	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 15, 2021	Dec. 28, 2021	Jul. 14, 2022	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 25, 2021	Dec. 28, 2021	Jul. 24, 2022	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 22, 2021	Dec. 28, 2021	Oct. 21, 2022	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 22, 2021	Dec. 28, 2021	Oct. 21, 2022	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 20, 2021	Dec. 28, 2021	Jul. 19, 2022	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Oct. 22, 2021	Dec. 28, 2021	Oct. 21, 2022	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Dec. 28, 2021	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Dec. 28, 2021	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Dec. 28, 2021	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.8dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.1dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.9dB
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Appendix A. Test Results of Conducted and ERP/EIRP Test

Conducted Output Power(Average power) and ERP/EIRP

GSM850	Burst Average Power (dBm)			ERP(W)		
TX Channel	128	189	251	L	M	H
Frequency (MHz)	824.2	836.4	848.8			
GSM 1 Tx slot	32.50	32.72	32.69	0.8035	0.8453	0.8395
GPRS 1 Tx slot	32.48	32.72	32.66	0.7998	0.8453	0.8337
GPRS 2 Tx slots	30.74	30.53	30.39	0.5358	0.5105	0.4943
GPRS 3 Tx slots	29.33	29.20	28.94	0.3873	0.3758	0.3540
GPRS 4 Tx slots	28.25	28.35	28.19	0.3020	0.3090	0.2979
EDGE 1 Tx slot	26.28	26.52	26.08	0.1919	0.2028	0.1832
EDGE 2 Tx slots	24.81	24.93	24.63	0.1368	0.1406	0.1312
EDGE 3 Tx slots	23.74	23.69	23.56	0.1069	0.1057	0.1026
EDGE 4 Tx slots	22.64	22.57	22.36	0.0830	0.0817	0.0778

GSM1900	Burst Average Power (dBm)			EIRP(W)		
TX Channel	512	661	810	L	M	H
Frequency (MHz)	1850.2	1880	1909.8			
GSM 1 Tx slot	26.89	26.81	26.83	0.3622	0.3556	0.3573
GPRS 1 Tx slot	26.89	26.80	26.83	0.3622	0.3548	0.3573
GPRS 2 Tx slots	25.82	26.05	25.96	0.2831	0.2985	0.2924
GPRS 3 Tx slots	24.01	24.01	23.75	0.1866	0.1866	0.1758
GPRS 4 Tx slots	23.01	23.11	22.81	0.1483	0.1517	0.1416
EDGE 1 Tx slot	23.56	23.49	23.51	0.1683	0.1656	0.1663
EDGE 2 Tx slots	22.45	22.51	22.53	0.1303	0.1321	0.1327
EDGE 3 Tx slots	20.53	20.45	20.51	0.0838	0.0822	0.0834
EDGE 4 Tx slots	19.34	19.45	19.48	0.0637	0.0653	0.0658



Band		WCDMA V			ERP(W)		
TX Channel		4132	4182	4233			
Rx Channel		4357	4407	4458			
Frequency (MHz)		826.4	836.4	846.6	L	M	H
3GPP Rel 99	AMR 12.2Kbps	23.65	23.70	23.64	0.1047	0.1059	0.1045
3GPP Rel 99	RMC 12.2Kbps	23.69	23.73	23.70	0.1057	0.1067	0.1059
3GPP Rel 6	HSDPA Subtest-1	22.66	22.52	22.57	0.0834	0.0807	0.0817
3GPP Rel 6	HSDPA Subtest-2	22.57	22.60	22.71	0.0817	0.0822	0.0843
3GPP Rel 6	HSDPA Subtest-3	22.08	22.03	22.27	0.0729	0.0721	0.0762
3GPP Rel 6	HSDPA Subtest-4	22.13	22.27	22.22	0.0738	0.0762	0.0753
3GPP Rel 8	DC-HSDPA Subtest-1	22.59	22.37	22.45	0.0820	0.0780	0.0794
3GPP Rel 8	DC-HSDPA Subtest-2	22.57	22.41	22.49	0.0817	0.0787	0.0802
3GPP Rel 8	DC-HSDPA Subtest-3	21.89	22.10	21.86	0.0698	0.0733	0.0693
3GPP Rel 8	DC-HSDPA Subtest-4	21.90	22.17	22.12	0.0700	0.0745	0.0736
3GPP Rel 6	HSUPA Subtest-1	22.35	22.24	22.47	0.0776	0.0757	0.0798
3GPP Rel 6	HSUPA Subtest-2	20.53	20.56	20.26	0.0511	0.0514	0.0480
3GPP Rel 6	HSUPA Subtest-3	21.29	21.33	21.39	0.0608	0.0614	0.0622
3GPP Rel 6	HSUPA Subtest-4	20.19	20.35	20.39	0.0472	0.0490	0.0494
3GPP Rel 6	HSUPA Subtest-5	22.57	22.63	22.53	0.0817	0.0828	0.0809
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.23	20.09	20.06	0.0476	0.0461	0.0458



A1. GSM

Peak-to-Average Ratio

Mode	GSM850		Limit: 13dB
Mod.	GSM	EDGE	Result
Lowest CH	0.12	2.99	PASS
Middle CH	0.17	2.99	
Highest CH	0.17	2.81	

Mode	GSM1900		Limit: 13dB
Mod.	GSM	EDGE	Result
Lowest CH	0.17	3.13	PASS
Middle CH	0.20	3.04	
Highest CH	0.17	3.04	



GSM850 (GSM)

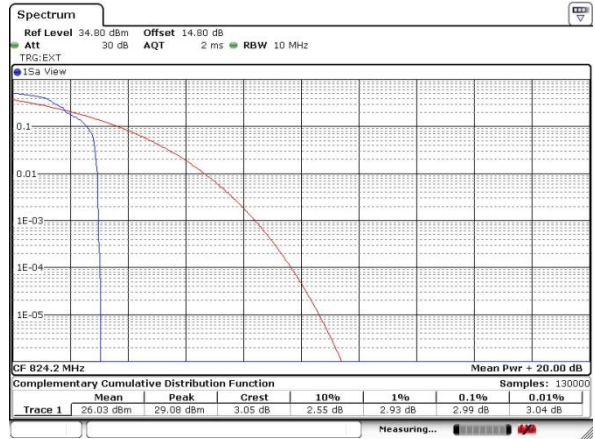
Lowest Channel



Date: 18.DEC.2021 08:44:40

GSM850 (EDGE)

Lowest Channel



Date: 18.DEC.2021 09:01:05

Middle Channel



Date: 18.DEC.2021 08:44:51

Middle Channel



Date: 18.DEC.2021 09:01:20

Highest Channel



Date: 18.DEC.2021 08:45:06

Highest Channel



Date: 18.DEC.2021 09:01:35



GSM1900 (GSM)

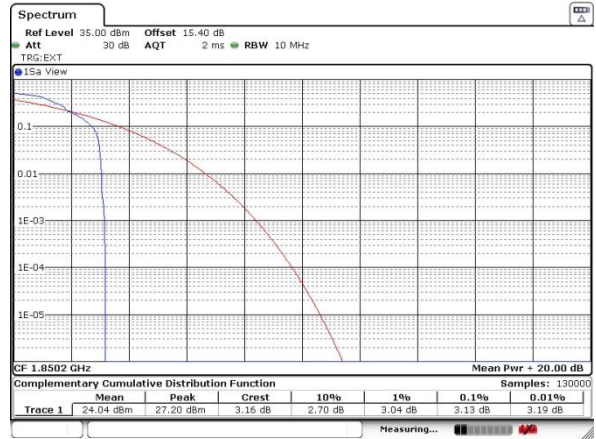
Lowest Channel



Date: 18.DEC.2021 07:55:17

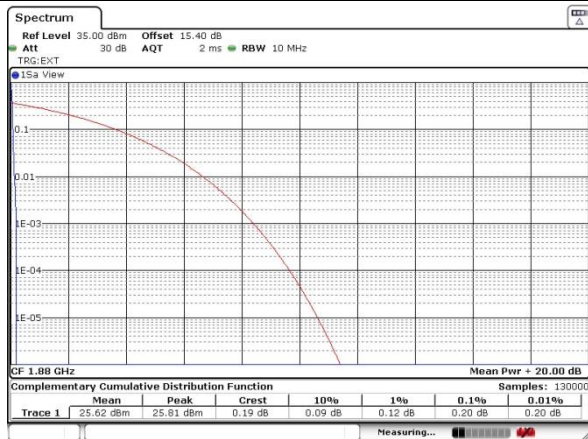
GSM1900 (EDGE)

Lowest Channel



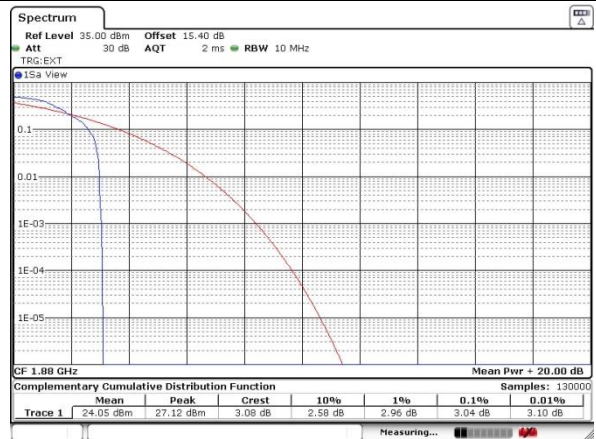
Date: 18.DEC.2021 08:11:26

Middle Channel



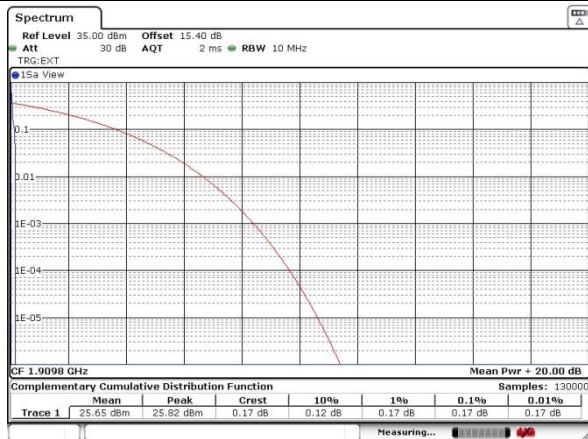
Date: 18.DEC.2021 07:55:19

Middle Channel



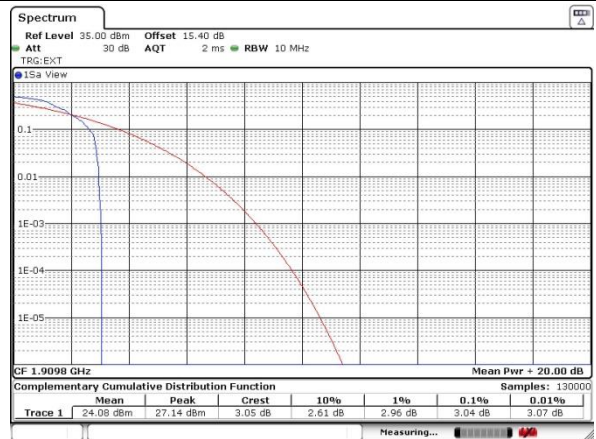
Date: 18.DEC.2021 08:11:39

Highest Channel



Date: 18.DEC.2021 07:56:03

Highest Channel



Date: 18.DEC.2021 08:11:58

**26dB Bandwidth**

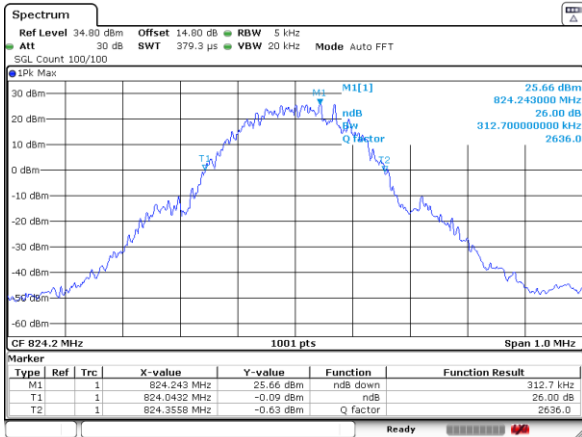
Mode	GSM850(MHz)	
Mod.	GSM	EDGE
Lowest CH	0.31	0.30
Middle CH	0.29	0.30
Highest CH	0.31	0.30

Mode	GSM1900(MHz)	
Mod.	GSM	EDGE
Lowest CH	0.30	0.30
Middle CH	0.31	0.29
Highest CH	0.31	0.30



GSM850 (GSM)

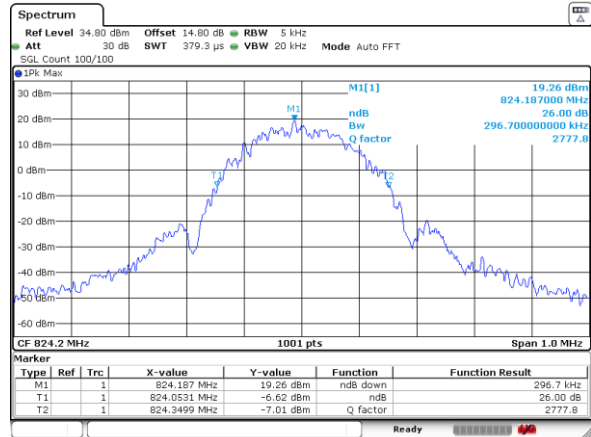
Lowest Channel



Date: 25 DEC 2021 00:35:09

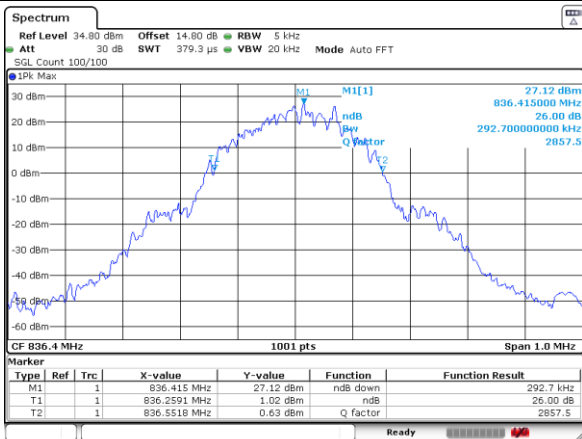
GSM850 (EDGE)

Lowest Channel



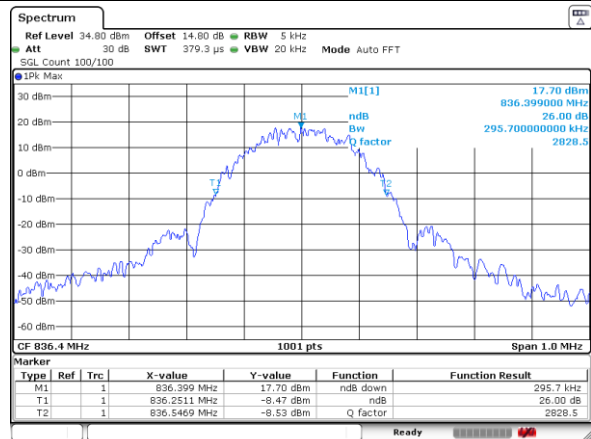
Date: 25 DEC 2021 00:20:46

Middle Channel



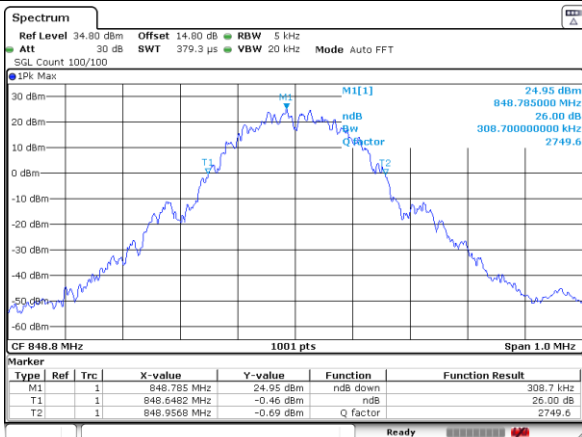
Date: 25 DEC 2021 00:35:53

Middle Channel



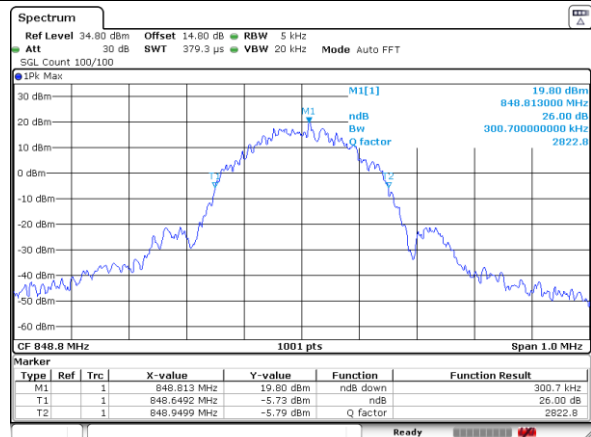
Date: 25 DEC 2021 00:21:24

Highest Channel



Date: 25 DEC 2021 00:36:24

Highest Channel

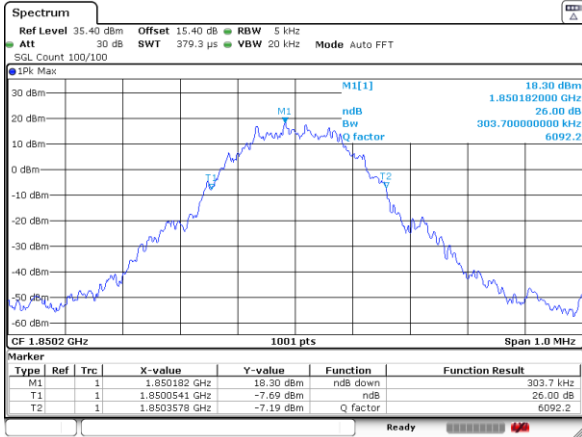


Date: 25 DEC 2021 00:22:01



GSM1900 (GSM)

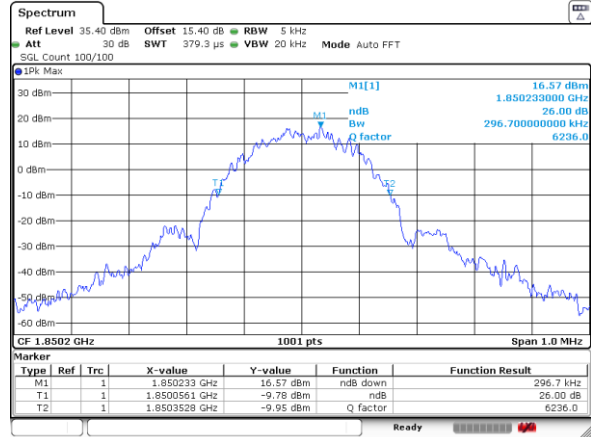
Lowest Channel



Date: 25 DEC 2021 00:29:49

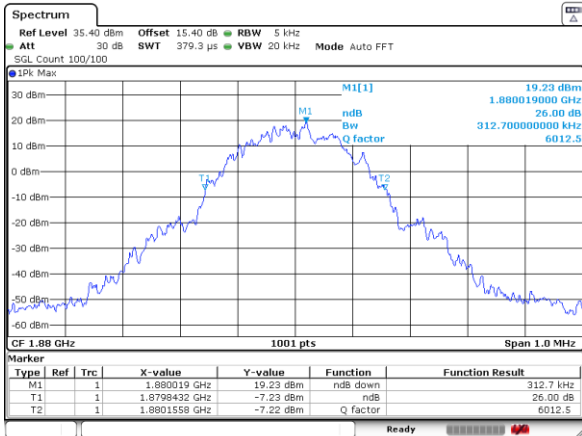
GSM1900 (EDGE)

Lowest Channel



Date: 25 DEC 2021 00:24:26

Middle Channel



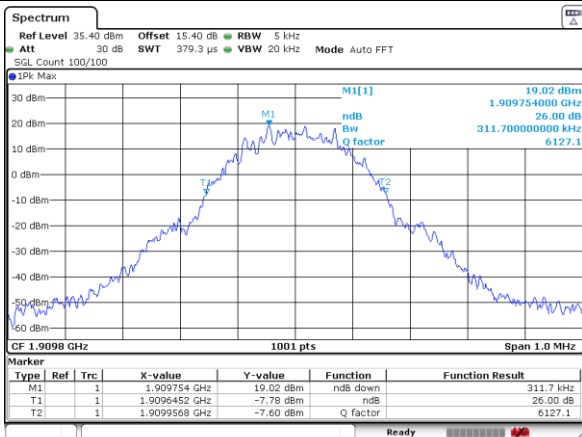
Date: 25 DEC 2021 00:30:31

Middle Channel



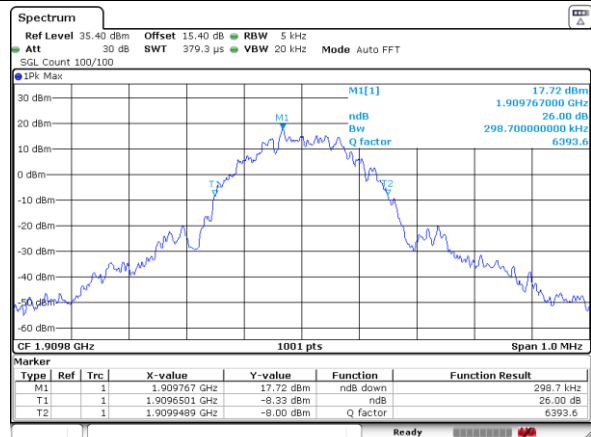
Date: 25 DEC 2021 00:25:28

Highest Channel



Date: 25 DEC 2021 00:31:09

Highest Channel



Date: 25 DEC 2021 00:26:13



Occupied Bandwidth

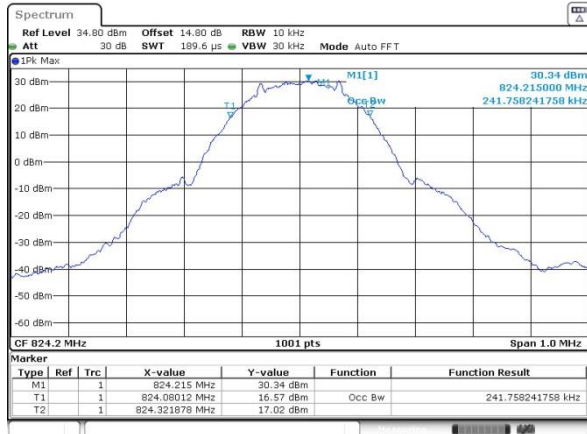
Mode	GSM850(MHz)	
Mod.	GSM	EDGE
Lowest CH	0.242	0.242
Middle CH	0.240	0.239
Highest CH	0.242	0.240

Mode	GSM1900(MHz)	
Mod.	GSM	EDGE
Lowest CH	0.240	0.244
Middle CH	0.240	0.247
Highest CH	0.242	0.242



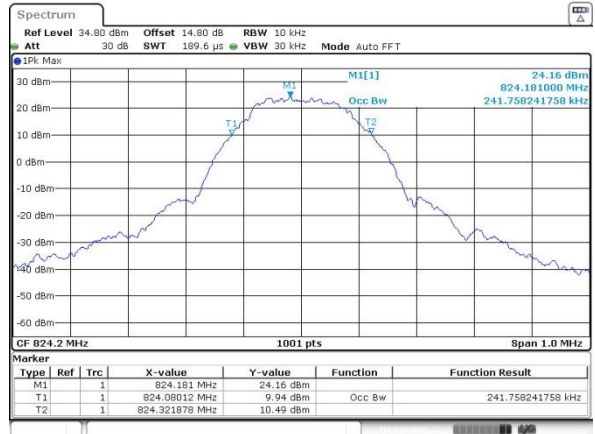
GSM850 (GSM)

Lowest Channel



GSM850 (EDGE)

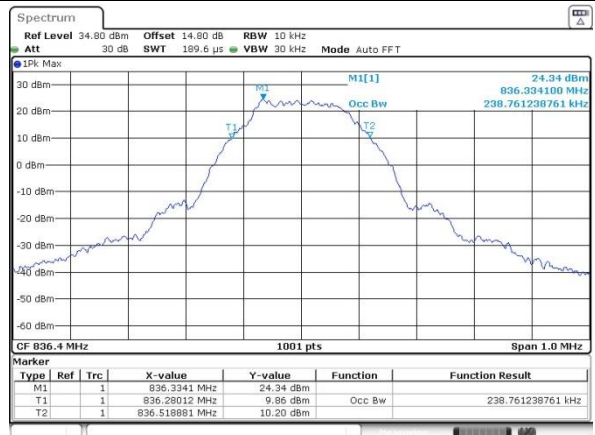
Lowest Channel



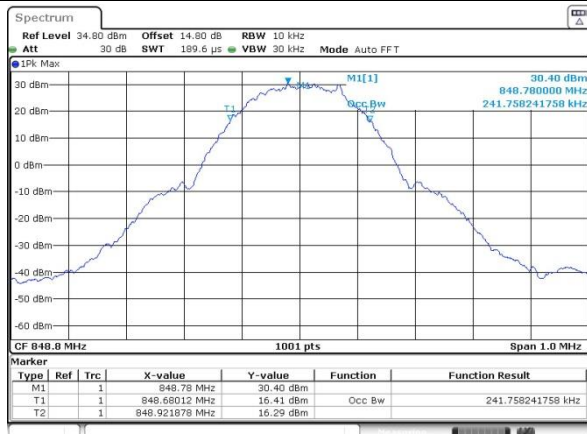
Middle Channel



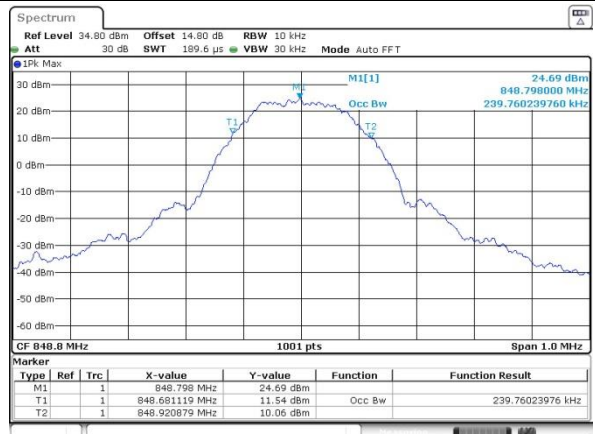
Middle Channel



Highest Channel



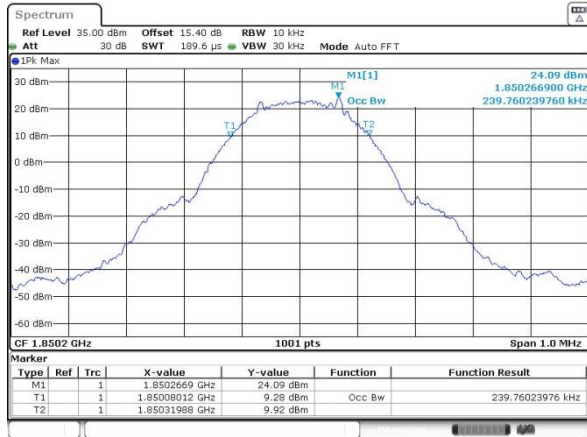
Highest Channel





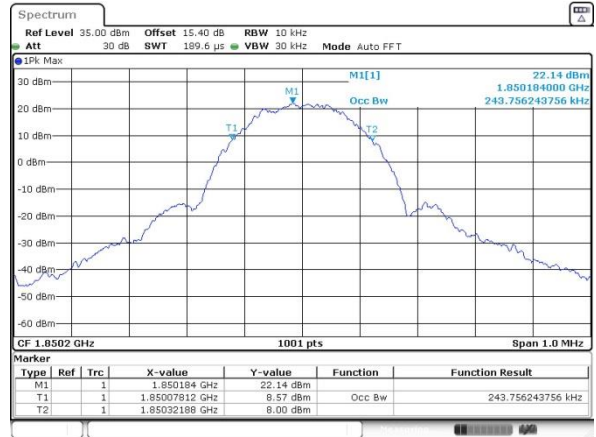
GSM1900 (GSM)

Lowest Channel

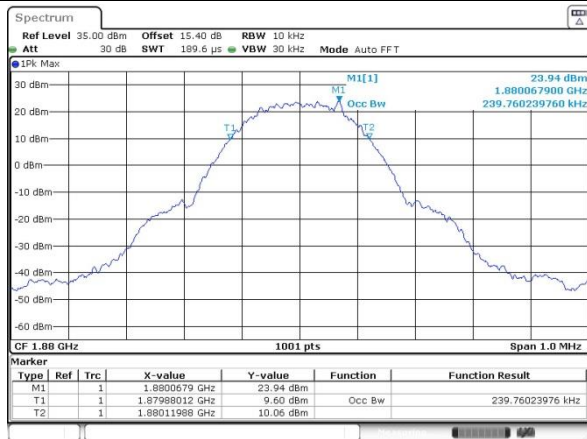


GSM1900 (EDGE)

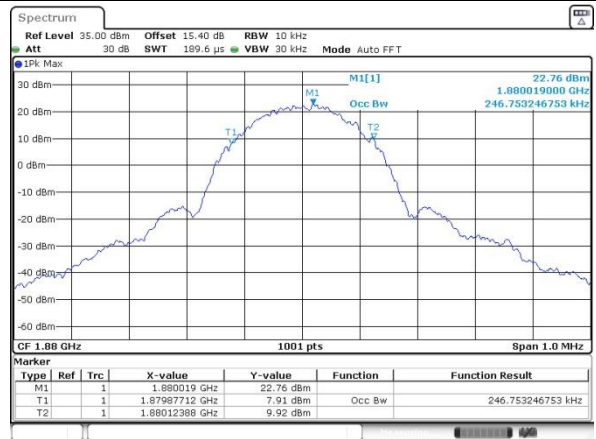
Lowest Channel



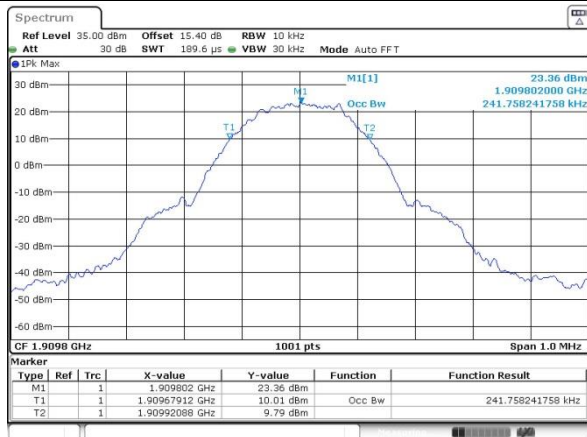
Middle Channel



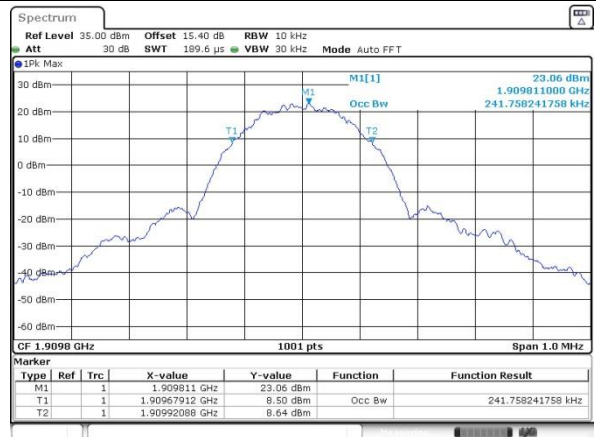
Middle Channel

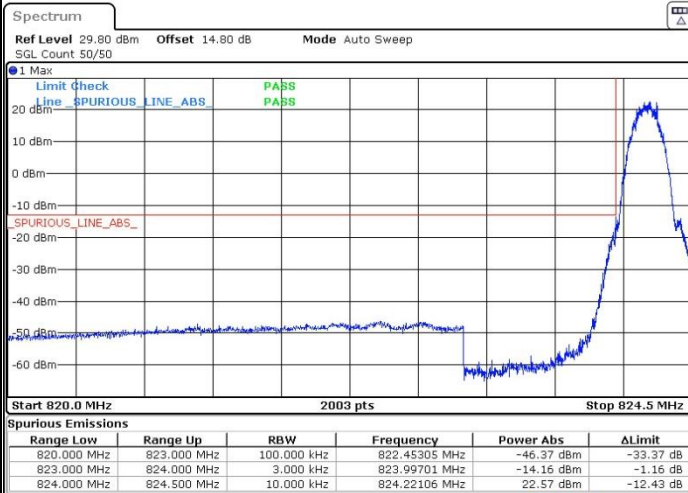
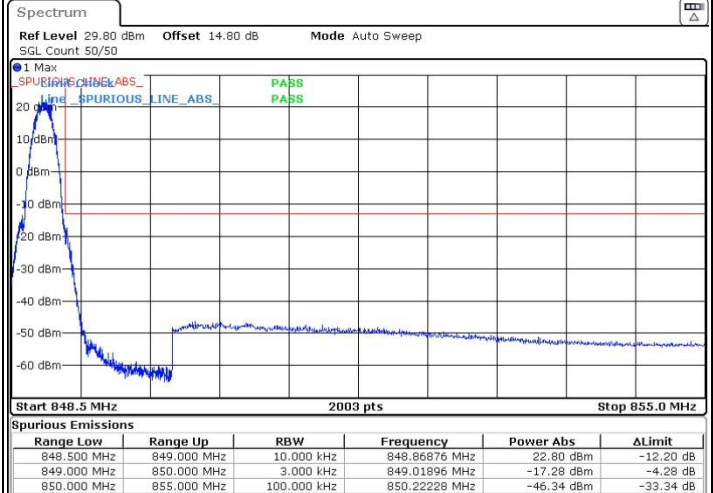
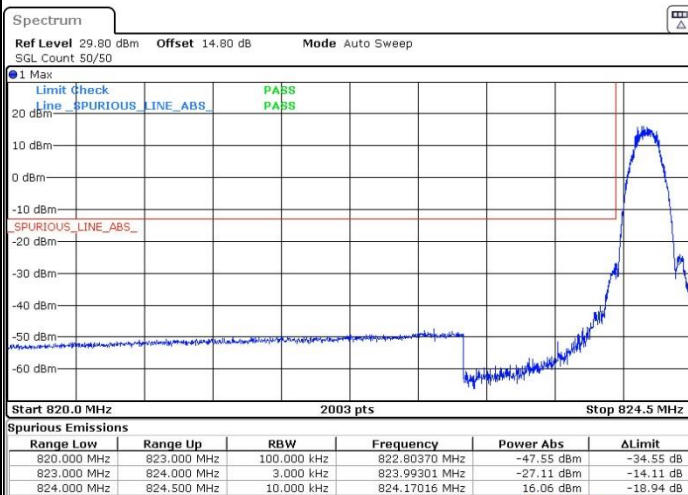
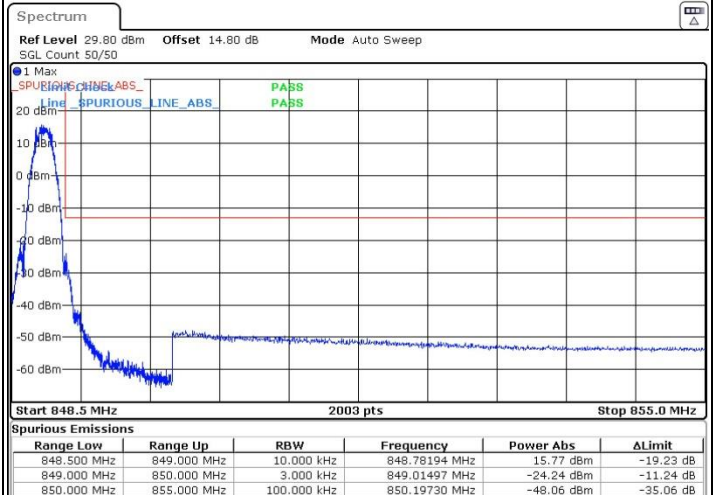


Highest Channel



Highest Channel

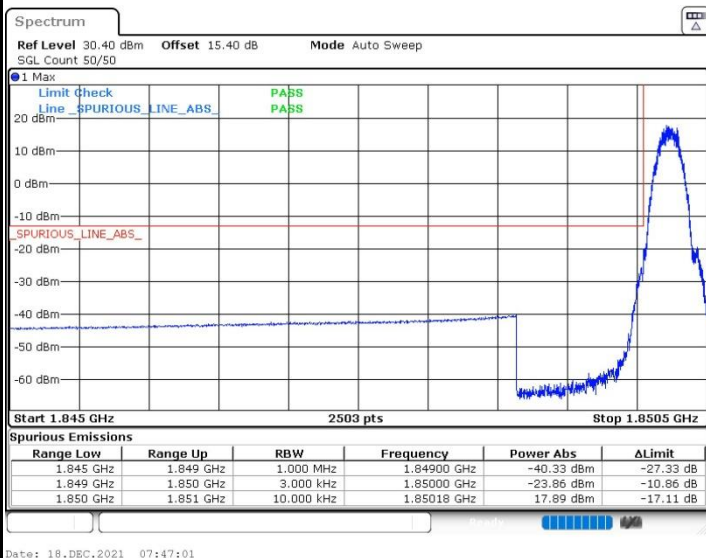


**Conducted Band Edge****GSM850 (GSM)****Lowest Band Edge****Highest Band Edge****GSM850 (EDGE)****Lowest Band Edge****Highest Band Edge**

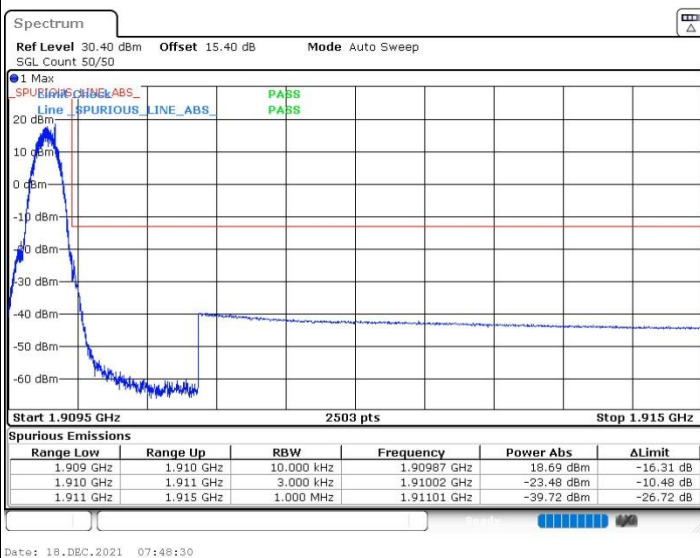


GSM1900 (GSM)

Lowest Band Edge

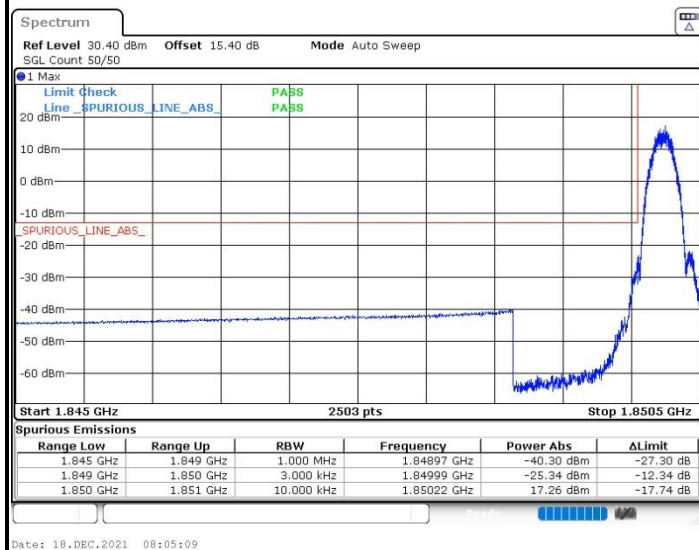


Highest Band Edge

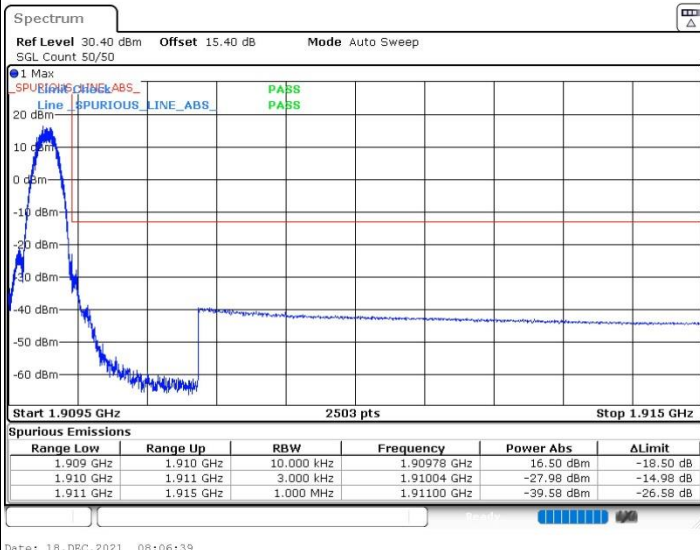


GSM1900 (EDGE)

Lowest Band Edge



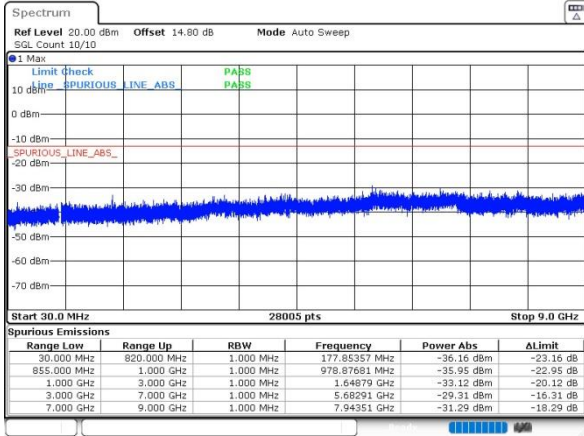
Highest Band Edge



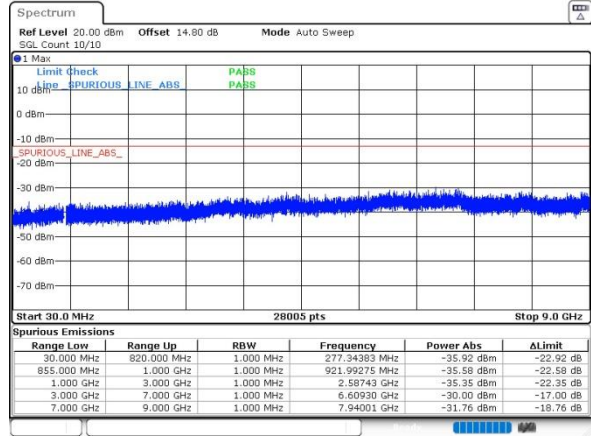


Conducted Spurious Emission

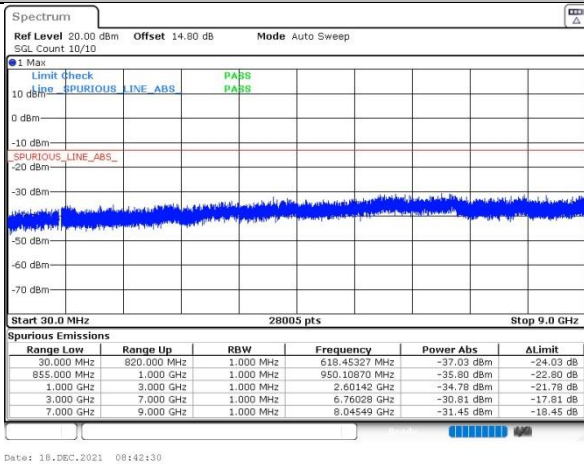
GSM850 (GSM) Lowest Channel



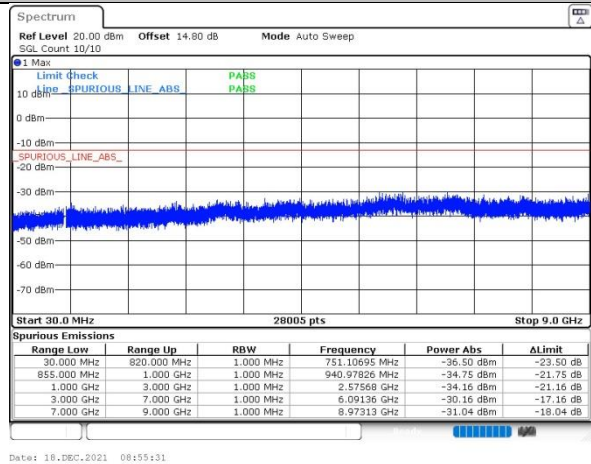
GSM850 (EDGE) Lowest Channel



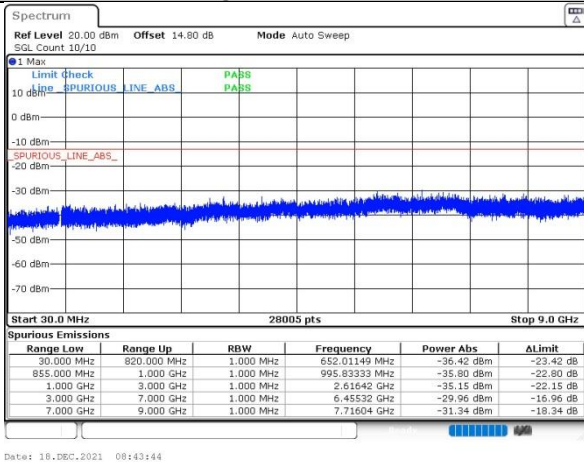
Middle Channel



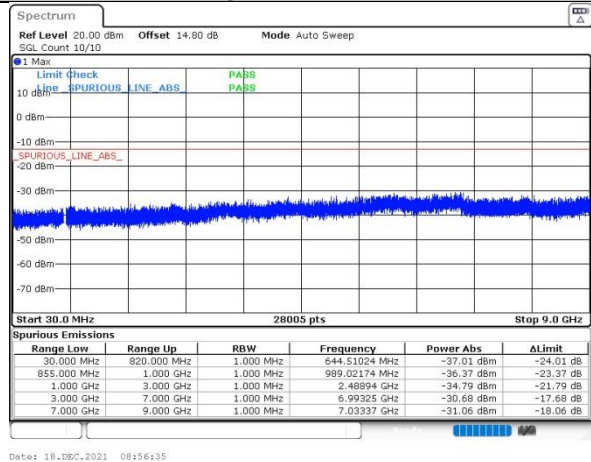
Middle Channel



Highest Channel



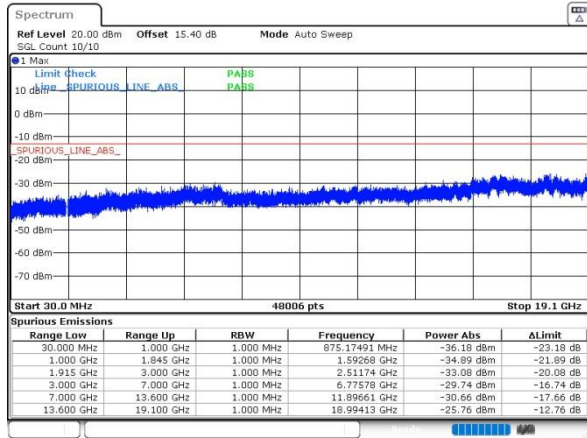
Highest Channel





GSM1900 (GSM)

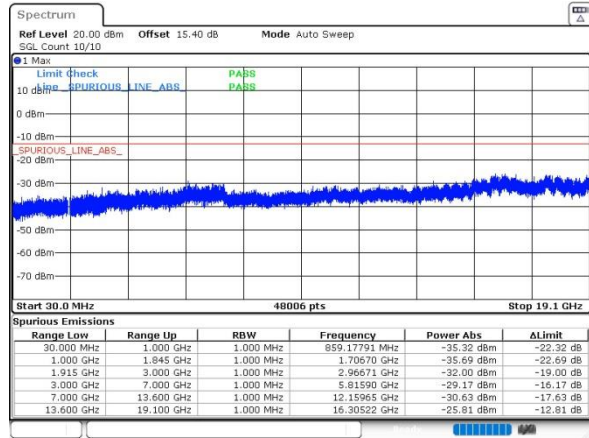
Lowest Channel



Date: 18.DEC.2021 07:51:24

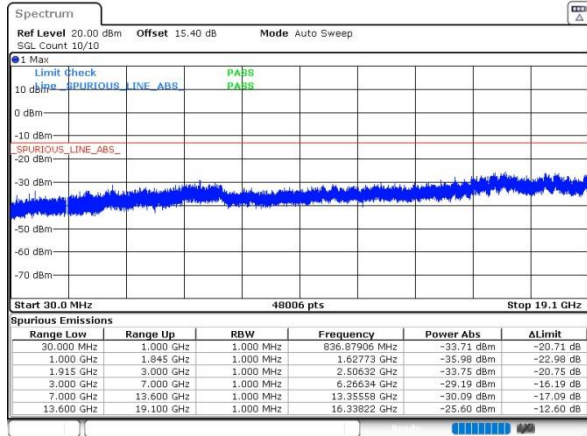
GSM1900 (EDGE)

Lowest Channel



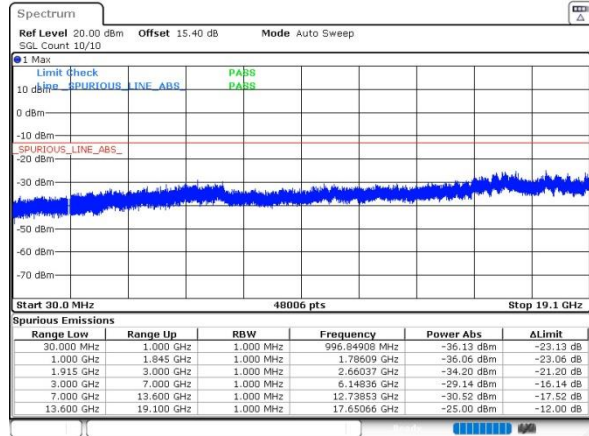
Date: 18.DEC.2021 08:07:59

Middle Channel



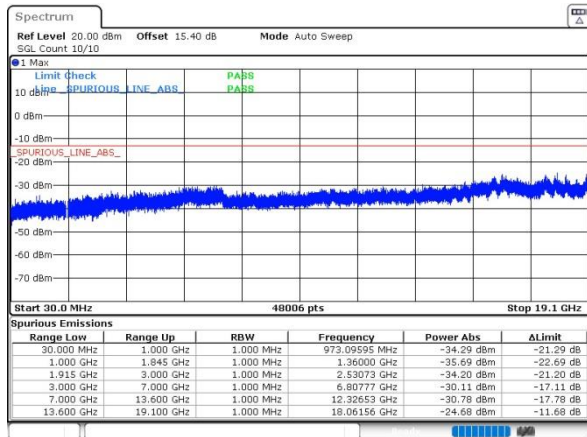
Date: 18.DEC.2021 07:52:23

Middle Channel



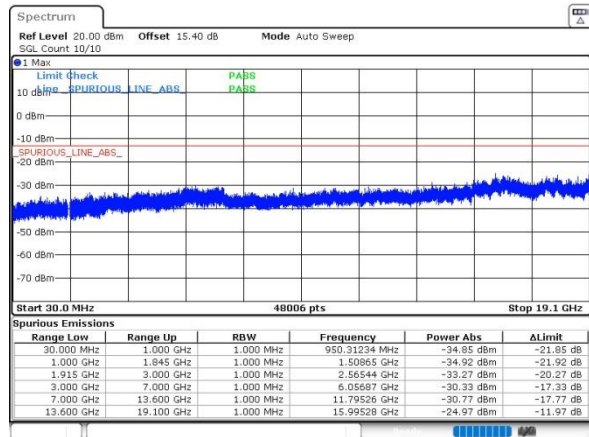
Date: 18.DEC.2021 08:08:59

Highest Channel



Date: 18.DEC.2021 07:53:24

Highest Channel



Date: 18.DEC.2021 08:10:35

Frequency Stability

Test Conditions	Middle Channel	GSM850 (GSM)	GSM850 (EDGE)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)		Result
50	Normal Voltage	0.0120	0.0114	PASS
40	Normal Voltage	0.0022	0.0178	
30	Normal Voltage	0.0630	0.0187	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0125	0.0135	
0	Normal Voltage	0.0068	0.0229	
-10	Normal Voltage	0.0225	0.0234	
-20	Normal Voltage	0.0669	0.0065	
-30	Normal Voltage	0.0143	0.0108	
20	Maximum Voltage	0.0036	0.0332	
20	Normal Voltage	0.0121	0.0203	
20	Battery End Point	0.0221	0.0011	

Note:

1. Normal Voltage = 3.89V. ; Battery End Point (BEP) =3.4V. ; Maximum Voltage =4.48V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



Test Conditions	Middle Channel	GSM1900 (GSM)	GSM1900 (EDGE)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)		Result
50	Normal Voltage	0.0044	0.0111	PASS
40	Normal Voltage	0.0022	0.0133	
30	Normal Voltage	0.0319	0.0022	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0125	0.0112	
0	Normal Voltage	0.0137	0.0132	
-10	Normal Voltage	0.0119	0.0114	
-20	Normal Voltage	0.0021	0.0127	
-30	Normal Voltage	0.0132	0.0113	
20	Maximum Voltage	0.0062	0.0028	
20	Normal Voltage	0.0211	0.0124	
20	Battery End Point	0.0224	0.0017	

Note:

1. Normal Voltage = 3.89V. ; Battery End Point (BEP) =3.4V. ; Maximum Voltage =4.48V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



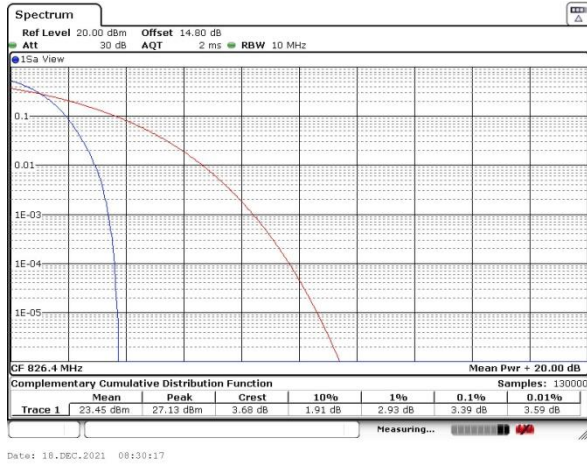
A2. WCDMA

Peak-to-Average Ratio

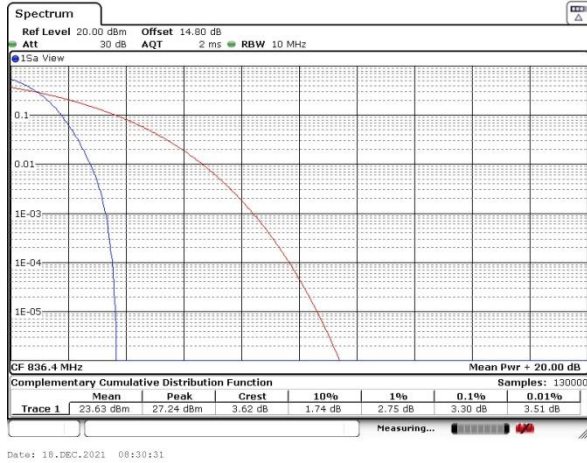
Mode	WCDMA Band V
Mod.	RMC 12.2Kbps
Lowest CH	3.39
Middle CH	3.30
Highest CH	3.22

WCDMA Band V (RMC 12.2Kbps)

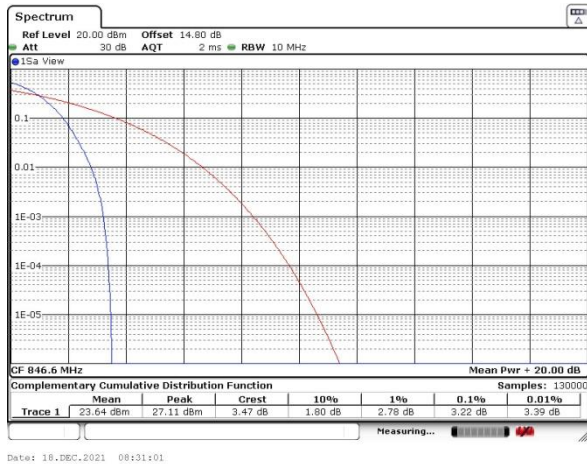
Lowest Channel



Middle Channel



Highest Channel





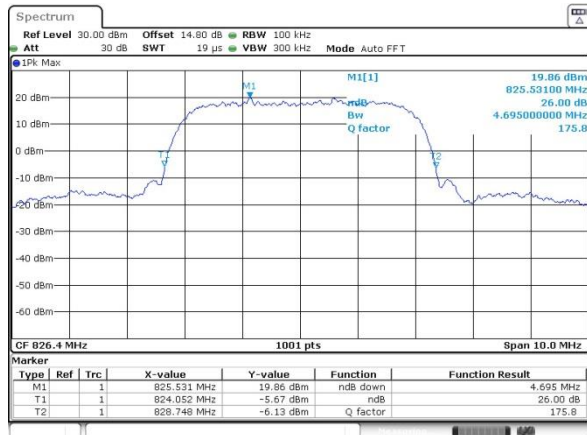
26dB Bandwidth

Mode	WCDMA Band V (MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.70
Middle CH	4.70
Highest CH	4.72



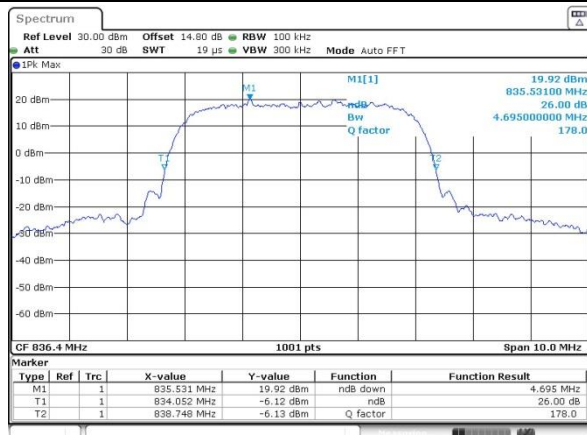
WCDMA Band V (RMC 12.2Kbps)

Lowest Channel



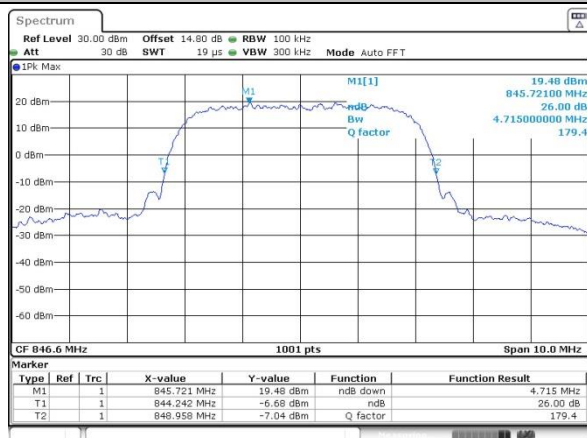
Date: 18 DEC 2021 08:16:36

Middle Channel



Date: 18 DEC 2021 08:17:31

Highest Channel



Date: 18 DEC 2021 08:17:53



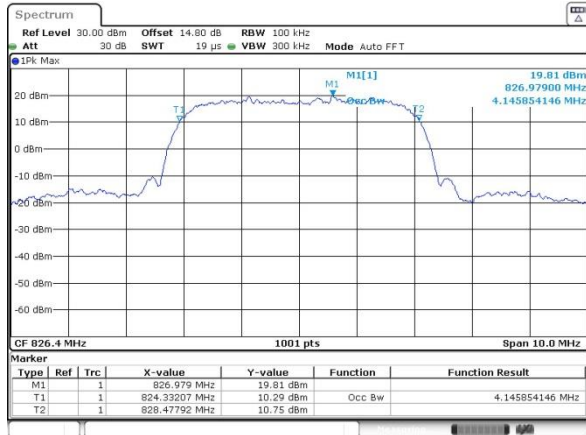
Occupied Bandwidth

Mode	WCDMA Band V (MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.15
Middle CH	4.12
Highest CH	4.13

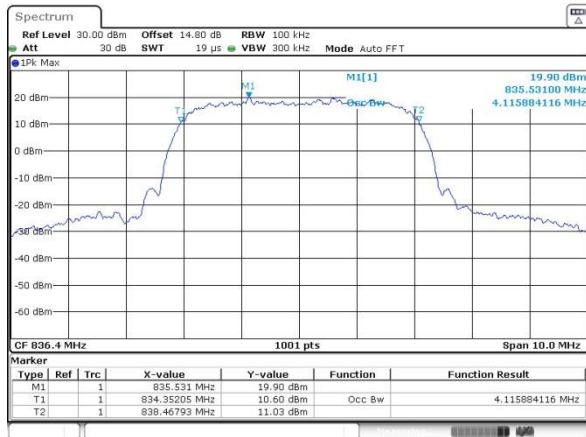


WCDMA Band V (RMC 12.2Kbps)

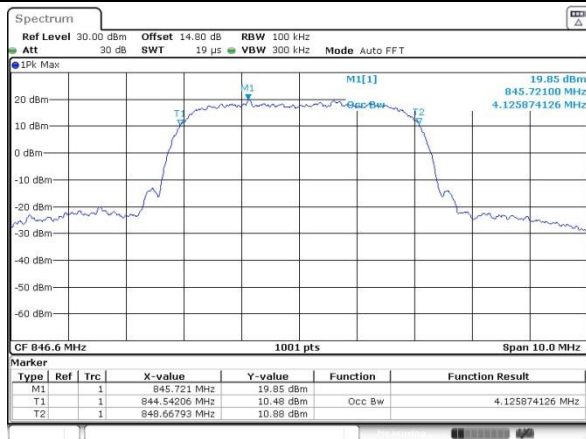
Lowest Channel



Middle Channel



Highest Channel



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

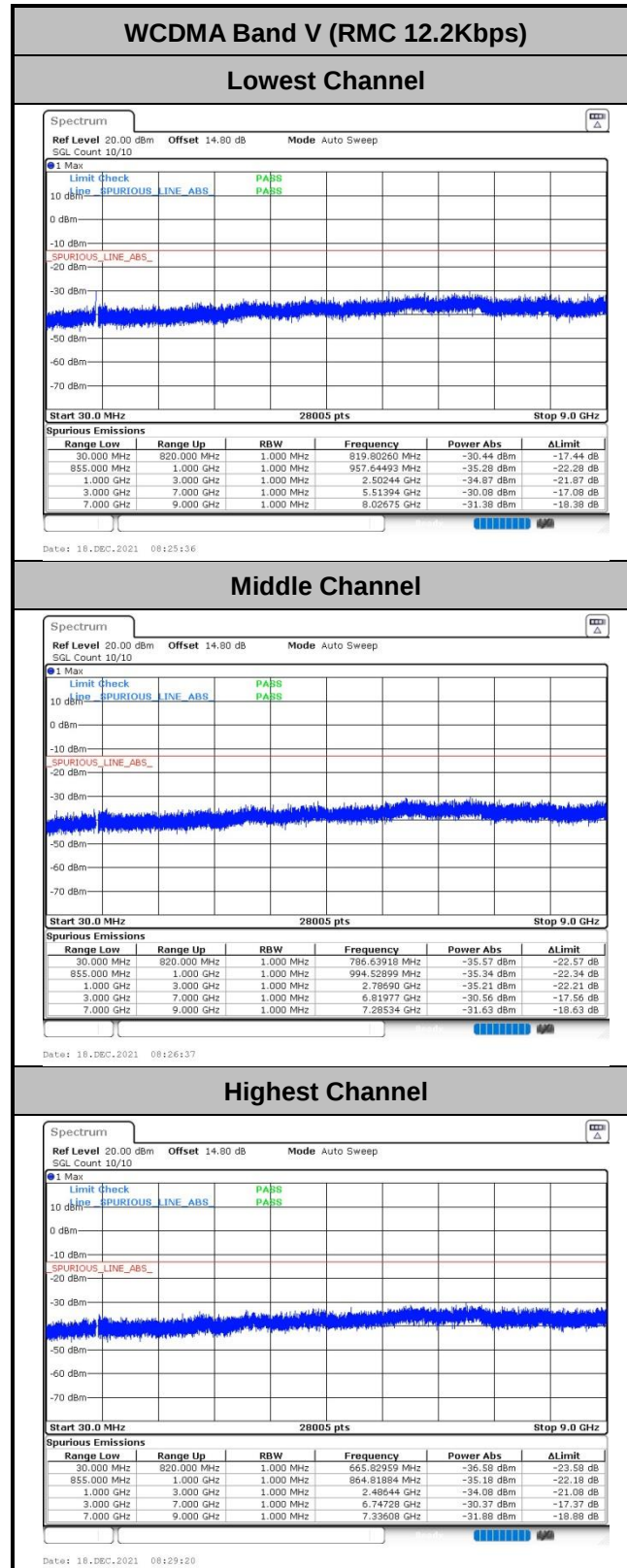
Date: 18.DEC.2021 08:23:26

Highest Band Edge

Date: 18.DEC.2021 08:24:28



Conducted Spurious Emission



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	0.0012	PASS
40	Normal Voltage	0.0265	
30	Normal Voltage	0.0011	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0338	
0	Normal Voltage	0.0133	
-10	Normal Voltage	0.0065	
-20	Normal Voltage	0.0413	
-30	Normal Voltage	0.0028	
20	Maximum Voltage	0.0023	
20	Normal Voltage	0.0241	
20	Battery End Point	0.0233	

Note:

1. Normal Voltage = 3.89V ; Battery End Point (BEP) =3.4V ; Maximum Voltage =4.48V
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 (GSM)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1648.4	-47.75	-13	-34.75	-55.06	-50.98	3.98	9.36	H
	2472.6	-44.60	-13	-31.60	-56.21	-48.15	4.85	10.55	H
	3296.8	-58.85	-13	-45.85	-73.74	-63.78	5.50	12.58	H
	1648.4	-54.51	-13	-41.51	-61.86	-57.74	3.98	9.36	V
	2472.6	-46.45	-13	-33.45	-58.10	-50.00	4.85	10.55	V
	3296.8	-62.59	-13	-49.59	-77.39	-67.52	5.50	12.58	V
Middle	1672.8	-52.55	-13	-39.55	-59.37	-55.80	4.00	9.40	H
	2509.2	-46.70	-13	-33.70	-58.39	-50.27	4.88	10.60	H
	3345.6	-62.57	-13	-49.57	-77.45	-67.50	5.52	12.60	H
	1672.8	-54.81	-13	-41.81	-61.82	-58.06	4.00	9.40	V
	2509.2	-52.98	-13	-39.98	-64.79	-56.55	4.88	10.60	V
	3345.6	-62.75	-13	-49.75	-77.65	-67.68	5.52	12.60	V
Highest	1697.6	-48.76	-13	-35.76	-55.80	-51.93	4.10	9.42	H
	2546.4	-46.35	-13	-33.35	-58.36	-49.93	4.90	10.63	H
	3395.2	-61.82	-13	-48.82	-76.76	-66.74	5.55	12.62	H
	1697.6	-52.39	-13	-39.39	-59.61	-55.56	4.10	9.42	V
	2546.4	-45.80	-13	-32.80	-57.82	-49.38	4.90	10.63	V
	3395.2	-61.82	-13	-48.82	-76.77	-66.74	5.55	12.62	V

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



GSM850 (EDGE)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1648.4	-64.19	-13	-51.19	-71.50	-67.42	3.98	9.36	H
	2472.6	-55.94	-13	-42.94	-67.55	-59.49	4.85	10.55	H
	3296.8	-62.19	-13	-49.19	-77.08	-67.12	5.50	12.58	H
	1648.4	-64.46	-13	-51.46	-71.81	-67.69	3.98	9.36	V
	2472.6	-51.26	-13	-38.26	-62.91	-54.81	4.85	10.55	V
	3296.8	-62.74	-13	-49.74	-77.54	-67.67	5.50	12.58	V
Middle	1672.8	-61.99	-13	-48.99	-68.81	-65.24	4.00	9.40	H
	2509.2	-63.20	-13	-50.20	-74.89	-66.77	4.88	10.60	H
	3345.6	-62.83	-13	-49.83	-77.71	-67.76	5.52	12.60	H
	1672.8	-63.16	-13	-50.16	-70.17	-66.41	4.00	9.40	V
	2509.2	-62.44	-13	-49.44	-74.25	-66.01	4.88	10.60	V
	3345.6	-62.79	-13	-49.79	-77.69	-67.72	5.52	12.60	V
Highest	1697.6	-55.62	-13	-42.62	-62.66	-58.79	4.10	9.42	H
	2546.4	-60.75	-13	-47.75	-72.76	-64.33	4.90	10.63	H
	3395.2	-62.51	-13	-49.51	-77.45	-67.43	5.55	12.62	H
	1697.6	-63.11	-13	-50.11	-70.33	-66.28	4.10	9.42	V
	2546.4	-61.41	-13	-48.41	-73.43	-64.99	4.90	10.63	V
	3395.2	-62.50	-13	-49.50	-77.45	-67.42	5.55	12.62	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1652.8	-64.03	-13	-51.03	-71.30	-67.26	3.98	9.36	H
	2479.2	-64.51	-13	-51.51	-76.13	-68.06	4.85	10.55	H
	3305.6	-62.49	-13	-49.49	-77.35	-67.42	5.50	12.58	H
	1652.8	-65.92	-13	-52.92	-73.26	-69.15	3.98	9.36	V
	2479.2	-64.12	-13	-51.12	-75.79	-67.67	4.85	10.55	V
	3305.6	-62.54	-13	-49.54	-77.33	-67.47	5.50	12.58	V
Middle	1672.8	-63.19	-13	-50.19	-70.01	-66.44	4.00	9.40	H
	2509.2	-63.95	-13	-50.95	-75.64	-67.52	4.88	10.60	H
	3345.6	-62.90	-13	-49.90	-77.78	-67.83	5.52	12.60	H
	1672.8	-64.98	-13	-51.98	-71.99	-68.23	4.00	9.40	V
	2509.2	-63.21	-13	-50.21	-75.02	-66.78	4.88	10.60	V
	3345.6	-62.92	-13	-49.92	-77.82	-67.85	5.52	12.60	V
Highest	1693.2	-62.76	-13	-49.76	-69.78	-65.93	4.10	9.42	H
	2539.8	-64.22	-13	-51.22	-76.16	-67.80	4.90	10.63	H
	3386.4	-62.49	-13	-49.49	-77.45	-67.41	5.55	12.62	H
	1693.2	-64.93	-13	-51.93	-72.13	-68.10	4.10	9.42	V
	2539.8	-64.13	-13	-51.13	-76.10	-67.71	4.90	10.63	V
	3386.4	-62.51	-13	-49.51	-77.48	-67.43	5.55	12.62	V

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



GSM1900 (GSM)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3700.4	-61.12	-13	-48.12	-77.64	-67.88	5.82	12.58	H
	5550.6	-59.95	-13	-46.95	-79.27	-65.67	7.28	13.00	H
	7400.8	-55.76	-13	-42.76	-79.68	-58.92	8.32	11.48	H
	3700.4	-61.14	-13	-48.14	-77.41	-67.90	5.82	12.58	V
	5550.6	-60.47	-13	-47.47	-79.64	-66.19	7.28	13.00	V
	7400.8	-54.98	-13	-41.98	-79.21	-58.14	8.32	11.48	V
Middle	3760	-60.95	-13	-47.95	-77.64	-67.70	5.85	12.60	H
	5640	-58.34	-13	-45.34	-78.51	-64.14	7.30	13.10	H
	7520	-56.04	-13	-43.04	-79.73	-59.19	8.35	11.50	H
	3760	-60.97	-13	-47.97	-77.22	-67.72	5.85	12.60	V
	5640	-59.94	-13	-46.94	-78.9	-65.74	7.30	13.10	V
	7520	-55.45	-13	-42.45	-79.56	-58.60	8.35	11.50	V
Highest	3819.6	-60.64	-13	-47.64	-77.47	-67.38	5.88	12.62	H
	5729.4	-57.60	-13	-44.60	-78.43	-63.41	7.32	13.13	H
	7639.2	-55.55	-13	-42.55	-79.05	-58.71	8.38	11.54	H
	3819.6	-59.36	-13	-46.36	-75.71	-66.10	5.88	12.62	V
	5729.4	-59.30	-13	-46.30	-79.3	-65.11	7.32	13.13	V
	7639.2	-54.41	-13	-41.41	-78.44	-57.57	8.38	11.54	V

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



GSM1900 (EDGE)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3700.4	-61.06	-13	-48.06	-77.58	-67.82	5.82	12.58	H
	5550.6	-60.18	-13	-47.18	-79.50	-65.90	7.28	13.00	H
	7400.8	-55.62	-13	-42.62	-79.54	-58.78	8.32	11.48	H
	3700.4	-61.05	-13	-48.05	-77.32	-67.81	5.82	12.58	V
	5550.6	-60.57	-13	-47.57	-79.74	-66.29	7.28	13.00	V
	7400.8	-55.17	-13	-42.17	-79.4	-58.33	8.32	11.48	V
Middle	3760	-60.80	-13	-47.80	-77.49	-67.55	5.85	12.60	H
	5640	-59.17	-13	-46.17	-79.34	-64.97	7.30	13.10	H
	7520	-55.98	-13	-42.98	-79.67	-59.13	8.35	11.50	H
	3760	-60.79	-13	-47.79	-77.04	-67.54	5.85	12.60	V
	5640	-60.06	-13	-47.06	-79.02	-65.86	7.30	13.10	V
	7520	-55.28	-13	-42.28	-79.39	-58.43	8.35	11.50	V
Highest	3819.6	-60.99	-13	-47.99	-77.82	-67.73	5.88	12.62	H
	5729.4	-58.51	-13	-45.51	-79.34	-64.32	7.32	13.13	H
	7639.2	-55.34	-13	-42.34	-78.84	-58.50	8.38	11.54	H
	3819.6	-60.34	-13	-47.34	-76.69	-67.08	5.88	12.62	V
	5729.4	-59.35	-13	-46.35	-79.35	-65.16	7.32	13.13	V
	7639.2	-54.56	-13	-41.56	-78.59	-57.72	8.38	11.54	V

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

————THE END————