RF MEASUREMENT REPORT

FCC ID:	U4GDL36LT
Application:	Datalogic S.r.l.
Product:	Barcode Reader
Model No.:	DL36LT
Brand Name:	DATALOGIC
FCC Rule Part(s):	Part 2, 22 (H), 24 (E), 27
Result:	Complies
Test Date:	2022-09-07 ~ 2022-09-27

Reviewed By: Jame Yuan

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2209RSU001-U7	Rev. 01	Initial Report	2023-02-02	Valid

CONTENTS

1. General Information

1.1. Applicant

Datalogic S.r.l.

Via San Vitalino no.13, Calderara di Reno - 40012(BO) - Italy

1.2. Manufacturer

Datalogic S.r.l.

Via San Vitalino no.13, Calderara di Reno - 40012(BO) - Italy

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong)				
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Location (Suzhou - SIP)				
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	Barcode Reader
Model No.	DL36LT
IMEI	004403000215550
NFC Specification	13.56MHz
Wi-Fi Specification	802.11a/b/g/n/ac
Bluetooth Specification	v5.2 dual mode
GNSS Specification	GPS/GNSS/Beidou/Galileo/SBAS
WPT Specification	119-140kHz, WPT client type
Operating Temp.	-20 ~ 55℃
3GPP Specification	GSM 850/1900 WCDMA Band 2/4/5 LTE Band 2/4/5/7/12/13/17/25/26
Power Type	3.60 ~ 4.35Vdc, typical 3.8Vdc
Accessories	
AC Adapter	Model: S008ACM0500200 Input: 100-240V ~ 50/60Hz, 0.3A Output: 5V, 2A, 10W
Rechargeable Li-ion Battery	Model No.: BTDL36 Rated Voltage: 3.8V Rated Capacity: 3980mAh/15.1Wh Limited Charge Voltage: 4.35V
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

GSM Specification	
TX Frequency Range	GSM/GPRS/EDGE: 850: 824 ~ 849MHz 1900: 1850 ~ 1910MHz
RX Frequency Range	GSM/GPRS/EDGE: 850: 869 ~ 894MHz 1900: 1930 ~ 1990MHz,
Modulation	GMSK, 8-PSK
Power Class	GSM900: 4, DCS1800: 1
Category	Multi-slot class 12
UMTS Specification	
TX Frequency Range:	WCDMA Band II: 1850 ~ 1910MHz, WCDMA Band IV: 1710 ~ 1755MHz WCDMA Band V: 824 ~ 849MHz
RX Frequency Range:	WCDMA Band II: 1930 ~ 1990MHz, WCDMA Band IV: 2110 ~ 2155MHz WCDMA Band V: 869 ~ 894MHz
Modulation	UL up to 16QAM & DL up to 64QAM
Power Class	3
Category	HSDPA: 24; HSUPA: 7

1.6. Description of Available Antennas

Technology	Frequency Range (MHz)	Antenna Type	Max Peak Gain (dBi)
GSM850	824 ~ 849	PIFA	1.92
PCS1900	1850 ~ 1910		1.22
WCDMA Band II	1850 ~ 1910		1.22
WCDMA Band IV	1710 ~ 1755		2.46
WCDMA Band V	824 ~ 849		1.92

Note: All antenna information (Antenna type and Peak Gain) is provided by the manufacturer.

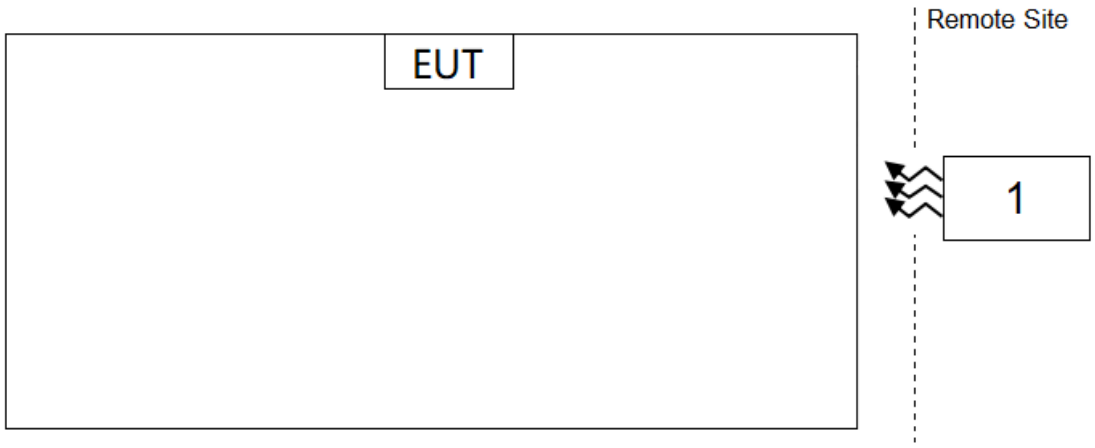
1.7. Test Methodology

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

- ANSI C63.26:2015
- FCC CFR 47 Part 22, Part 24, Part 27
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

2. Test Configuration

2.1. Test System Connnection Diagram



Product		Manufacturer	Model No.
1	Wideband Radio Communication Tester	R&S	CMW 500

2.2. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20% ~ 75%RH

3. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Signal Analyzer	Keysight	N9010B	MRTSUE07028	1 year	2022-12-09	SIP-SR1
Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2023-06-01	SIP-SR1
Signal Analyzer	Keysight	N9010B	MRTSUE06603	1 year	2022-10-31	SIP-SR1
Communication Tester	R&S	CMW500	MRTSUE06243	1 year	2022-10-10	SIP-SR1
Signal Generator	Keysight	E8257D	MRTSUE06453	1 year	2023-06-01	SIP-SR1
Thermohygrometer	testo	622	MRTSUE06629	1 year	2023-01-06	SIP-SR1
5G Wireless Test Platform	Keysight	E7515B	MRTSUE06903	1 year	2022-11-23	SIP-SR1
Signal Generator	Keysight	E8257D	MRTSUE06904	1 year	2022-11-23	SIP-SR1
DC POWER MODULE	Keysight	N6743B	MRTSUE06905	N/A	N/A	SIP-SR1
DC POWER MODULE	Keysight	N6743B	MRTSUE06906	N/A	N/A	SIP-SR1
Common Interface Unit	Keysight	E7770A	MRTSUE06957	N/A	N/A	SIP-SR1
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2023-06-08	SIP-AC3
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2022-12-29	SIP-AC1/SIP-AC2/SIP-AC3
Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2023-06-01	SIP-AC1/SIP-AC2/SIP-AC3/ SIP-SR1
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06599	1 year	2022-10-20	SIP-AC1/SIP-AC3
Preamplifier	EMCI	EMC184045SE	MRTSUE06602	1 year	2022-10-11	SIP-AC1/SIP-AC2/SIP-AC3
Signal Analyzer	Keysight	N9010B	MRTSUE06603	1 year	2022-10-31	SIP-AC1/SIP-AC2/SIP-AC3/ SIP-SR1
Signal Analyzer	Keysight	N9020B	MRTSUE06604	1 year	2023-09-06	SIP-AC1/SIP-AC2/SIP-AC3/ SIP-SR1
Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2023-07-30	SIP-AC3
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2023-06-01	SIP-AC1/SIP-AC2/SIP-AC3
Thermohygrometer	testo	608-H1	MRTSUE06619	1 year	2022-11-02	SIP-AC3
Thermohygrometer	testo	608-H1	MRTSUE06622	1 year	2022-11-28	SIP-AC3
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2023-01-13	SIP-AC3
Preamplifier	EMCI	EMC001330	MRTSUE06643	1 year	2023-01-13	SIP-AC1/SIP-AC2/SIP-AC3
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06646	1 year	2023-08-16	SIP-AC3
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2022-12-23	SIP-AC3
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2023-03-14	SIP-AC1/SIP-AC2/SIP-AC3
Directional Coupler	ar	DC7200A	MRTSUE06147	N/A	N/A	SIP
Directional Coupler	ar	DC6080A	MRTSUE06148	N/A	N/A	SIP-SR1
Directional Coupler	narda	4226-10	MRTSUE06564	1 year	2022-10-11	SIP-SR1
Directional Coupler	PULSAR	CS10-23-436/20	MRTSUE06846	1 year	2023-06-02	SIP-SR1
Directional Coupler	PULSAR	CS10-23-436/20	MRTSUE06848	1 year	2023-06-02	SIP-SR1

Attenuator	MVE	MVE2213	MRTSUE11055	1 year	2023-06-09	SIP-SR1
Attenuator	MVE	MVE2213	MRTSUE11056	1 year	2023-06-09	SIP-SR1
Attenuator	MVE	MVE2213	MRTSUE11057	1 year	2023-06-09	SIP-SR1
Attenuator	MVE	MVE2213	MRTSUE11058	1 year	2023-06-09	SIP-SR1
Attenuator	MVE	MVE2213	MRTSUE11059	1 year	2023-06-09	SIP-SR1
Attenuator	MVE	MVE2213	MRTSUE11060	1 year	2023-06-09	SIP-SR1

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802BS	V1.02	RE Antenna & Turntable

4. Decision Rules and Measurement Uncertainty

4.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Radiated Spurious Emissions
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 9kHz ~ 300MHz: 5.04dB 300MHz ~ 1GHz: 4.95dB 1GHz ~ 40GHz: 6.40dB Vertical: 9kHz ~ 300MHz: 5.24dB 300MHz ~ 1GHz: 6.03dB 1GHz ~ 40GHz: 6.40dB
Conducted Spurious Emissions
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%
Frequency Stability
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 76.2Hz

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Verdict
2.1049	Occupied Bandwidth	Conducted	Pass
2.1055, 22.355 24.235, 27.54	Frequency Stability		Pass
22.913(a)(5)	Equivalent Radiated Power		Pass
27.50(d)(4) 24.232(c)	Equivalent Isotropic Radiated Power		
2.1051, 22.917(a) 24.238(a), 27.53(h)	Band Edge		Pass
2.1051, 22.917(a) 24.238(a), 27.53(h)	Spurious Emission		
22.913(d) 24.232(d) 27.50(d)(5)	Peak to Average Ratio		Pass
2.1053, 22.917(a) 24.238(a), 27.53(h)	Spurious Emissions	Radiated	Pass

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) All supported modulation types were evaluated. The worst-case emission of modulation was selected. The power of EGPRS/HSDPA/HSUPA is lower than that of GPRS 1Tx Slot/WCDMA.Therefore, the Frequency Stability, Channel Band Edge, Radiated & Conducted Spurious Emission were presented worst-case in the test report.
3) For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

5.2. Occupied Bandwidth Measurement

5.2.1. Test Limit

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

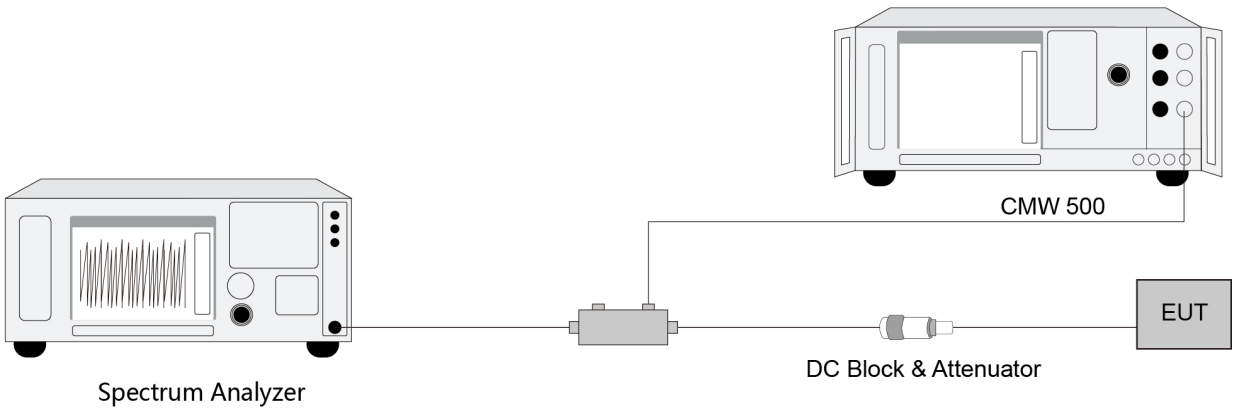
5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.4

5.2.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency
2. RBW = The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

5.2.4. Test Setup



5.2.5. Test Result

Refer to Appendix A.1.

5.3. Frequency Stability Measurement

5.3.1. Test Limit

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.

5.3.2. Test Procedure

ANSI C63.26-2015 - Section 5.6

5.3.3. Test Setting

Frequency Stability Under Temperature Variations:

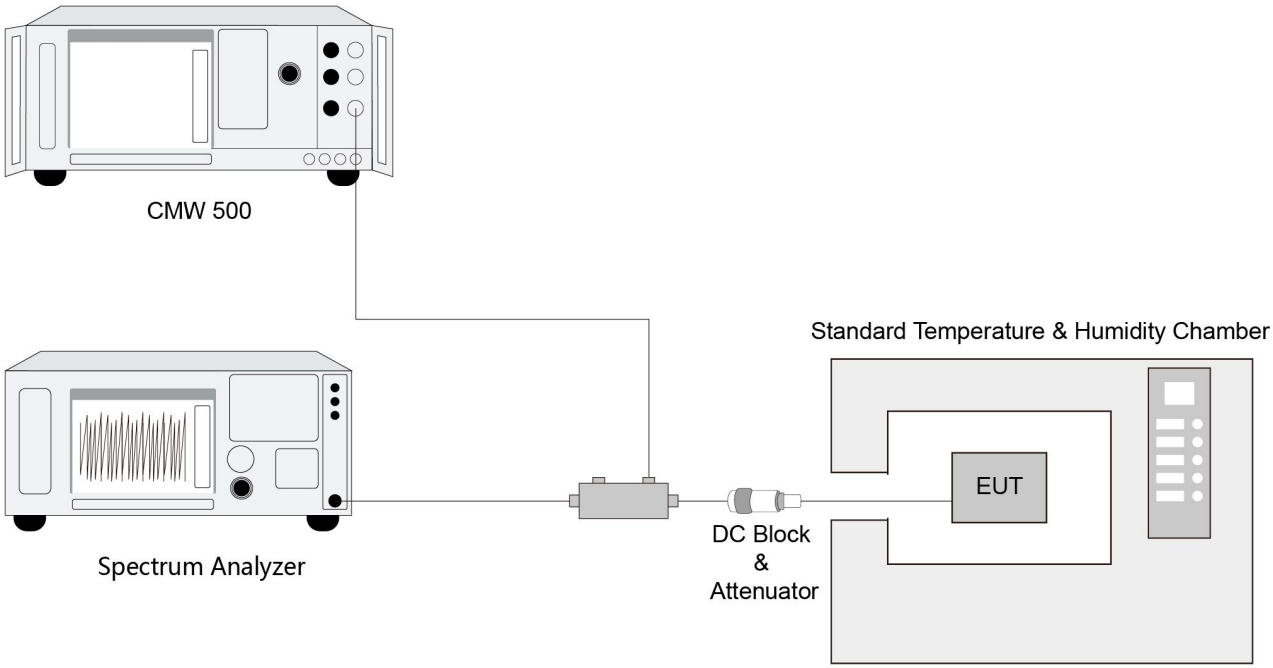
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to High. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the Low temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, recordthe maximum frequency change.

5.3.4. Test Setup



5.3.5. Test Result

Refer to Appendix A.2.

5.4. Equivalent Isotropically Radiated Power Measurement

5.4.1. Test Limit

WCDMA Band 2 & PCS 1900

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

WCDMA Band 4:

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

WCDMA Band 5 & GSM 850:

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

5.4.2. Test Procedure

ANSI C63.26-2015 - Section 5.2

5.4.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

ERP or EIRP = P_{Meas} + G_T

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

ERP = EIRP -2.15

5.4.4. Test Setup

5.4.5. Test Result

Refer to Appendix A.3.

5.5. Band Edge Measurement

5.5.1. Test Limit

For operations in the 824 ~ 849 MHz, 1850 ~ 1910 MHz, 1930 ~ 1990 MHz, 698 ~ 746 MHz and 1710 ~ 1755 MHz, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

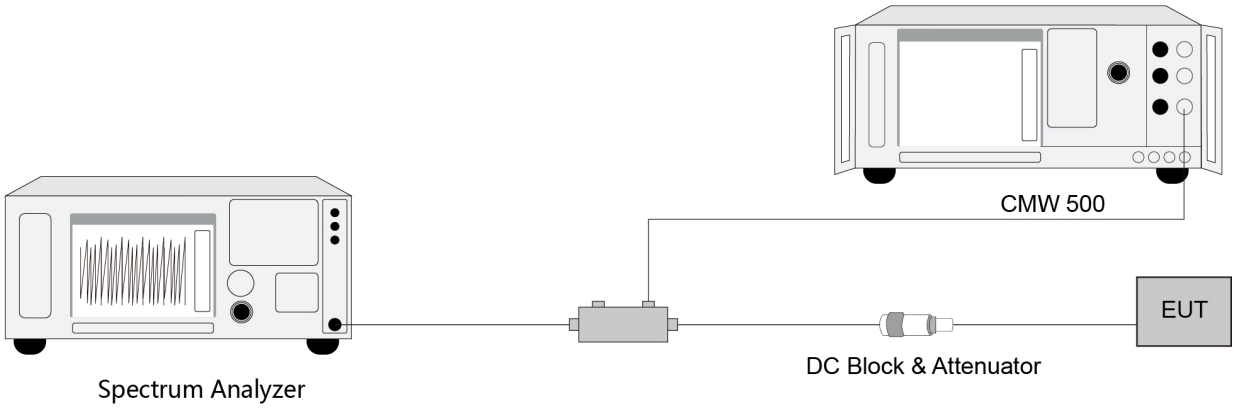
5.5.2. Test Procedure

ANSI C63.26-2015 - Section 5.7

5.5.3. Test Setting

1. Set the analyzer frequency to low or high channel
2. RBW ≥ The nominal RBW shall be in the range of 1% of the anticipated OBW (in the 1MHz band immediately outside and adjacent to the band edge). For improvement of the accuracy in the measurement of the average power of a noise-like emission, a RBW narrower than the specified reference bandwidth can be used (generally limited to no less than 1% of the OBW), provided that a subsequent integration is performed over the full required measurement bandwidth. This integration should be performed using the spectrum analyzer’s band power functions.
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run.”
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

5.5.4. Test Setup



5.5.5. Test Result

Refer to Appendix A.4.

5.6. Peak to Average Ratio Measurement

5.6.1. Test Limit

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

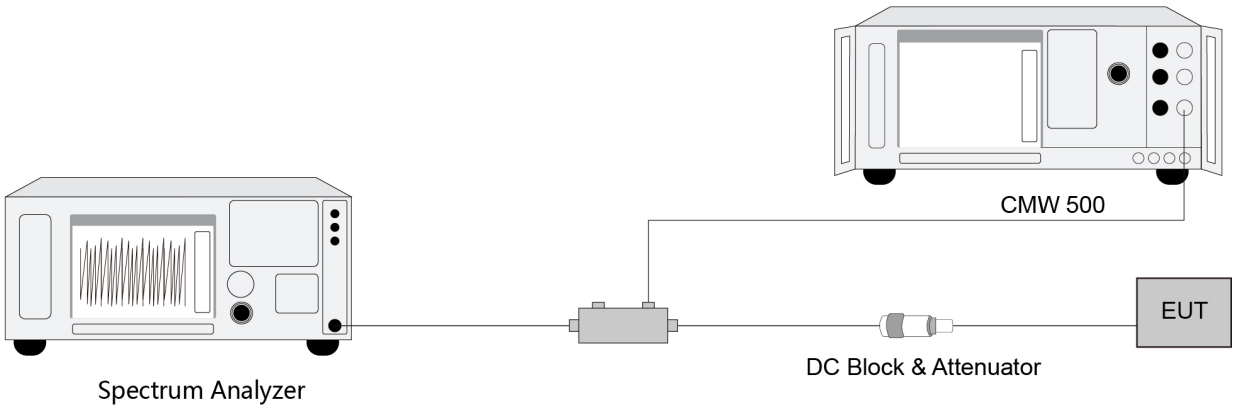
5.6.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.3.4 (CCDF).

5.6.3. Test Setting

1. Set the resolution / measurement bandwidth ≥ signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Record the maximum PARR level associated with a probability of 0.1%

5.6.4. Test Setup



5.6.5. Test Result

Refer to Appendix A.5.

5.7. Conducted Spurious Emissions Measurement

5.7.1. Test Limit

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the Low frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

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

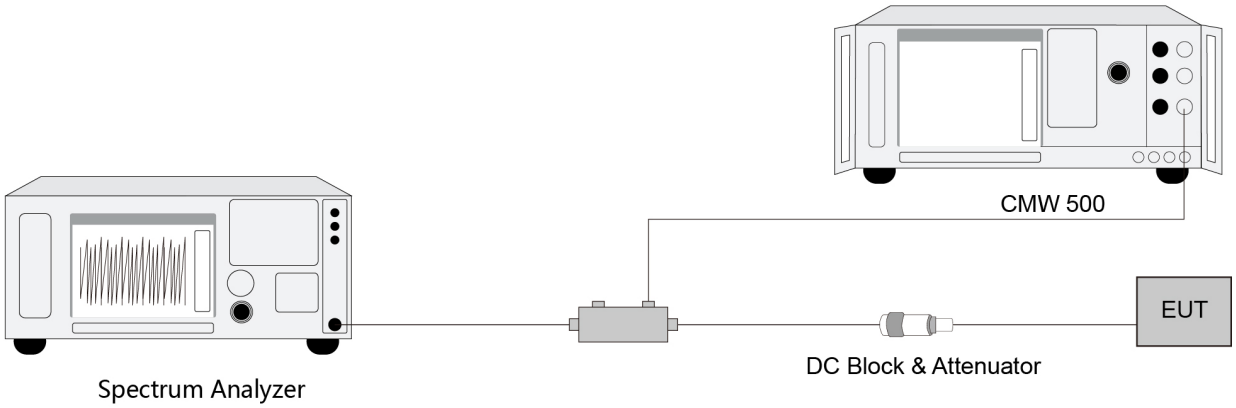
5.7.2. Test Procedure

ANSI C63.26-2015 - Section 5.7

5.7.3. Test Setting

1. Set the analyzer frequency to low, mid, high channel.
2. RBW = 1MHz
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run.”
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power.
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

5.7.4. Test Setup



5.7.5. Test Result

Refer to Appendix A.6.

5.8. Radiated Spurious Emissions Measurement

5.8.1. Test Limit

Out of band emissions: The powerof any emission outside of theauthorized operating frequency ranges must be attenuated below the transmitting power (P) by a factorof at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

E (dBμV/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 82.3dBμV/m.

5.8.2. Test Procedure

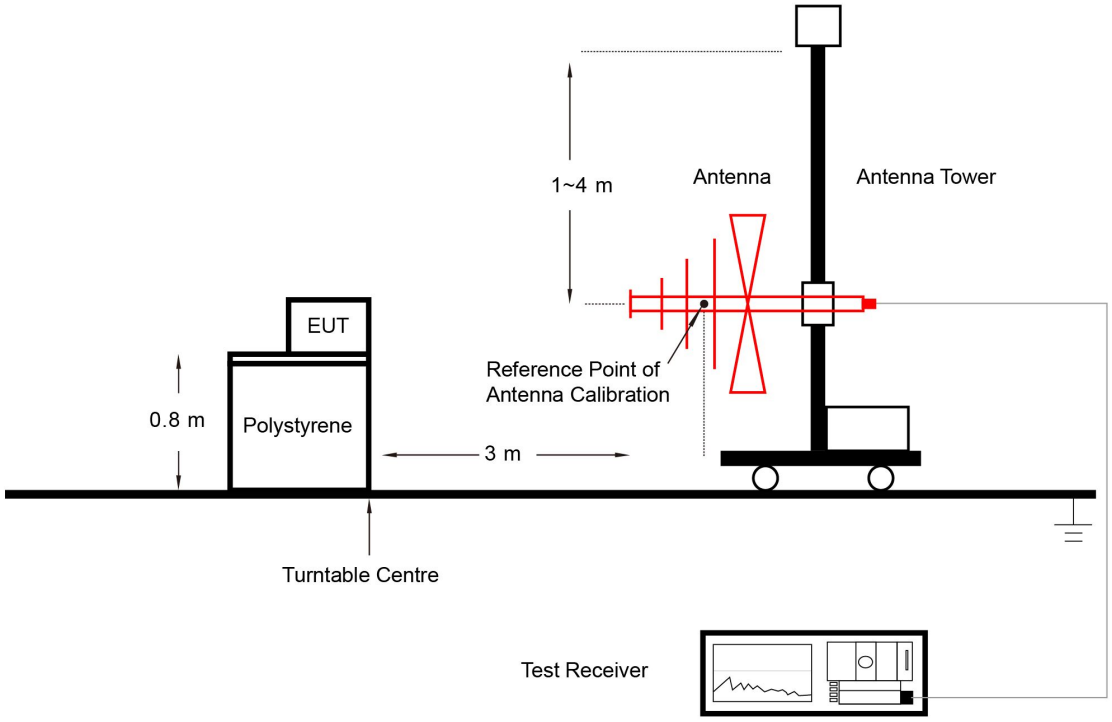
ANSI C63.26-2015 - Section 5.2.7 & 5.5

5.8.3. Test Setting

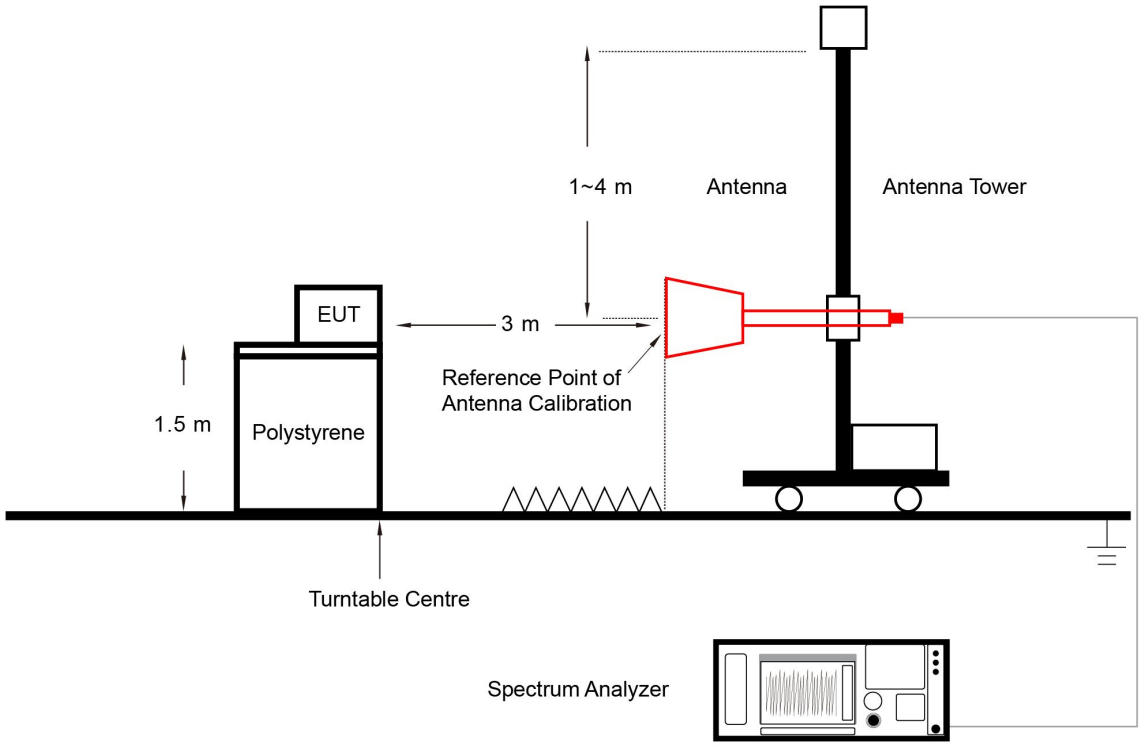
1. RBW = 1MHz
2. VBW ≥ 3*RBW
3. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

5.8.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.8.5. Test Result

Refer to Appendix A.7.

Appendix A - Test Result

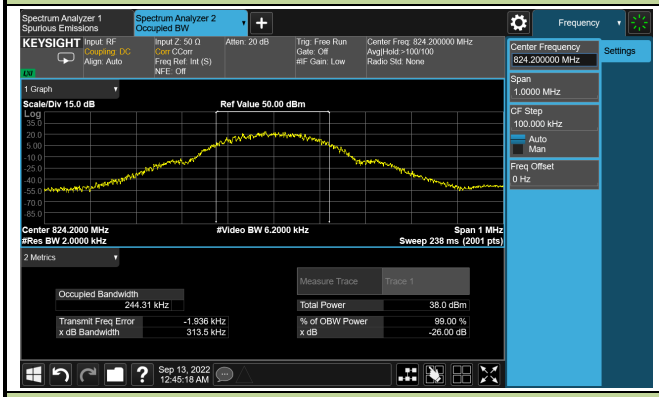
A.1 Occupied Bandwidth Test Result

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	GSM 850_GPRS

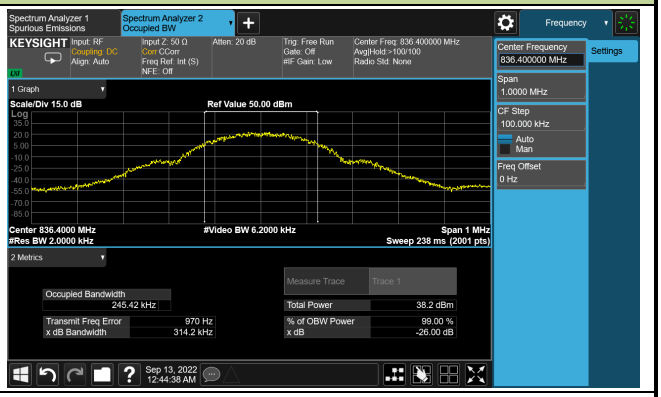
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	824.2	0.244
Middle	836.4	0.245
High	848.8	0.246

99% Bandwidth

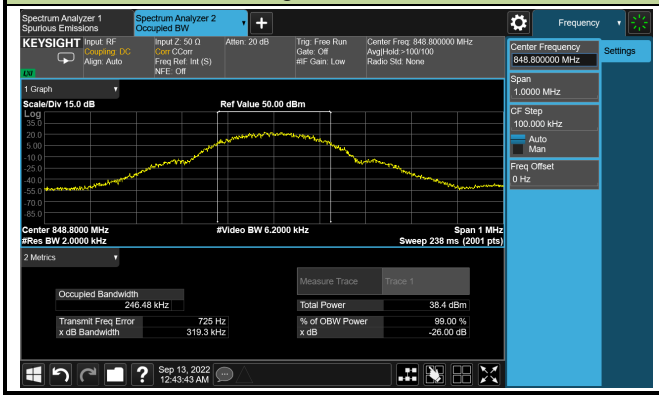
Low Channel



Middle Channel



High Channel

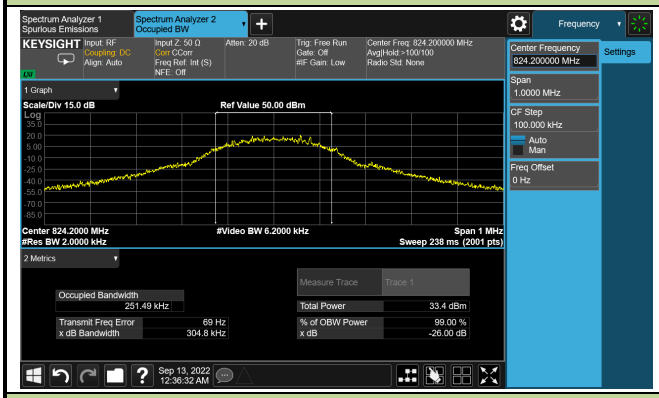


Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	GSM 850_EGPRS

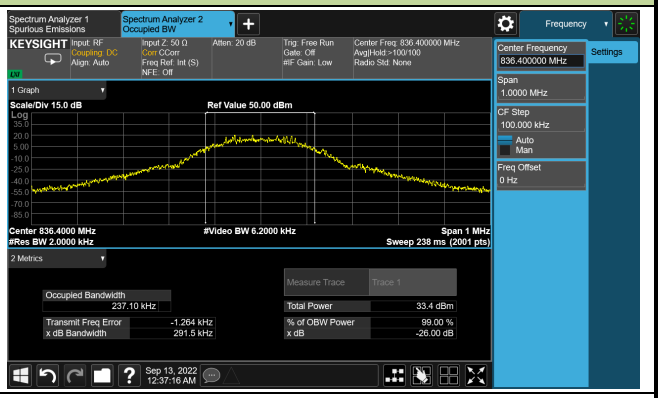
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	824.2	0.251
Middle	836.4	0.237
High	848.4	0.239

99% Bandwidth

Low Channel



Middle Channel



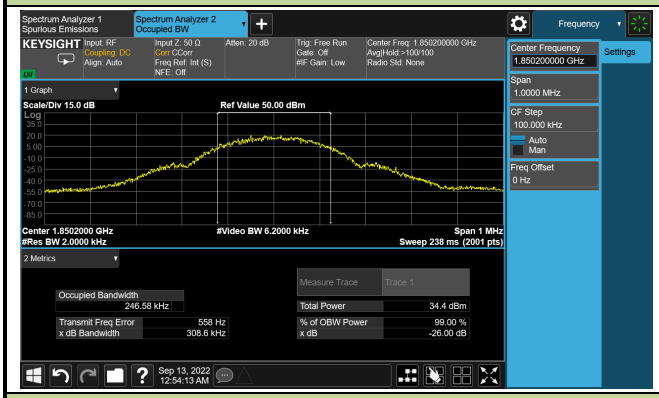
High Channel

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	PCS 1900_GPRS

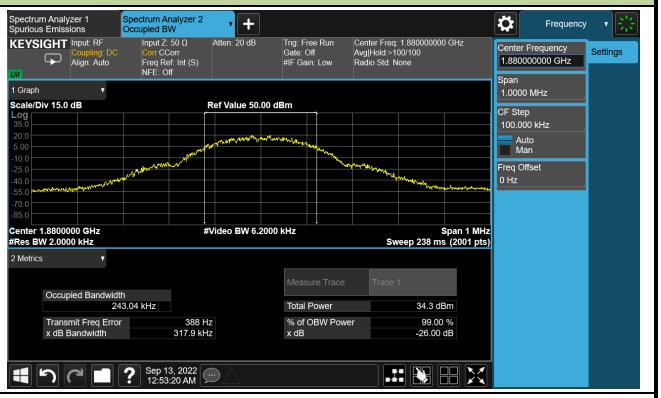
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	1850.2	0.247
Middle	1880.0	0.243
High	1909.8	0.244

99% Bandwidth

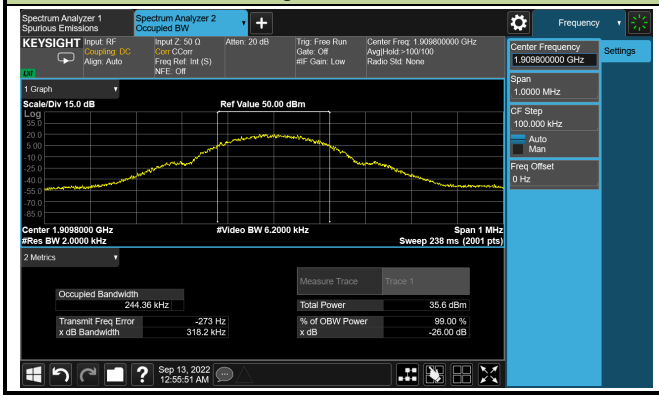
Low Channel



Middle Channel



High Channel

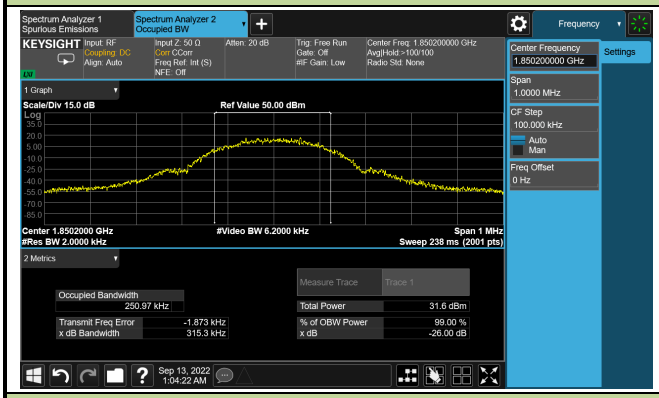


Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	PCS 1900_EGPRS

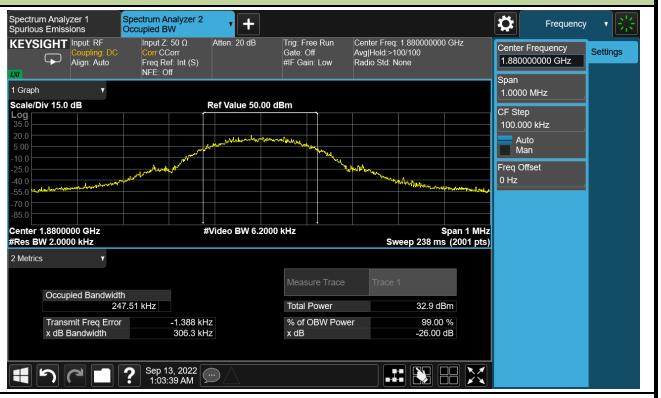
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	1850.2	0.251
Middle	1880.0	0.248
High	1909.8	0.250

99% Bandwidth

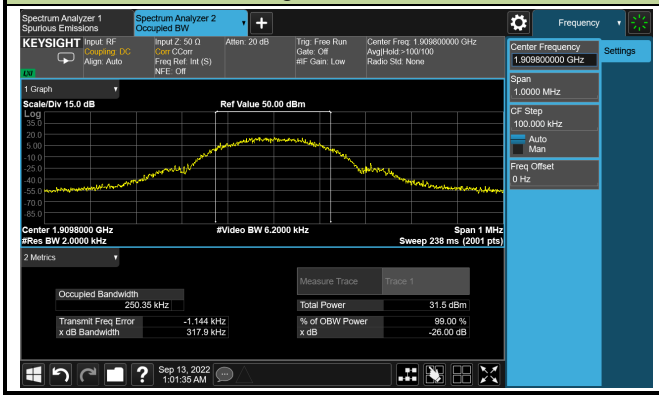
Low Channel



Middle Channel



High Channel

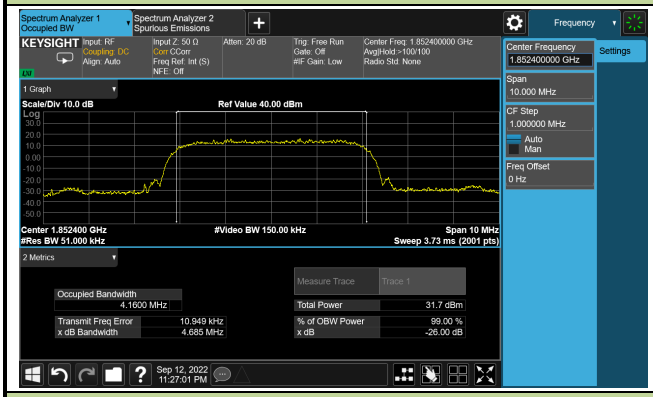


Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	WCDMA Band II

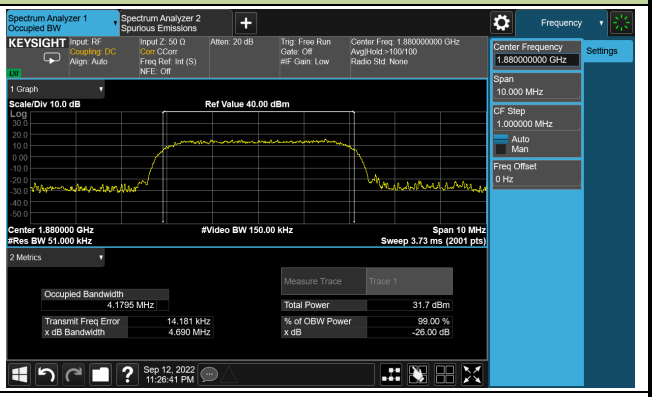
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	1852.4	4.16
Middle	1880.0	4.18
High	1907.6	4.16

99% Bandwidth

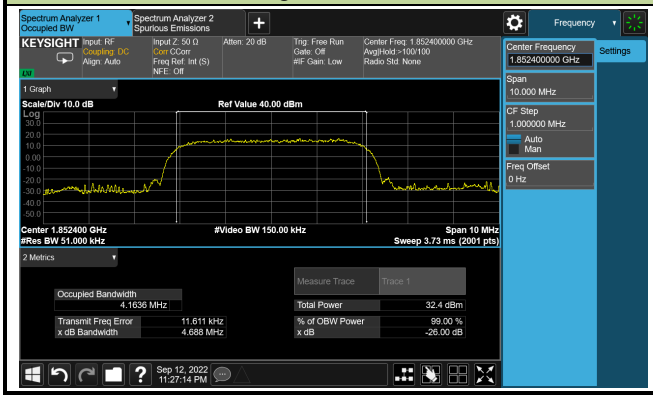
Low Channel



Middle Channel



High Channel

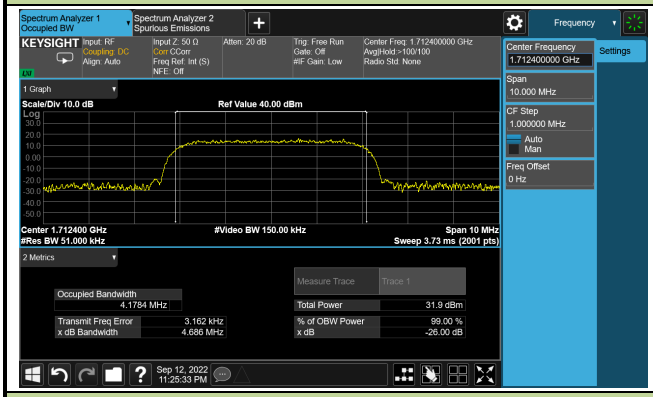


Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	WCDMA Band IV

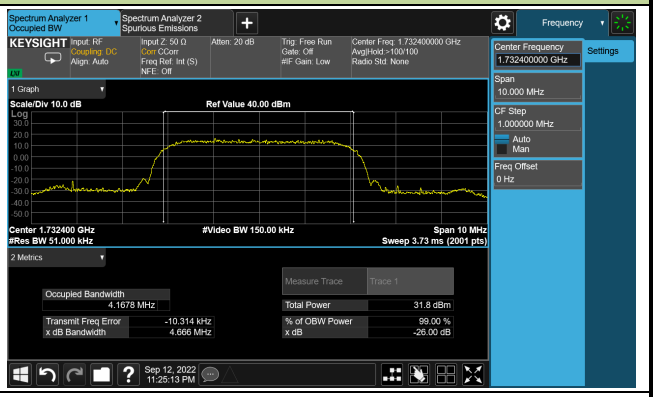
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	1712.4	4.18
Middle	1732.4	4.17
High	1752.6	4.16

99% Bandwidth

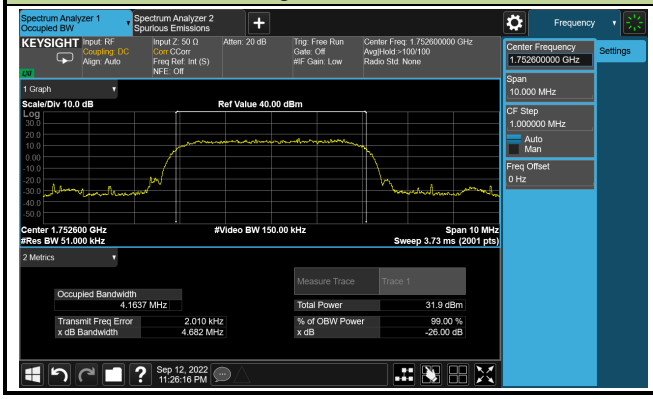
Low Channel



Middle Channel



High Channel

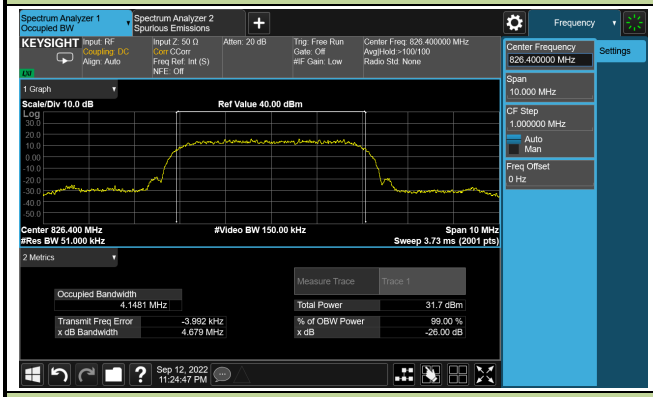


Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	WCDMA Band V

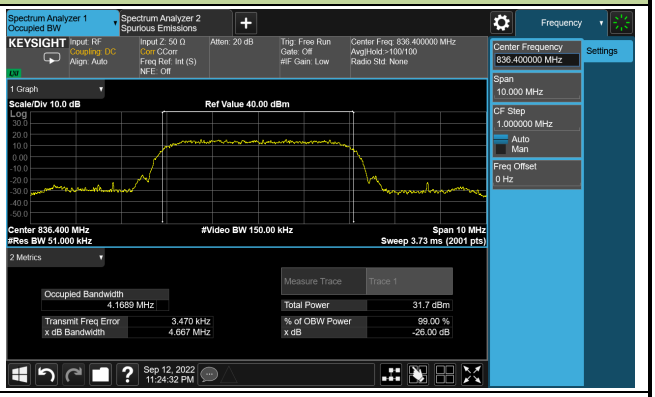
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	826.4	4.15
Middle	836.4	4.17
High	846.6	4.16

99% Bandwidth

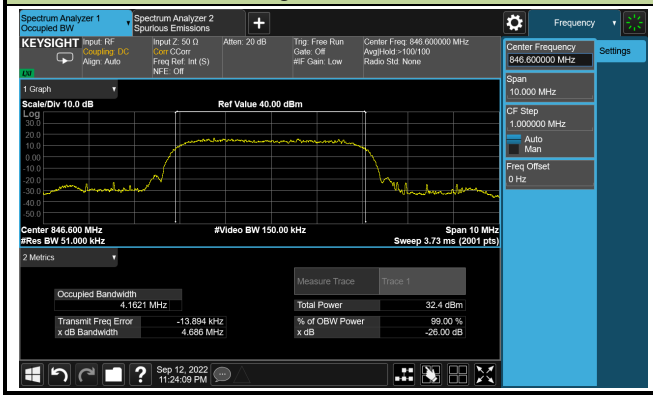
Low Channel



Middle Channel



High Channel



A.2 Frequency Stability Test Result

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14	Test Band	GSM 850_GPRS

Power (Vdc)	Temp. (°C)	Frequency Tolerance (ppm)
3.80	- 30	0.0048
	- 20	0.0045
	- 10	0.0152
	0	0.0026
	+ 10	0.0041
	+ 20 (Ref)	0.0000
	+ 30	0.0047
	+ 40	0.0053
	+ 50	0.0065
4.35	+ 20	0.0050
3.60	+ 20	-0.0005

Note: 3.60Vdc is the battery end point.

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14	Test Band	PCS 1900_GPRS

Power (Vdc)	Temp. (°C)	Frequency Tolerance (ppm)
3.80	- 30	0.0062
	- 20	0.0037
	- 10	0.0049
	0	0.0003
	+ 10	0.0035
	+ 20 (Ref)	0.0000
	+ 30	0.0097
	+ 40	0.0041
	+ 50	0.0031
4.35	+ 20	0.0027
3.60	+ 20	0.0030

Note: 3.60Vdc is the battery end point.

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14	Test Band	WCDMA Band II

Power (Vdc)	Temp. (°C)	Frequency Tolerance (ppm)
3.80	- 30	0.0008
	- 20	0.0004
	- 10	0.0007
	0	0.0010
	+ 10	-0.0009
	+ 20 (Ref)	0.0000
	+ 30	0.0004
	+ 40	0.0015
	+ 50	0.0014
4.35	+ 20	0.0021
3.60	+ 20	0.0031

Note: 3.60Vdc is the battery end point.

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14	Test Band	WCDMA Band IV

Power (Vdc)	Temp. (°C)	Frequency Tolerance (ppm)
3.80	- 30	-0.0179
	- 20	-0.0174
	- 10	-0.0153
	0	-0.0148
	+ 10	-0.0169
	+ 20 (Ref)	0.0000
	+ 30	-0.0177
	+ 40	-0.0185
	+ 50	-0.0162
4.35	+ 20	-0.0158
3.60	+ 20	-0.0148

Note: 3.60Vdc is the battery end point.

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14	Test Band	WCDMA Band V

Power (Vdc)	Temp. (°C)	Frequency Tolerance (ppm)
3.80	- 30	-0.0053
	- 20	-0.0067
	- 10	-0.0044
	0	-0.0036
	+ 10	-0.0080
	+ 20 (Ref)	0.0000
	+ 30	-0.0016
	+ 40	0.0004
	+ 50	-0.0014
4.35	+ 20	-0.0023
3.60	+ 20	-0.0004

Note: 3.60Vdc is the battery end point.

A.3 Equivalent Isotropically Radiated Power Test Result

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14 ~ 2022/09/15	Test Band	GSM 850

Mode	Slot	Conducted Power (dBm)			Antenna Gain (dBi)	ERP (dBm)		
		GSM 850 Channel				GSM 850 Channel		
		128	189	251		128	189	251
GSM	/	32.85	32.81	32.83	1.92	32.62	32.58	32.60
GPRS	1	32.86	32.82	32.86	1.92	32.63	32.59	32.63
	2	31.84	31.75	31.78	1.92	31.61	31.52	31.55
	3	29.78	29.67	29.72	1.92	29.55	29.44	29.49
	4	28.67	28.55	28.55	1.92	28.44	28.32	28.32
EGPRS (GMSK)	1	32.85	32.8	32.84	1.92	32.62	32.57	32.61
	2	31.84	31.75	31.77	1.92	31.61	31.52	31.54
	3	29.77	29.67	29.72	1.92	29.54	29.44	29.49
	4	28.65	28.54	28.54	1.92	28.42	28.31	28.31
EGPRS (8PSK)	1	27.59	27.14	26.63	1.92	27.36	26.91	26.40
	2	26.17	25.65	25.26	1.92	25.94	25.42	25.03
	3	23.65	23.16	22.76	1.92	23.42	22.93	22.53
	4	21.86	21.52	21.09	1.92	21.63	21.29	20.86
Limit	38.45dBm							

Note: The ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) - 2.15

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14 ~ 2022/09/15	Test Band	PCS 1900

Mode	Slot	Conducted Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)		
		PCS 1900 Channel				PCS 1900 Channel		
		512	661	810		512	661	810
GSM	/	29.09	29.37	29.13	1.22	30.31	30.59	30.35
GPRS	1	29.14	29.38	29.15	1.22	30.36	30.60	30.37
	2	28.35	28.61	28.38	1.22	29.57	29.83	29.60
	3	26.61	26.86	26.72	1.22	27.83	28.08	27.94
	4	25.52	25.76	25.53	1.22	26.74	26.98	26.75
EGPRS (GMSK)	1	29.12	29.39	29.15	1.22	30.34	30.61	30.37
	2	28.37	28.61	28.4	1.22	29.59	29.83	29.62
	3	26.60	26.86	26.67	1.22	27.82	28.08	27.89
	4	25.52	25.76	25.54	1.22	26.74	26.98	26.76
EGPRS (8PSK)	1	26.47	26.01	25.46	1.22	27.69	27.23	26.68
	2	25.35	24.85	24.35	1.22	26.57	26.07	25.57
	3	23.09	22.56	22.12	1.22	24.31	23.78	23.34
	4	21.89	21.32	20.87	1.22	23.11	22.54	22.09
Limit	33.01dBm							

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14 ~ 2022/09/15	Test Band	WCDMA Band II

Mode	3GPP Subtest	Conducted Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)		
		Band II Channel				Band II Channel		
		9262	9400	9538		9262	9400	9538
WCDMA R99	1	22.90	23.07	22.94	1.22	24.12	24.29	24.16
HSDPA	1	21.96	22.09	22.00	1.22	23.18	23.31	23.22
	2	21.91	22.05	21.96	1.22	23.13	23.27	23.18
	3	21.53	21.62	21.53	1.22	22.75	22.84	22.75
	4	21.52	21.61	21.55	1.22	22.74	22.83	22.77
HSUPA	1	19.96	20.07	20.00	1.22	21.18	21.29	21.22
	2	19.93	20.08	20.01	1.22	21.15	21.30	21.23
	3	20.97	21.07	21.02	1.22	22.19	22.29	22.24
	4	19.46	19.57	19.51	1.22	20.68	20.79	20.73
	5	20.97	21.06	21.05	1.22	22.19	22.28	22.27
Limit	33.01dBm							

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14 ~ 2022/09/15	Test Band	WCDMA Band IV

Mode	3GPP Subtest	Conducted Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)		
		Band IV Channel				Band IV Channel		
		1312	1412	1513		1312	1412	1513
WCDMA R99	1	23.22	23.17	23.01	2.46	25.68	25.63	25.47
HSDPA	1	22.31	22.22	22.11	2.46	24.77	24.68	24.57
	2	22.24	22.20	22.07	2.46	24.70	24.66	24.53
	3	21.77	21.73	21.59	2.46	24.23	24.19	24.05
	4	21.76	21.71	21.52	2.46	24.22	24.17	23.98
HSUPA	1	20.23	20.15	20.05	2.46	22.69	22.61	22.51
	2	20.26	20.19	20.07	2.46	22.72	22.65	22.53
	3	21.26	21.17	21.07	2.46	23.72	23.63	23.53
	4	19.79	19.69	19.59	2.46	22.25	22.15	22.05
	5	21.25	21.14	21.06	2.46	23.71	23.60	23.52
Limit	30.00dBm							

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

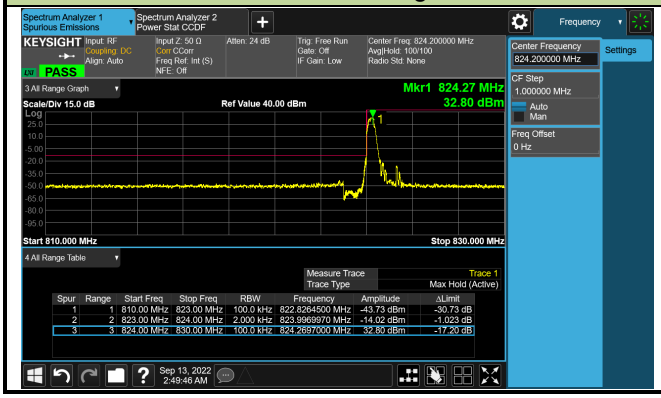
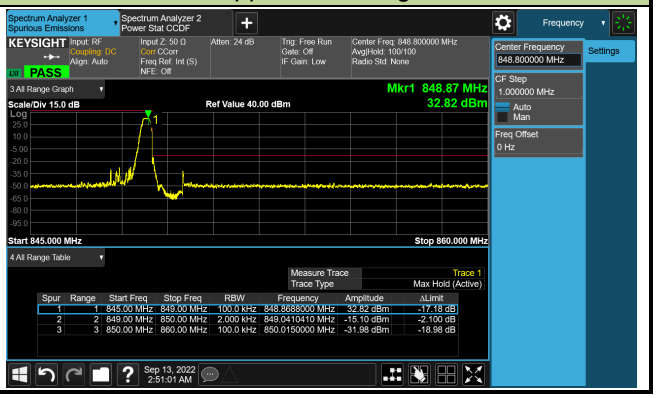
Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/14 ~ 2022/09/15	Test Band	WCDMA Band V

Mode	3GPP Subtest	Conducted Power (dBm)			Antenna Gain (dBi)	ERP (dBm)		
		Band V Channel				Band V Channel		
		4132	4182	4233		4132	4182	4233
WCDMA R99	1	23.09	23.13	23.30	1.92	22.86	22.90	23.07
HSDPA	1	22.22	22.27	22.34	1.92	21.99	22.04	22.11
	2	22.15	22.20	22.28	1.92	21.92	21.97	22.05
	3	21.71	21.73	21.82	1.92	21.48	21.50	21.59
	4	21.70	21.68	21.79	1.92	21.47	21.45	21.56
HSUPA	1	20.15	20.17	20.27	1.92	19.92	19.94	20.04
	2	20.17	20.19	20.26	1.92	19.94	19.96	20.03
	3	21.17	21.18	21.28	1.92	20.94	20.95	21.05
	4	19.68	19.72	19.82	1.92	19.45	19.49	19.59
	5	21.16	21.19	21.29	1.92	20.93	20.96	21.06
Limit	38.45dBm							

Note: The ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) – 2.15

A.4 Band Edge Test Result

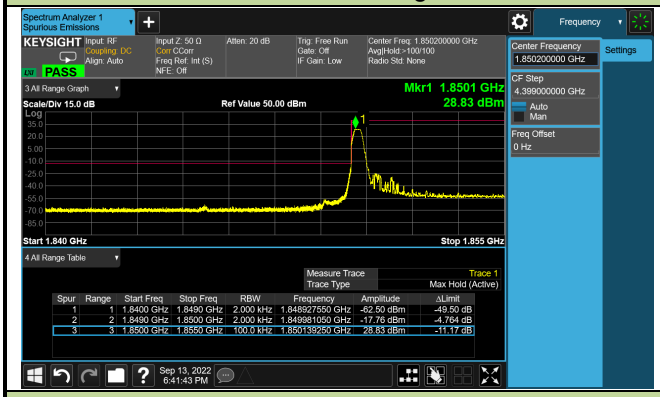
Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	GSM 850

GSM 850_GPRS	
Lower Band Edge	Upper Band Edge
	

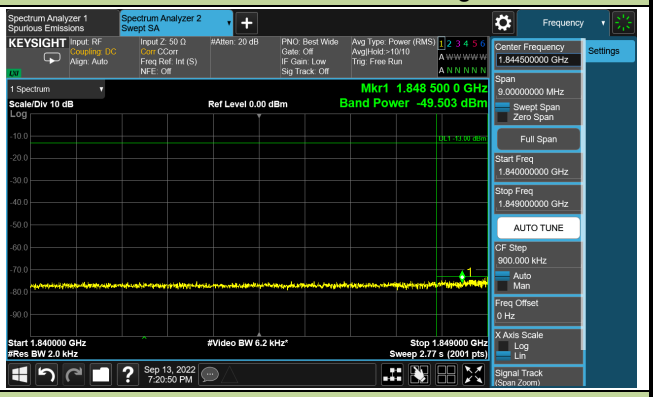
Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	PCS 1900

PCS 1900_GPRS

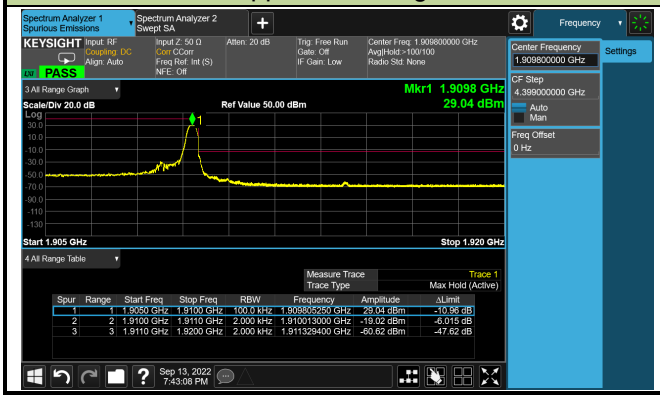
Lower Band Edge



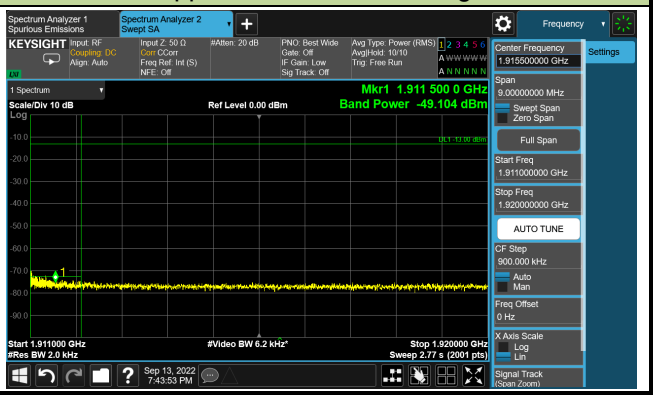
Lower Extended Band Edge



Upper Band Edge



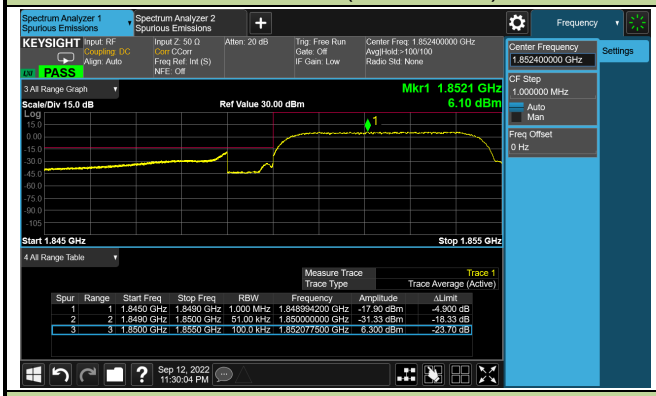
Upper Extended Band Edge



Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/12	Test Band	WCDMA Band II, IV, V

WCDMA Band II

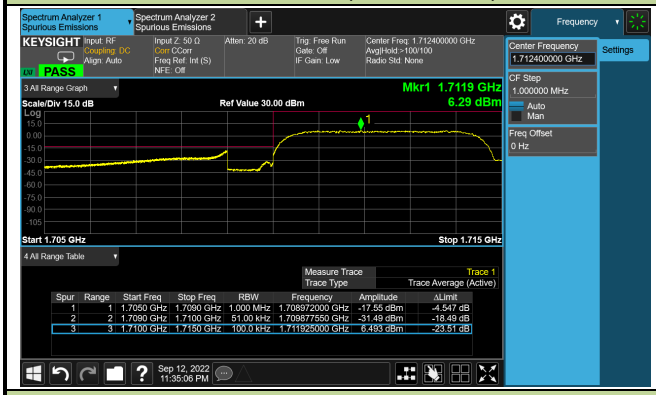
Channel 9262 (1852.4MHz)



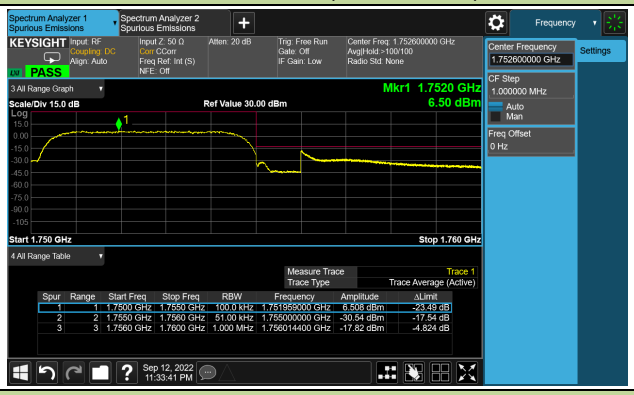
Channel 9538 (1907.6MHz)

WCDMA Band IV

Channel 1312 (1712.4MHz)

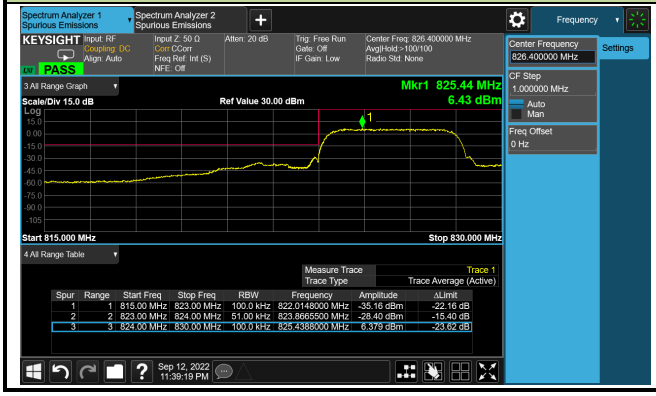


Channel 1513 (1752.6MHz)

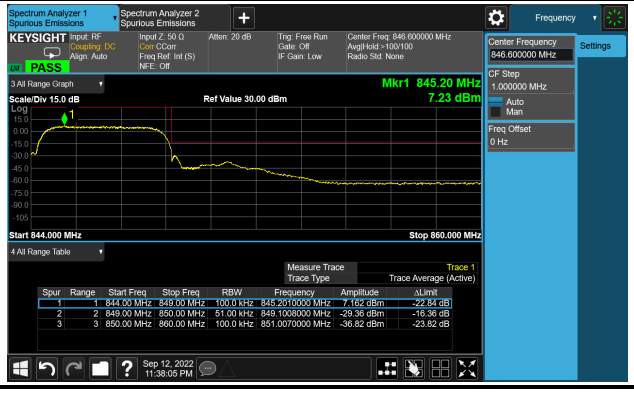


WCDMA Band V

Channel 4132 (826.4MHz)



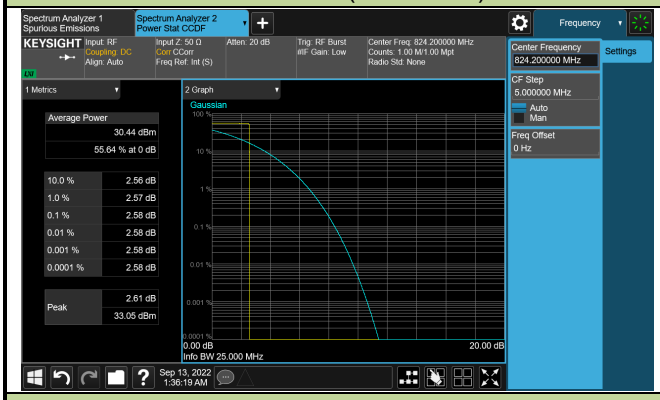
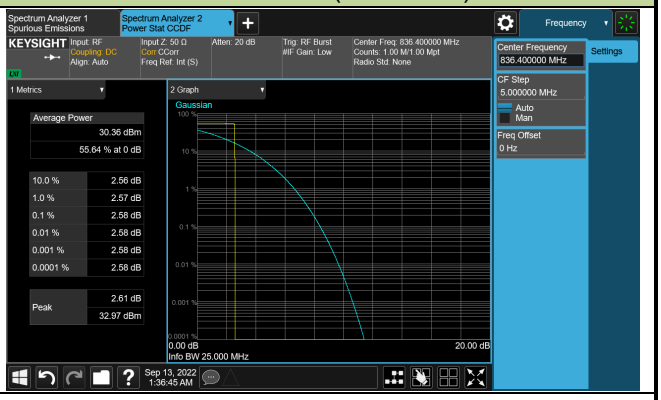
Channel 4233 (846.6MHz)



A.5 Peak to Average Ratio Test Result

Test Site	SIP-SR1	Test Engineer	Allen Zou
Test Date	2022/09/13	Test Band	GSM 850, PCS 1900

Channel No.	Frequency (MHz)	Channel Bandwidth (kHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
GSM 850_GPRS					
128	824.2	200	2.58	≤ 13.00	Pass
189	836.4	200	2.58	≤ 13.00	Pass
251	848.8	200	2.57	≤ 13.00	Pass
GSM 850_EGPRS					
128	824.2	200	5.63	≤ 13.00	Pass
189	836.4	200	5.74	≤ 13.00	Pass
251	848.8	200	5.73	≤ 13.00	Pass
PCS 1900_GPRS					
512	1850.2	200	2.57	≤ 13.00	Pass
661	1880.0	200	2.56	≤ 13.00	Pass
810	1909.8	200	2.57	≤ 13.00	Pass
PCS 1900_EGPRS					
512	1850.2	200	5.10	≤ 13.00	Pass
661	1880.0	200	5.45	≤ 13.00	Pass
810	1909.8	200	5.51	≤ 13.00	Pass

GSM 850_GPRS	
Channel 128 (824.2MHz)	Channel 189 (836.4MHz)
	
Channel 254 (848.8MHz)