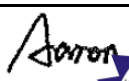


TEST REPORT

FCC ID.....:	2A77SBLKSIMTEK22	
Test Report No.:	TCT220907E004	
Date of issue	Sep. 08, 2022	
Testing laboratory.....:	SHENZHEN TONGCE TESTING LAB	
Testing location/ address:	2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name	Simtek, Inc.	
Address	3806 Branson Drive, San Mateo CA 94403 USA	
Manufacturer's name	Simtek, Inc.	
Address	3806 Branson Drive, San Mateo CA 94403 USA	
Standard(s).....:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part22 FCC CFR Title 47 Part24 FCC CFR Title 47 Part27	
Product Name	Simtek Sensor II	
Trade Mark.....:	Simtek	
Model/Type reference	BLK-SIMTEK-22	
Rating(s)	DC 3.7V	
Date of receipt of test item	Sep. 07, 2022	
Date (s) of performance of test	Aug. 08, 2022 - Sep. 08, 2022	
Tested by (+signature)....:	Aaron MO	
Check by (+signature)	Beryl ZHAO	
Approved by (+signature):	Tomsin	

**General disclaimer:**

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1. General Product Information

1.1. EUT description

Product Name.....:	Simtek Sensor II
Model/Type reference.....:	BLK-SIMTEK-22
Sample Number.....:	TCT220907E004-0101
3G Version	WCDMA: R99 HSDPA: Release 5 HSUPA: Release 6
Tx Frequency.....:	GPRS/EGPRS 850: 824.2MHz ~ 848.8MHz GPRS/EGPRS 1900: 1850.2MHz ~ 1909.8MHz WCDMA Band V: 826.4MHz ~ 846.6MHz WCDMA Band IV: 1712.4MHz ~ 1752.6MHz WCDMA Band II: 1852.4MHz ~ 1907.6MHz
Rx Frequency	GPRS/EGPRS 850: 869.2MHz ~ 893.8MHz GPRS/EGPRS 1900: 1930.2MHz ~ 1989.8MHz WCDMA Band V: 871.4MHz ~ 891.6MHz WCDMA Band IV: 2112.4 MHz ~ 2152.6 MHz WCDMA Band II: 1932.4MHz ~ 1987.6MHz
Maximum Output Power to Antenna.....:	GPRS/EGPRS 850: 31.58dBm GPRS/EGPRS 1900: 28.67dBm WCDMA/HSDPA/HSUPA Band 2: 30.75dBm WCDMA/HSDPA/HSUPA Band 4: 29.74dBm WCDMA/HSDPA/HSUPA Band 5: 30.22dBm
99% Occupied Bandwidth.....:	GPRS850 Class 8: 247KG7W GPRS1900 Class 8: 245KG7W EGPRS850 Class 8: 247KG7W EGPRS1900 Class 8: 245KG7W WCDMA Band V RMC 12.2Kbps: 4M29F9W WCDMA Band II RMC 12.2Kbps: 4M27F9W WCDMA Band IV RMC 12.2Kbps: 4M25F9W
Type of Modulation.....:	GPRS/EGPRS: GMSK/8PSK WCDMA/HSDPA/HSUPA: QPSK
Antenna Type.....:	External Antenna
Antenna Gain.....:	GPRS/EGPRS 850: 3dBi GPRS/EGPRS 1900: 3dBi WCDMA Band V: 3dBi WCDMA Band IV: 3dBi WCDMA Band II: 3dBi
Rating(s).....:	DC 3.7V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

None.

1.3. Operation Frequency

GSM 850		PCS1900	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
128	824.20	512	1850.20
129	824.40	513	1850.40
....			
189	836.40	660	1879.80
190	836.60	661	1880.00
191	836.80	662	1880.20
...	...	...	...
250	848.60	809	1909.60
251	848.80	810	1909.80

WCDMA Band V		WCDMA Band IV		WCDMA Band II	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
4132	826.40	1312	1712.4	9262	1852.40
4133	826.60	1313	1712.6	9263	1852.60
....					
4182	836.40	1412	1732.4	9399	1879.80
4183	836.60	1413	1732.6	9400	1880.00
4184	836.80	1414	1732.8	9401	1880.20
...	...			...	...
4233	846.60	1513	1752.6	9538	1907.60

2. Test Result Summary

Requirement	CFR 47 Section	Result
Conducted Output Power	§22.913; §2.1046 §24.232; §27.50(d)	PASS
Peak-to-Average Ratio	§2.1046; §24.232(d) §22.913; §27.50(d)	PASS
Effective Radiated Power	§2.1046; §22.913(a) §24.232; §27.50(d)	PASS
Equivalent Isotropic Radiated Power	§2.1046; §22.913(a) §24.232; §27.50(d)	PASS
Occupied Bandwidth	§2.1049	PASS
Band Edge	§2.1051 §22.917(a) §24.238(a) §27.53(g)	PASS
Conducted Spurious Emission	§2.1051; §22.917 §24.238; §27.53(h)	PASS
Field Strength of Spurious Radiation	§2.1053; §22.917(a) §24.238; §27.53(g)	PASS
Frequency Stability for Temperature & Voltage	§2.1055; §22.355 §24.235; §27.54	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

3. General Information

3.1. Test environment and mode

Operating Environment:

Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar

Keep the EUT in communication with CMU200 and select channel with modulation
All modes and data rates and positions were investigated.

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

Test Mode		
Band	Radiated TCs	Conducted TCs
GSM 850	GPRS class 12 Link EGPRS class 12 Link	GPRS class 12 Link EGPRS class 12 Link
PCS 1900	GPRS class 12 Link	GPRS class 12 Link
WCDMA Band V	RMC 12.2Kbps Link	RMC 12.2Kbps Link
WCDMA Band IV	RMC 12.2Kbps Link	RMC 12.2Kbps Link
WCDM Band II	RMC 12.2Kbps Link	RMC 12.2Kbps Link

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission. The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarization. The emissions worst-case (Z axis) are shown in Test Results of the following pages.

3.2. Description of Support Units

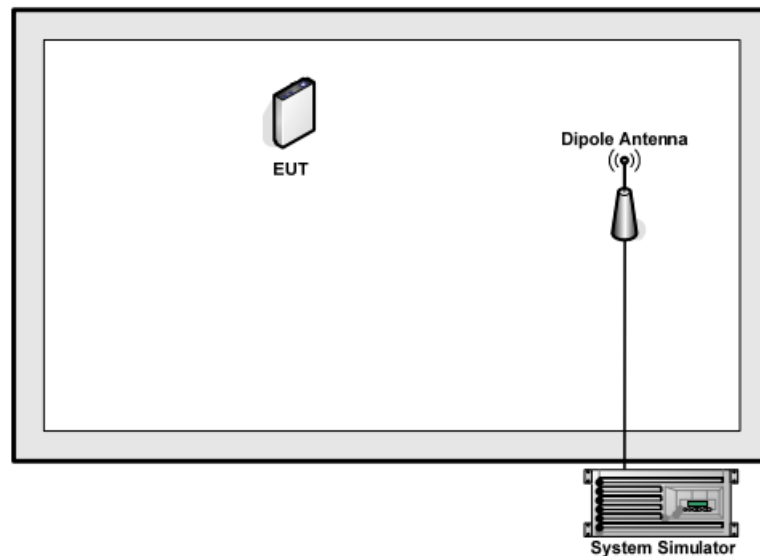
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Auto Range DC Power Supply	IT6721	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3.3. Configuration of Tested System



3.4. 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 3 dB and a 5dB attenuator.

Example: *Offset (dB) = RF cable loss (dB) + attenuator factor (dB).*
= 8(dB)

4. Facilities and Accreditations

4.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

SHENZHEN TONGCE TESTING LAB

Designation Number: CN1205

The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

SHENZHEN TONGCE TESTING LAB

CAB identifier: CN0031

The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

SHENZHEN TONGCE TESTING LAB

Address: 2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China

TEL: +86-755-27673339

4.3. Measurement Uncertainty

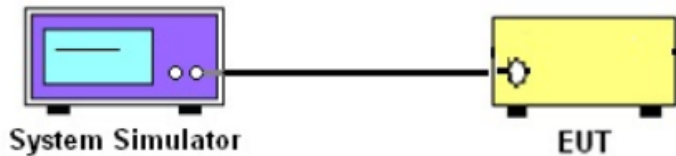
The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB
7	Temperature	$\pm 0.1^{\circ}\text{C}$
8	Humidity	$\pm 1.0\%$

5. Test Results and Measurement Data

5.1. Conducted Output Power Measurement

5.1.1. Test Specification

Test Requirement:	FCC part 22.913(a) and FCC part 24.232(b) FCC part 27.50(d);
Test Method:	FCC KDB 971168 D01 v03r01
Operation mode:	Refer to item 3.1
Limits:	GSM 850: 7W PCS 1900: 2W WCDMA Band V: 7W WCDMA Band II: 2W WCDMA Band IV: 1W
Test Setup:	 The diagram illustrates the test setup. On the left is a purple box labeled 'System Simulator' with a screen and two buttons. A black line connects it to a yellow box on the right labeled 'EUT' (Equipment Under Test), which has a circular port on its left side.
Test Procedure:	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.
Test Result:	PASS

5.1.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	110188	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

5.1.3. Test data

Conducted Power Measurement Results:

Average Conducted Power (*Unit: dBm)						
Band	GSM850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GPRS class8	30.40	30.67	30.73	25.29	24.78	24.5
GPRS class10	29.74	30.03	30.13	25.23	24.79	24.52
GPRS class11	28.06	28.34	28.40	25.13	24.73	24.45
GPRS class12	26.81	27.12	27.18	24.99	24.65	24.37
EGPRS class8	24.61	24.60	24.05	24.12	25.56	24.36
EGPRS class10	24.58	24.77	25.77	24.01	25.67	24.37
EGPRS class11	23.54	23.75	22.97	23.79	25.41	24.21
EGPRS class12	20.20	21.52	20.07	23.79	25.13	23.94
Average Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4183	4233	9262	9400	9538
Frequency(MHz)	826.4	836.6	846.6	1852.4	1880.0	1907.6
WCDMA RMC 12.2K	23.05	23.31	23.19	22.72	22.85	22.77
HSDPA Subtest-1	22.37	22.43	22.40	22.34	22.31	22.28
HSDPA Subtest-2	22.42	22.44	22.41	22.23	22.34	22.25
HSDPA Subtest-3	22.27	22.33	22.30	22.19	22.27	22.21
HSDPA Subtest-4	22.22	22.26	22.23	22.01	22.22	22.12
HSUPA Subtest-1	21.87	21.95	21.91	21.79	21.91	21.80
HSUPA Subtest-2	21.75	21.78	21.74	21.68	21.75	21.67
HSUPA Subtest-3	21.45	21.47	21.45	21.38	21.42	21.35
HSUPA Subtest-4	21.34	21.39	21.36	21.21	21.36	21.36
HSUPA Subtest-5	21.21	21.26	21.23	21.13	21.20	21.18
Band	WCDMA Band IV					
Channel	1312	1413	1513			
Frequency(MHz)	1712.4	1732.6	1752.6			
WCDMA RMC 12.2K	20.99	21.11	21.11			
HSDPA Subtest-1	26.31	26.51	26.71			
HSDPA Subtest-2	26.31	26.61	26.72			
HSDPA Subtest-3	26.24	26.54	26.74			
HSDPA Subtest-4	26.31	26.53	26.74			
HSUPA Subtest-1	23.93	24.38	24.70			
HSUPA Subtest-2	24.52	24.33	24.70			

HSUPA Subtest-3	24.63	24.72	24.75			
HSUPA Subtest-4	24.31	24.34	24.05			
HSUPA Subtest-5	24.07	24.64	24.58			

5.2. Peak to Average Ratio

5.2.1. Test Specification

Test Requirement:	FCC part 24.232(d) ; FCC part 22.913; FCC part 27.50(d);
Test Method:	ANSI C63.26:2013
Operation mode:	Refer to item 3.1
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test Setup:	<pre> graph LR SS[System Simulator] --- PD[Power Divider] SA[Spectrum Analyzer] --- PD PD --- EUT[EUT] </pre>
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03r01 Section 5.7.1. 2. The EUT was connected to spectrum analyzer and system simulator via a power divider. 3. Set EUT to transmit at maximum output power. 4. For GSM/EGPRS operating modes, signal gating is implemented on the spectrum analyzer by triggering from the system simulator. 5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.
Test Result:	PASS

5.2.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	110188	Jul. 04, 2023
Spectrum Analyzer	R&S	FSU	200054	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

5.2.3. Test Data

Cellular Band			
Mode	GSM850		
Channel	128	189	251
Frequency (MHz)	824.2	836.6	848.8
Peak-to-Average Ratio (dB)	9.82	9.88	3.66

PCS Band			
Mode	GSM 1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	9.66	3.62	3.64

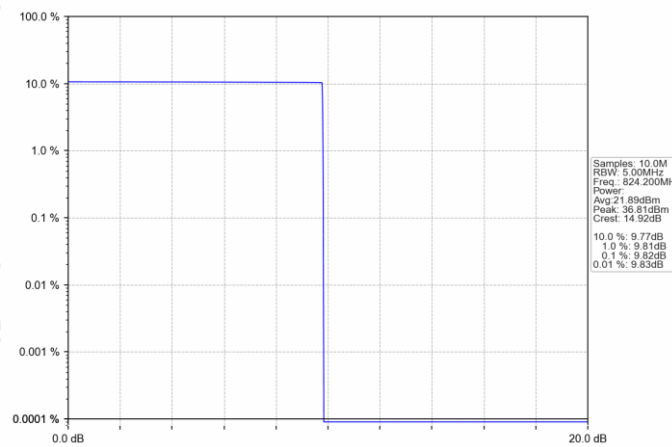
Mode	WCDMA Band V (RMC 12.2Kbps)			WCDMA Band II (RMC 12.2Kbps)			WCDMA Band IV (RMC 12.2Kbps)		
Channel	4132	4183	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)	826.4	836.6	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
Peak-to-Average Ratio (dB)	2.73	2.64	1.97	2.62	2.89	2.70	3.06	2.71	2.90

Note: Measurements were conducted in all GMSK modulation (GPRS/EGPRS) and the worst case Mode (GPRS) was submitted only.

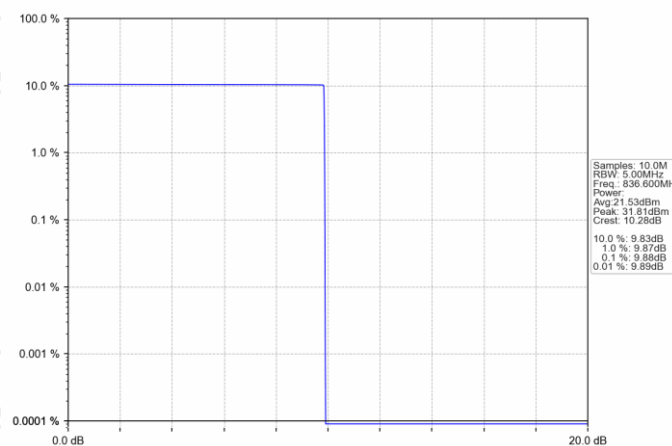
Test plots as follows:

GSM 850

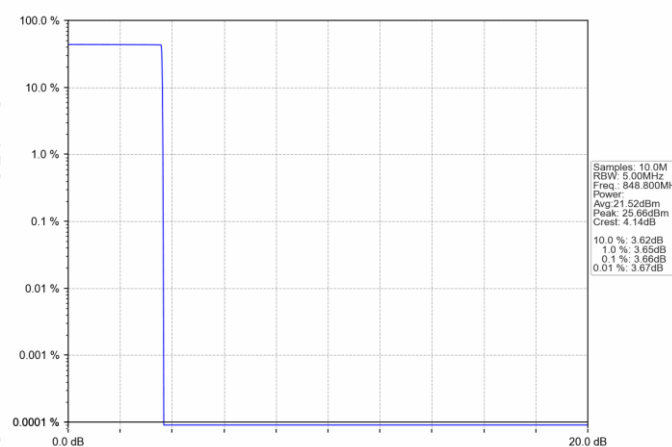
Peak-to-Average Ratio on Channel 128



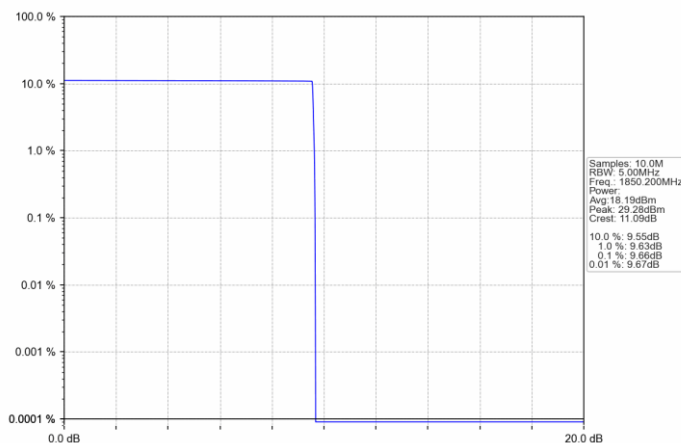
Peak-to-Average Ratio on Channel 190



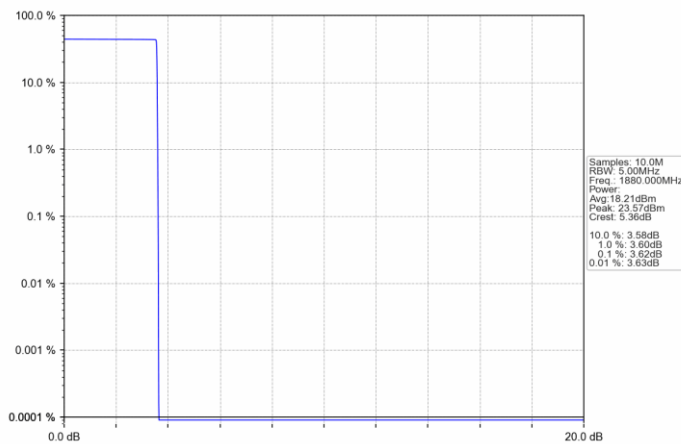
Peak-to-Average Ratio on Channel 251



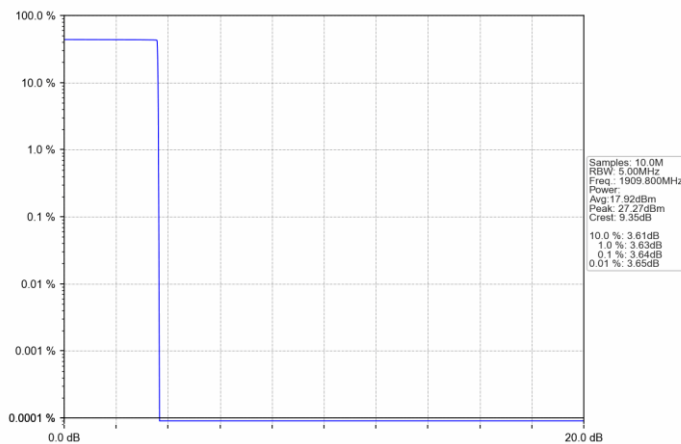
Peak-to-Average Ratio on Channel 512



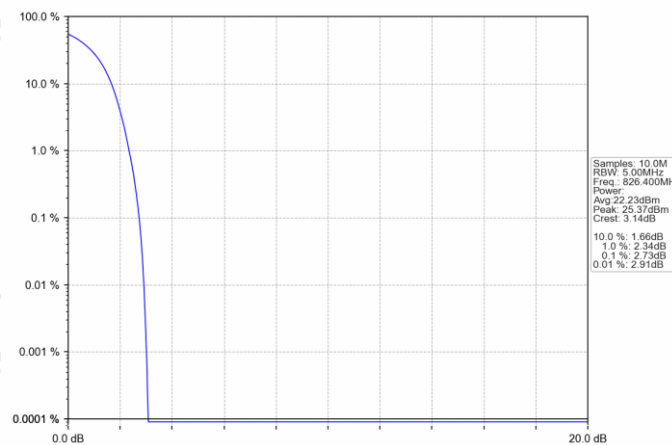
Peak-to-Average Ratio on Channel 661



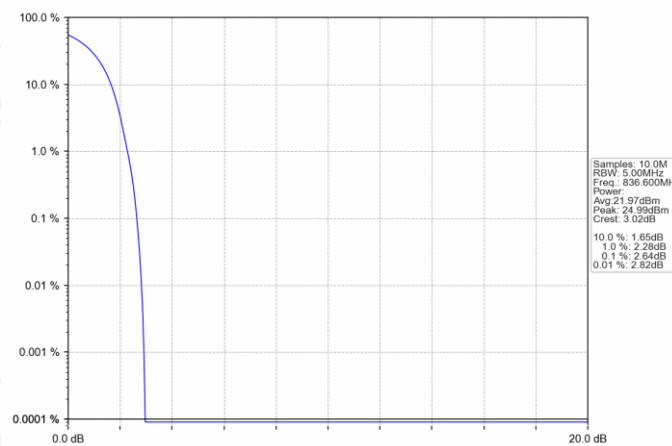
Peak-to-Average Ratio on Channel 810



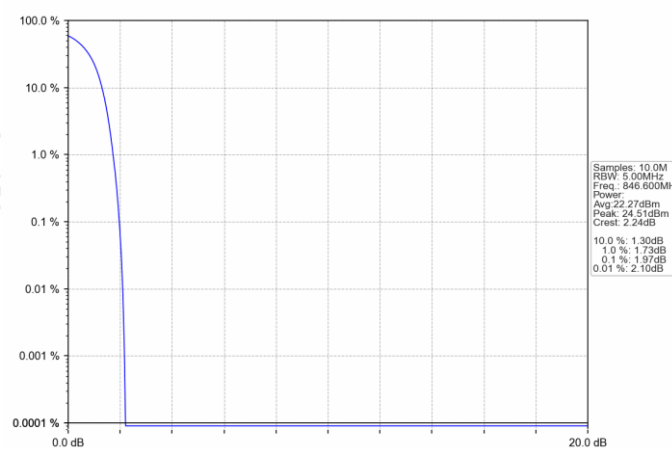
Peak-to-Average Ratio on Channel 4132



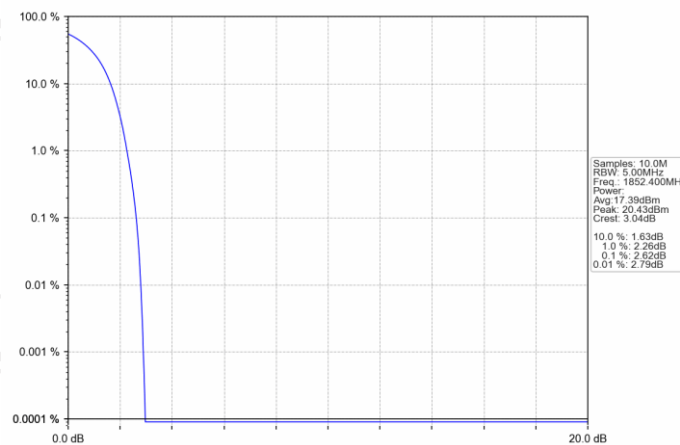
Peak-to-Average Ratio on Channel 4183



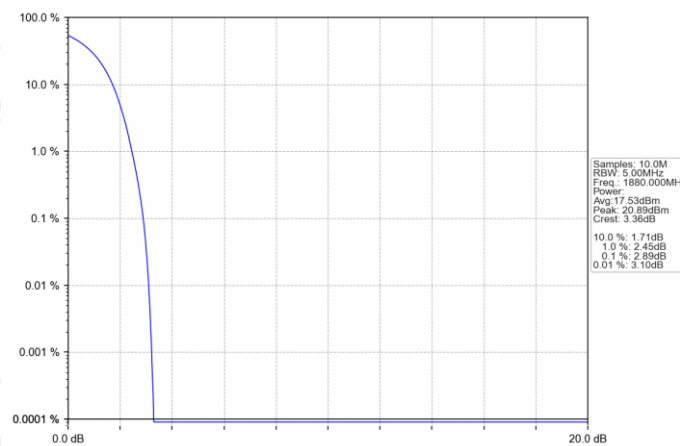
Peak-to-Average Ratio on Channel 4233



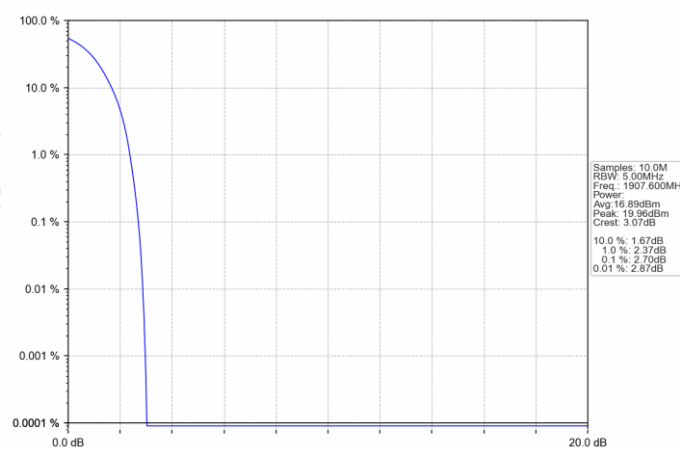
Peak-to-Average Ratio on Channel 9262



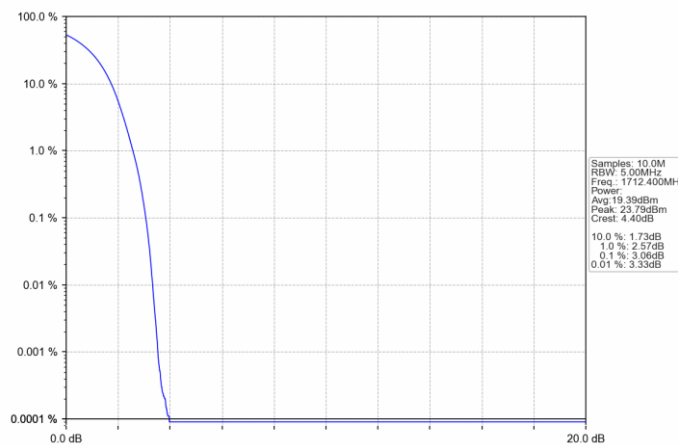
Peak-to-Average Ratio on Channel 9400



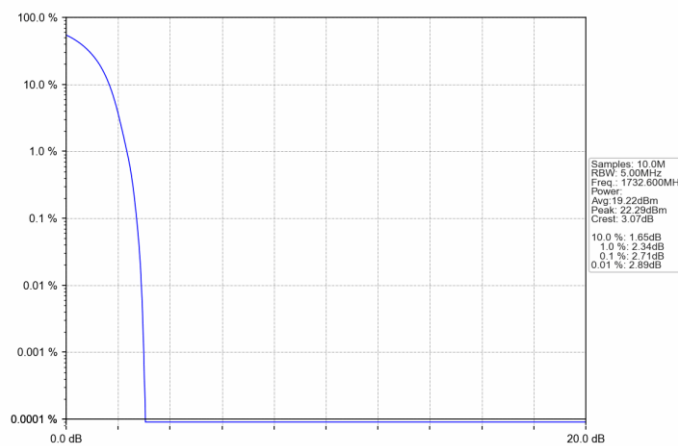
Peak-to-Average Ratio on Channel 9538



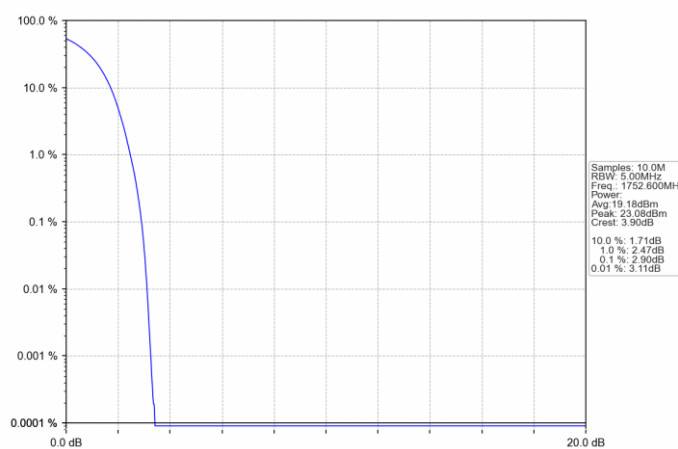
Peak-to-Average Ratio on Channel 1312



Peak-to-Average Ratio on Channel 1413

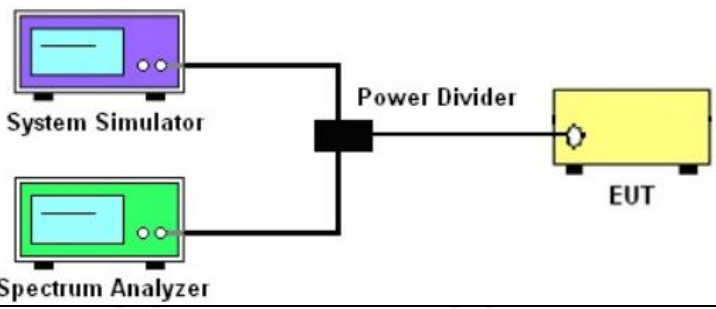


Peak-to-Average Ratio on Channel 1513



5.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

5.3.1. Test Specification

Test Requirement:	FCC part 2.1049
Test Method:	FCC KDB 971168 D01v03r01
Operation mode:	Refer to item 3.1
Limit:	N/A
Test Setup:	
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03r01 Section 4.2. 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. 3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold. 5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.
Test Result:	PASS

5.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	110188	Jul. 04, 2023
Spectrum Analyzer	R&S	FSU	200054	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

5.3.3. Test data

Cellular Band			
Mode	GSM850		
Channel	128	190	251
Frequency (MHz)	824.2	836.6	848.8
99% OBW (kHz)	246.00	246.00	247.00
26dB BW (kHz)	322.00	316.00	324.00

Cellular Band			
Mode	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
99% OBW (kHz)	249.00	248.00	247.00
26dB BW (kHz)	317.00	316.00	326.00

Cellular Band			
Mode	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
99% OBW (MHz)	4.21	4.21	4.29
26dB BW (MHz)	4.89	4.89	5.01

Cellular Band			
Mode	WCDMA Band II (RMC 12.2Kbps)		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880	1907.6
99% OBW (MHz)	4.24	4.21	4.22
26dB BW (MHz)	4.92	4.92	4.93

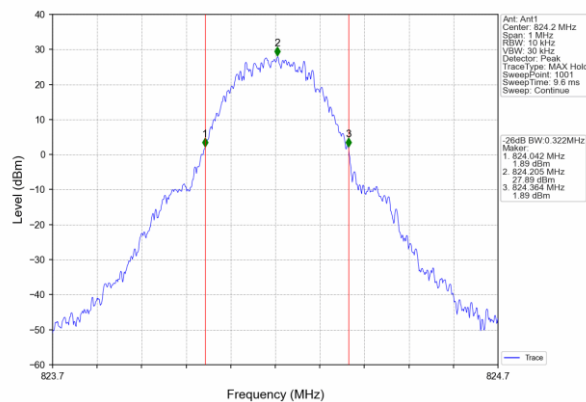
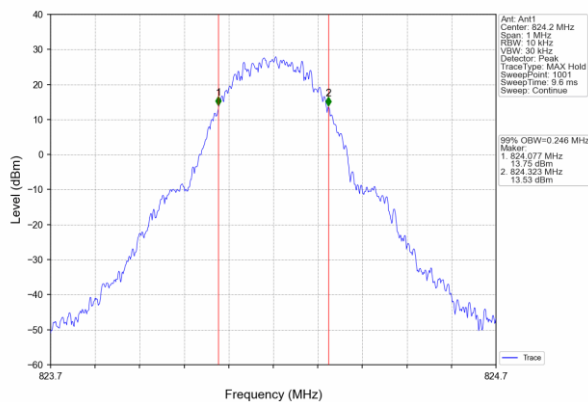
Cellular Band			
Mode	WCDMA Band IV (RMC 12.2Kbps)		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
99% OBW (MHz)	4.21	4.23	4.22
26dB BW (MHz)	4.89	4.88	4.90

Note: Measurements were conducted in all GMSK modulation (GPRS/EGPRS) and the worst case Mode (GPRS) was submitted only.

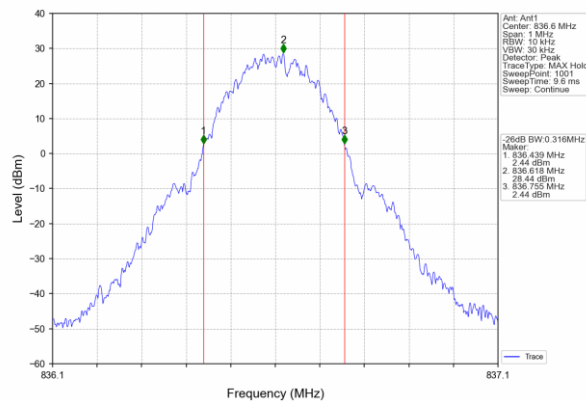
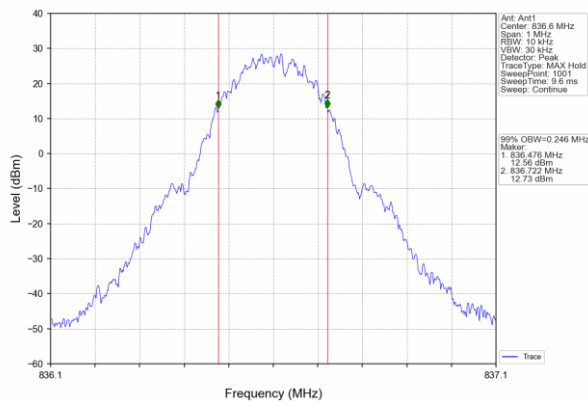
Test plots as follows:

Band:	GSM 850	Test Mode:	GSM Link (GMSK)
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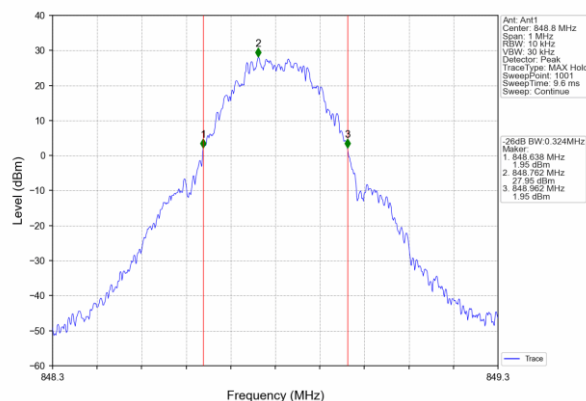
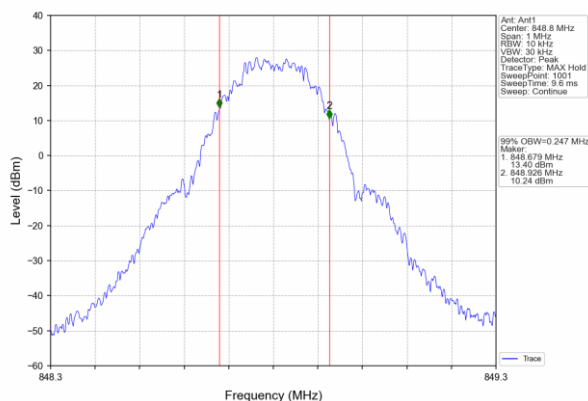
26dB&99% Occupied Bandwidth Plot on Channel 128



26dB&99% Occupied Bandwidth Plot on Channel 190



26dB&99% Occupied Bandwidth Plot on Channel 251



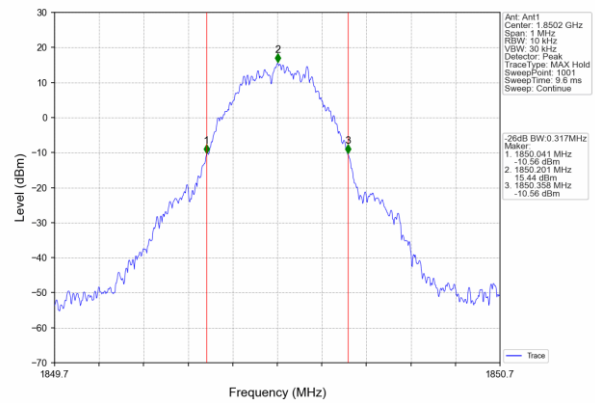
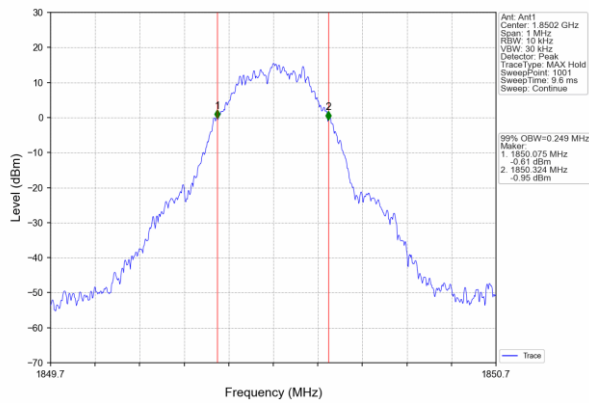
Band:

GSM 1900

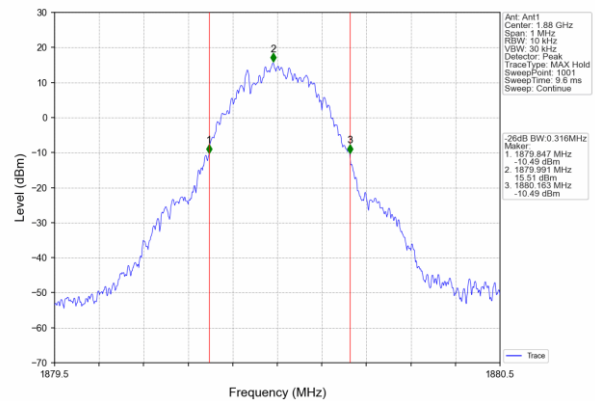
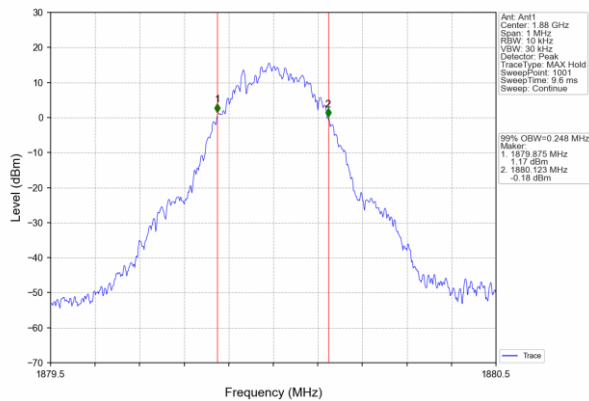
Test Mode:

GSM Link (GMSK)

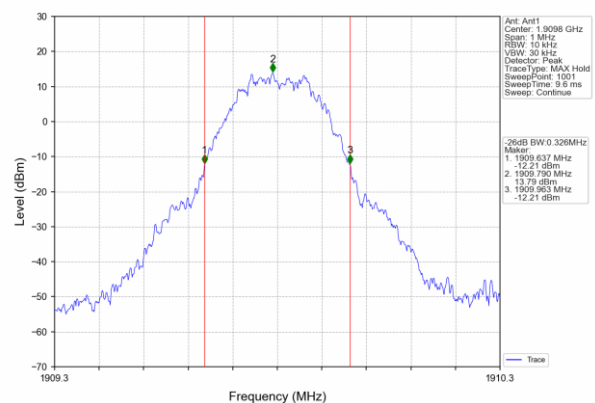
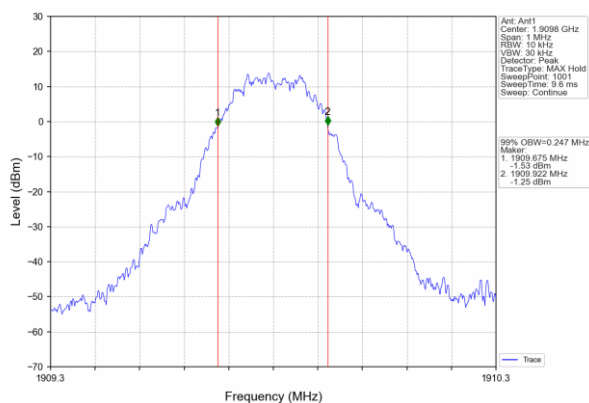
26dB&99% Occupied Bandwidth Plot on Channel 512



26dB&99% Occupied Bandwidth Plot on Channel 661



26dB&99% Occupied Bandwidth Plot on Channel 810



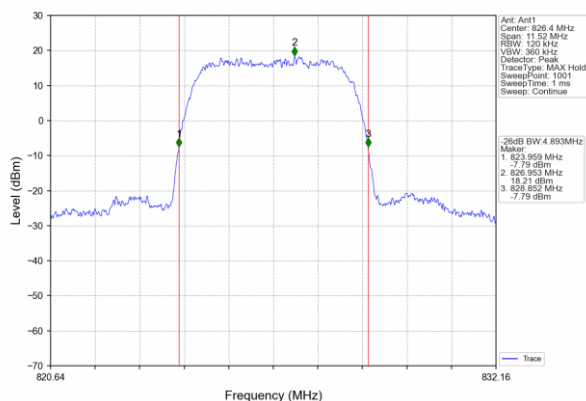
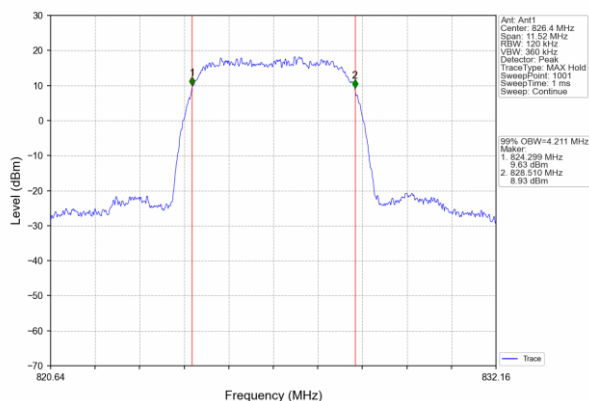
Band:

WCDMA Band V

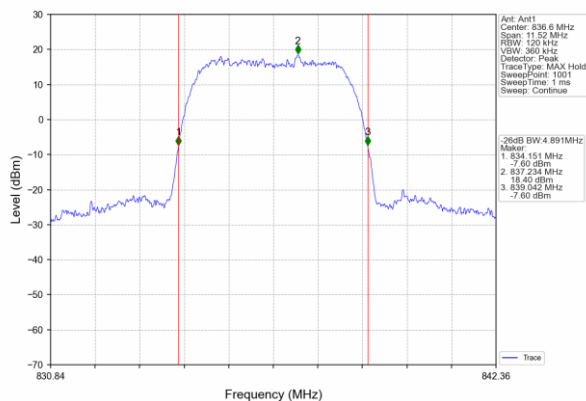
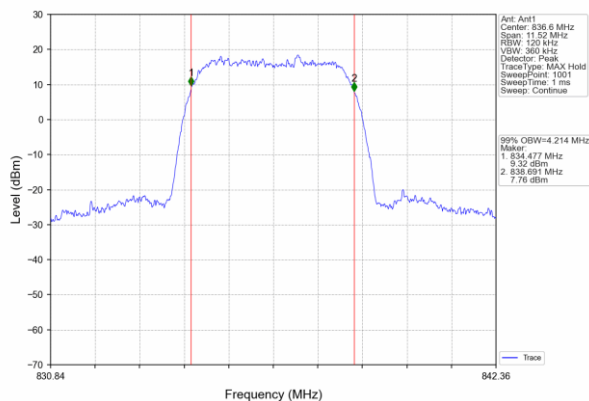
Test Mode:

RMC 12.2Kbps Link
(QPSK)

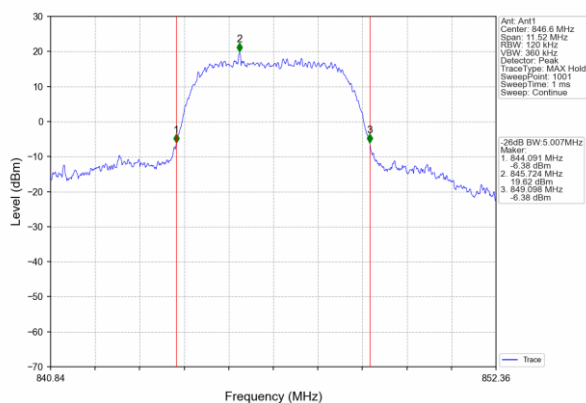
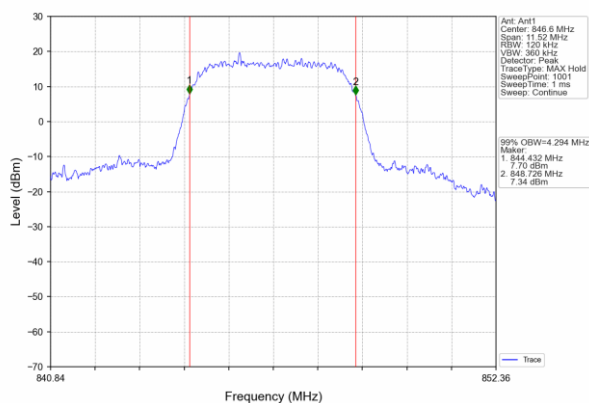
26dB&99% Occupied Bandwidth Plot on Channel 4132



26dB&99% Occupied Bandwidth Plot on Channel 4183



26dB&99% Occupied Bandwidth Plot on Channel 4233



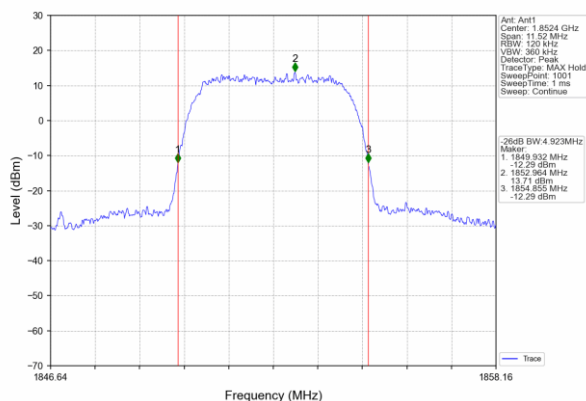
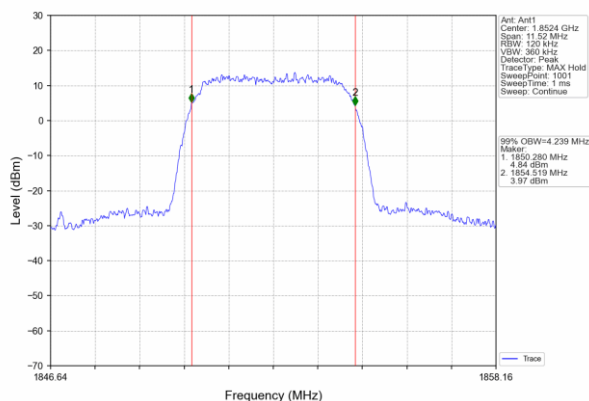
Band:

WCDMA Band II

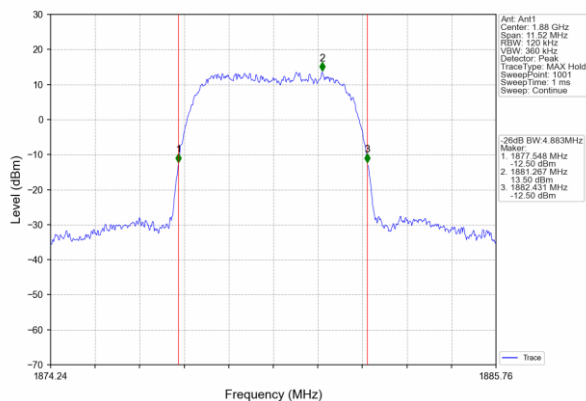
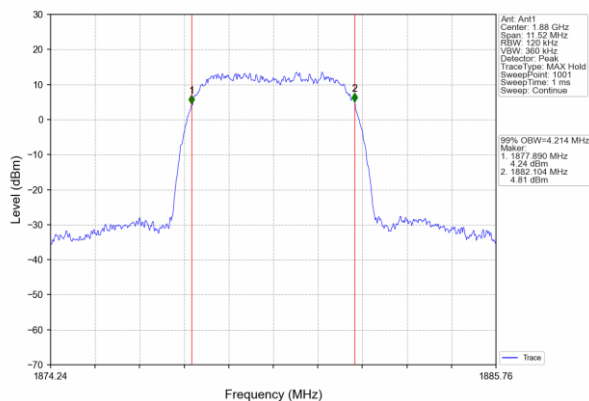
Test Mode:

RMC 12.2Kbps Link
(QPSK)

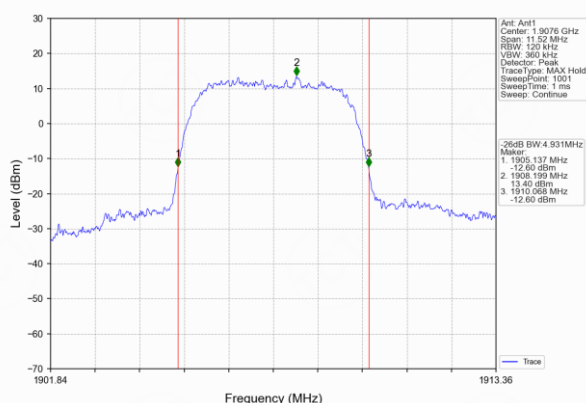
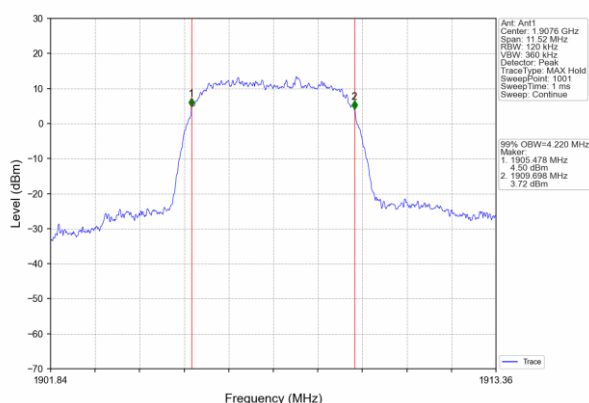
26dB&99% Occupied Bandwidth Plot on Channel 9262



26dB&99% Occupied Bandwidth Plot on Channel 9400



26dB&99% Occupied Bandwidth Plot on Channel 9538



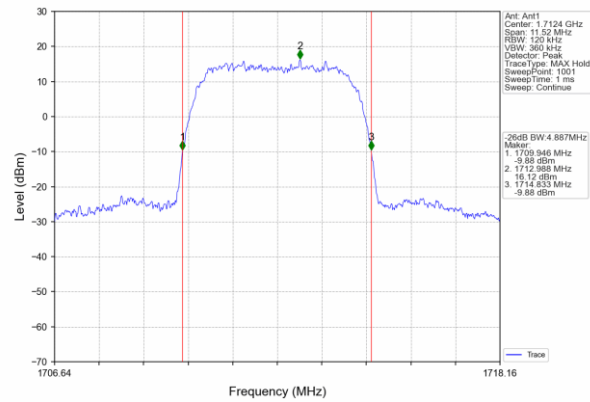
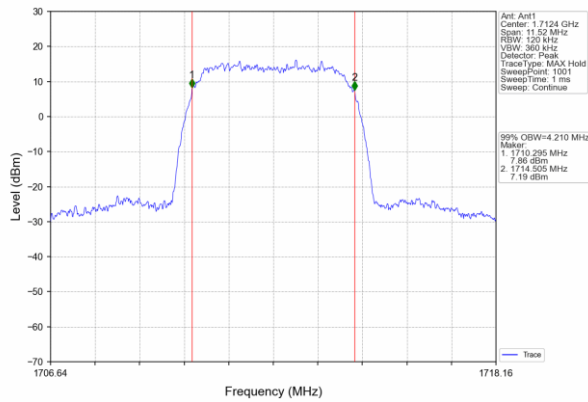
Band:

WCDMA Band IV

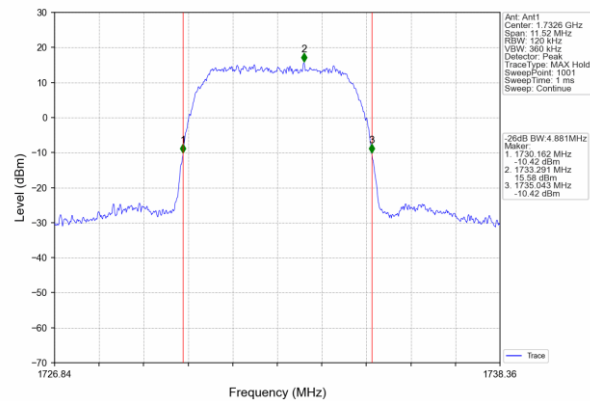
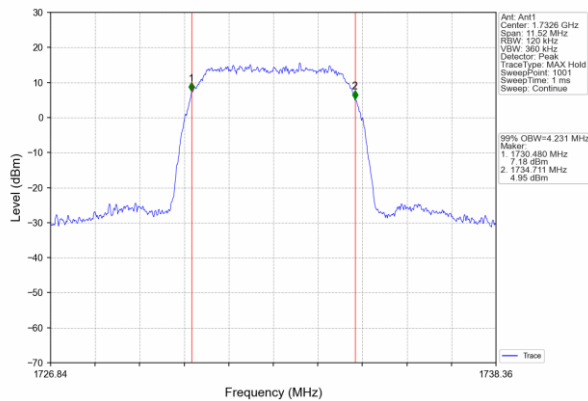
Test Mode:

RMC 12.2Kbps Link
(QPSK)

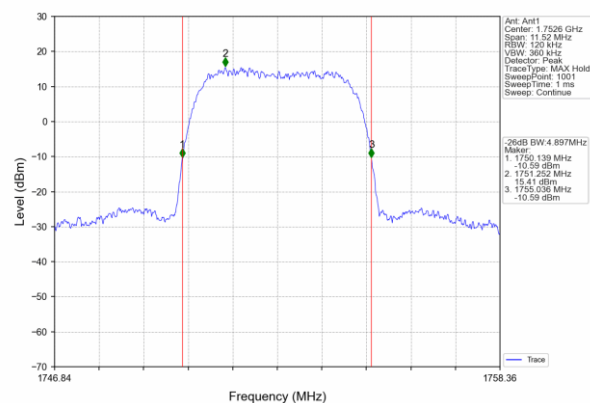
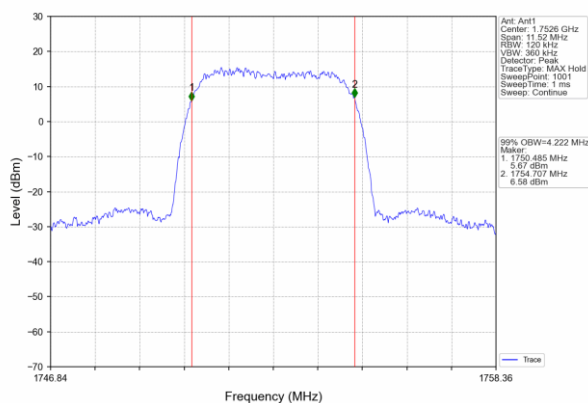
26dB&99% Occupied Bandwidth Plot on Channel 1312



26dB&99% Occupied Bandwidth Plot on Channel 1413

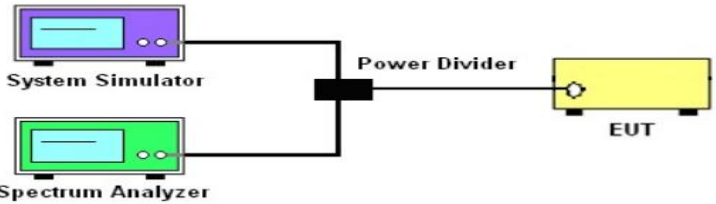


26dB&99% Occupied Bandwidth Plot on Channel 1513



5.4. Band Edge and Conducted Spurious Emission Measurement

5.4.1. Test Specification

Test Requirement:	FCC part22.917(a) and FCC part24.238(a) FCC part27.53(g)
Test Method:	FCC KDB 971168 D01v03r01
Operation mode:	Refer to item 3.1
Limit:	-13dBm
Test Setup:	 The diagram illustrates the test setup. A System Simulator (purple box) and a Spectrum Analyzer (green box) are connected to a Power Divider (black box). The Power Divider is then connected to the EUT (Equipment Under Test, yellow box).
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03r01 Section 6.0. 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement. 4. The band edges of low and high channels for the highest RF powers were measured. 5. The conducted spurious emission for the whole frequency range was taken. 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band. 7. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power $P(\text{Watts}) = P(\text{W}) - [43 + 10\log(P)] \text{ (dB)} = [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13\text{dBm}.$
Test Result:	PASS

5.4.2. Test Instruments

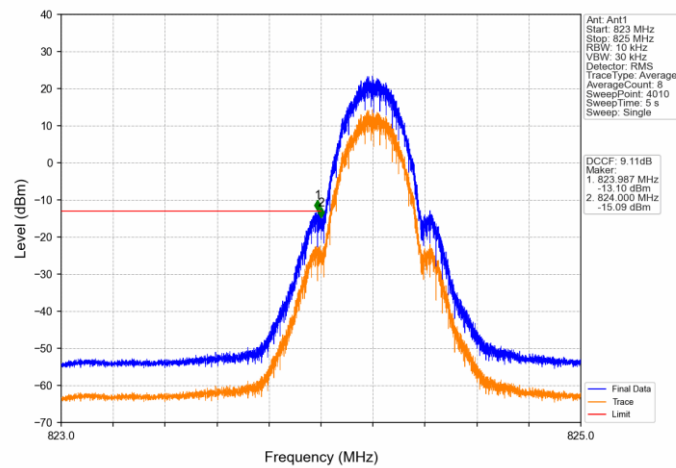
Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	110188	Jul. 04, 2023
Spectrum Analyzer	R&S	FSU	200054	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

5.4.3. Test data

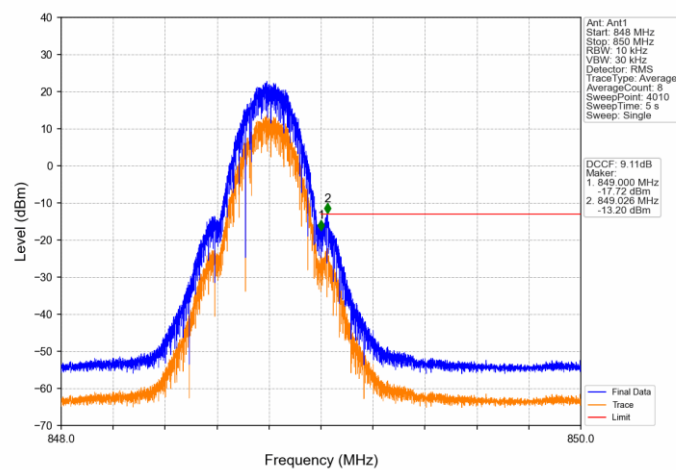
Test plots as follows:

Band:	GSM 850	Test Mode:	GPRS Link (GMSK)
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Lower Band Edge Plot on Channel 128



Higher Band Edge Plot on Channel 251



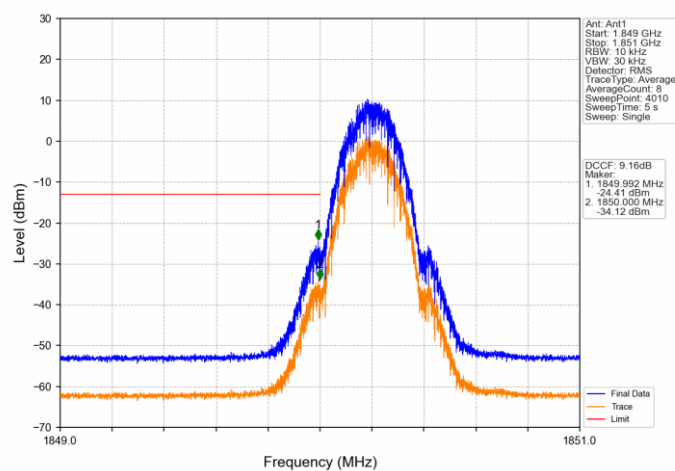
Band:

GSM 1900

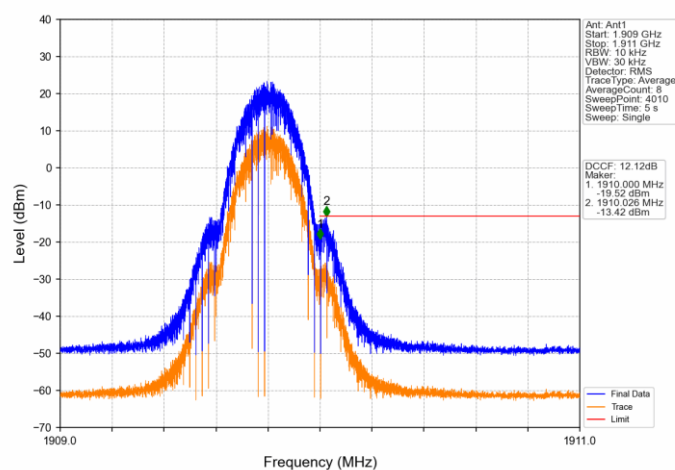
Test Mode:

GPRS Link (GMSK)

Lower Band Edge Plot on Channel 512

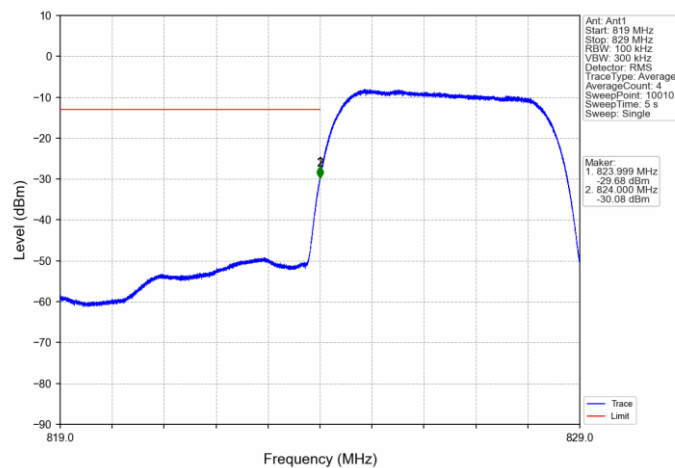


Higher Band Edge Plot on Channel 810

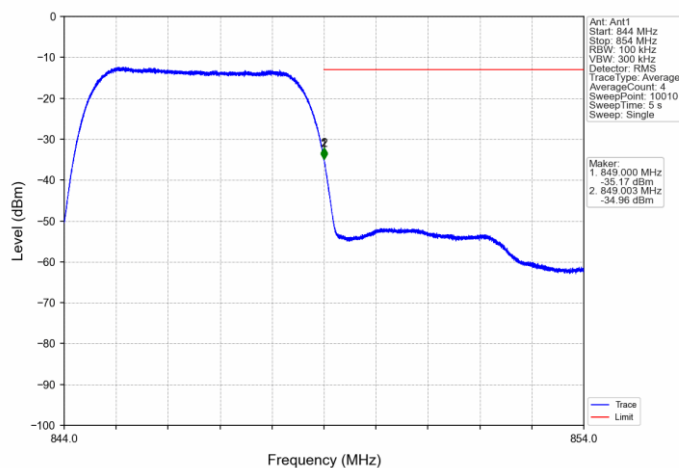


Band:	WCDMA Band V	Test Mode:	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 4132

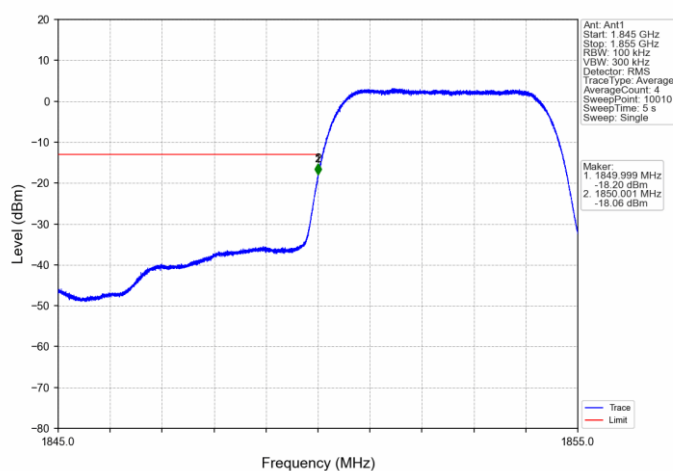


Higher Band Edge Plot on Channel 4233

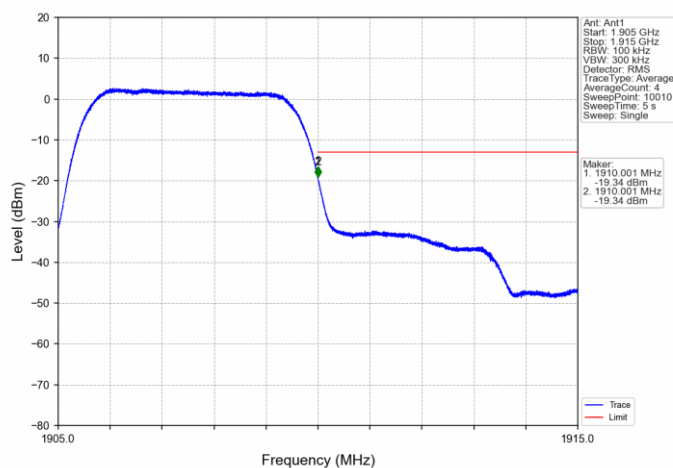


Band:	WCDMA Band II	Test Mode:	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 9262

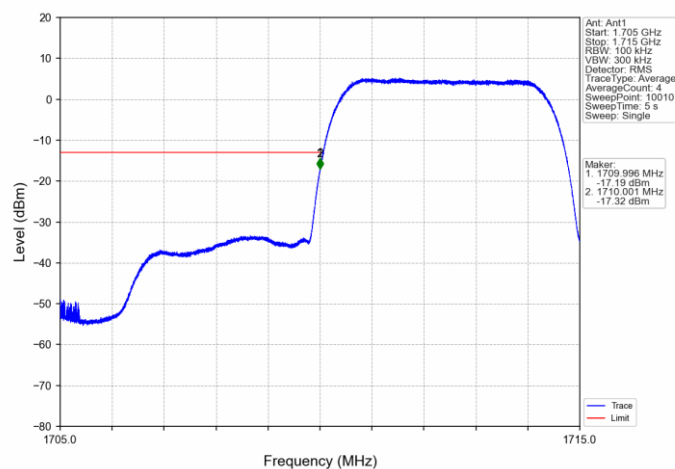


Higher Band Edge Plot on Channel 9538

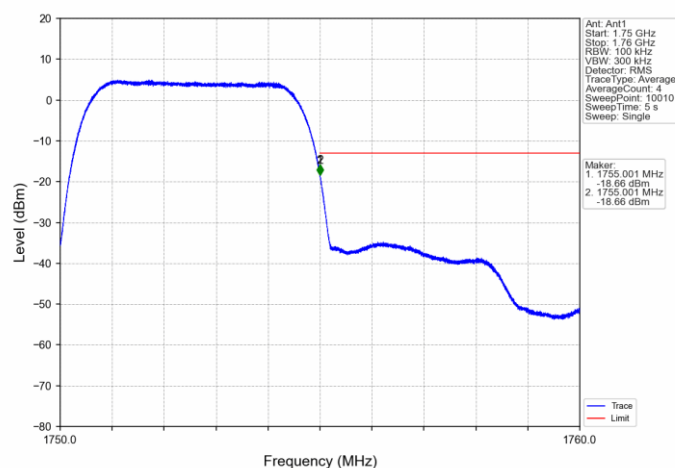


Band:	WCDMA Band IV	Test Mode:	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 1312



Higher Band Edge Plot on Channel 1513



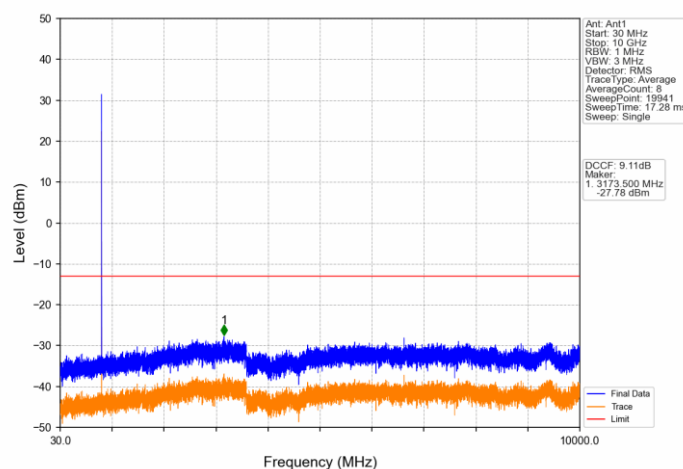
Band:

GSM 850

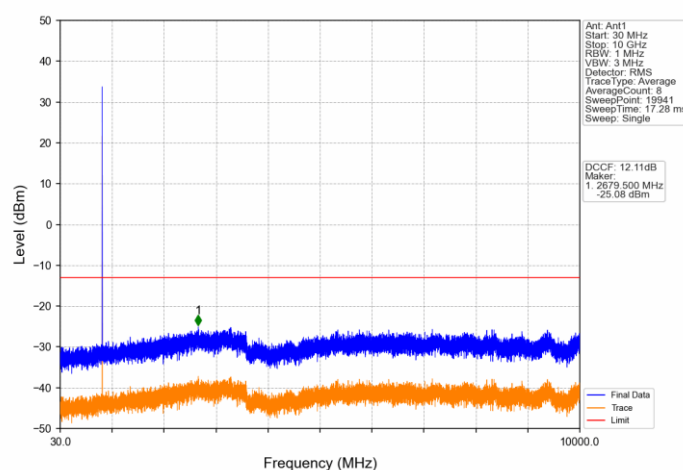
Test Mode:

GPRS Link (GMSK)

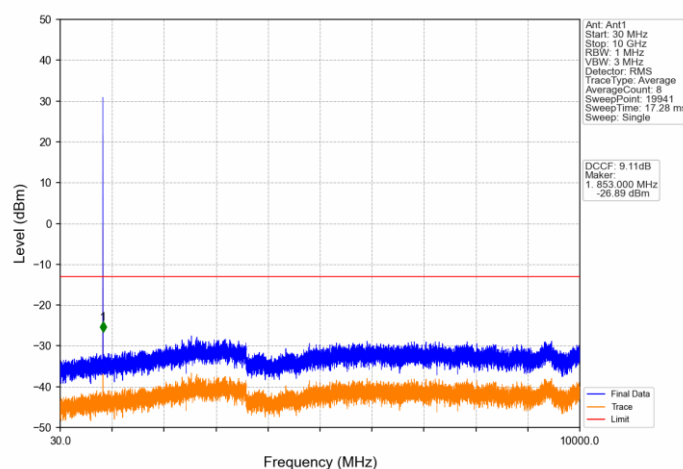
Conducted Spurious Emission on Channel 128



Conducted Spurious Emission on Channel 190



Conducted Spurious Emission on Channel 251



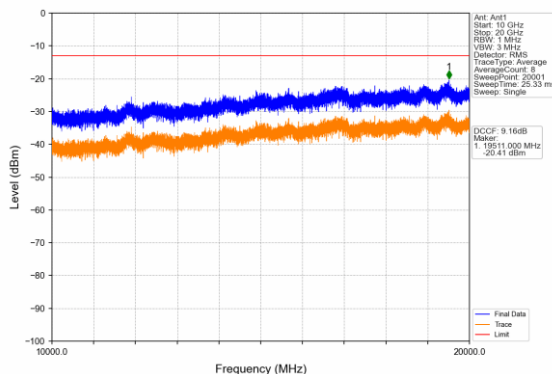
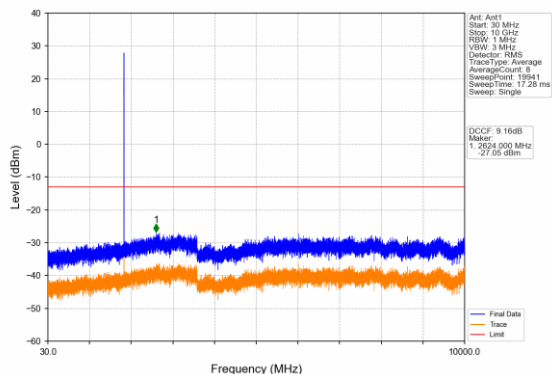
Band:

GSM 1900

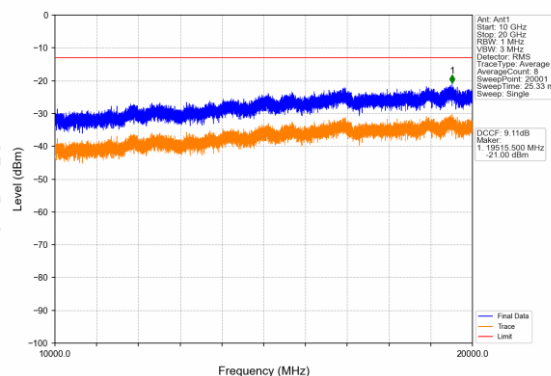
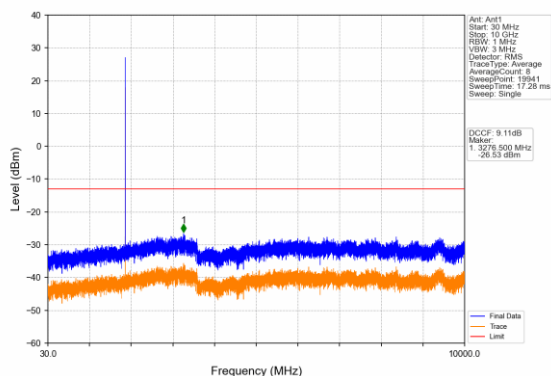
Test Mode:

GPRS Link (GMSK)

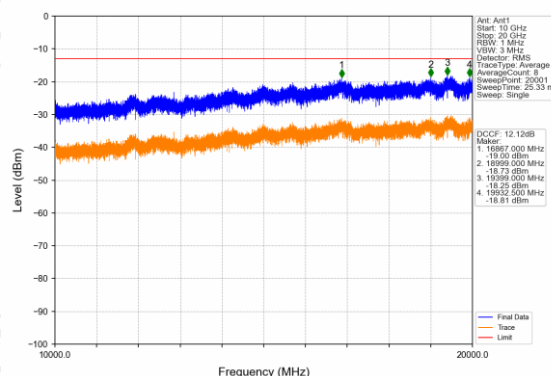
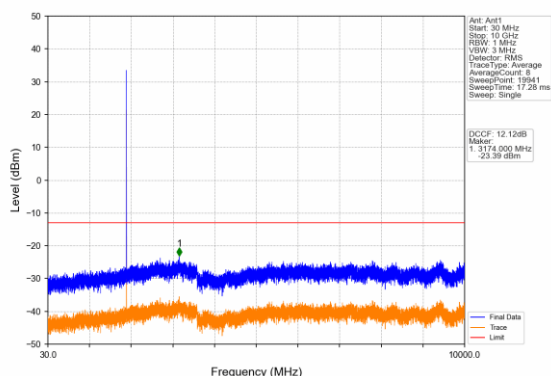
Conducted Spurious Emission on Channel 512



Conducted Spurious Emission on Channel 661



Conducted Spurious Emission on Channel 810



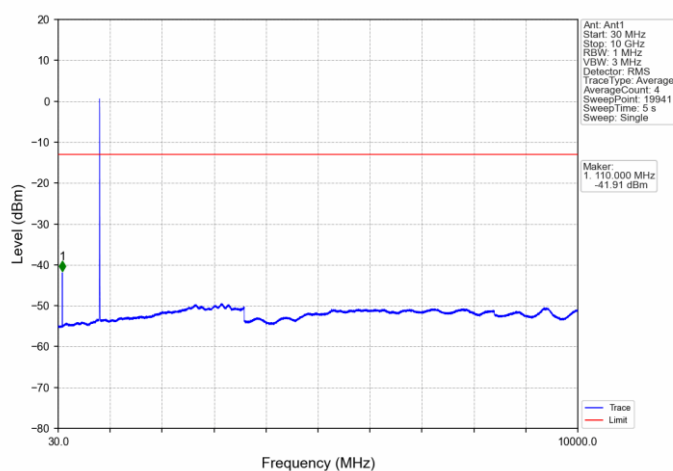
Band:

WCDMA Band V

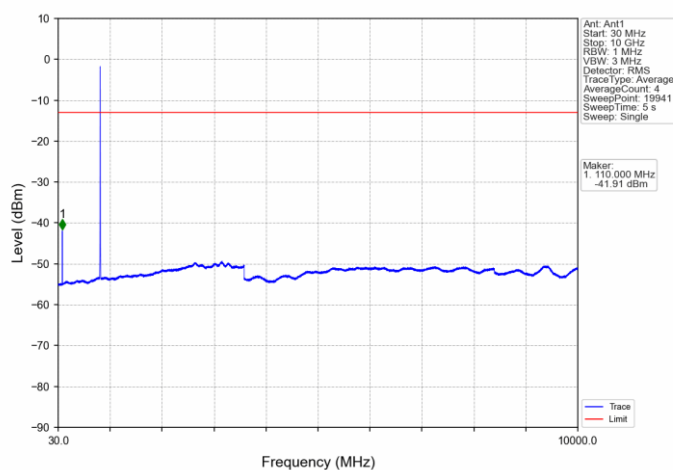
Test Mode:

RMC 12.2Kbps Link
(QPSK)

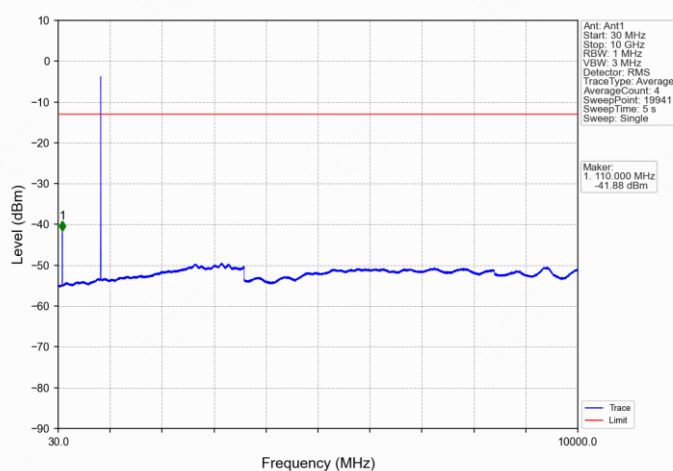
Conducted Spurious Emission on Channel 4132



Conducted Spurious Emission on Channel 4183



Conducted Spurious Emission on Channel 4233



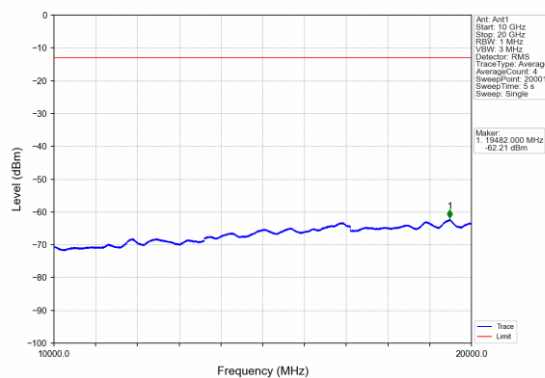
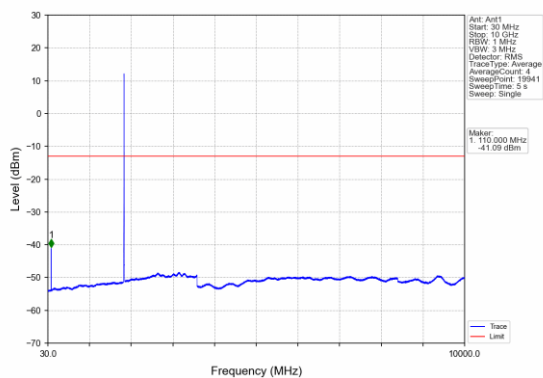
Band:

WCDMA Band II

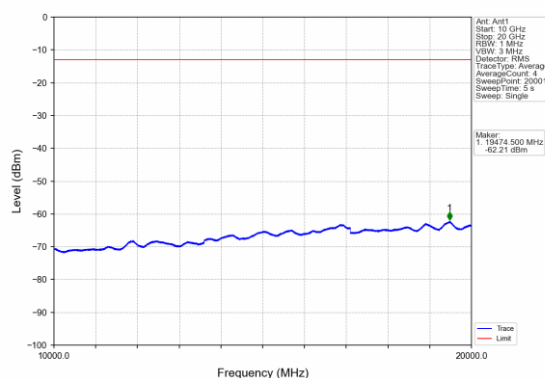
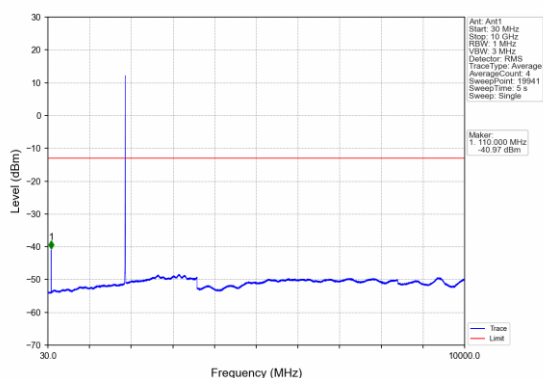
Test Mode:

RMC 12.2Kbps Link
(QPSK)

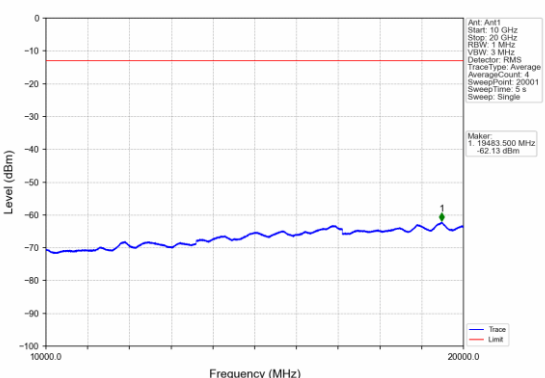
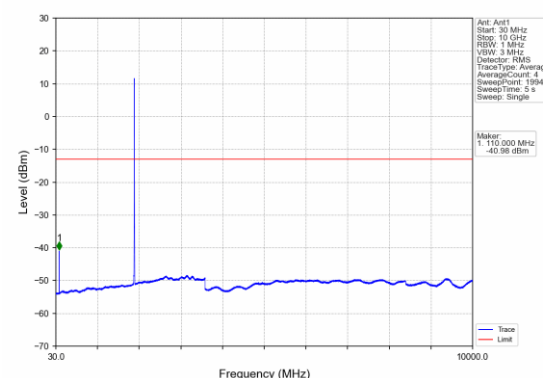
Conducted Spurious Emission on Channel 9262



Conducted Spurious Emission on Channel 9400



Conducted Spurious Emission on Channel 9538



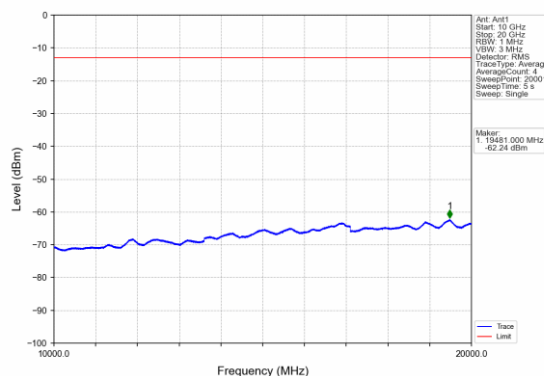
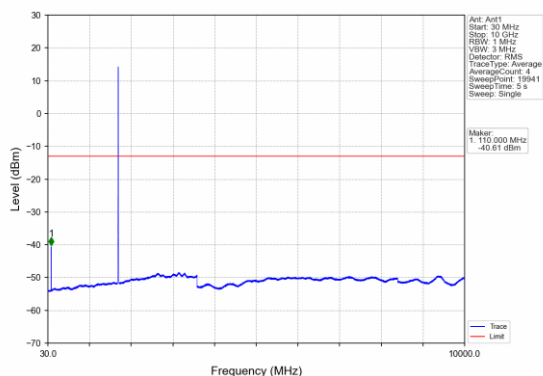
Band:

WCDMA Band IV

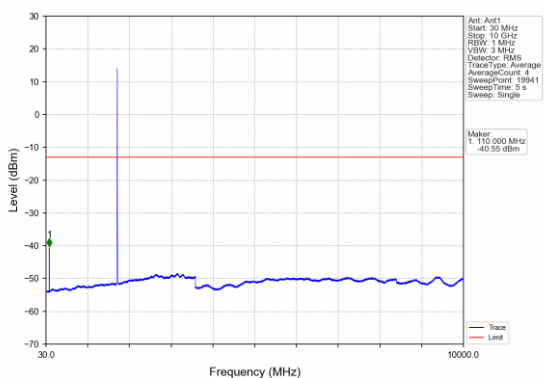
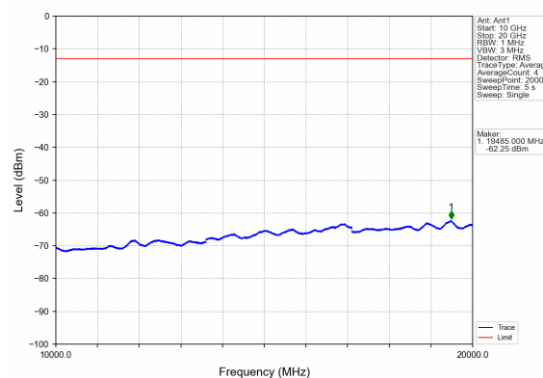
Test Mode:

RMC 12.2Kbps Link
(QPSK)

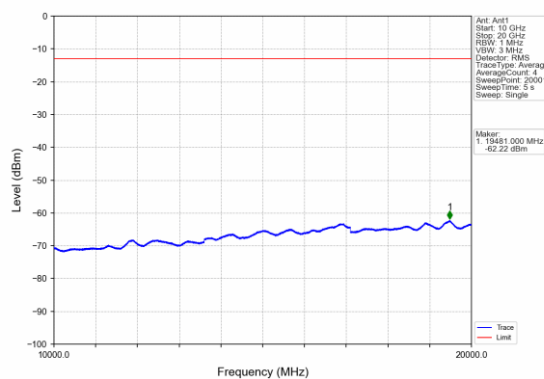
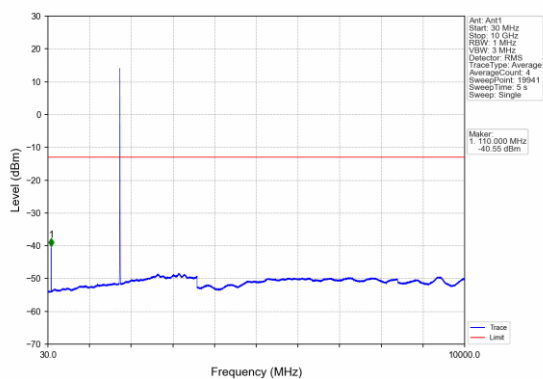
Conducted Spurious Emission on Channel 1312



Conducted Spurious Emission on Channel 1413

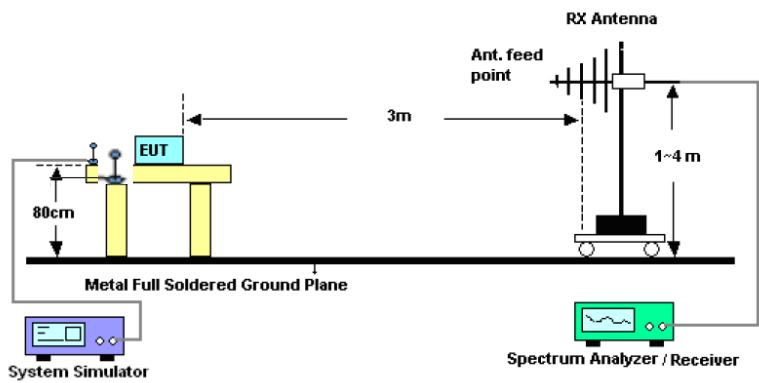
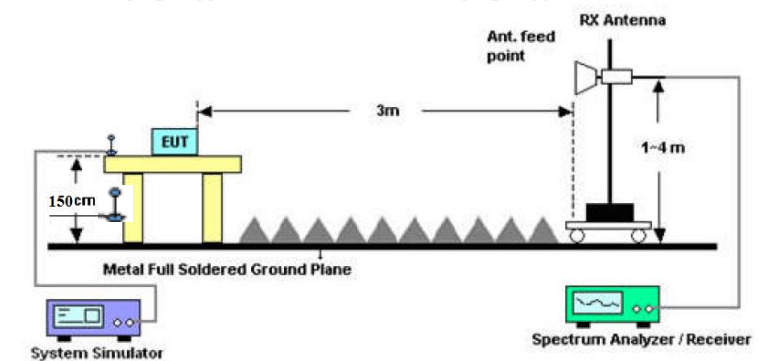


Conducted Spurious Emission on Channel 1513



5.5. Effective Radiated Power and Effective Isotropic Radiated Power Measurement

5.5.1. Test Specification

Test Requirement:	FCC part 22.913(a) and FCC part 24.232(c) FCC part 27.50(d)		
Test Method:	FCC KDB 971168 D01v03r01		
Receiver Setup:		GSM/GPRS/EDGE	WCDMA/HSPA
	SPAN	500kHz	10MHz
	RBW	10kHz	100kHz
	VBW	30kHz	300kHz
	Detector	RMS	RMS
	Trace	Average	Average
	Average Type	Power	Power
	Sweep Count	100	100
Limit:	GSM850: 7W ERP PCS1900: 2W EIRP WCDMA Band V: 7W ERP WCDMA Band II: 2W EIRP WCDMA Band IV: 1W EIRP		
	From 30MHz to 1GHz		
			
	Above 1GHz		
			

Test Procedure:

1. The testing follows FCC KDB 971168 D01v03r01 Section 5.8. and ANSI / TIA-603-D-2010 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01v03.
3. Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment.
4. Replace the transmitter under test with a substitution antenna. The center of the antenna should be at the same location as the center of the antenna under test.
5. Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.

$$\text{LOSS} = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$$
6. Determine the effective radiated output power at each angular position from the readings in steps 3) and 5) using the following equation:

$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
7. The maximum ERP is the maximum value determined in the preceding step.
8. Calculating ERP:

$$\text{ERP (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBd)}$$

$$\text{Antenna Gain (dBd)} = \text{Antenna Gain (dBi)} - 2.15$$

$$\text{EIRP} = \text{ERP} + 2.15$$

Test results:

PASS

5.5.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Universal Radio Communication Tester	R&S	CMU200	110188	Jul. 04, 2023
Spectrum Analyzer	R&S	FSQ40	200061	Jul. 03, 2023
Signal Generator	HP	83623B	3614A00396	Feb. 24, 2023
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 04, 2022
Broadband Antenna	Schwarzbeck	VULB9163	412	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	1201	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Apr. 10, 2023
Coaxial cable	SKET	RC-18G-N-M	/	Feb. 24, 2024
Coaxial cable	SKET	RC_40G-K-M	/	Feb. 24, 2024
Antenna Mast	Keleto	RE-AM	/	/
EMI Test Software	Shurple Technology	EZ-EMC	/	/

5.5.3. Test Data

Test Result of ERP

Band: GSM850								
ENV	Mode		Frequency (MHz)	Conducted Power (dBm)	Gain (dbi)	ERP (dBm)		Verdict
	Network	Subset				Result	Limit	
NTNV	GPRS	1 TX Slot	824.2	30.40	3.00	31.25	<=38.45	Pass
		2 TX Slots	824.2	29.74	3.00	30.59	<=38.45	Pass
		3 TX Slots	824.2	28.06	3.00	28.91	<=38.45	Pass
		4 TX Slots	824.2	26.81	3.00	27.66	<=38.45	Pass
		1 TX Slot	836.6	30.67	3.00	31.52	<=38.45	Pass
		2 TX Slots	836.6	30.03	3.00	30.88	<=38.45	Pass
		3 TX Slots	836.6	28.34	3.00	29.19	<=38.45	Pass
		4 TX Slots	836.6	27.12	3.00	27.97	<=38.45	Pass
		1 TX Slot	848.8	30.73	3.00	31.58	<=38.45	Pass
		2 TX Slots	848.8	30.13	3.00	30.98	<=38.45	Pass
		3 TX Slots	848.8	28.40	3.00	29.25	<=38.45	Pass
		4 TX Slots	848.8	27.18	3.00	28.03	<=38.45	Pass
	EGPRS	1 TX Slot	824.2	24.61	3.00	25.46	<=38.45	Pass
		2 TX Slots	824.2	24.58	3.00	25.43	<=38.45	Pass
		3 TX Slots	824.2	23.54	3.00	24.39	<=38.45	Pass
		4 TX Slots	824.2	20.20	3.00	21.05	<=38.45	Pass
		1 TX Slot	836.6	24.60	3.00	25.45	<=38.45	Pass
		2 TX Slots	836.6	24.77	3.00	25.62	<=38.45	Pass
		3 TX Slots	836.6	23.75	3.00	24.60	<=38.45	Pass
		4 TX Slots	836.6	21.52	3.00	22.37	<=38.45	Pass
		1 TX Slot	848.8	24.05	3.00	24.90	<=38.45	Pass
		2 TX Slots	848.8	25.77	3.00	26.62	<=38.45	Pass
		3 TX Slots	848.8	22.97	3.00	23.82	<=38.45	Pass
		4 TX Slots	848.8	20.07	3.00	20.92	<=38.45	Pass

Note1: ERP=Conducted Power+Antenna Gain-2.15

WCDMA Band: V								
ENV	Mode		Frequency (MHz)	Conducted Power (dBm)	Gain (dbi)	ERP (dBm)		Verdict
	Network	Subset				Result	Limit	
NTNV	RMC	12.2kbps RMC	826.4	22.57	3.00	23.42	<=38.45	Pass
			836.6	29.15	3.00	30.00	<=38.45	Pass
			846.6	29.37	3.00	30.22	<=38.45	Pass
	HSDPA	Subtest 1	826.4	27.22	3.00	28.07	<=38.45	Pass
		Subtest 2	826.4	27.22	3.00	28.07	<=38.45	Pass
		Subtest 3	826.4	27.19	3.00	28.04	<=38.45	Pass
		Subtest 4	826.4	27.05	3.00	27.90	<=38.45	Pass
		Subtest 1	836.6	26.99	3.00	27.84	<=38.45	Pass
		Subtest 2	836.6	27.02	3.00	27.87	<=38.45	Pass
		Subtest 3	836.6	27.13	3.00	27.98	<=38.45	Pass
		Subtest 4	836.6	27.04	3.00	27.89	<=38.45	Pass
		Subtest 1	846.6	27.13	3.00	27.98	<=38.45	Pass
		Subtest 2	846.6	19.61	3.00	20.46	<=38.45	Pass
		Subtest 3	846.6	19.66	3.00	20.51	<=38.45	Pass
		Subtest 4	846.6	19.66	3.00	20.51	<=38.45	Pass
	HSUPA	Subtest 1	826.4	17.45	3.00	18.30	<=38.45	Pass
		Subtest 2	826.4	17.45	3.00	18.30	<=38.45	Pass
		Subtest 3	826.4	17.24	3.00	18.09	<=38.45	Pass
		Subtest 4	826.4	17.43	3.00	18.28	<=38.45	Pass
		Subtest 5	826.4	17.73	3.00	18.58	<=38.45	Pass
		Subtest 1	836.6	17.36	3.00	18.21	<=38.45	Pass
		Subtest 2	836.6	17.37	3.00	18.22	<=38.45	Pass
		Subtest 3	836.6	17.81	3.00	18.66	<=38.45	Pass
		Subtest 4	836.6	17.37	3.00	18.22	<=38.45	Pass
		Subtest 5	836.6	17.23	3.00	18.08	<=38.45	Pass
		Subtest 1	846.6	17.65	3.00	18.50	<=38.45	Pass
		Subtest 2	846.6	17.41	3.00	18.26	<=38.45	Pass
		Subtest 3	846.6	17.84	3.00	18.69	<=38.45	Pass
		Subtest 4	846.6	17.89	3.00	18.74	<=38.45	Pass
		Subtest 5	846.6	17.47	3.00	18.32	<=38.45	Pass

Note1: ERP=Conducted Power+Antenna Gain-2.15

Test Result of EIRP

Band: PCS1900

ENV	Mode		Frequency (MHz)	Conducted Power (dBm)	Gain (dbi)	EIRP (dBm)		Verdict
	Network	Subset				Result	Limit	
NTNV	GPRS	1 TX Slot	1850.2	25.29	3.00	28.67	<=33.01	Pass
		2 TX Slots	1850.2	25.23	3.00	28.56	<=33.01	Pass
		3 TX Slots	1850.2	25.13	3.00	28.41	<=33.01	Pass
		4 TX Slots	1850.2	24.99	3.00	28.29	<=33.01	Pass
		1 TX Slot	1880	24.78	3.00	28.23	<=33.01	Pass
		2 TX Slots	1880	24.79	3.00	28.13	<=33.01	Pass
		3 TX Slots	1880	24.73	3.00	28.13	<=33.01	Pass
		4 TX Slots	1880	24.65	3.00	27.99	<=33.01	Pass
		1 TX Slot	1909.8	24.5	3.00	27.79	<=33.01	Pass
		2 TX Slots	1909.8	24.52	3.00	27.78	<=33.01	Pass
		3 TX Slots	1909.8	24.45	3.00	27.73	<=33.01	Pass
		4 TX Slots	1909.8	24.37	3.00	27.65	<=33.01	Pass
	EGPRS	1 TX Slot	1850.2	24.12	3.00	27.52	<=33.01	Pass
		2 TX Slots	1850.2	24.01	3.00	27.5	<=33.01	Pass
		3 TX Slots	1850.2	23.79	3.00	27.45	<=33.01	Pass
		4 TX Slots	1850.2	23.79	3.00	27.37	<=33.01	Pass
		1 TX Slot	1880	25.56	3.00	27.37	<=33.01	Pass
		2 TX Slots	1880	25.67	3.00	27.36	<=33.01	Pass
		3 TX Slots	1880	25.41	3.00	27.21	<=33.01	Pass
		4 TX Slots	1880	25.13	3.00	27.12	<=33.01	Pass
		1 TX Slot	1909.8	24.36	3.00	27.01	<=33.01	Pass
		2 TX Slots	1909.8	24.37	3.00	26.94	<=33.01	Pass
		3 TX Slots	1909.8	24.21	3.00	26.79	<=33.01	Pass
		4 TX Slots	1909.8	23.94	3.00	26.79	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain

WCDMA Band: II								
ENV	Mode		Frequency (MHz)	Conducted Power (dBm)	Gain (dbi)	EIRP (dBm)		Verdict
	Network	Subset				Result	Limit	
NTNV	RMC	12.2kbps RMC	1852.4	21.81	3.00	29.81	<=33.01	Pass
			1880	27.75	3.00	30.75	<=33.01	Pass
			1907.6	27.11	3.00	30.11	<=33.01	Pass
	HSDPA	Subtest 1	1852.4	26.05	3.00	29.05	<=33.01	Pass
		Subtest 2	1852.4	26.06	3.00	29.06	<=33.01	Pass
		Subtest 3	1852.4	26.01	3.00	29.01	<=33.01	Pass
		Subtest 4	1852.4	25.50	3.00	28.50	<=33.01	Pass
		Subtest 1	1880	25.81	3.00	28.81	<=33.01	Pass
		Subtest 2	1880	25.81	3.00	28.81	<=33.01	Pass
		Subtest 3	1880	25.79	3.00	28.79	<=33.01	Pass
		Subtest 4	1880	25.20	3.00	28.20	<=33.01	Pass
		Subtest 1	1907.6	24.50	3.00	27.50	<=33.01	Pass
		Subtest 2	1907.6	24.57	3.00	27.57	<=33.01	Pass
		Subtest 3	1907.6	24.53	3.00	27.53	<=33.01	Pass
		Subtest 4	1907.6	24.47	3.00	27.47	<=33.01	Pass
	HSUPA	Subtest 1	1852.4	23.20	3.00	26.20	<=33.01	Pass
		Subtest 2	1852.4	23.30	3.00	26.30	<=33.01	Pass
		Subtest 3	1852.4	23.13	3.00	26.13	<=33.01	Pass
		Subtest 4	1852.4	23.55	3.00	26.55	<=33.01	Pass
		Subtest 5	1852.4	23.64	3.00	26.64	<=33.01	Pass
		Subtest 1	1880	22.85	3.00	25.85	<=33.01	Pass
		Subtest 2	1880	23.00	3.00	26.00	<=33.01	Pass
		Subtest 3	1880	23.42	3.00	26.42	<=33.01	Pass
		Subtest 4	1880	23.28	3.00	26.28	<=33.01	Pass
		Subtest 5	1880	23.20	3.00	26.20	<=33.01	Pass
		Subtest 1	1907.6	22.23	3.00	25.23	<=33.01	Pass
		Subtest 2	1907.6	22.65	3.00	25.65	<=33.01	Pass
		Subtest 3	1907.6	22.48	3.00	25.48	<=33.01	Pass
		Subtest 4	1907.6	22.08	3.00	25.08	<=33.01	Pass
		Subtest 5	1907.6	22.00	3.00	25.00	<=33.01	Pass

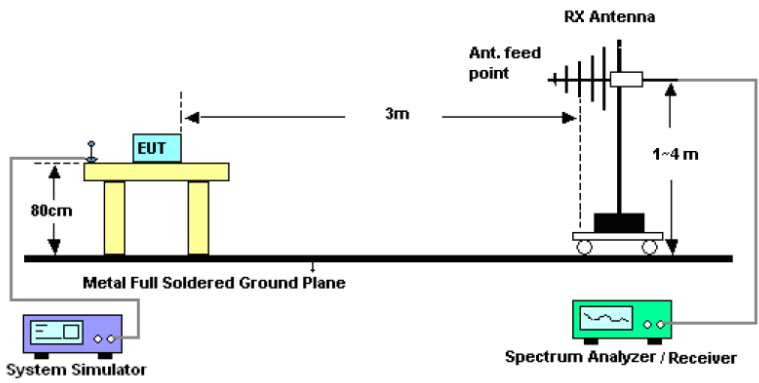
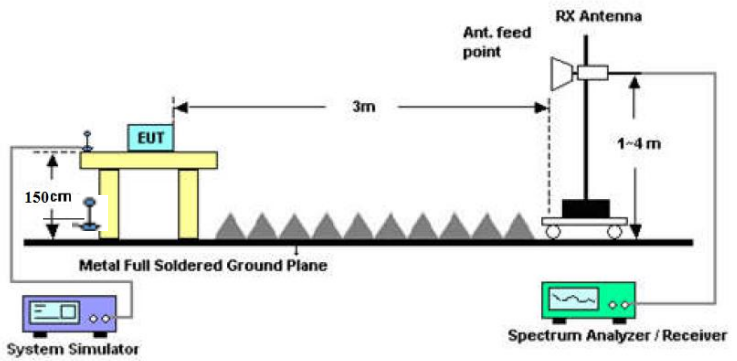
Note1: EIRP=Conducted Power+Antenna Gain

WCDMA Band: IV								
ENV	Mode		Frequency (MHz)	Conducted Power (dBm)	Gain (dbi)	EIRP (dBm)		Verdict
	Network	Subset				Result	Limit	
NTNV	RMC	12.2kbps RMC	1712.4	20.99	3.00	23.99	<=30	Pass
			1732.6	21.11	3.00	24.11	<=30	Pass
			1752.6	21.11	3.00	24.11	<=30	Pass
	HSDPA	Subtest 1	1712.4	26.31	3.00	29.31	<=30	Pass
		Subtest 2	1712.4	26.31	3.00	29.31	<=30	Pass
		Subtest 3	1712.4	26.24	3.00	29.24	<=30	Pass
		Subtest 4	1712.4	26.31	3.00	29.31	<=30	Pass
		Subtest 1	1732.6	26.51	3.00	29.51	<=30	Pass
		Subtest 2	1732.6	26.61	3.00	29.61	<=30	Pass
		Subtest 3	1732.6	26.54	3.00	29.54	<=30	Pass
		Subtest 4	1732.6	26.53	3.00	29.53	<=30	Pass
		Subtest 1	1752.6	26.71	3.00	29.71	<=30	Pass
		Subtest 2	1752.6	26.72	3.00	29.72	<=30	Pass
		Subtest 3	1752.6	26.74	3.00	29.74	<=30	Pass
		Subtest 4	1752.6	26.74	3.00	29.74	<=30	Pass
	HSUPA	Subtest 1	1712.4	23.93	3.00	26.93	<=30	Pass
		Subtest 2	1712.4	24.52	3.00	27.52	<=30	Pass
		Subtest 3	1712.4	24.63	3.00	27.63	<=30	Pass
		Subtest 4	1712.4	24.31	3.00	27.31	<=30	Pass
		Subtest 5	1712.4	24.07	3.00	27.07	<=30	Pass
		Subtest 1	1732.6	24.38	3.00	27.38	<=30	Pass
		Subtest 2	1732.6	24.33	3.00	27.33	<=30	Pass
		Subtest 3	1732.6	24.72	3.00	27.72	<=30	Pass
		Subtest 4	1732.6	24.34	3.00	27.34	<=30	Pass
		Subtest 5	1732.6	24.64	3.00	27.64	<=30	Pass
		Subtest 1	1752.6	24.70	3.00	27.70	<=30	Pass
		Subtest 2	1752.6	24.70	3.00	27.70	<=30	Pass
		Subtest 3	1752.6	24.75	3.00	27.75	<=30	Pass
		Subtest 4	1752.6	24.05	3.00	27.05	<=30	Pass
		Subtest 5	1752.6	24.58	3.00	27.58	<=30	Pass

Note1: EIRP=Conducted Power+Antenna Gain

5.6. Field Strength of Spurious Radiation Measurement

5.6.1. Test Specification

Test Requirement:	FCC part 22.917(a) and FCC part 24.238(a) FCC part 27.53(g)
Test Method:	FCC KDB 971168 D01v03r01
Operation mode:	Refer to item 3.1
Limit:	-13dBm
Test setup:	For 30MHz~1GHz  Above 1GHz 
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03r01 Section 6 and ANSI / TIA-603-D-2010 Section 2.2.12. 2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground. 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower. 4. The table was rotated 360 degrees to determine the position of the highest spurious emission. 5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations. 6. Make the measurement with the spectrum analyzer's

	RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission. 7. A horn antenna was substituted in place of the EUT and was driven by a signal generator. 8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission. 9. Taking the record of output power at antenna port. 10. Repeat step 7 to step 8 for another polarization. 11. $EIRP\ (dBm) = S.G.\ Power - Tx\ Cable\ Loss + Tx\ Antenna\ Gain$ 12. $ERP\ (dBm) = EIRP - 2.15$ 13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band. 14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts) $= P(W) - [43 + 10\log(P)]\ (dB)$ $= [30 + 10\log(P)]\ (dBm) - [43 + 10\log(P)]\ (dB)$ $= -13dBm.$
Test results:	PASS
Remark:	All modulations have been tested, but only the worst modulation show in this test item.