

TEST REPORT

ACCORDING TO: FCC 47CFR part 27, RSS-131 Issue 3:2017,
RSS-139 Issue 3:2015, RSS-130 Issue 1:2013

FOR:

Axell Wireless Israel Ltd.

**Digital Multi-Band Mini
Repeater (DIGImini)**

Model: D-MINI-2107L-2017F

FCC ID:NEOD2107L2017F

IC:8749A-DM7L17F

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Table of contents

1	Applicant information	3
2	Equipment under test attributes	3
3	Manufacturer information	3
4	Test details	3
5	Tests summary	4
6	EUT description	5
6.1	General information	5
6.2	Ports and lines	5
6.3	Support and test equipment	5
6.4	Changes made in the EUT	5
6.5	Test configuration	6
6.6	Transmitter characteristics	7
7	Transmitter tests according to 47CFR part 27, RSS-131	8
7.1	Automatic gain control (AGC) threshold test	8
7.2	Mean output power and booster gain test	16
7.3	Out-of-band rejection test	34
7.4	Occupied bandwidth and Input-versus-output spectrum test	38
7.5	Out-of-band emission conducted test	52
7.6	Spurious emissions at RF antenna connector test	99
7.7	Radiated spurious emission measurements	148
8	APPENDIX A Test equipment and ancillaries used for tests	158
8.1	Test equipment and ancillaries used for tests	159
9	APPENDIX B Measurement uncertainties	160
10	APPENDIX C Test facility description	161
11	APPENDIX D Specification references	161
12	APPENDIX E Test equipment correction factors	162
13	APPENDIX F Abbreviations and acronyms	176

1 Applicant information

Client name: Axell Wireless Israel Ltd.
Address: Bareket 6 street, Petach Tikva 49002, Israel
Telephone: +972 3918 0129
Fax: +972 3918 0190
E-mail: boaz.reuven@cobham.com
Contact name: Mr. Boaz Reuven

2 Equipment under test attributes

Product name: Digital Multi-Band Mini Repeater (DIGImini)
Product type: Repeater
Model(s): D-MINI-2107L-2017F
Serial number: 12090082
Hardware version: Rev 1
Software release: 40A
Receipt date 03-Apr-17

3 Manufacturer information

Manufacturer name: Axell Wireless Israel Ltd.
Address: Bareket 6 street, Petach Tikva 49002, Israel
Telephone: +972 3918 0129
Fax: +972 3918 0190
E-Mail: boaz.reuven@cobham.com
Contact name: Mr. Boaz Reuven

4 Test details

Project ID: 29464
Location: Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel
Test started: 03-Apr-17
Test completed: 16-May-17
Test specification(s): FCC 47CFR part 27, RSS-131 issue 2, RSS-139 issue 3, RSS-130 issue 1

5 Tests summary

Test	Status
FCC Section 27.50, Automatic gain control (AGC) threshold	Pass
FCC Section 2.1049/ RSS-131 sec. 5.2.2, Occupied bandwidth and Input-versus-output spectrum	Pass
FCC Section 27.50(d) / RSS-131 sec. 5.2.3, Mean output power and booster gain	Pass
FCC Section 2.1049 / RSS-131 sec. 5.2.1, Out-of-band rejection	Pass
FCC Section 27.53, Out-of-band emissions at RF connector	Pass
FCC Section 27.53, Conducted spurious emissions	Pass
FCC Section 27.53, Radiated spurious emissions	Pass
FCC Section 27.52, RF exposure	Pass, exhibit provided in Application for certification

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.

The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

This test report supersedes the previously issued test report identified by Doc ID:AXE RAD_FCC.29464.

	Name and Title	Date	Signature
Tested by:	Mr. S. Samokha, test engineer	May 16, 2017	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	March 18, 2018	
Approved by:	Mr. M. Nikishin, EMC and Radio group manager	March 19, 2018	

6 EUT description

6.1 General information

The EUT, Digital Multi-Band Mini Repeater (DIGImini repeater), is an innovative and flexible multiband coverage solution optimized for in-building applications which offers a range of possibilities.

With multi band technology applications, multiple filters are required in the operation bands. The DIGImini is designed to provide high performance digital filters with a price competitive to legacy analog mini repeaters.

The DIGImini is connected to two antennas, a donor antenna placed on the roof of the building and a radiating coaxial cable or antennas in the area to be covered. A state-of-the-art Interference Mitigation and Oscillation Prevention (IMOP) algorithm is used to monitor the isolation between the antennas and should oscillation be present the gain is adjusted immediately to prevent it. The device is powered via 120 VAC/12 VDC adapter, model VEH90PS12.

6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable length, m
Power	DC	AC/DC adapter	EUT	1	Unshielded	0.5
Signal	RF	EUT	Attenuator	2	Coax	1
Telecom	Ethernet	Laptop	EUT	1	FTP	5
Control	Alarm	EUT	Open circuit	1	Unshielded	3
Control	Wi-Fi	EUT	Open circuit	1	Coax	3
Control	RS-232	EUT	Open circuit	1	Unshielded	3

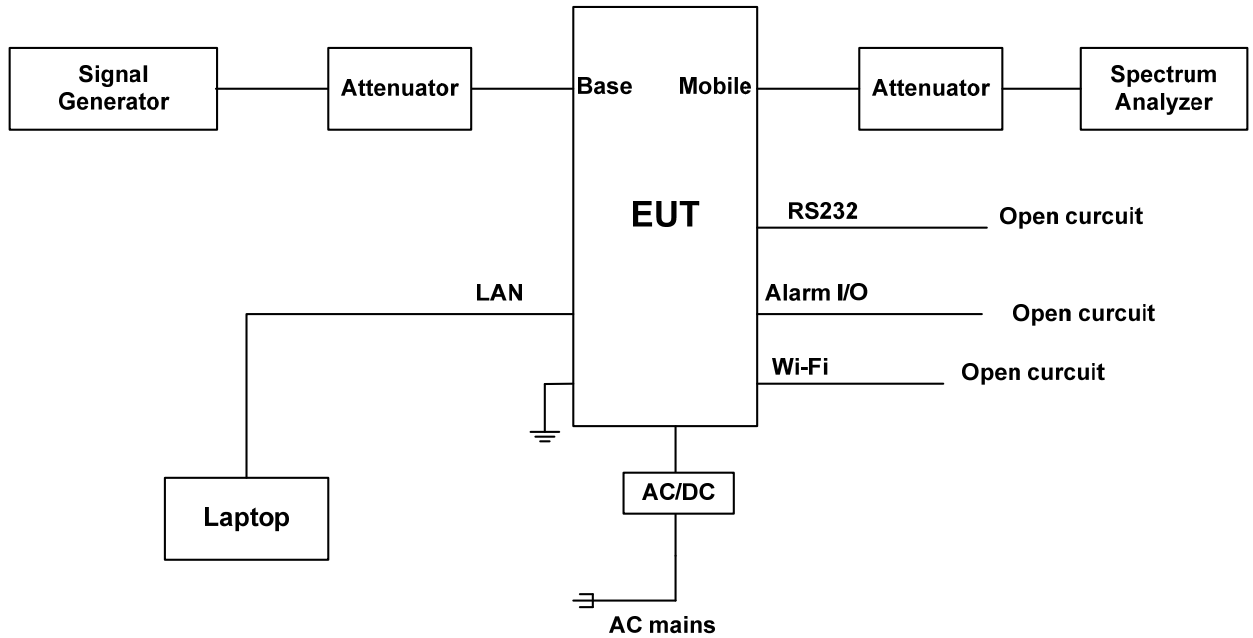
6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	DELL	PP20L	5QXF83G
AC/DC adapter	DELL	LA65N80	0DF263-71615-7QF-E850
Mouse	Logitech	810-001317	NA

6.4 Changes made in the EUT

No changes were implemented in the EUT during testing.

6.5 Test configuration



6.6 Transmitter characteristics

Type of equipment				
☒	Stand-alone (Equipment with or without its own control provisions)			
☐	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)			
☐	Plug-in card (Equipment intended for a variety of host systems)			
Intended use		Condition of use		
☐	fixed	Always at a distance more than 2 m from all people		
☒	mobile	Always at a distance more than 20 cm from all people		
☐	portable	May operate at a distance closer than 20 cm to human body		
Assigned frequency range		2110.0 – 2180.0 MHz		
Operating frequency		1) 2110.0 – 2180.0 MHz DL, 1710-1780 MHz UL 2) 728 -746 MHz DL, 698- 716 MHz UL		
Maximum rated output power		At maximum gain, Output port	21.83 dBm in 2110.0 – 2180.0 MHz 23.85 dBm in 728 -746 MHz	
Is transmitter output power variable?		☐ No		
		☒ Yes	☐ continuous variable	
			☒ stepped variable with stepsize	1 dB
			minimum RF power	NA
		maximum RF power at antenna connector	23 dBm on the entire band	
Antenna connection				
☐ unique coupling	☒ standard connector	☐ Integral	☐ with temporary RF connector ☐ without temporary RF connector	
Antenna/s technical characteristics				
Type	Manufacturer	Model number	Gain	
External (Indoor)	Any	Any	2.2 dBi	
Transmitter aggregate data rate/s, MBps				
Transmitter 99% power bandwidth		Type of modulation		
		AWGN	GSM	WCDMA
		NA	NA	NA
Transmitter power source				
☐		Nominal rated voltage	Battery type	
☐	DC	Nominal rated voltage		
☒	AC mains	Nominal rated voltage	Via 120 VAC/12 VDC adapter	
Common power source for transmitter and receiver		☒ yes	☐ no	

Test specification: Section 27.50, AGC threshold test			
Test procedure: KDB 935210 D05 v01r01, section 3.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

7 Transmitter tests according to 47CFR part 27, RSS-131

7.1 Automatic gain control (AGC) threshold test

7.1.1 General

This test was performed to measure the AGC threshold of the EUT.

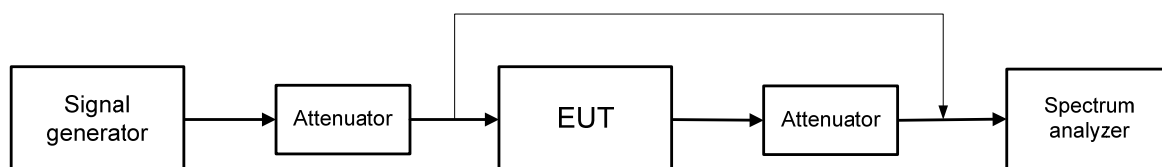
7.1.2 Test procedure

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

7.1.2.2 The EUT was adjusted to produce maximum available to the end user RF output power.

7.1.2.3 The peak output power was measured with spectrum analyzer as provided in the associated tables and plots.

Figure 7.1.1 AGC Threshold test setup





Test specification: Section 27.50, AGC threshold test			
Test procedure: KDB 935210 D05 v01r01, section 3.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

Table 7.1.1 AGC threshold test results

OPERATING FREQUENCY RANGE: 2110.0 – 21180.0 MHz (downlink)
1710.0 – 1780.0 MHz (uplink)

DETECTOR USED: Average

MEASUREMENT METHOD: Spectrum Analyzer

CONFIGURATION: Single Channel

MODULATING SIGNAL: AWGN

Frequency, MHz		Input port		SA reading, dBm		AGC threshold level, dBm	Margin*, dB	Verdict
				Input power	Output power			
Downlink transmit mode								
2145.0	Base	-50.29	20.71	-50.29	NA	Pass		
Uplink transmit mode								
1745.0	Mobile	-53.48	20.73	-53.48	NA	Pass		

MODULATING SIGNAL: WCDMA

Frequency, MHz	Input port	SA reading, dBm		AGC threshold level, dBm	Margin*, dB	Verdict
		Input power	Output power			
Downlink transmit mode						
2145.0	Base	-50.07	20.89	-50.07	NA	Pass
Uplink transmit mode						
1745.0	Mobile	-53.17	20.95	-53.17	NA	Pass

MODULATING SIGNAL: GSM

Frequency, MHz	Input port	SA reading, dBm		AGC threshold level, dBm	Margin*, dB	Verdict
		Input power	Output power			
Downlink transmit mode						
2145.0	Base	-50.50	20.90	-50.50	NA	Pass
Uplink transmit mode						
1745.0	Mobile	-53.50	20.95	-53.50	NA	Pass



Test specification: Section 27.50, AGC threshold test			
Test procedure: KDB 935210 D05 v01r01, section 3.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

Table 7.1.2 AGC threshold test results

OPERATING FREQUENCY RANGE: 728.0 – 746.0 MHz (downlink)
698.0 – 716.0 MHz (uplink)

DETECTOR USED: Average

MEASUREMENT METHOD: Spectrum Analyzer

CONFIGURATION: Single Channel

MODULATING SIGNAL: AWGN

Frequency, MHz	Input port	SA reading, dBm		AGC threshold level, dBm	Margin*, dB	Verdict
		Input power	Output power			
Downlink transmit mode						
737.0	Base	-51.36	21.08	-51.36	NA	Pass
Uplink transmit mode						
707.0	Mobile	-51.26	21.28	-51.26	NA	Pass

MODULATING SIGNAL: GSM

MODULATING SIGNAL:				COM		
Frequency, MHz	Input port	SA reading, dBm		AGC threshold level, dBm	Margin*, dB	Verdict
		Input power	Output power			
Downlink transmit mode						
737.0	Base	-51.22	20.94	-51.22	NA	Pass
Uplink transmit mode						
707.0	Mobile	-50.98	20.84	-50.98	NA	Pass

Reference numbers of test equipment used

HL 0539	HL 1876	HL 2909	HL 3779	HL 3787	HL 3903	HL 4273	HL 4275
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Full description is given in Appendix A.

Test specification: Section 27.50, AGC threshold test			
Test procedure: KDB 935210 D05 v01r01, section 3.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

Plot 7.1.1 AGC Threshold test results at mid frequency carrier, Port 1

FREQUENCY RANGE:

2110.0 – 2180.0 MHz

OPERATIONAL MODE:

AWGN downlink transmit

CONFIGURATION:

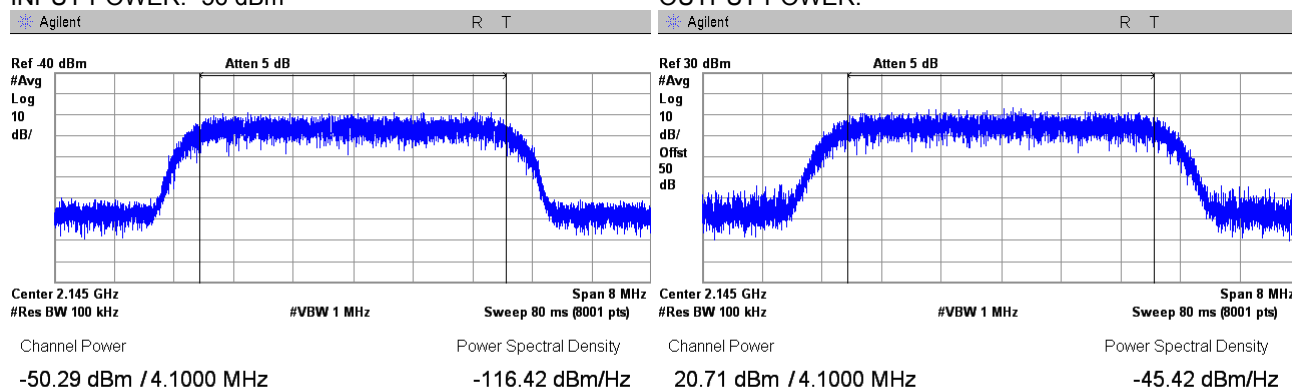
Single Channel

INPUT PORT:

Base

INPUT POWER: -56 dBm

OUTPUT POWER:



Plot 7.1.2 AGC Threshold test results at mid frequency carrier, Port 1

FREQUENCY RANGE:

2110.0 – 2180.0 MHz

OPERATIONAL MODE:

WCDMA downlink transmit

CONFIGURATION:

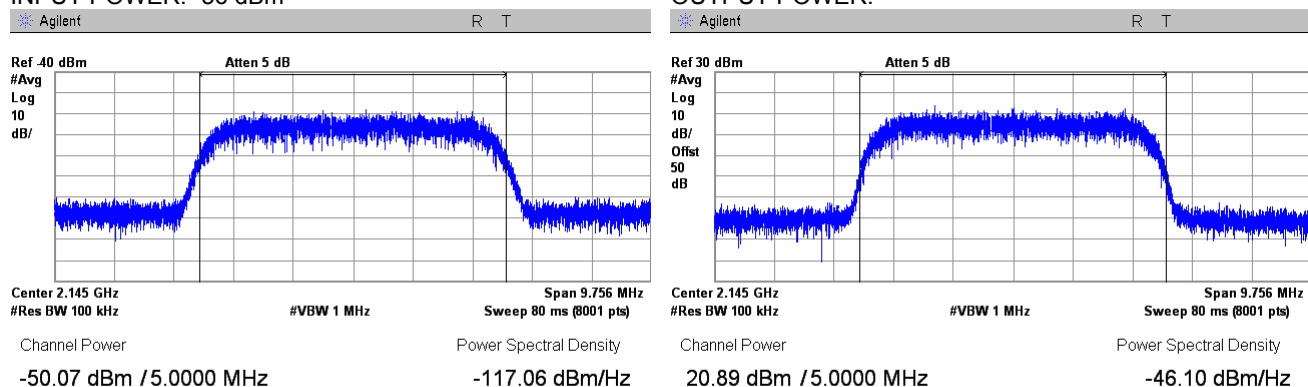
Single Channel

INPUT PORT:

Base

INPUT POWER: -56 dBm

OUTPUT POWER:

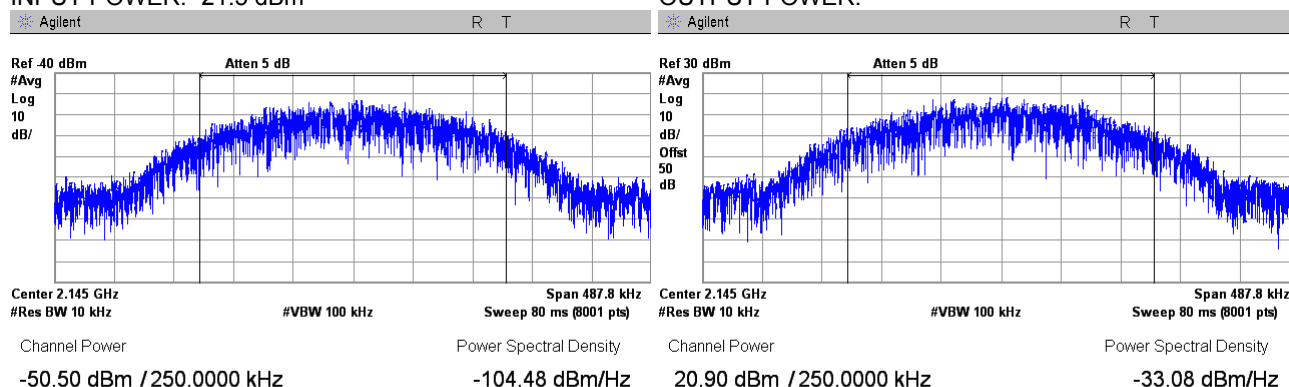


Test specification: Section 27.50, AGC threshold test			
Test procedure: KDB 935210 D05 v01r01, section 3.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

Plot 7.1.3 RF output power measurements at mid frequency carrier, Port 1

FREQUENCY RANGE:
OPERATIONAL MODE:
CONFIGURATION:
INPUT PORT:
INPUT POWER: -21.5 dBm

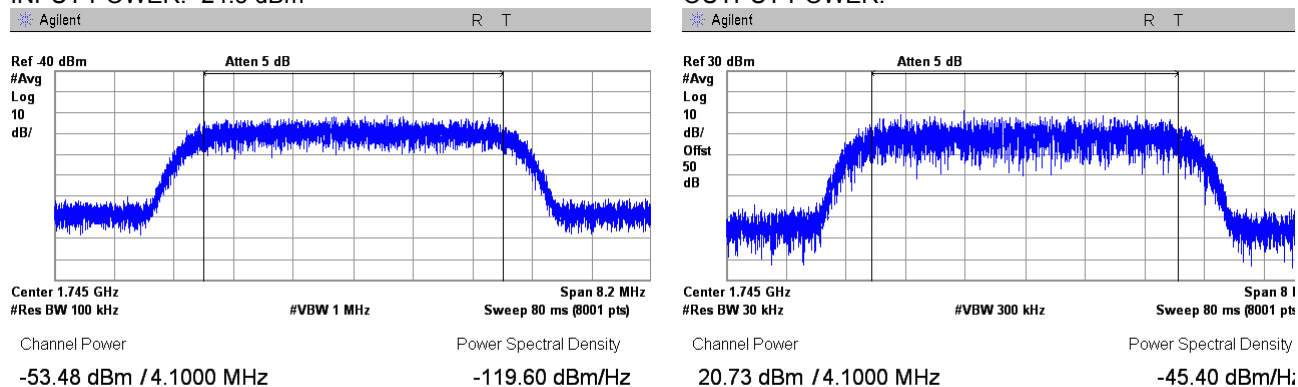
2110.0 – 2180.0 MHz
GSM downlink transmit
Single Channel
Base
OUTPUT POWER:



Plot 7.1.4 AGC Threshold test results at mid frequency carrier, Port 1

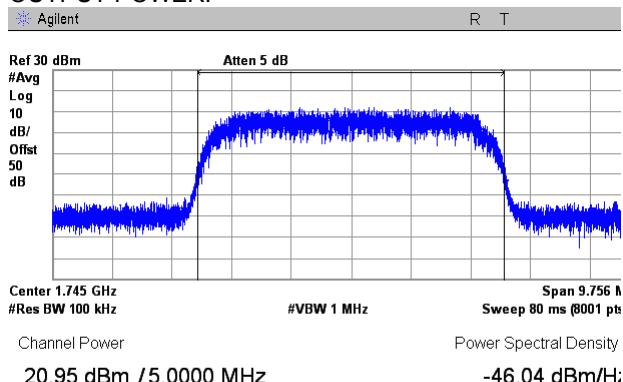
FREQUENCY RANGE:
OPERATIONAL MODE:
CONFIGURATION:
INPUT PORT:
INPUT POWER: -24.5 dBm

1710.0 – 1780.0 MHz Uplink
AWGN uplink transmit
Single Channel
Base
OUTPUT POWER:

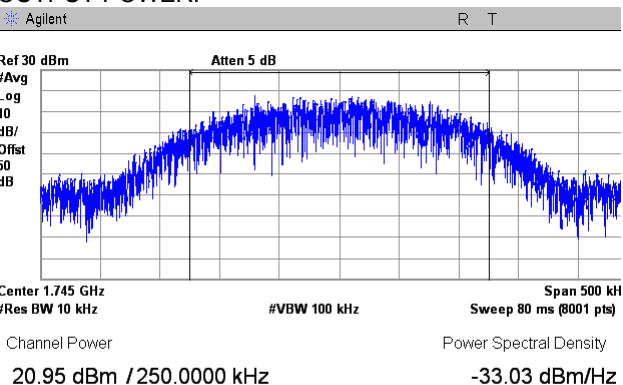
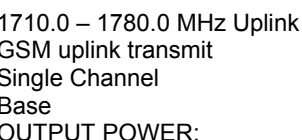




1710.0 – 1780.0 MHz Uplink
WCDMA uplink transmit
Single Channel
Base
OUTPUT POWER:



FREQUENCY RANGE:
OPERATIONAL MODE:
CONFIGURATION:
INPUT PORT:
INPUT POWER: -69 dBm

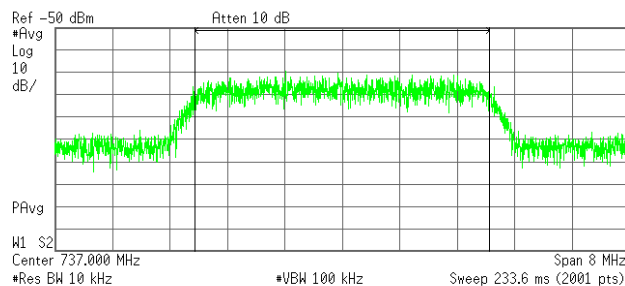


Test specification:		Section 27.50, AGC threshold test	
Test procedure:		KDB 935210 D05 v01r01, section 3.2	
Test mode:		Verdict: PASS	
Date(s):			
03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

Plot 7.1.7 Mean output power and booster gain test results at mid frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22.5 dBm

* Agilent

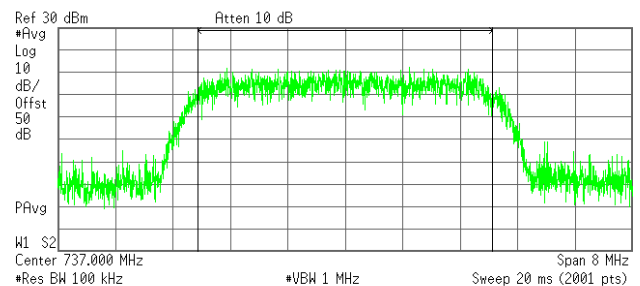


Channel Power
-51.33 dBm /4.1000 MHz

Power Spectral Density
-117.46 dBm/Hz

728.0 – 746.0 MHz Downlink
AWGN
Base
Below AGC threshold
OUTPUT SIGNAL:

* Agilent



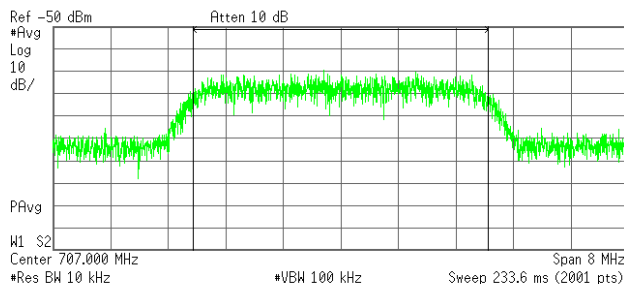
Channel Power
21.08 dBm /4.1000 MHz

Power Spectral Density
-45.05 dBm/Hz

Plot 7.1.8 Mean output power and booster gain test results at mid frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24.2 dBm 3.45MHz

* Agilent

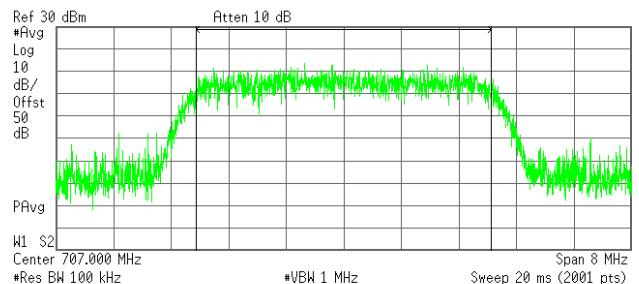


Channel Power
-51.26 dBm /4.1000 MHz

Power Spectral Density
-117.38 dBm/Hz

698.0 – 716.0 MHz Uplink
AWGN
Mobile
Below AGC threshold
OUTPUT SIGNAL:

* Agilent



Channel Power
21.28 dBm /4.1000 MHz

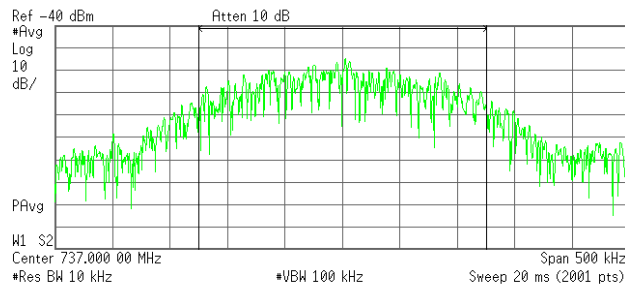
Power Spectral Density
-44.85 dBm/Hz

Test specification:		Section 27.50, AGC threshold test	
Test procedure:		KDB 935210 D05 v01r01, section 3.2	
Test mode:		Verdict: PASS	
Date(s):			
03-Apr-17 – 16-May-17			
Temperature: 23.5 °C	Relative Humidity: 49 %	Air Pressure: hPa	Power: 120 VAC
Remarks:			

Plot 7.1.9 Mean output power and booster gain test results at mid frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22.5 dBm 3.45MHz

✱ Agilent

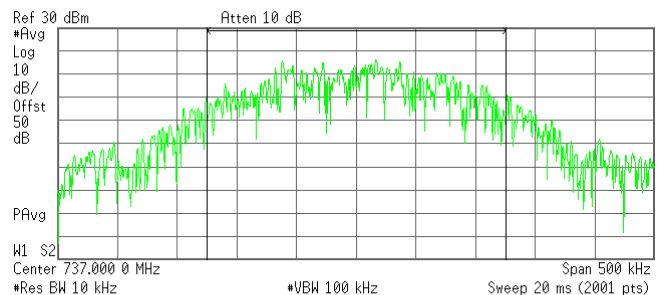


Channel Power
-51.22 dBm /250.0000 kHz

Power Spectral Density
-105.20 dBm/Hz

728.0 – 746.0 MHz Downlink
GSM
Base
Below AGC threshold
OUTPUT SIGNAL:

✱ Agilent



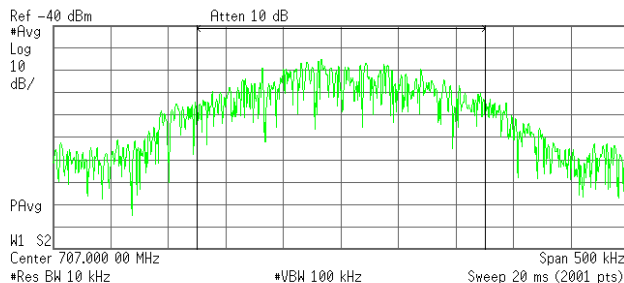
Channel Power
20.94 dBm /250.0000 kHz

Power Spectral Density
-33.04 dBm/Hz

Plot 7.1.10 Mean output power and booster gain test results at mid frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24.2 dBm 3.45MHz

✱ Agilent

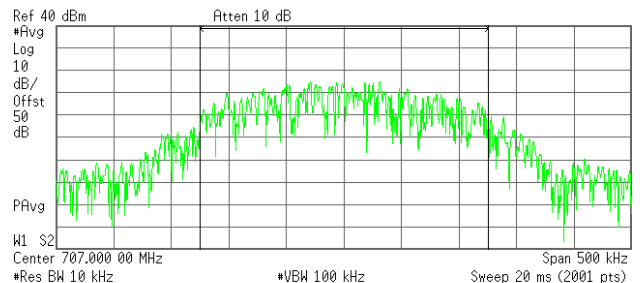


Channel Power
-50.98 dBm /250.0000 kHz

Power Spectral Density
-104.96 dBm/Hz

698.0 – 716.0 MHz Uplink
GSM
Mobile
Below AGC threshold
OUTPUT SIGNAL:

✱ Agilent



Channel Power
20.84 dBm /250.0000 kHz

Power Spectral Density
-33.14 dBm/Hz

Test specification: Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test			
Test procedure: KDB 935210 D05 v01r01, section 3.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

7.2 Mean output power and booster gain test

7.2.1 General

This test was performed to measure the mean input and output power at RF antenna connector and to calculate corresponding EUT gain. Specification test limits are given in Table 7.2.1, Table 7.2.2.

Table 7.2.1 Peak output power limits according to Part 27 FCC

Assigned frequency range, MHz	Maximum booster gain,	Maximum EIRP,
	dB	dBm
AWS-1 and AWS-3 band		
2110.0 – 2180.0	72.0	62.15
1710.0 – 1780.0	78.0	30.0
Assigned frequency range, MHz	Maximum booster gain,	Maximum ERP,
	dB	dBm
LTE700L band		
728.0 – 746.0	75.0	60.0
698.0 – 716.0	76.0	35.0

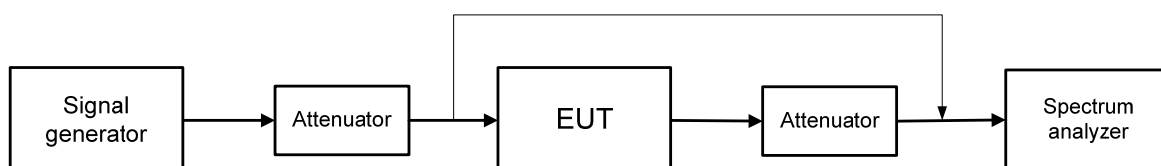
Table 7.2.2 Peak output power limits according to RSS requirements

Assigned frequency range, MHz	Maximum booster gain,	Maximum EIRP,
	dB	dBm
AWS-1 and AWS-3 band		
2110.0 – 2180.0	72.0	62.15
1710.0 – 1780.0	78.0	30.0
LTE700L band		
728.0 – 746.0	75.0	62.15
698.0 – 716.0	76.0	37.0

7.2.2 Test procedure

- 7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.
- 7.2.2.2 The signal generator power was adjusted to a level just below the AGC threshold but not more than 0.5 dB below.
- 7.2.2.3 The mean output power was measured with the spectrum analyzer as provided in the associated tables and plots.
- 7.2.2.4 The corresponding input power was measured with the same settings of the spectrum analyzer.
- 7.2.2.5 The above measurements were repeated with input signal adjusted to be 3 dB above the AGC threshold.
- 7.2.2.6 The EUT gain was calculated as a difference between output and input signal levels.
- 7.2.2.7 The test results provided in the associated tables.

Figure 7.2.1 Mean output power and booster gain test setup





Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.3 Mean output power and booster gain test results

OPERATING FREQUENCY RANGE: 2110.0 – 2180.0 MHz (downlink)
 1710.0 – 1780.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 100 kHz

VIDEO BANDWIDTH: 300 kHz

RF SIGNAL: AWGN

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain**, dB	Limit, dBm	Margin*, dB	Verdict
		Input	Output				
Below AGC level							
Downlink transmit mode							
2177.59	Base	-49.19	21.16	70.35	73.0	-2.65	Pass
Uplink transmit mode							
1729.99	Mobile	-56.66	21.48	78.14	79.0	-0.86	Pass
Above AGC level							
Downlink transmit mode							
2177.59	Base	-46.23	21.30	67.53	73.0	-5.47	Pass
Uplink transmit mode							
1729.99	Mobile	-53.60	21.54	75.14	79.0	-3.86	Pass

RF SIGNAL: WCDMA

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain**, dB	Limit, dBm	Margin*, dB	Verdict
		Input	Output				
Below AGC level							
Downlink transmit mode							
2177.59	Base	-49.48	21.63	71.11	73.0	-1.89	Pass
Uplink transmit mode							
1729.99	Mobile	-56.33	21.26	77.59	79.0	-1.41	Pass
Above AGC level							
Downlink transmit mode							
2177.59	Base	-46.53	21.58	68.11	73.0	-4.89	Pass
Uplink transmit mode							
1729.99	Mobile	-53.22	21.30	74.52	79.0	-4.48	Pass



Test specification: Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test			
Test procedure: KDB 935210 D05 v01r01, section 3.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.3 Mean output power and booster gain test results (continued)

OPERATING FREQUENCY RANGE: 2110.0 – 2180.0 MHz (downlink)
1710.0 – 1780.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 10 kHz

VIDEO BANDWIDTH: 30 kHz

RF SIGNAL: GSM

RF SIGNAL:

GSM

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain**, dB	Limit, dBm	Margin*, dB	Verdict
		Input	Output				
Below AGC level							
Downlink transmit mode							
2177.59	Base	-50.58	21.83	72.41	73.0	-0.59	Pass
Uplink transmit mode							
1729.99	Mobile	-56.67	21.27	77.94	79.0	-1.06	Pass
Above AGC level							
Downlink transmit mode							
2177.59	Base	-47.73	21.21	68.94	73.0	-4.06	Pass
Uplink transmit mode							
1729.99	Mobile	-53.40	21.31	74.71	79.0	-4.29	Pass

* - Margin = ERP – specification limit

** - Booster Gain = Output SA reading – Input SA reading



Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.4 EIRP test results

OPERATING FREQUENCY RANGE: 2110.0 – 2180.0 MHz (downlink)
 1710.0 – 1780.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 100 kHz

VIDEO BANDWIDTH: 300 kHz

RF SIGNAL: AWGN

Carrier frequency, MHz				Input port	SA reading, dBm		Booster gain, dB	Antenna assembly Gain**, dBi	EIRP***, dBm	Limit, dBm	Margin*, dB	Verdict
		Input	Output									
Below AGC level												
Downlink transmit mode												
2177.59	Base	-49.19	21.16	70.35	0.2	21.36	62.15	-40.79	Pass			
Uplink transmit mode												
1729.99	Mobile	-56.66	21.48	78.14	0.2	21.68	30.0	-8.32	Pass			
Above AGC level												
Downlink transmit mode												
2177.59	Base	-46.23	21.30	67.53	0.2	21.50	62.15	-40.65	Pass			
Uplink transmit mode												
1729.99	Mobile	-53.60	21.54	75.14	0.2	21.74	30.0	-8.26	Pass			

RF SIGNAL: WCDMA

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain, dB	Antenna assembly Gain**, dBi	EIRP***, dBm	Limit, dBm	Margin*, dB	Verdict
		Input	Output						
Below AGC level									
Downlink transmit mode									
2177.59	Base	-49.48	21.63	71.11	0.2	21.83	62.15	-40.32	Pass
Uplink transmit mode									
1729.99	Mobile	-56.33	21.26	77.59	0.2	21.46	30.0	-8.54	Pass
Above AGC level									
Downlink transmit mode									
2177.59	Base	-46.53	21.58	68.11	0.2	21.78	62.15	-40.37	Pass
Uplink transmit mode									
1729.99	Mobile	-53.22	21.30	74.52	0.2	21.50	30.0	-8.50	Pass



Test specification: Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test			
Test procedure: KDB 935210 D05 v01r01, section 3.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.4 EIRP test results (continued)

OPERATING FREQUENCY RANGE: 2110.0 – 2180.0 MHz (downlink)
1710.0 – 1780.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 10 kHz

VIDEO BANDWIDTH: 30 kHz

RF SIGNAL: GSM

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain, dB	Antenna assembly Gain**, dBi	EIRP***, dBm	Limit, dBm	Margin*, dB	Verdict
		Input	Output						
Below AGC level									
Downlink transmit mode									
2177.59	Base	-50.58	21.83	72.41	0.2	22.03	62.15	-40.12	Pass
Uplink transmit mode									
1729.99	Mobile	-56.67	21.27	77.94	0.2	21.47	30.0	-8.53	Pass
Above AGC level									
Downlink transmit mode									
2177.59	Base	-47.73	21.21	68.94	0.2	21.41	62.15	-40.74	Pass
Uplink transmit mode									
1729.99	Mobile	-53.40	21.31	74.71	0.2	21.51	30.0	-8.49	Pass

* - Margin = ERP – specification limit

** - Antenna Assembly Gain = Maximum Antenna Gain (dBi) – Cable Loss (dB) = 2.2 – 2.0 = 0.2 dBi

*** - EIRP = Output SA reading + Antenna Assembly Gain (dBi)



Test specification: Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test			
Test procedure: KDB 935210 D05 v01r01, section 3.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.5 Mean output power and booster gain test results

OPERATING FREQUENCY RANGE: 728.0 – 746.0 MHz (downlink)
698.0 – 716.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 100 kHz

VIDEO BANDWIDTH: 300 kHz

RF SIGNAL: AWGN

RF SIGNAL:

AWGN

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain**, dB	Limit, dBm	Margin*, dB	Verdict
		Input	Output				
Below AGC level							
Downlink transmit mode							
745.258	Base	-50.75	23.44	74.19	76.0	-1.81	Pass
Uplink transmit mode							
700.599	Mobile	-53.39	23.08	76.47	77.0	-0.53	Pass
Below AGC level							
Downlink transmit mode							
745.258	Base	-47.85	23.31	71.16	76.0	-4.84	Pass
Uplink transmit mode							
700.599	Mobile	-50.32	23.06	73.38	77.0	-3.62	Pass

* - Margin = ERP – specification limit

** - Booster Gain = Output SA reading – Input SA reading

Table 7.2.6 EIRP test results

OPERATING FREQUENCY RANGE: 728.0 – 746.0 MHz (downlink)
698.0 – 716.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 100 kHz

VIDEO BANDWIDTH: 300 kHz

RF SIGNAL: AWGN

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain, dB	Antenna assembly Gain**, dBi	EIRP***, dBm	Limit, dBm	Margin*, dB	Verdict
		Input	Output						
Below AGC level									
Downlink transmit mode									
745.258	Base	-50.75	23.44	74.19	0.2	23.64	62.15	-38.51	Pass
Uplink transmit mode									
700.599	Mobile	-53.39	23.08	76.47	0.2	23.28	37.0	-13.72	Pass
Above AGC level									
Downlink transmit mode									
745.258	Base	-47.85	23.31	71.16	0.2	23.51	62.15	-38.64	Pass
Uplink transmit mode									
700.599	Mobile	-50.32	23.06	73.38	0.2	23.26	37.0	-13.74	Pass

* - Margin = ERP – specification limit

** - Antenna Assembly Gain = Maximum Antenna Gain (dBi) – Cable Loss (dB) = 2.2 – 2.0 = 0.2 dBi

*** - EIRP = Output SA reading + Antenna Assembly Gain (dBi)



Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.7 Mean output power and booster gain test results

OPERATING FREQUENCY RANGE: 728.0 – 746.0 MHz (downlink)
698.0 – 716.0 MHz (uplink)
DETECTOR USED: Average
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 300 kHz

RF SIGNAL: GSM

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain**, dB	Limit, dBm	Margin*, dB	Verdict
		Input	Output				
Below AGC level							
Downlink transmit mode							
745.258	Base	-51.70	23.48	75.18	76.0	-0.82	Pass
Uplink transmit mode							
700.599	Mobile	-51.92	23.85	75.77	77.0	-1.23	Pass
Above AGC level							
Downlink transmit mode							
745.258	Base	-48.90	23.51	72.41	76.0	-3.59	Pass
Uplink transmit mode							
700.599	Mobile	-49.04	23.66	72.70	77.0	-4.30	Pass

* - Margin = ERP – specification limit

** - Booster Gain = Output SA reading – Input SA reading



Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Table 7.2.8 EIRP test results

OPERATING FREQUENCY RANGE: 728.0 – 746.0 MHz (downlink)
698.0 – 716.0 MHz (uplink)

DETECTOR USED: Average

RESOLUTION BANDWIDTH: 100 kHz

VIDEO BANDWIDTH: 300 kHz

RF SIGNAL: GSM

Carrier frequency, MHz	Input port	SA reading, dBm		Booster gain, dB	Antenna assembly Gain**, dBi	EIRP***, dBm	Limit, dBm	Margin*, dB	Verdict
		Input	Output						
Below AGC level									
Downlink transmit mode									
745.258	Base	-51.70	23.48	75.18	0.2	23.68	62.15	-38.47	Pass
Uplink transmit mode									
700.599	Mobile	-51.92	23.85	75.77	0.2	24.05	37.0	-12.95	Pass
Above AGC level									
Downlink transmit mode									
745.258	Base	-48.90	23.51	72.41	0.2	23.71	62.15	-38.44	Pass
Uplink transmit mode									
700.599	Mobile	-49.04	23.66	72.7	0.2	23.86	37.0	-13.14	Pass

* - Margin = ERP – specification limit

** - Antenna Assembly Gain = Maximum Antenna Gain (dBi) – Cable Loss (dB) = 2.2 – 2.0 = 0.2 dBi

*** - EIRP = Output SA reading + Antenna Assembly Gain (dBi)

Reference numbers of test equipment used

HL 2016	HL 2017	HL 2909	HL 3472	HL 3474	HL 3779	HL 3780	HL 3787
HL 3901	HL 4070	HL 4274	HL 4275				
GB39340603		MY45090513					

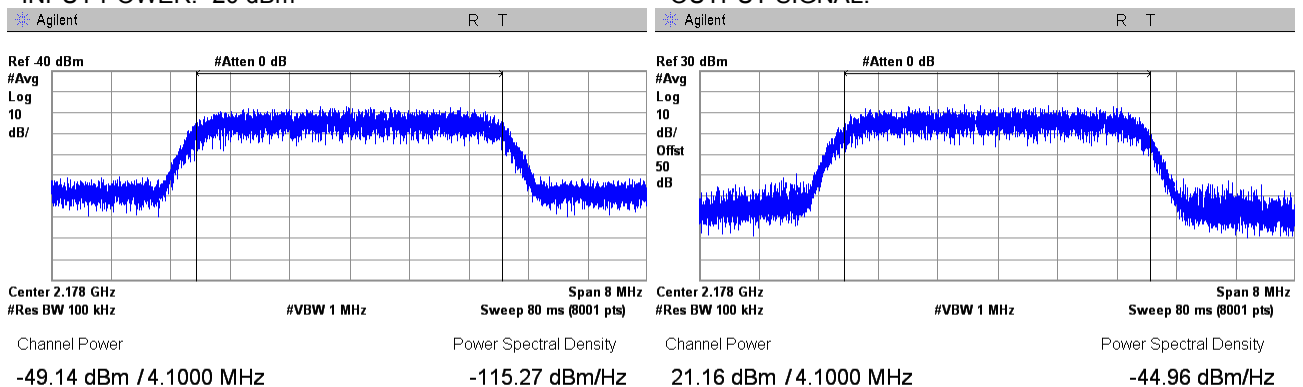
Full description is given in Appendix A.

Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.1 Mean output power and booster gain test results at f0 frequency

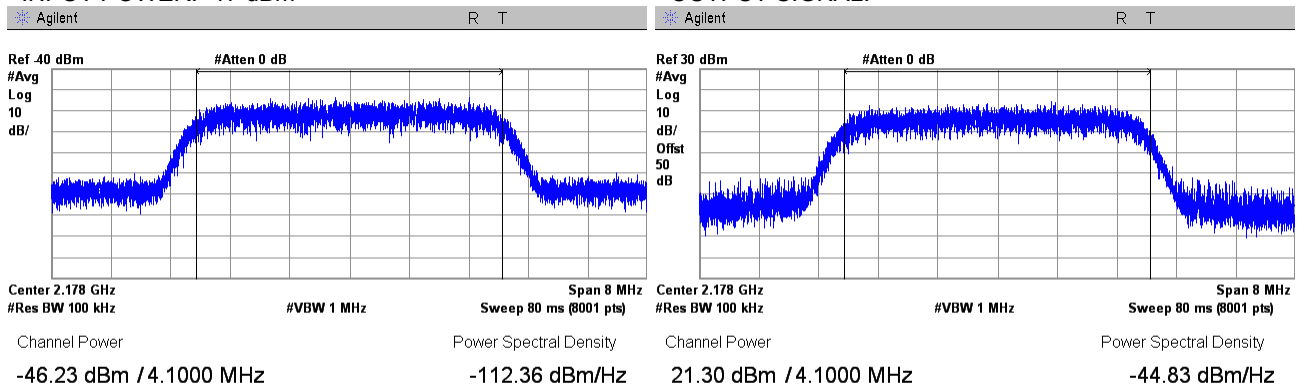
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -20 dBm

2110.0 – 2180.0 MHz Downlink
AWGN
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -17 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

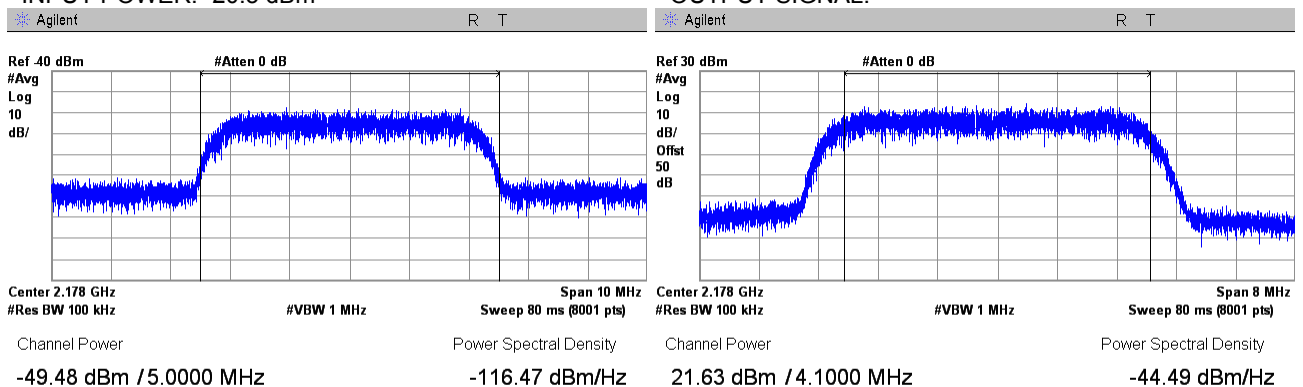


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.2 Mean output power and booster gain test results at f0 frequency

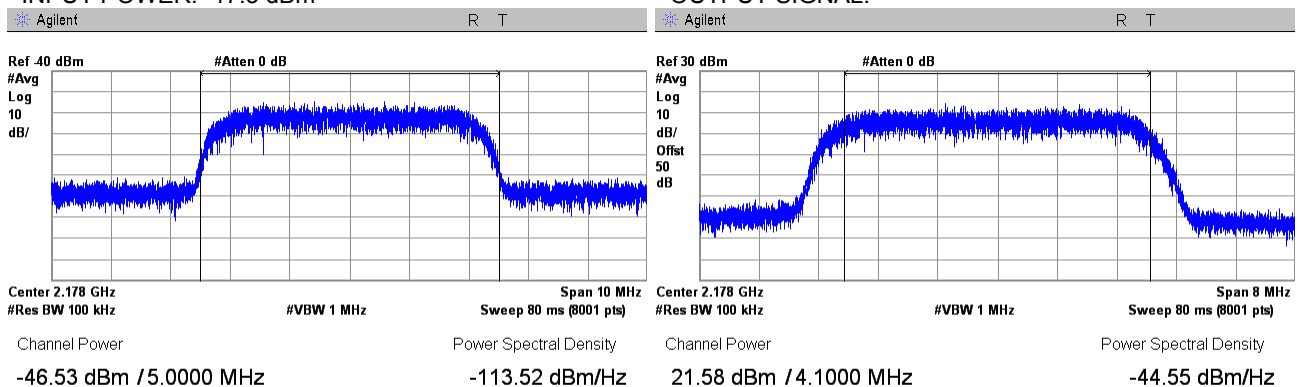
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -20.5 dBm

2110.0 – 2180.0 MHz Downlink
WCDMA
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -17.5 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

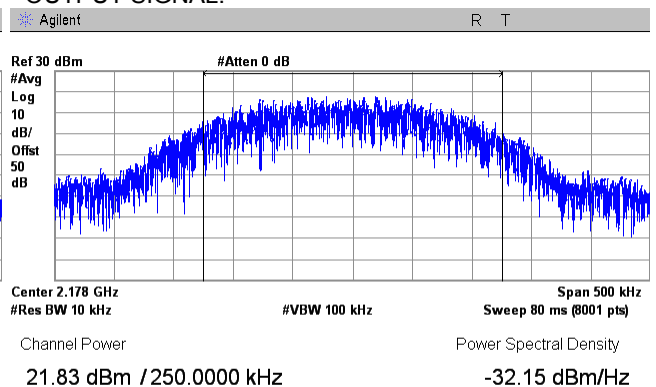
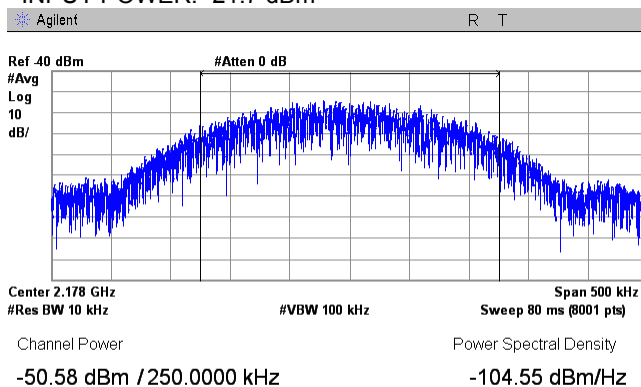


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.3 Mean output power and booster gain test results at f0 frequency

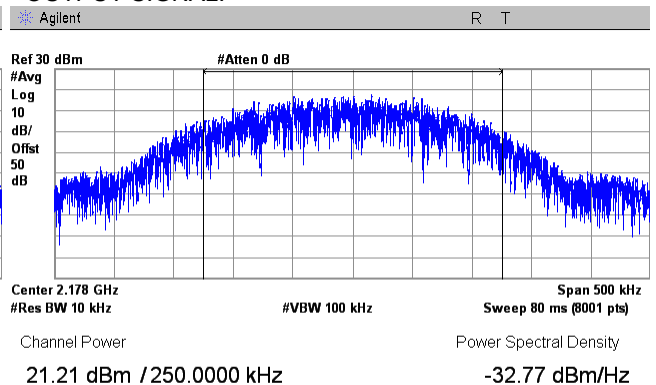
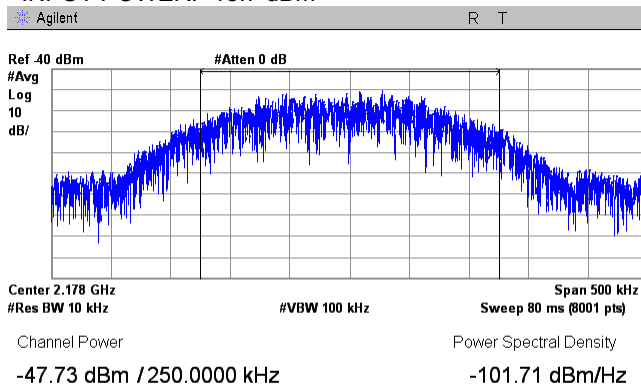
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -21.7 dBm

2110.0 – 2180.0 MHz Downlink
GSM
Base
Below AGC threshold +3 dB
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -18.7 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

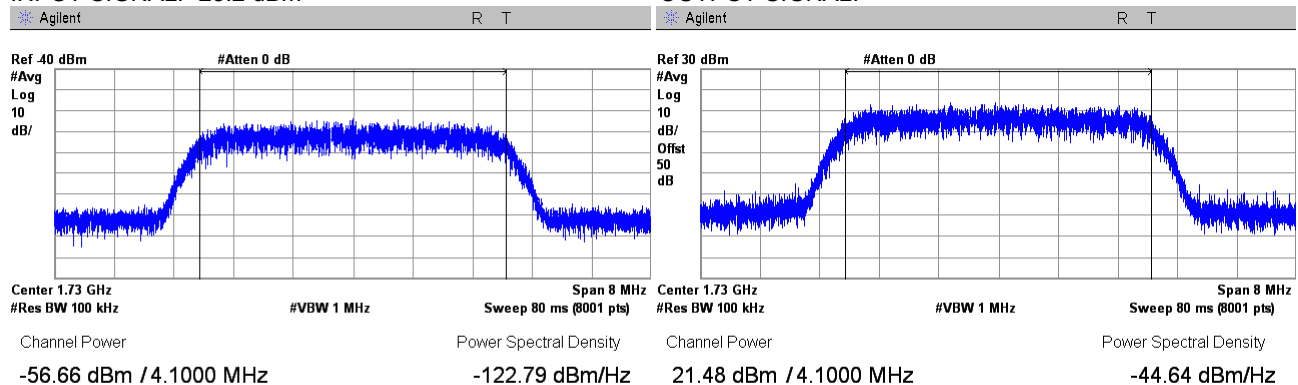


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.4 Mean output power and booster gain test results at f0 frequency

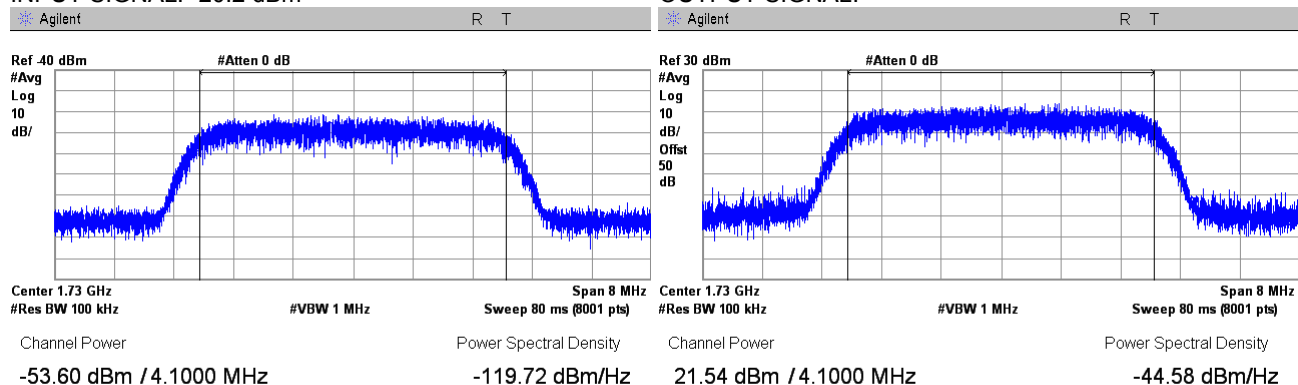
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -23.2 dBm

1710.0 – 1780.0 MHz Uplink
AWGN
Mobile
Below AGC threshold
OUTPUT SIGNAL:



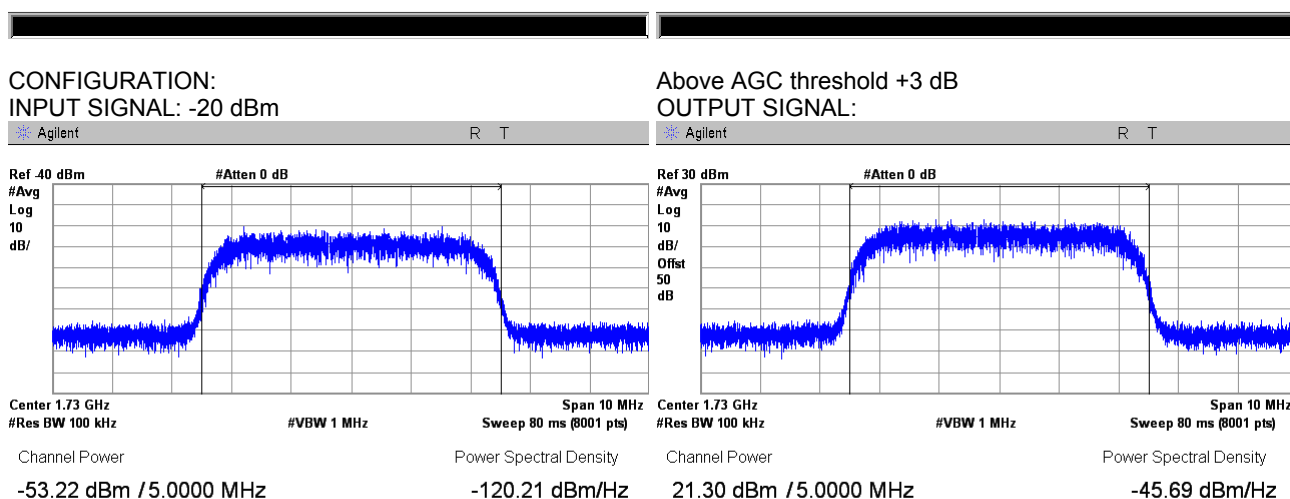
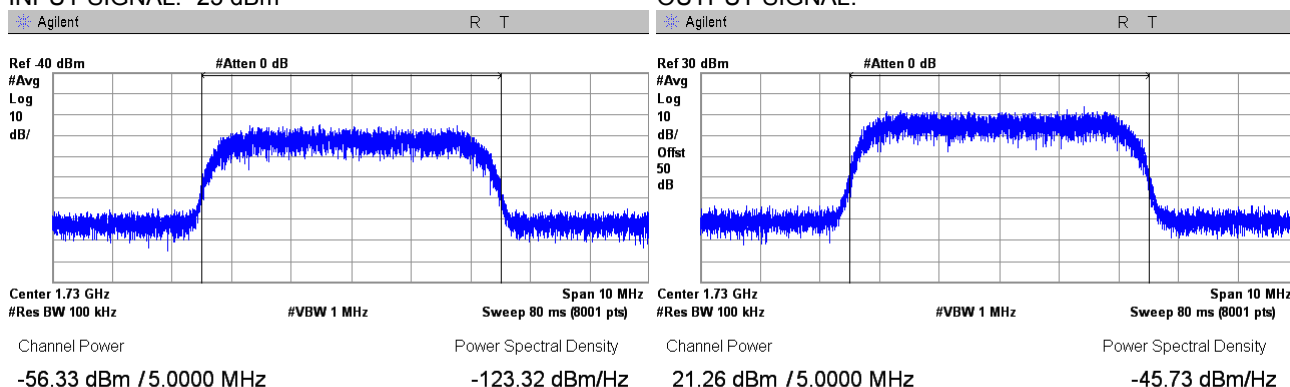
CONFIGURATION:
INPUT SIGNAL: -20.2 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:





FREQUENCY RANGE:	1710.0 – 1780.0 MHz Uplink
OPERATIONAL MODE:	WCDMA
INPUT PORT:	Mobile
CONFIGURATION:	Below AGC threshold
INPUT SIGNAL: -23 dBm	OUTPUT SIGNAL:

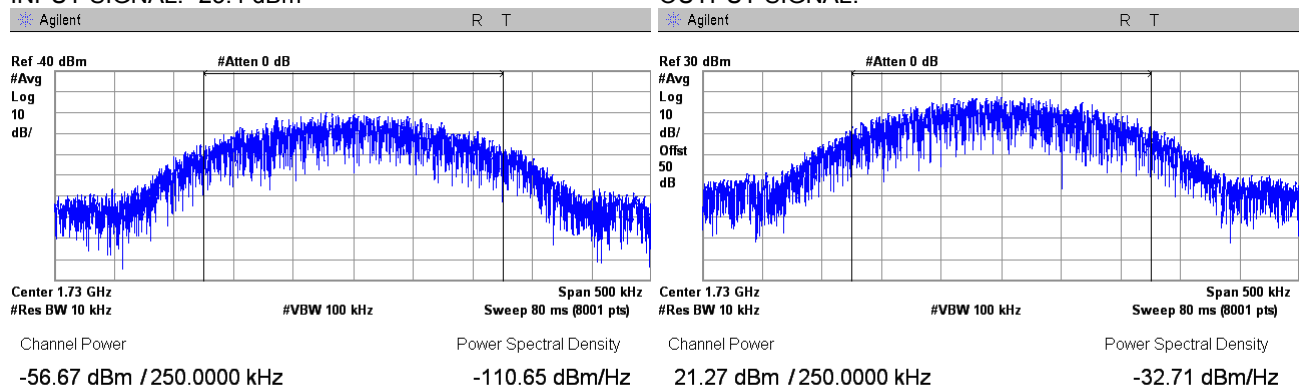


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.6 Mean output power and booster gain test results at f0 frequency

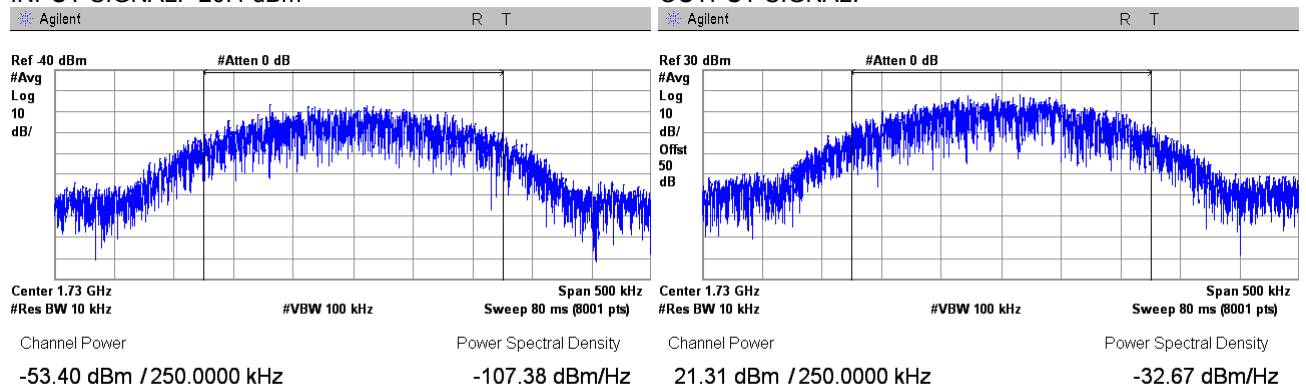
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -23.4 dBm

1710.0 – 1780.0 MHz Uplink
GSM
Mobile
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT SIGNAL: -20.4 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

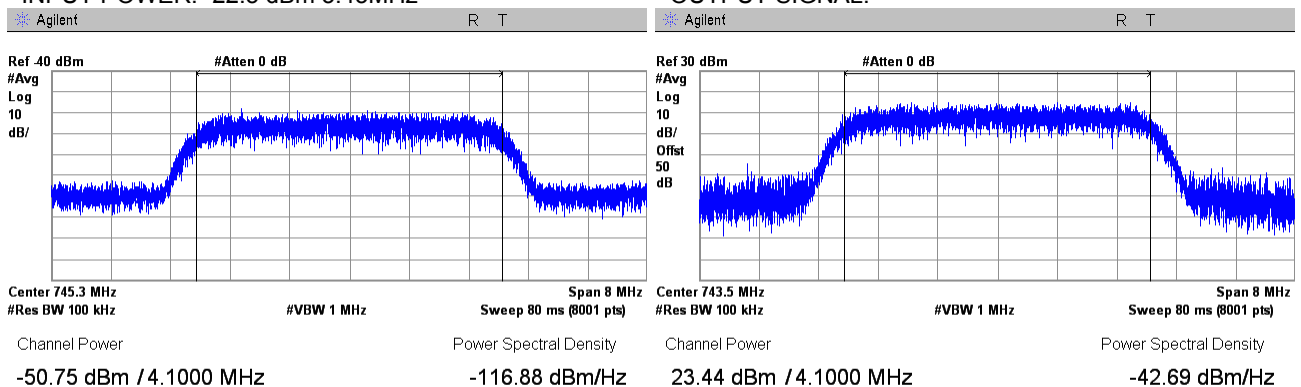


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.7 Mean output power and booster gain test results at f0 frequency

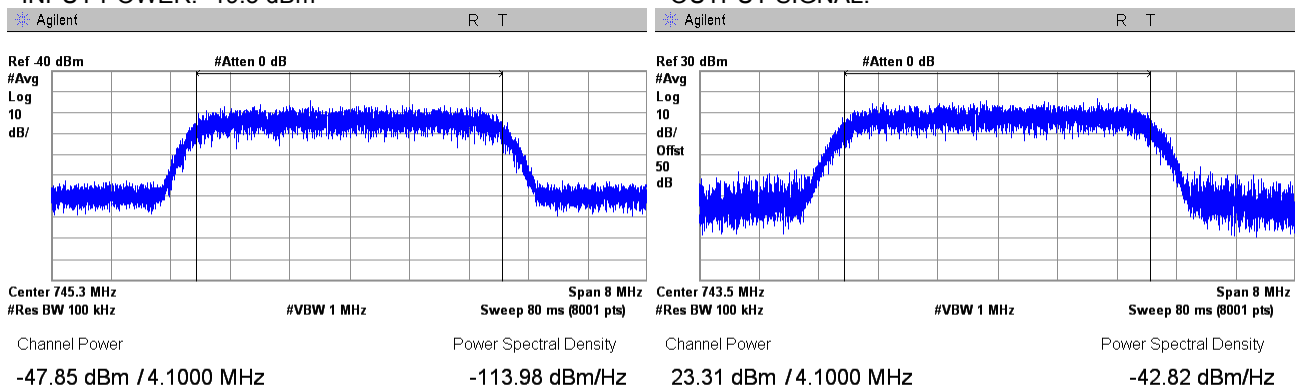
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22.5 dBm 3.45MHz

728.0 – 746.0 MHz Downlink
AWGN
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -19.5 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

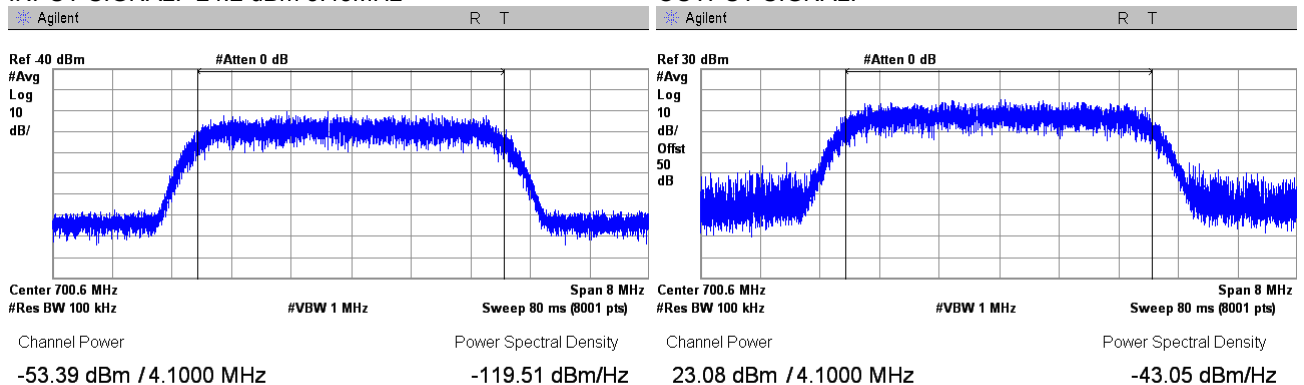


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.8 Mean output power and booster gain test results at f0 frequency

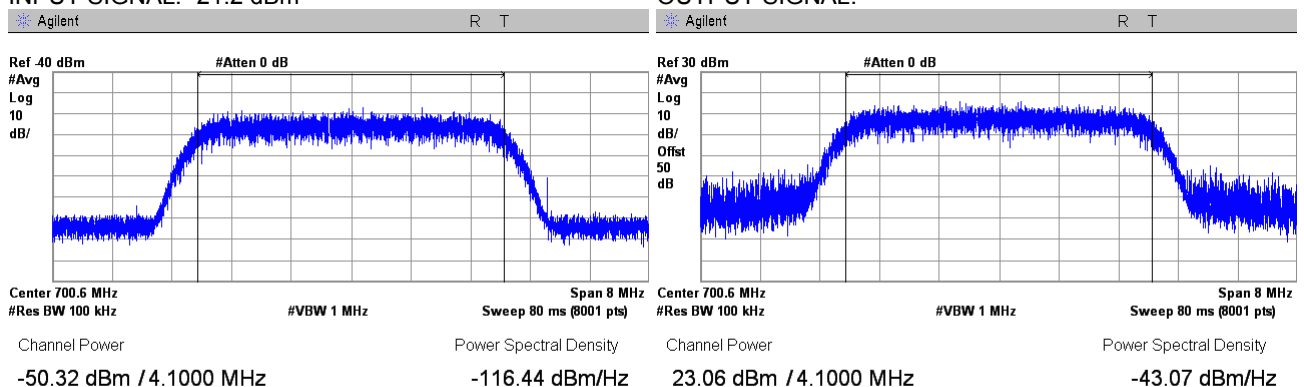
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24.2 dBm 3.45MHz

698.0 – 716.0 MHz Uplink
AWGN
Mobile
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT SIGNAL: -21.2 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

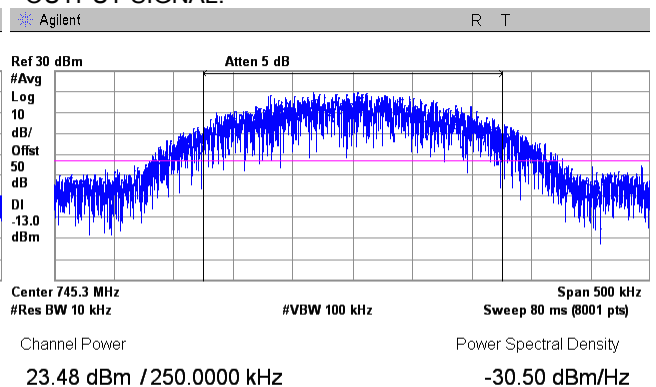
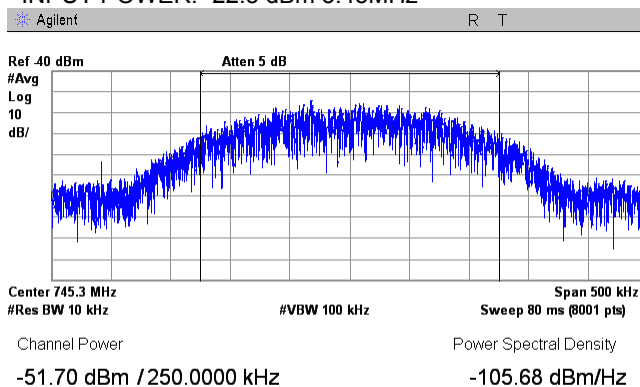


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.9 Mean output power and booster gain test results at f0 frequency

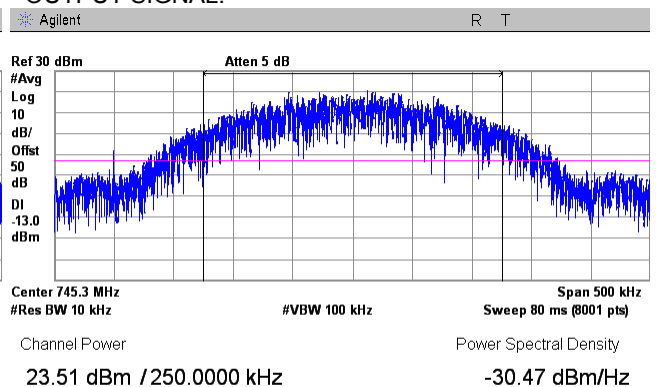
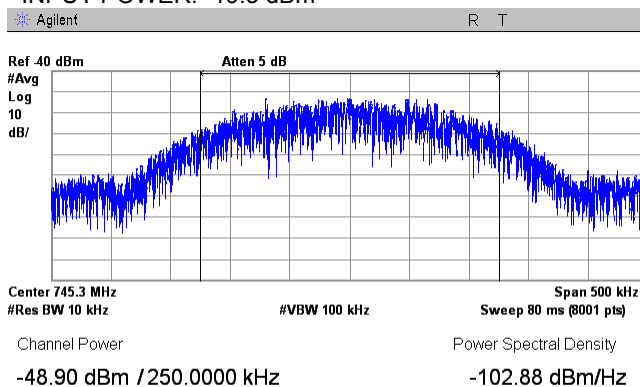
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22.5 dBm 3.45MHz

728.0 – 746.0 MHz Downlink
GSM
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -19.5 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

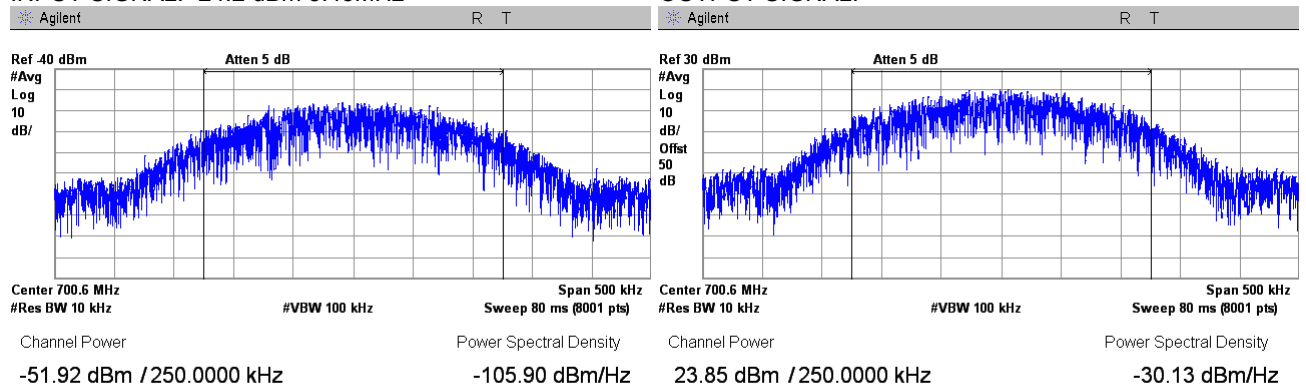


Test specification:		Section 27.50(d)/RSS-131 sec. 5.2.3, Mean output power and booster gain test	
Test procedure:		KDB 935210 D05 v01r01, section 3.5	
Test mode:		Verdict: PASS	
Date(s):			
05-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 48 %	Air Pressure: 1013 hPa	Power: 120 VAC
Remarks:			

Plot 7.2.10 Mean output power and booster gain test results at f0 frequency

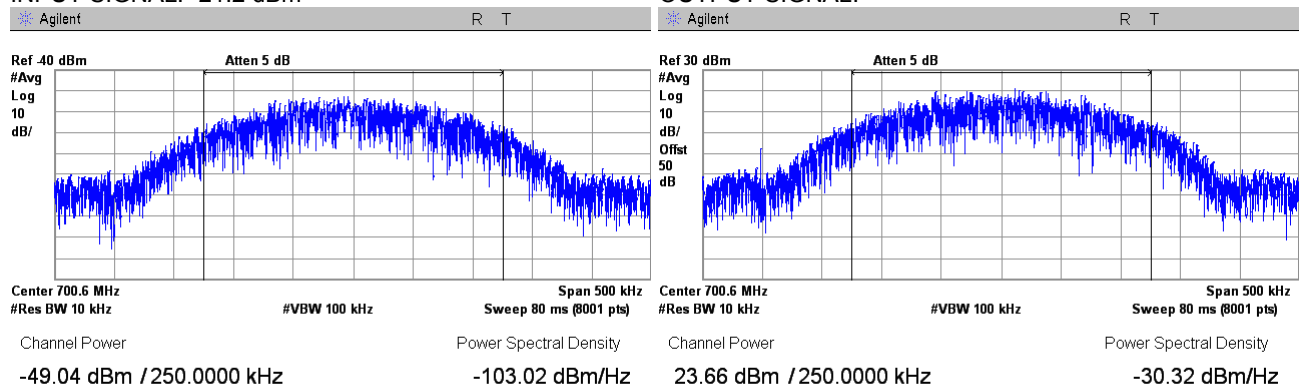
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24.2 dBm 3.45MHz

698.0 – 716.0 MHz Uplink
GSM
Mobile
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT SIGNAL: -21.2 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:



Test specification: Section 2.1049 / RSS-131 section 5.2.1, Out-of-band rejection test			
Test procedure: KDB 935210 D05 v01r01, section 3.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 49 %	Air Pressure: 1019 hPa	Power: 120 VAC
Remarks:			

7.3 Out-of-band rejection test

7.3.1 General

This test was performed to measure amplifier pass bandwidth. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Out-of-band rejection limits

Assigned frequency range, MHz	Tested frequency range	Modulation envelope reference points*, dBc	Maximum allowed Gain versus frequency response, dB
2110.0 – 2180.0 1710.0 – 1780.0	$F_0 \pm 250\% BW$	20	≤ 1 dB nominal gain
728.0 – 746.0 698.0 – 716.0	$F_0 \pm 250\% BW$	20	≤ 1 dB nominal gain

* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

7.3.2 Test procedure

- 7.3.2.1 The EUT was set up as shown in The tested frequency range was swept with the signal generator and the amplifier 20 dB bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on power envelope and provided in Table 7.3.2, Table 7.3.3 and the associated plots.
- 7.3.2.2 Figure 7.3.1, energized and its proper operation was checked.
- 7.3.2.3 The EUT was set to amplify the unmodulated carrier and the reference peak power level was measured.
- 7.3.2.4 The EUT was set to transmit the normally modulated carrier.
- 7.3.2.5 The tested frequency range was swept with the signal generator and the amplifier 20 dB bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on power envelope and provided in Table 7.3.2, Table 7.3.3 and the associated plots.

Figure 7.3.1 Out-of-band rejection test setup





Test specification: Section 2.1049 / RSS-131 section 5.2.1, Out-of-band rejection test			
Test procedure: KDB 935210 D05 v01r01, section 3.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 49 %	Air Pressure: 1019 hPa	Power: 120 VAC
Remarks:			

Table 7.3.2 Out-of-band rejection test results

FREQUENCY RANGE: 2110.0 – 2180.0 MHz Downlink
 1710.0 – 1780.0 MHz Uplink
 DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 1000 kHz
 VIDEO BANDWIDTH: 3000 kHz
 MODULATION ENVELOPE REFERENCE POINTS: 20 dBc

Input Power, dBm	Start Band frequency, MHz	Stop Band frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Verdict
Downlink AWS-1 and AWS-3					
-56.91	2110.10	2179.90	69.80	2110.0 – 2180.0	Pass
Uplink AWS-1 and AWS-3					
-57.98	1710.09	1779.81	6.803	1710.0 – 1780.0	Pass

Table 7.3.3 Out-of-band rejection test results

FREQUENCY RANGE: 728.0 – 746.0 MHz Downlink
 698.0 – 716.0 MHz Uplink
 DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 300 kHz
 MODULATION ENVELOPE REFERENCE POINTS: 20 dBc

Input Power, dBm	Start Band frequency, MHz	Stop Band frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Verdict
Downlink LTE700L					
-57.78	728.079	745.989	17.910	728.0 – 746.0	Pass
Uplink LTE700L					
-58.78	698.034	715.966	17.932	698.0 – 716.0	Pass

Reference numbers of test equipment used

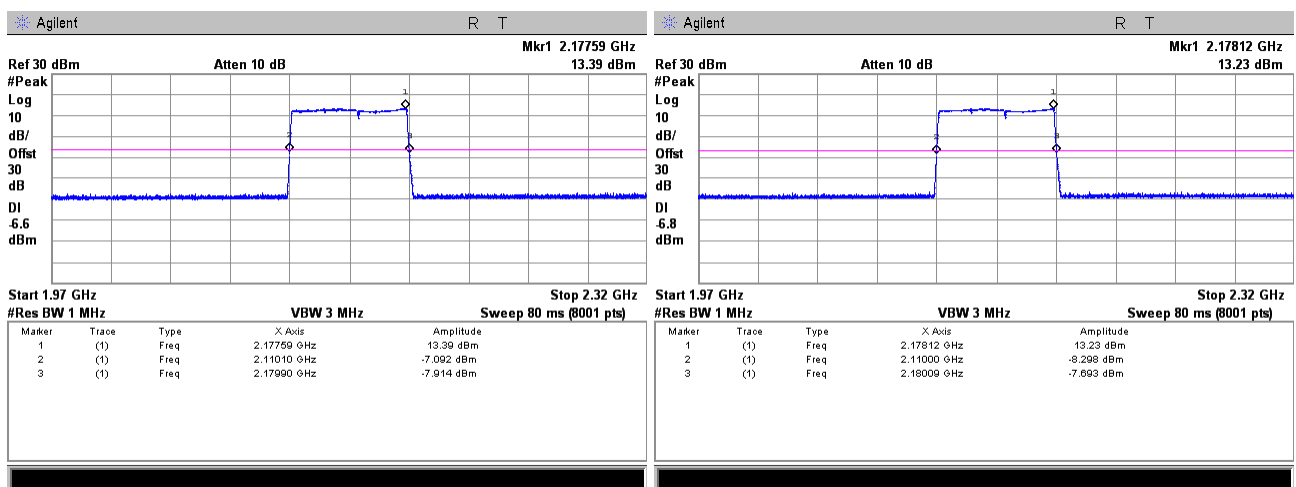
HL 2016	HL 2017	HL 2909	HL 3472	HL 3474	HL 3779	HL 3780	HL 3787
HL 3901	HL 4070	HL 4274	HL 4275				
GB39340603		MY47071059		MY45090513			

Full description is given in Appendix A.

Test specification: Section 2.1049 / RSS-131 section 5.2.1, Out-of-band rejection test			
Test procedure: KDB 935210 D05 v01r01, section 3.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 49 %	Air Pressure: 1019 hPa	Power: 120 VAC
Remarks:			

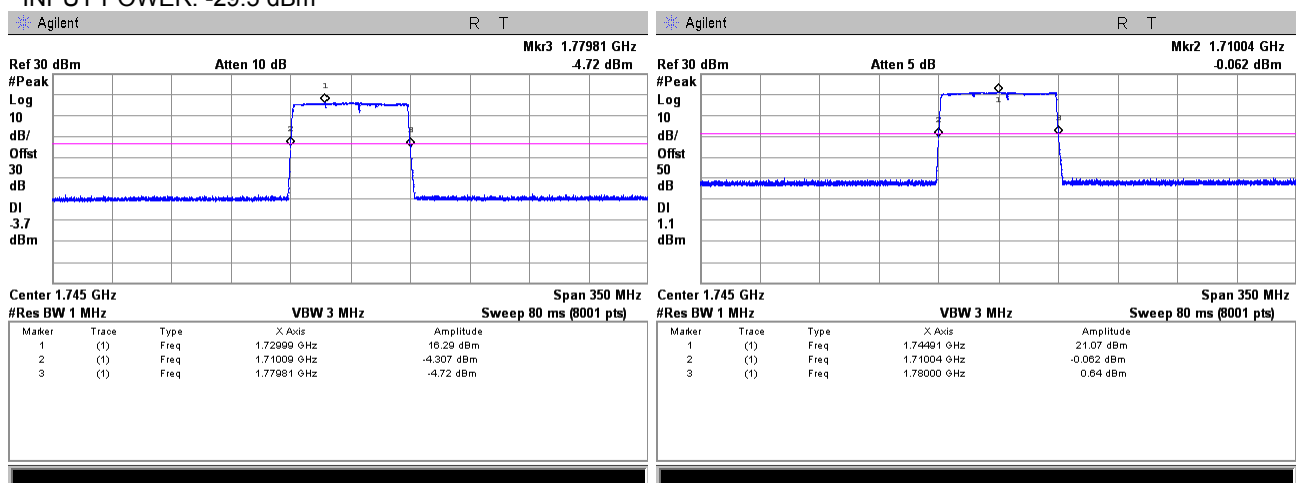
Plot 7.3.1 Out-of-band rejection test result, AWS-1 and AWS-3

FREQUENCY RANGE: 2110.0 – 2180.0 MHz
MIDBAND FREQUENCY: 2145.0 MHz
SWEEP FREQUENCY RANGE: 1970.0 – 2320.0 MHz
INPUT PORT: Base
INPUT POWER: -30.5dBm



Plot 7.3.2 Out-of-band rejection test result, AWS-1 and AWS-3

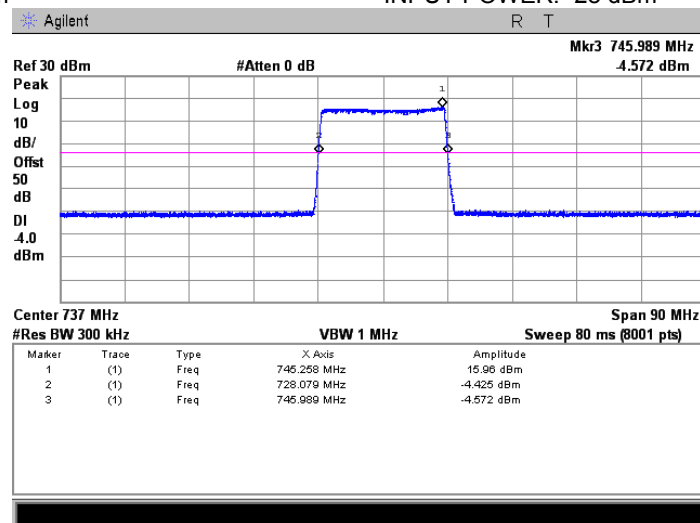
FREQUENCY RANGE: 1710.0 – 1780.0 MHz Uplink
MIDBAND FREQUENCY: 1745.0 MHz
SWEEP FREQUENCY RANGE: 1570.0 – 1920.0 MHz
INPUT PORT: Mobile
INPUT POWER: -29.5 dBm



Test specification: Section 2.1049 / RSS-131 section 5.2.1, Out-of-band rejection test			
Test procedure: KDB 935210 D05 v01r01, section 3.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 03-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 49 %	Air Pressure: 1019 hPa	Power: 120 VAC
Remarks:			

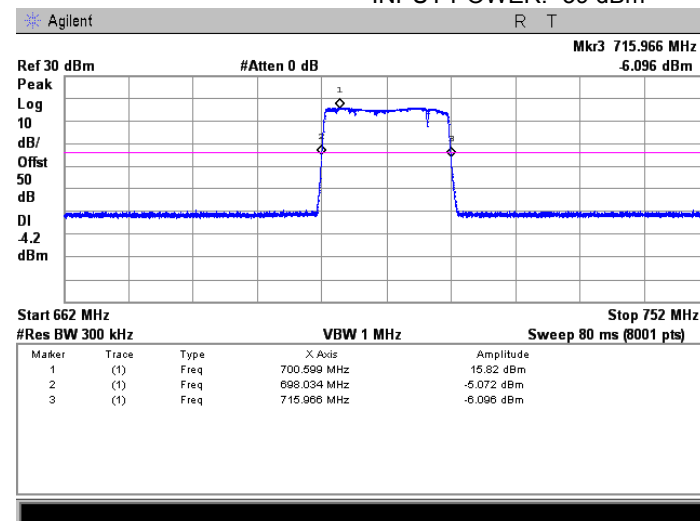
Plot 7.3.3 Out-of-band rejection test result, LTE700L

FREQUENCY RANGE: 728.0 – 746.0 MHz
MIDBAND FREQUENCY: 737.0 MHz
SWEEP FREQUENCY RANGE: 692.0 – 782.0 MHz
INPUT PORT: Base
INPUT POWER: -58 dBm



Plot 7.3.4 Out-of-band rejection test result, LTE700L

FREQUENCY RANGE: 698.0 – 716.0 MHz Uplink
MIDBAND FREQUENCY: 707.0 MHz
SWEEP FREQUENCY RANGE: 662.0 – 752.0 MHz
INPUT PORT: Mobile
INPUT POWER: -39 dBm



Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

7.4 Occupied bandwidth and Input-versus-output spectrum test

7.4.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Occupied bandwidth limits

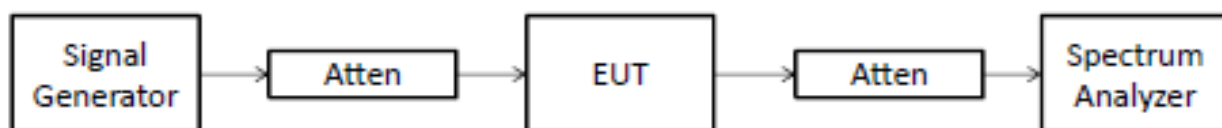
Assigned frequency, MHz	Modulation envelope reference points, %	Maximum allowed bandwidth, kHz
AWS-1 and AWS-3 band		
2110.0 – 2180.0	99	NA
1710.0 – 1780.0	99	NA
LTE700L band		
728.0 – 746.0	99	NA
698.0 – 716.0	99	NA

* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

7.4.2 Test procedure

- 7.4.2.1 The EUT was set up as shown in Figure 7.4.1 The tested frequency range was swept with the signal generator and the amplifier 20 dB bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on power envelope and provided in Table 7.3.2, Table 7.3.3 and the associated plots.
- 7.4.2.2 Figure 7.3.1, energized and its proper operation was checked.
- 7.4.2.3 The EUT was set to transmit the normally modulated carrier.
- 7.4.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in the associated tables and plots.

Figure 7.4.1 Occupied bandwidth test setup





Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Table 7.4.2 Occupied bandwidth test results

DETECTOR USED: Average
 MODULATION ENVELOPE REFERENCE POINTS: 99%
 OPERATING FREQUENCY RANGE: 2110.0 – 2180.0 MHz (downlink)
 1710.0 – 1780.0 MHz (uplink)
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 1000 kHz
 MODULATING SIGNAL: AWGN
 CONFIGURATION: Below AGC threshold level

Carrier frequency, MHz	Output port	Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict
		Input signal	Output signal			
Downlink						
2145.0	Base	4174.2	4131.0	NA	NA	Pass
Uplink						
1745.0	Mobile	4171.4	4164.1	NA	NA	Pass

CONFIGURATION: Above AGC threshold level

Carrier frequency, MHz	Output port	Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict
		Input signal	Output signal			
Downlink						
2145.0	Base	4166.1	4133.5	NA	NA	Pass
Uplink						
1745.0	Mobile	4169.7	4181.3	NA	NA	Pass

MODULATING SIGNAL: WCDMA
 CONFIGURATION: Below AGC threshold level

Carrier frequency, MHz		Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict
Output port	Input signal	Output signal				
Downlink						
2145.0	Base	4432.6	4434.7	NA	NA	Pass
Uplink						
1745.0	Mobile	4415.4	4265.7	NA	NA	Pass

CONFIGURATION: Above AGC threshold level

Carrier frequency, MHz	Output port	Occupied bandwidth, kHz			Margin, kHz	Verdict
		Input signal	Output signal			
Downlink						
2145.0	Base	4442.7	4440.5	NA	NA	Pass
Uplink						
1745.0	Mobile	4425.7	4286.0	NA	NA	Pass



Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Table 7.4.2 Occupied bandwidth test results (continued)

DETECTOR USED: Average
 MODULATION ENVELOPE REFERENCE POINTS: 99%
 OPERATING FREQUENCY RANGE: 2110.0 – 2180.0 MHz (downlink)
 1710.0 – 1780.0 MHz (uplink)
 RESOLUTION BANDWIDTH: 10 kHz
 VIDEO BANDWIDTH: 100 kHz
 MODULATING SIGNAL: GSM
 CONFIGURATION: Below AGC threshold level

Carrier frequency, MHz	Output port	Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict
		Input signal	Output signal			
Downlink						
2145.0	Base	251.287	250.165	NA	NA	Pass
Uplink						
1745.0	Mobile	251.229	253.040	NA	NA	Pass

CONFIGURATION: Above AGC threshold level

Carrier frequency, MHz	Output port	Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict
		Input signal	Output signal			
Downlink						
2145.0	Base	250.280	251.439	NA	NA	Pass
Uplink						
1745.0	Mobile	253.748	253.457	NA	NA	Pass



Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Table 7.4.3 Occupied bandwidth test results

OPERATING FREQUENCY RANGE: 728.0 – 746.0 MHz (downlink)
698.0 – 716.0 MHz (uplink)

DETECTOR USED: Peak

MODULATION ENVELOPE REFERENCE POINTS: 99%

RESOLUTION BANDWIDTH: 100 kHz

VIDEO BANDWIDTH: 1000 kHz

MODULATING SIGNAL: AWGN

CONFIGURATION: Below AGC threshold level

Carrier frequency, MHz		Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict
Output port		Input signal	Output signal			
Downlink						
737.0	Base	4166.9	4168.2	NA	NA	Pass
Uplink						
707.0	Mobile	4152.0	4182.8	NA	NA	Pass

CONFIGURATION: Above AGC threshold level

Carrier frequency, MHz		Output port		Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict		
		Input signal		Output signal						
Downlink										
737.0		Base		4166.4		4162.0		NA	NA	Pass
Uplink										
707.0		Mobile		4161.8		4179.7		NA	NA	Pass

MODULATING SIGNAL: GSM

CONFIGURATION: Below AGC threshold level

Carrier frequency, MHz		Output port		Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict		
		Input signal		Output signal						
Downlink										
737.0		Base		243.381		242.750		NA	NA	Pass
Uplink										
707.0		Mobile		247.399		247.781		NA	NA	Pass

CONFIGURATION: Above AGC threshold level

Carrier frequency, MHz		Output port		Occupied bandwidth, kHz		Limit, kHz	Margin, kHz	Verdict		
		Input signal		Output signal						
Downlink										
737.0		Base		248.756		248.532		NA	NA	Pass
Uplink										
707.0		Mobile		246.507		248.593		NA	NA	Pass

Reference numbers of test equipment used

HL 2016	HL 2017	HL 2909	HL 3472	HL 3474	HL 3779	HL 3780	HL 3787
HL 3901	HL 4274	HL 4275					
GB39340603		MY47071059		MY45090513			

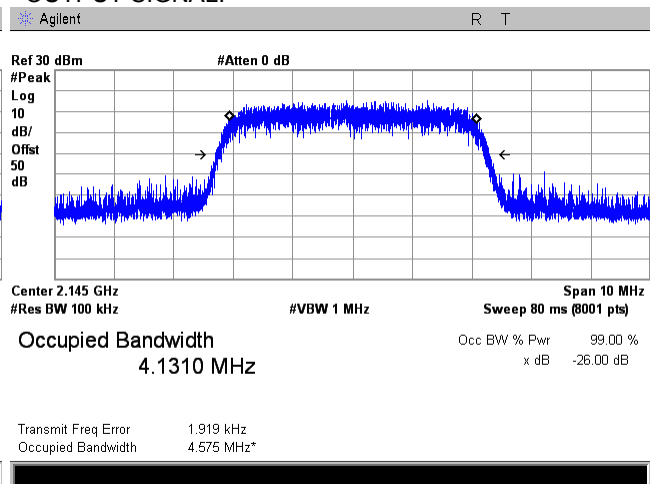
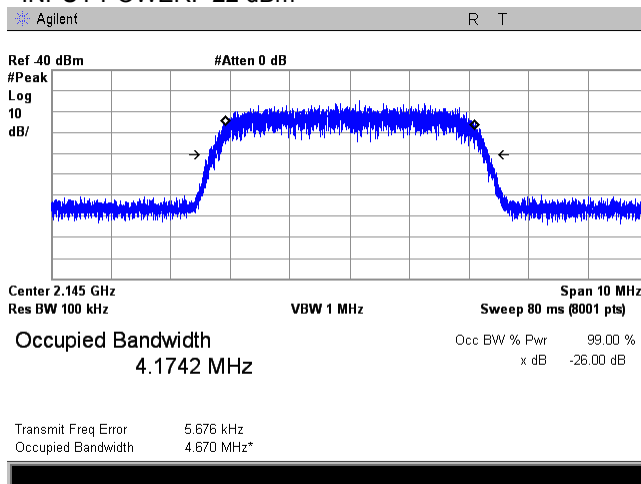
Full description is given in Appendix A.

Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Plot 7.4.1 Occupied bandwidth test result at mid frequency carrier, Port 1

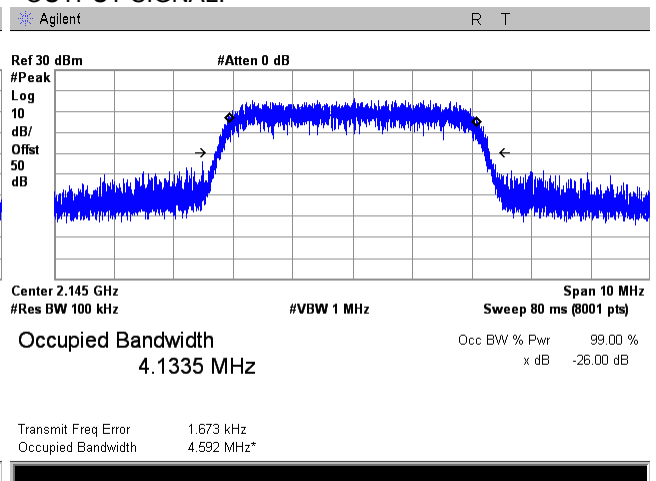
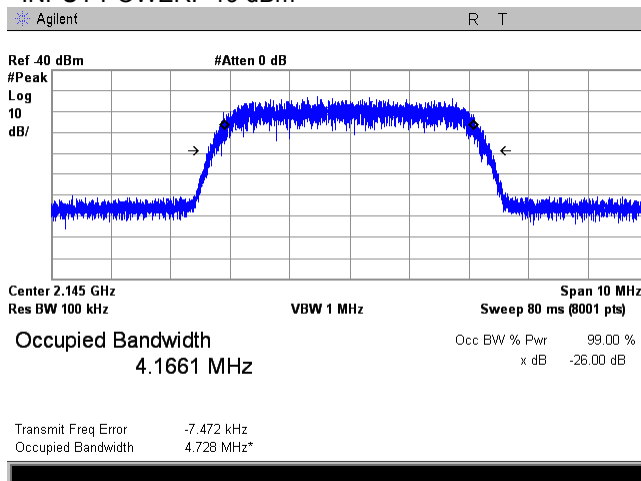
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22 dBm

2110.0 – 2180.0 MHz Downlink
AWGN
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -19 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

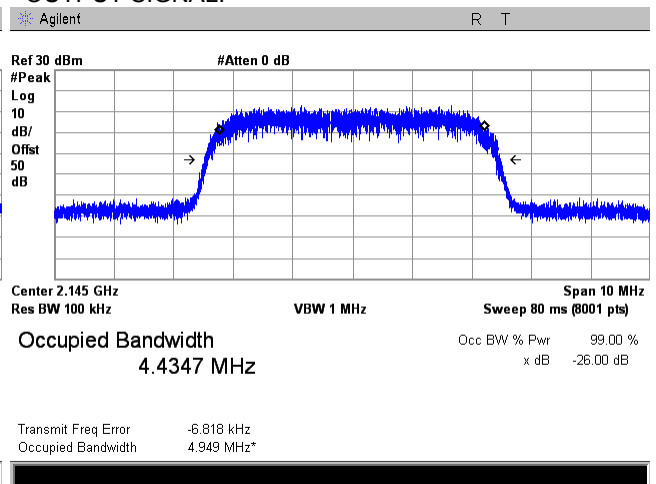
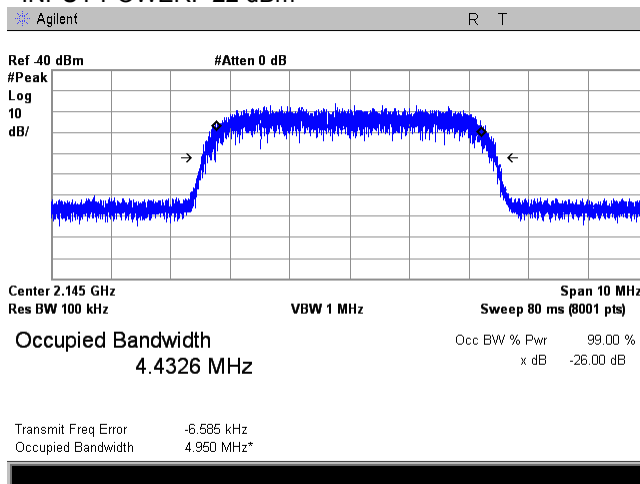


Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Plot 7.4.2 Occupied bandwidth test result at mid frequency carrier, Port 1

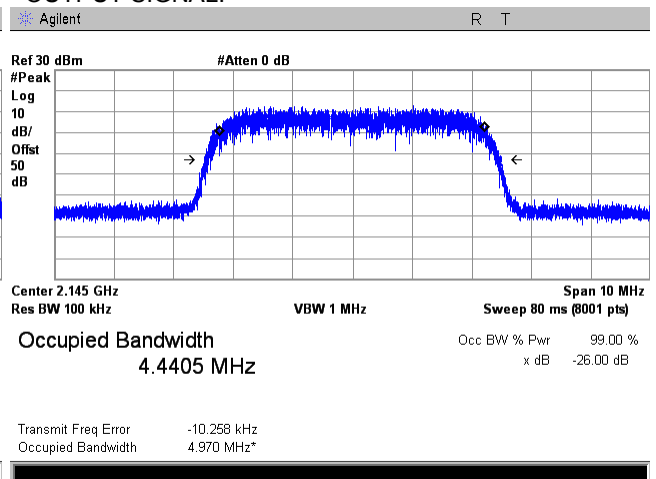
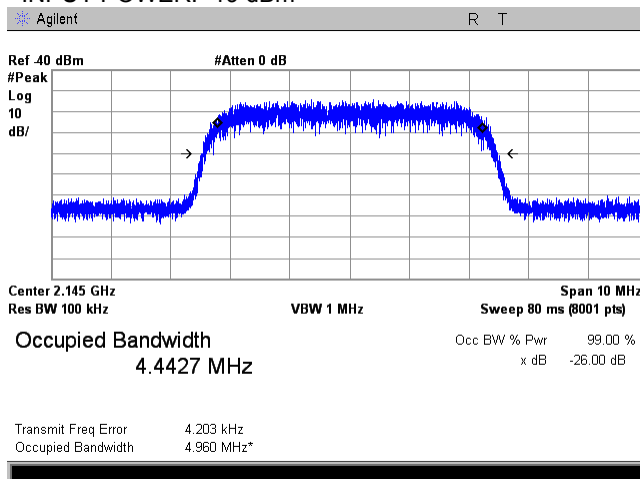
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22 dBm

2110.0 – 2180.0 MHz Downlink
WCDMA
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -19 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

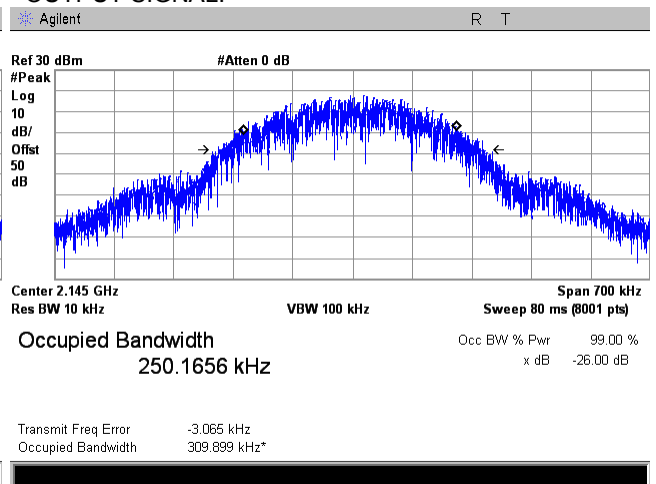
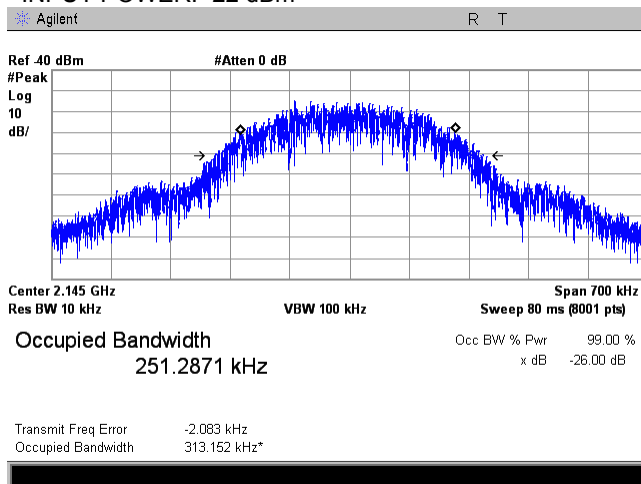


Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Plot 7.4.3 Occupied bandwidth test result at mid frequency carrier, Port 1

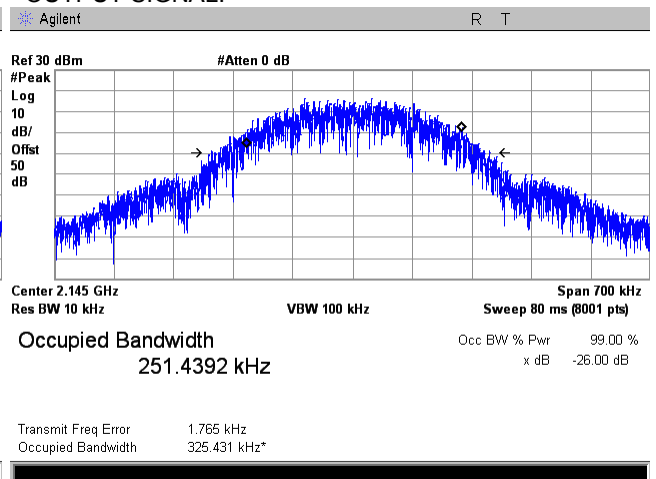
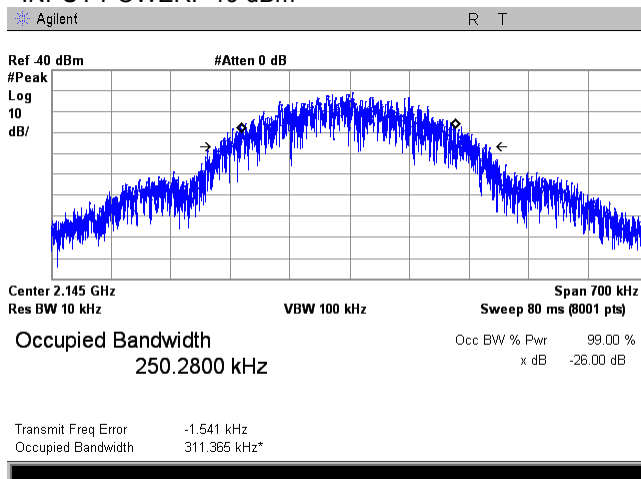
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -22 dBm

2110.0 – 2180.0 MHz Downlink
GSM
Base
Below AGC threshold +3 dB
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -19 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

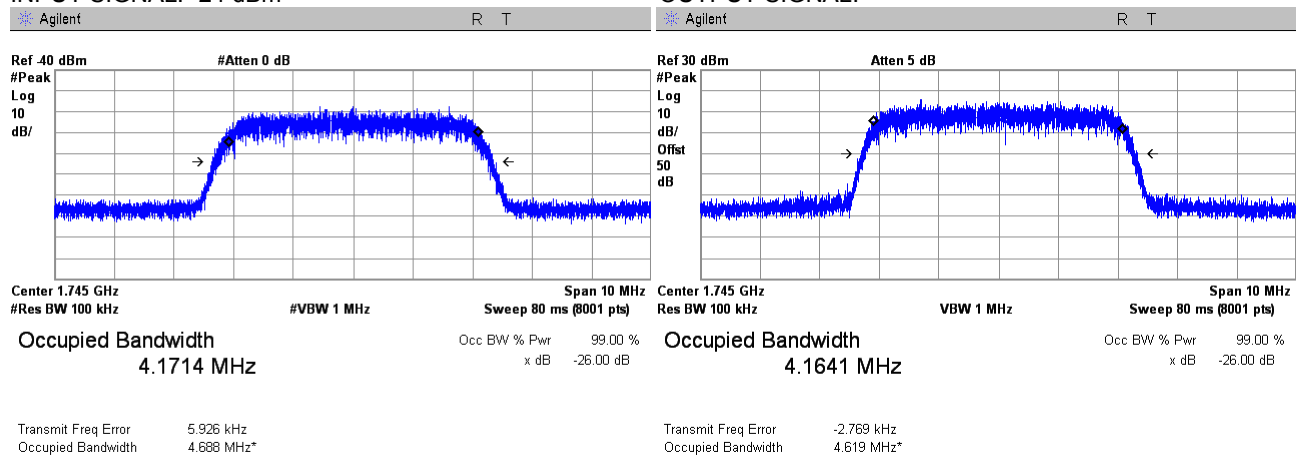


Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Plot 7.4.4 Occupied bandwidth test result at mid frequency carrier, Port 2

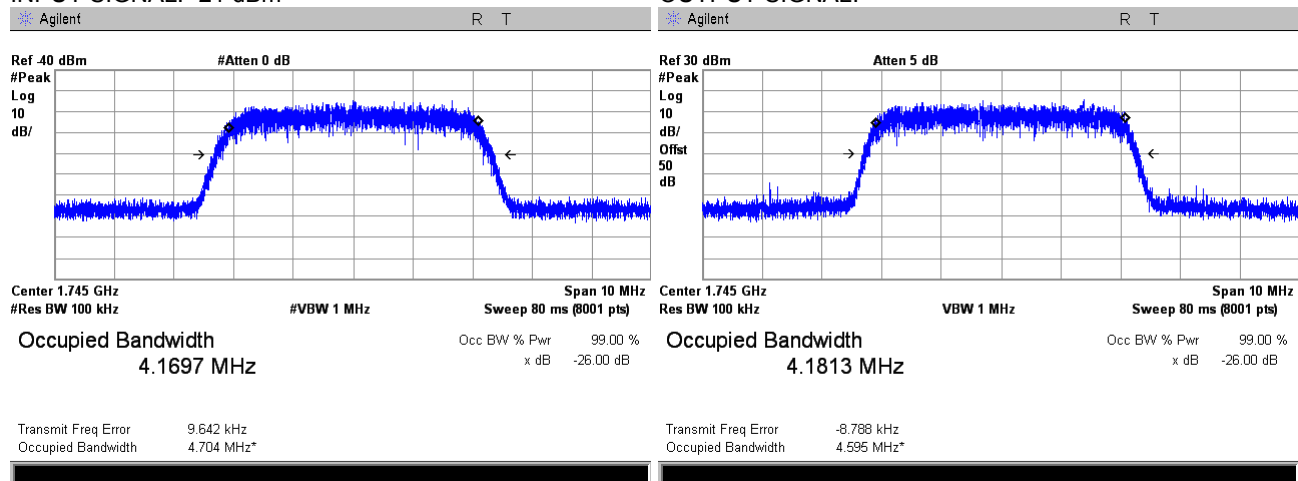
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24 dBm

1710.0 – 1780.0 MHz Uplink
AWGN
Mobile
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT SIGNAL: -21 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

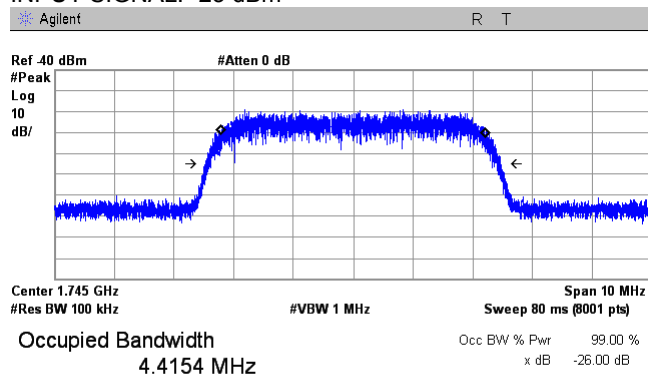


Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

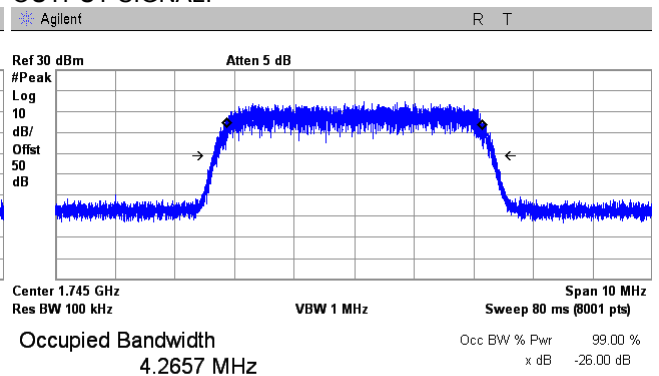
Plot 7.4.5 Occupied bandwidth test result at mid frequency carrier, Port 2

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -23 dBm

1710.0 – 1780.0 MHz Uplink
WCDMA
Mobile
Below AGC threshold
OUTPUT SIGNAL:



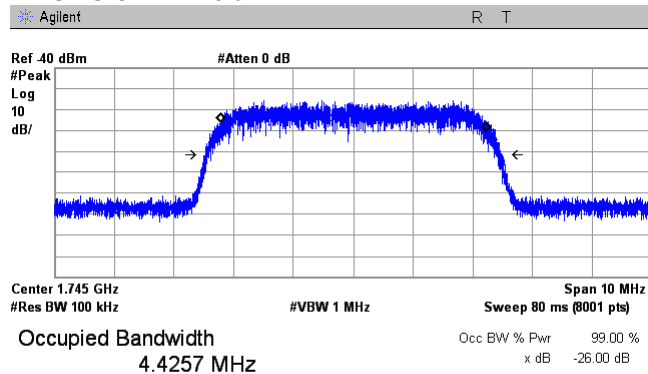
Transmit Freq Error 5.826 kHz
Occupied Bandwidth 4.947 MHz*



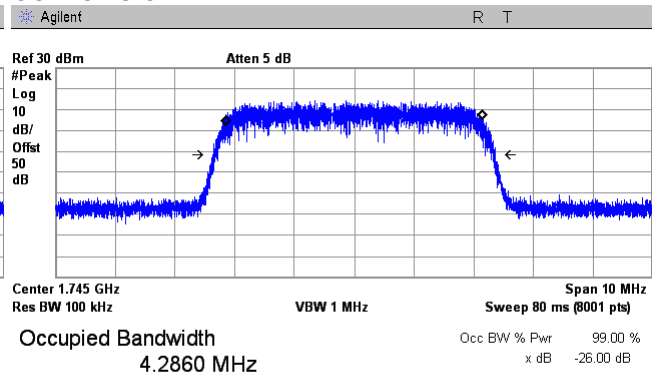
Transmit Freq Error 3.333 kHz
Occupied Bandwidth 4.720 MHz*

CONFIGURATION:
INPUT SIGNAL: -20 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:



Transmit Freq Error 6.643 kHz
Occupied Bandwidth 4.957 MHz*



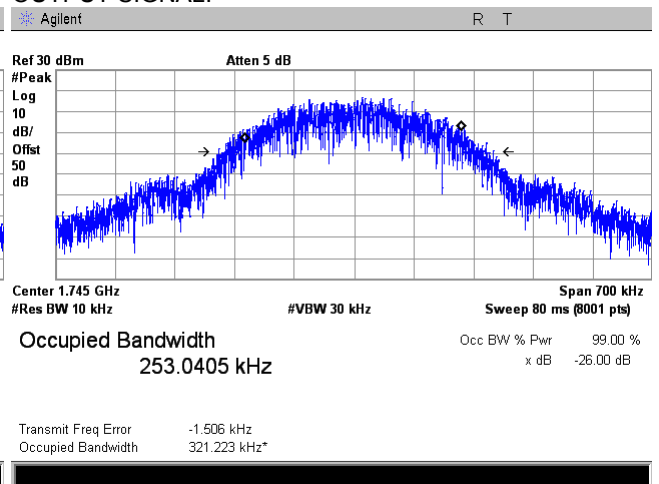
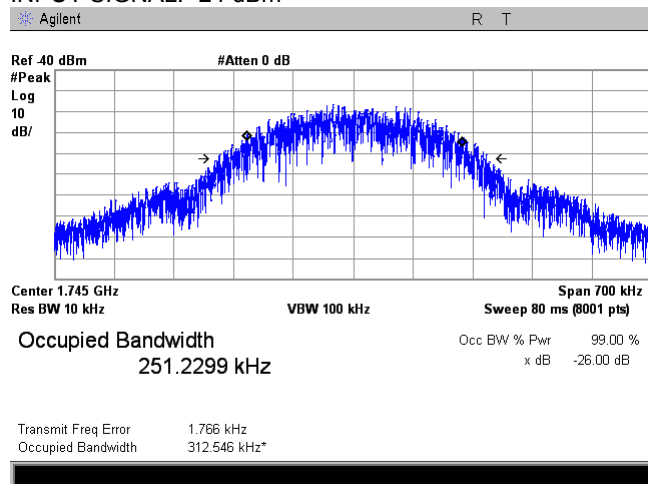
Transmit Freq Error -3.289 kHz
Occupied Bandwidth 4.715 MHz*

Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Plot 7.4.6 Occupied bandwidth test result at mid frequency carrier, Port 2

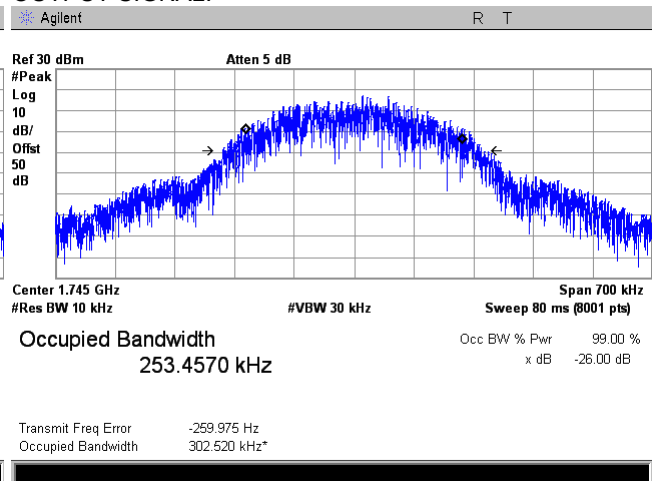
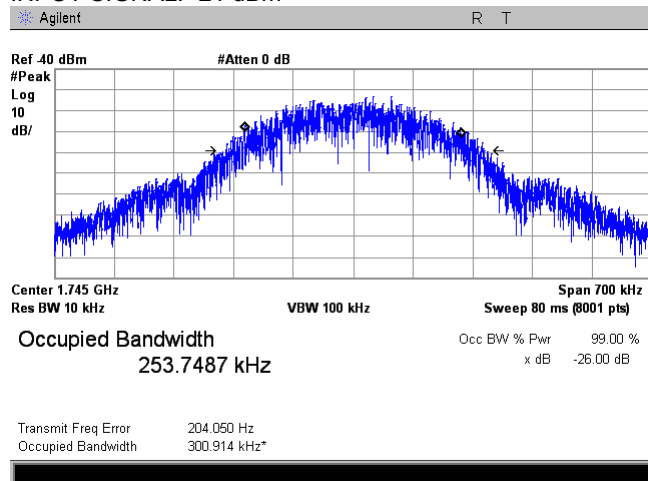
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24 dBm

1710.0 – 1780.0 MHz Uplink
GSM
Mobile
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT SIGNAL: -21 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

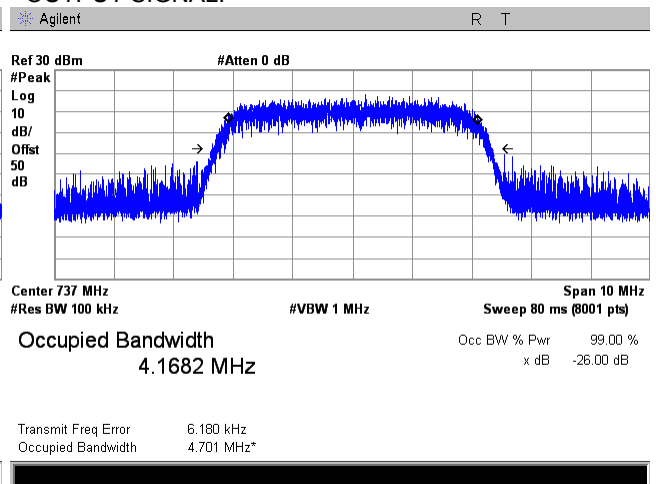
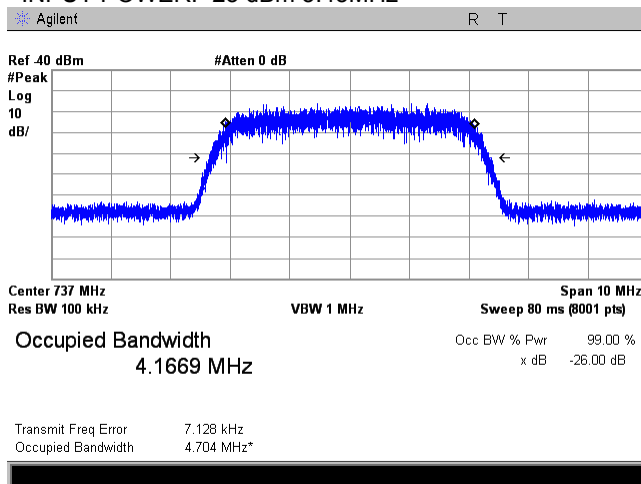


Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

Plot 7.4.7 Occupied bandwidth test result at mid frequency carrier, Port 1

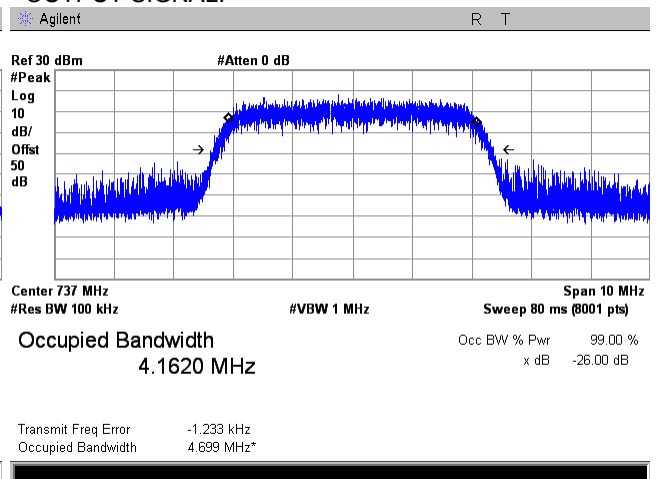
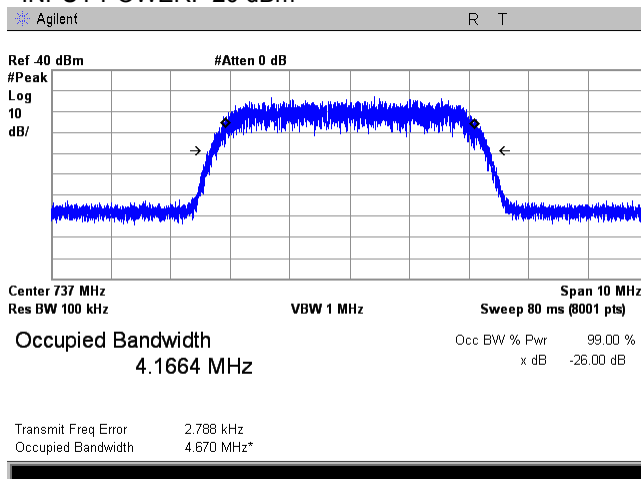
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -23 dBm 3.45MHz

728.0 – 746.0 MHz Downlink
AWGN
Base
Below AGC threshold
OUTPUT SIGNAL:



CONFIGURATION:
INPUT POWER: -20 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:

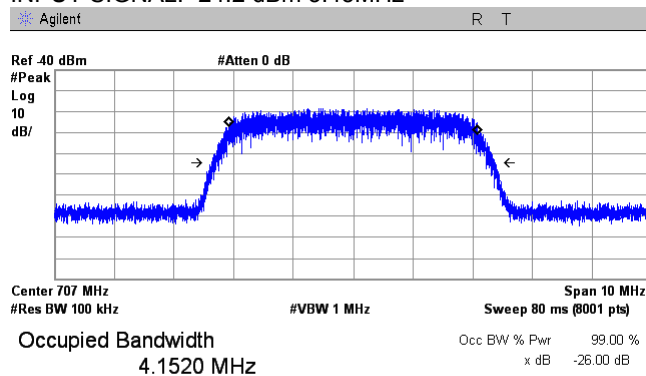


Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

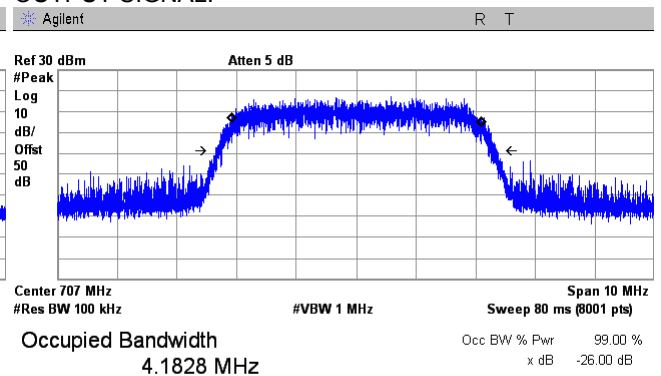
Plot 7.4.8 Occupied bandwidth test result at mid frequency carrier, Port 2

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -24.2 dBm 3.45MHz

698.0 – 716.0 MHz Uplink
AWGN
Mobile
Below AGC threshold
OUTPUT SIGNAL:



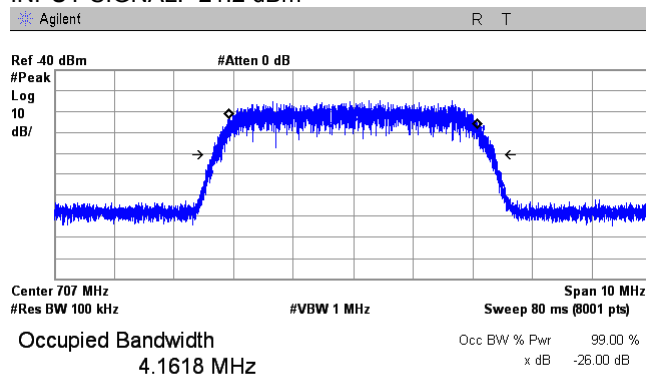
Transmit Freq Error -6.257 kHz
Occupied Bandwidth 4.721 MHz*



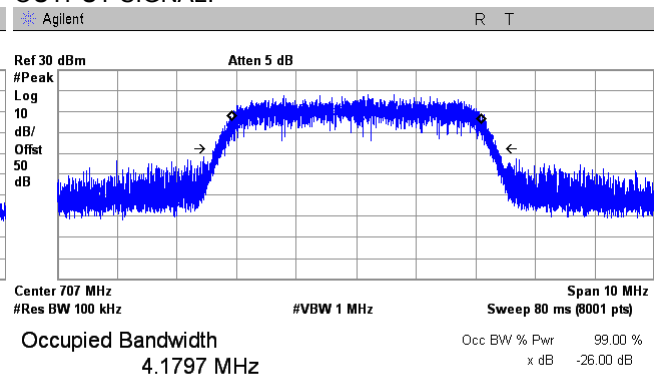
Transmit Freq Error 7.936 kHz
Occupied Bandwidth 4.683 MHz*

CONFIGURATION:
INPUT SIGNAL: -21.2 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:



Transmit Freq Error -1.811 kHz
Occupied Bandwidth 4.718 MHz*



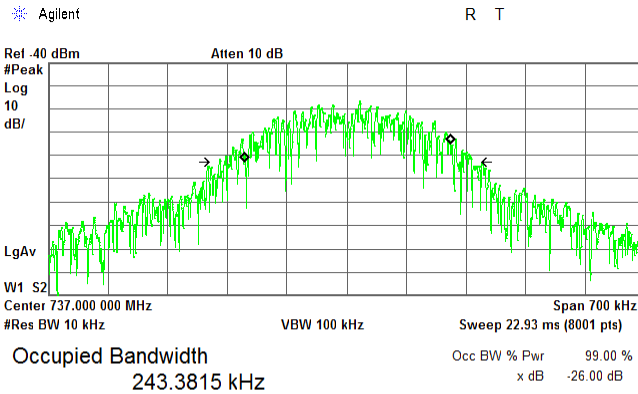
Transmit Freq Error 6.281 kHz
Occupied Bandwidth 4.718 MHz*

Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

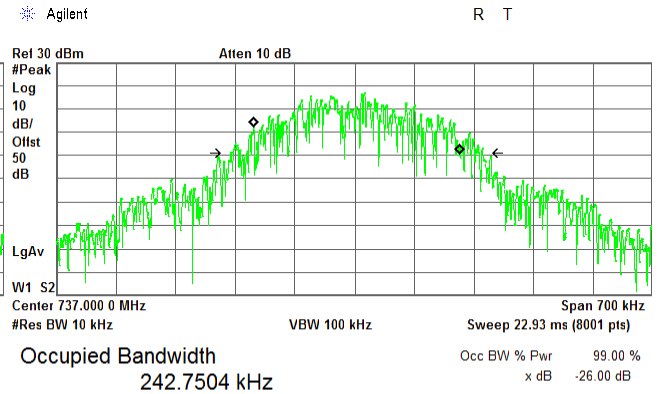
Plot 7.4.9 Occupied bandwidth test result at mid frequency carrier, Port 1

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER: -32 dBm

728.0 – 746.0 MHz Downlink
AWGN
Base
Below AGC threshold
OUTPUT SIGNAL:



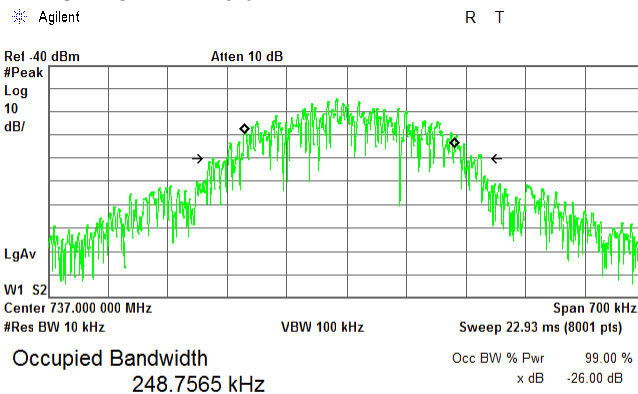
Transmit Freq Error 763.747 Hz
Occupied Bandwidth 297.665 kHz*



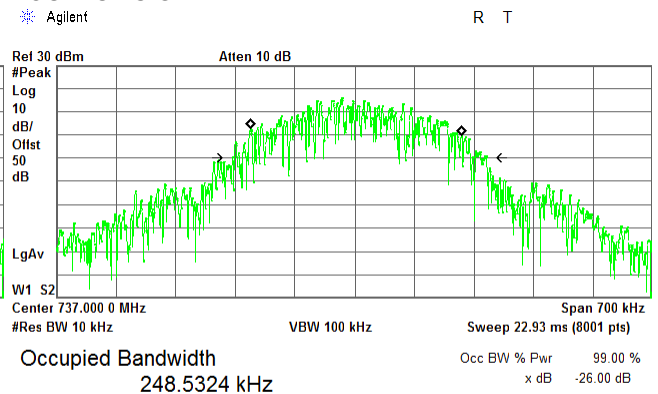
Transmit Freq Error 2.402 kHz
Occupied Bandwidth 298.031 kHz*

CONFIGURATION:
INPUT POWER: -29 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:



Transmit Freq Error 3.666 kHz
Occupied Bandwidth 317.260 kHz*



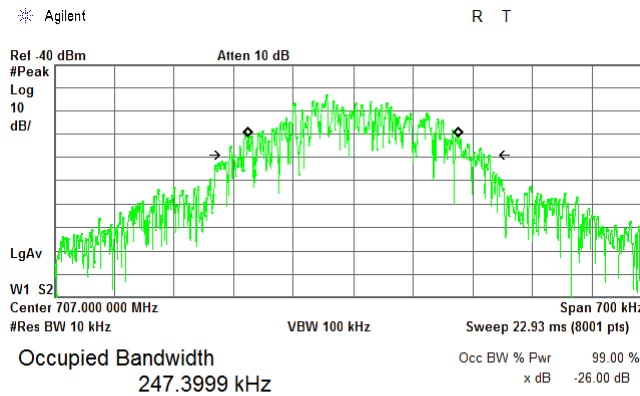
Transmit Freq Error 1.830 kHz
Occupied Bandwidth 300.115 kHz*

Test specification:		Section 2.1049 / RSS-131 section 5.2.2, Occupied bandwidth and Input-versus-output spectrum	
Test procedure:		KDB 935210 D05 v01r01, section 3.4	
Test mode:		Compliance	Verdict: PASS
Date(s):		03-Apr-17 - 12-Apr-17	
Temperature: 23.2 °C	Relative Humidity: 48 %	Air Pressure: 1012 hPa	Power: 120 VAC
Remarks:			

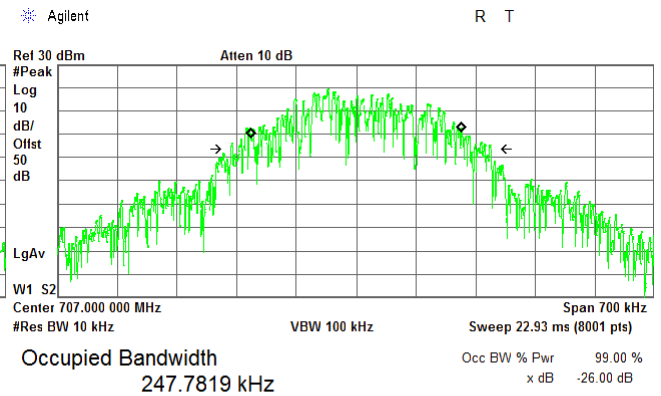
Plot 7.4.10 Occupied bandwidth test result at mid frequency carrier, Port 2

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT SIGNAL: -29.5 dBm 3.45MHz

698.0 – 716.0 MHz Uplink
AWGN
Mobile
Below AGC threshold
OUTPUT SIGNAL:



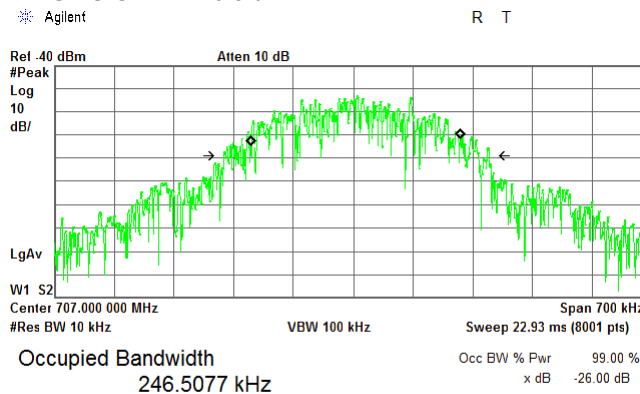
Transmit Freq Error 252.123 Hz
Occupied Bandwidth 305.805 kHz*



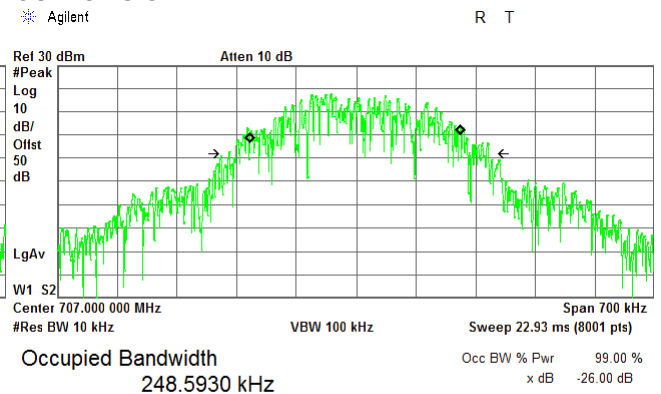
Transmit Freq Error 59.238 Hz
Occupied Bandwidth 306.437 kHz*

CONFIGURATION:
INPUT SIGNAL: -26.5 dBm

Above AGC threshold +3 dB
OUTPUT SIGNAL:



Transmit Freq Error 3.073 kHz
Occupied Bandwidth 312.827 kHz*



Transmit Freq Error -962.674 Hz
Occupied Bandwidth 306.246 kHz*



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

7.5 Out-of-band emission conducted test

7.5.1 General

This test was performed to measure out-of-band spurious emissions at the channel edge at the RF antenna connector. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Out-of-band emission limits

Frequency range, MHz	Attenuation below carrier, dBc	Out-of-band emission limit, dBm/100kHz
AWS-1 and AWS-3 frequency band		
2110.0 – 2180.0	43+10logP**	-13.0
1710.0 – 1780.0		
LTE700L frequency band		
728.0 – 746.0	43+10logP**	-13.0
698.0 – 716.0		

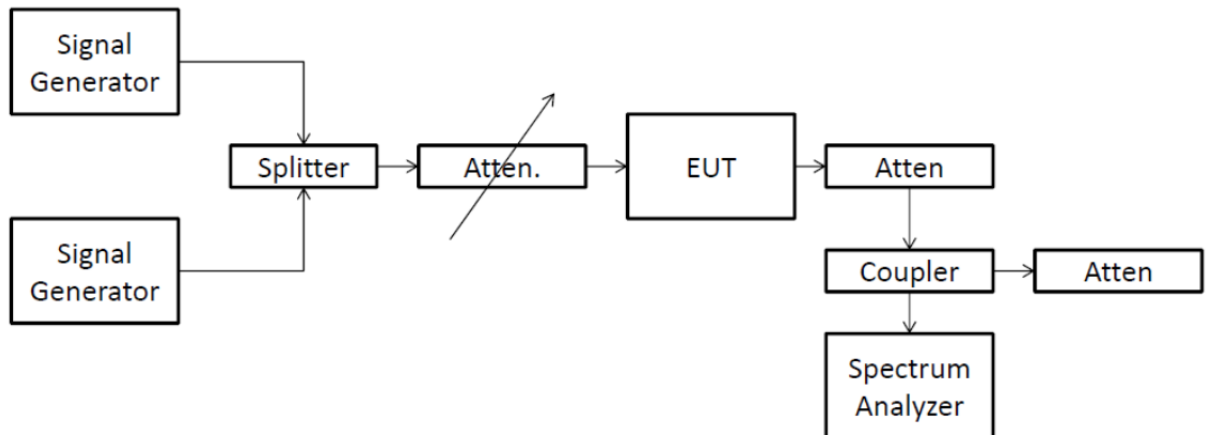
7.5.2 Test procedure

- 7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.
- 7.5.2.1 Signal generator A was configured for CW operation at the f0 frequency of appropriate frequency band,
- 7.5.2.2 Signal generator B was configured for CW operation tuned available channel spacing (e.g. 25, 12.5 or 6.25 kHz) above the frequency f0 or below the frequency f0 of the same frequency band.
- 7.5.2.3 The generator amplitudes were set so that the power from each into RF combiner was equivalent.
- 7.5.2.4 The signal generator's amplitudes were increased equally until just below the EUT's AGC threshold level was reached and all intermodulation products were measured.
- 7.5.2.5 Signal generator B was varied in frequency to check if intermodulation products were produced.
- 7.5.2.6 The intermodulation products were measured with spectrum analyzer as provided in the associated plots.
- 7.5.2.7 The EUT was tested with the composite input power level set to 3 dB above the AGC threshold level to show AGC operation, worst case results taken.
- 7.5.2.8 The test was repeated for all uplink and downlink operational bands. The test results are provided in the associated tables and plots.



Test specification:		Section 27.53, Out-of-band emissions conducted measurements	
Test procedure:		47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2	
Test mode:		Verdict: PASS	
Date(s):			
06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Figure 7.5.1 Out-of-band emission test setup





Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.5.2 Out-of-band emission test results

ASSIGNED FREQUENCY RANGE: 2110.0 – 2180.0 MHz Downlink
1710.0 – 1780.0 MHz Uplink

DETECTOR USED: Average

VIDEO BANDWIDTH: ≥ Resolution bandwidth

MODULATING SIGNAL: PRBS

CONFIGURATION: Two signals

MODULATION: AWGN / AWGN

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
2108.967	-19.35	NA	1000	-19.35	-13.0	-6.35	Pass
2108.969	NA	-19.92	1000	-19.92	-13.0	-6.92	Pass
Upper band edge							
2181.025	-18.86	NA	1000	-18.86	-13.0	-5.86	Pass
2181.004	NA	-21.42	1000	-21.42	-13.0	-8.42	Pass
Uplink							
Lower band edge							
1708.998	-18.86	NA	1000	-18.86	-13.0	-5.86	Pass
1708.995	NA	-21.28	1000	-21.28	-13.0	-8.28	Pass
Upper band edge							
1781.007	-21.00	NA	1000	-21.00	-13.0	-8.00	Pass
1781.000	NA	-20.97	1000	-20.97	-13.0	-7.97	Pass

CONFIGURATION: Single signal

MODULATION: AWGN

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
2108.923	-19.36	NA	1000	-19.36	-13.0	-6.36	Pass
2108.994	NA	-17.36	1000	-17.36	-13.0	-4.36	Pass
Upper band edge							
2181.018	-19.12	NA	1000	-19.12	-13.0	-6.12	Pass
2181.001	NA	-21.85	1000	-21.85	-13.0	-8.85	Pass
Uplink							
Lower band edge							
1708.998	-20.95	NA	1000	-20.95	-13.0	-7.95	Pass
1708.996	NA	-21.09	1000	-21.09	-13.0	-8.09	Pass
Upper band edge							
1781.004	-22.93	NA	1000	-21.09	-13.0	-8.09	Pass
1781.002	NA	-20.77	1000	-22.93	-13.0	-9.93	Pass



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance	Verdict: PASS		
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.5.3 Out-of-band emission test results

ASSIGNED FREQUENCY RANGE: 2110.0 – 2180.0 MHz Downlink
1710.0 – 1780.0 MHz Uplink

DETECTOR USED: Average

VIDEO BANDWIDTH: ≥ Resolution bandwidth

MODULATING SIGNAL: PRBS

CONFIGURATION: Two signals

MODULATION: WCDMA / WCDMA

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
2108.999	-23.01	NA	1000	-23.01	-13.0	-10.01	Pass
2108.988	NA	-23.30	1000	-23.30	-13.0	-10.30	Pass
Upper band edge							
2181.003	-24.19	NA	1000	-24.19	-13.0	-11.19	Pass
2181.000	NA	-25.24	1000	-25.24	-13.0	-12.24	Pass
Uplink							
Lower band edge							
1708.997	-23.82	NA	1000	-23.82	-13.0	-10.82	Pass
1708.995	NA	-22.46	1000	-22.46	-13.0	-9.46	Pass
Upper band edge							
1781.003	-22.82	NA	1000	-22.82	-13.0	-9.82	Pass
1781.000	NA	-22.40	1000	-22.40	-13.0	-9.40	Pass

CONFIGURATION: Single signal

MODULATION: WCDMA

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
2108.999	-25.53	NA	1000	-25.53	-13.0	-12.53	Pass
2108.995	NA	-26.73	1000	-26.73	-13.0	-13.73	Pass
Upper band edge							
2181.003	-25.38	NA	1000	-25.38	-13.0	-12.38	Pass
2181.003	NA	-26.57	1000	-26.57	-13.0	-13.57	Pass
Uplink							
Lower band edge							
1708.993	-23.74	NA	1000	-23.74	-13.0	-10.74	Pass
1708.999	NA	-23.90	1000	-23.90	-13.0	-10.90	Pass
Upper band edge							
1781.003	-25.72	NA	1000	-25.72	-13.0	-12.72	Pass
1781.002	NA	-24.17	1000	-24.17	-13.0	-11.17	Pass



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.5.4 Out-of-band emission test results

ASSIGNED FREQUENCY RANGE: 2110.0 – 2180.0 MHz Downlink
1710.0 – 1780.0 MHz Uplink

DETECTOR USED: Average

VIDEO BANDWIDTH: ≥ Resolution bandwidth

MODULATING SIGNAL: PRBS

CONFIGURATION: Two signals

MODULATION: GSM / GSM

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
2108.998	-14.98	NA	1000	-14.98	-13.0	-1.98	Pass
2108.988	NA	-15.23	1000	-15.23	-13.0	-2.23	Pass
Upper band edge							
2181.001	-16.02	NA	1000	-16.02	-13.0	-3.02	Pass
2181.000	NA	-14.42	1000	-14.42	-13.0	-1.42	Pass
Uplink							
Lower band edge							
1708.996	-16.45	NA	1000	-16.45	-13.0	-3.45	Pass
1708.997	NA	-15.12	1000	-15.12	-13.0	-2.12	Pass
Upper band edge							
1781.001	-15.13	NA	1000	-15.13	-13.0	-2.13	Pass
1781.000	NA	-15.34	1000	-15.34	-13.0	-2.34	Pass

CONFIGURATION: Single signal

MODULATION: GSM

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
2108.993	-15.42	NA	1000	-15.42	-13.0	-2.42	Pass
2108.999	NA	-16.13	1000	-16.13	-13.0	-3.13	Pass
Upper band edge							
2181.003	-14.73	NA	1000	-14.73	-13.0	-1.73	Pass
2181.000	NA	-14.84	1000	-14.84	-13.0	-1.84	Pass
Uplink							
Lower band edge							
1708.997	-15.51	NA	1000	-15.51	-13.0	-2.51	Pass
1708.995	NA	-15.63	1000	-15.63	-13.0	-2.63	Pass
Upper band edge							
1781.000	-16.59	NA	1000	-16.59	-13.0	-3.59	Pass
1781.000	NA	-15.56	1000	-15.56	-13.0	-2.56	Pass

*- Margin = Spurious emission – specification limit.



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.5.5 Out-of-band emission test results

ASSIGNED FREQUENCY RANGE: 728.0 –746.0 MHz Downlink
698.0 – 716.0 MHz Uplink

DETECTOR USED: Average

VIDEO BANDWIDTH: ≥ Resolution bandwidth

MODULATING SIGNAL: PRBS

CONFIGURATION: Two signals

MODULATION: AWGN / AWGN

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
727.998	-17.62	NA	100	-17.62	-13.0	-4.62	Pass
727.998	NA	-17.99	100	-17.99	-13.0	-4.99	Pass
Upper band edge							
745.999	-17.05	NA	100	-17.05	-13.0	-4.05	Pass
745.999	NA	-17.38	100	-17.38	-13.0	-4.38	Pass
Uplink							
Lower band edge							
697.998	-17.83	NA	100	-17.83	-13.0	-4.83	Pass
697.997	NA	-19.39	100	-19.39	-13.0	-6.39	Pass
Upper band edge							
715.998	-19.26	NA	100	-19.26	-13.0	-6.26	Pass
715.999	NA	-18.16	100	-18.16	-13.0	-5.16	Pass

CONFIGURATION: Single signal

MODULATION: AWGN

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
727.997	-17.79	NA	100	-17.79	-13.0	-4.79	Pass
727.999	NA	-18.13	100	-18.13	-13.0	-5.13	Pass
Upper band edge							
745.999	-17.17	NA	100	-17.17	-13.0	-4.17	Pass
745.999	NA	-17.60	100	-17.60	-13.0	-4.60	Pass
Uplink							
Lower band edge							
697.998	-17.85	NA	100	-17.85	-13.0	-4.85	Pass
697.998	NA	-18.06	100	-18.06	-13.0	-5.06	Pass
Upper band edge							
715.999	-19.50	NA	100	-19.50	-13.0	-6.50	Pass
716.003	NA	-19.57	100	-19.57	-13.0	-6.57	Pass

*- Margin = Spurious emission – specification limit.



Test specification:		Section 27.53, Out-of-band emissions conducted measurements	
Test procedure:		47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2	
Test mode:		Verdict: PASS	
Date(s):			
06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.5.6 Out-of-band emission test results

ASSIGNED FREQUENCY RANGE: 728.0 – 746.0 MHz Downlink
698.0 – 716.0 MHz Uplink

DETECTOR USED: Average

VIDEO BANDWIDTH: ≥ Resolution bandwidth

MODULATING SIGNAL: PRBS

CONFIGURATION: Two signals

MODULATION: GSM / GSM

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
727.985	-15.25	NA	10	-15.25	-13.0	-2.25	Pass
727.985	NA	-14.65	10	-14.65	-13.0	-1.65	Pass
Upper band edge							
746.015	-13.82	NA	10	-13.82	-13.0	-0.82	Pass
746.015	NA	-14.22	10	-14.22	-13.0	-1.22	Pass
Uplink							
Lower band edge							
697.985	-14.73	NA	10	-14.73	-13.0	-1.73	Pass
697.985	NA	-14.26	10	-14.26	-13.0	-1.26	Pass
Upper band edge							
716.015	-15.61	NA	10	-15.61	-13.0	-2.61	Pass
716.015	NA	-15.78	10	-15.78	-13.0	-2.78	Pass

CONFIGURATION: Single signal

MODULATION: GSM

Frequency, MHz	SA reading below AGC, dBm	SA reading above AGC, dBm	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink							
Lower band edge							
727.985	-14.98	NA	10	-14.98	-13.0	-1.98	Pass
727.985	NA	-15.22	10	-15.22	-13.0	-2.22	Pass
Upper band edge							
746.015	-14.09	NA	10	-14.09	-13.0	-1.09	Pass
746.015	NA	-15.15	10	-15.15	-13.0	-2.15	Pass
Uplink							
Lower band edge							
697.985	-13.67	NA	10	-13.67	-13.0	-0.67	Pass
697.985	NA	-13.48	10	-13.48	-13.0	-0.48	Pass
Upper band edge							
716.015	-15.27	NA	10	-15.27	-13.0	-2.27	Pass
716.015	NA	-14.78	10	-14.78	-13.0	-1.78	Pass

*- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

HL 2016	HL 2017	HL 2909	HL 3472	HL 3474	HL 3779	HL 3780	HL 3787
HL 3818	HL 3901	HL 4070	HL 4274	HL 4275			
GB39340603		MY45090513					

Full description is given in Appendix A.

Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.1 Out-of-band emission test results in the 2107.0 – 2110.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

MODULATION:

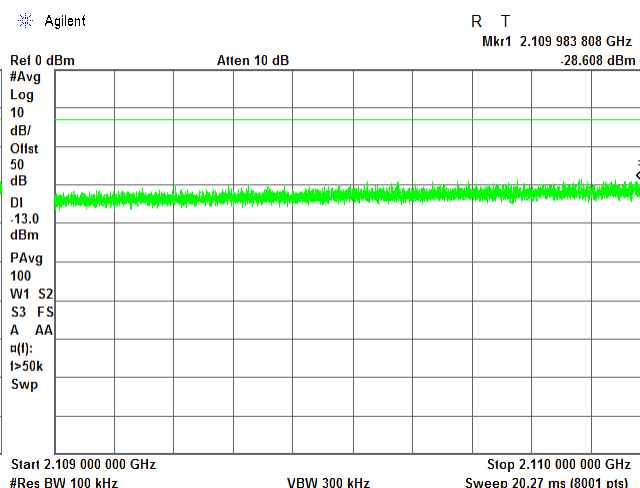
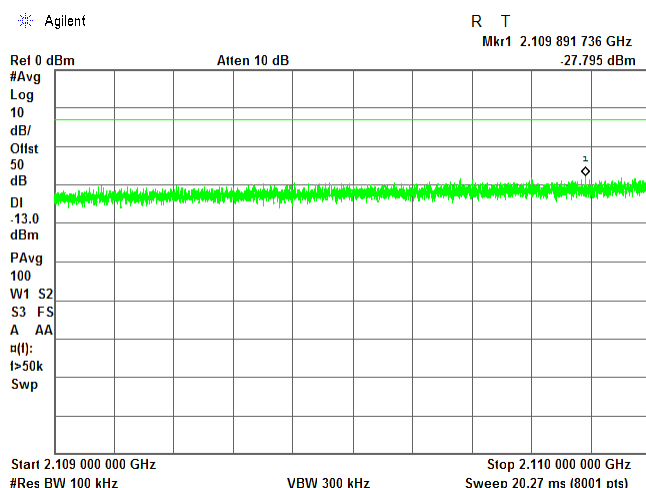
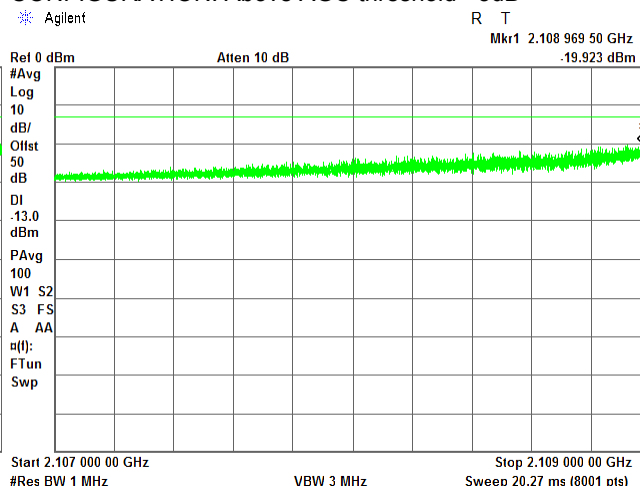
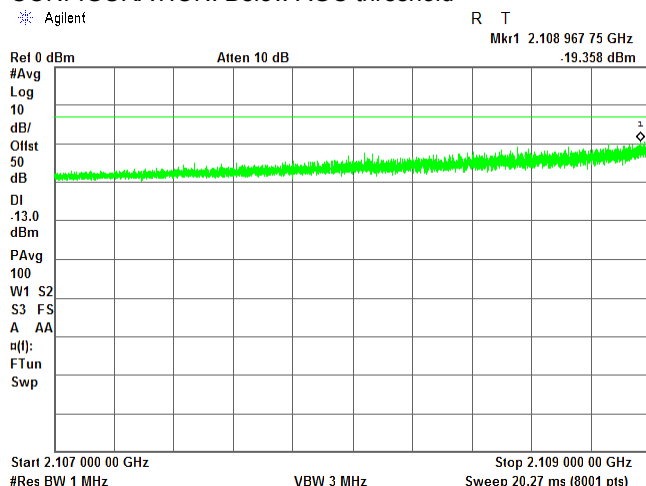
AWGN / AWGN

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.2 Out-of-band emission test results in the 2107.0 – 2110.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

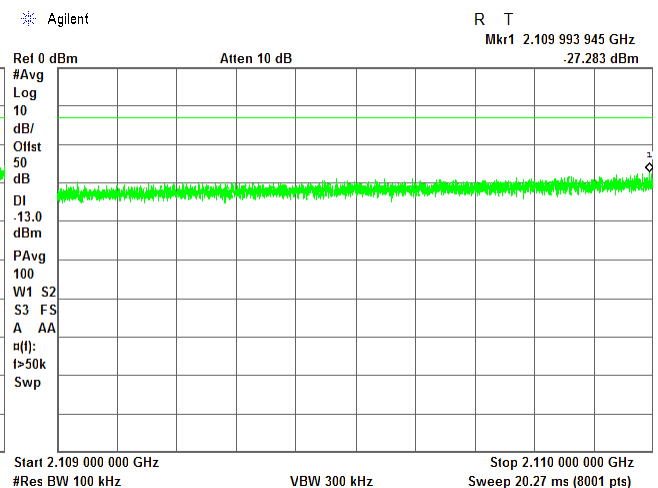
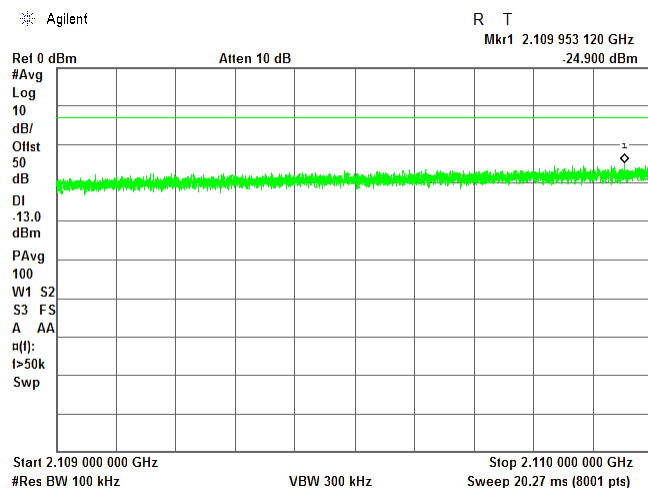
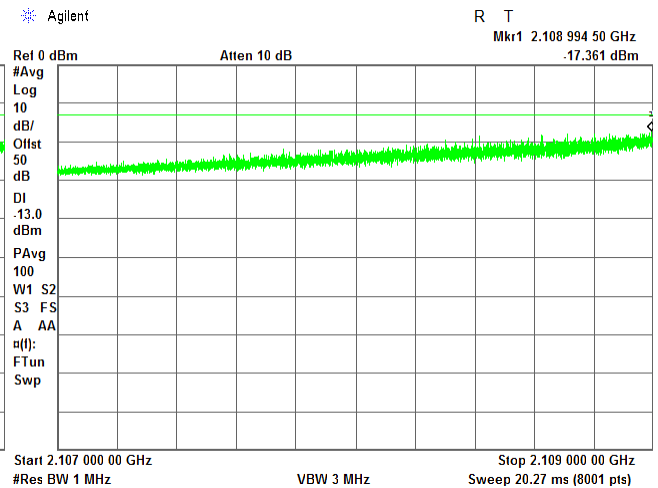
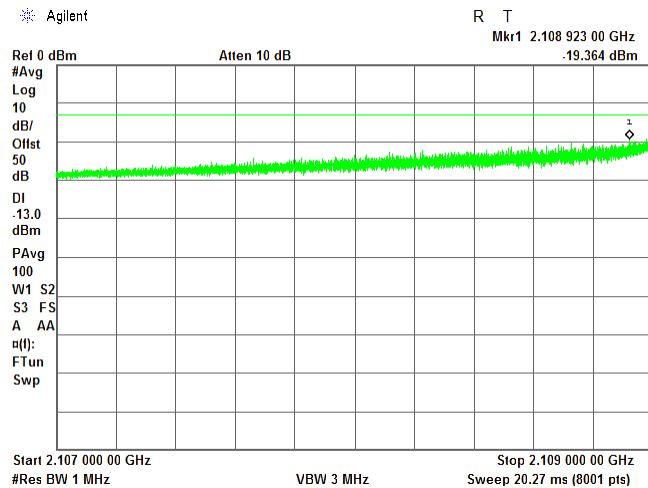
MODULATION:

AWGN / AWGN

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.3 Out-of-band emission test results in the 2180.0 – 2183.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

MODULATION:

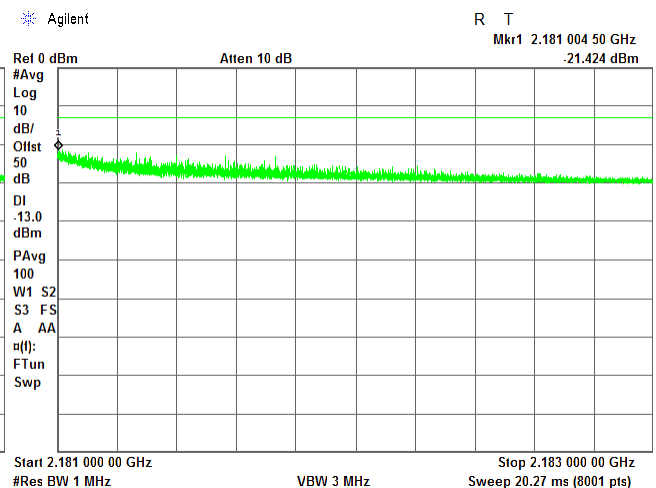
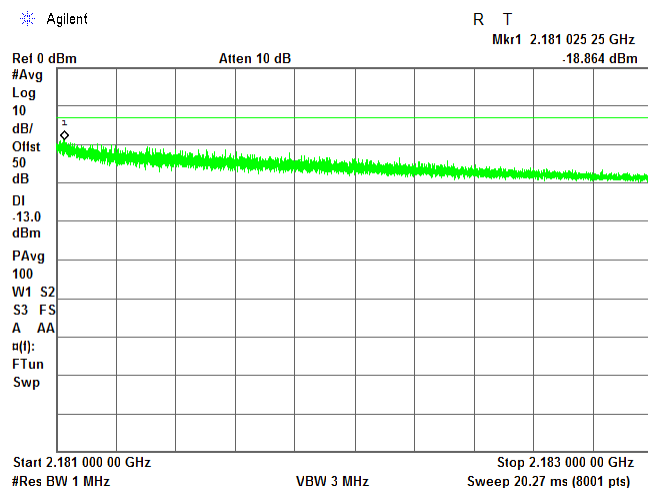
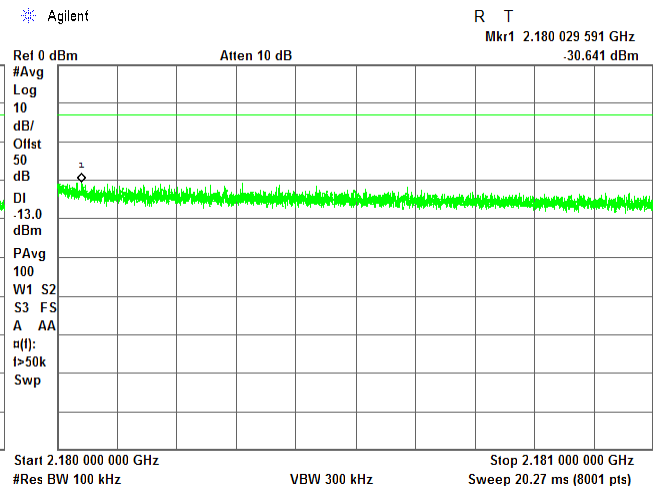
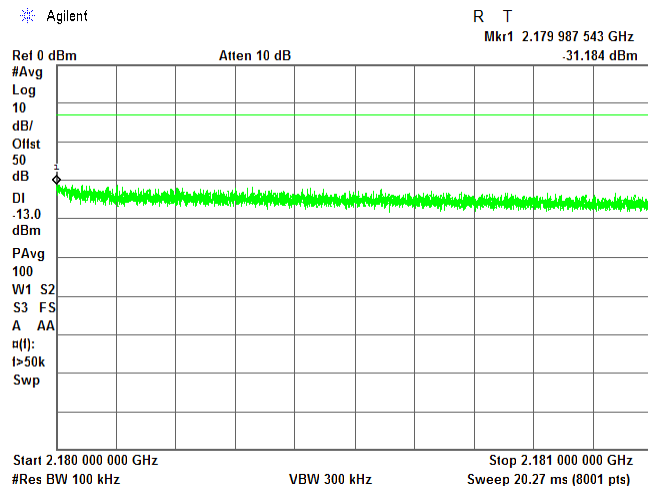
AWGN / AWGN

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.4 Out-of-band emission test results in the 2180.0 – 2183.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

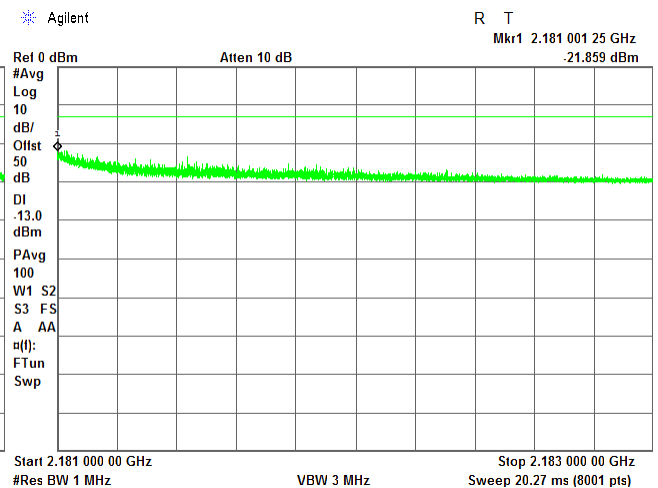
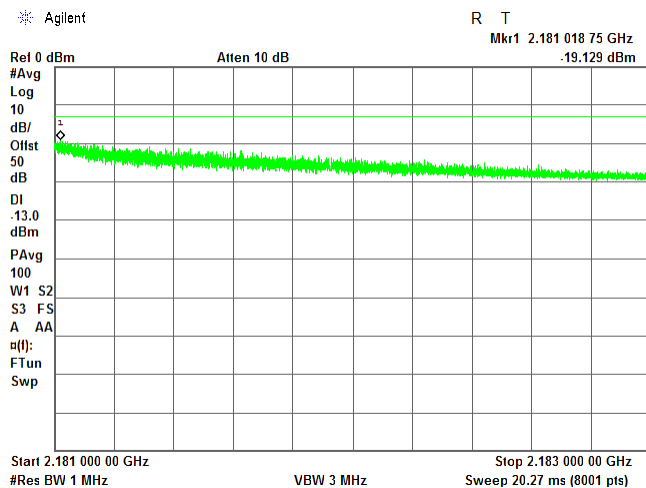
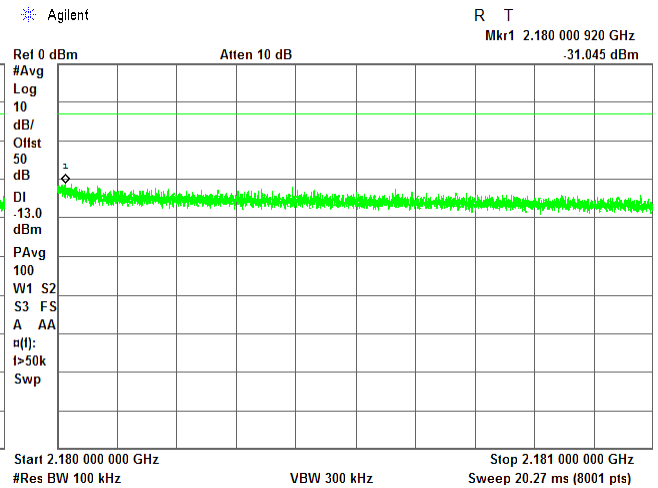
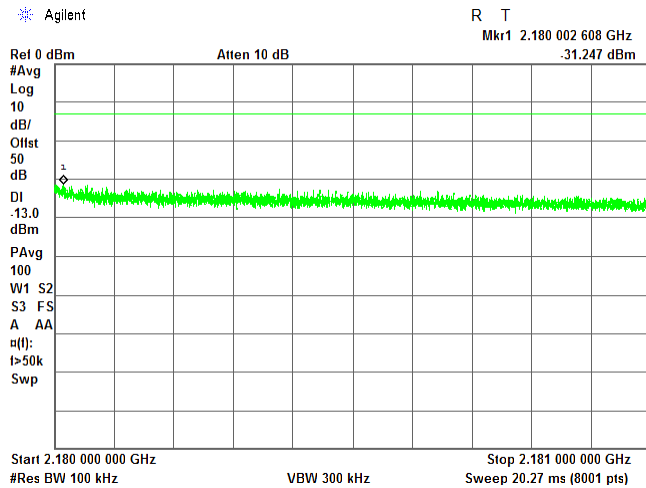
MODULATION:

AWGN / AWGN

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.5 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

MODULATION:

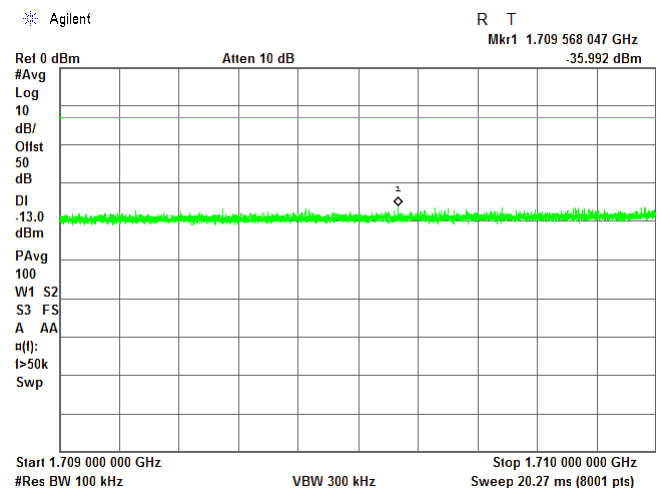
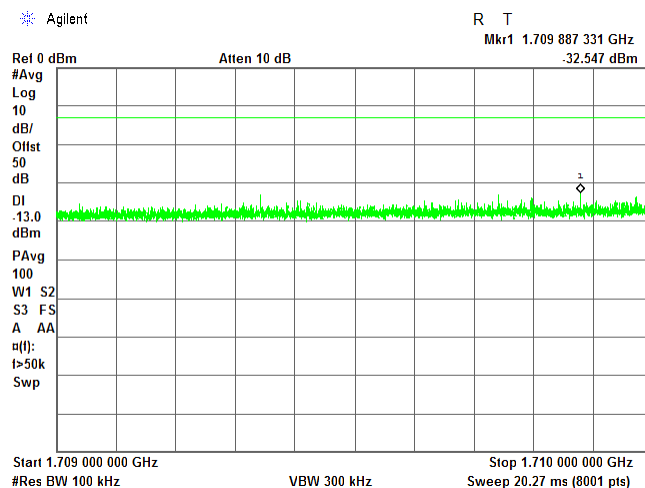
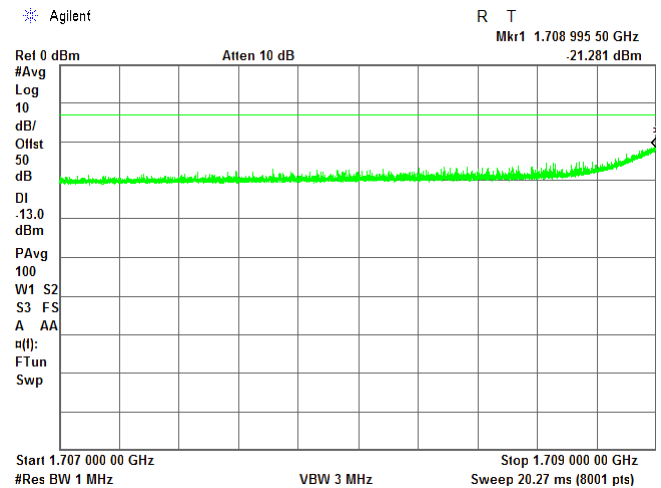
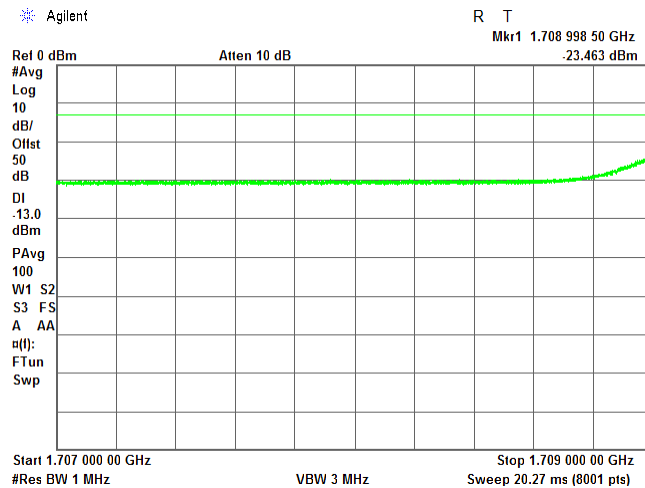
AWGN / AWGN

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.6 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

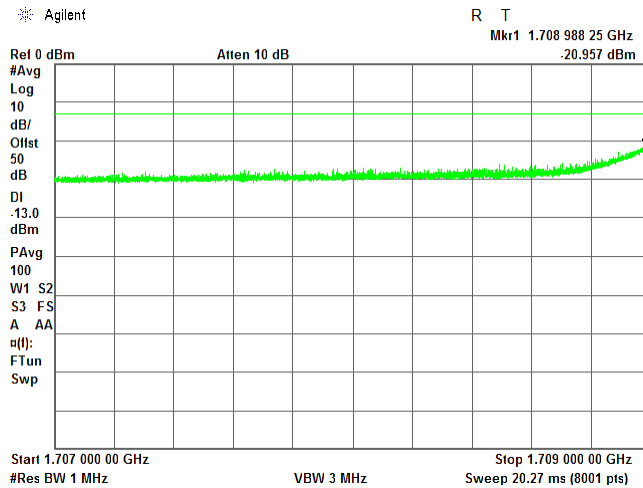
Downlink

MODULATION:

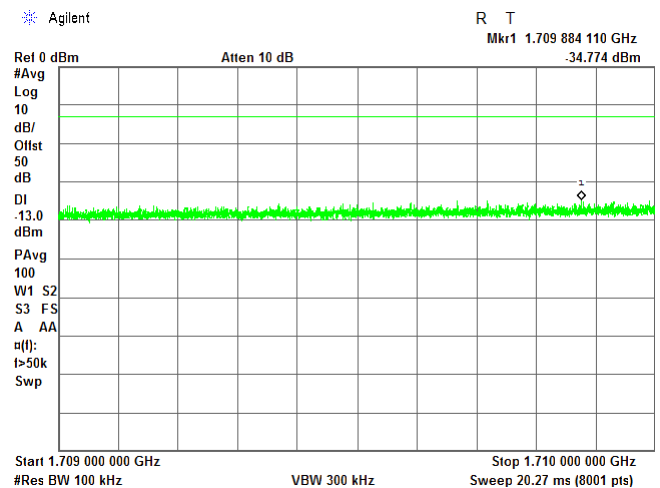
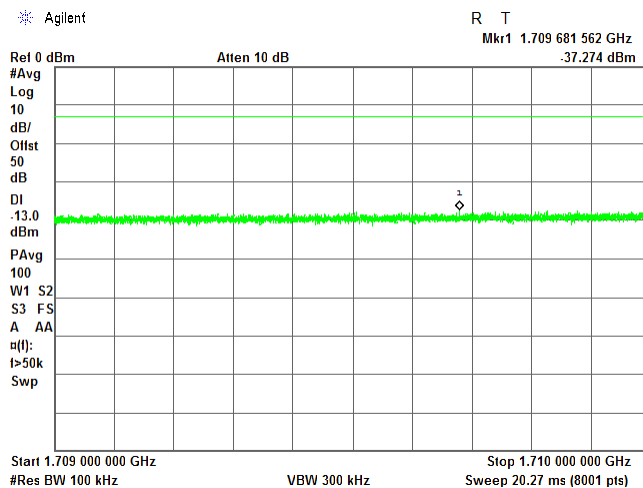
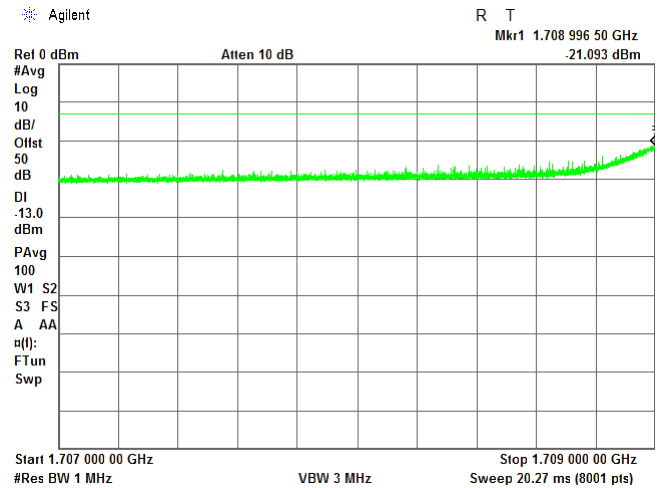
AWGN / AWGN

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold



CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.7 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

MODULATION:

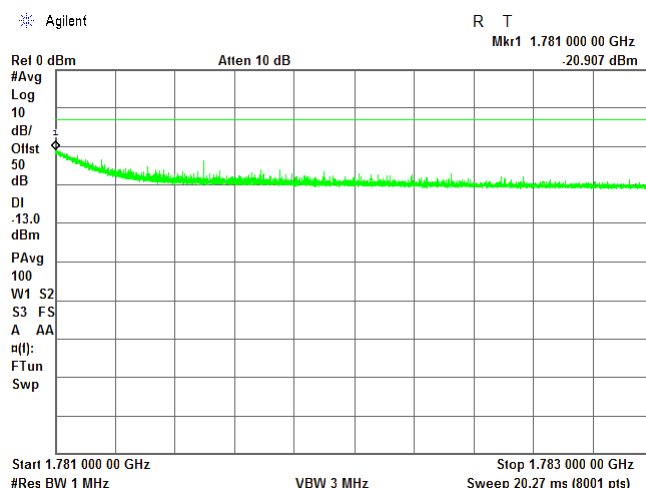
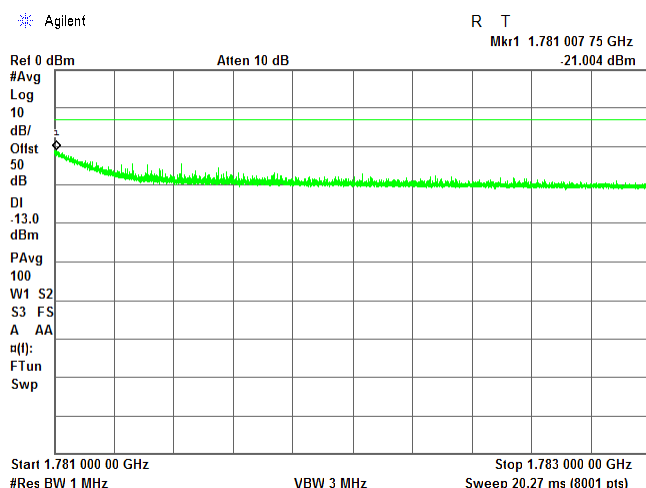
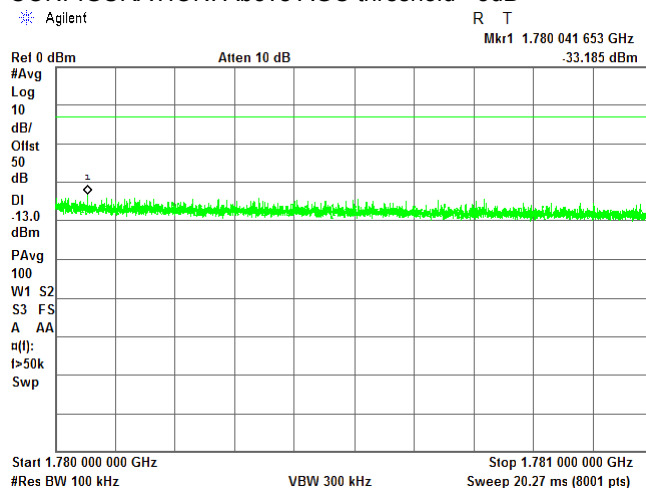
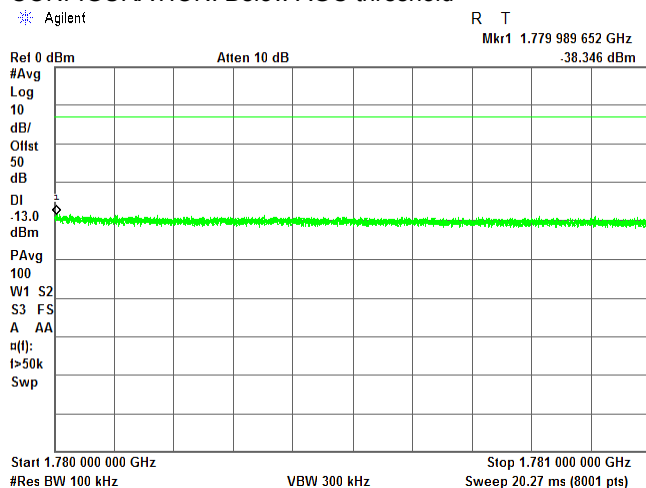
AWGN / AWGN

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.8 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

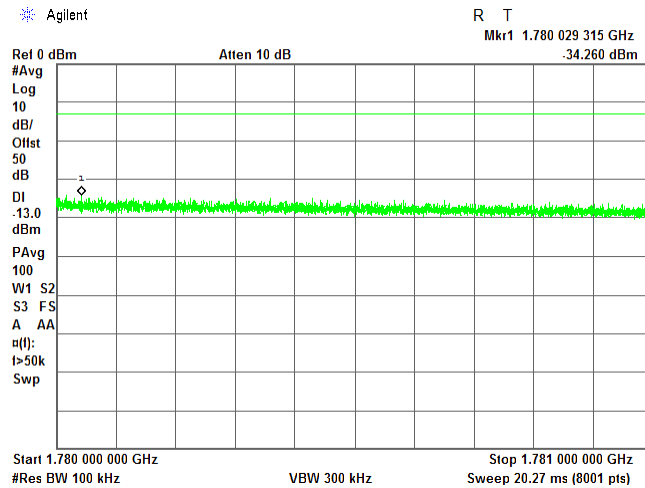
MODULATION:

AWGN / AWGN

SINGLE TEST SIGNAL INPUT:

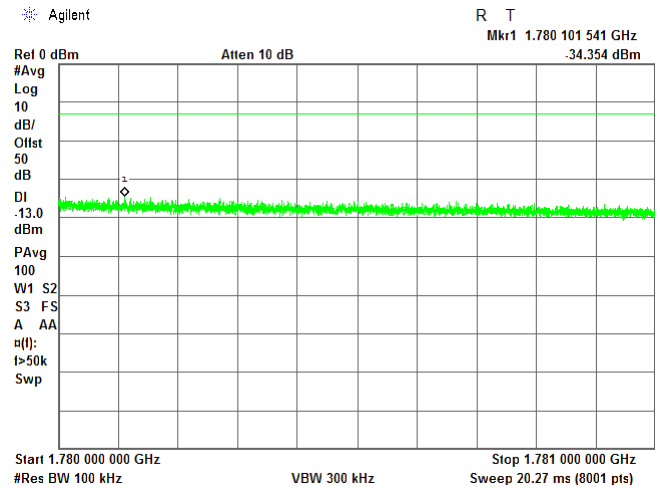
CONFIGURATION: Below AGC threshold

Agilent

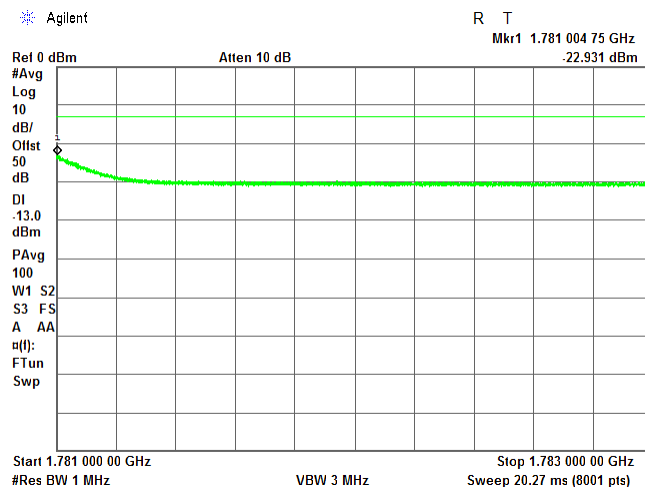


CONFIGURATION: Above AGC threshold +3dB

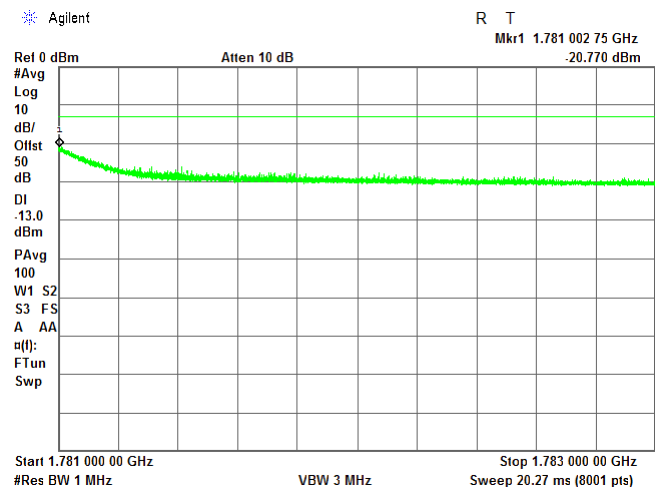
Agilent



Agilent



Agilent



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.9 Out-of-band emission test results in the 2107.0 – 2110.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

MODULATION:

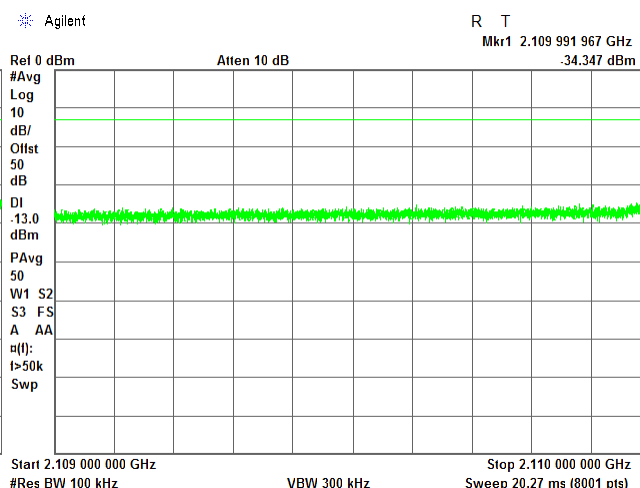
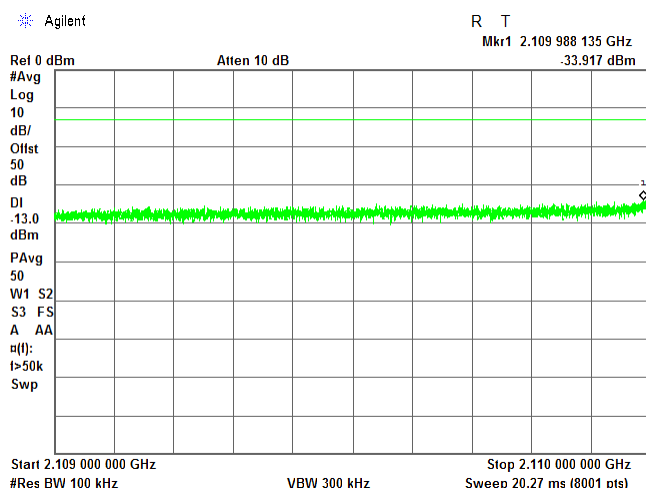
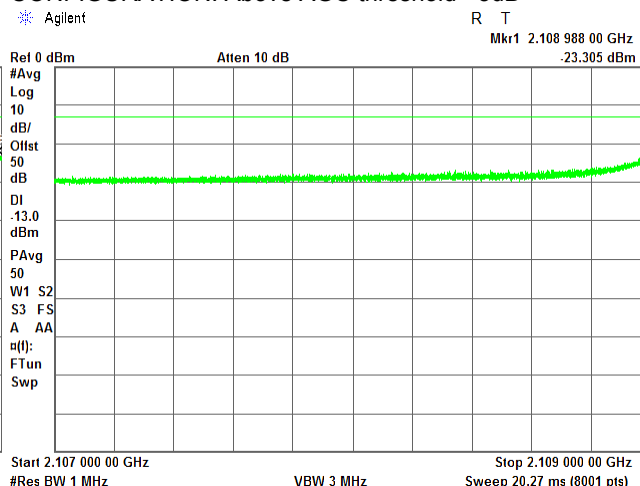
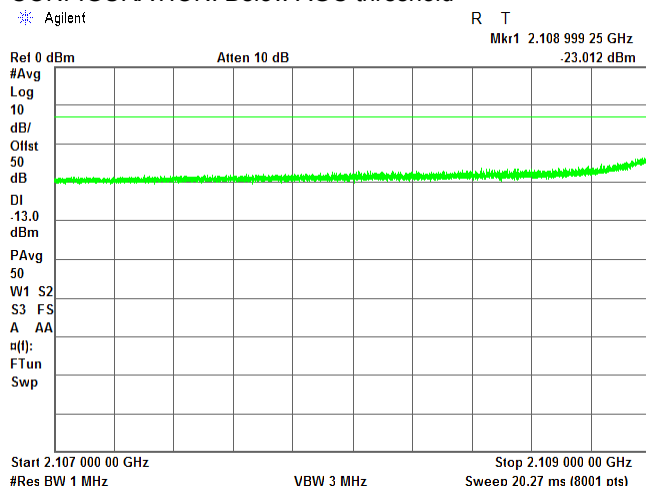
WCDMA / WCDMA

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.10 Out-of-band emission test results in the 2107.0 – 2110.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

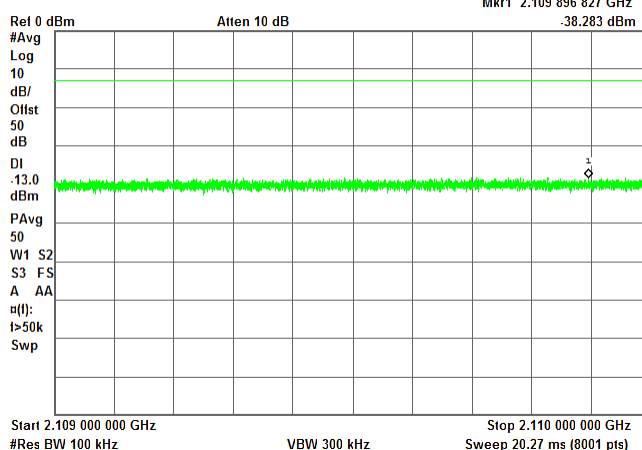
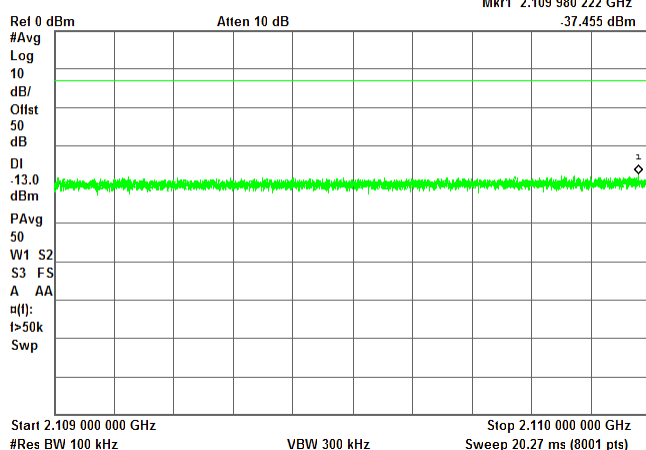
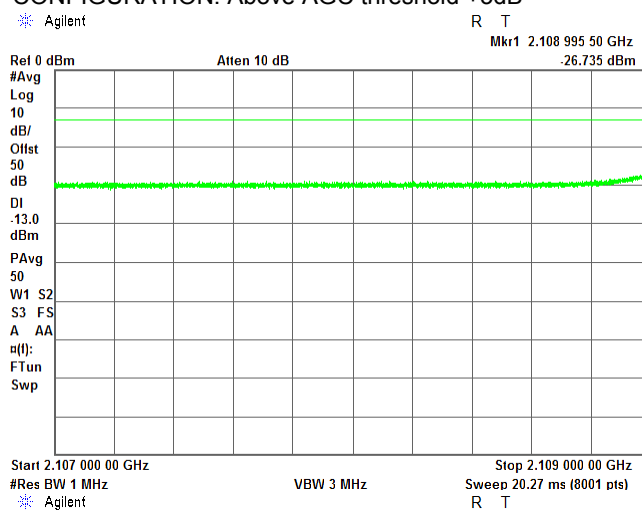
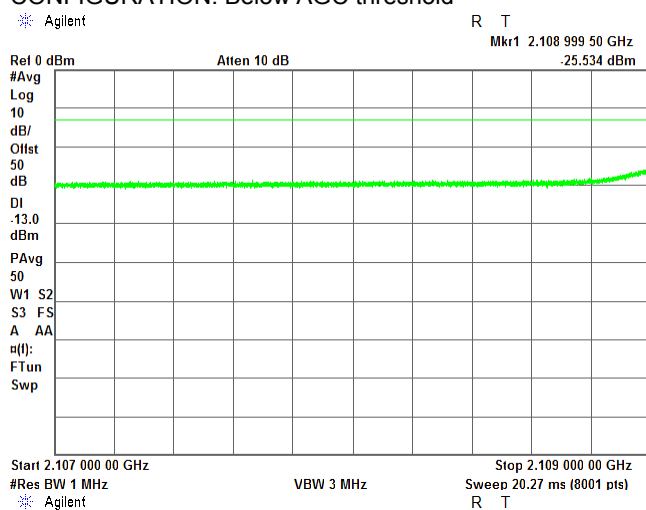
MODULATION:

WCDMA / WCDMA

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

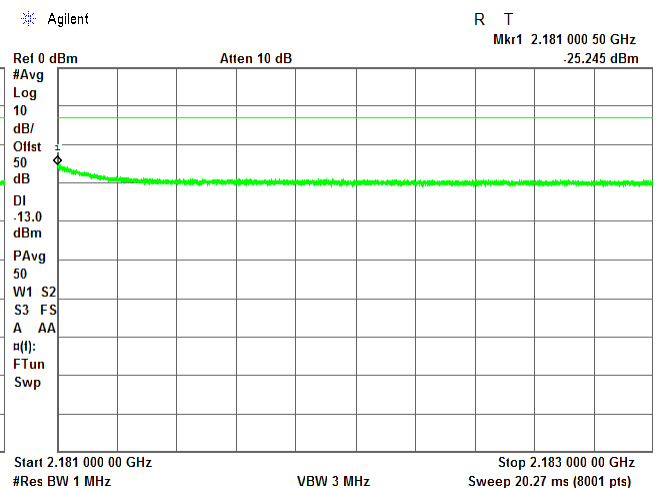
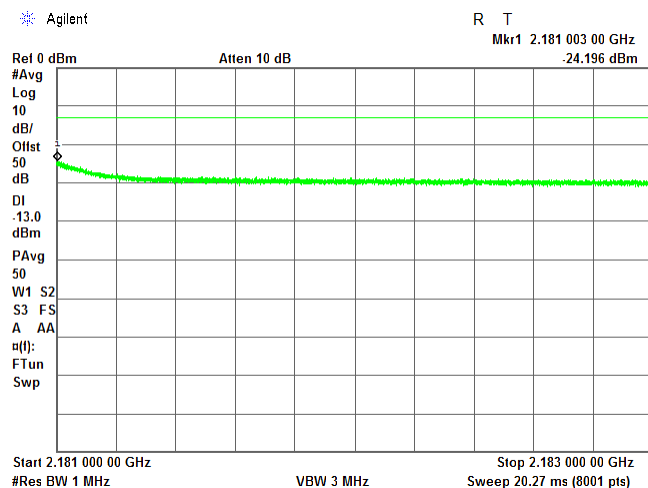
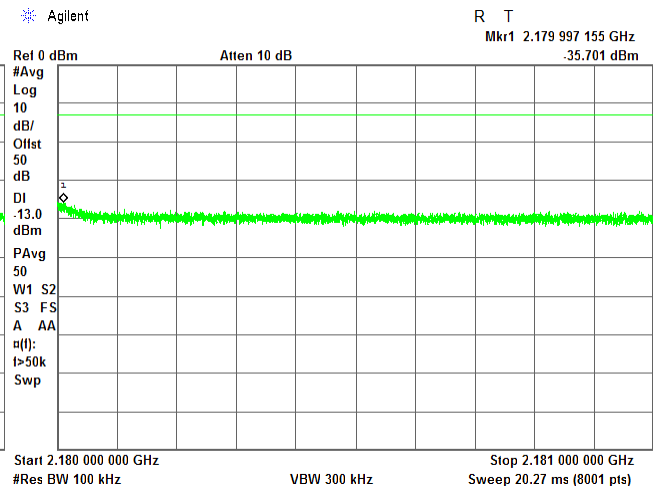
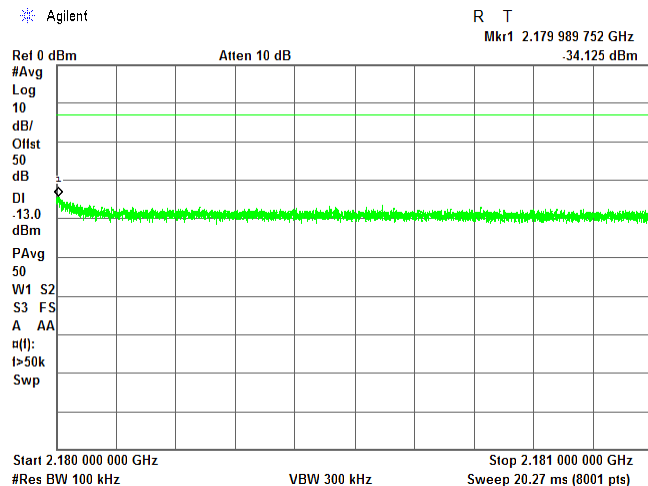
Plot 7.5.11 Out-of-band emission test results in the 2180.0 – 2183.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

2110.0 – 2180.0 MHz
Average
Downlink
WCDMA / WCDMA

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.12 Out-of-band emission test results in the 2180.0 – 2183.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

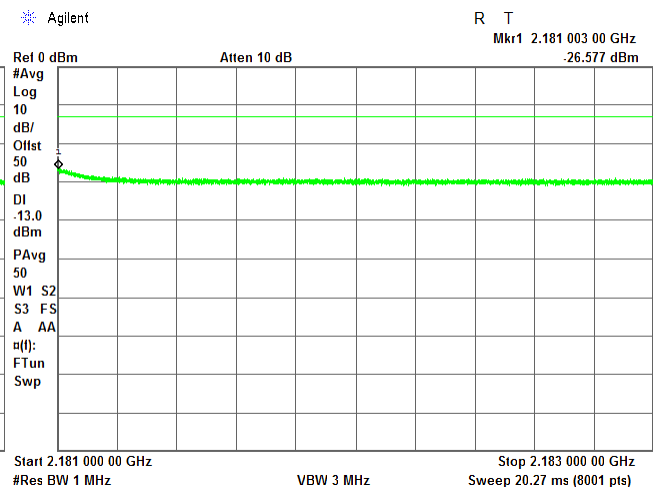
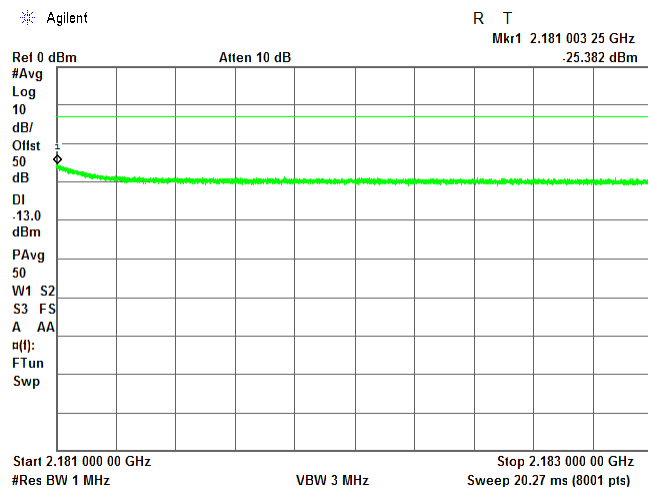
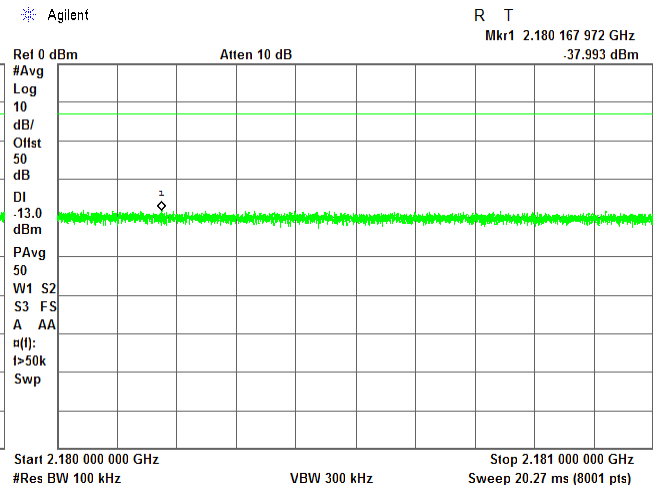
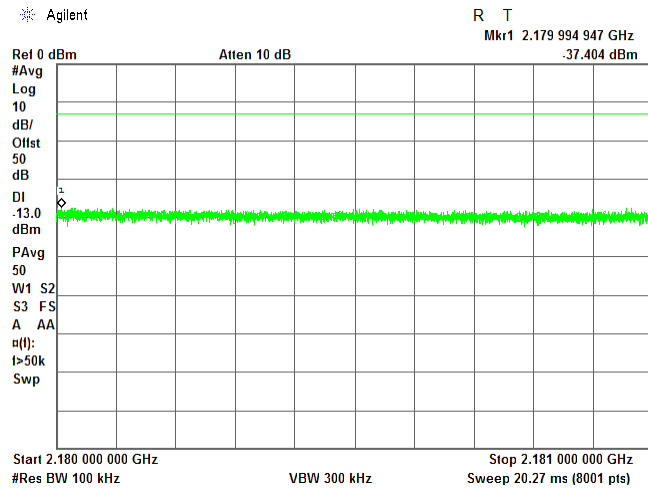
MODULATION:

WCDMA / WCDMA

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

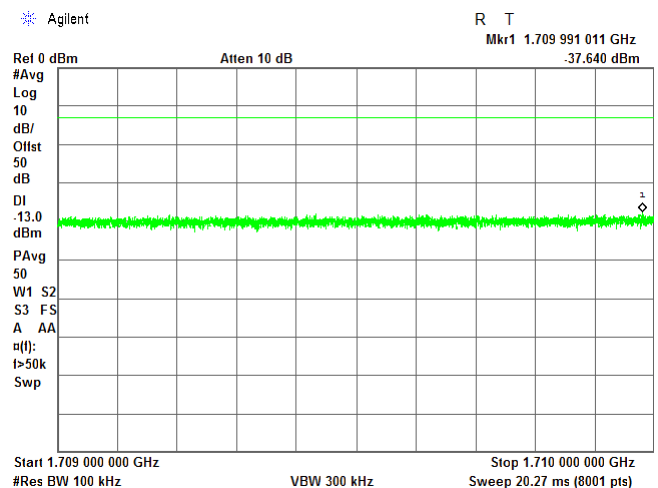
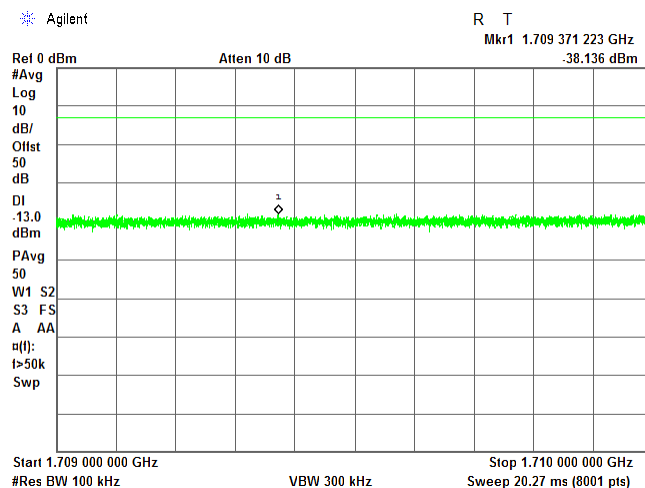
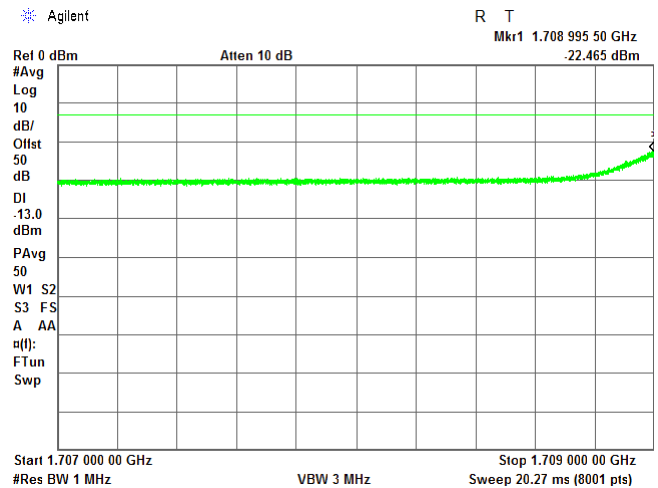
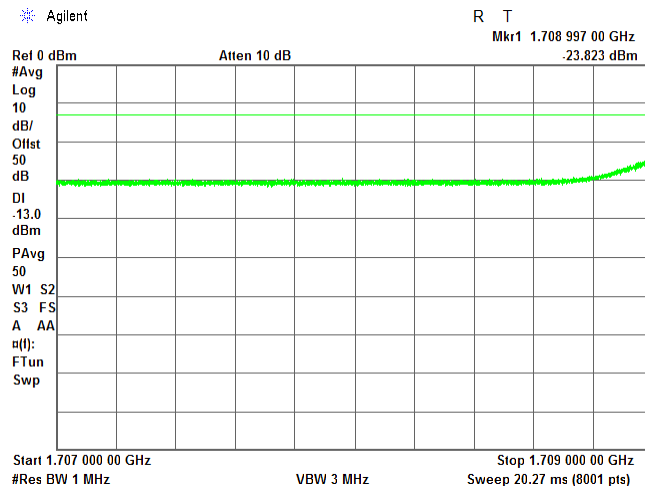
Plot 7.5.13 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

1710.0 – 1780.0 MHz
Average
Downlink
WCDMA / WCDMA

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.14 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

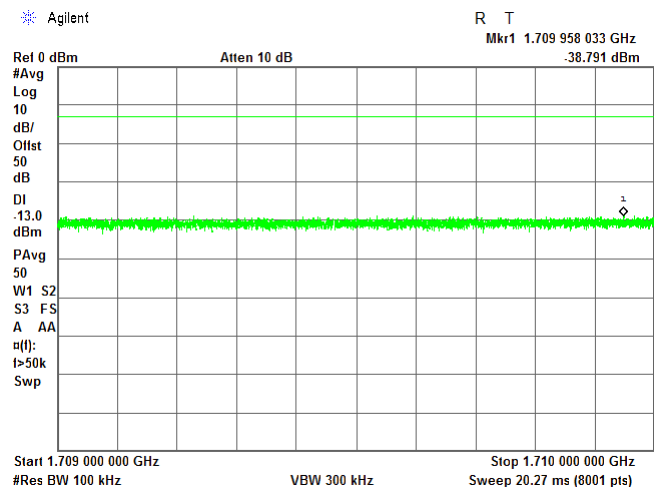
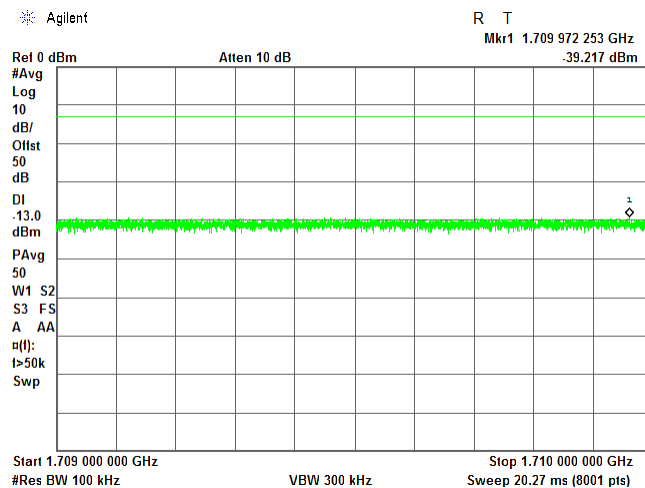
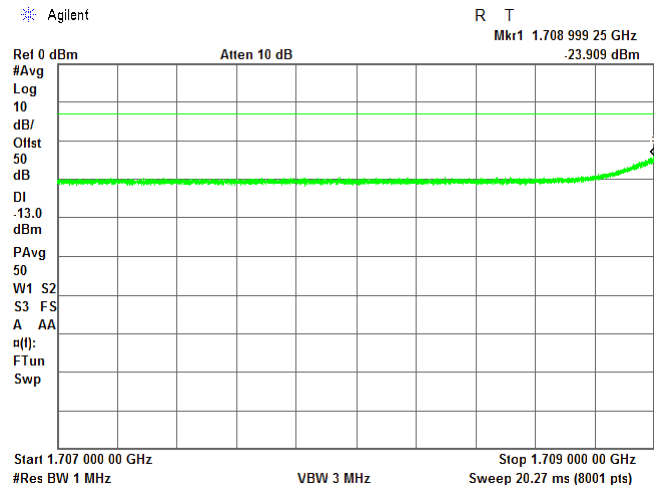
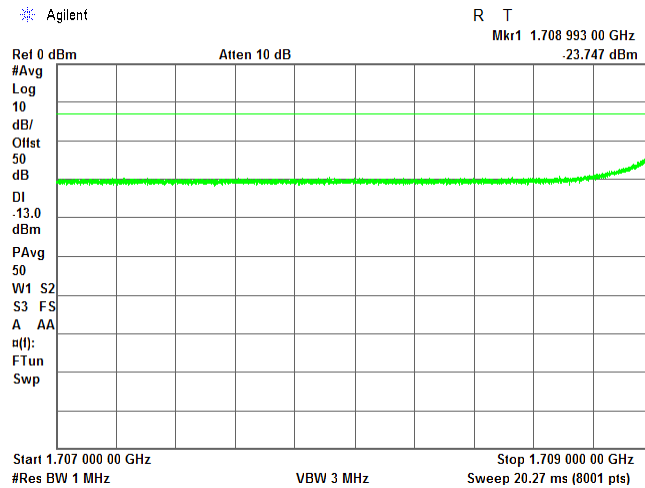
MODULATION:

WCDMA / WCDMA

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

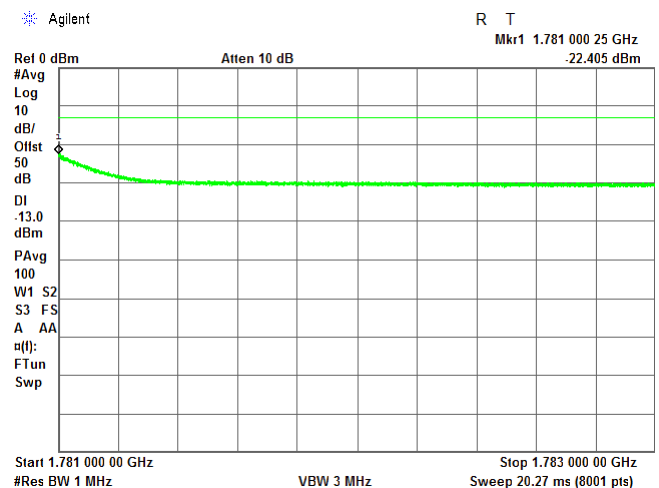
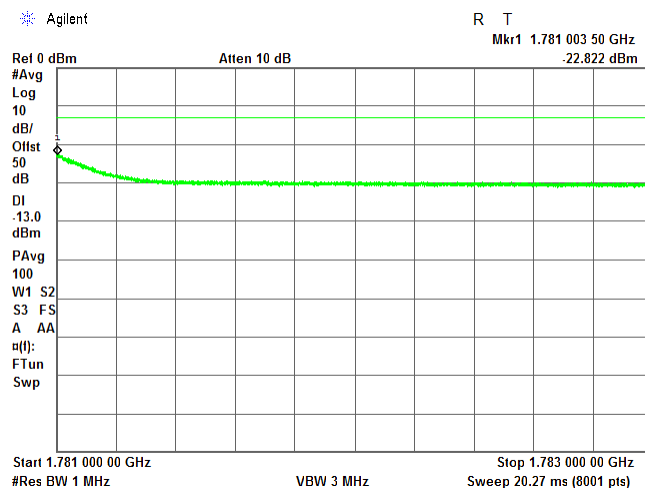
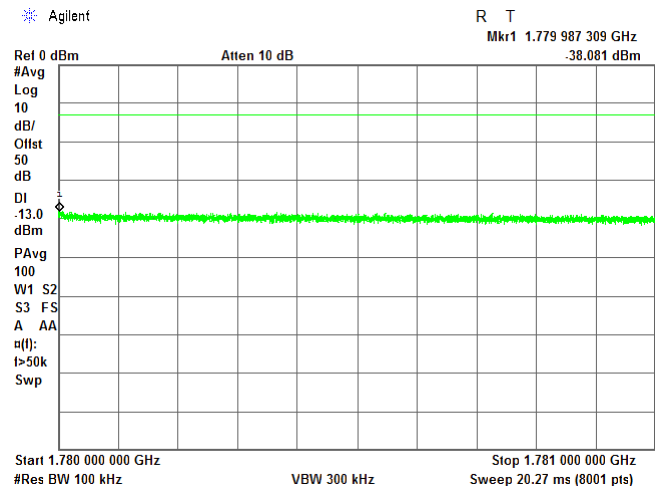
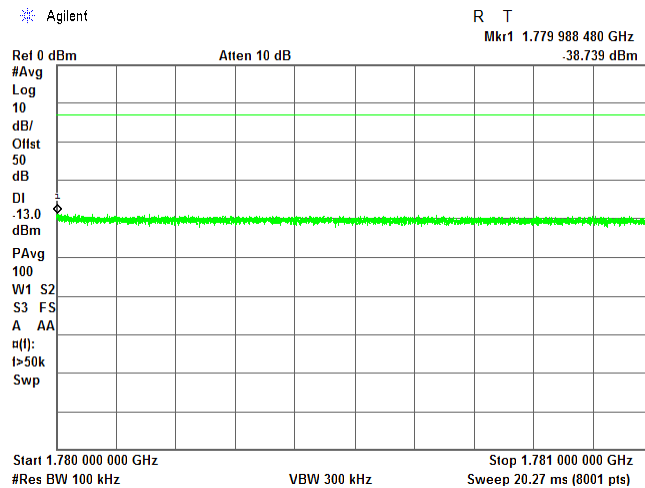
Plot 7.5.15 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

1710.0 – 1780.0 MHz
Average
Downlink
WCDMA / WCDMA

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.16 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

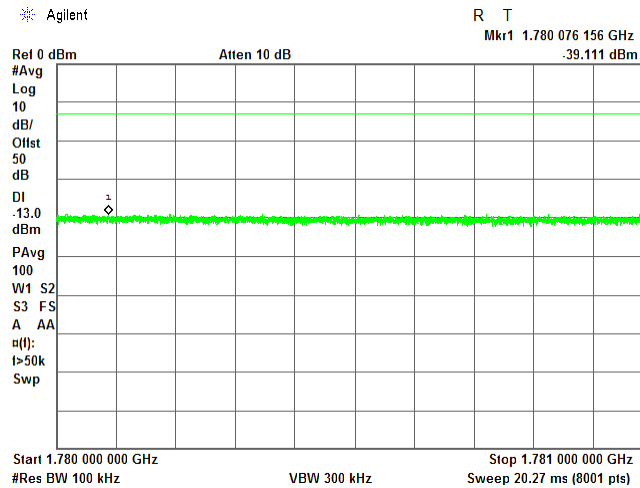
MODULATION:

WCDMA / WCDMA

SINGLE TEST SIGNAL INPUT:

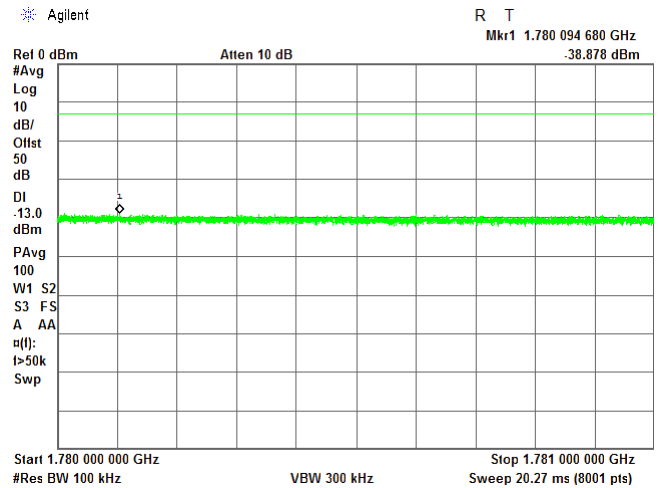
CONFIGURATION: Below AGC threshold

Agilent

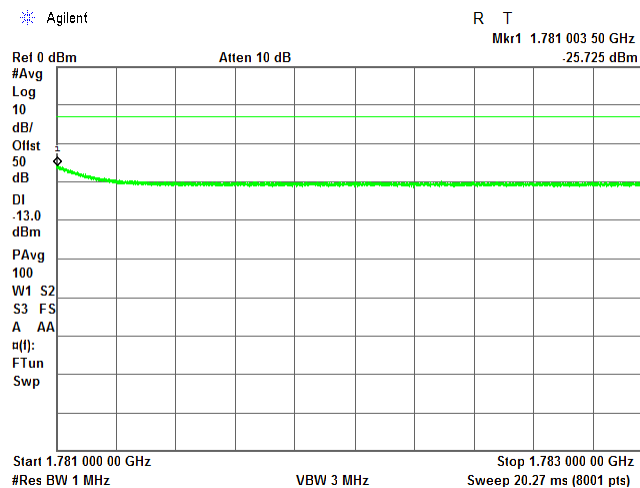


CONFIGURATION: Above AGC threshold +3dB

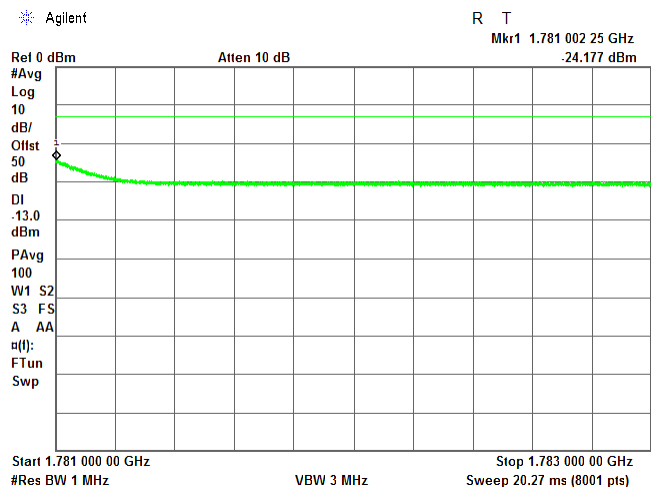
Agilent



Agilent



Agilent



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.17 Out-of-band emission test results in the 2107.0 – 2110.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

DETECTOR USED:

CONFIGURATION:

MODULATION:

2110.0 – 2180.0 MHz

Average

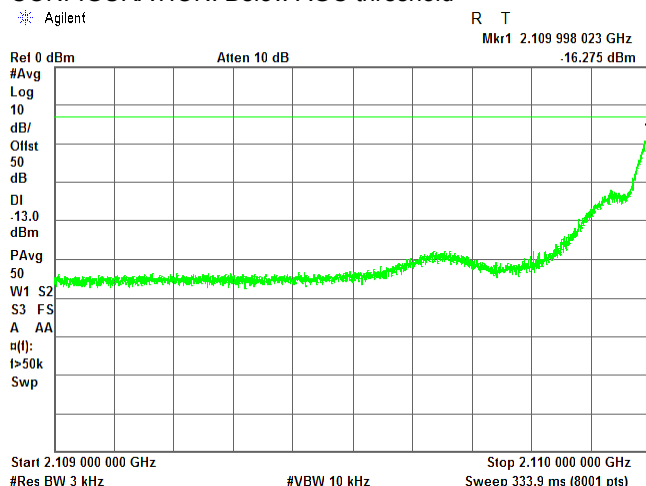
Downlink

GSM/GSM

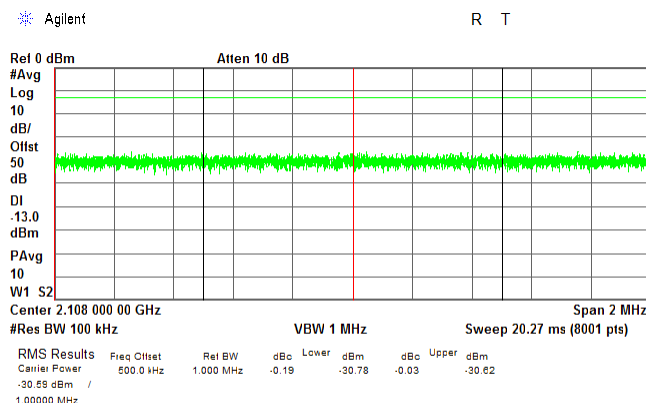
COMPOSITE INPUT SIGNAL:

CONFIGURATION: Below AGC threshold

Agilent



Agilent



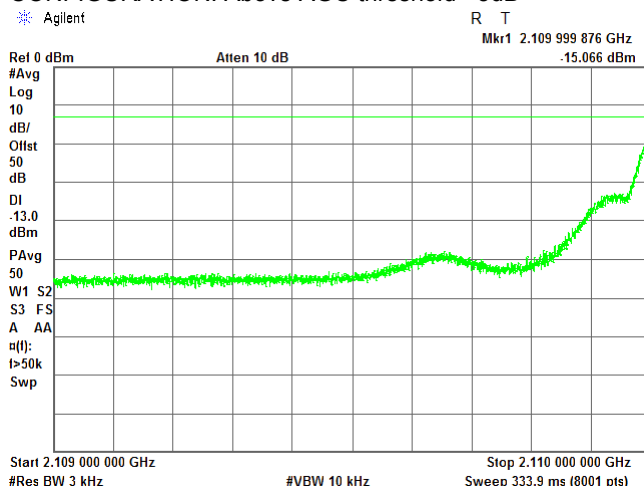
RMS Results
Carrier Power 500.0 kHz
-30.55 dBm / 1.00000 MHz

Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
1.000 MHz	-0.19	-30.78	-0.03	-30.62		

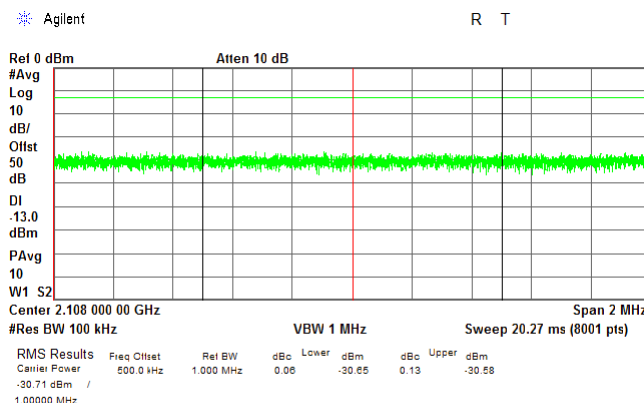
Two signals

CONFIGURATION: Above AGC threshold +3dB

Agilent



Agilent



RMS Results
Carrier Power 500.0 kHz
-30.71 dBm / 1.00000 MHz

Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
1.000 MHz	0.06	-30.65	0.13	-30.58		

Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.18 Out-of-band emission test results in the 2107.0 – 2110.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

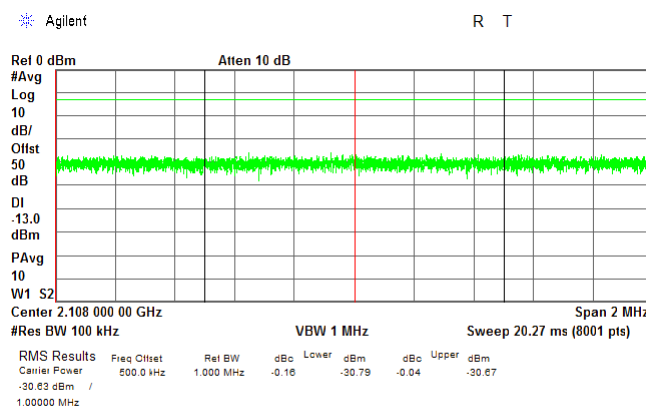
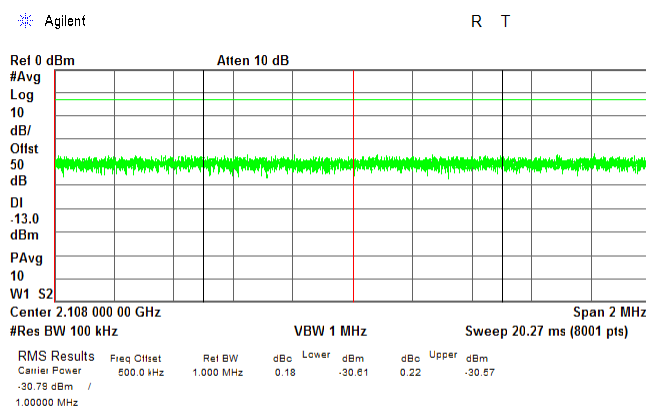
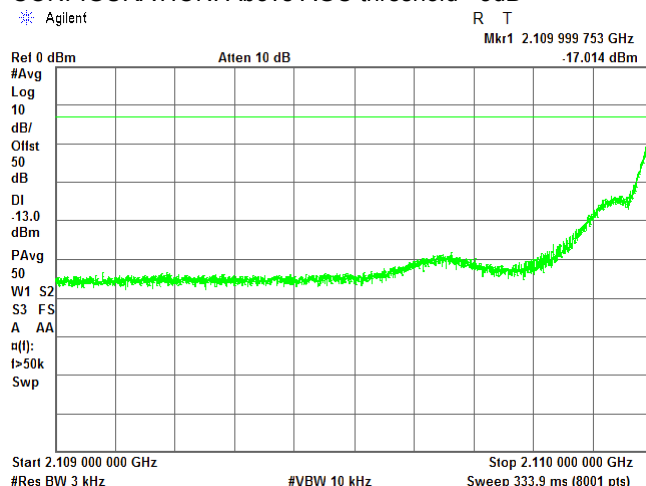
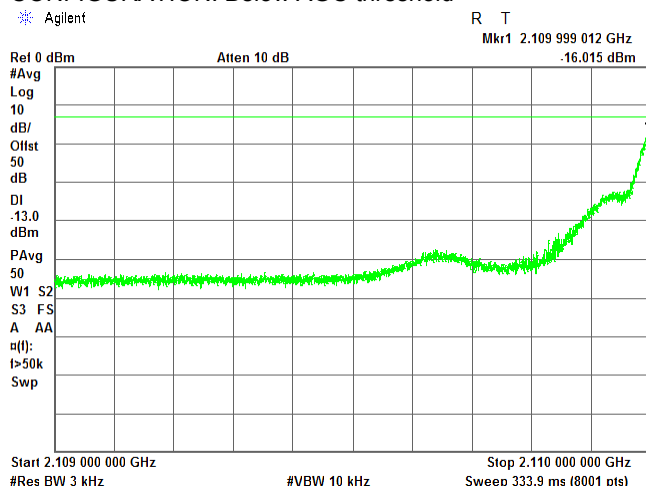
MODULATION:

GSM/GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

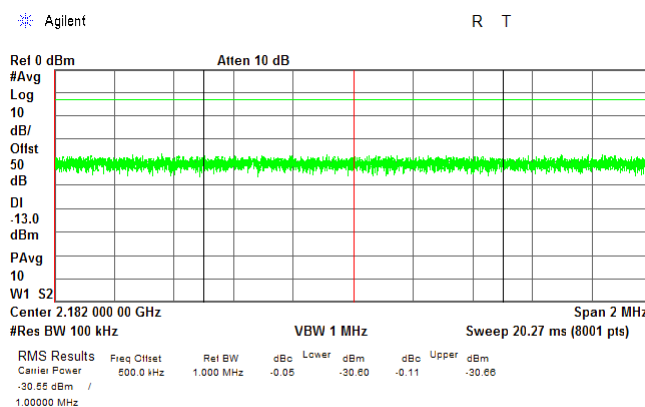
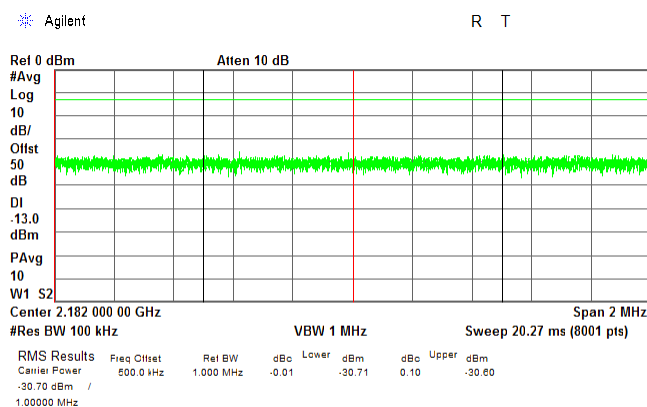
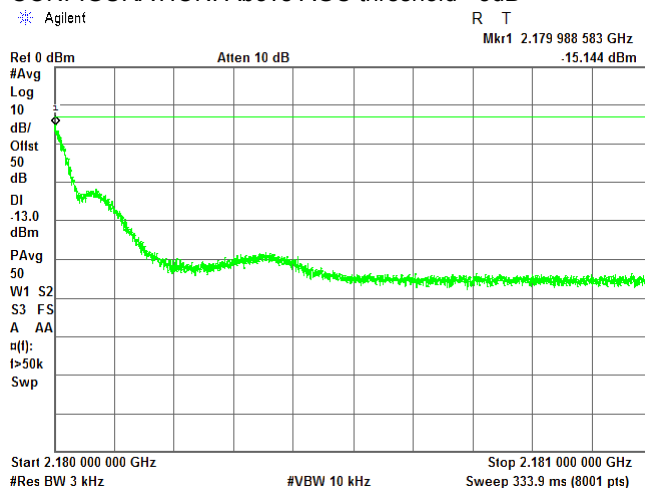
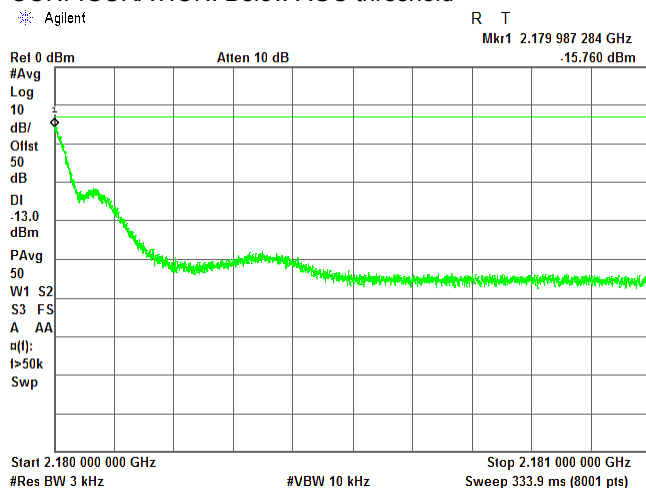
Plot 7.5.19 Out-of-band emission test results in the 2180.0 – 2183.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

2110.0 – 2180.0 MHz
Average
Downlink
GSM/GSM

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.20 Out-of-band emission test results in the 2180.0 – 2183.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

2110.0 – 2180.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

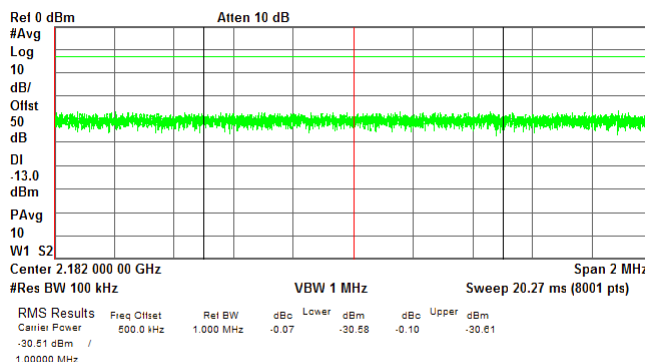
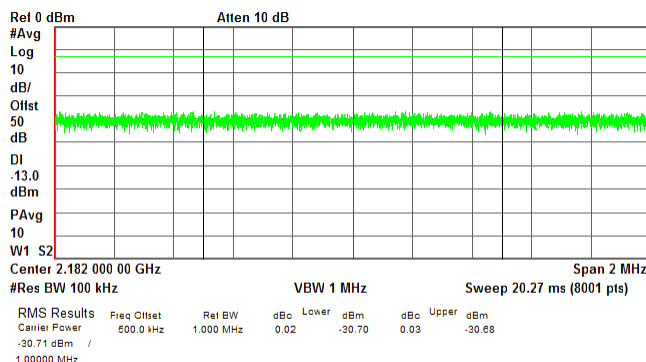
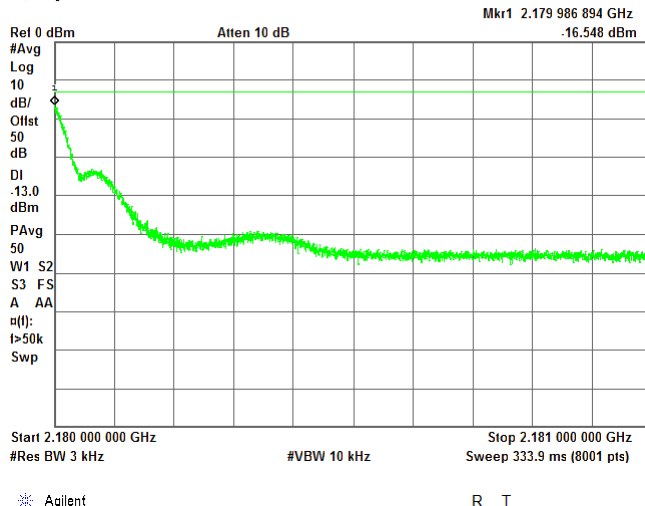
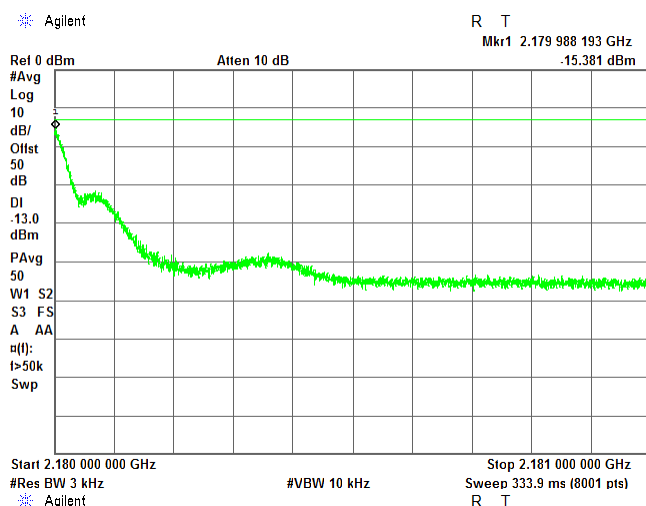
MODULATION:

GSM/GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

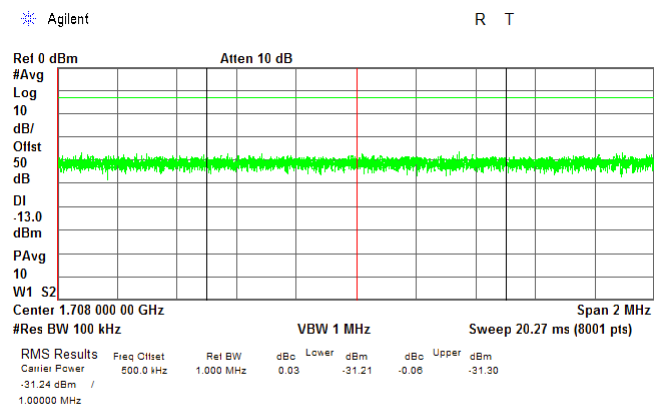
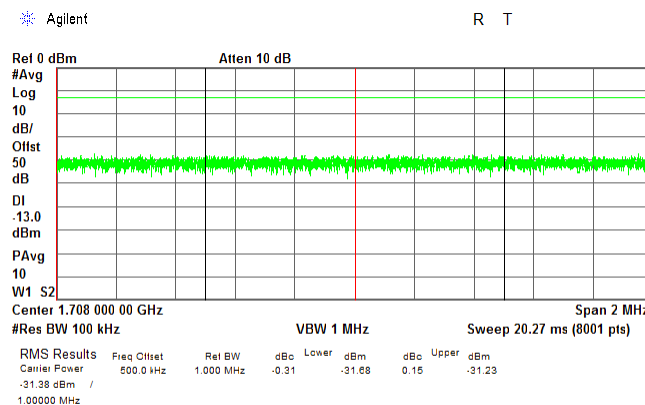
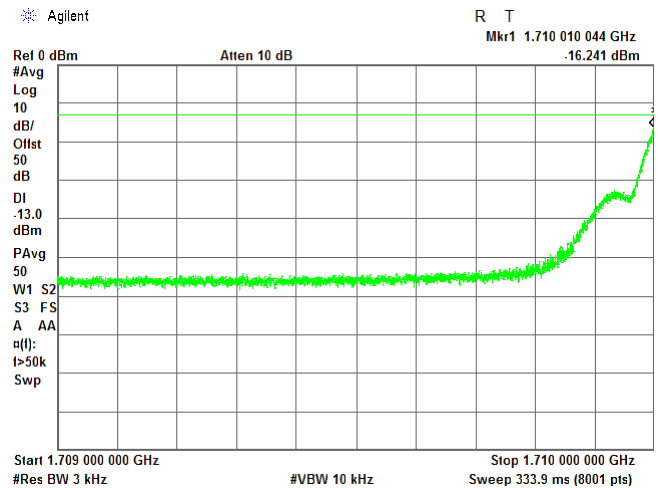
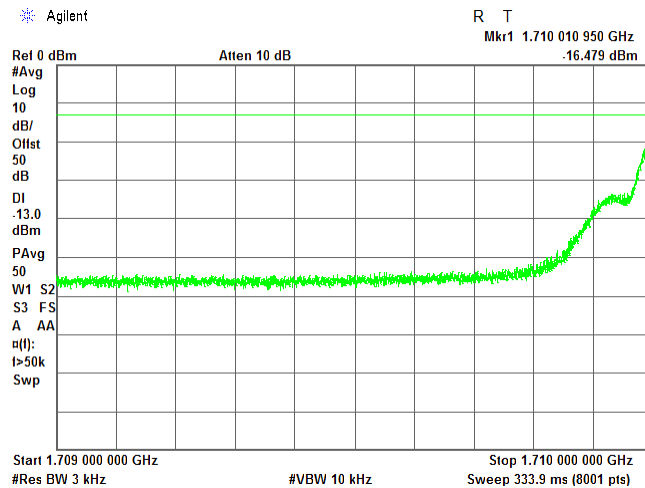
Plot 7.5.21 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

1710.0 – 1780.0 MHz
Average
Uplink
GSM/GSM

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB

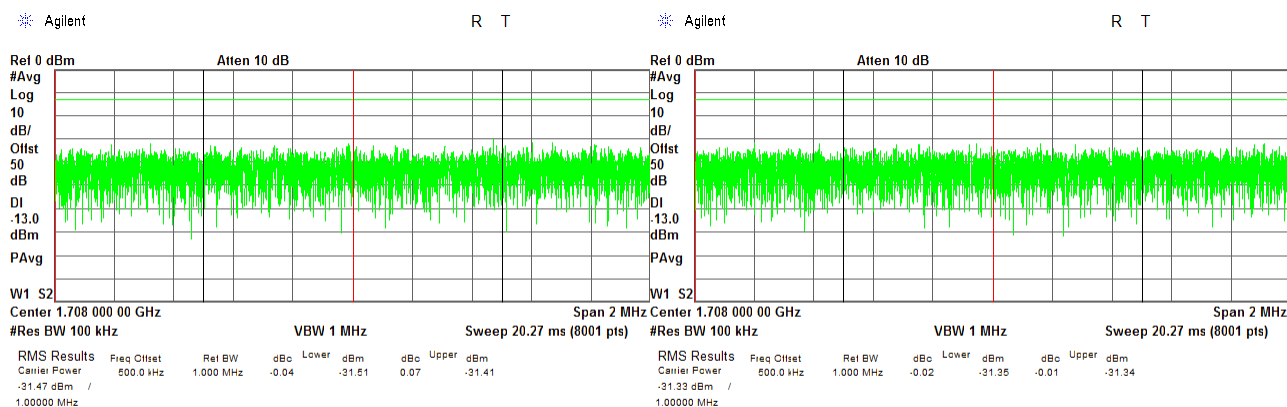


Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.21 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge (continued)

OPERATING FREQUENCY RANGE: 1710.0 – 1780.0 MHz
DETECTOR USED: Average
CONFIGURATION: Uplink
MODULATION: GSM/GSM

COMPOSITE INPUT SIGNAL: Two signals
CONFIGURATION: Below AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.22 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

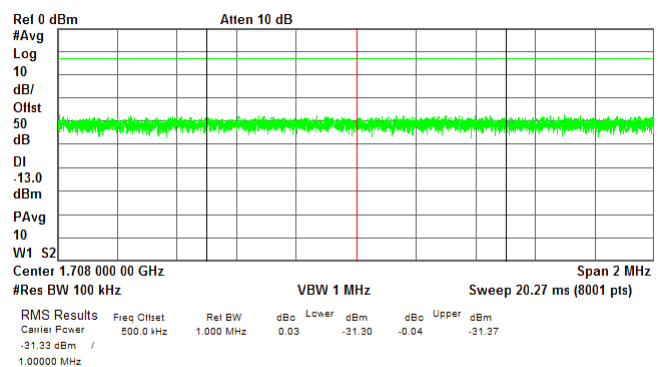
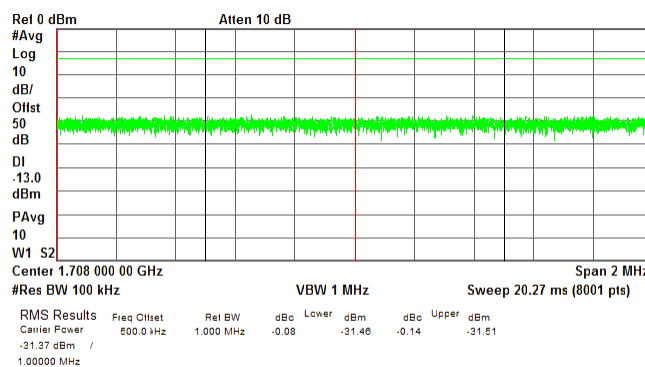
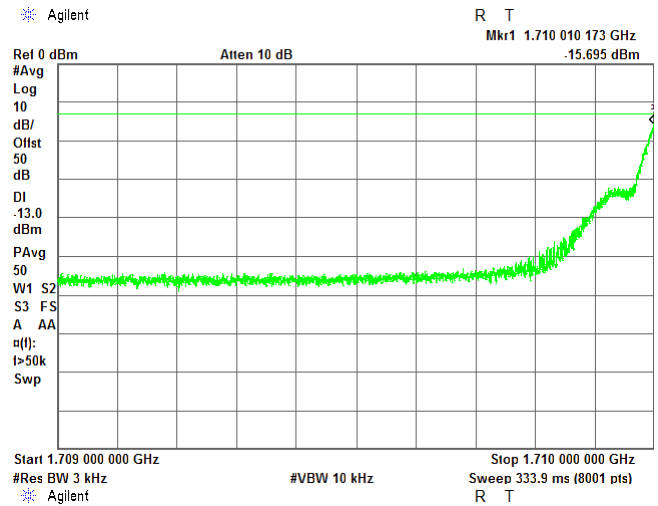
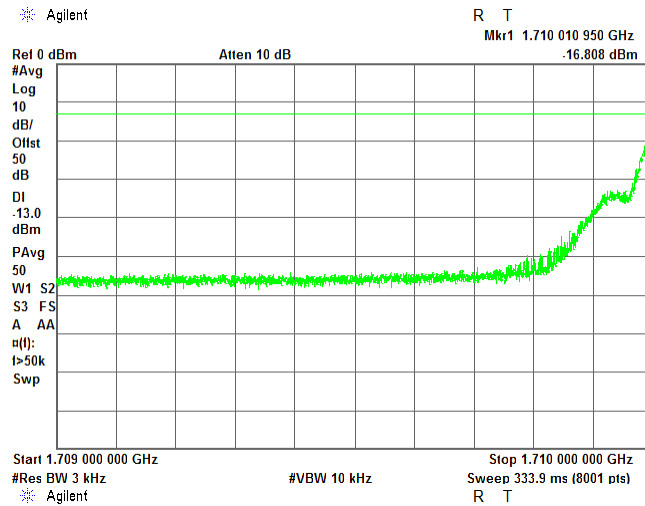
MODULATION:

GSM/GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB

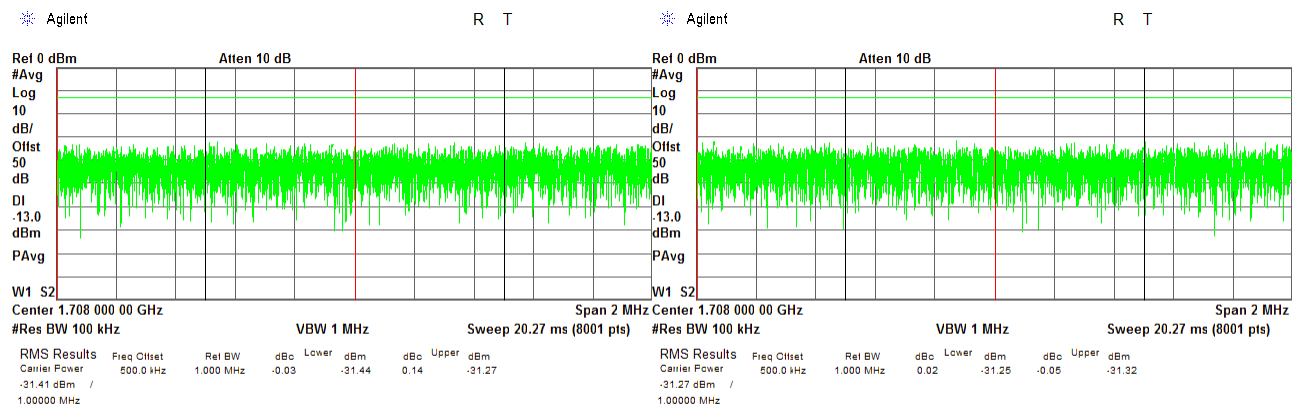


Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.22 Out-of-band emission test results in the 1707.0 – 1710.0 MHz frequency range, Lower band Edge (continued)

OPERATING FREQUENCY RANGE: 1710.0 – 1780.0 MHz
DETECTOR USED: Average
CONFIGURATION: Uplink
MODULATION: GSM/GSM

SINGLE TEST SIGNAL INPUT: CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.23 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

MODULATION:

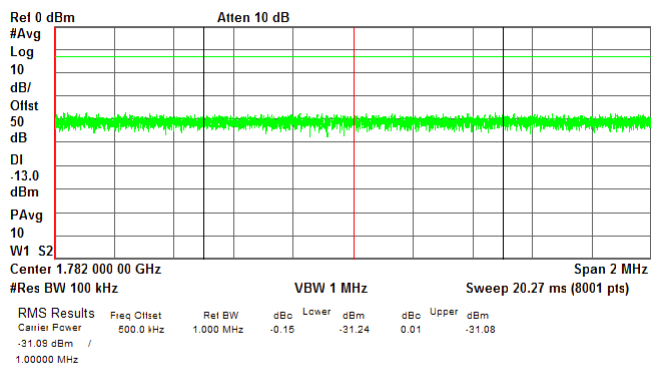
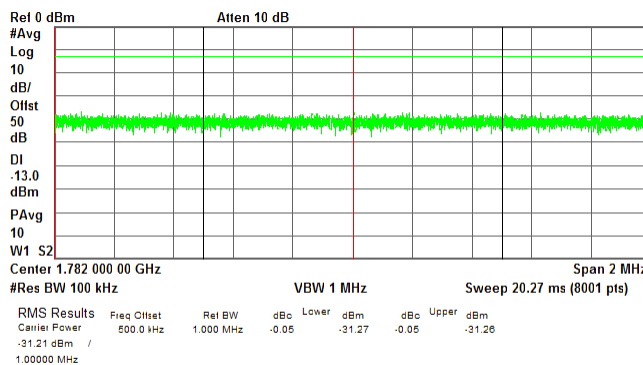
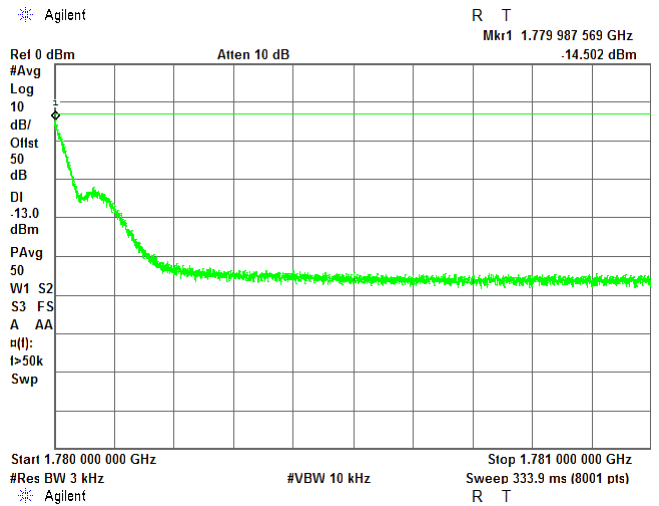
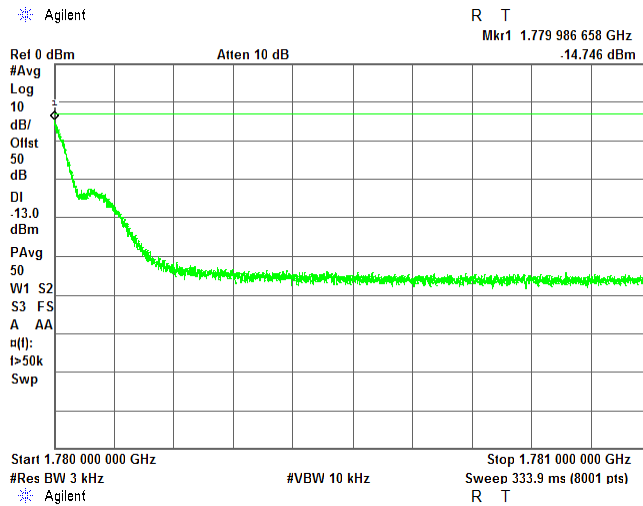
GSM/GSM

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.23 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge (continued)

OPERATING FREQUENCY RANGE: 1710.0 – 1780.0 MHz

DETECTOR USED: Average

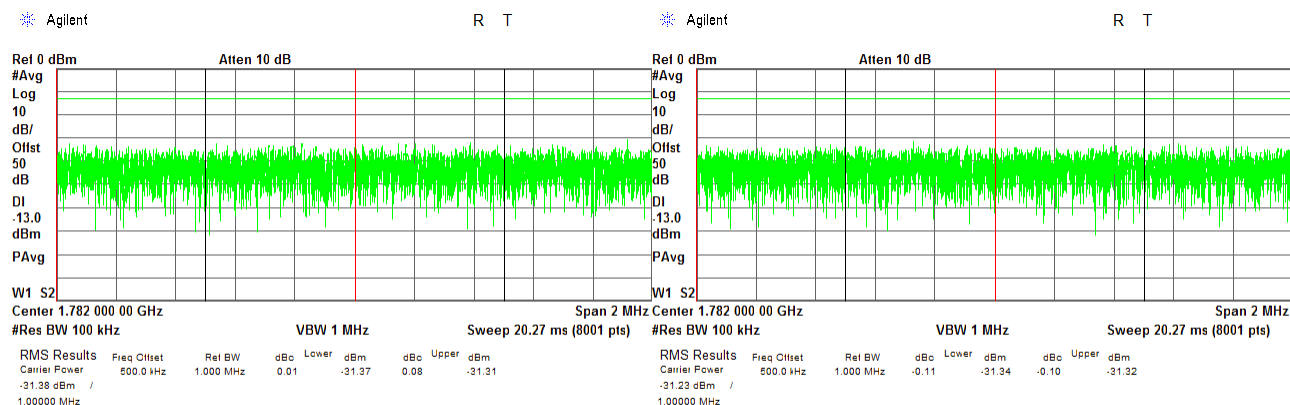
CONFIGURATION: Downlink

MODULATION: GSM/GSM

COMPOSITE INPUT SIGNAL: Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.24 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

1710.0 – 1780.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

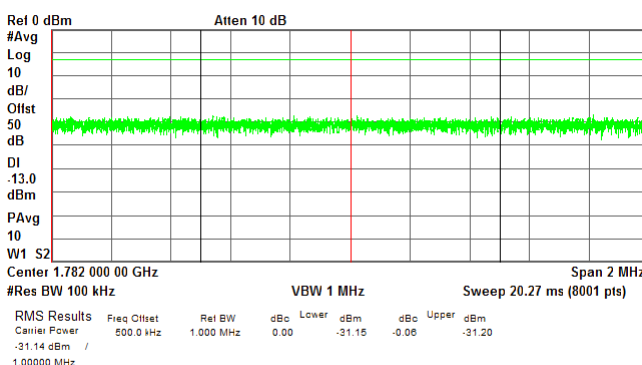
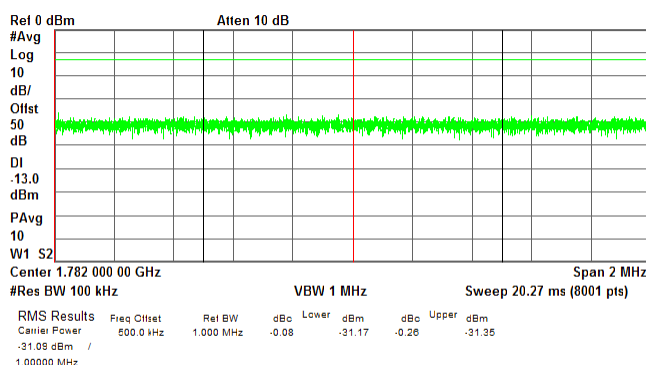
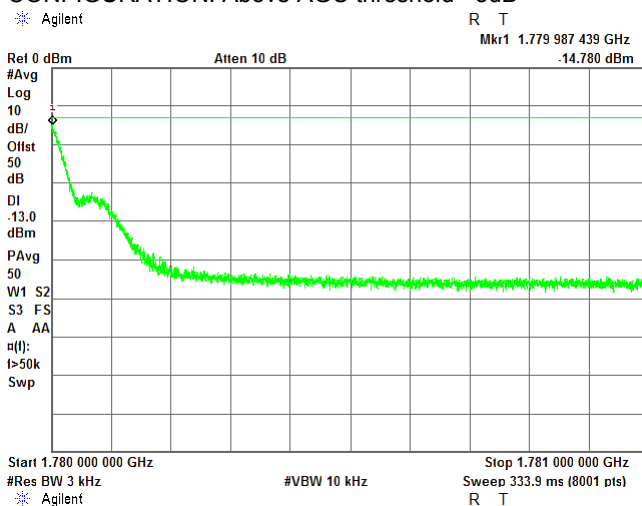
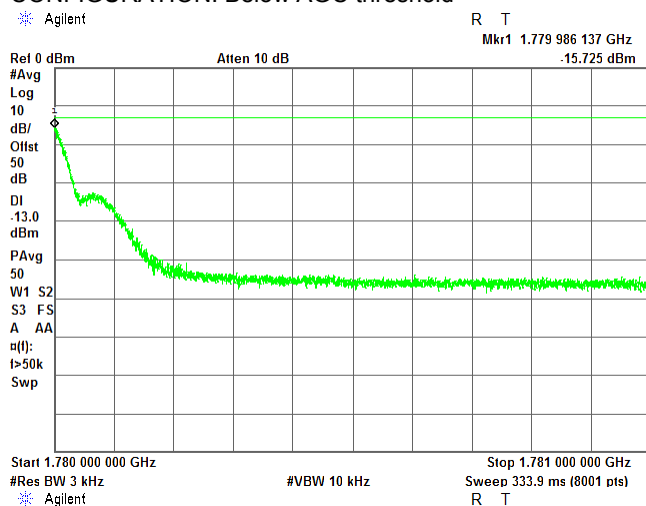
MODULATION:

GSM/GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB

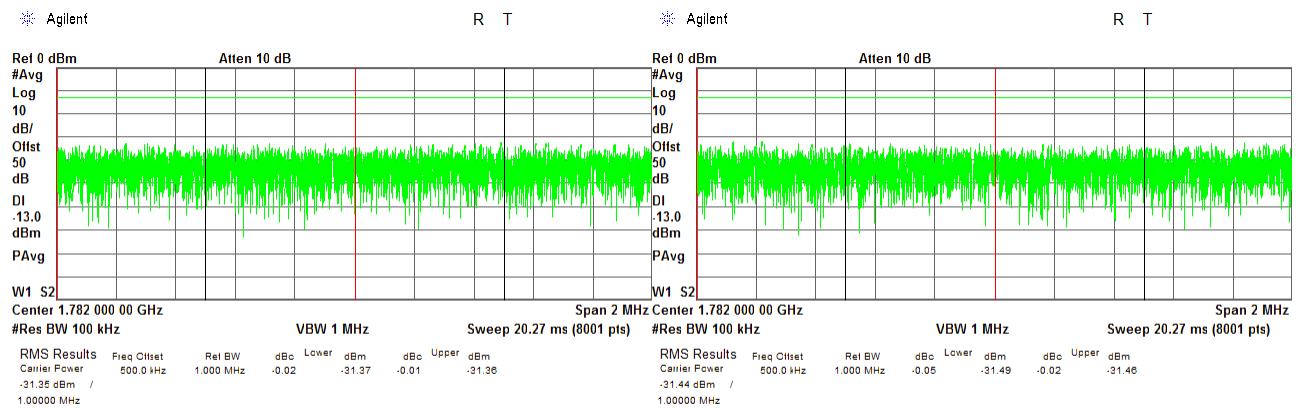


Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.24 Out-of-band emission test results in the 1780.0 – 1783.0 MHz frequency range, Upper band Edge (continued)

OPERATING FREQUENCY RANGE: 1710.0 – 1780.0 MHz
DETECTOR USED: Average
CONFIGURATION: Downlink
MODULATION: GSM/GSM

SINGLE TEST SIGNAL INPUT: CONFIGURATION: Above AGC threshold +3dB
CONFIGURATION: Below AGC threshold



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.25 Out-of-band emission test results in the 727.7 – 728.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

728.0 – 746.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

MODULATION:

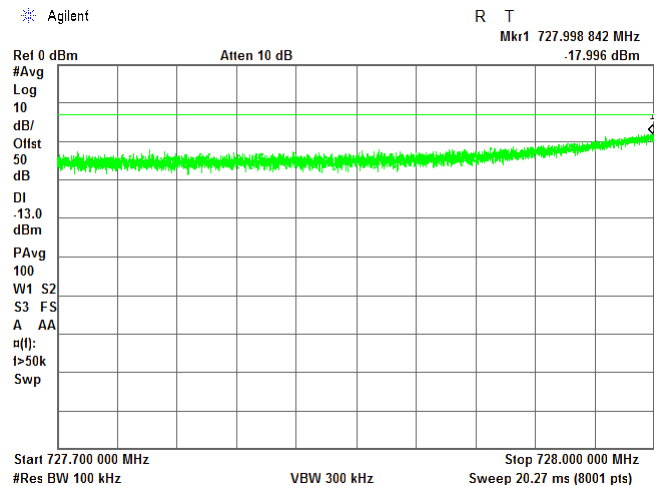
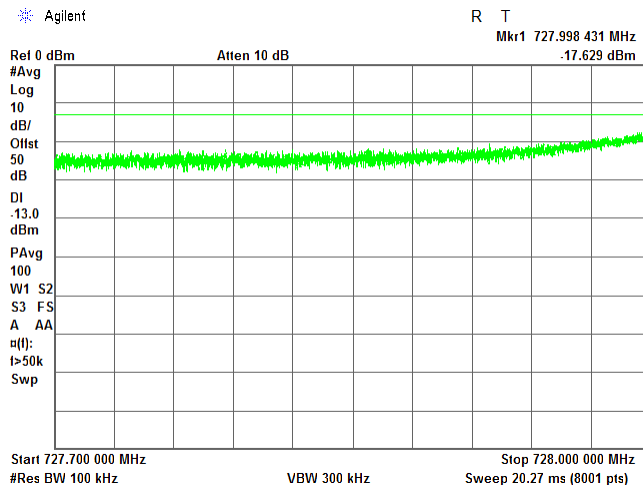
AWGN / AWGN

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

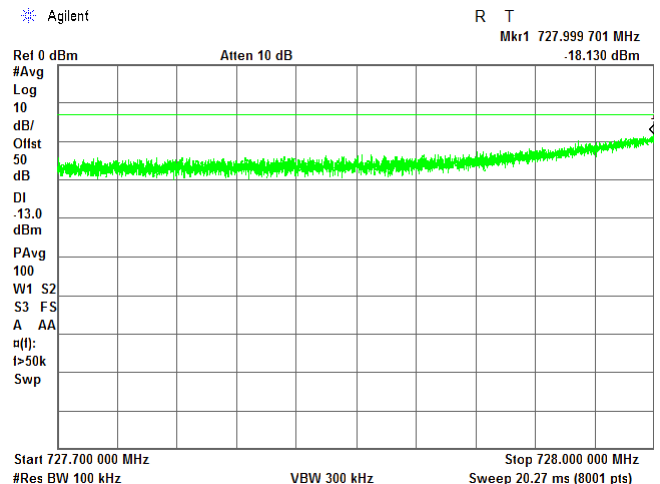
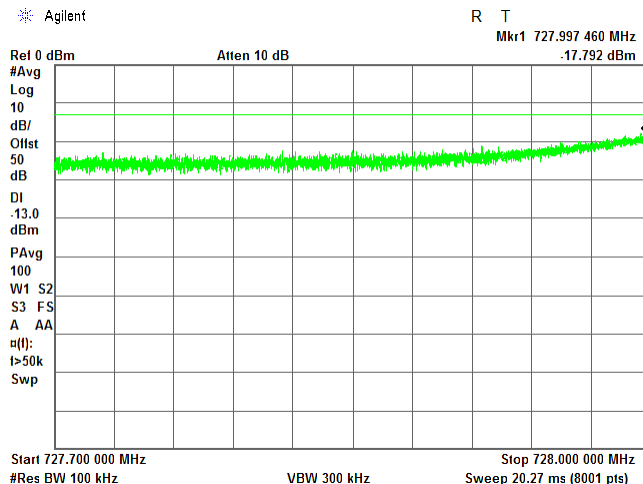
CONFIGURATION: Above AGC threshold +3dB



SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Above AGC threshold +3dB

CONFIGURATION: Below AGC threshold



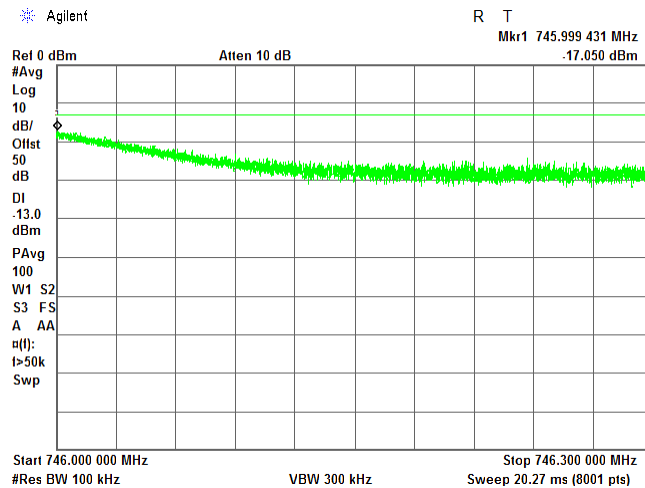
Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.26 Out-of-band emission test results in the 746.0 – 746.3 MHz frequency range, Upper band Edge

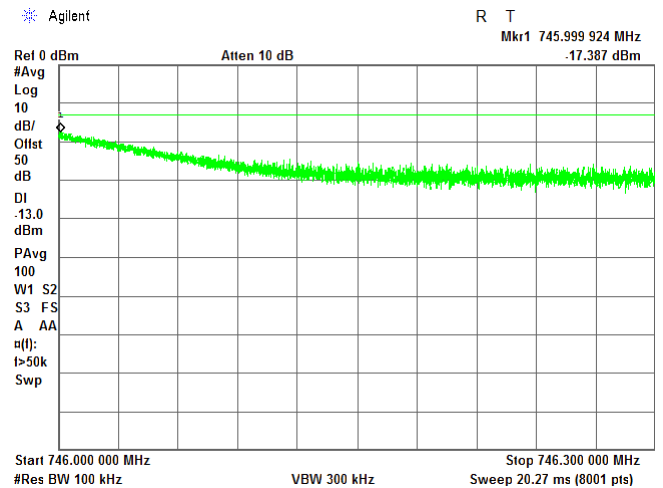
OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

728.0 – 746.0 MHz
Average
Downlink
AWGN / AWGN

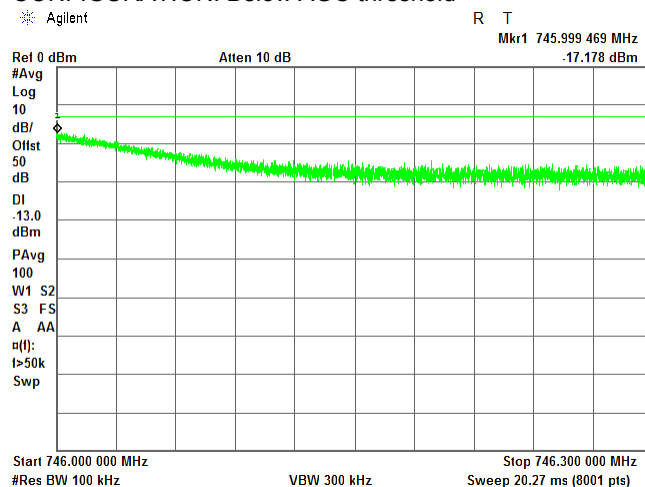
COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold



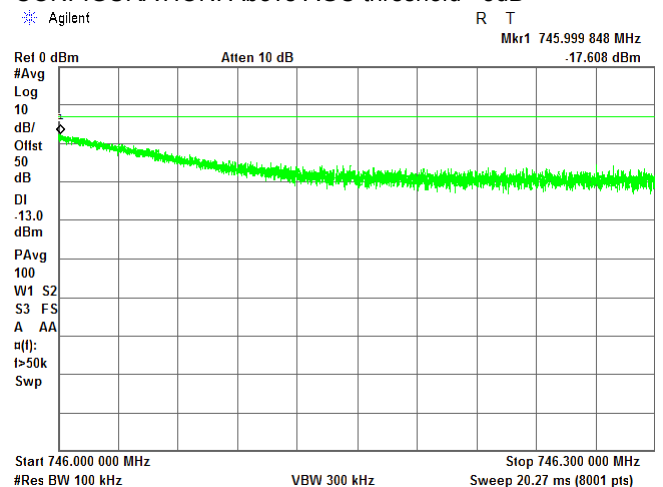
Two signals
CONFIGURATION: Above AGC threshold +3dB



SINGLE TEST SIGNAL INPUT:
CONFIGURATION: Below AGC threshold



CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.27 Out-of-band emission test results in the 695.0 – 698.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

698.0 – 716.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

MODULATION:

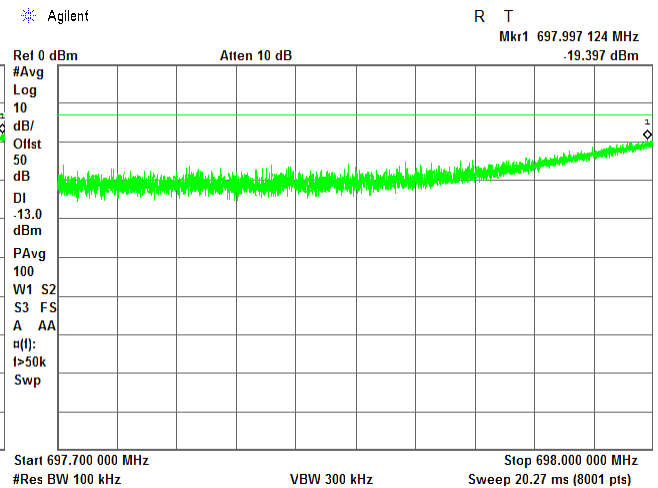
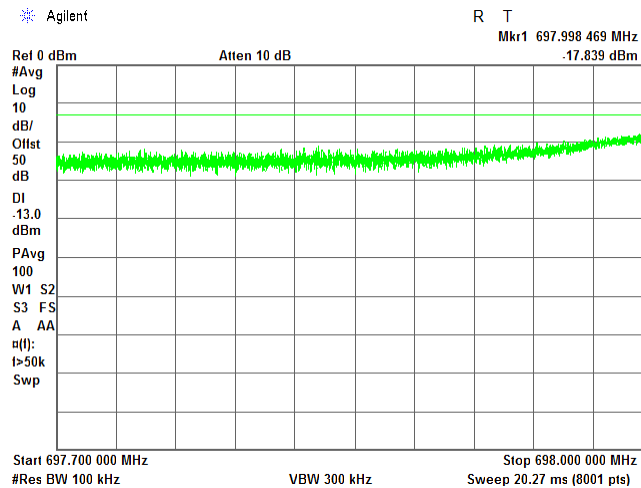
AWGN / AWGN

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

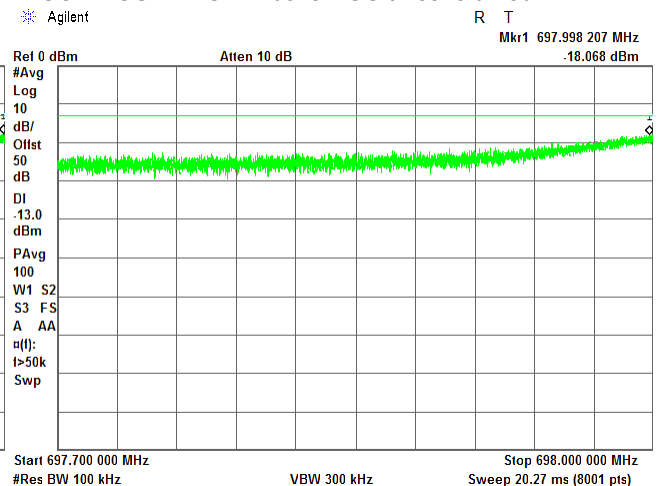
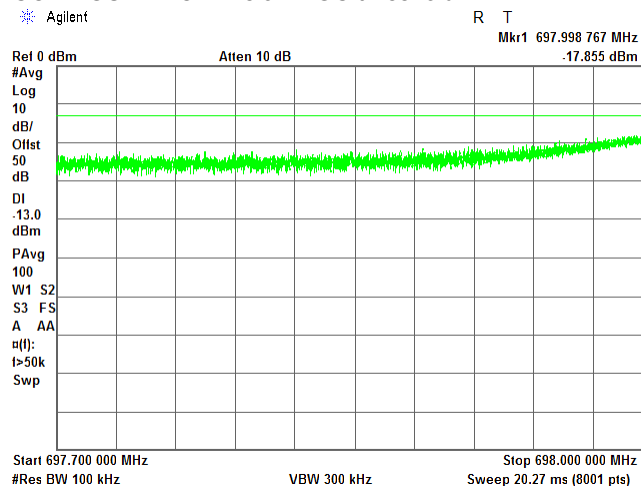
CONFIGURATION: Above AGC threshold +3dB



SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Above AGC threshold +3dB

CONFIGURATION: Below AGC threshold



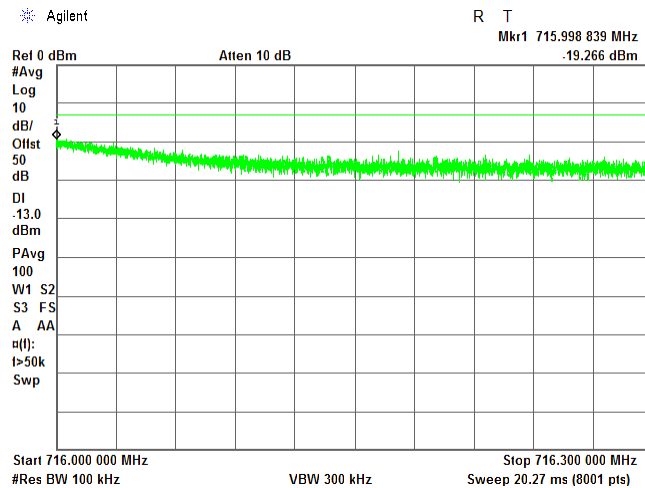
Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.28 Out-of-band emission test results in the 716.0 – 719.0 MHz frequency range, Upper band Edge

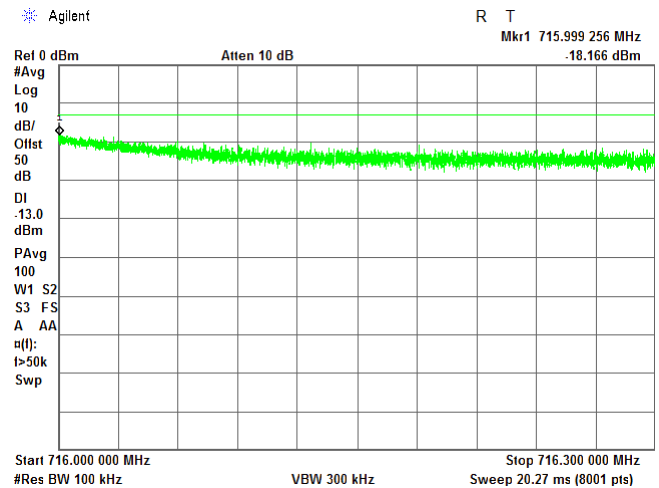
OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

698.0 – 716.0 MHz
Average
Uplink
AWGN / AWGN

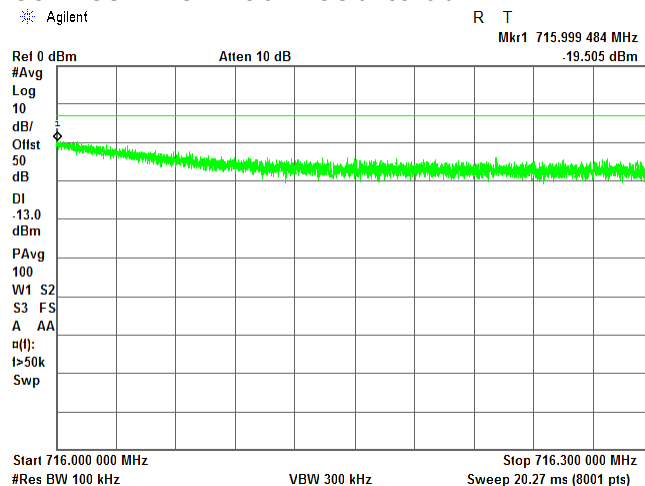
COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold



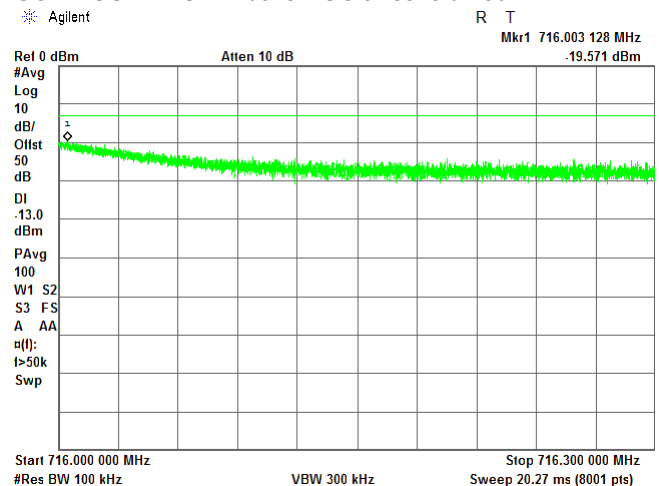
Two signals
CONFIGURATION: Above AGC threshold +3dB



SINGLE TEST SIGNAL INPUT:
CONFIGURATION: Below AGC threshold



CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

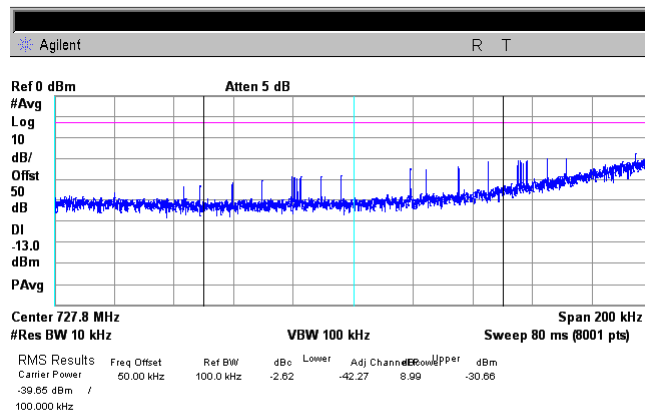
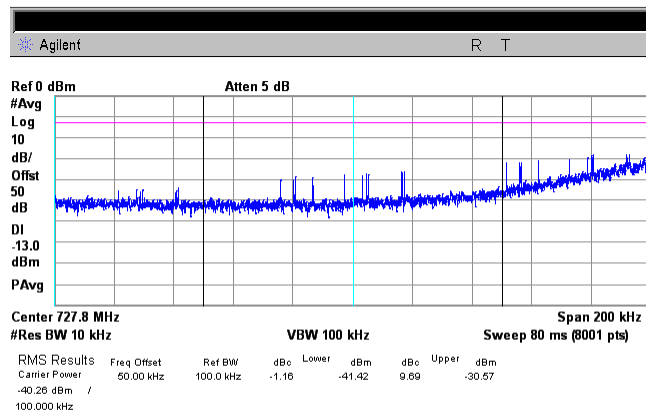
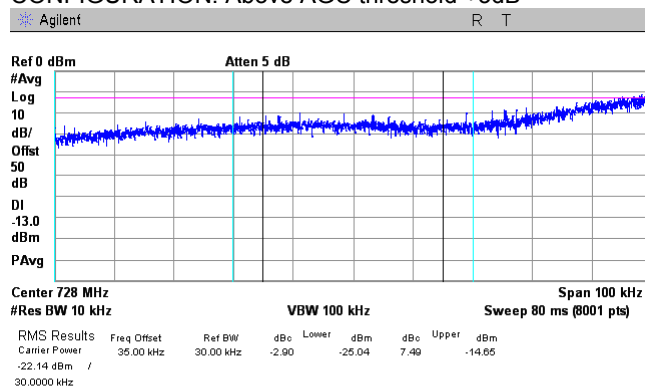
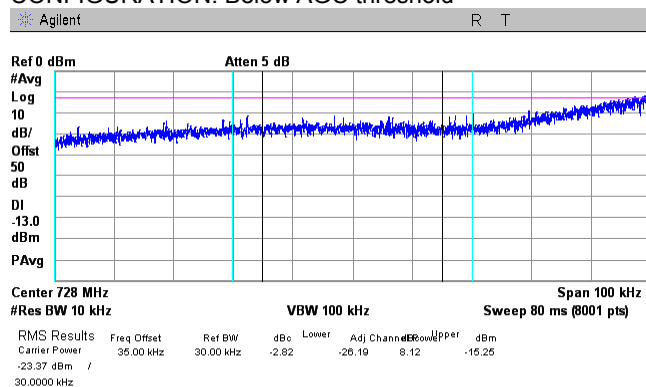
Plot 7.5.29 Out-of-band emission test results in the 727.7 – 728.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

728.0 – 746.0 MHz
Average
Uplink
GSM / GSM

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.30 Out-of-band emission test results in the 727.7 – 728.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

728.0 – 746.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

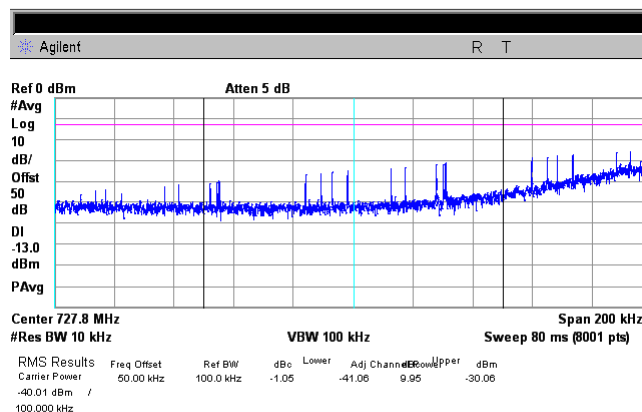
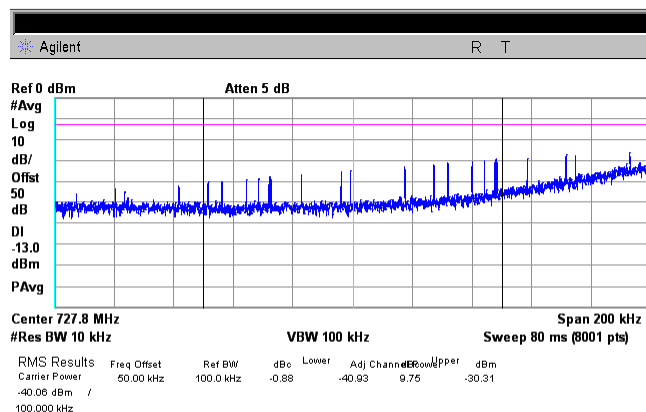
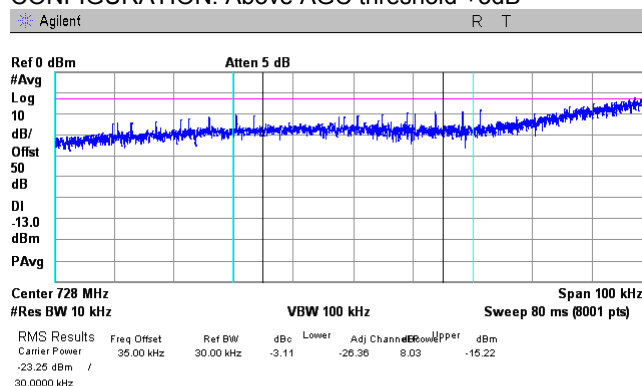
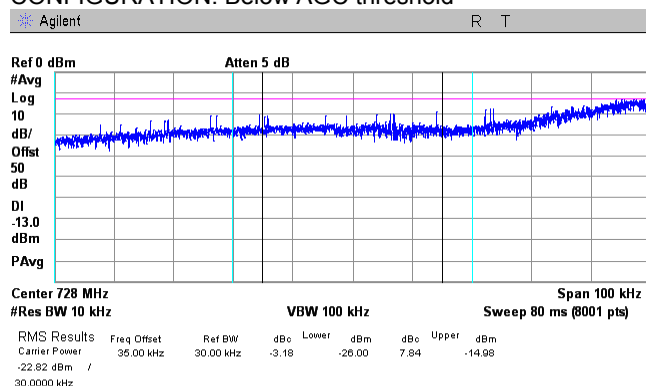
MODULATION:

GSM / GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

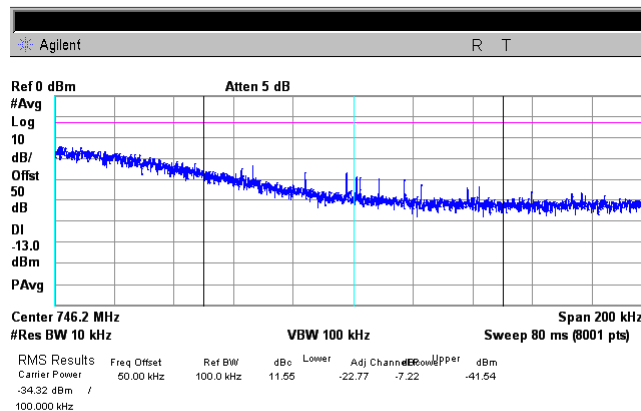
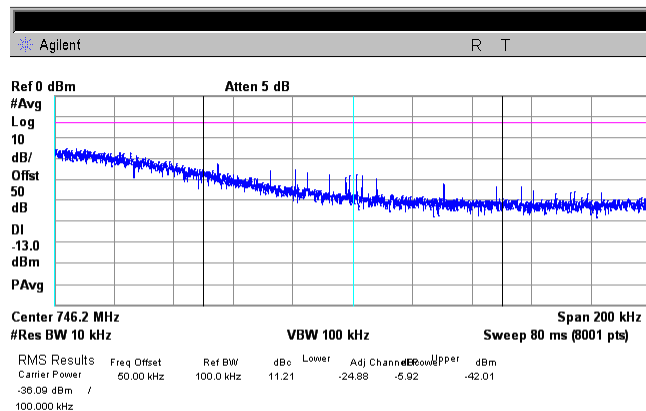
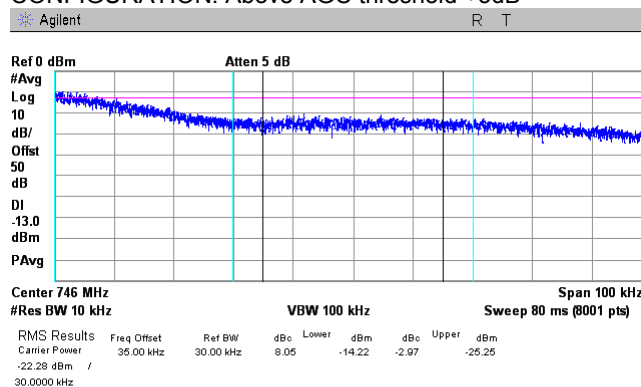
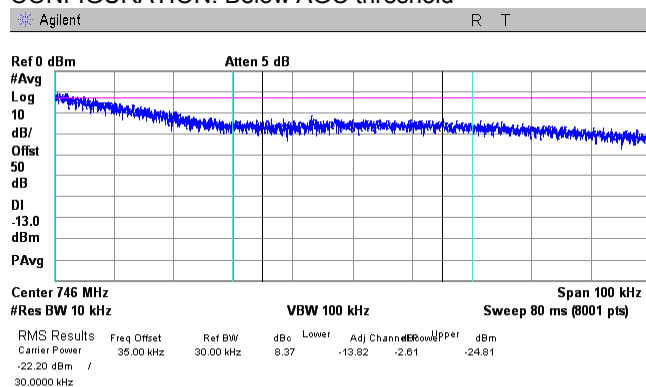
Plot 7.5.31 Out-of-band emission test results in the 746.0 – 746.3 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:
DETECTOR USED:
CONFIGURATION:
MODULATION:

728.0 – 746.0 MHz
Average
Downlink
GSM / GSM

COMPOSITE INPUT SIGNAL:
CONFIGURATION: Below AGC threshold

Two signals
CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.32 Out-of-band emission test results in the 746.0 – 746.3 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

728.0 – 746.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Downlink

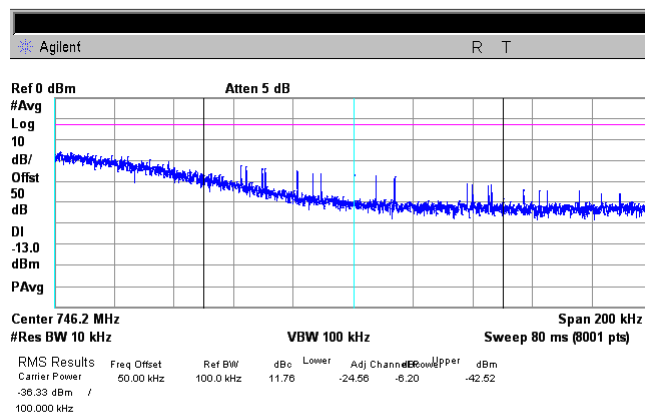
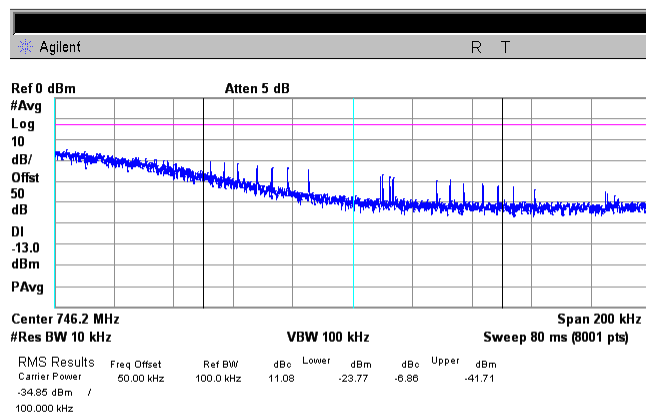
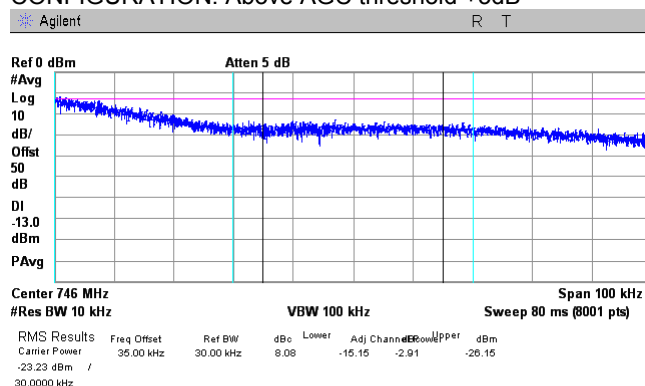
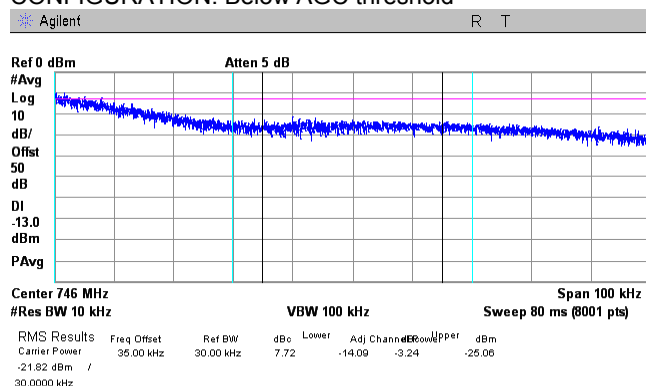
MODULATION:

GSM / GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.33 Out-of-band emission test results in the 695.0 – 698.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

DETECTOR USED:

CONFIGURATION:

MODULATION:

698.0 – 716.0 MHz

Average

Uplink

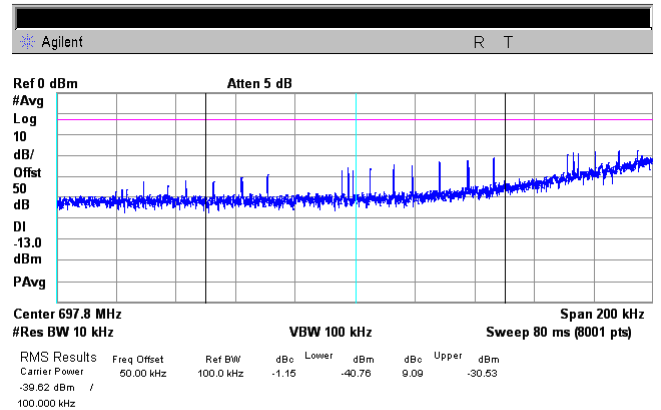
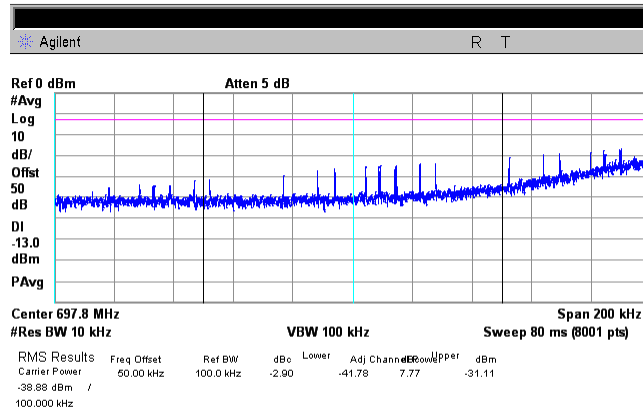
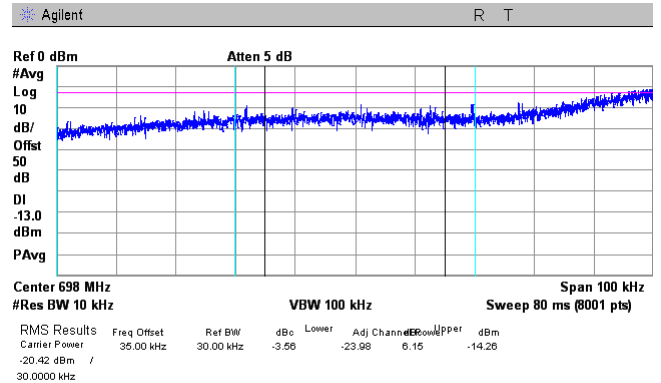
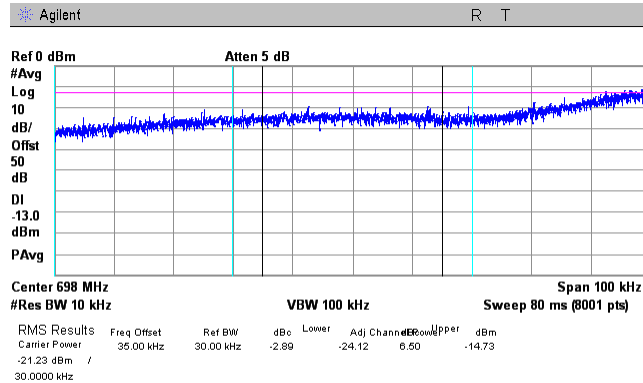
GSM / GSM

COMPOSITE INPUT SIGNAL:

CONFIGURATION: Below AGC threshold

Two signals

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.34 Out-of-band emission test results in the 695.0 – 698.0 MHz frequency range, Lower band Edge

OPERATING FREQUENCY RANGE:

698.0 – 716.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

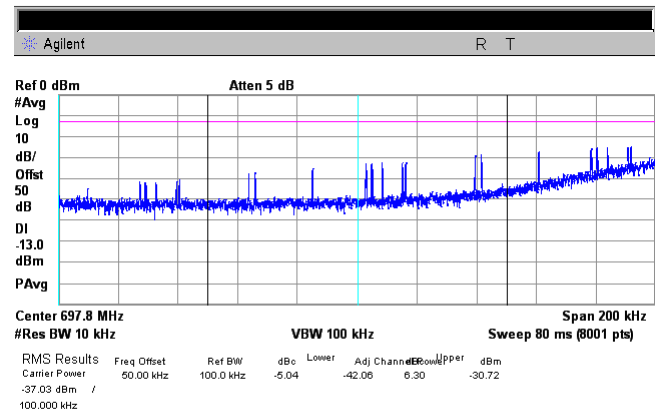
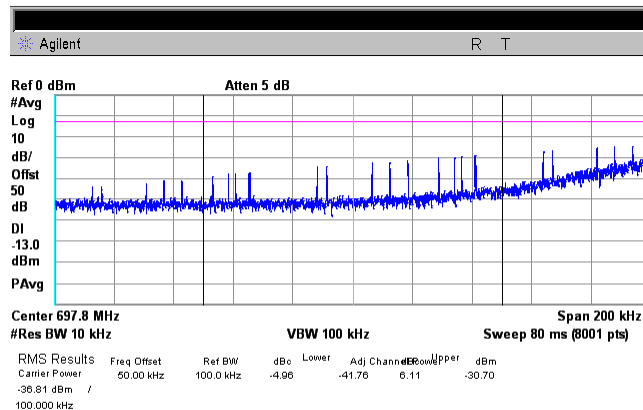
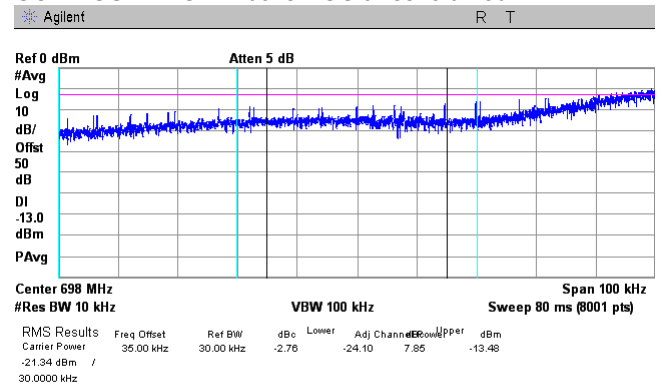
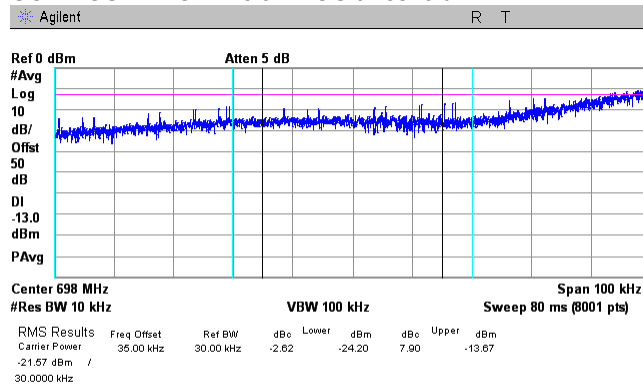
MODULATION:

GSM / GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.35 Out-of-band emission test results in the 716.0 – 719.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

698.0 – 716.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

MODULATION:

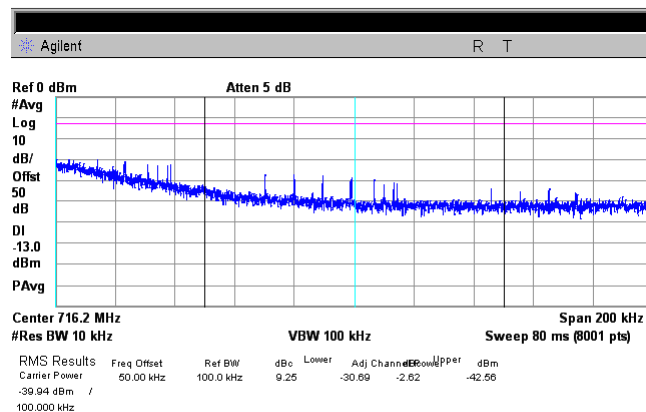
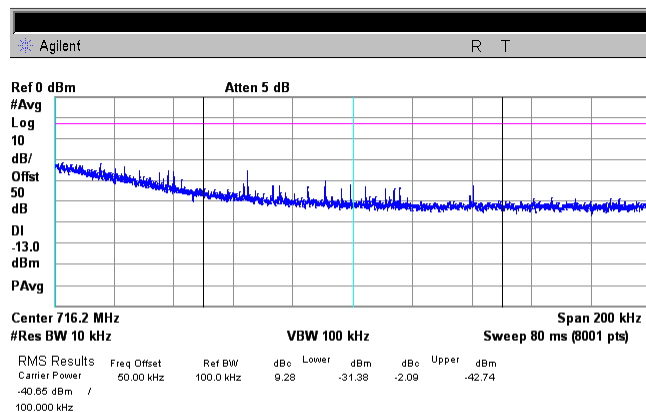
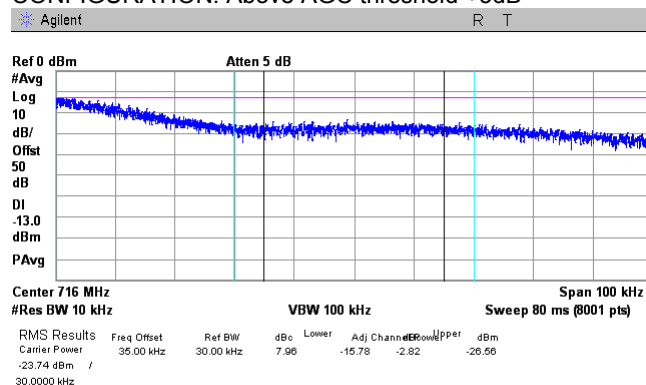
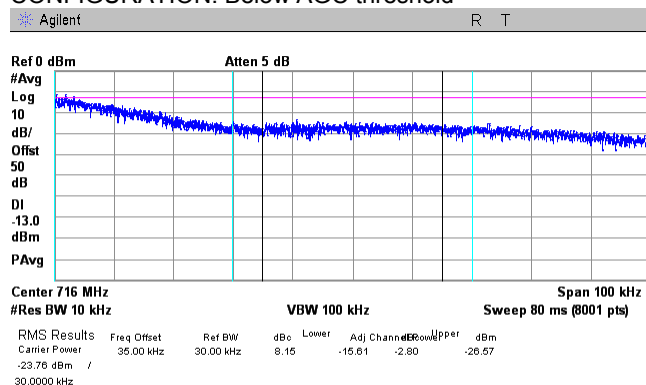
GSM / GSM

COMPOSITE INPUT SIGNAL:

Two signals

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Out-of-band emissions conducted measurements			
Test procedure: 47 CFR, Sections 2.1051; KDB 935210 D05 v01r01, section 3.6.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 09-Apr-17			
Temperature: 23.4 °C	Relative Humidity: 47 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.5.36 Out-of-band emission test results in the 716.0 – 719.0 MHz frequency range, Upper band Edge

OPERATING FREQUENCY RANGE:

698.0 – 716.0 MHz

DETECTOR USED:

Average

CONFIGURATION:

Uplink

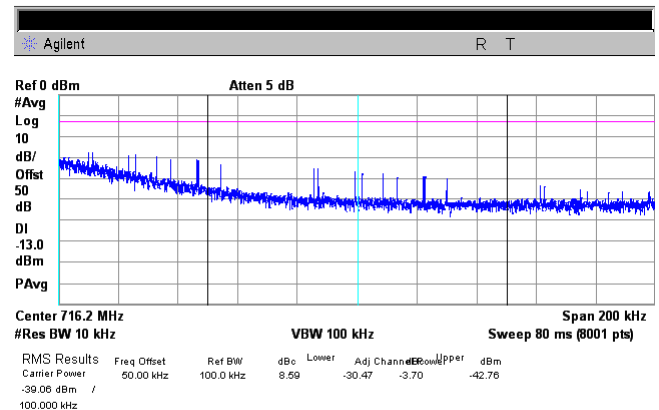
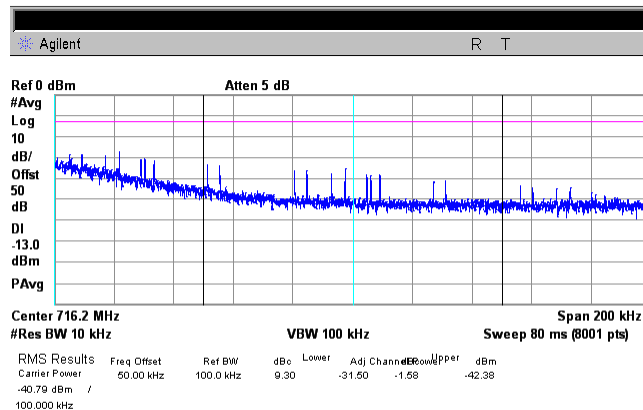
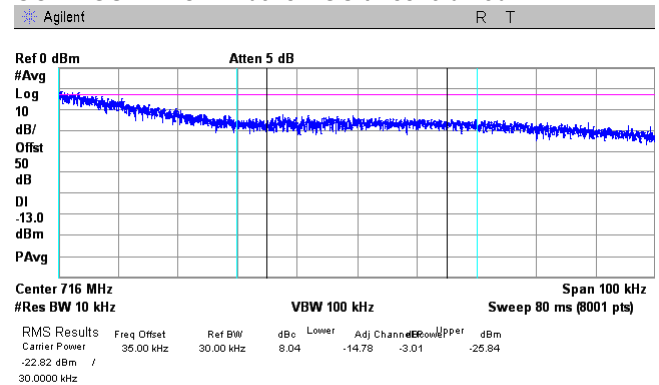
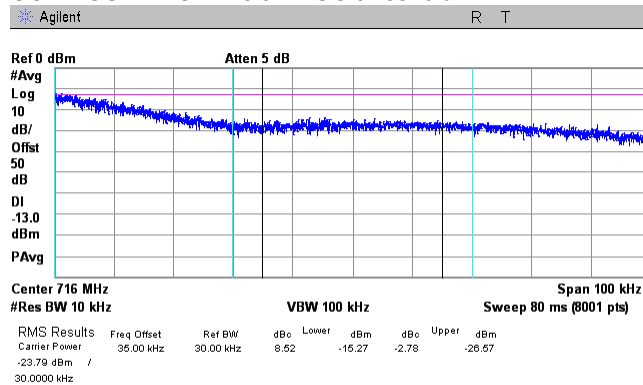
MODULATION:

GSM / GSM

SINGLE TEST SIGNAL INPUT:

CONFIGURATION: Below AGC threshold

CONFIGURATION: Above AGC threshold +3dB



Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

7.6 Spurious emissions at RF antenna connector test

7.6.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Spurious emission limits

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm
0.009 – 10th harmonic*	$43+10\log P^{**}$	-13.0

* - spurious emission limits do not apply to the in band emission within ± 250 % of the authorized bandwidth from the carrier; investigated in course of emission mask testing

** - P is transmitter output power in Watts

7.6.2 Test procedure

7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.

7.6.2.2 The EUT was adjusted to produce maximum available for end user RF output power.

7.6.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.6.2, Table 7.6.3 and associated plots.

Figure 7.6.1 Spurious emission test setup





Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode:	Compliance	Verdict: PASS	
Date(s):	06-Apr-17 - 10-Apr-17		
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.6.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 2110.0 – 2180.0 MHz
 1710.0 – 1780.0 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 21800 MHz
 DETECTOR USED: Peak
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

MODULATION: AWGN / W-CDMA / GSM

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink								
Low carrier frequency								
All emissions were found more than 20 dB below limit								Pass
Mid carrier frequency								
All emissions were found more than 20 dB below limit								Pass
High carrier frequency								
All emissions were found more than 20 dB below limit								Pass
Uplink								
Low carrier frequency								
All emissions were found more than 20 dB below limit								Pass
Mid carrier frequency								
All emissions were found more than 20 dB below limit								Pass
igh carrier frequency								
All emissions were found more than 20 dB below limit								Pass

*- Margin = Spurious emission – specification limit.



Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Table 7.6.3 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 728.0 – 746.0 MHz
698.0 – 716.0 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 7460 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: ≥ Resolution bandwidth
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

MODULATION: AWGN / GSM

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
Downlink								
Low carrier frequency								
All emissions were found more than 20 dB below limit								Pass
Mid carrier frequency								
All emissions were found more than 20 dB below limit								Pass
High carrier frequency								
All emissions were found more than 20 dB below limit								Pass
Uplink								
Low carrier frequency								
All emissions were found more than 20 dB below limit								Pass
Mid carrier frequency								
All emissions were found more than 20 dB below limit								Pass
igh carrier frequency								
All emissions were found more than 20 dB below limit								Pass

*- Margin = Spurious emission – specification limit.

Reference numbers of test equipment used

HL 2016	HL 2017	HL 2909	HL 3472	HL 3474	HL 3779	HL 3780	HL 3787
HL 3901	HL 4070	HL 4274	HL 4275				
GB39340603		MY45090513					

Full description is given in Appendix A.

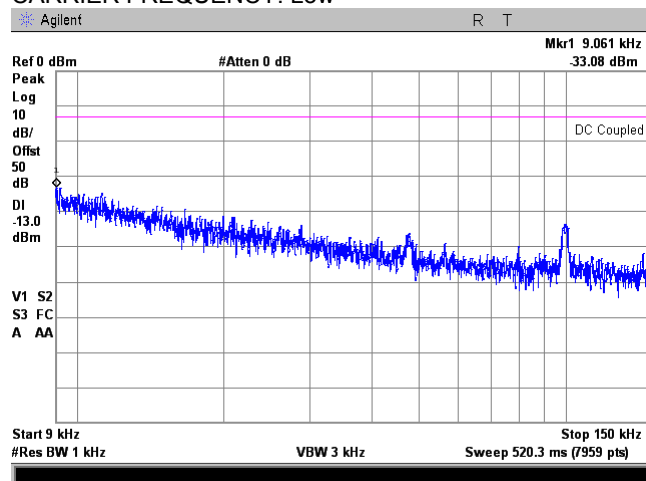
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.1 Spurious emission measurements in 9 - 150 kHz range at carrier frequency

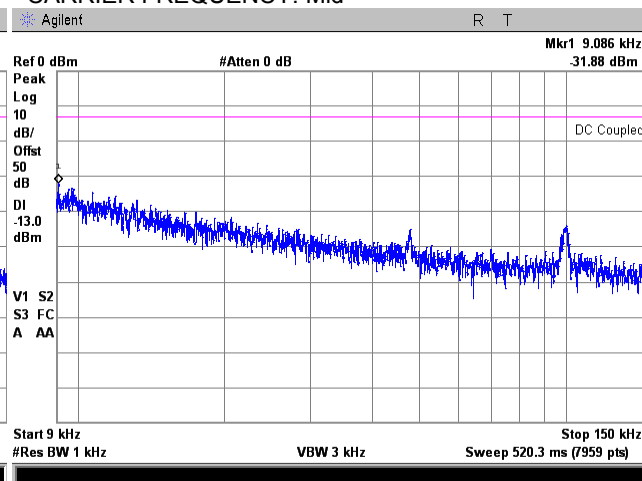
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

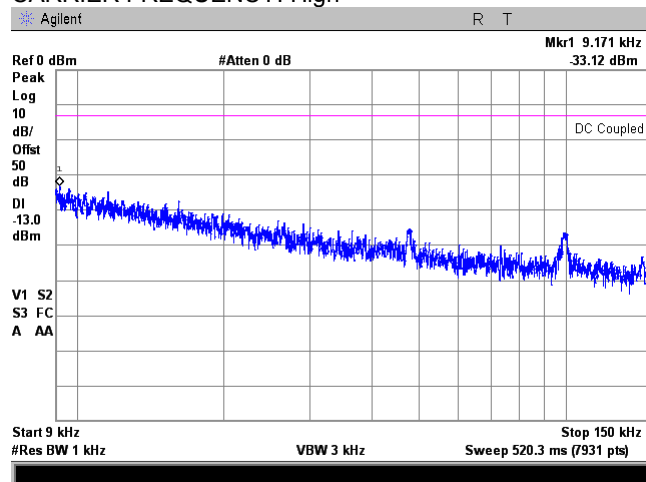
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

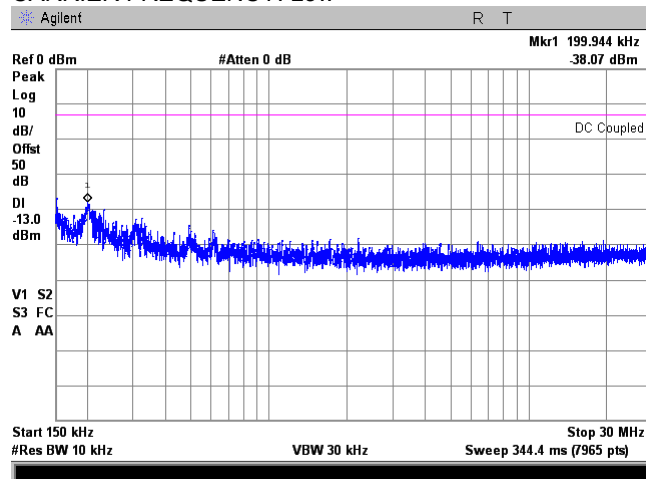


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

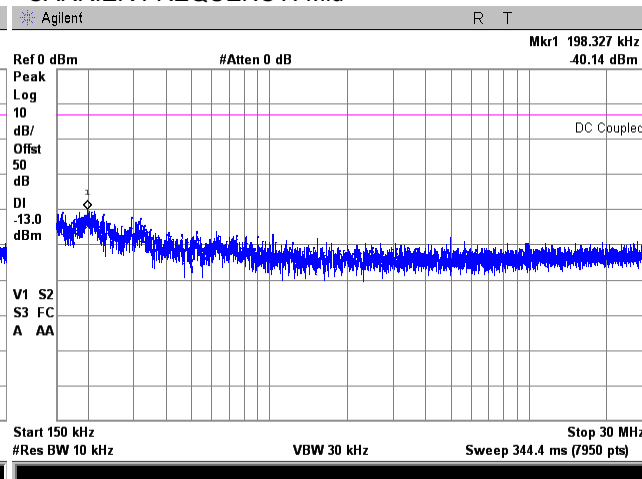
Plot 7.6.2 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

FREQUENCY RANGE: 2110.0 – 2180.0 MHz
 OPERATIONAL MODE: AWGN downlink transmit
 INPUT PORT: Base
 CONFIGURATION: Maximum gain
 INPUT POWER: Below AGC level

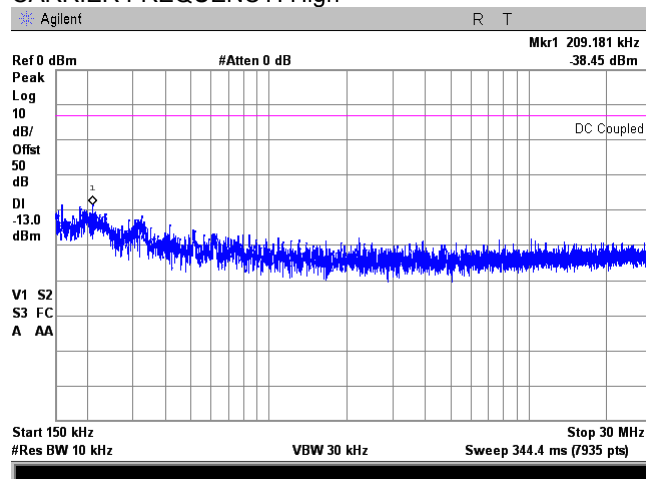
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

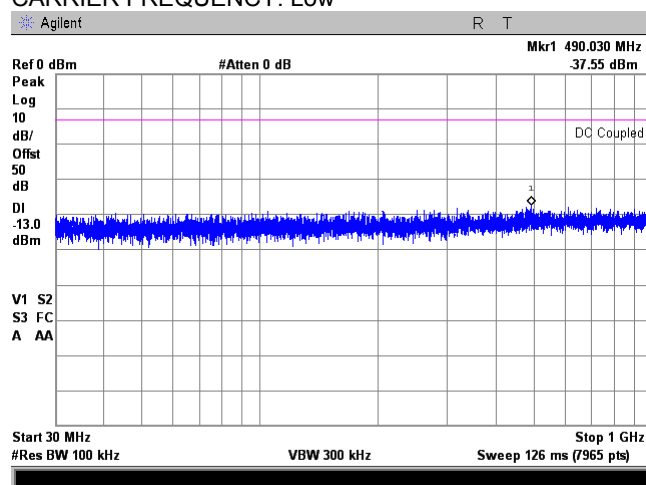


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

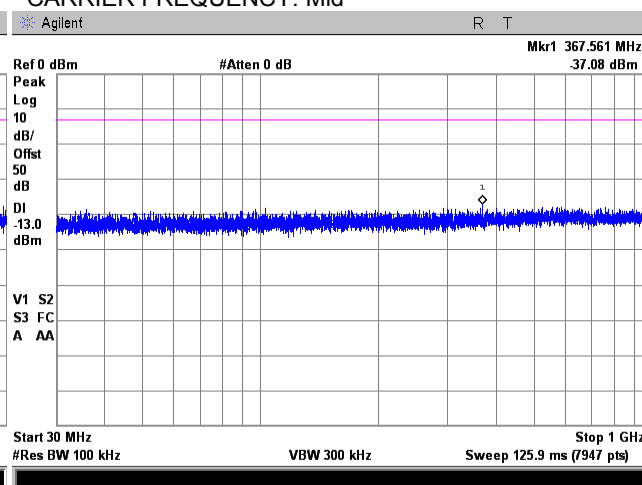
Plot 7.6.3 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

FREQUENCY RANGE: 2110.0 – 2180.0 MHz
 OPERATIONAL MODE: AWGN downlink transmit
 INPUT PORT: Base
 CONFIGURATION: Maximum gain
 INPUT POWER: Below AGC level

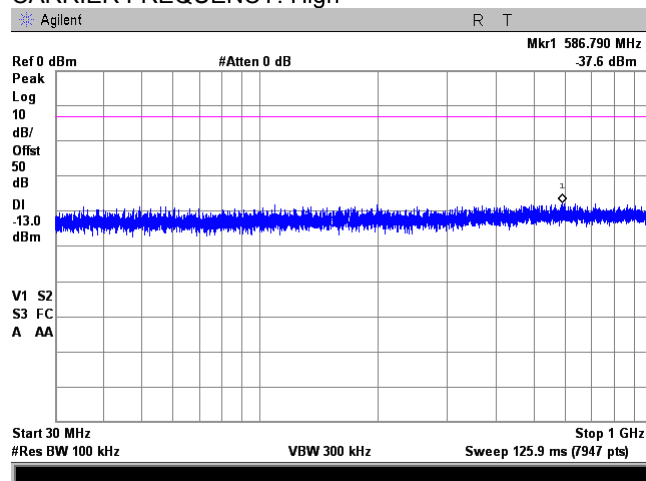
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



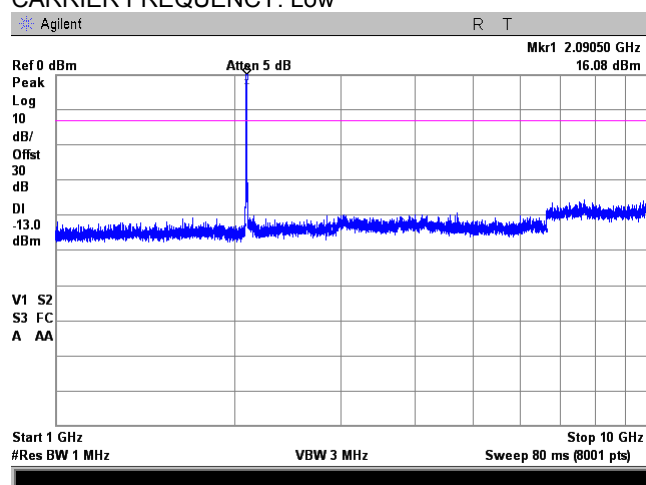
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.4 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency

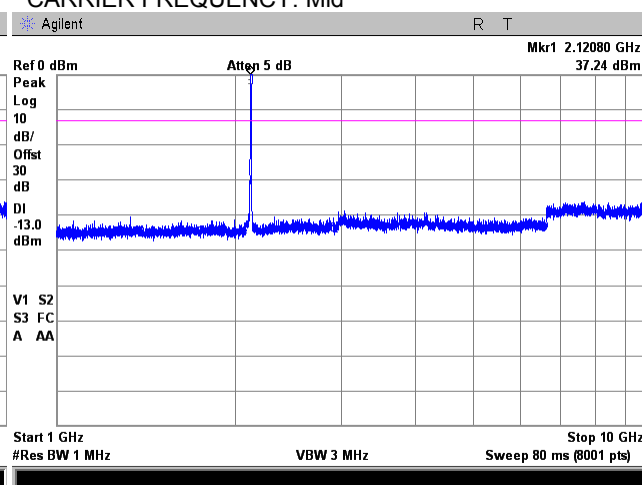
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

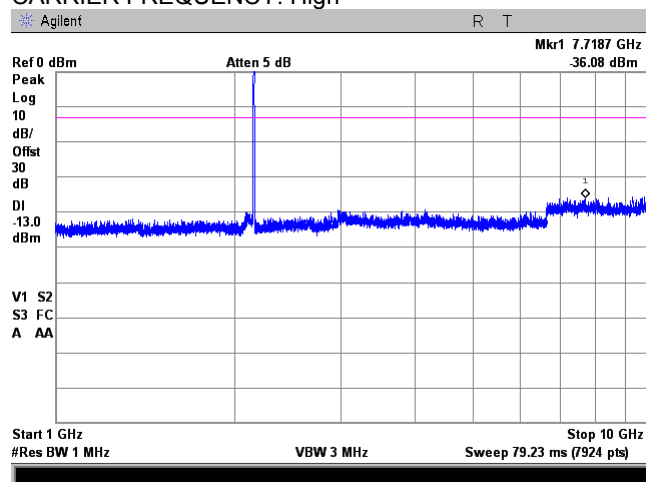
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



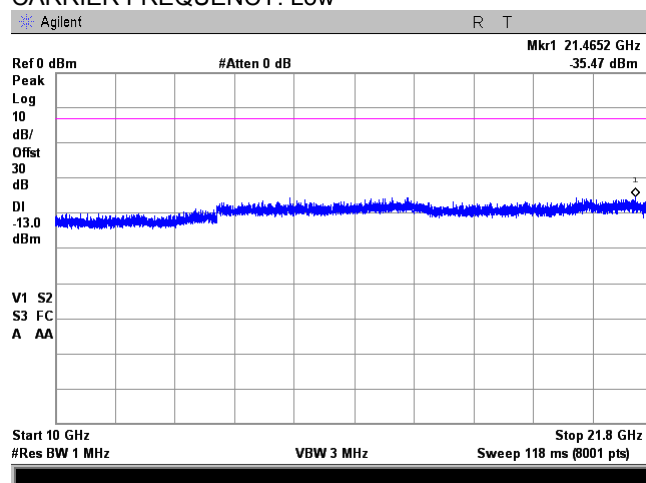
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.5 Spurious emission measurements in 10000 - 21800 MHz range at low carrier frequency

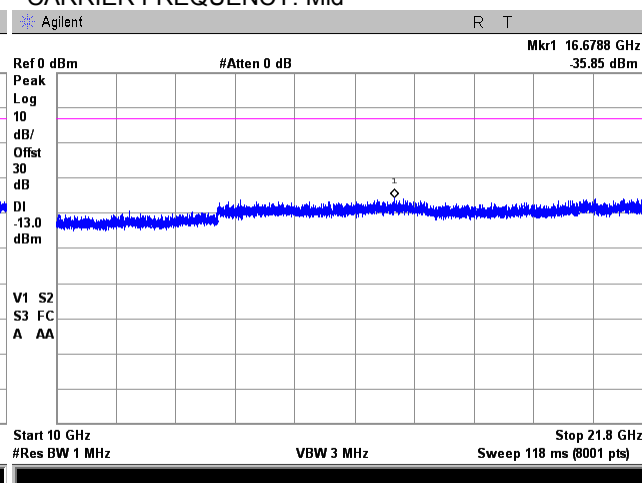
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

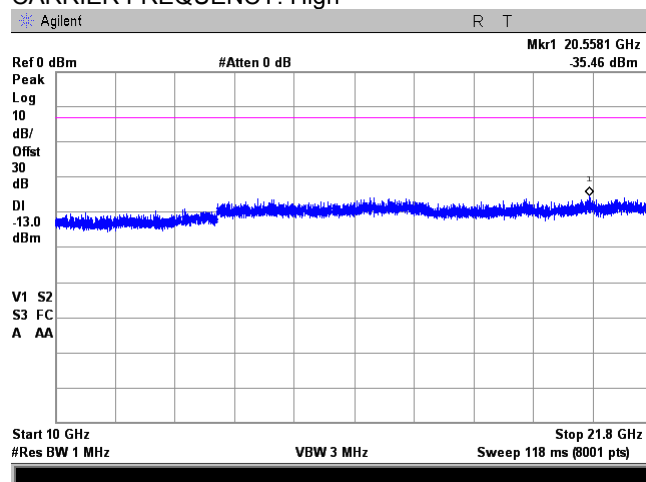
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



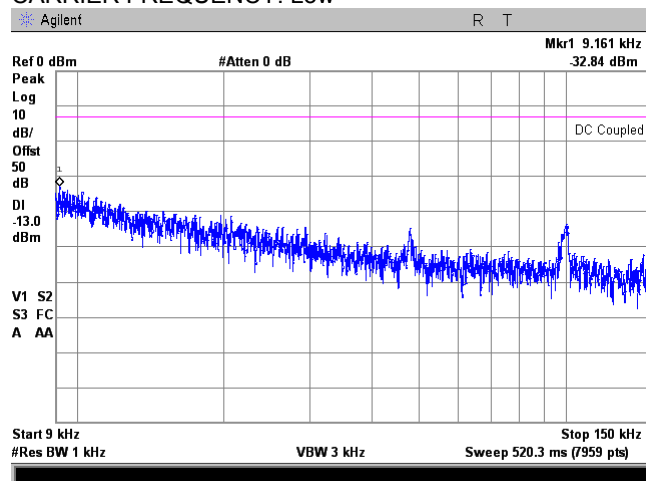
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.6 Spurious emission measurements in 9 - 150 kHz range at carrier frequency

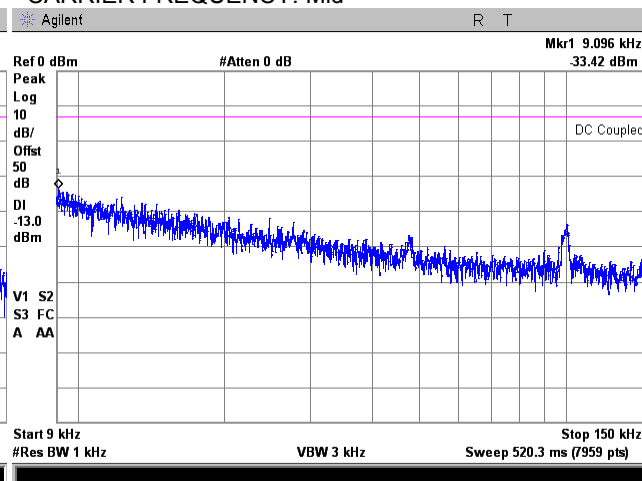
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
WCDMA downlink transmit
Base
Maximum gain
Below AGC level

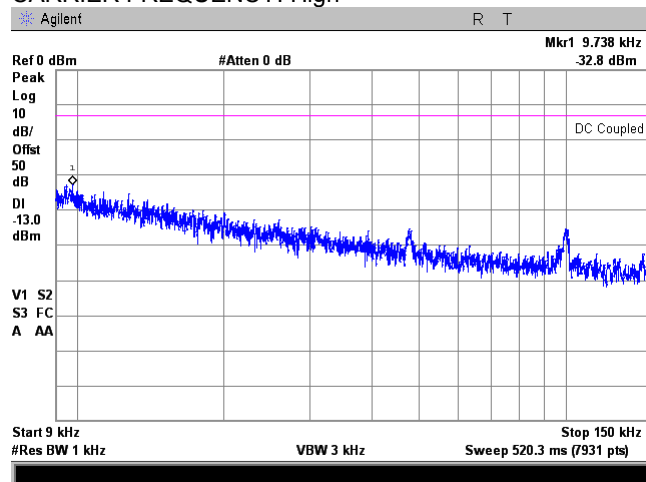
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

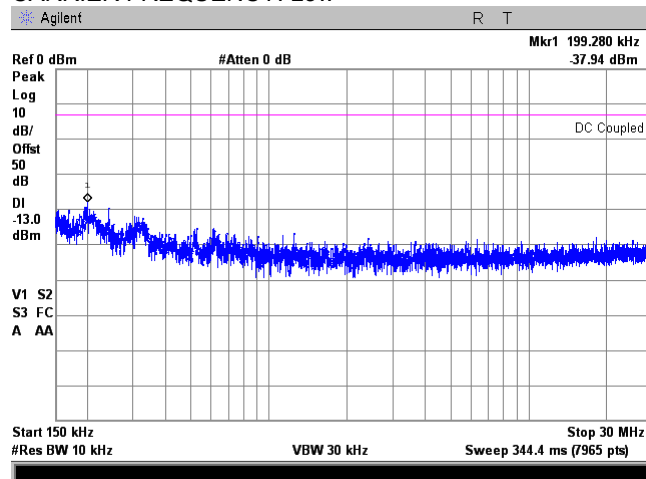


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

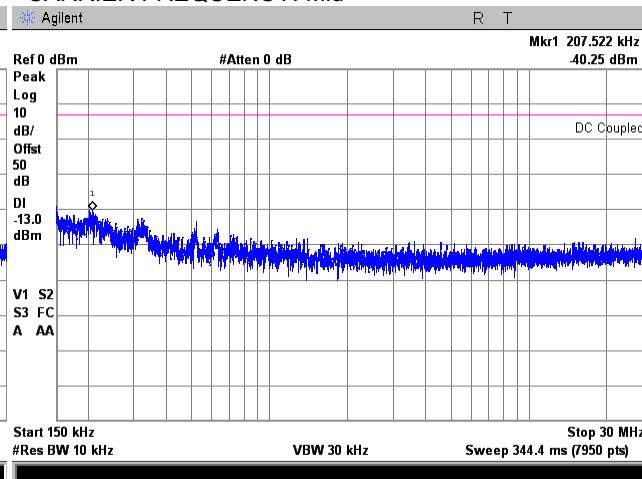
Plot 7.6.7 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

FREQUENCY RANGE: 2110.0 – 2180.0 MHz
 OPERATIONAL MODE: WCDMA downlink transmit
 INPUT PORT: Base
 CONFIGURATION: Maximum gain
 INPUT POWER: Below AGC level

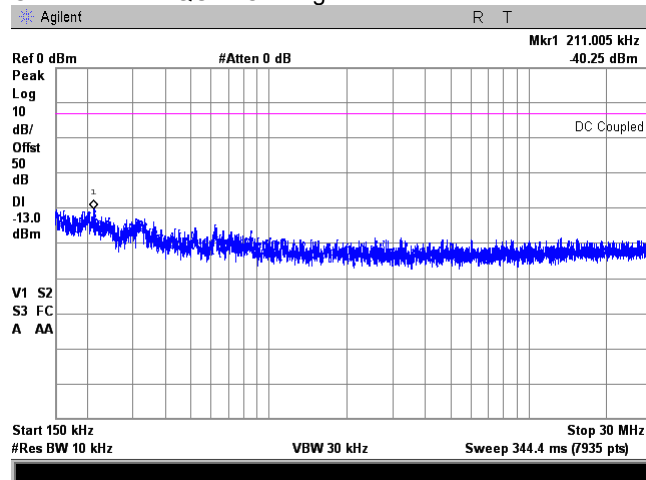
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

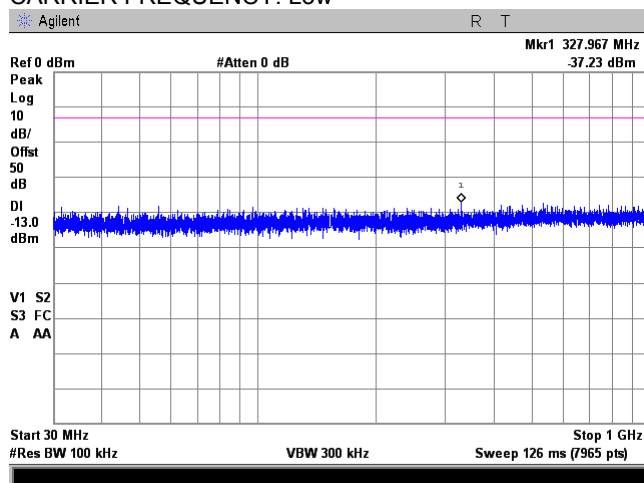


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

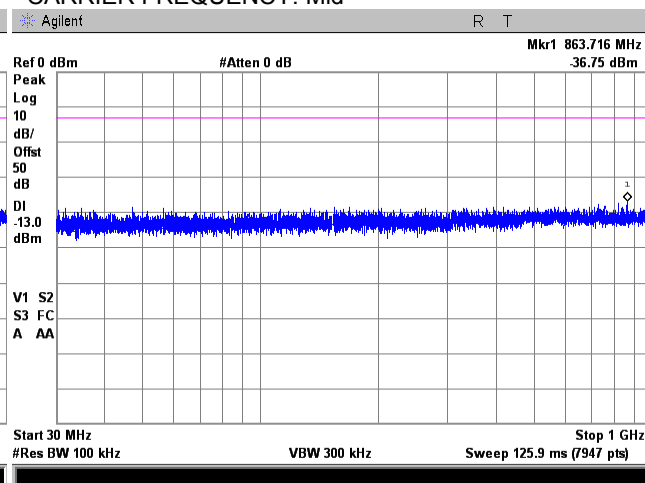
Plot 7.6.8 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

FREQUENCY RANGE: 2110.0 – 2180.0 MHz
 OPERATIONAL MODE: WCDMA downlink transmit
 INPUT PORT: Base
 CONFIGURATION: Maximum gain
 INPUT POWER: Below AGC level

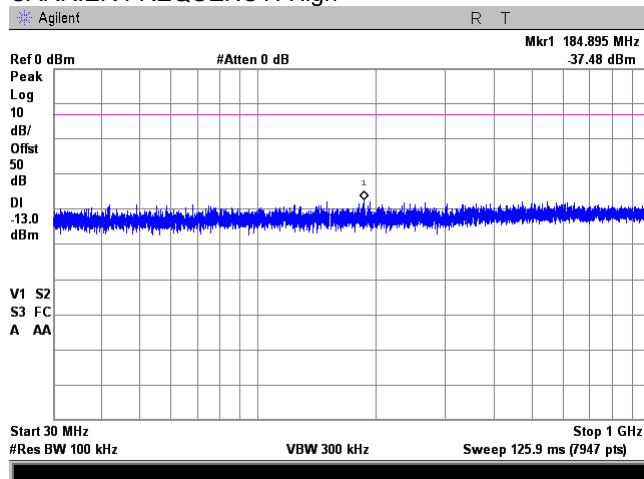
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



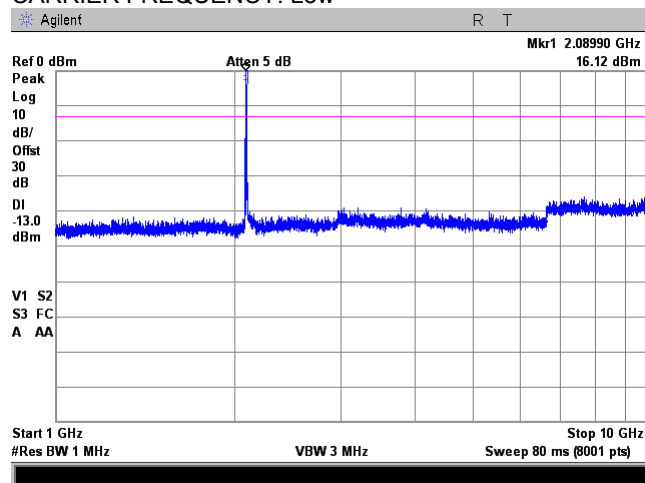
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.9 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency

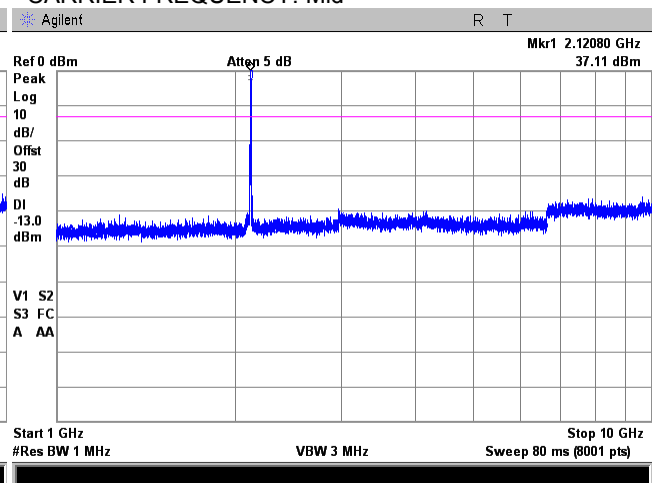
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
WCDMA downlink transmit
Base
Maximum gain
Below AGC level

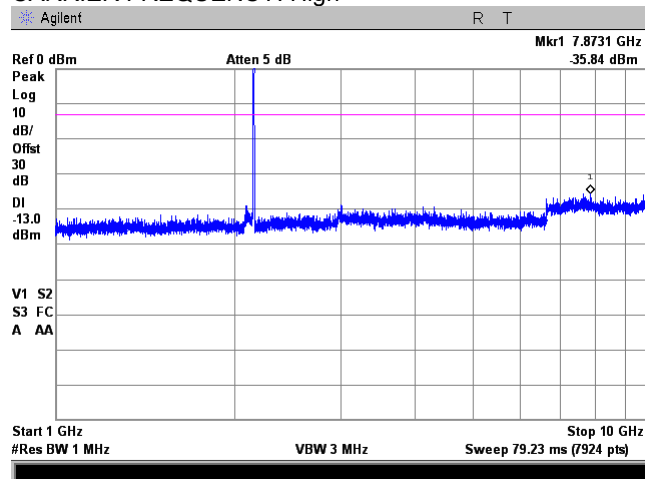
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



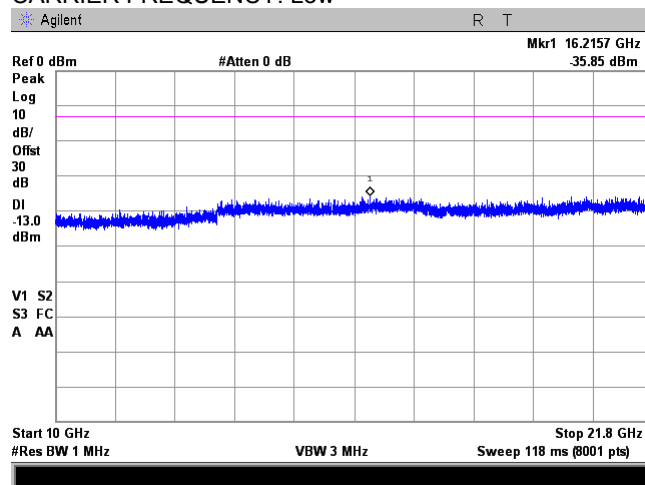
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.10 Spurious emission measurements in 10000 - 21800 MHz range at low carrier frequency

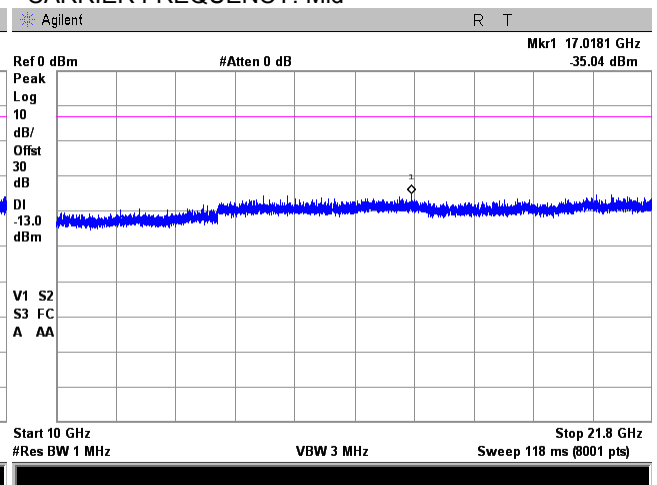
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
WCDMA downlink transmit
Base
Maximum gain
Below AGC level

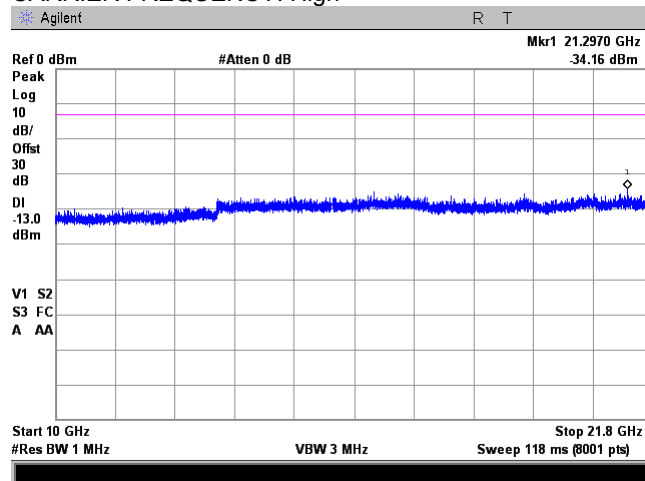
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

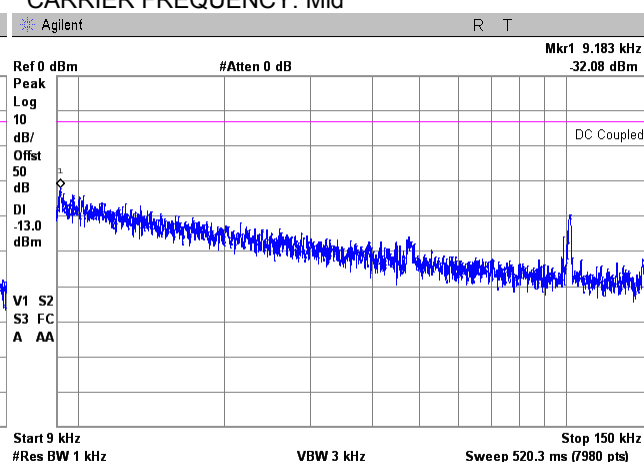
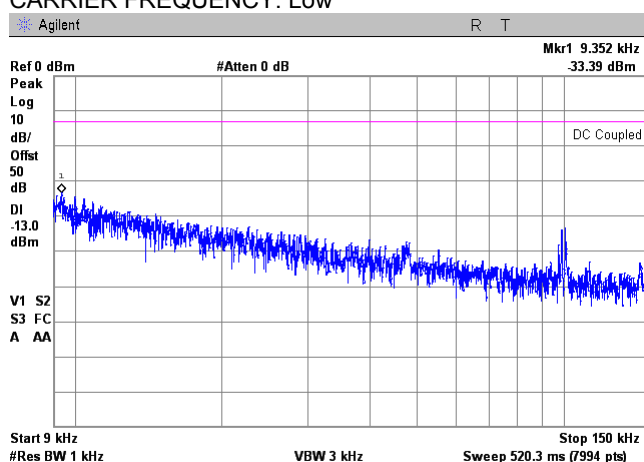


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

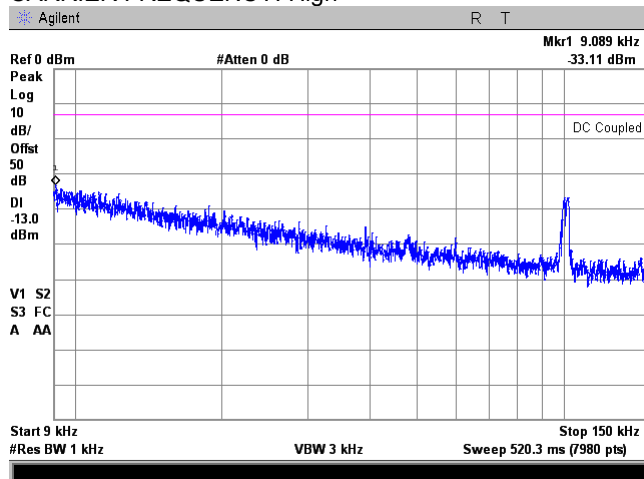
Plot 7.6.11 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:
CARRIER FREQUENCY: Low

2110.0 – 2180.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level
CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



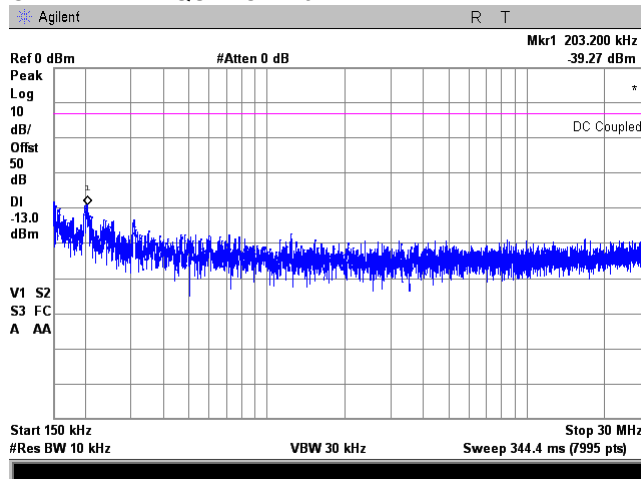
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.12 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

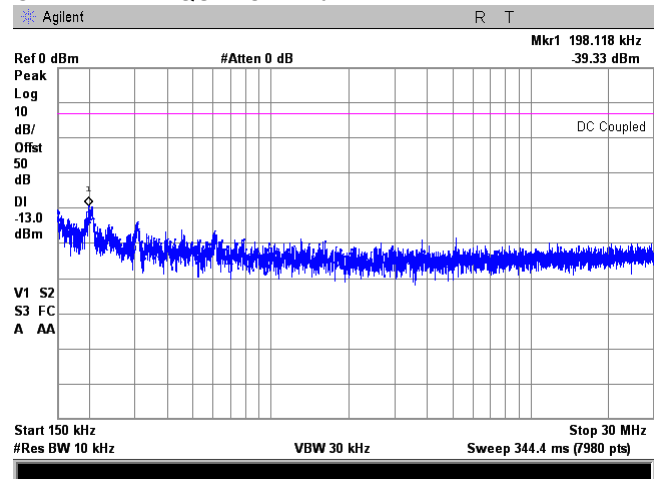
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

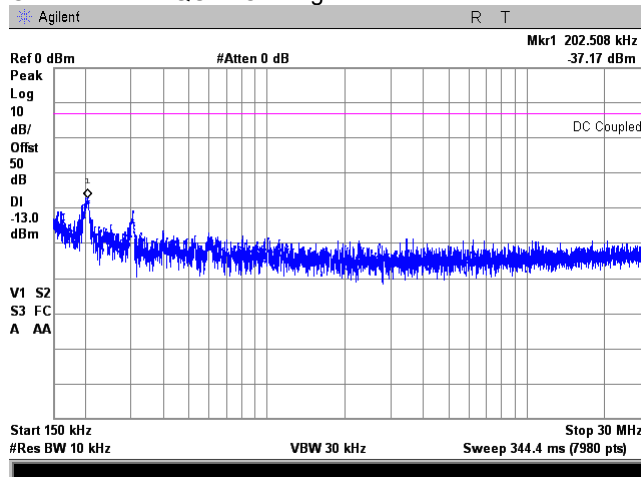
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



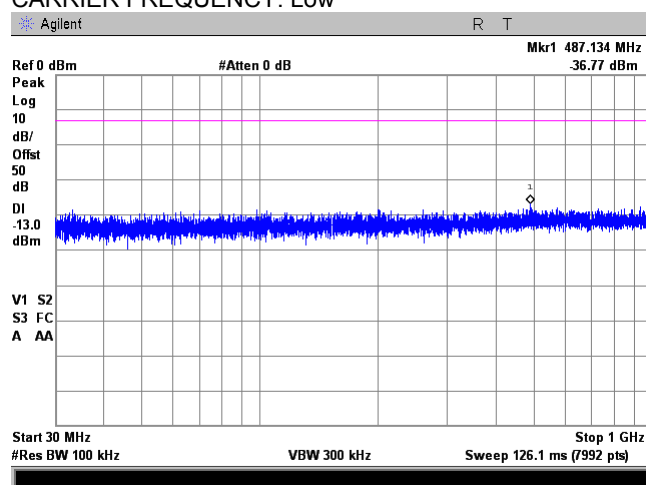
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.13 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency

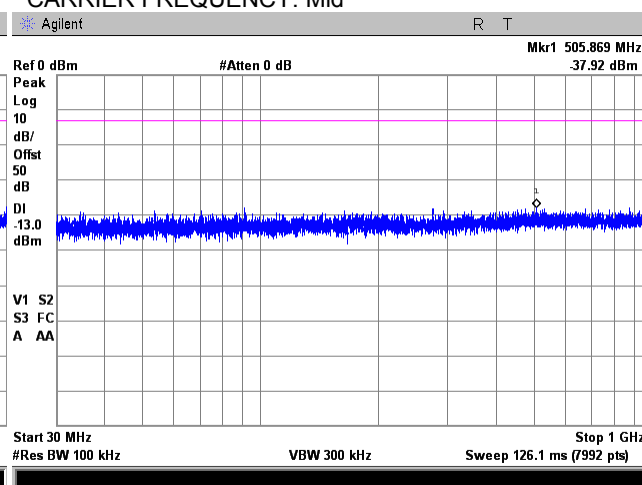
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

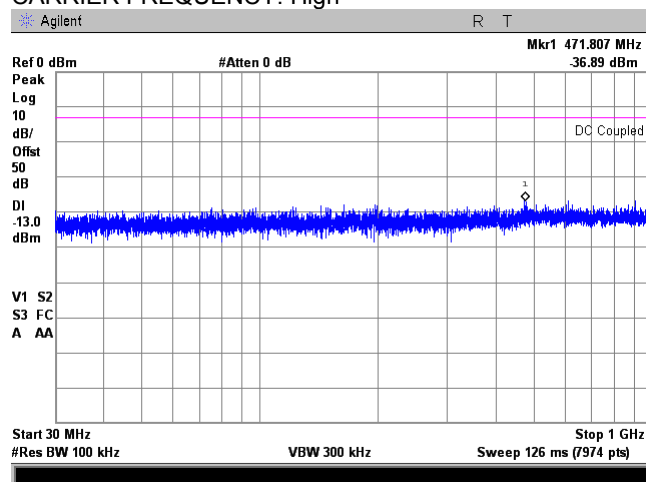
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



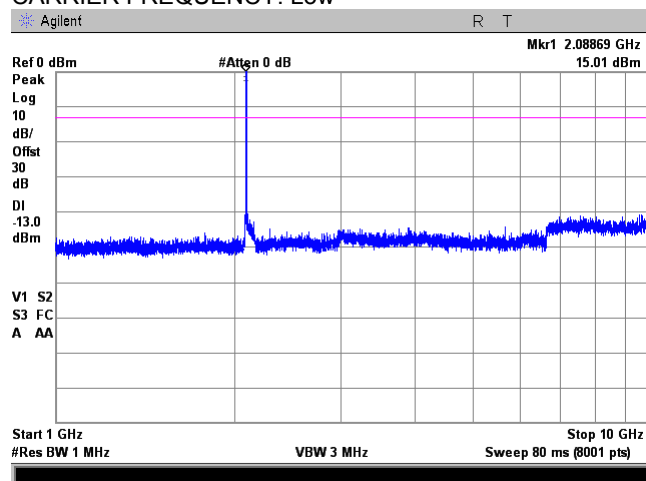
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.14 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency

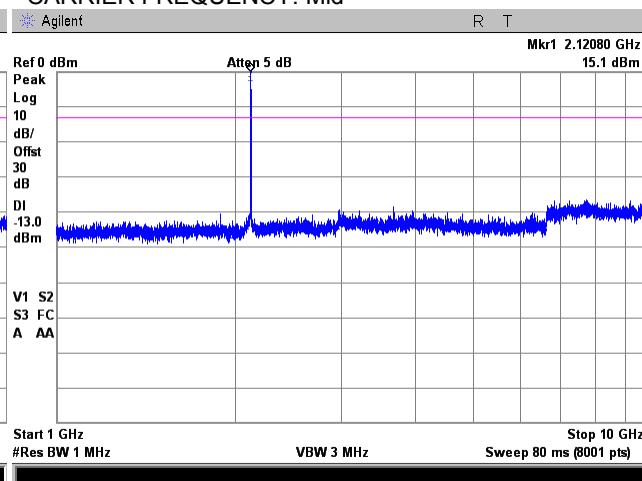
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

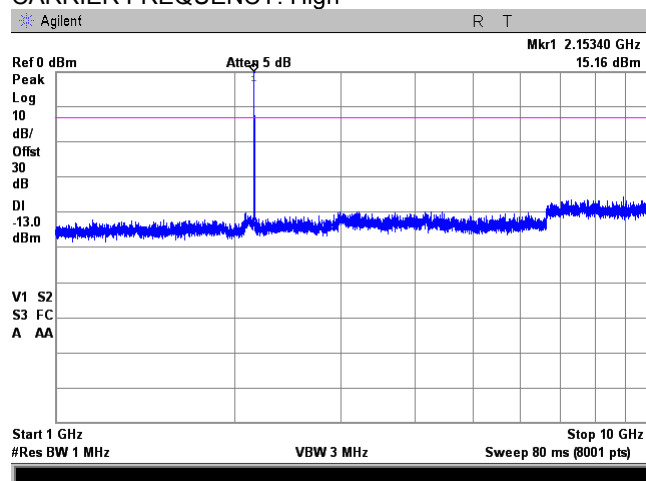
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



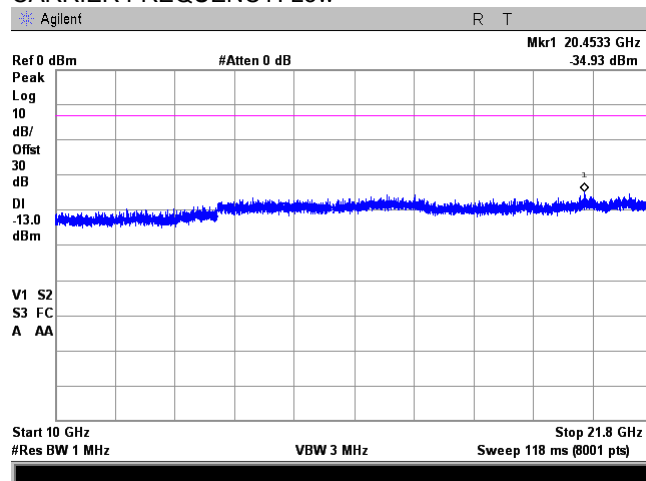
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.15 Spurious emission measurements in 10000 - 21800 MHz range at low carrier frequency

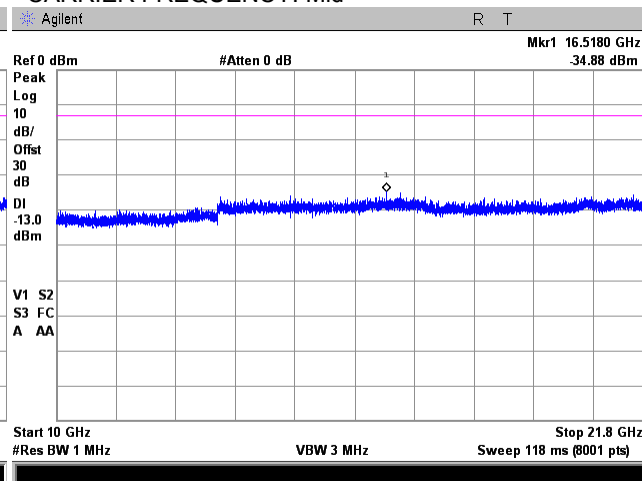
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

2110.0 – 2180.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

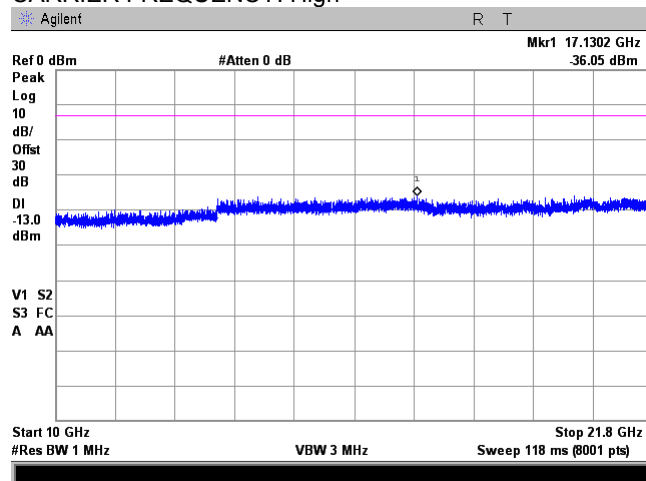
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



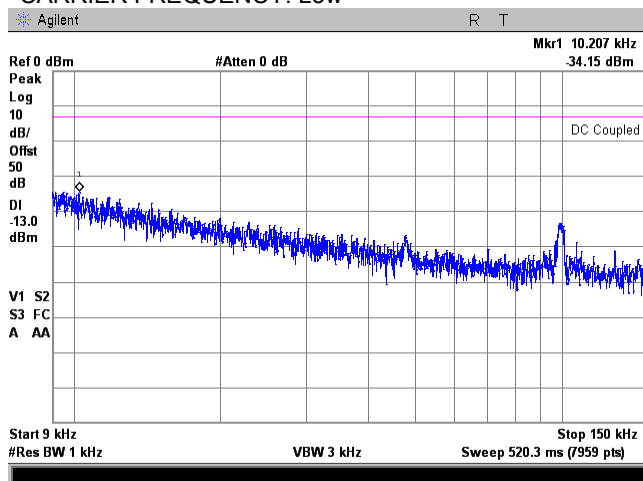
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.16 Spurious emission measurements in 9 - 150 kHz range at carrier frequency

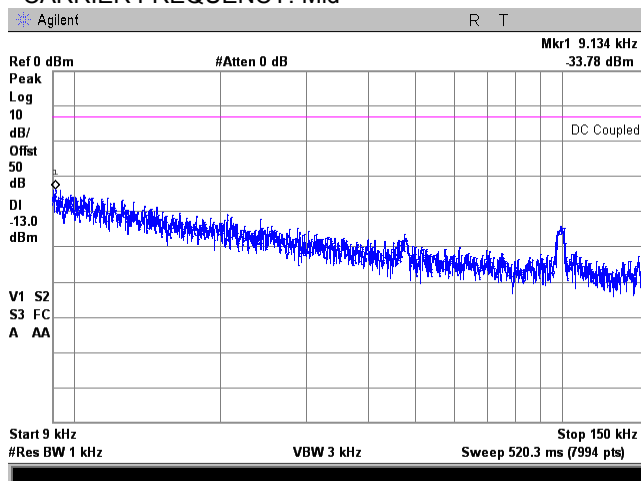
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

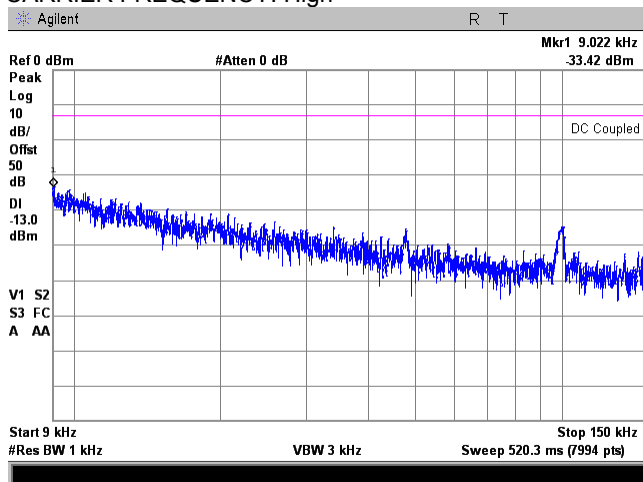
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



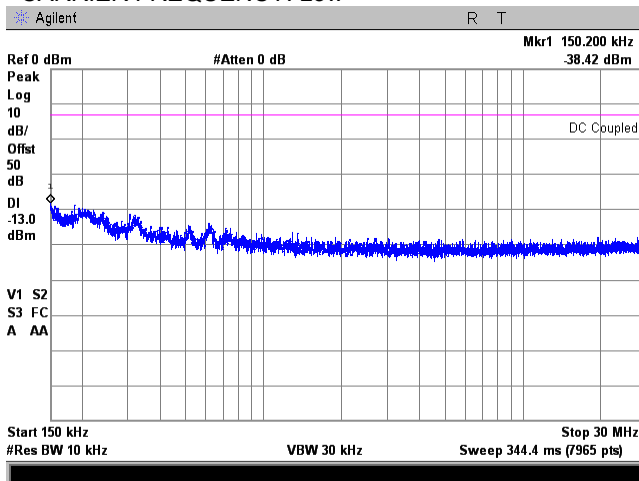
Test specification:		Section 27.53, Spurious emissions conducted measurements	
Test procedure:		47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3	
Test mode:		Verdict: PASS	
Date(s):			
06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.17 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

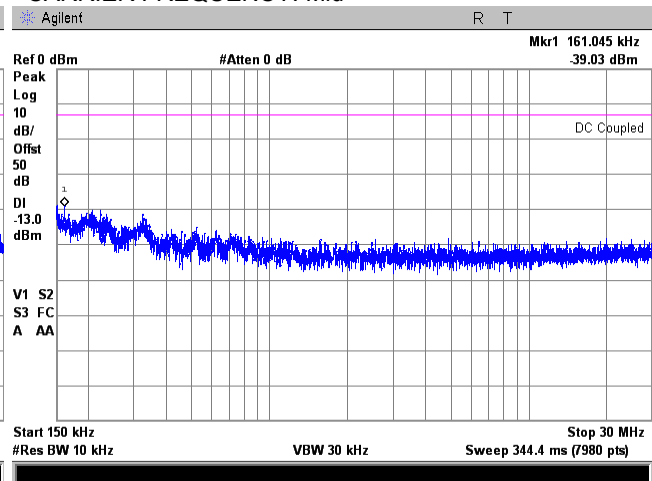
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

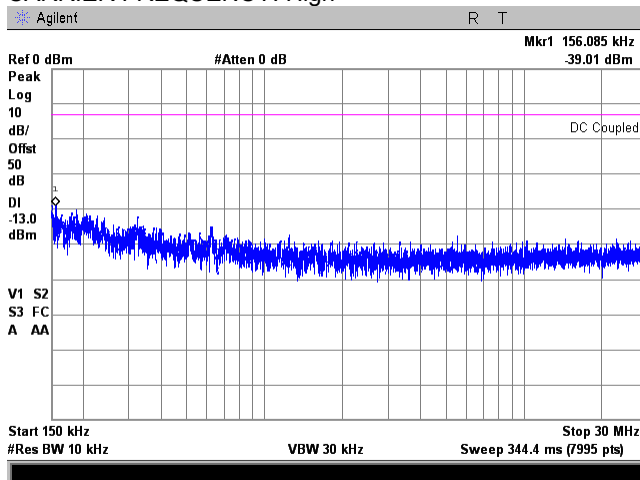
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



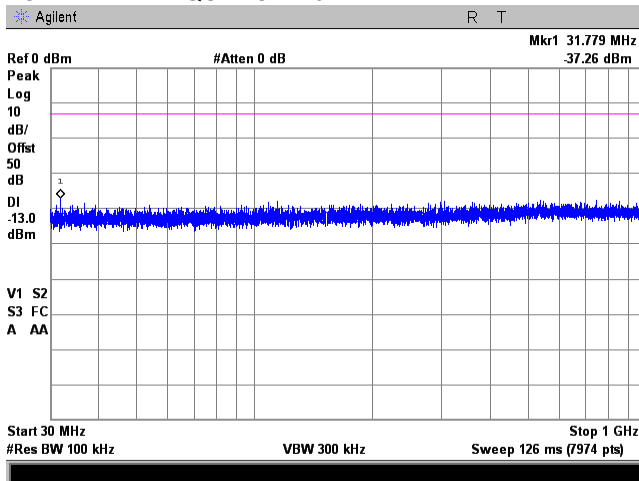
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.18 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

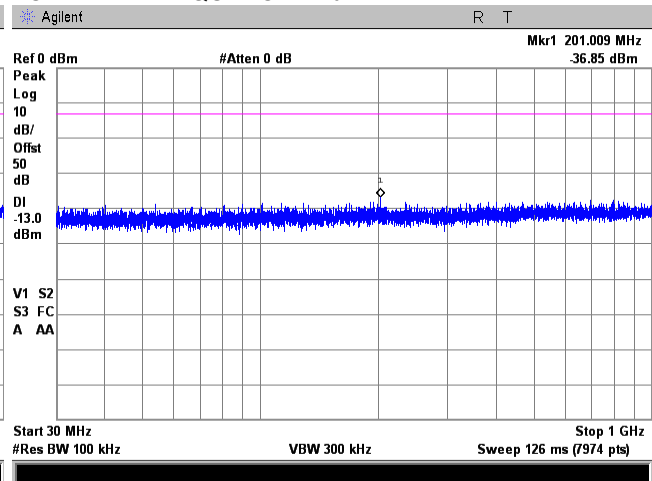
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

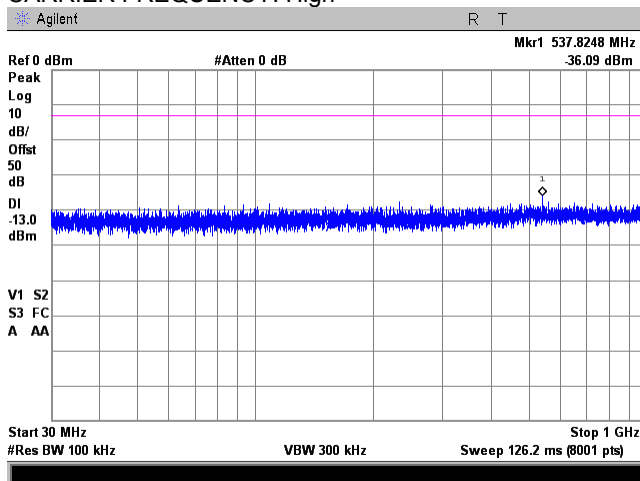
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



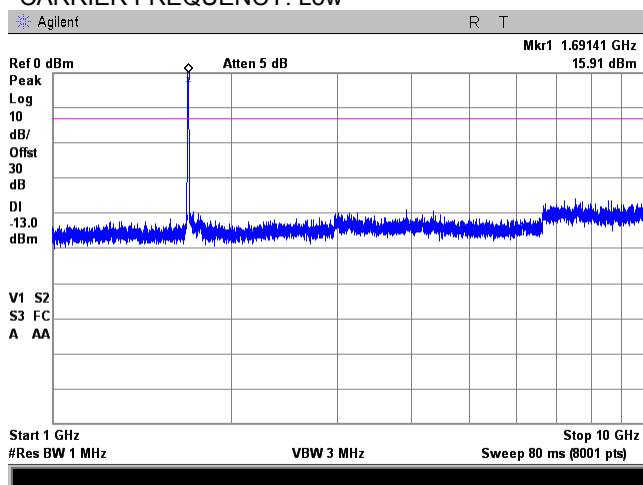
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.19 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency

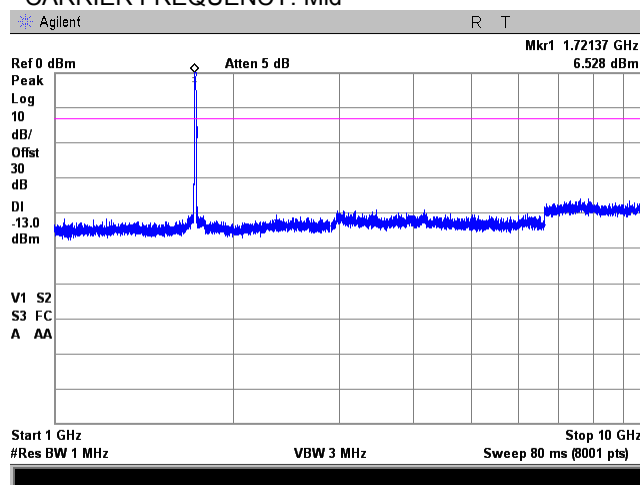
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

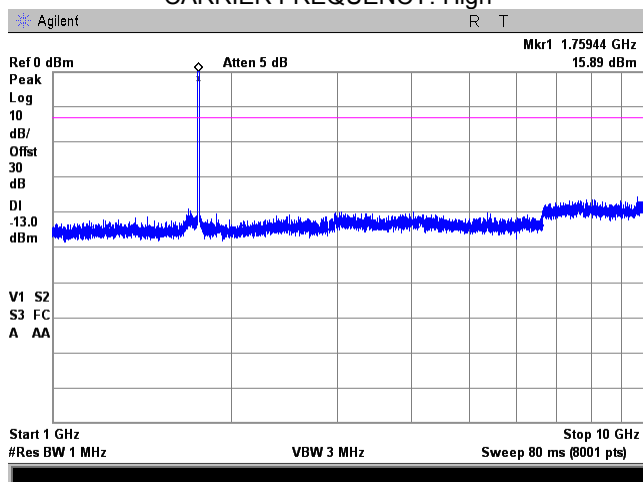
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



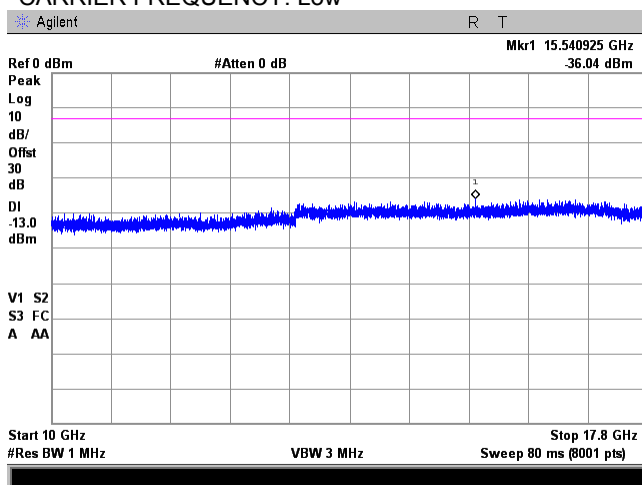
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.20 Spurious emission measurements in 10000 - 17800 MHz range at low carrier frequency

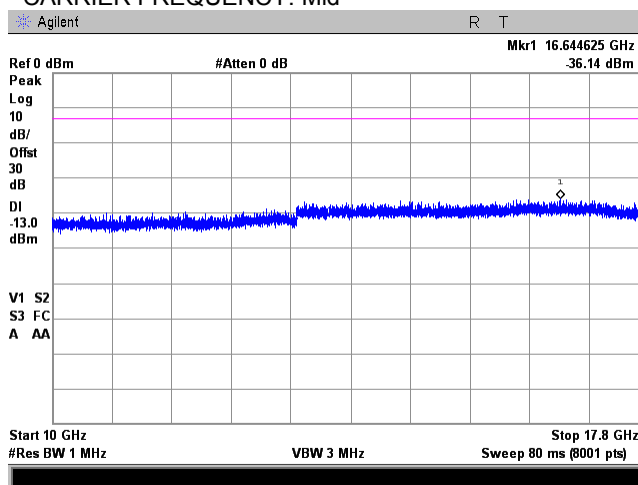
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

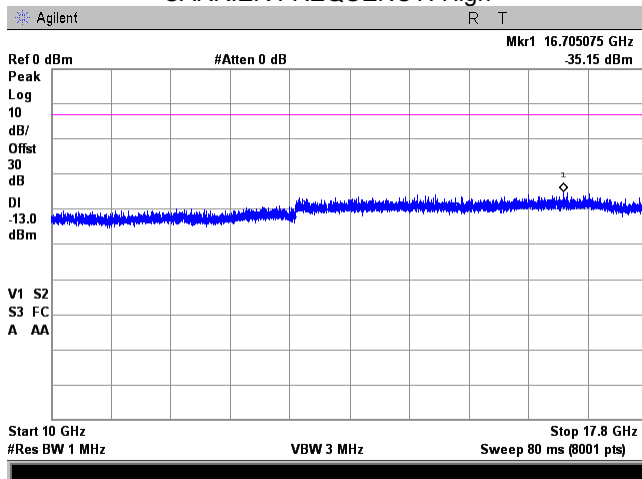
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



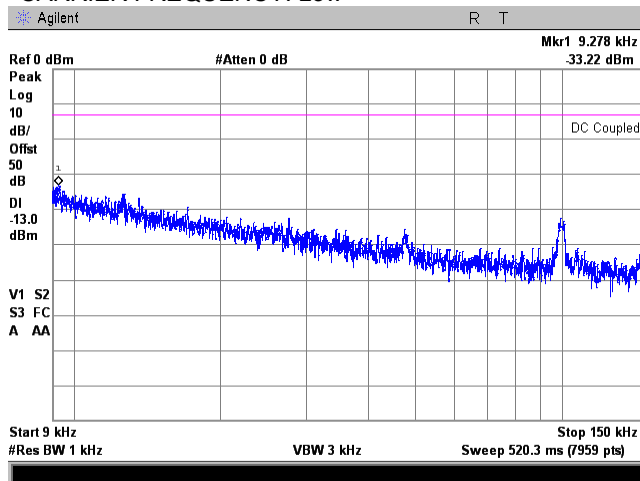
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.21 Spurious emission measurements in 9 - 150 kHz range at carrier frequency

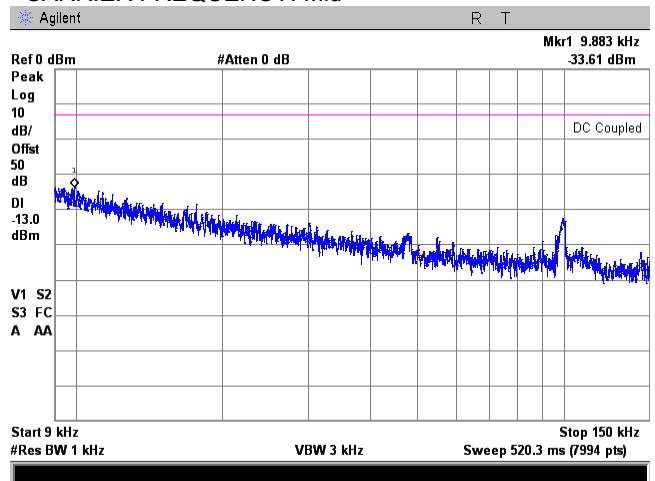
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
WCDMA uplink transmit
Mobile
Maximum gain
Below AGC level

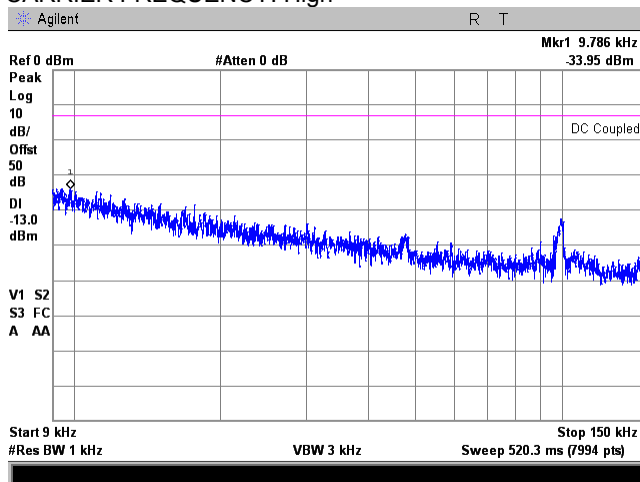
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



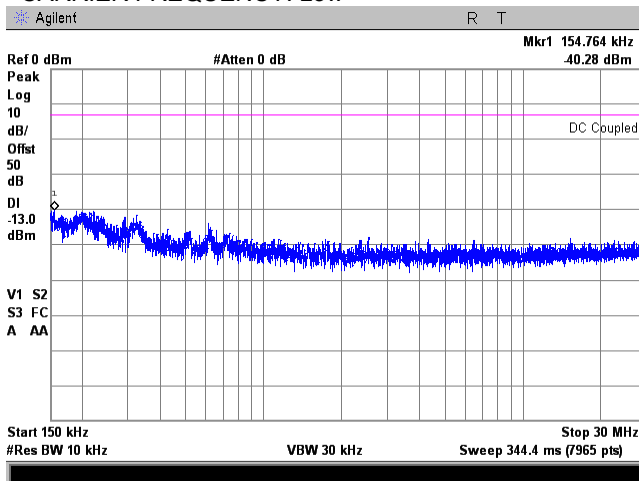
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.22 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

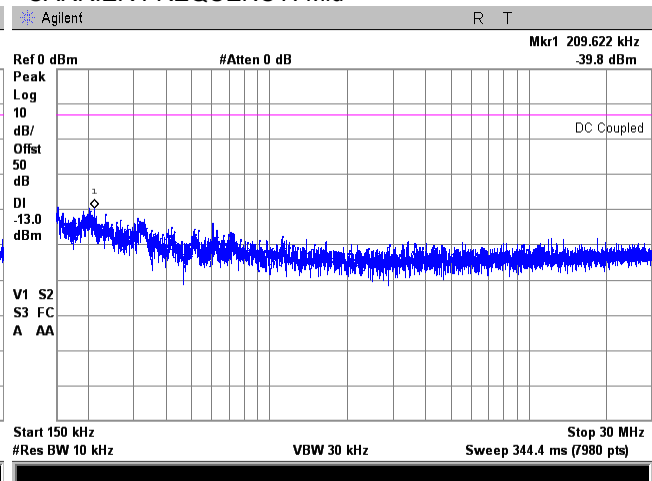
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
WCDMA uplink transmit
Mobile
Maximum gain
Below AGC level

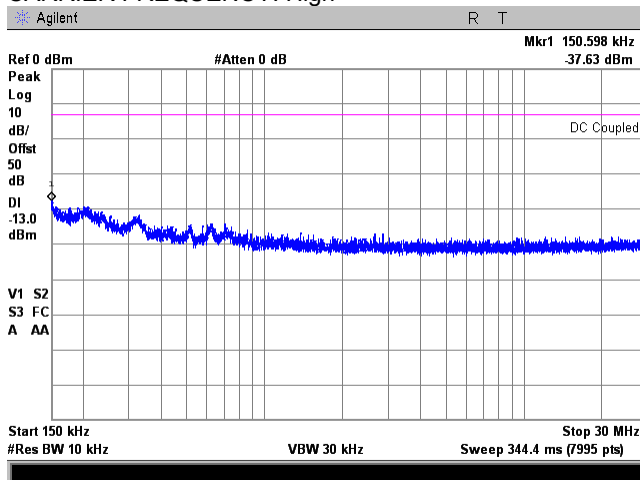
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



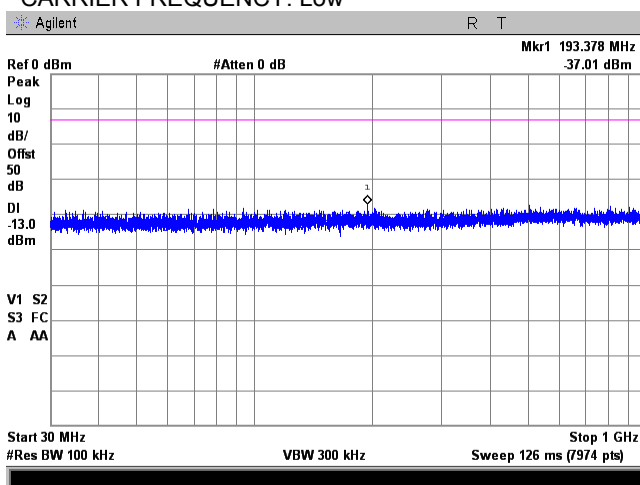
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.23 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

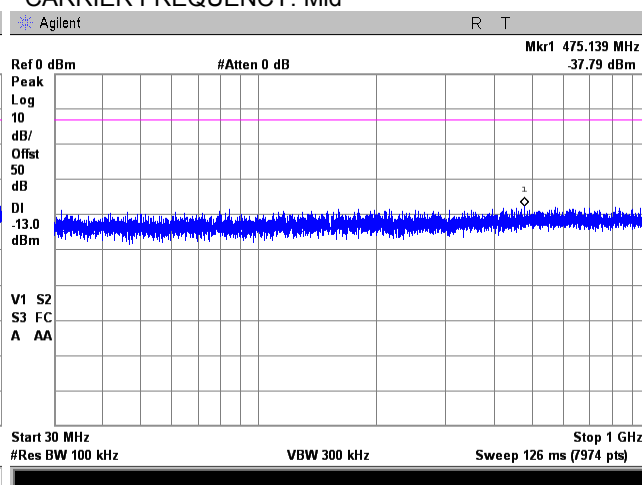
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
WCDMA uplink transmit
Mobile
Maximum gain
Below AGC level

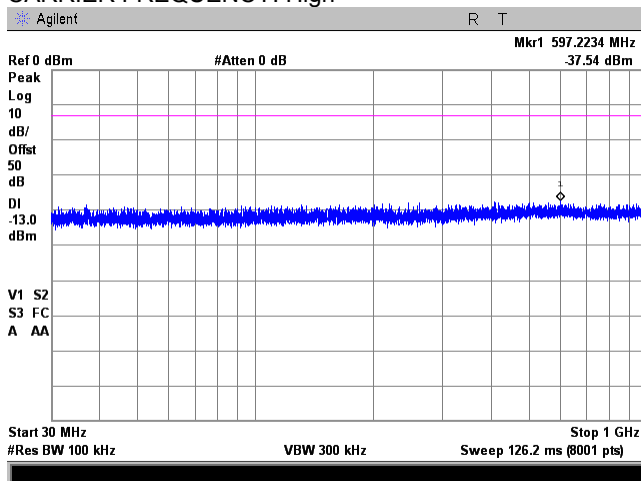
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



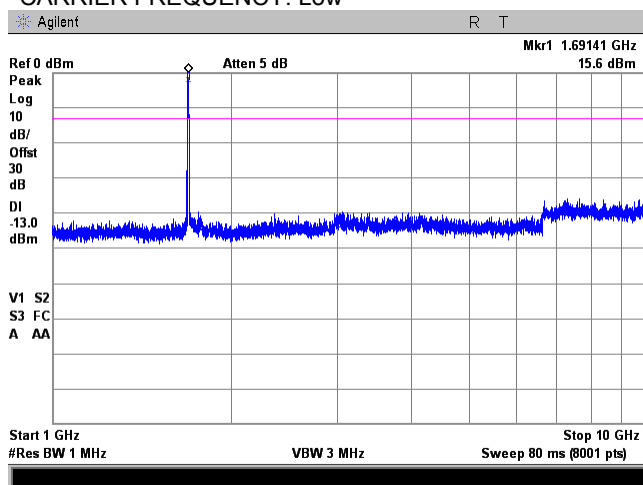
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.24 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency

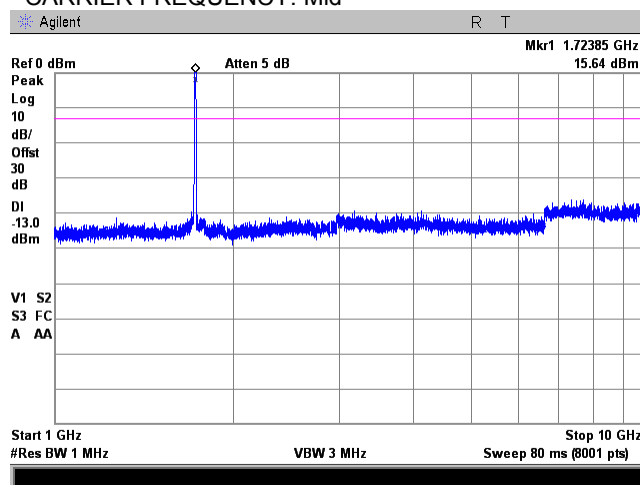
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

817 – 824 MHz
WCDMA uplink transmit
Mobile
Maximum gain
Below AGC level

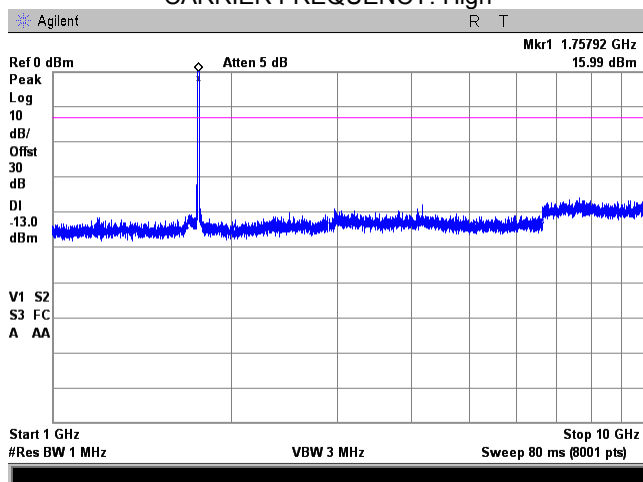
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



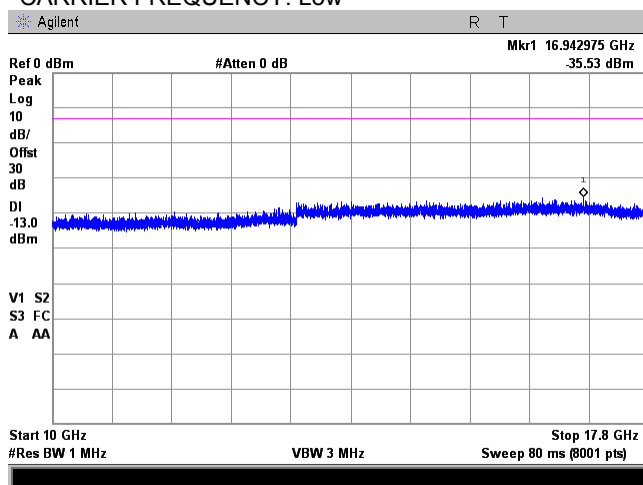
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode:	Compliance	Verdict: PASS	
Date(s):	06-Apr-17 - 10-Apr-17		
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.25 Spurious emission measurements in 10000 - 17800 MHz range at low carrier frequency

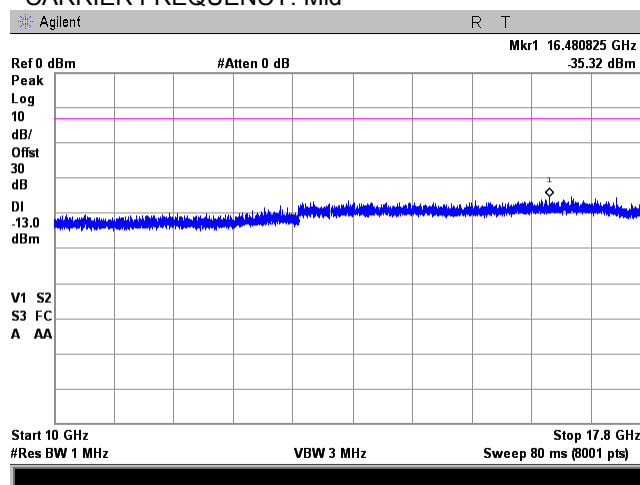
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

817 – 824 MHz
WCDMA uplink transmit
Mobile
Maximum gain
Below AGC level

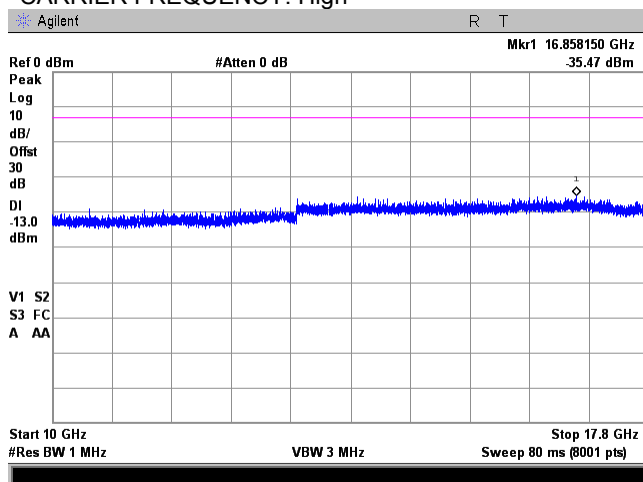
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

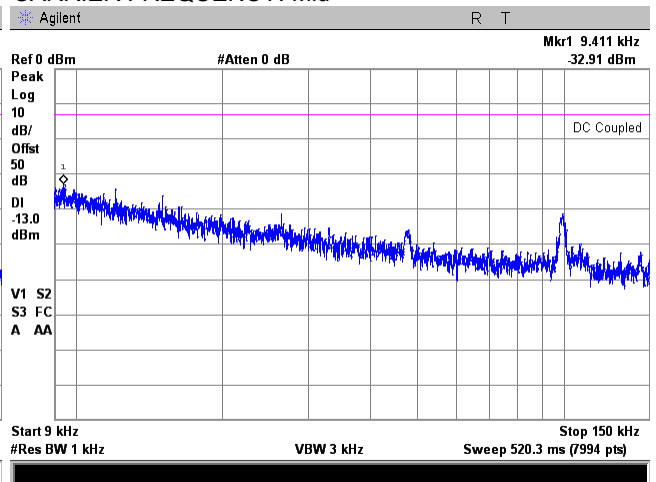
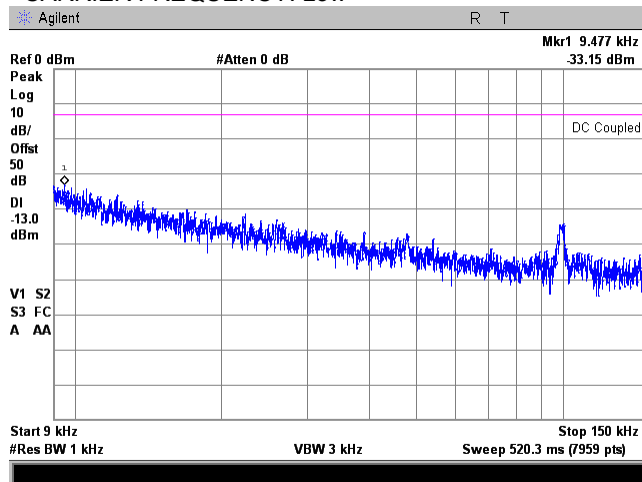
Plot 7.6.26 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

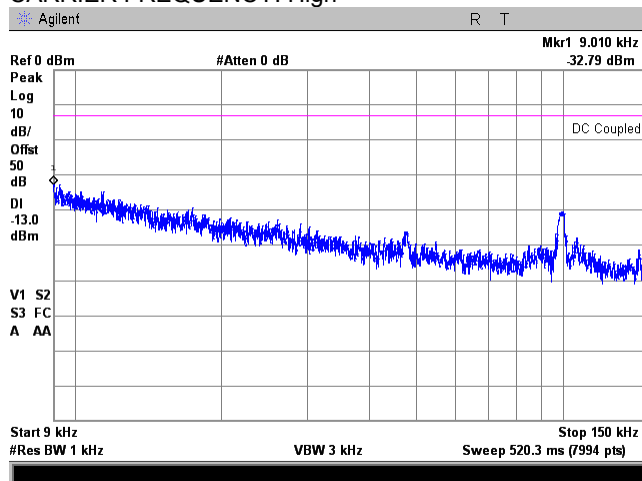
1710.0 – 1780.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

CARRIER FREQUENCY: Low

CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



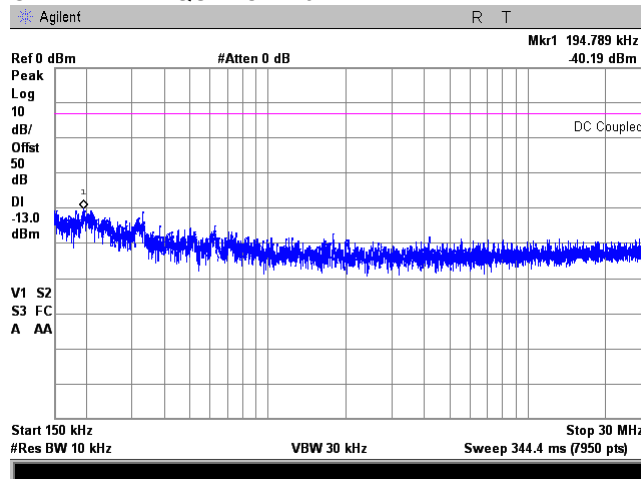
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.27 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

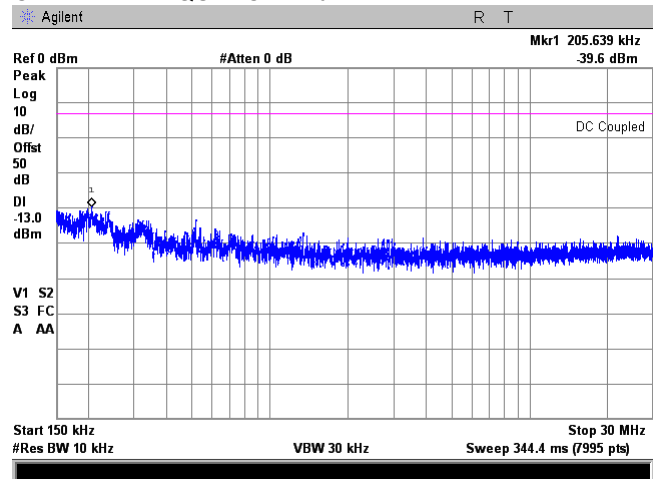
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

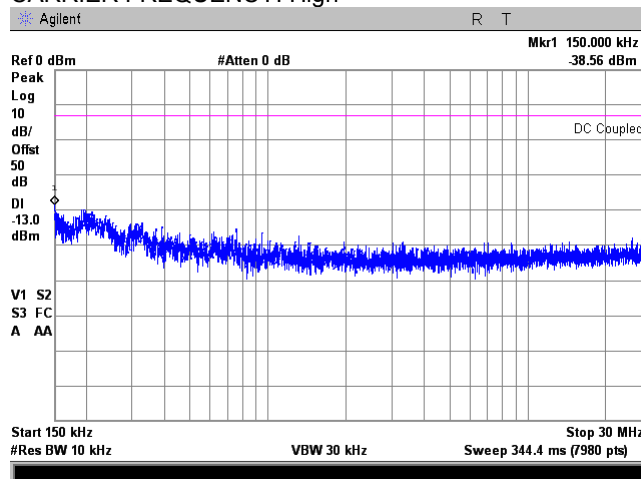
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

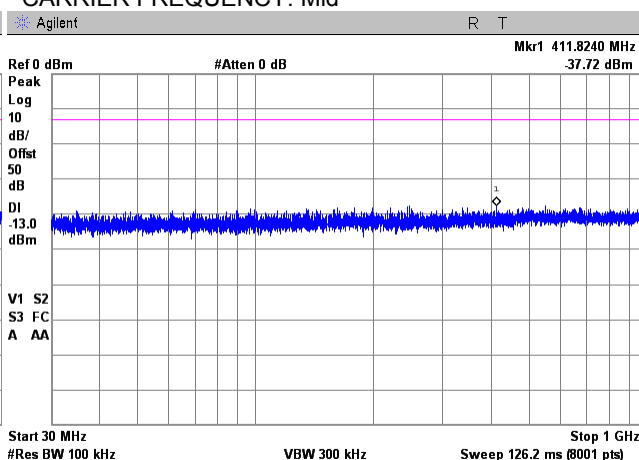
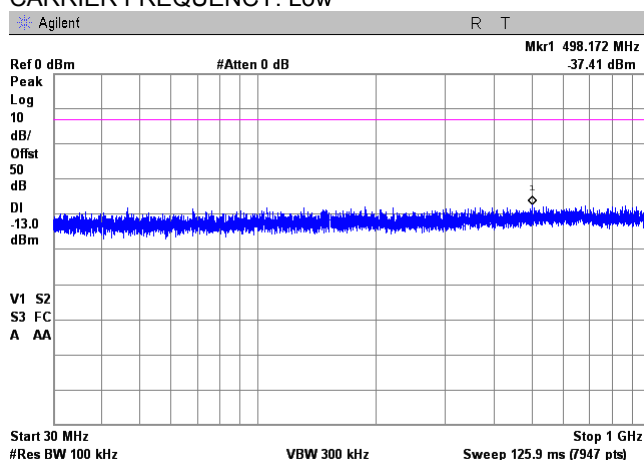


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

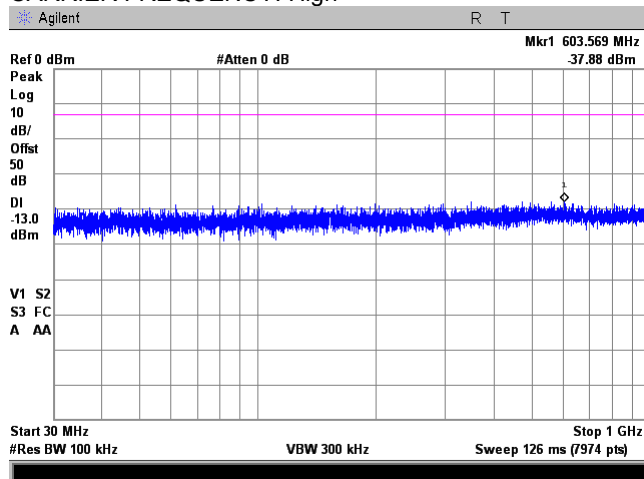
Plot 7.6.28 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:
CARRIER FREQUENCY: Low

1710.0 – 1780.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level
CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



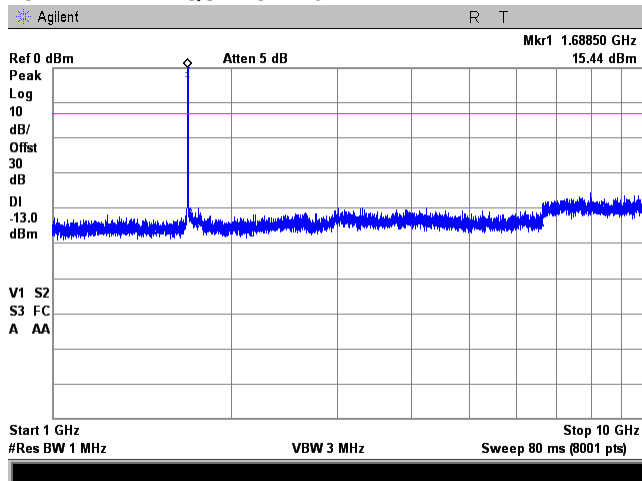
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.29 Spurious emission measurements in 1000 - 10000 MHz range at low carrier frequency

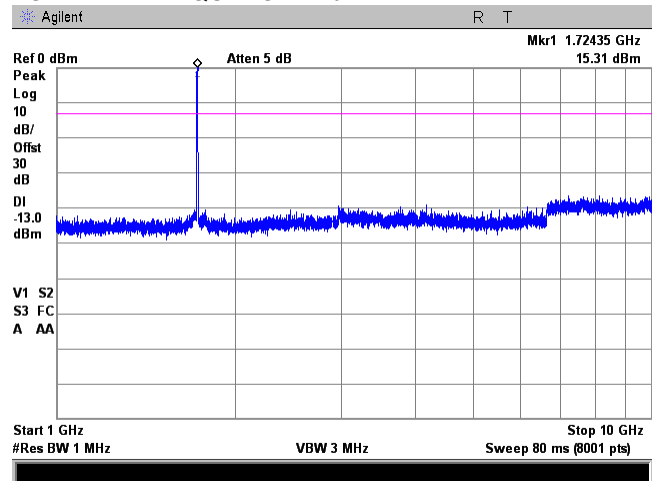
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

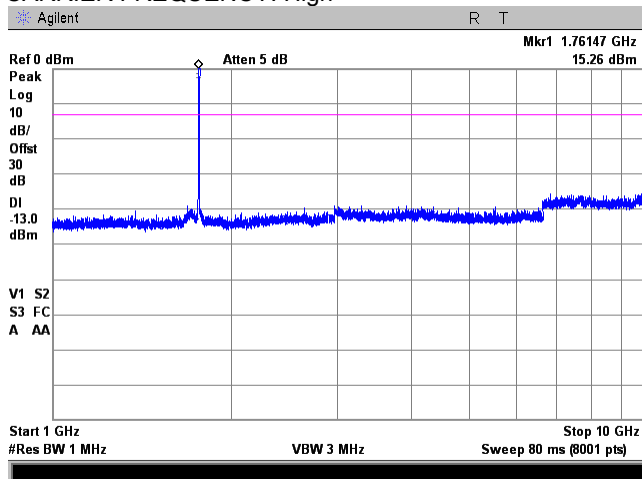
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



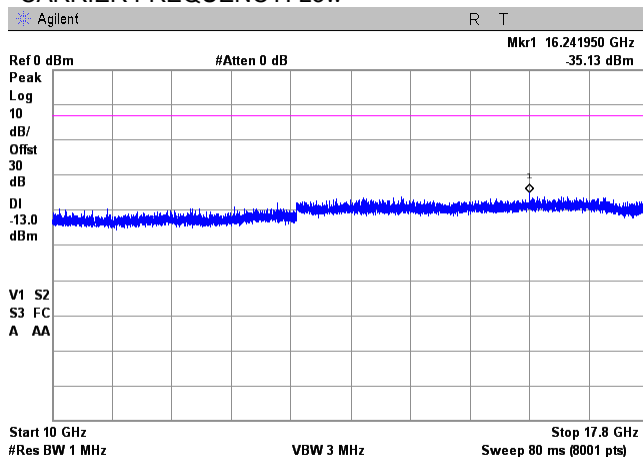
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.30 Spurious emission measurements in 10000 - 17800 MHz range at low carrier frequency

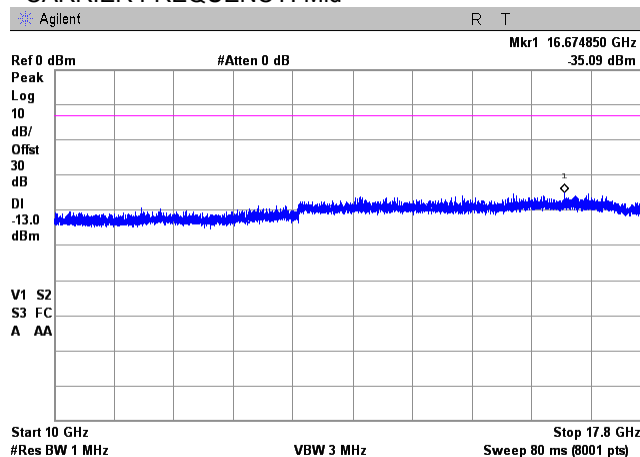
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

1710.0 – 1780.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

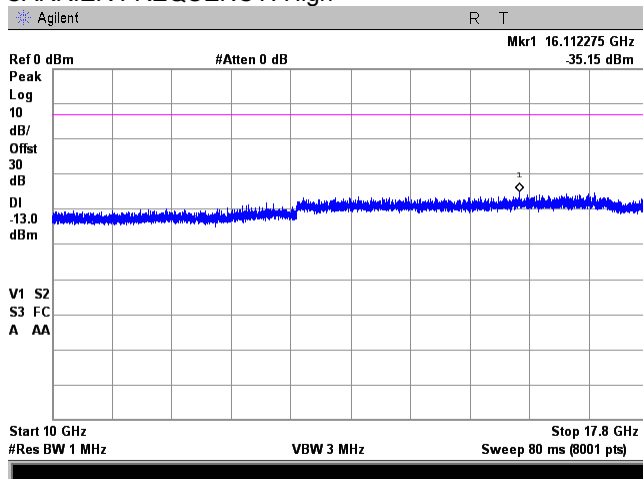
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



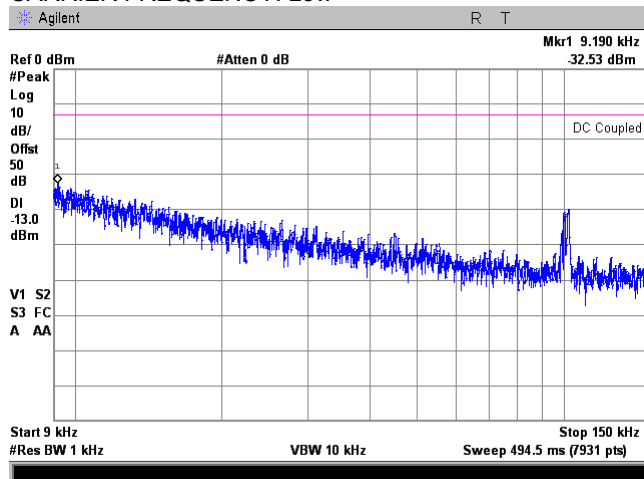
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.31 Spurious emission measurements in 9 - 150 kHz range at carrier frequency

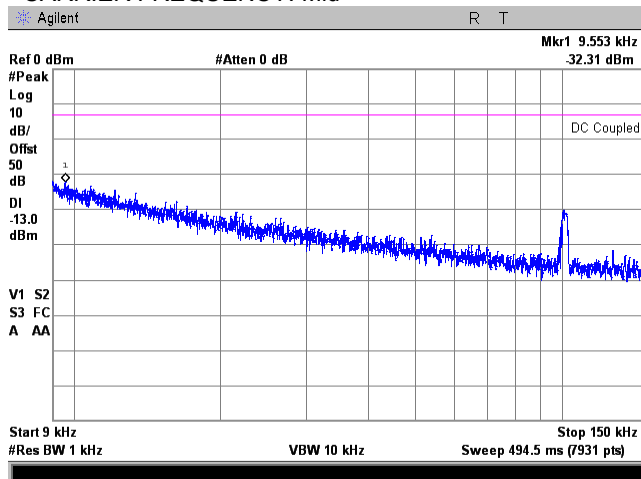
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

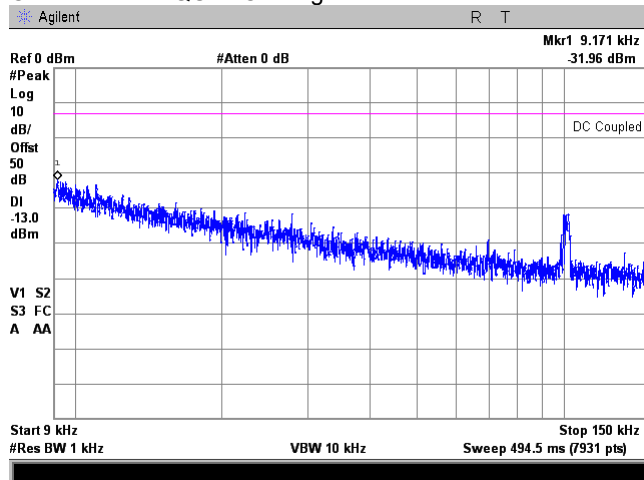
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



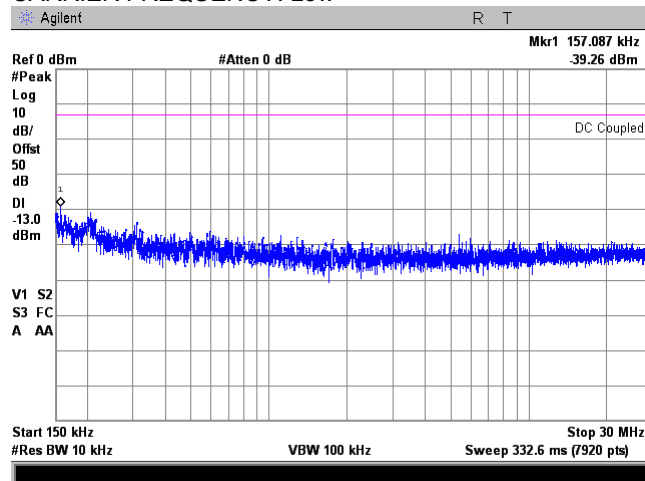
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.32 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

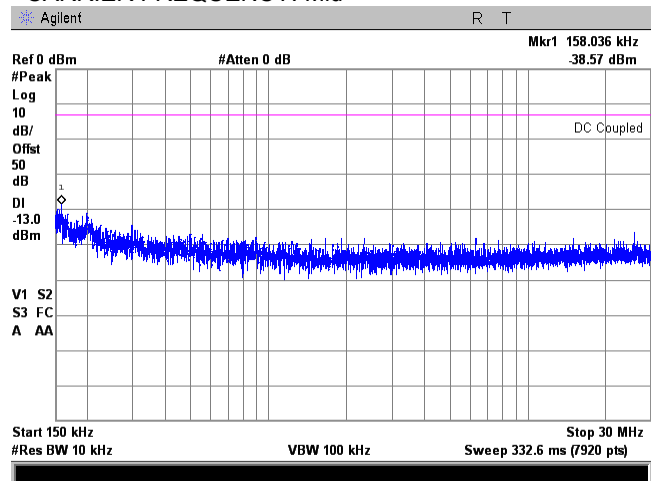
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

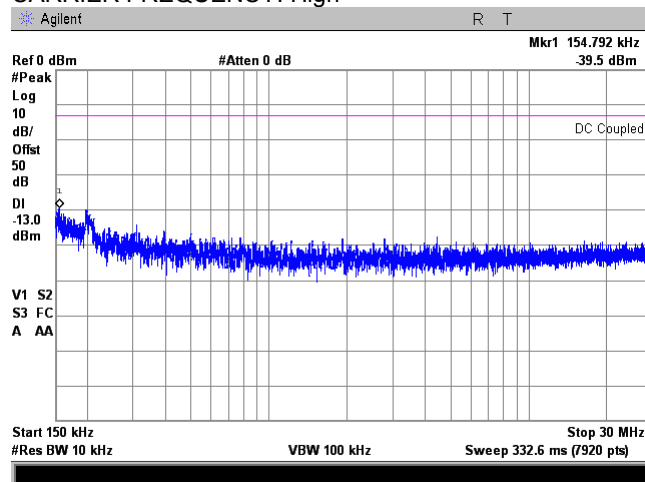
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



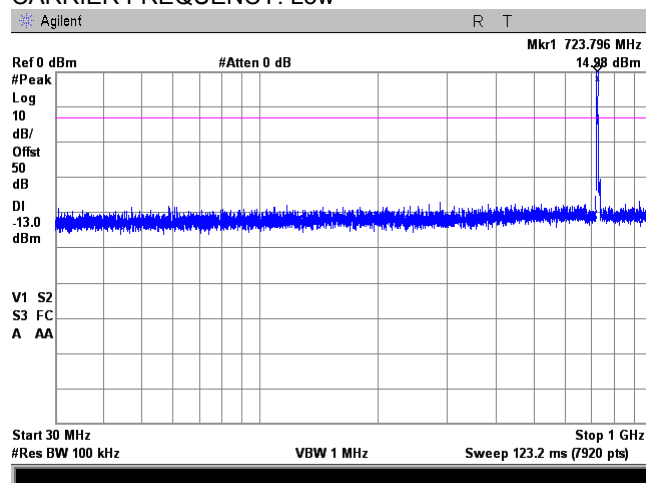
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.33 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

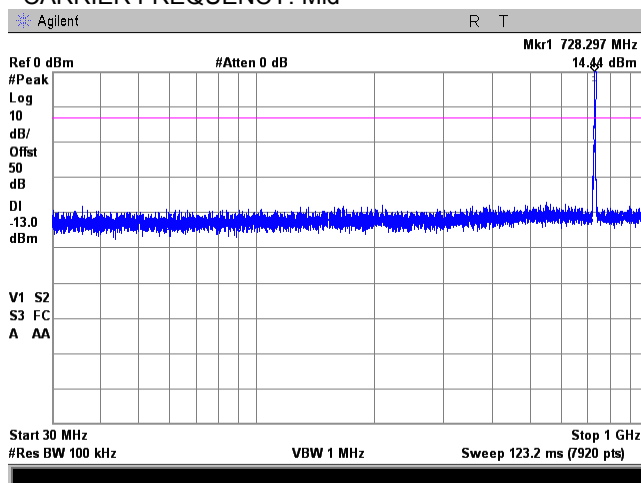
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

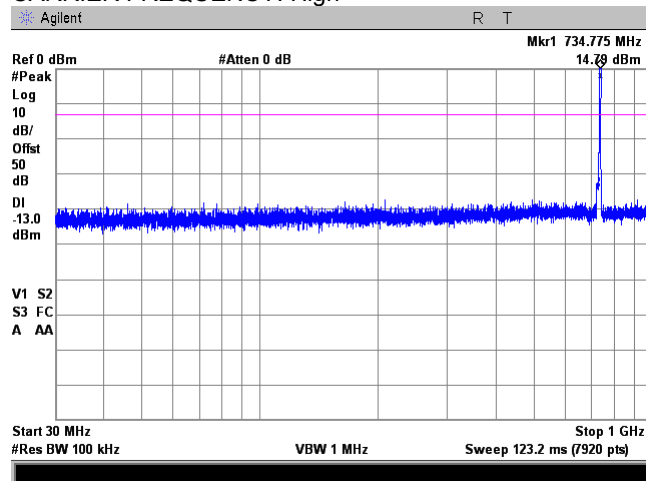
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



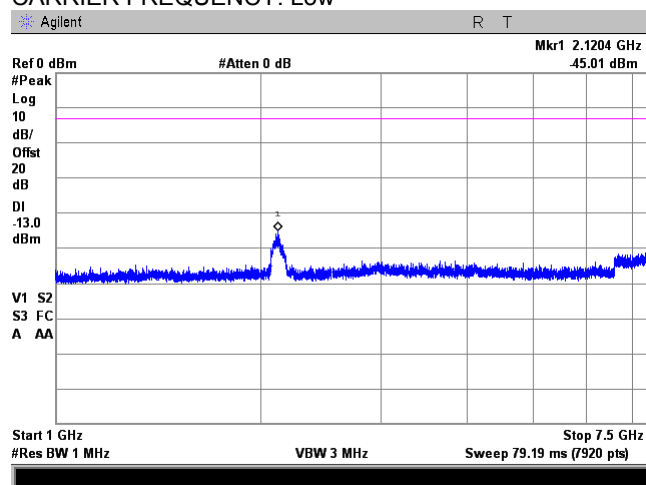
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.34 Spurious emission measurements in 1000 - 7500 MHz range at low carrier frequency

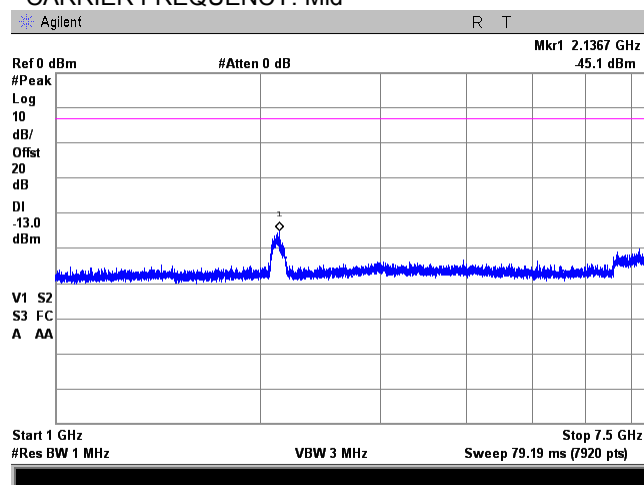
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
AWGN downlink transmit
Base
Maximum gain
Below AGC level

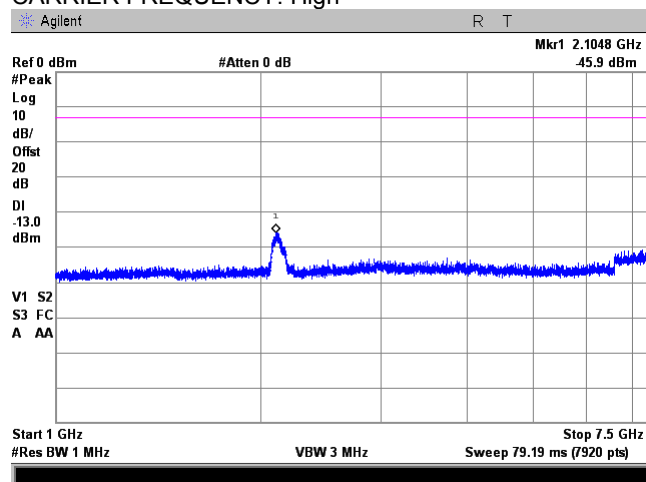
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



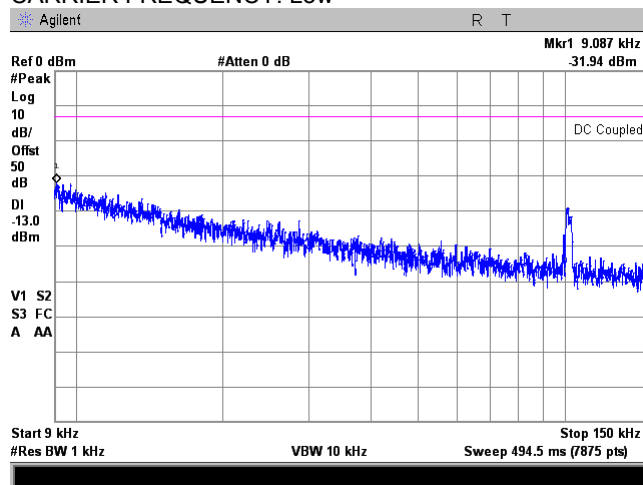
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.35 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

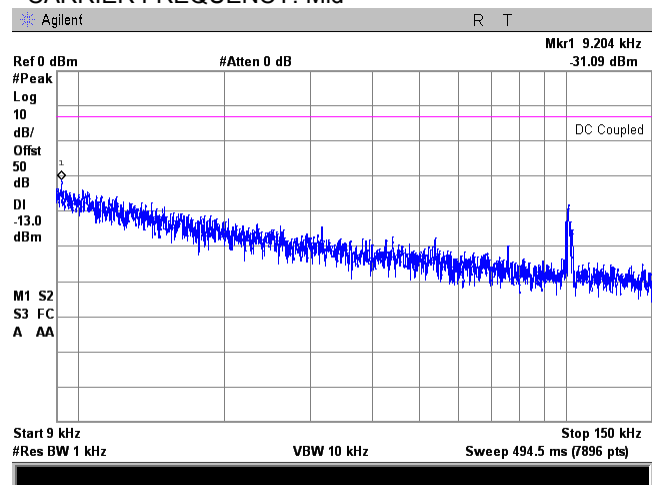
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

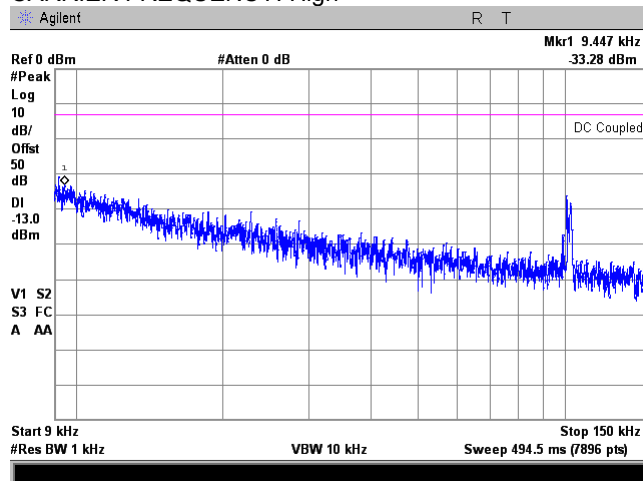
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



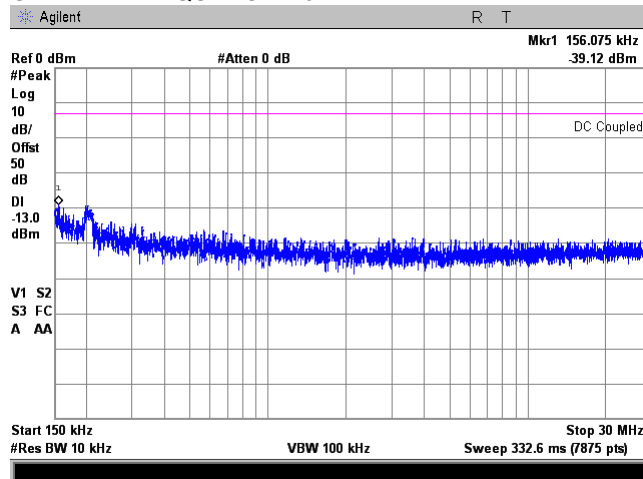
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.36 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

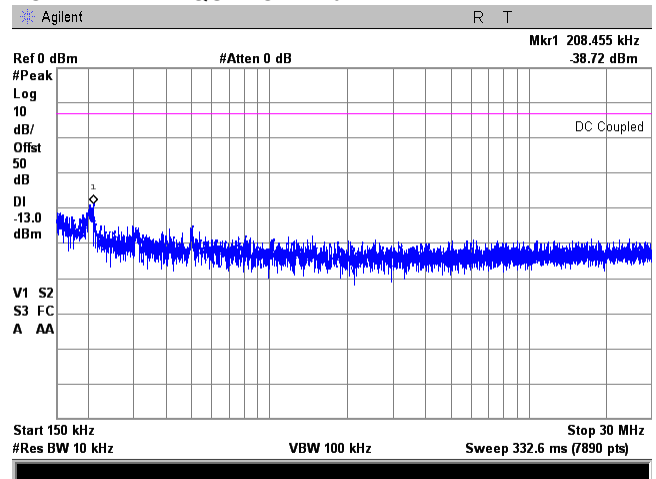
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

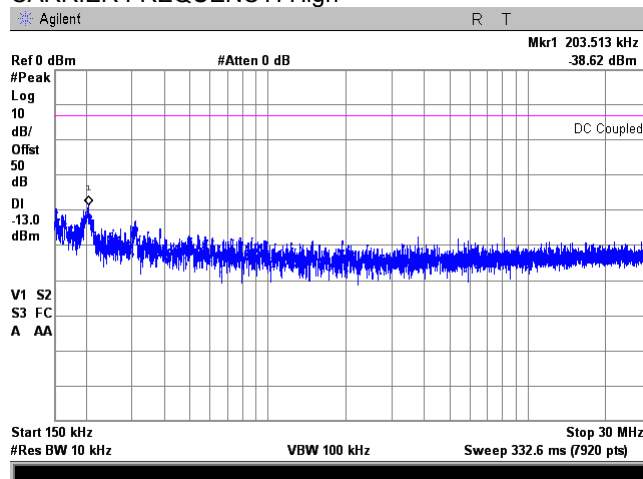
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

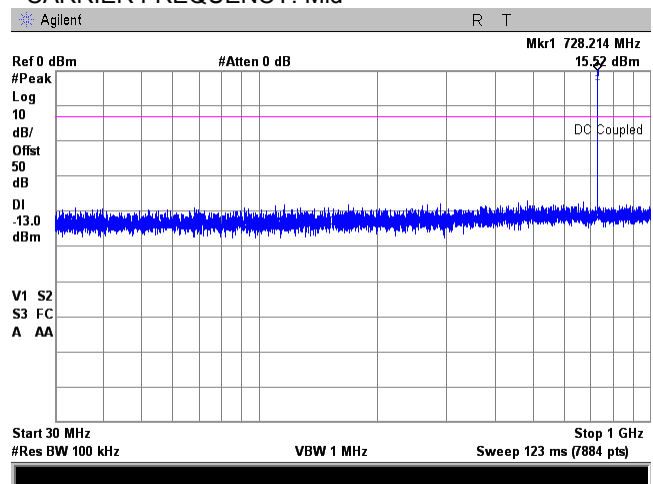
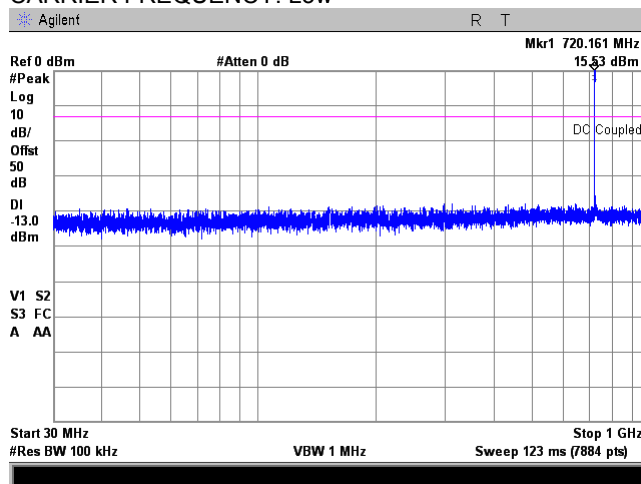


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

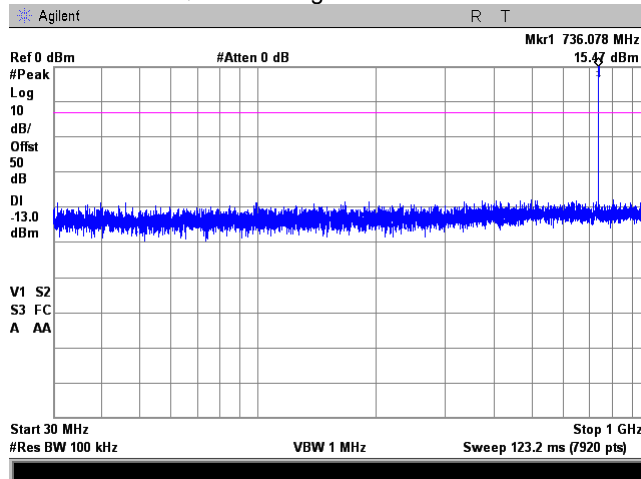
Plot 7.6.37 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:
CARRIER FREQUENCY: Low

728.0 – 746.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level
CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



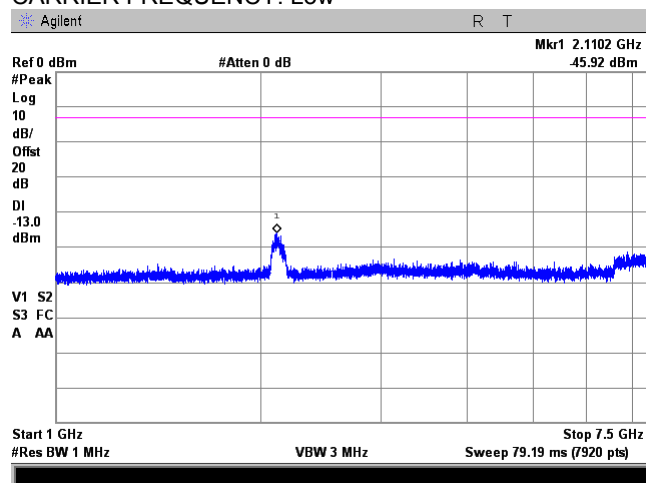
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.38 Spurious emission measurements in 1000 - 7500 MHz range at low carrier frequency

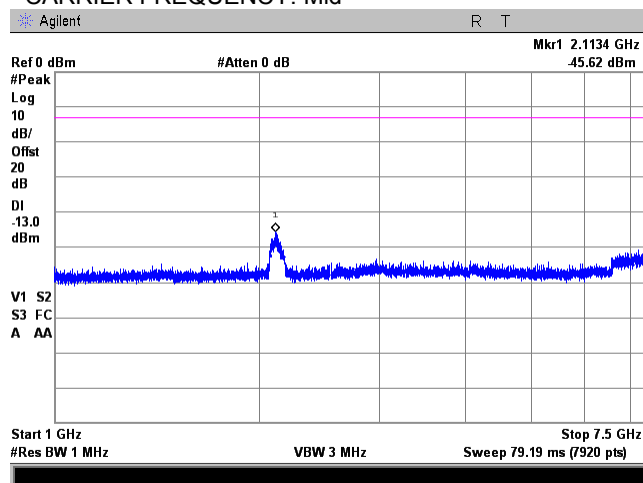
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

728.0 – 746.0 MHz
GSM downlink transmit
Base
Maximum gain
Below AGC level

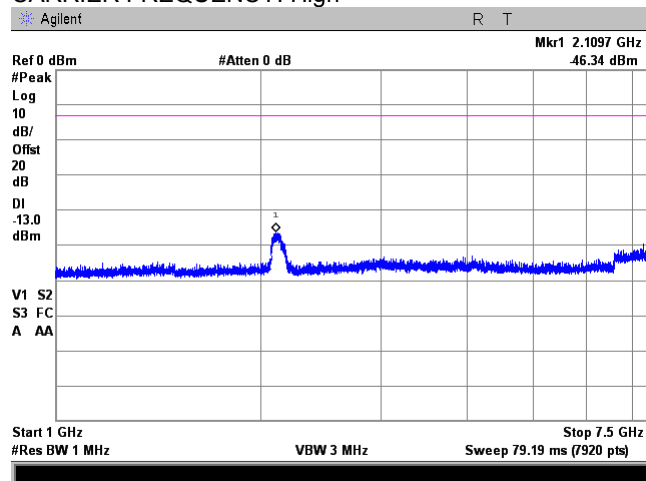
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



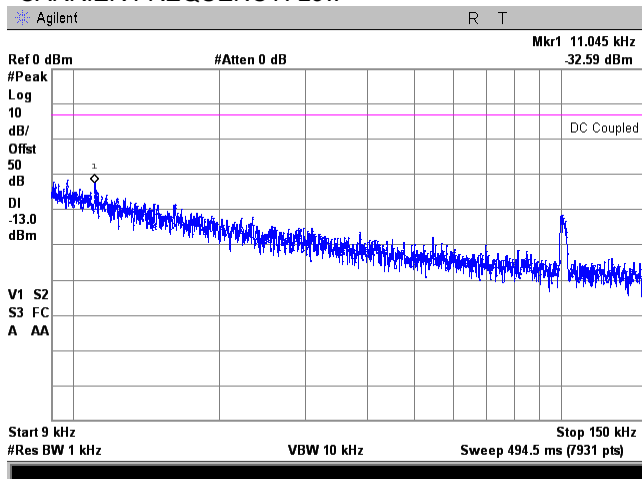
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.39 Spurious emission measurements in 9 - 150 kHz range at carrier frequency

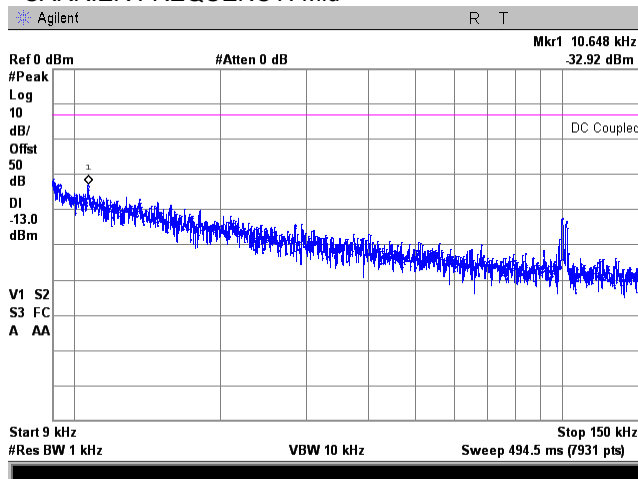
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

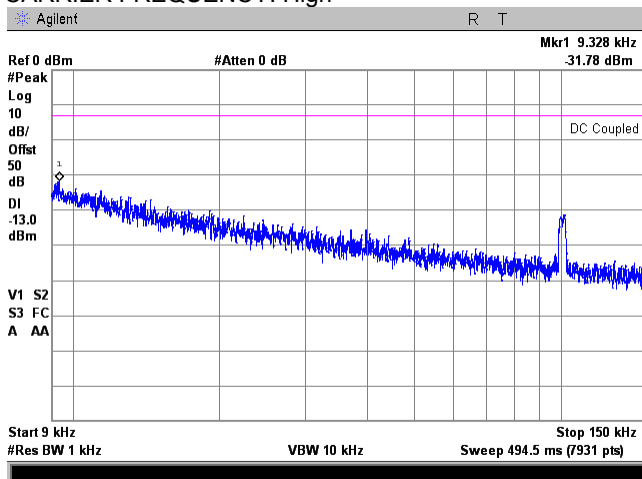
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



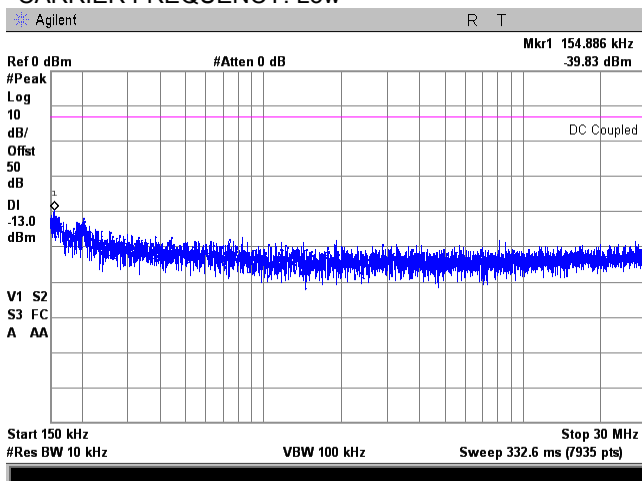
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.40 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

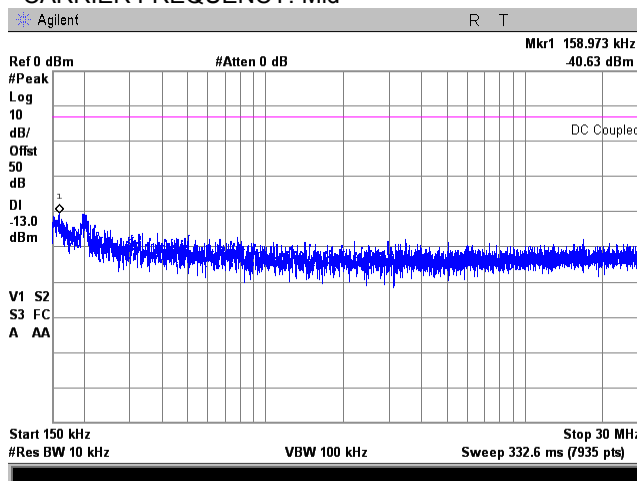
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

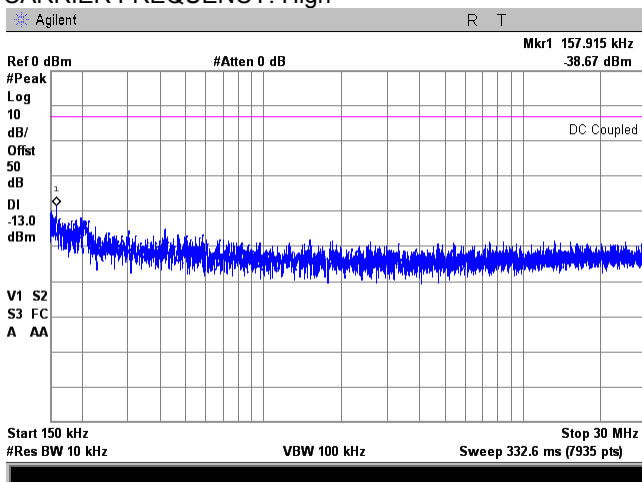
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



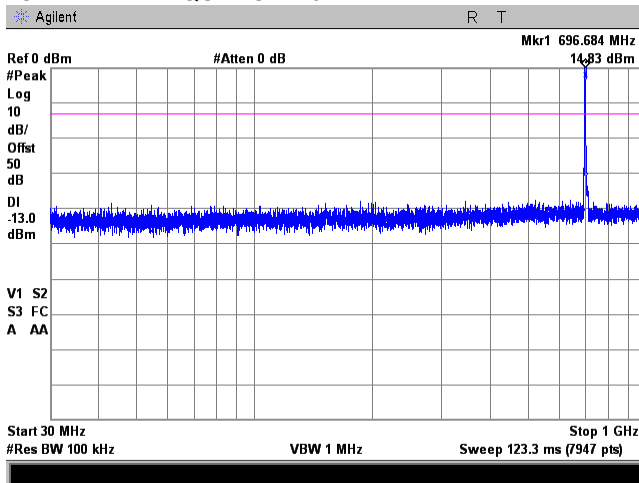
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.41 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

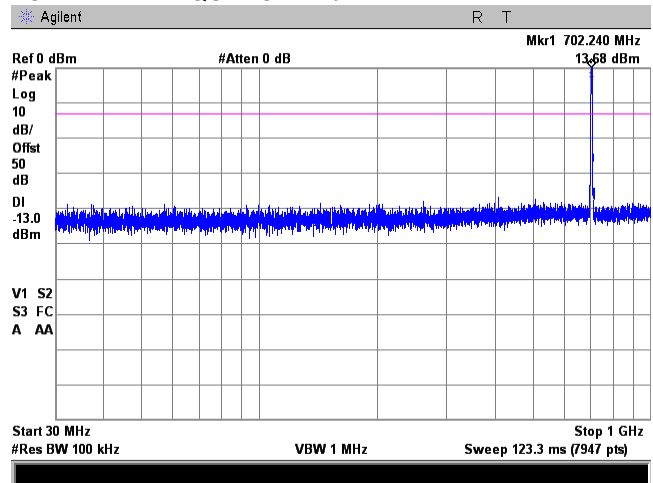
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

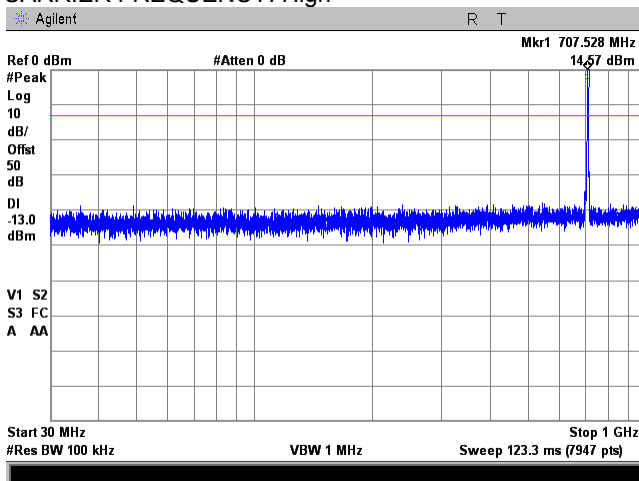
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



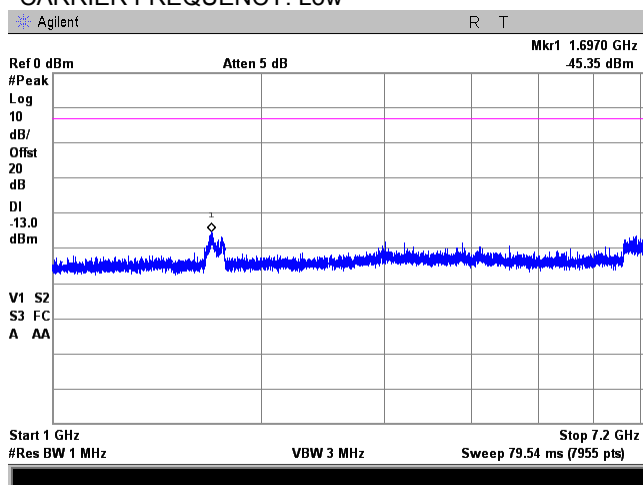
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.42 Spurious emission measurements in 1000 - 8700 MHz range at low carrier frequency

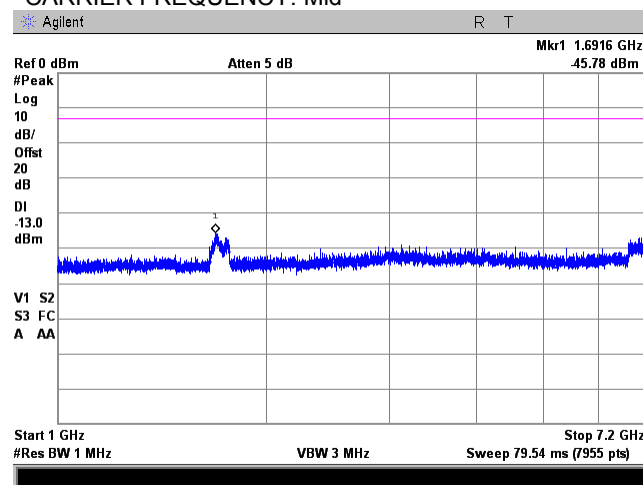
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
AWGN uplink transmit
Mobile
Maximum gain
Below AGC level

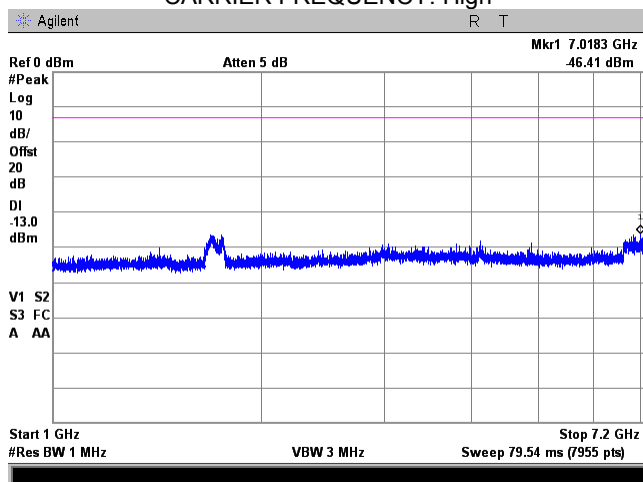
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



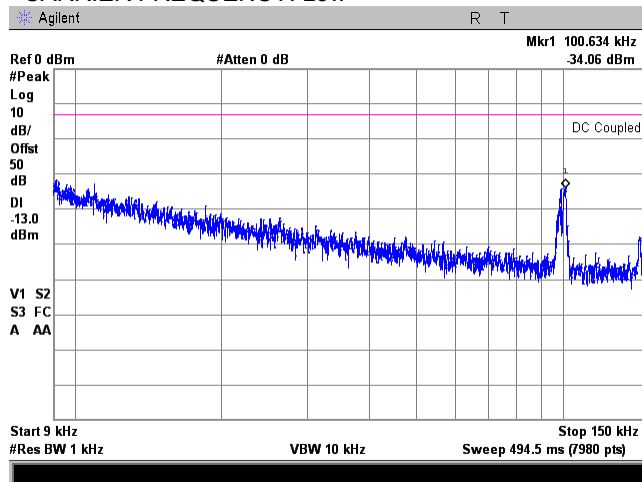
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.43 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

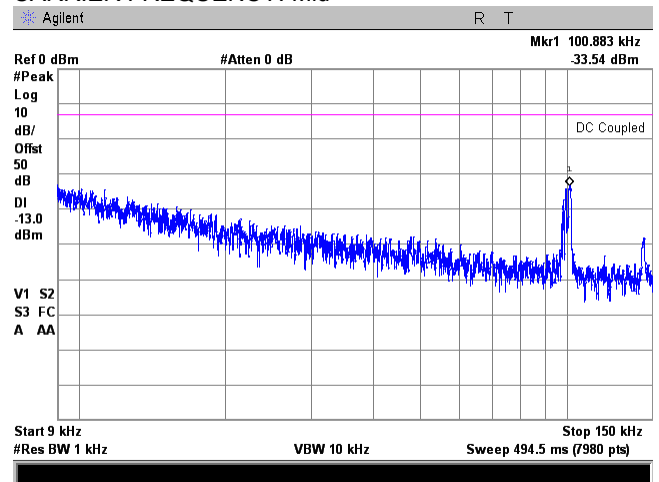
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

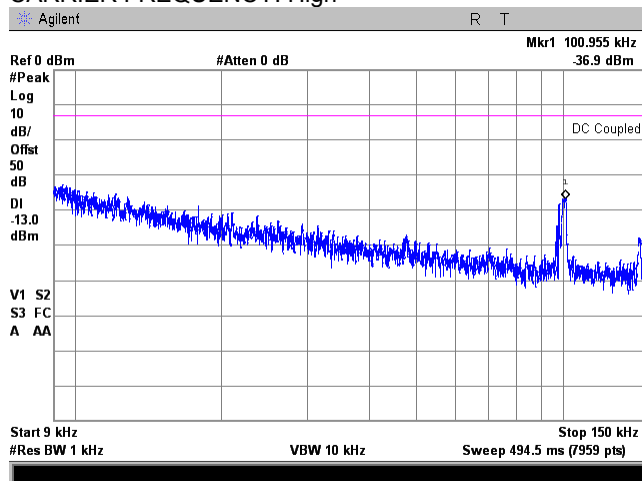
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



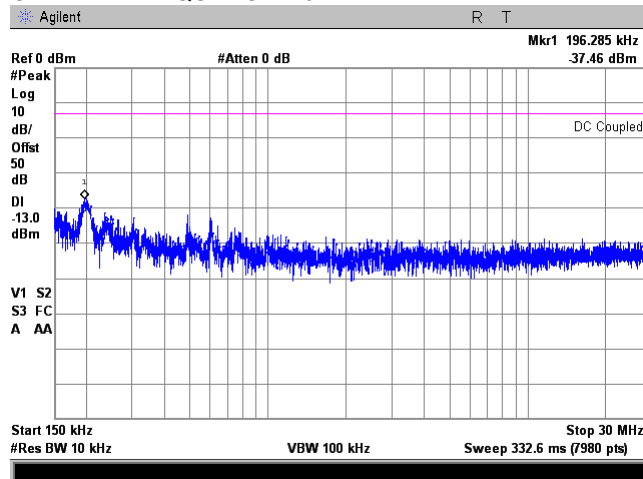
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.44 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

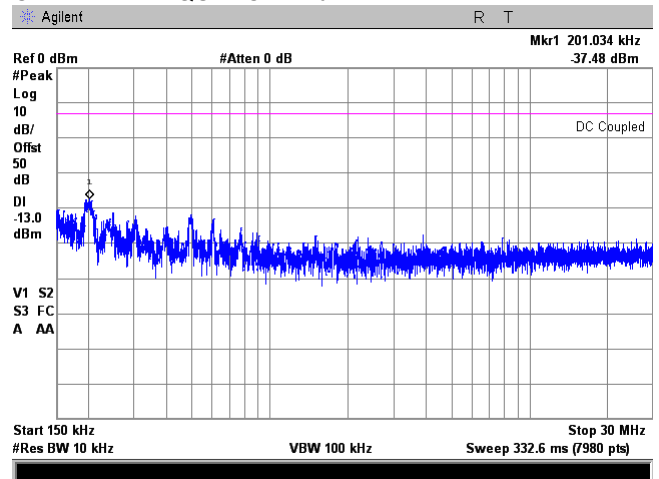
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

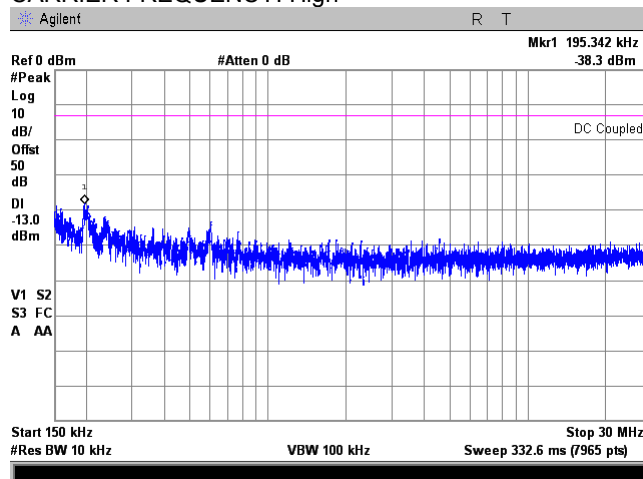
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High

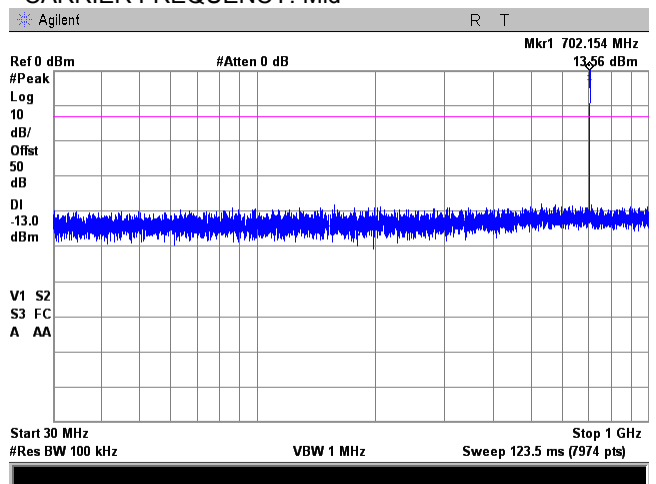
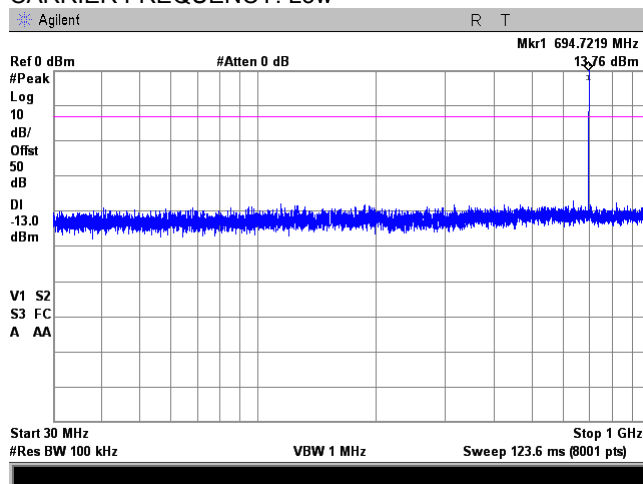


Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

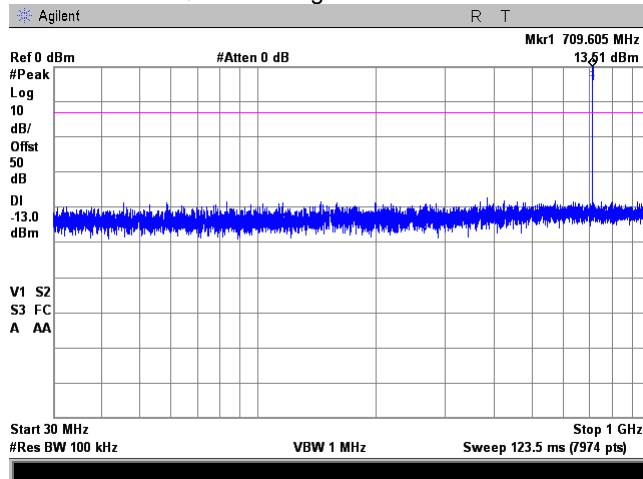
Plot 7.6.45 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:
CARRIER FREQUENCY: Low

698.0 – 716.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level
CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



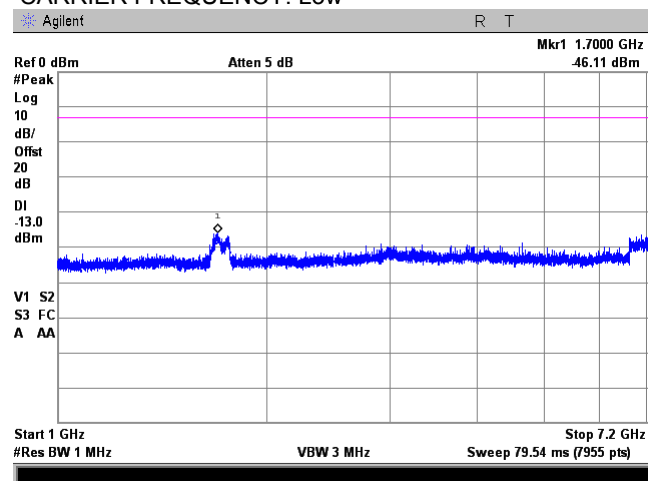
Test specification: Section 27.53, Spurious emissions conducted measurements			
Test procedure: 47 CFR, Section 2.1051; KDB 935210 D05 v01r01 section 3.6.3			
Test mode: Compliance		Verdict: PASS	
Date(s): 06-Apr-17 - 10-Apr-17			
Temperature: 23.2 °C	Relative Humidity: 46 %	Air Pressure: 1016 hPa	Power: 120 VAC
Remarks:			

Plot 7.6.46 Spurious emission measurements in 1000 - 7200 MHz range at low carrier frequency

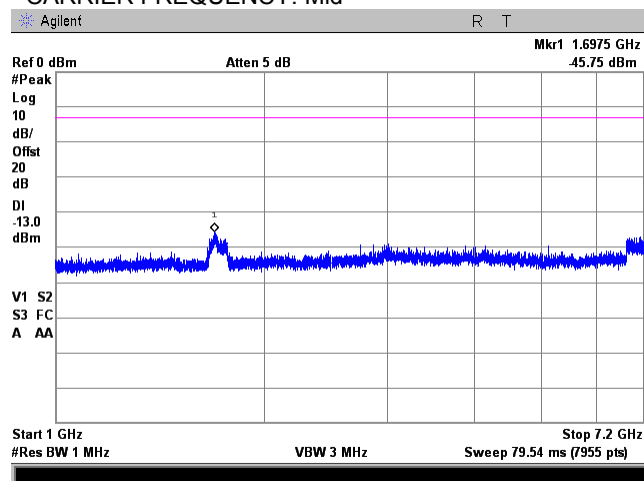
FREQUENCY RANGE:
OPERATIONAL MODE:
INPUT PORT:
CONFIGURATION:
INPUT POWER:

698.0 – 716.0 MHz
GSM uplink transmit
Mobile
Maximum gain
Below AGC level

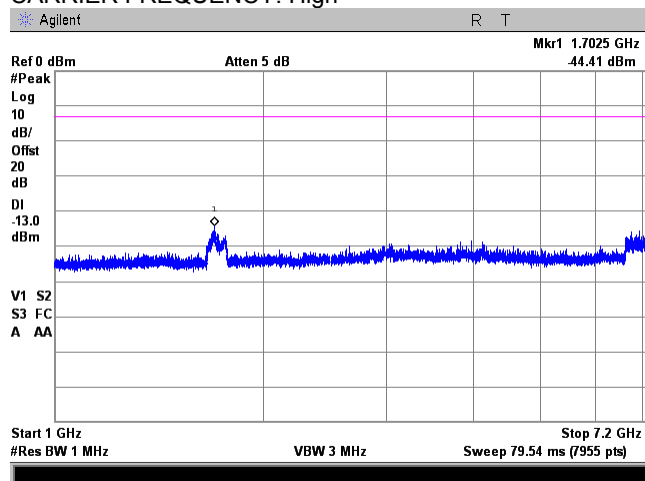
CARRIER FREQUENCY: Low



CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High





Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

7.7 Radiated spurious emission measurements

7.7.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.7.1.

Table 7.7.1 Radiated spurious emission test limits

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm	Equivalent field strength limit @ 3m, dB(μV/m)***
0.009 – 10 th harmonic*	43+10logP**	-13	84.4

* - Excluding the in band emission within ± 250 % of the authorized bandwidth from the carrier

** - P is transmitter output power in Watts

*** - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows:
 $E = \sqrt{30 \times P \times 1.64} / r$, where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

7.7.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized and the performance check was conducted.

7.7.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

7.7.2.3 The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.

7.7.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.7.3.1 The EUT was set up as shown in Figure 7.7.2, energized and the performance check was conducted.

7.7.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.7.3.3 The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.

Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

Figure 7.7.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

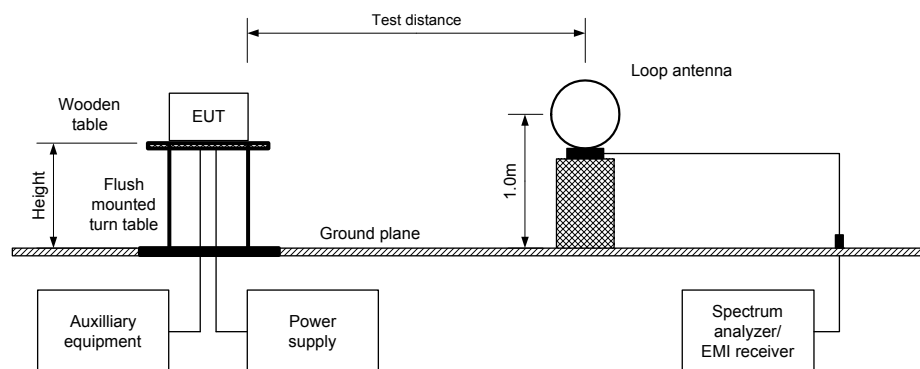
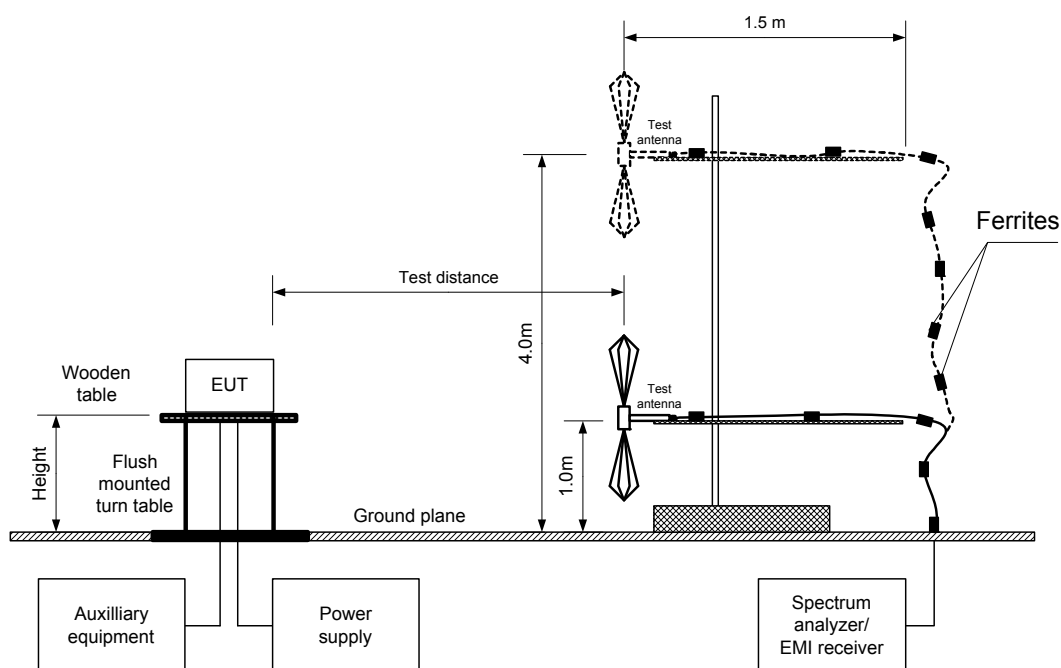


Figure 7.7.2 Setup for spurious emission field strength measurements above 30 MHz





HERMON LABORATORIES

Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance	Verdict: PASS		
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

Table 7.7.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE: 2110.0 – 2180.0 MHz Downlink
1710.0 – 1780.0 MHz Uplink
728.0 – 746.0 MHz Downlink
698.0 – 716.0 MHz Uplink

TEST DISTANCE: 3 m

TEST SITE: Semi anechoic chamber

EUT HEIGHT: 0.8 m

INVESTIGATED FREQUENCY RANGE: 0.009 – 22000 MHz

DETECTOR USED: Peak

VIDEO BANDWIDTH: > Resolution bandwidth

TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
Biconilog (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

MODULATION: Unmodulated

TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
Downlink AWS Band								
Low carrier frequency 2110.0 MHz								
All emissions were found more than 20dB below limit								Pass
Mid carrier frequency 2145.0 MHz								
All emissions were found more than 20dB below limit								Pass
High carrier frequency 2180.0 MHz								
All emissions were found more than 20dB below limit								Pass
Uplink AWS Band								
Low carrier frequency 1710.0 MHz								
All emissions were found more than 20dB below limit								Pass
Mid carrier frequency 1745.0 MHz								
All emissions were found more than 20dB below limit								Pass
High carrier frequency 1780.0 MHz								
All emissions were found more than 20dB below limit								Pass
Downlink LTE700L Band								
Low carrier frequency 728.0 MHz								
All emissions were found more than 20dB below limit								Pass
Mid carrier frequency 737.0 MHz								
All emissions were found more than 20dB below limit								Pass
High carrier frequency 746.0 MHz								
All emissions were found more than 20dB below limit								Pass
Uplink LTE700L Band								
Low carrier frequency 698.0 MHz								
All emissions were found more than 20dB below limit								Pass
Mid carrier frequency 707.0 MHz								
All emissions were found more than 20dB below limit								Pass
High carrier frequency 716.0 MHz								
All emissions were found more than 20dB below limit								Pass

*- Margin = Field strength of spurious – calculated field strength limit.

** - EUT front panel refers to 0 degrees position of turntable.

Reference numbers of test equipment used

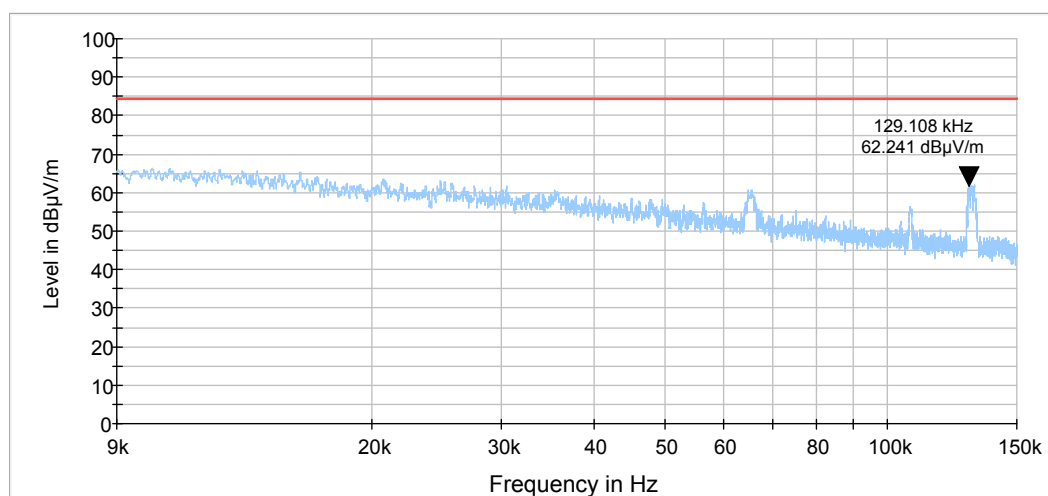
HL 0446	HL 0604	HL 2909	HL 4353	HL 4360	HL 4933	HL 4956	HL 5103
HL 5111							

Full description is given in Appendix A.

Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

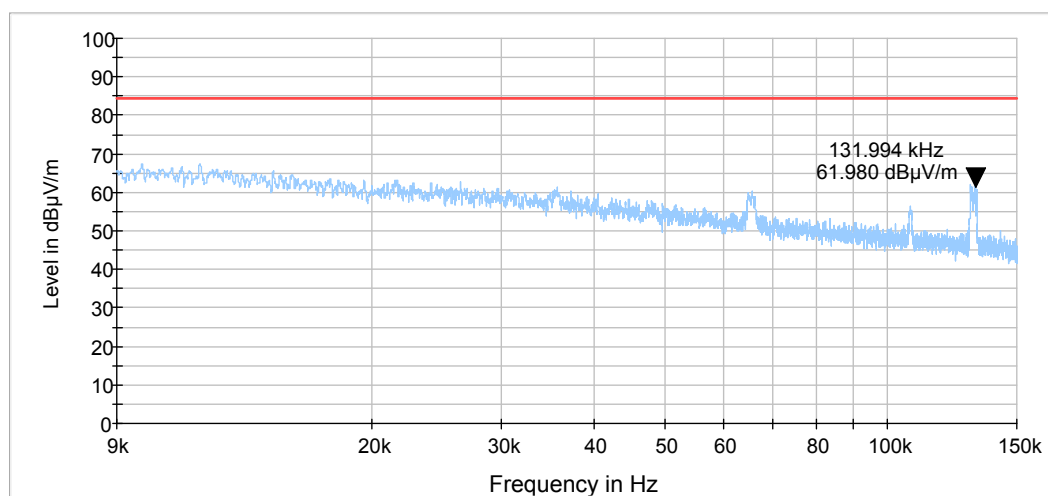
Plot 7.7.1 Radiated emission measurements in 9 - 150 kHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Plot 7.7.2 Radiated emission measurements in 9 - 150 kHz range

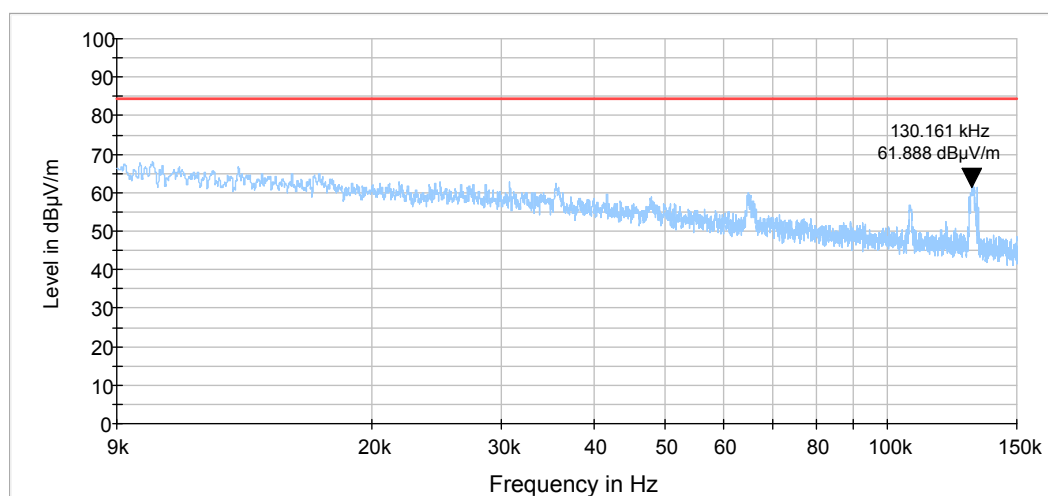
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

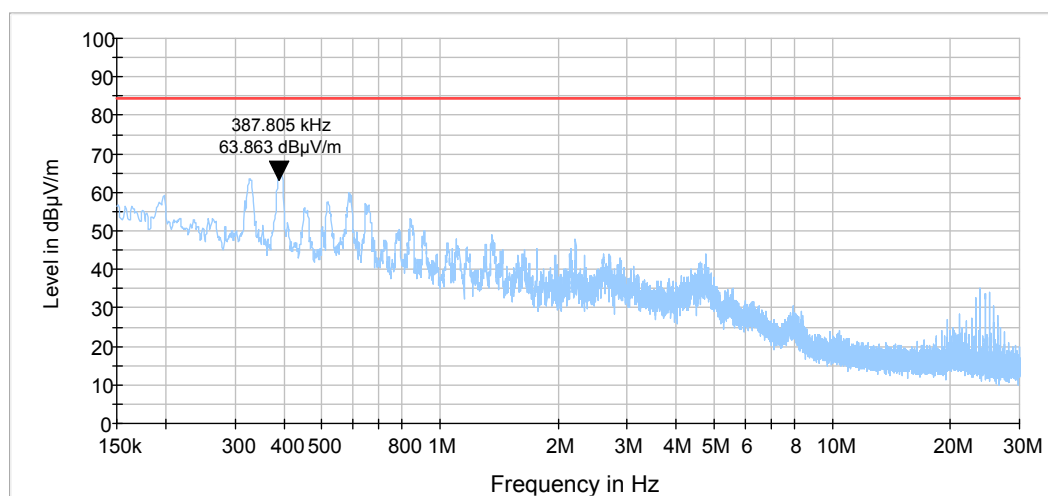
Plot 7.7.3 Radiated emission measurements in 9 - 150 kHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Plot 7.7.4 Radiated emission measurements in 0.15 - 30 MHz range

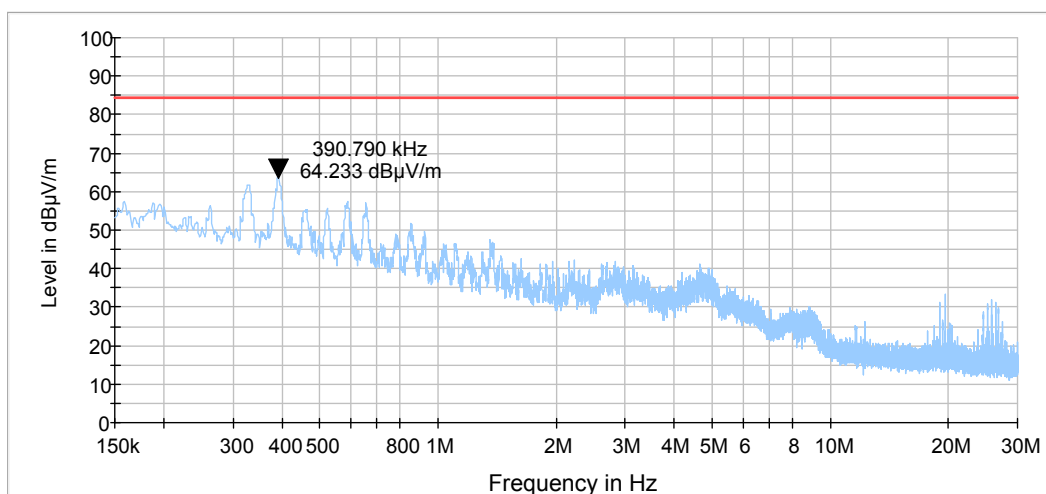
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

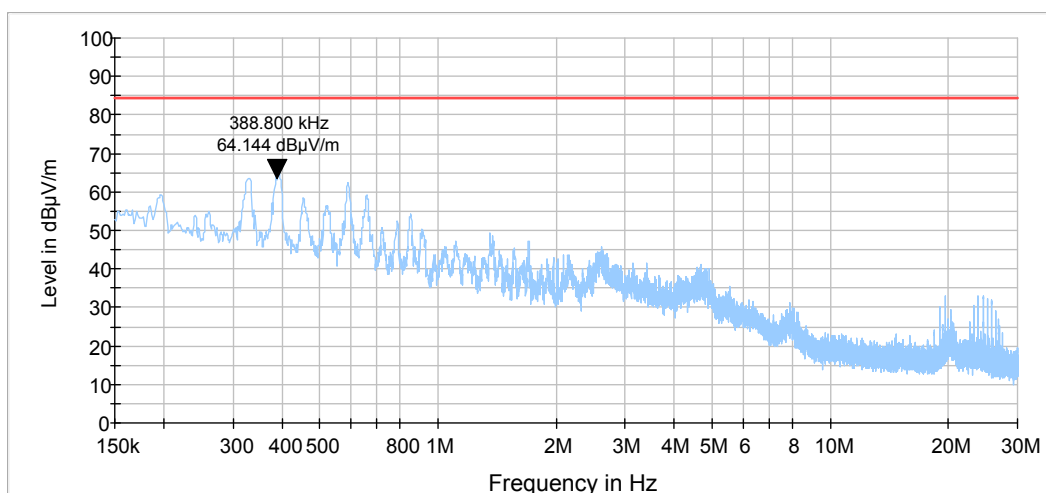
Plot 7.7.5 Radiated emission measurements in 0.15 - 30 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Plot 7.7.6 Radiated emission measurements in 0.15 - 30 MHz range

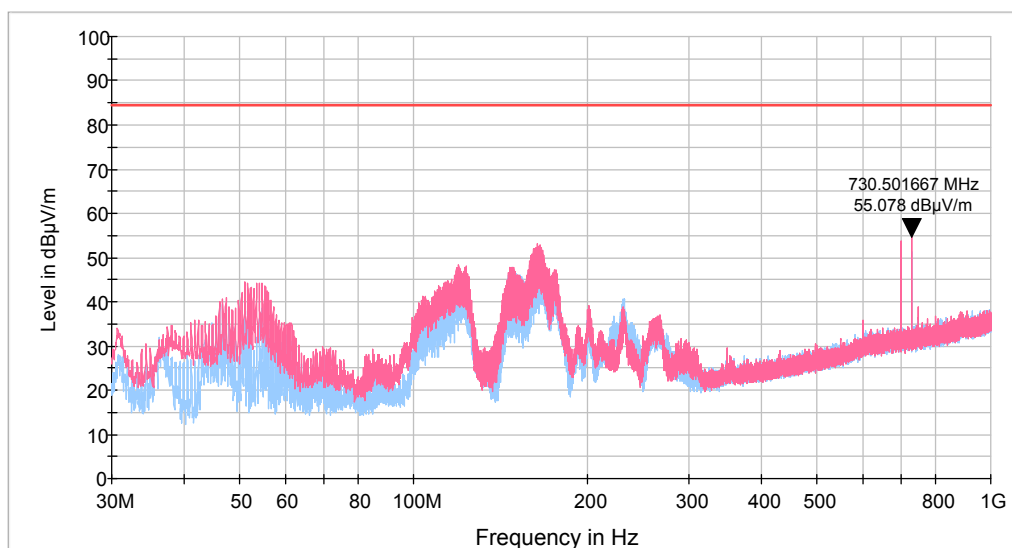
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

Plot 7.7.7 Radiated emission measurements in 30 - 1000 MHz range

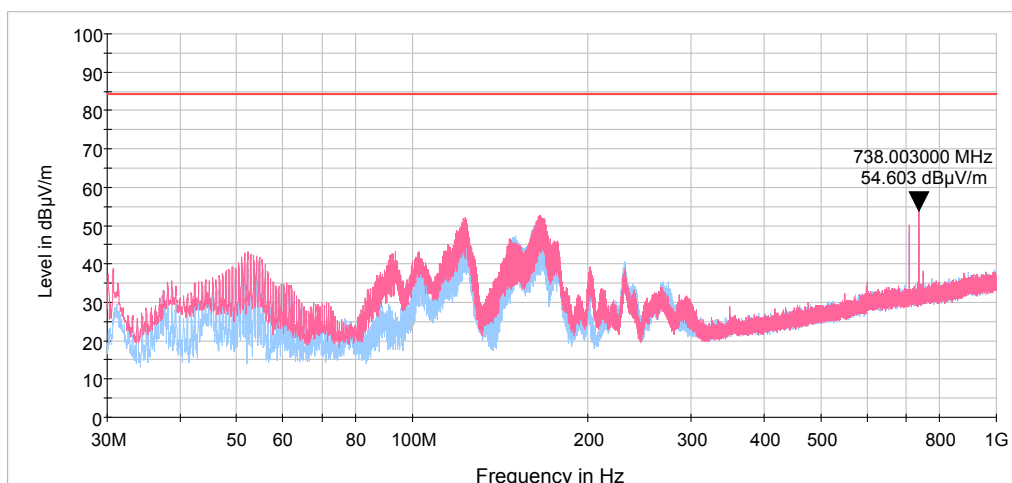
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



LTE700L band: 728.125 MHz – Downlink frequency; 698.125 MHz – Uplink frequency

Plot 7.7.8 Radiated emission measurements in 30 - 1000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m

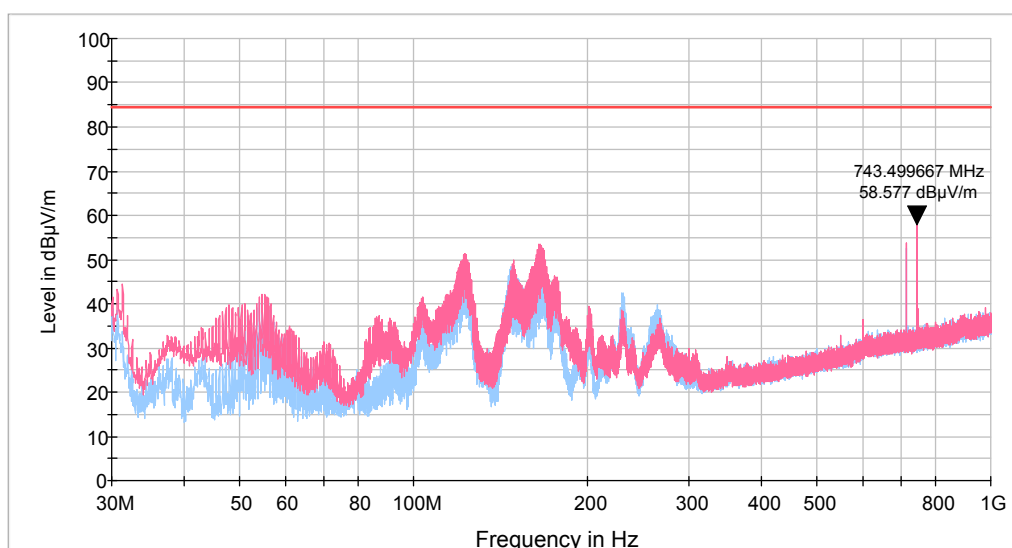


LTE700L band: 737.0 MHz – Downlink frequency; 707.0 MHz – Uplink frequency

Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

Plot 7.7.9 Radiated emission measurements in 30 - 1000 MHz range

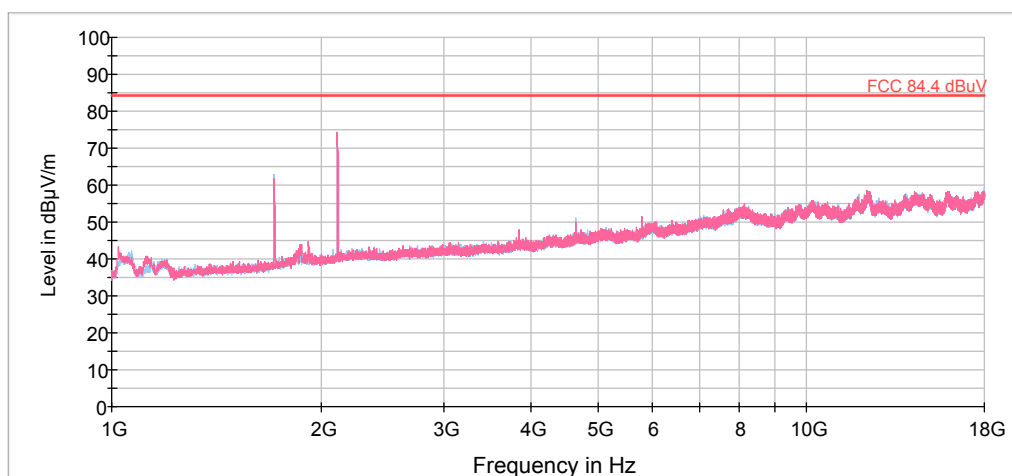
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



LTE700L band: 745.875 MHz – Downlink frequency; 715.875 MHz – Uplink frequency

Plot 7.7.10 Radiated emission measurements in 1000 - 18000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m

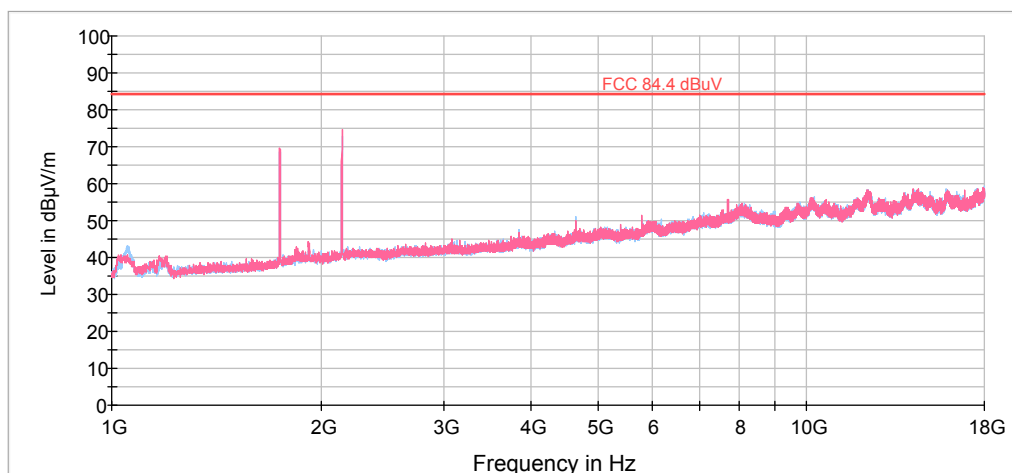


AWS band: 2110.0 MHz – Downlink frequency; 1710.0 MHz – Uplink frequency

Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

Plot 7.7.11 Radiated emission measurements in 1000 - 18000 MHz range

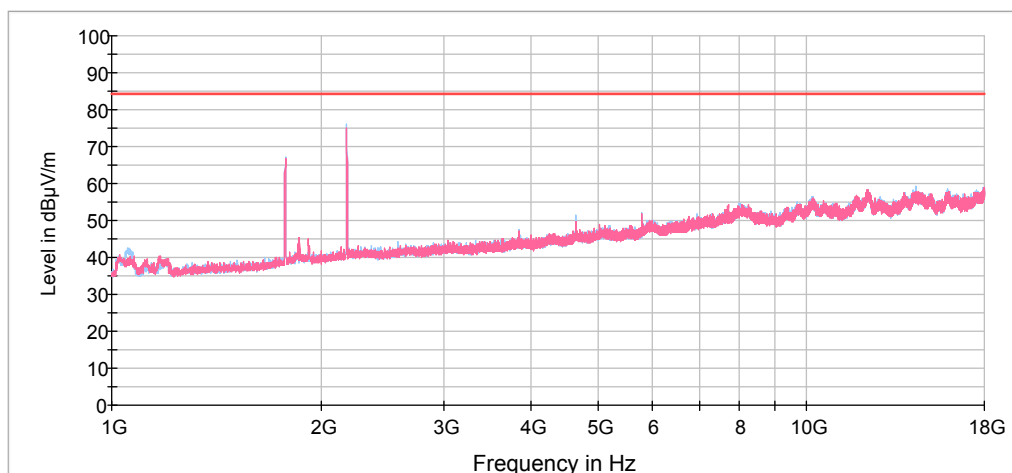
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



AWS band: 2145.0 MHz – Downlink frequency; 1745.0 MHz – Uplink frequency

Plot 7.7.12 Radiated emission measurements in 1000 - 18000 MHz range

TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



AWS band: 2180.0 MHz – Downlink frequency; 1780.0 MHz – Uplink frequency



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Test specification: Section 90.210, Radiated spurious emissions			
Test procedure: 47 CFR, Sections 2.1053 and 90.210(m); TIA/EIA-603-A, Section 2.2.12			
Test mode: Compliance		Verdict: PASS	
Date(s): 19-Apr-17 - 20-Apr-17			
Temperature: 28 °C	Relative Humidity: 49 %	Air Pressure: 1017 hPa	Power: 120 VAC
Remarks:			

Plot 7.7.13 Radiated emission measurements in 18000 – 22000 MHz range

TEST SITE:

CARRIER FREQUENCY:

ANTENNA POLARIZATION:

TEST DISTANCE:

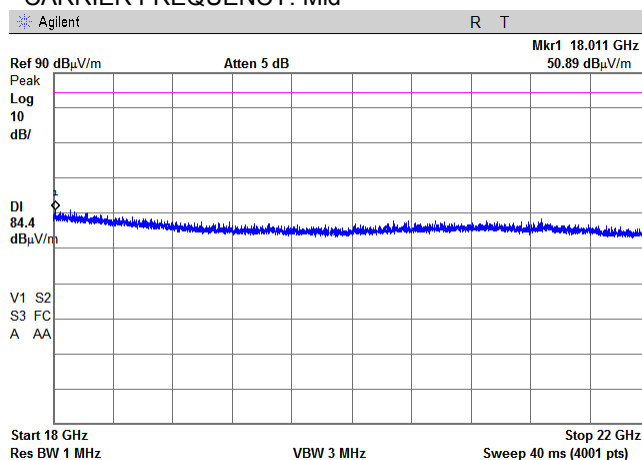
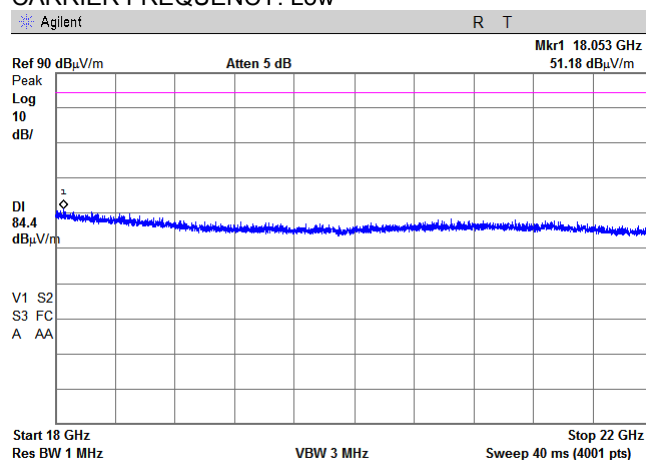
CARRIER FREQUENCY: Low

Semi anechoic chamber

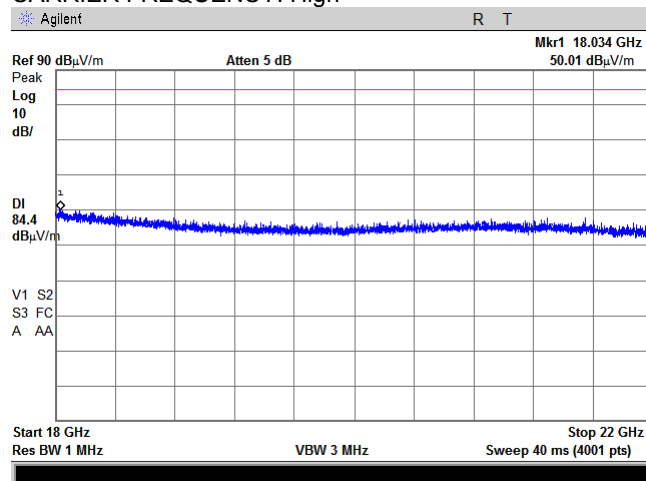
Vertical and Horizontal

3 m

CARRIER FREQUENCY: Mid



CARRIER FREQUENCY: High



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	19-Jan-17	19-Jan-18
0447	LISN, 16/2, 300V RMS, 50 Ohm/50 uH + 5 Ohm, STD CISPR 16-1	Hermon Laboratories	LISN 16 - 1	066	01-Nov-16	01-Nov-17
0539	Generator Signal, 10 kHz - 1.2 GHz	Marconi Instruments	2023	112121/04 1	13-Oct-16	13-Oct-17
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	12-May-17	12-May-18
0813	Cable Coax, 12 m, N-type, up to 3.0 GHz	Hermon Laboratories	C214-12	149	18-Dec-16	18-Dec-17
1501	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1501	15-Dec-16	15-Dec-17
1552	Cable RF, 8 m	Alpha Wire	RG-214	1552	18-Dec-16	18-Dec-17
1876	Attenuator, 50 Ohm, 100 W, 20 dB	Bird Electronic Corp.	8343-200	2200	09-Feb-17	09-Feb-18
2016	Attenuator, Manual Step, 0-9/1 dB, 0-8 GHz, 2 W	Midwest Microwave	1072	1315	05-Mar-17	05-Mar-18
2017	Attenuator, Manual Step, 0-60/10 dB, 0-8.0 GHz	Midwest Microwave	1071	2017	05-Mar-17	05-Mar-18
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	09-Mar-17	09-Mar-18
3472	Cable, Coax, Microwave, DC-18 GHz, SMA-SMA, 0.6 m	Gore	GORE 65474	1003478	30-May-16	30-May-17
3474	Cable, Coax, Microwave, DC-18 GHz, SMA-SMA, 0.6 m	Gore	GORE 65475	1640102	30-May-16	30-May-17
3779	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	NA	31-May-16	31-May-17
3780	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	NA	25-Aug-16	25-Aug-17
3787	Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz	Mini-Circuits	BW-S10W5+	NA	07-Dec-16	07-Dec-17
3818	PSA Series Spectrum Analyzer, 3 Hz- 44 GHz	Agilent Technologies	E4446A	MY482502 88	07-May-17	07-May-18
3901	Microwave Cable Assembly, 40.0 GHz, 3.5 m, SMA/SMA	Huber-Suhner	SUCOFLE X 102A	1225/2A	20-Feb-17	20-Feb-18
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFLE X 102A	1226/2A	20-Feb-17	20-Feb-18
4070	Attenuator, SMA, 30 dB, DC to 18 GHz, 5 W	Weinschel	WA7	NA	25-Aug-16	25-Aug-17
4273	Test Cable , DC-18 GHz, 1.8 m, SMA/M - N/M	Mini-Circuits	CBL-6FT-SMNM+	70045	30-May-16	30-May-17
4274	Test Cable , DC-18 GHz, 1.8 m, SMA/M - N/M	Mini-Circuits	CBL-6FT-SMNM+	70047	30-May-16	30-May-17
4275	Test Cable , DC-18 GHz, 1.8 m, SMA/M - N/M	Mini-Circuits	CBL-6FT-SMNM+	70050	27-Mar-17	27-Mar-18
4353	Low Loss Armored Test Cable, DC - 18 GHz, 6.2 m, N type-M/N type-M	MegaPhase	NC29-N1N1-244	12025101 003	15-Mar-17	15-Mar-18

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
4360	EMI Test Receiver, 20 Hz to 40 GHz.	Rohde & Schwarz	ESU40	100322	04-Dec-16	04-Dec-17
4933	Active Horn Antenna, 1 GHz to 18 GHz	Com-Power Corporation	AHA-118	701046	14-Oct-16	14-Oct-17
4956	Active horn antenna, 18 to 40 GHz	Com-Power Corporation	AHA-840	105004	17-Jan-17	17-Jan-18
5103	RF cable, 18 GHz, 6 m, N-type	Huber-Suhner	SF106A/1 1N/11N/6 000MM	500849/6A	26-Jul-16	26-Jul-17
5111	RF cable, 40 GHz, 5.5 m, K-type	Huber-Suhner	SF102EA/ 11SK/11S K/5500M M	502493/2E A	26-Jul-16	26-Jul-17

8.1 Test equipment and ancillaries used for tests

HL No.	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
NA	MXG Vector Signal Generator	Keysight	N5182A	MY47071059	28-Apr-15	28-Apr-18
NA	ESG Vector Generator	Agilent	E4438C	MY45090513	20-Aug-15	19-Aug-17
NA	ESG-D Series Signal Generator	Keysight	E4433B	GB39340603	21-Apr-15	21-Apr-17

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Transmitter tests	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	$\pm 8\%$
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Transient frequency behaviour	187 Hz $\pm 13.9\%$
Duty cycle, timing (Tx ON / OFF) and average factor measurements	$\pm 1.0\%$
Unintentional radiator tests	
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

10 APPENDIX C Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, Radio, Safety, Environmental and Telecommunication testing facility.

Hermon Laboratories is recognized and accredited by the Federal Communications Commission (USA) for 1, 2, 15, 18 parts of Code of Federal Regulations 47 (CFR 47), Test Firm Registration Number is 927748, Designation Number is IL1001; registered by Industry Canada for electromagnetic emissions, file number IC 2186A-1 for OATS, certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-869 for RE measurements above 1 GHz, C-845 for conducted emissions site and T-1606 for conducted emissions at telecommunication ports).

The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing, environmental simulation and calibration (for exact scope please refer to Certificate No. 839.01, 839.03 and 839.04).

Address: P.O. Box 23, Binyamina 3055001, Israel.
Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Michael Nikishin, EMC&Radio group manager

11 APPENDIX D Specification references

47CFR part 27: 2016	Private land mobile radio services
47CFR part 1: 2016	Practice and procedure
47CFR part 2: 2016	Frequency allocations and radio treaty matters; general rules and regulations
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI/TIA/EIA-603-D:2010	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
KDB 935210 D05 v01r01:12.02.2016	Measurements Guidance for Industrial and Non-consumer Signal Booster, Repeater and Amplifier Devices
RSS-131 Issue 3: 2017	Zone Enhancers
RSS-139 Issue 3: 2015	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
RSS-130 Issue 1: 2013	Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz

12 APPENDIX E Test equipment correction factors

Antenna factor
Active loop antenna
Model 6502, S/N 2857, HL 0446

Frequency, MHz	Magnetic antenna factor, dB	Electric antenna factor, dB
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.8
0.750	-41.9	9.7
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.2
4.000	-41.4	10.1
5.000	-41.5	10.1
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field strength in dB(μ V/m).

Antenna factor
Biconilog antenna EMCO Model 3141
Ser.No.1011, HL 0604

Frequency, MHz	Antenna factor, dB(1/m)	Frequency, MHz	Antenna factor, dB(1/m)	Frequency, MHz	Antenna factor, dB(1/m)
26	7.8	580	20.6	1320	27.8
28	7.8	600	21.3	1340	28.3
30	7.8	620	21.5	1360	28.2
40	7.2	640	21.2	1380	27.9
60	7.1	660	21.4	1400	27.9
70	8.5	680	21.9	1420	27.9
80	9.4	700	22.2	1440	27.8
90	9.8	720	22.2	1460	27.8
100	9.7	740	22.1	1480	28.0
110	9.3	760	22.3	1500	28.5
120	8.8	780	22.6	1520	28.9
130	8.7	800	22.7	1540	29.6
140	9.2	820	22.9	1560	29.8
150	9.8	840	23.1	1580	29.6
160	10.2	860	23.4	1600	29.5
170	10.4	880	23.8	1620	29.3
180	10.4	900	24.1	1640	29.2
190	10.3	920	24.1	1660	29.4
200	10.6	940	24.0	1680	29.6
220	11.6	960	24.1	1700	29.8
240	12.4	980	24.5	1720	30.3
260	12.8	1000	24.9	1740	30.8
280	13.7	1020	25.0	1760	31.1
300	14.7	1040	25.2	1780	31.0
320	15.2	1060	25.4	1800	30.9
340	15.4	1080	25.6	1820	30.7
360	16.1	1100	25.7	1840	30.6
380	16.4	1120	26.0	1860	30.6
400	16.6	1140	26.4	1880	30.6
420	16.7	1160	27.0	1900	30.6
440	17.0	1180	27.0	1920	30.7
460	17.7	1200	26.7	1940	30.9
480	18.1	1220	26.5	1960	31.2
500	18.5	1240	26.5	1980	31.6
520	19.1	1260	26.5	2000	32.0
540	19.5	1280	26.6		
560	19.8	1300	27.0		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field strength in dB(μ V/m).



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Antenna factor, HL 4933

**Active Horn Antenna Factor Calibration**

1 GHz to 18 GHz

Equipment:			ACTIVE HORN ANTENNA		
Model:			AHA-118		
Serial Number:			701046		
Calibration Distance:			3 Meter		
Polarization:			Horizontal		
Calibration Date:			11/12/2014		
Frequency (GHz)	Preamplifier Gain (dB)	Antenna Factor with pre-amp (dB/m)	Frequency (GHz)	Preamplifier Gain (dB)	Antenna Factor with pre-amp (dB/m)
1	40.96	-16.47	10	40.94	-1.97
1.5	41.21	-14.53	10.5	40.63	-1.06
2	41.44	-13.30	11	40.74	-1.50
2.5	41.71	-12.87	11.5	40.65	-0.52
3	41.96	-12.26	12	40.76	-0.15
3.5	42.14	-11.77	12.5	41.03	-0.85
4	42.13	-10.91	13	41.37	-0.81
4.5	41.79	-9.41	13.5	41.18	0.05
5	41.44	-7.54	14	40.98	0.36
5.5	40.91	-6.47	14.5	40.81	1.26
6	40.69	-5.48	15	40.65	0.25
6.5	40.64	-5.53	15.5	40.93	-1.05
7	40.76	-4.12	16	41.31	-1.44
7.5	40.94	-3.12	16.5	40.96	-0.80
8	40.68	-1.69	17	40.64	-0.02
8.5	40.08	-1.71	17.5	40.57	1.81
9	40.41	-1.86	18	40.08	3.63
9.5	41.21	-2.73			
Calibration according to ARP 958					
Antenna Factor to be added to receiver reading:					
Meter Reading (dBuV) + Antenna Factor (dB/m) = Corrected Reading (dBuV/m)					

Antenna factor, HL 4956



Active Horn Antenna Factor Calibration

18 GHz to 40 GHz

Equipment:			ACTIVE HORN ANTENNA		
Model:			AHA-840		
Serial Number:			105004		
Calibration Distance:			3 meter		
Polarization:			Horizontal		
Calibration Date:			1/26/2015		
Frequency (GHz)	Preamplifier Gain (dB)	Antenna Factor with pre-amp (dB/m)	Frequency (GHz)	Preamplifier Gain (dB)	Antenna Factor with pre-amp (dB/m)
18	38.83	-1.06	29.5	42.47	-5.33
18.5	39.34	-2.65	30	41.91	-4.86
19	39.71	-3.88	30.5	41.60	-4.64
19.5	39.87	-4.35	31	41.52	-4.60
20	39.98	-3.97	31.5	41.56	-4.79
20.5	40.42	-3.68	32	41.80	-5.21
21	41.12	-4.06	32.5	42.29	-5.54
21.5	41.74	-5.46	33	42.79	-5.63
22	42.14	-6.22	33.5	42.88	-5.38
22.5	42.35	-6.42	34	42.62	-4.76
23	42.50	-6.59	34.5	42.63	-4.84
23.5	42.65	-6.82	35	43.15	-5.13
24	42.81	-7.01	35.5	43.91	-5.83
24.5	42.86	-7.37	36	44.59	-6.39
25	42.73	-7.53	36.5	45.04	-6.64
25.5	42.77	-7.45	37	45.08	-6.40
26	42.85	-7.21	37.5	44.82	-5.75
26.5	42.98	-7.17	38	44.16	-4.58
27	43.14	-7.22	38.5	42.90	-2.66
27.5	43.18	-7.32	39	42.39	-1.71
28	43.04	-7.10	39.5	43.76	-2.49
28.5	43.01	-6.73	40	45.98	-5.21

Calibration per ANSI C63.5: 2006

Standard Site Method, Equations 1-6 (3-antenna)

Corrected Reading (dBμV/m) = Meter Reading (dBμV) + AFE(dB/m)

Cable loss
Cable coaxial, Microwave, SMA-SMA, 18 GHz, 1.0 m
Gore, HL 3472

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.01	5000	0.47	10200	0.72	15500	0.75
30	0.03	5100	0.47	10300	0.67	15600	0.89
50	0.04	5200	0.47	10400	0.77	15700	0.82
100	0.04	5300	0.47	10500	0.67	15800	0.89
200	0.08	5400	0.49	10600	0.74	15900	0.89
300	0.11	5500	0.48	10700	0.81	16000	0.93
400	0.11	5600	0.49	10800	0.77	16100	0.90
500	0.12	5700	0.49	10900	0.82	16200	0.92
600	0.14	5800	0.51	11000	0.86	16300	0.90
700	0.15	5900	0.50	11100	0.78	16400	0.94
800	0.16	6000	0.51	11200	0.82	16500	0.93
900	0.18	6100	0.53	11300	0.77	16600	0.95
1000	0.17	6200	0.52	11400	0.84	16700	0.98
1100	0.19	6300	0.53	11500	0.74	16800	1.00
1200	0.22	6400	0.54	11600	0.81	16900	0.94
1300	0.21	6500	0.55	11700	0.73	17000	1.00
1400	0.22	6600	0.54	11800	0.75	17100	0.93
1500	0.23	6700	0.57	11900	0.73	17200	1.00
1600	0.24	6800	0.54	12000	0.75	17300	0.93
1700	0.24	6900	0.58	12100	0.66	17400	0.93
1800	0.25	7000	0.58	12200	0.66	17500	0.96
1900	0.26	7100	0.58	12300	0.72	17600	0.94
2000	0.28	7200	0.61	12400	0.64	17700	0.99
2100	0.27	7300	0.59	12500	0.75	17800	0.97
2200	0.29	7400	0.55	12600	0.67	17900	0.90
2300	0.29	7500	0.63	12700	0.75	18000	0.78
2400	0.30	7600	0.60	12800	0.66		
2500	0.30	7700	0.61	12900	0.81		
2600	0.32	7800	0.64	13000	0.75		
2700	0.32	7900	0.60	13100	0.80		
2800	0.33	8000	0.58	13200	0.80		
2900	0.34	8100	0.61	13300	0.81		
3000	0.34	8200	0.62	13400	0.88		
3100	0.35	8300	0.62	13500	0.82		
3200	0.35	8400	0.68	13600	1.00		
3300	0.36	8500	0.63	13700	0.93		
3400	0.37	8600	0.61	13800	0.86		
3500	0.38	8700	0.63	13900	0.84		
3600	0.38	8800	0.62	14000	1.00		
3700	0.40	8900	0.64	14100	0.86		
3800	0.40	9000	0.62	14200	0.98		
3900	0.40	9100	0.64	14300	0.99		
4000	0.40	9200	0.62	14400	0.82		
4100	0.43	9300	0.62	14600	0.89		
4200	0.43	9400	0.62	14700	0.84		
4300	0.43	9500	0.63	14800	0.90		
4400	0.44	9600	0.64	14900	0.89		
4500	0.45	9700	0.60	15000	0.89		
4600	0.45	9800	0.65	15100	0.86		
4700	0.46	9900	0.60	15200	0.87		
4800	0.46	10000	0.67	15300	0.86		
4900	0.46	10100	0.69	15400	0.87		

Cable loss
Cable coaxial, Microwave, SMA-SMA, 18 GHz, 0.6 m
Gore, HL 3474

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.00	4800	0.43	9800	0.63	14900	0.89
30	0.02	4900	0.44	9900	0.58	15000	0.96
50	0.03	5000	0.44	10000	0.67	15100	0.90
100	0.03	5100	0.44	10100	0.69	15200	0.96
200	0.07	5200	0.44	10200	0.72	15300	0.90
300	0.10	5300	0.44	10300	0.68	15400	0.95
400	0.11	5400	0.46	10400	0.75	15500	0.84
500	0.12	5500	0.45	10500	0.64	15600	0.95
600	0.14	5600	0.46	10600	0.75	15700	0.82
700	0.14	5700	0.47	10700	0.80	15800	0.94
800	0.15	5800	0.48	10800	0.77	15900	0.91
900	0.18	5900	0.48	10900	0.80	16000	0.91
1000	0.17	6000	0.49	11000	0.79	16100	0.86
1100	0.18	6100	0.51	11100	0.70	16200	0.86
1200	0.21	6200	0.50	11200	0.76	16300	0.86
1300	0.20	6300	0.50	11300	0.70	16400	0.84
1400	0.21	6400	0.51	11400	0.73	16500	0.83
1500	0.22	6500	0.51	11500	0.67	16600	0.87
1600	0.23	6600	0.52	11600	0.74	16700	0.90
1700	0.23	6700	0.54	11700	0.64	16800	0.91
1800	0.24	6800	0.51	11800	0.68	16900	0.90
1900	0.25	6900	0.55	11900	0.67	17000	0.97
2000	0.27	7000	0.54	12000	0.71	17100	0.94
2100	0.26	7100	0.55	12100	0.64	17200	1.01
2200	0.28	7200	0.55	12200	0.64	17300	0.97
2300	0.28	7300	0.54	12300	0.71	17400	1.02
2400	0.28	7400	0.52	12400	0.62	17500	1.06
2500	0.29	7500	0.58	12500	0.80	17600	1.01
2600	0.30	7600	0.56	12600	0.69	17700	1.10
2700	0.31	7700	0.57	12700	0.85	17800	1.16
2800	0.32	7800	0.62	12800	0.67	17900	1.12
2900	0.32	7900	0.57	12900	0.84	18000	1.00
3000	0.32	8000	0.55	13000	0.76		
3100	0.33	8100	0.59	13100	0.85		
3200	0.33	8200	0.59	13200	0.77		
3300	0.35	8300	0.60	13300	0.82		
3400	0.35	8400	0.66	13400	0.79		
3500	0.36	8500	0.60	13500	0.82		
3600	0.36	8600	0.59	13600	0.91		
3700	0.37	8700	0.59	13700	0.81		
3800	0.38	8800	0.58	13800	0.76		
3900	0.38	8900	0.60	13900	0.75		
4000	0.38	9000	0.60	14000	0.81		
4100	0.41	9100	0.60	14100	0.77		
4200	0.40	9200	0.57	14200	0.89		
4300	0.41	9300	0.57	14300	0.92		
4400	0.42	9400	0.58	14400	0.78		
4500	0.43	9500	0.60	14600	0.85		
4600	0.42	9600	0.62	14700	0.83		
4700	0.44	9700	0.58	14800	0.95		

Cable loss
Microwave Cable Assembly, Huber-Suhner, 40 GHz, 3.5 m, SMA-SMA, S/N 1225/2A
HL 3901

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.09	9500	4.29	21000	6.67
100	0.41	10000	4.40	22000	6.92
500	0.93	10500	4.52	23000	7.00
1000	1.33	11000	4.64	24000	7.18
1500	1.63	11500	4.76	25000	7.29
2000	1.90	12000	4.87	26000	7.55
2500	2.12	12500	4.99	27000	7.70
3000	2.33	13000	5.11	28000	7.88
3500	2.50	13500	5.20	29000	8.02
4000	2.67	14000	5.31	30000	8.15
4500	2.82	14500	5.42	31000	8.35
5000	2.99	15000	5.51	32000	8.40
5500	3.16	15500	5.58	33000	8.62
6000	3.32	16000	5.68	34000	8.73
6500	3.51	16500	5.78	35000	8.78
7000	3.65	17000	5.91	36000	8.94
7500	3.79	17500	5.99	37000	9.21
8000	3.92	18000	6.07	38000	9.37
8500	4.04	19000	6.36	39000	9.45
9000	4.18	20000	6.49	40000	9.52

Cable loss
Microwave Cable Assembly, Huber-Suhner, 40 GHz, 1.5 m, SMA-SMA, S/N 1226/2A
HL 3903

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	-0.02	9500	1.84	21000	2.98
100	0.15	10000	1.86	22000	3.07
500	0.38	10500	1.93	23000	3.13
1000	0.56	11000	1.99	24000	3.21
1500	0.69	11500	2.04	25000	3.26
2000	0.82	12000	2.10	26000	3.48
2500	0.90	12500	2.15	27000	3.44
3000	0.98	13000	2.21	28000	3.53
3500	1.06	13500	2.25	29000	3.59
4000	1.11	14000	2.29	30000	3.66
4500	1.17	14500	2.34	31000	3.70
5000	1.24	15000	2.36	32000	3.79
5500	1.32	15500	2.40	33000	3.88
6000	1.40	16000	2.45	34000	3.94
6500	1.50	16500	2.48	35000	3.91
7000	1.56	17000	2.56	36000	4.05
7500	1.62	17500	2.58	37000	4.22
8000	1.68	18000	2.60	38000	4.25
8500	1.74	19000	2.84	39000	4.27
9000	1.78	20000	2.88	40000	4.33

Cable loss
Test cable, Mini-Circuits, S/N 70045, 18 GHz, 1.8 m, SMA/M - N/M
CBL-6FT-SMNM+, HL 4273

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.09	4800	1.76	9800	2.70	14800	3.59
30	0.11	4900	1.78	9900	2.71	14900	3.59
50	0.14	5000	1.81	10000	2.73	15000	3.60
100	0.20	5100	1.82	10100	2.75	15100	3.63
200	0.30	5200	1.86	10200	2.76	15200	3.67
300	0.38	5300	1.89	10300	2.79	15300	3.70
400	0.45	5400	1.92	10400	2.81	15400	3.68
500	0.50	5500	1.96	10500	2.82	15500	3.70
600	0.55	5600	2.00	10600	2.83	15600	3.71
700	0.60	5700	2.03	10700	2.87	15700	3.77
800	0.65	5800	2.04	10800	2.87	15800	3.75
900	0.69	5900	2.07	10900	2.88	15900	3.77
1000	0.73	6000	2.10	11000	2.89	16000	3.79
1100	0.77	6100	2.10	11100	2.91	16100	3.85
1200	0.80	6200	2.11	11200	2.92	16200	3.82
1300	0.84	6300	2.11	11300	2.94	16300	3.83
1400	0.88	6400	2.14	11400	2.95	16400	3.88
1500	0.92	6500	2.15	11500	2.98	16500	3.89
1600	0.95	6600	2.15	11600	3.00	16600	3.92
1700	0.98	6700	2.16	11700	3.02	16700	3.88
1800	1.01	6800	2.19	11800	3.04	16800	3.95
1900	1.04	6900	2.22	11900	3.08	16900	3.91
2000	1.07	7000	2.24	12000	3.09	17000	3.97
2100	1.09	7100	2.26	12100	3.12	17100	3.92
2200	1.13	7200	2.29	12200	3.13	17200	3.94
2300	1.15	7300	2.32	12300	3.16	17300	3.94
2400	1.18	7400	2.36	12400	3.17	17400	3.98
2500	1.21	7500	2.39	12500	3.19	17500	3.93
2600	1.24	7600	2.41	12600	3.20	17600	3.95
2700	1.27	7700	2.43	12700	3.21	17700	3.96
2800	1.30	7800	2.46	12800	3.21	17800	3.97
2900	1.34	7900	2.49	12900	3.22	17900	3.96
3000	1.36	8000	2.52	13000	3.22	18000	3.97
3100	1.38	8100	2.52	13100	3.24		
3200	1.41	8200	2.54	13200	3.24		
3300	1.45	8300	2.59	13300	3.27		
3400	1.46	8400	2.61	13400	3.28		
3500	1.49	8500	2.60	13500	3.31		
3600	1.51	8600	2.63	13600	3.31		
3700	1.55	8700	2.65	13700	3.35		
3800	1.34	8800	2.65	13800	3.37		
3900	1.36	8900	2.65	13900	3.40		
4000	1.38	9000	2.66	14000	3.43		
4100	1.41	9100	2.66	14100	3.45		
4200	1.45	9200	2.67	14200	3.46		
4300	1.46	9300	2.67	14300	3.46		
4400	1.49	9400	2.67	14400	3.49		
4500	1.51	9500	2.68	14500	3.50		
4600	1.55	9600	2.69	14600	3.50		
4700	1.34	9700	2.69	14700	3.52		

Cable loss
Test cable, Mini-Circuits, S/N 70047, 18 GHz, 1.8 m, SMA/M - N/M
CBL-6FT-SMNM+, HL 4274

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.07	4800	1.69	9800	2.62	14800	3.42
30	0.11	4900	1.70	9900	2.63	14900	3.39
50	0.14	5000	1.72	10000	2.64	15000	3.38
100	0.21	5100	1.75	10100	2.64	15100	3.40
200	0.26	5200	1.76	10200	2.66	15200	3.41
300	0.30	5300	1.77	10300	2.67	15300	3.40
400	0.37	5400	1.79	10400	2.68	15400	3.39
500	0.44	5500	1.82	10500	2.68	15500	3.41
600	0.49	5600	1.85	10600	2.70	15600	3.44
700	0.54	5700	1.86	10700	2.71	15700	3.46
800	0.58	5800	1.87	10800	2.73	15800	3.45
900	0.63	5900	1.91	10900	2.74	15900	3.47
1000	0.67	6000	1.94	11000	2.76	16000	3.51
1100	0.71	6100	1.97	11100	2.77	16100	3.56
1200	0.75	6200	1.98	11200	2.78	16200	3.55
1300	0.78	6300	1.99	11300	2.79	16300	3.54
1400	0.81	6400	2.02	11400	2.80	16400	3.57
1500	0.85	6500	2.05	11500	2.82	16500	3.62
1600	0.88	6600	2.06	11600	2.83	16600	3.61
1700	0.91	6700	2.06	11700	2.84	16700	3.60
1800	0.94	6800	2.08	11800	2.85	16800	3.62
1900	0.97	6900	2.10	11900	2.87	16900	3.68
2000	1.00	7000	2.12	12000	2.88	17000	3.70
2100	1.03	7100	2.12	12100	2.89	17100	3.68
2200	1.06	7200	2.13	12200	2.90	17200	3.70
2300	1.08	7300	2.16	12300	2.92	17300	3.80
2400	1.11	7400	2.19	12400	2.94	17400	3.84
2500	1.14	7500	2.22	12500	2.95	17500	3.83
2600	1.16	7600	2.23	12600	2.96	17600	3.83
2700	1.19	7700	2.26	12700	2.98	17700	3.86
2800	1.21	7800	2.30	12800	3.00	17800	3.86
2900	1.27	7900	2.33	12900	3.02	17900	3.80
3000	1.29	8000	2.35	13000	3.03	18000	3.79
3100	1.32	8100	2.37	13100	3.06		
3200	1.35	8200	2.41	13200	3.08		
3300	1.37	8300	2.44	13300	3.09		
3400	1.38	8400	2.47	13400	3.10		
3500	1.41	8500	2.48	13500	3.13		
3600	1.43	8600	2.51	13600	3.17		
3700	1.46	8700	2.53	13700	3.17		
3800	1.47	8800	2.55	13800	3.18		
3900	1.49	8900	2.56	13900	3.22		
4000	1.52	9000	2.57	14000	3.26		
4100	1.55	9100	2.58	14100	3.28		
4200	1.56	9200	2.59	14200	3.30		
4300	1.58	9300	2.59	14300	3.35		
4400	1.60	9400	2.60	14400	3.39		
4500	1.63	9500	2.60	14500	3.39		
4600	1.65	9600	2.61	14600	3.39		
4700	1.67	9700	2.61	14700	3.41		

Cable loss
Test cable, Mini-Circuits, S/N 70050, 18 GHz, 1.8 m, SMA/M - N/M
CBL-6FT-SMNM+, HL 4275

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	5000	1.71	10200	2.64	15400	3.46
30	0.11	5100	1.73	10300	2.65	15500	3.47
50	0.14	5200	1.75	10400	2.66	15600	3.52
100	0.21	5300	1.76	10500	2.67	15700	3.55
200	0.30	5400	1.77	10600	2.70	15800	3.55
300	0.37	5500	1.82	10700	2.71	15900	3.55
400	0.43	5600	1.84	10800	2.72	16000	3.61
500	0.49	5700	1.86	10900	2.73	16100	3.62
600	0.54	5800	1.86	11000	2.75	16200	3.63
700	0.58	5900	1.89	11100	2.77	16300	3.62
800	0.62	6000	1.94	11200	2.78	16400	3.66
900	0.66	6100	1.95	11300	2.80	16500	3.71
1000	0.70	6200	1.96	11400	2.82	16600	3.71
1100	0.74	6300	1.97	11500	2.83	16700	3.67
1200	0.78	6400	2.01	11600	2.84	16800	3.69
1300	0.81	6500	2.03	11700	2.86	16900	3.74
1400	0.84	6600	2.02	11800	2.88	17000	3.73
1500	0.88	6700	2.02	11900	2.89	17100	3.71
1600	0.91	6800	2.05	12000	2.90	17200	3.73
1700	0.94	6900	2.06	12100	2.92	17300	3.77
1800	0.97	7000	2.07	12200	2.93	17400	3.77
1900	1.00	7100	2.07	12300	2.94	17500	3.76
2000	1.02	7200	2.08	12400	2.96	17600	3.76
2100	1.05	7300	2.11	12500	2.98	17700	3.78
2200	1.07	7400	2.13	12600	2.99	17800	3.80
2300	1.10	7500	2.15	12700	3.01	17900	3.79
2400	1.13	7600	2.16	12800	3.03	18000	3.78
2500	1.15	7700	2.18	12900	3.05		
2600	1.18	7800	2.21	13000	3.07		
2700	1.20	7900	2.24	13100	3.09		
2800	1.24	8000	2.25	13200	3.12		
2900	1.26	8100	2.26	13300	3.13		
3000	1.28	8200	2.29	13400	3.14		
3100	1.30	8300	2.31	13500	3.16		
3200	1.33	8400	2.33	13600	3.18		
3300	1.36	8500	2.33	13700	3.19		
3400	1.37	8600	2.34	13800	3.21		
3500	1.39	8700	2.36	13900	3.23		
3600	1.42	8800	2.38	14000	3.25		
3700	1.45	8900	2.39	14100	3.26		
3800	1.46	9000	2.40	14200	3.27		
3900	1.48	9100	2.42	14300	3.30		
4000	1.50	9200	2.45	14400	3.32		
4100	1.53	9300	2.46	14500	3.33		
4200	1.55	9400	2.48	14600	3.34		
4300	1.57	9500	2.50	14700	3.36		
4400	1.59	9600	2.52	14800	3.39		
4500	1.61	9700	2.54	14900	3.40		
4600	1.64	9800	2.56	15000	3.41		
4700	1.66	9900	2.58	15100	3.41		
4800	1.67	10000	2.60	15200	3.44		
4900	1.69	10100	2.61	15300	3.46		

Cable loss
Low Loss Armored Test Cable, MegaPhase, 18 GHz, 6.2 m, N type-M/N type-M,
NC29-N1N1-244S/N 12025101 003,
HL 4353

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
50	0.20	9000	2.71
100	0.27	9500	2.81
300	0.47	10000	2.90
500	0.61	10500	2.97
1000	0.87	11000	3.06
1500	1.07	11500	3.13
2000	1.24	12000	3.20
2500	1.39	12500	3.26
3000	1.53	13000	3.34
3500	1.65	13500	3.39
4000	1.77	14000	3.47
4500	1.89	14500	3.54
5000	1.99	15000	3.62
5500	2.07	15500	3.69
6000	2.20	16000	3.76
6500	2.30	16500	3.83
7000	2.39	17000	3.86
7500	2.51	17500	3.94
8000	2.58	18000	4.02
8500	2.65		

Cable loss
RF Cable, Huber-Suhner, 18 GHz, 6 m, N- type,
SF106A/11N/11N/6000MM, S/N 500849/6A
HL 5103

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
0.1	0.01	5500	2.43
50	0.22	6000	2.54
100	0.31	6500	2.66
200	0.43	7000	2.76
300	0.53	7500	2.87
400	0.62	8000	2.97
500	0.69	8500	3.07
600	0.76	9000	3.17
700	0.82	9500	3.27
800	0.88	10000	3.36
900	0.94	10500	3.45
1000	0.99	11000	3.54
1100	1.04	11500	3.62
1200	1.08	12000	3.71
1300	1.13	12500	3.79
1400	1.17	13000	3.88
1500	1.21	13500	3.97
1600	1.26	14000	4.05
1700	1.30	14500	4.13
1800	1.33	15000	4.22
1900	1.37	15500	4.30
2000	1.41	16000	4.38
2500	1.59	16500	4.45
3000	1.75	17000	4.52
3500	1.90	17500	4.61
4000	2.04	18000	4.72
4500	2.17		
5000	2.30		

Cable loss
RF Cable, Huber-Suhner, 40 GHz, 5.5 m, K type,
SF102EA/11SK/11SK/5500MM, S/N 502493/2EA
HL 5111

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
100	0.68	20500	10.17
200	0.97	21000	10.30
300	1.18	21500	10.43
500	1.52	22000	10.58
1000	2.14	22500	10.73
1500	2.62	23000	10.85
2000	3.03	23500	10.98
2500	3.39	24000	11.11
3000	3.72	24500	11.20
3500	4.03	25000	11.32
4000	4.32	25500	11.47
4500	4.59	26000	11.59
5000	4.84	26500	11.72
5500	5.09	27000	11.83
6000	5.32	27500	11.94
6500	5.55	28000	12.04
7000	5.77	28500	12.16
7500	5.99	29000	12.28
8000	6.19	29500	12.40
8500	6.40	30000	12.50
9000	6.60	30500	12.59
9500	6.79	31000	12.68
10000	6.98	31500	12.80
10500	7.16	32000	12.94
11000	7.34	32500	13.09
11500	7.51	33000	13.23
12000	7.68	33500	13.32
12500	7.84	34000	13.44
13000	8.00	34500	13.54
13500	8.15	35000	13.68
14000	8.31	35500	13.81
14500	8.46	36000	13.90
15000	8.62	36500	13.99
15500	8.76	37000	14.12
16000	8.91	37500	14.22
16500	9.06	38000	14.33
17000	9.21	38500	14.47
17500	9.35	39000	14.54
18000	9.49	39500	14.62
18500	9.62	40000	14.75
19000	9.76		
19500	9.90		
20000	10.05		

13 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μ V)	decibel referred to one microvolt
dB(μ V/m)	decibel referred to one microvolt per meter
dB(μ A)	decibel referred to one microampere
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μ s	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω	Ohm
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt

END OF DOCUMENT