

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: EB1173
FCC ID: JOYEB1173

In accordance with FCC Part 24 Subpart E

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Hiroaki Suzuki	Deputy Manager of RF Group	Approved Signatory	2023.09.27

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EXECUTIVE SUMMARY - Result: Complied

A sample(s) of this product was tested and the result above was confirmed in accordance with FCC Part 24 Subpart E.



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1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-23101-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 24 Subpart E

1.3 Test methods

KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA 603-E-2016
ANSI C63.26-2015

1.4 Deviation from standards

None

1.5 List of applied test(s) of the EUT

Test item section	Test item	Condition	Result	Remark
2.1046	Conducted Output Power	Conducted	PASS	*1
24.232(c)	Equivalent Isotropic Radiated Power	Radiated	PASS	-
24.232(d)	Peak to Average Ratio	Conducted	PASS	-
24.238(a) 2.1049	Occupied Bandwidth	Conducted	PASS	-
24.238(a) 2.1051	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS	-
24.238(a) 2.1053	Radiated emissions and Harmonic Emissions	Radiated	PASS	-
24.235 2.1055	Frequency Stability	Conducted	PASS	-

*1: Refer to RF Exposure Report (Test Report_SAR)

1.6 Test information

None

1.7 Test set up

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1.8 Test period

27-July-2023 - 20-August-2023

2 Equipment Under Test

All information in this chapter was provided by the applicant.

2.1 EUT information

Applicant	KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment Under Test (EUT)	Mobile Phone
Model number	EB1173
Serial number	350614610004032, 350614610006516, 350614610006607
Trade name	Kyocera
Number of sample(s)	3
EUT condition	Pre-Production
Power rating	Battery: DC 3.87 V
Size	(W) 81.2 mm × (D) 17.5 mm × (H) 164.9 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20 °C to 60 °C
Hardware version	DMT1
Software version	EB1173_nightly_20230713
Firmware version	Not applicable
RF Specification	
Frequency of Operation	Up Link GSM1900: 1850.2-1909.8 MHz WCDMA Band II: 1852.4-1907.6MHz LTE Band II: 1850.7-1909.3MHz Down Link GSM1900: 1930.2-1989.8 MHz WCDMA Band II: 1932.4-1987.6MHz LTE Band II: 1930.7-1989.3MHz
Modulation type	GSM1900: GMSK WCDMA Band II: QPSK, 16QAM LTE Band II: QPSK, 16QAM, 64QAM
Emission designator	GSM1900: 247KGXW WCDMA Band II: 4M14F9W LTE Band II: BW 1.4M QPSK: 1M09G7D, 16QAM: 1M10W7D, 64QAM: 1M09W7D BW 3M QPSK: 2M70G7D, 16QAM: 2M71W7D, 64QAM: 2M72W7D BW 5M QPSK: 4M50G7D, 16QAM: 4M49W7D, 64QAM: 4M50W7D BW 10M QPSK: 8M99G7D, 16QAM: 8M99W7D, 64QAM: 8M98W7D BW 15M QPSK: 13M5G7D, 16QAM: 13M5W7D, 64QAM: 13M5W7D BW 20M QPSK: 17M9G7D, 16QAM: 17M9W7D, 64QAM: 17M9W7D



Equivalent Isotropic Radiated Power (E.I.R.P)	GSM1900: 1.349 W (31.3dBm) WCDMA Band II: 0.200W (23.0dBm) LTE Band II: 0.174W (22.4dBm)
Antenna type	Internal antenna
Antenna gain	GSM1900: -0.4 dBi WCDMA Band II: -0.4 dBi LTE Band II: -0.4 dBi

2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

Modification State	Description of Modification	Modification fitted by	Date of Modification
Model: EB1173, Serial Number: 350614610004032, 350614610006516, 350614610006607			
0	As supplied by the applicant	Not Applicable	Not Applicable

2.3 Variation of family model(s)

2.3.1 List of family model(s)

	EB1173		EB1169		EB1185		EB1205	
	Pattern1 *	Pattern2	Pattern1	Pattern2	Pattern1	Pattern2	Pattern1	Pattern2
hybrid shield	without	with	with	without	with	without	without	with
Radio Function (Cellular)	4G:B2/B4/B5/B12/B41 3G:B2/B4/B5 2G:850/1900						no ※Components are mounted	
Radio Function (etc)	WiFi:2.4G/5G BT/NFC+FeliCa/GPS							
Size	164.9x81.2x17.5[mm]							

*: Tested

The hybrid shield is a resin, so there is no EMC impact.

The hybrid shield is mounted on top of the screen (tempered glass), but the enclosure size remains unchanged.

EB1205 does not use WWAN (2G/3G/4G) functionality. However, WWAN (2G/3G/4G) components are installed.

2.3.2 Reason for selection of EUT

The applicant decided that the differences between the hybrid shield and the design had no EMC impact and selected EB1173 Pattern1 with full function.

2.4 Description of test mode

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]
GSM1900	GMSK	-	512, 661, 810	1850.2, 1880.0, 1909.8
WCDMA Band II	QPSK, 16QAM	-	9262, 9400, 9538	1852.4, 1880.0, 1907.6
LTE Band II	QPSK, 16QAM, 64QAM	1.4	18607, 18900, 19193	1850.7, 1880.0, 1909.3
		3	18615, 18900, 19185	1851.5, 1880.0, 1908.5
		5	18625, 18900, 19175	1852.5, 1880.0, 1907.5
		10	18650, 18900, 19150	1855.0, 1880.0, 1905.0
		15	18675, 18900, 19125	1857.5, 1880.0, 1902.5
		20	18700, 18900, 19100	1860.0, 1880.0, 1900.0

The field strength of spurious emissions was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.

The worst emission was found in Y-axis (All Bands), and the worst case recorded.

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.



3 Configuration of Equipment

Numbers assigned to equipment on the diagram in “3.2 System configuration” correspond to the list in “3.1 Equipment used”.

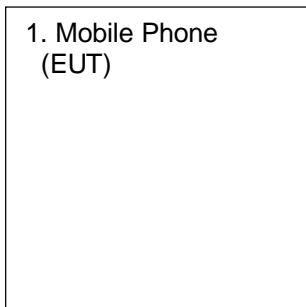
This test configuration is based on the manufacture’s instruction.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

3.1 Equipment used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Mobile Phone	KYOCERA	EB1173	350614610004032, 350614610006516, 350614610006607	JOYEB1173	EUT

3.2 System configuration



4 Test Result

4.1 Equivalent Isotropic Radiated Power

4.1.1 Measurement procedure

[FCC 24.232(c)]

<Step 1>

The EUT and support equipment are placed on a 0.6 meter x 0.6 meter surface, 1.5 meter height styrene foam table. Radiated emission measurements are performed at 3 meter distance with the broadband antenna (double ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission.

The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

<Step 2>

The substitution antenna is replaced by the transmitter antenna (EUT).

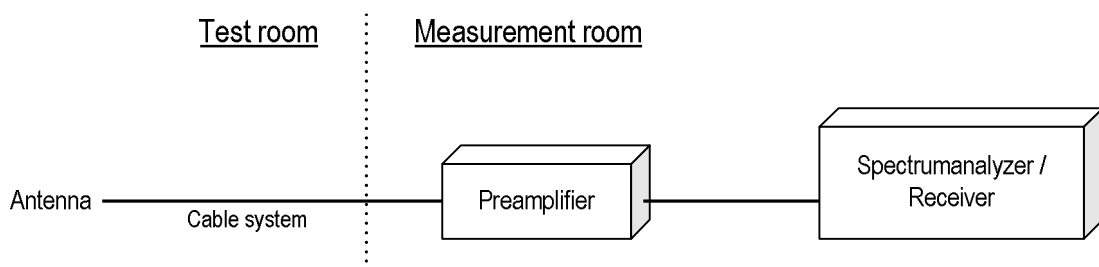
The frequency of the signal generator is adjusted to the measurement frequency.

Level of the signal generator is adjusted to the level that is obtained from step 1, and record the emission level of signal generator.

The spectrum analyzer is set to;

- a) Span = 1.5 times the OBW
- b) RBW = 1-5% of the expected OBW, not to exceed 1 MHz
- c) VBW $\geq 3 \times$ RBW
- d) Number of sweep points $\geq 2 \times$ span / RBW
- e) Sweep time = auto-couple
- f) Detector = RMS (power averaging)
- g) If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
- h) If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
- i) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

- Test configuration



4.1.2 Calculation method

Result (EIRP) = Ant. Input - Cable loss + Antenna Gain
Margin = Limit – Result (EIRP)

Example:

Limit @ 1880 MHz: 33.0 dBm
Ant. Input = 25.0 dBm Cable loss = 1.1dB Ant. Gain = 4.7 dBi
Result = 25.0 - 1.1 + 4.7 = 28.6 dBm
Margin = 33.0 - 28.6 = 4.4 dB

4.1.3 Limit

2 W (33 dBm)

4.1.4 Test data

Date	:	27~28-July-2023	Test engineer	:	
Temperature	:	24.4 [°C]			
Humidity	:	69.6 [%]			
Test place	:	3m Semi-anechoic chamber		:	<u>Tadahiro Seino</u>
Date	:	28-July-2023	Test engineer	:	
Temperature	:	23.8 [°C]			
Humidity	:	68.4 [%]			
Test place	:	3m Semi-anechoic chamber		:	<u>Chiaki Kanno</u>
Date	:	8~9-August-2023	Test engineer	:	
Temperature	:	24.3 [°C]			
Humidity	:	70.0 [%]			
Test place	:	3m Semi-anechoic chamber		:	<u>Chiaki Kanno</u>

[GSM1900]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1850.2	-50.1	28.3	1.6	4.6	31.3	1.349	33.0	1.7
H	1880.0	-50.7	27.0	1.6	4.6	30.0	1.000	33.0	3.0
H	1909.8	-50.5	27.8	1.6	4.6	30.8	1.202	33.0	2.2

[WCDMA Band II]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1852.4	-30.0	20.0	1.6	4.6	23.0	0.200	33.0	10.0
H	1880.0	-30.4	19.3	1.6	4.6	22.3	0.170	33.0	10.7
H	1907.6	-30.2	19.7	1.6	4.6	22.7	0.186	33.0	10.3

**[LTE Band II]
QPSK, BW 1.4MHz**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1850.7	-31.7	18.6	1.6	4.6	21.6	0.145	33.0	11.4
H	1880.0	-32.5	17.3	1.6	4.6	20.3	0.107	33.0	12.7
H	1909.3	-32.2	17.8	1.6	4.6	20.8	0.120	33.0	12.2

16QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1850.7	-32.8	17.5	1.6	4.6	20.5	0.112	33.0	12.5
H	1880.0	-33.6	16.2	1.6	4.6	19.2	0.083	33.0	13.8
H	1909.3	-33.2	16.8	1.6	4.6	19.8	0.095	33.0	13.2

64QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1850.7	-33.6	16.7	1.6	4.6	19.7	0.093	33.0	13.3
H	1880.0	-34.5	15.3	1.6	4.6	18.3	0.068	33.0	14.7
H	1909.3	-34.3	15.7	1.6	4.6	18.7	0.074	33.0	14.3

QPSK, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1851.5	-31.5	19.3	1.6	4.6	22.3	0.170	33.0	10.7
H	1880.0	-32.5	17.3	1.6	4.6	20.3	0.107	33.0	12.7
H	1908.5	-31.9	18.2	1.6	4.6	21.2	0.132	33.0	11.8

16QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1851.5	-32.5	18.3	1.6	4.6	21.3	0.135	33.0	11.7
H	1880.0	-33.3	16.5	1.6	4.6	19.5	0.089	33.0	13.5
H	1908.5	-32.8	17.3	1.6	4.6	20.3	0.107	33.0	12.7

64QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1851.5	-33.4	17.4	1.6	4.6	20.4	0.110	33.0	12.6
H	1880.0	-34.5	15.3	1.6	4.6	18.3	0.068	33.0	14.7
H	1908.5	-34.0	16.1	1.6	4.6	19.1	0.081	33.0	13.9

**[LTE Band II]
QPSK, BW 5MHz**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1852.5	-31.9	18.9	1.6	4.6	21.9	0.155	33.0	11.1
H	1880.0	-32.8	17.0	1.6	4.6	20.0	0.100	33.0	13.0
H	1907.5	-32.3	17.8	1.6	4.6	20.8	0.120	33.0	12.2

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1852.5	-32.9	17.9	1.6	4.6	20.9	0.123	33.0	12.1
H	1880.0	-33.7	16.1	1.6	4.6	19.1	0.081	33.0	13.9
H	1907.5	-33.1	17.0	1.6	4.6	20.0	0.100	33.0	13.0

64QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1852.5	-33.8	17.0	1.6	4.6	20.0	0.100	33.0	13.0
H	1880.0	-34.8	15.0	1.6	4.6	18.0	0.063	33.0	15.0
H	1907.5	-34.2	15.9	1.6	4.6	18.9	0.078	33.0	14.1

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1855.0	-31.7	18.5	1.6	4.6	21.5	0.141	33.0	11.5
H	1880.0	-32.4	17.4	1.6	4.6	20.4	0.110	33.0	12.6
H	1905.0	-32.0	18.4	1.6	4.6	21.4	0.138	33.0	11.6

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1855.0	-32.6	17.6	1.6	4.6	20.6	0.115	33.0	12.4
H	1880.0	-33.4	16.4	1.6	4.6	19.4	0.087	33.0	13.6
H	1905.0	-32.9	17.5	1.6	4.6	20.5	0.112	33.0	12.5

64QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1855.0	-33.8	16.4	1.6	4.6	19.4	0.087	33.0	13.6
H	1880.0	-34.3	15.5	1.6	4.6	18.5	0.071	33.0	14.5
H	1905.0	-34.1	16.2	1.6	4.6	19.2	0.083	33.0	13.8

**[LTE Band II]
QPSK, BW 15MHz**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1857.5	-31.4	18.5	1.6	4.6	21.5	0.141	33.0	11.5
H	1880.0	-32.5	17.3	1.6	4.6	20.3	0.107	33.0	12.7
H	1902.5	-31.2	19.4	1.6	4.7	22.4	0.174	33.0	10.6

16QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1857.5	-32.4	17.5	1.6	4.6	20.5	0.112	33.0	12.5
H	1880.0	-33.1	16.7	1.6	4.6	19.7	0.093	33.0	13.3
H	1902.5	-32.0	18.6	1.6	4.7	21.6	0.145	33.0	11.4

64QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1857.5	-33.2	16.7	1.6	4.6	19.7	0.093	33.0	13.3
H	1880.0	-34.3	15.5	1.6	4.6	18.5	0.071	33.0	14.5
H	1902.5	-33.0	17.6	1.6	4.7	20.6	0.115	33.0	12.4

QPSK, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1860.0	-31.4	18.5	1.6	4.6	21.5	0.141	33.0	11.5
H	1880.0	-32.2	17.6	1.6	4.6	20.6	0.115	33.0	12.4
H	1900.0	-31.7	19.1	1.6	4.7	22.1	0.162	33.0	10.9

16QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1860.0	-32.4	17.5	1.6	4.6	20.5	0.112	33.0	12.5
H	1880.0	-33.0	16.8	1.6	4.6	19.8	0.095	33.0	13.2
H	1900.0	-32.7	18.1	1.6	4.7	21.1	0.129	33.0	11.9

64QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1860.0	-33.4	16.5	1.6	4.6	19.5	0.089	33.0	13.5
H	1880.0	-34.1	15.7	1.6	4.6	18.7	0.074	33.0	14.3
H	1900.0	-33.7	17.1	1.6	4.7	20.1	0.102	33.0	12.9

4.2 Peak to Average Ratio

4.2.1 Measurement procedure

[FCC 24.232(d)]

The peak to average ratio was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;

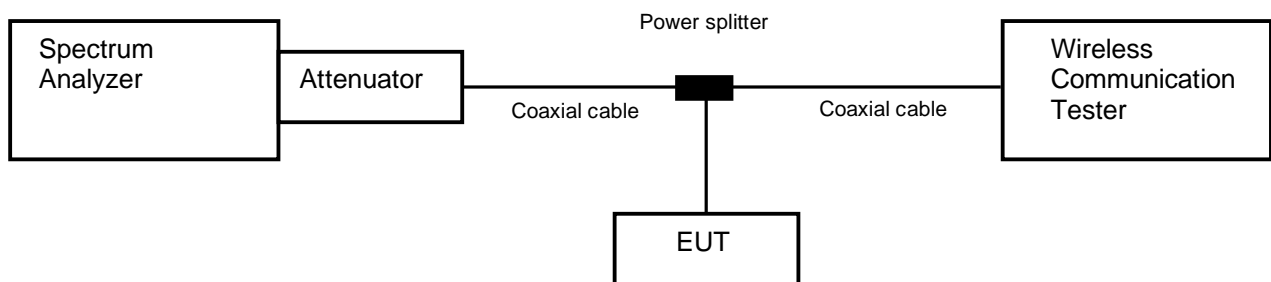
[GSM1900]

- a) Span = 5 MHz
- b) RBW = 1 MHz
- c) VBW $\geq 3 \times$ RBW
- d) Detector = Peak / Average
- e) Sweep time = auto-couple
- f) Trace mode=Max hold

[WCDMA Band II, LTE Band II]

- a) Power Stat CCDF mode
- b) Set resolution / measurement bandwidth \geq signal's occupied bandwidth.
- c) Set the number of counts to a value that stabilizes the measured CCDF curve.
- d) Set the measurement interval as follows:
 - 1) For continuous transmissions, set to 1ms.
 - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst duration.
- e) Record the maximum PAPR level associated with a probability of 0.1%.

- Test configuration



4.2.2 Limit

13 dB or less



4.2.3 Measurement result

Date : 5-August-2023
 Temperature : 23.9 [°C]
 Humidity : 51.8 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 6-August-2023
 Temperature : 23.6 [°C]
 Humidity : 54.9 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

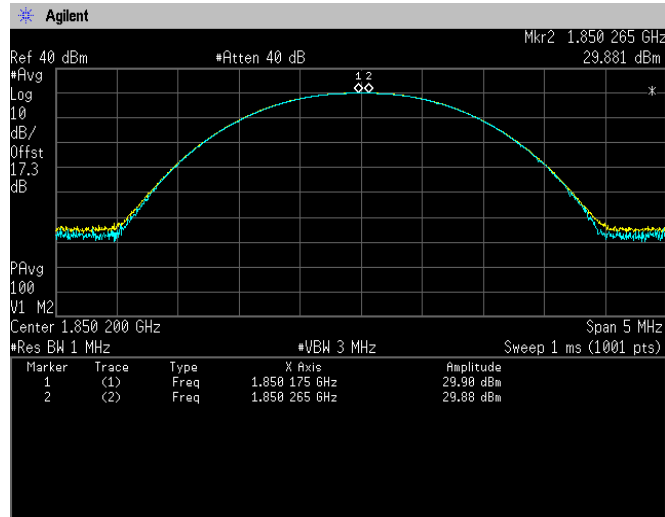
Band	Channel	Frequency [MHz]	Peak to Average Power Ratio [dB]	Limit [dB]
GSM1900	512	1850.2	0.02	13.0
	661	1880.0	0.01	
	810	1909.8	0.01	
WCDMA Band II	9262	1852.4	3.20	13.0
	9400	1880.0	3.49	
	9538	1907.6	3.40	

Band	Channel	Frequency [MHz]	Modulation	Bandwidth [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band II	18900	1880.0	QPSK	1.4	6-0	5.84	13.0
				3	15-0	5.79	
				5	25-0	5.77	
				10	50-0	4.63	
				15	75-0	5.76	
				20	100-0	6.54	
			16QAM	1.4	6-0	6.50	
				3	15-0	6.44	
				5	25-0	6.39	
				10	50-0	6.11	
				15	75-0	6.99	
				20	100-0	7.32	
			64QAM	1.4	6-0	6.86	
				3	15-0	6.61	
				5	25-0	6.53	
				10	50-0	6.41	
				15	75-0	7.14	
				20	100-0	7.28	

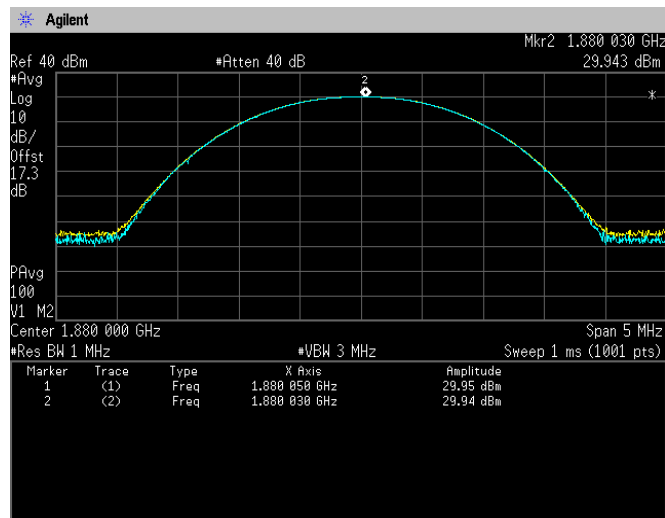
4.2.4 Trace data

[GSM1900]

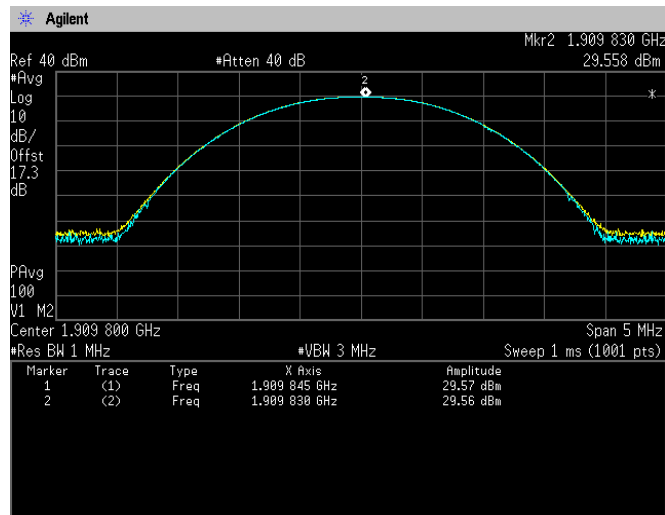
Channel: 512



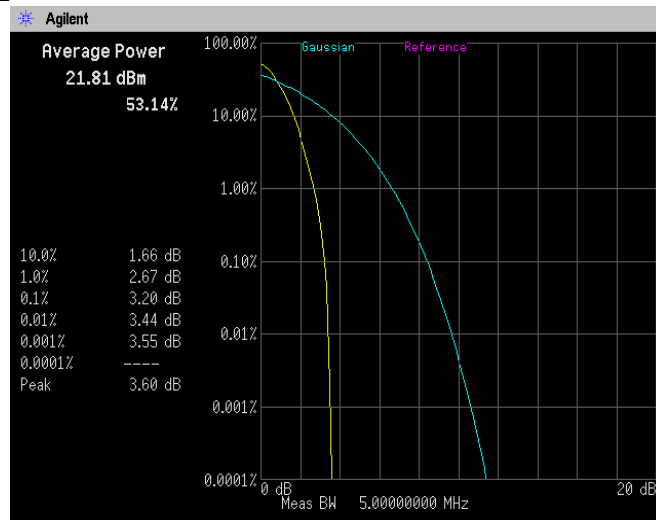
Channel: 661



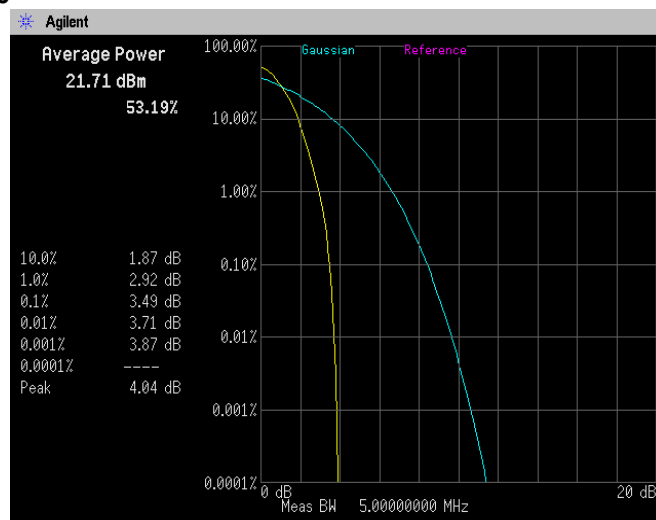
Channel: 810



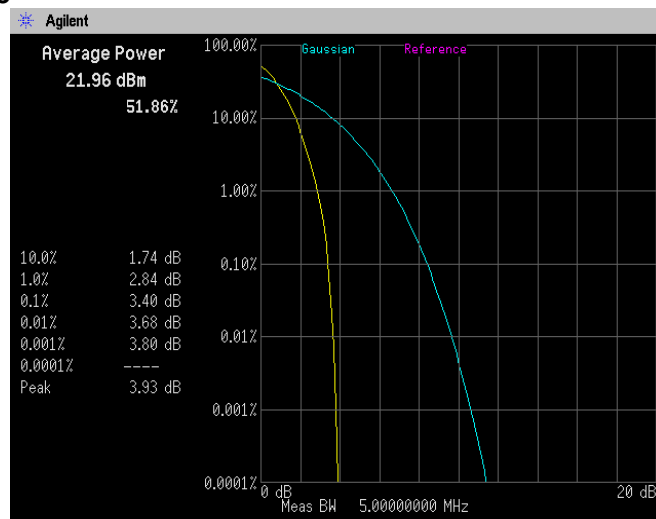
**[WCDMA Band II]
Channel: 9262**



Channel: 9400

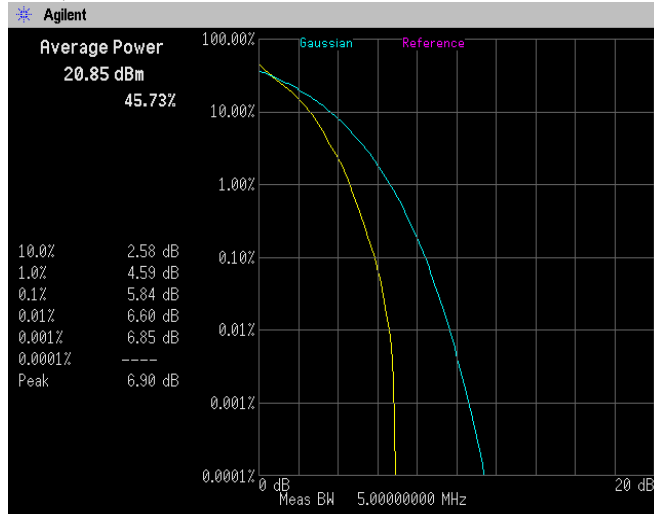


Channel: 9538

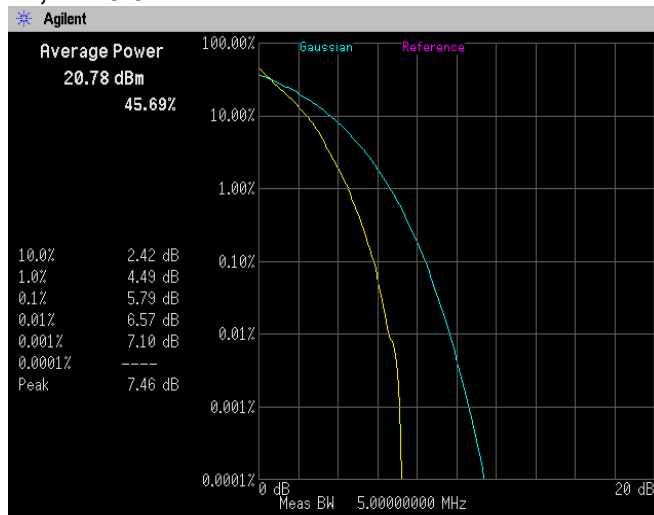


[LTE Band II]

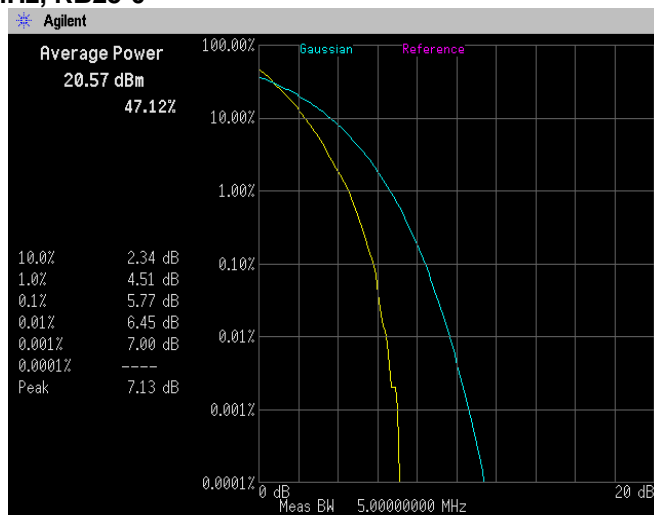
Channel: 18900
 QPSK, BW 1.4MHz, RB6-0



QPSK, BW 3MHz, RB15-0

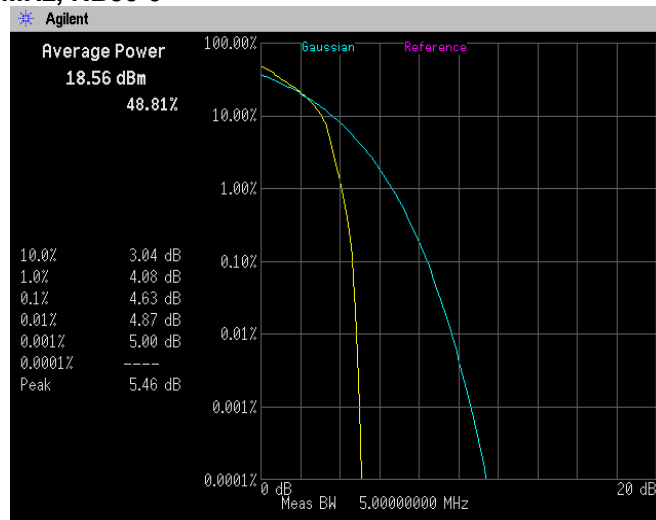


QPSK, BW 5MHz, RB25-0

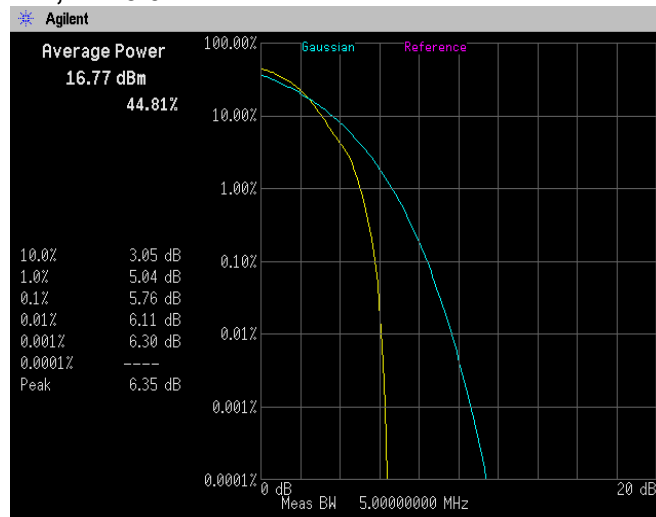


[LTE Band II]

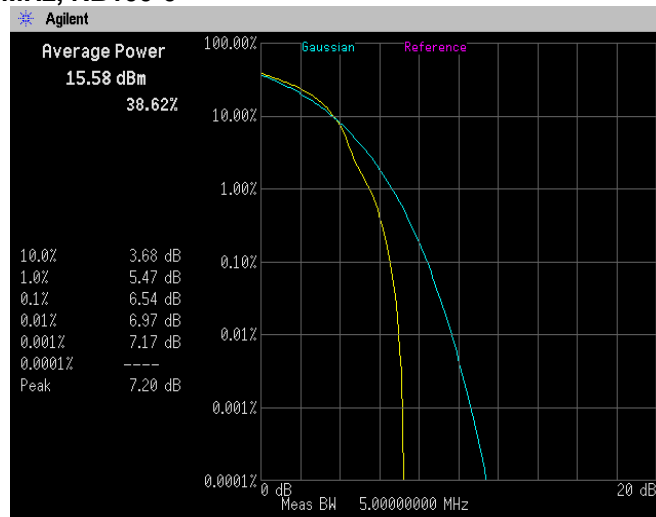
Channel: 18900
 QPSK, BW 10MHz, RB50-0



QPSK, BW 15MHz, RB75-0



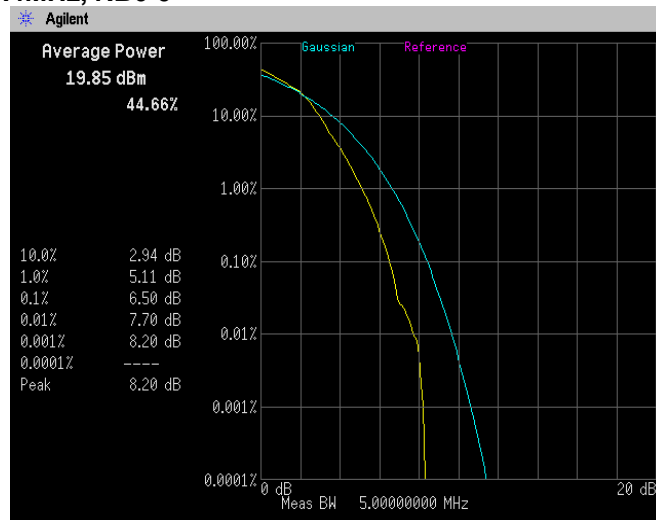
QPSK, BW 20MHz, RB100-0



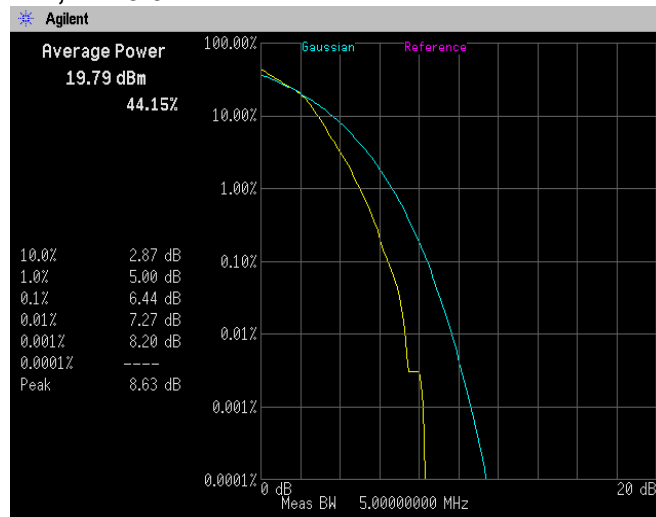
[LTE Band II]

Channel: 18900

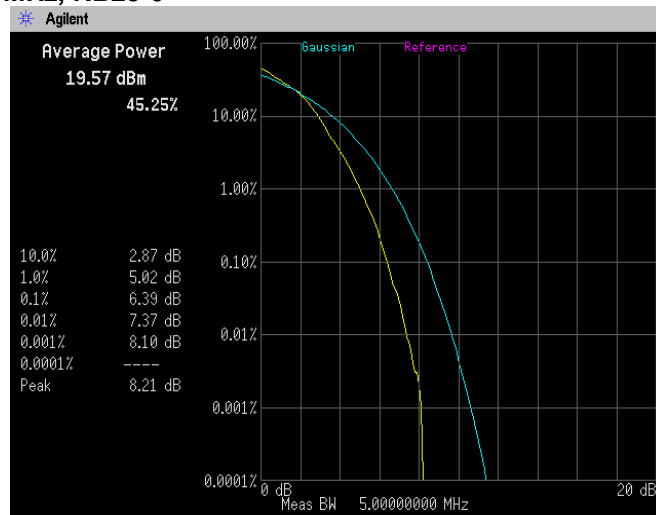
16QAM, BW 1.4MHz, RB6-0



16QAM, BW 3MHz, RB15-0



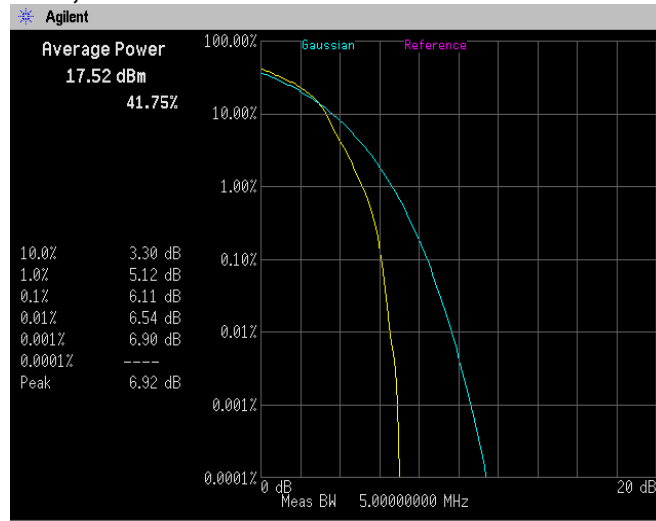
16QAM, BW 5MHz, RB25-0



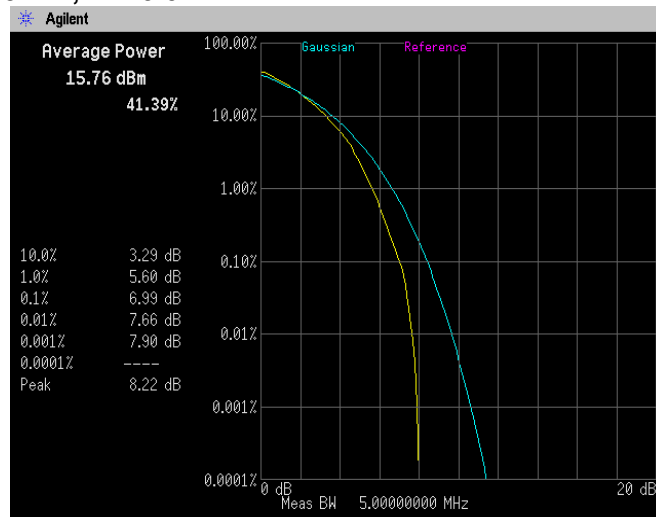
[LTE Band II]

Channel: 18900

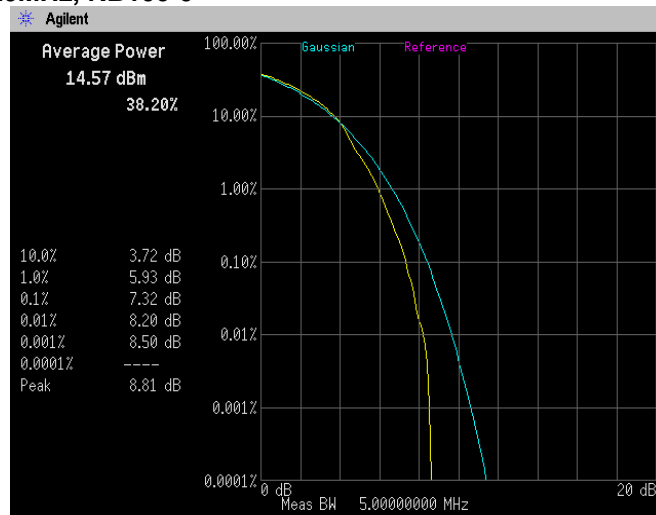
16QAM, BW 10MHz, RB50-0



16QAM, BW 15MHz, RB75-0



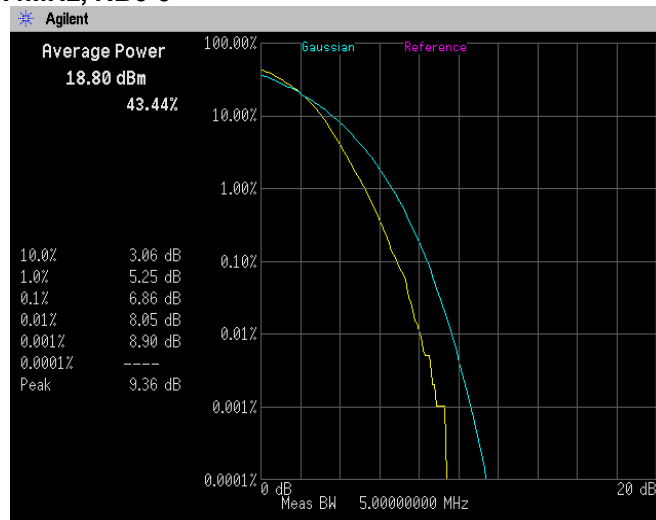
16QAM, BW 20MHz, RB100-0



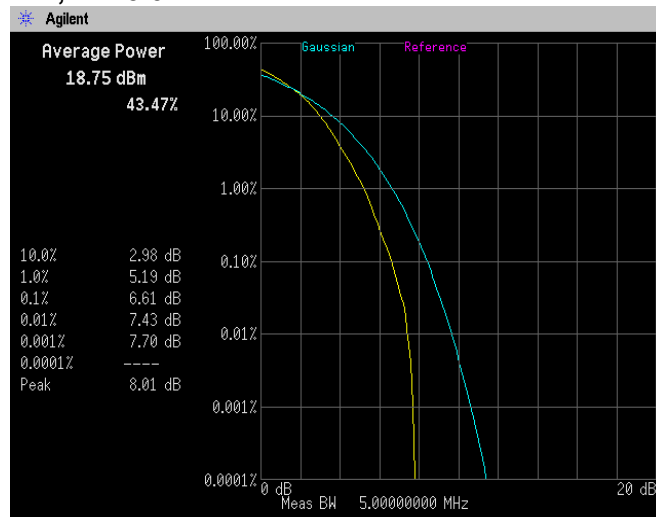
[LTE Band II]

Channel: 18900

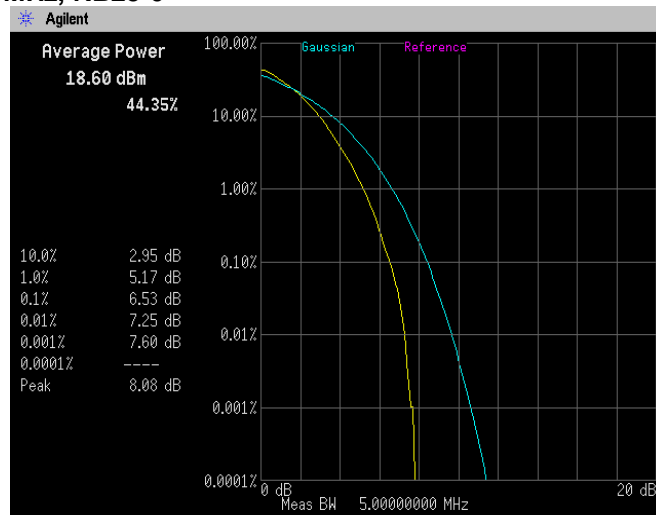
64QAM, BW 1.4MHz, RB6-0



64QAM, BW 3MHz, RB15-0



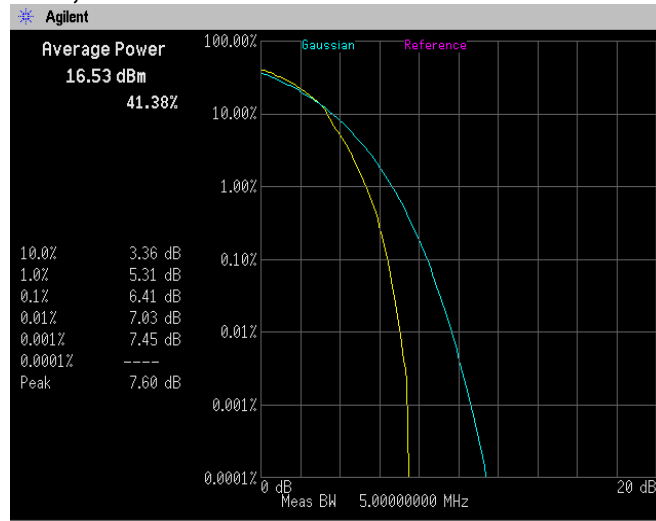
64QAM, BW 5MHz, RB25-0



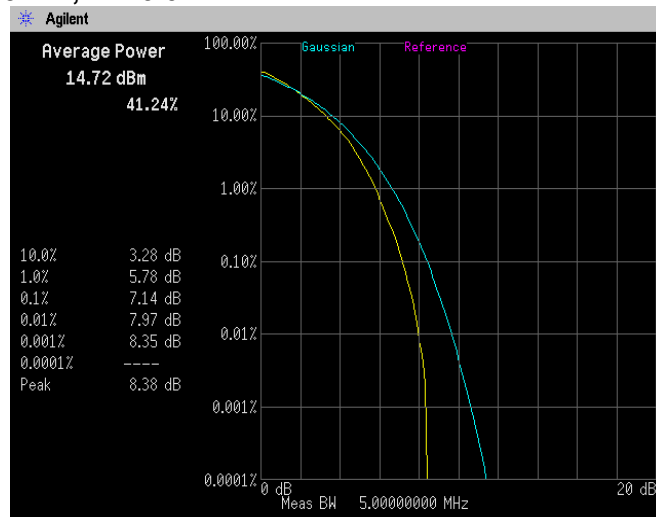
[LTE Band II]

Channel: 18900

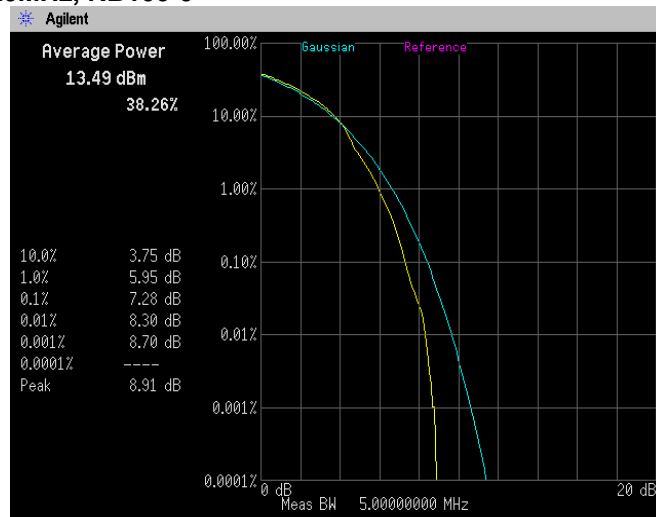
64QAM, BW 10MHz, RB50-0



64QAM, BW 15MHz, RB75-0



64QAM, BW 20MHz, RB100-0



4.3 Occupied Bandwidth

4.3.1 Measurement procedure

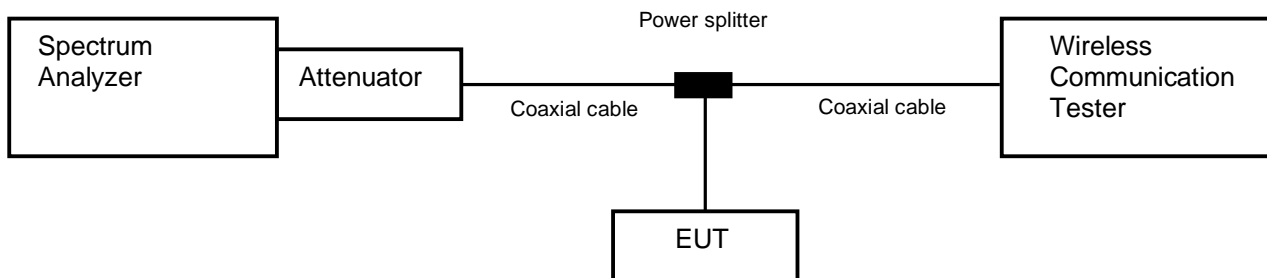
[FCC 24.238(a), 2.1049]

The Occupied bandwidth was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;

- a) RBW = 1-5% of the expected OBW & VBW ≥ 3 x RBW
- b) Detector = Peak
- c) Trace mode = Max hold
- d) Sweep time = auto-couple

- Test configuration



4.3.2 Limit

None

4.3.3 Measurement result

Date : 5-August-2023
 Temperature : 23.9 [°C]
 Humidity : 51.8 [%]
 Test place : Shielded room No.4

Test engineer : Kazunori Saito

Date : 6-August-2023
 Temperature : 23.6 [°C]
 Humidity : 54.9 [%]
 Test place : Shielded room No.4

Test engineer : Kazunori Saito

Band	Channel	Frequency [MHz]	Test Result [kHz]
GSM1900	512	1850.2	246.9498
	661	1880.0	242.9530
	810	1909.8	247.4717
WCDMA Band II	9262	1852.4	4134.5
	9400	1880.0	4140.7
	9538	1907.6	4125.3

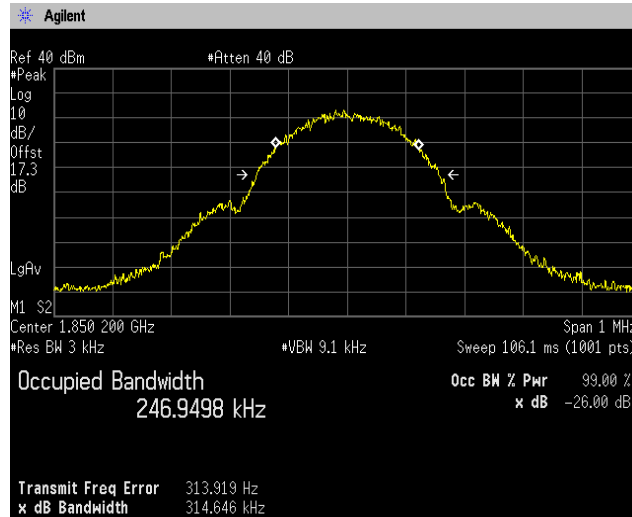


Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band II	18900	1880.0	1.4	QPSK	3-1	0.5993
					6-0	1.0925
				16QAM	3-1	0.6153
					6-0	1.1004
				64QAM	3-1	0.5991
					6-0	1.0905
			3	QPSK	8-4	1.5034
					15-0	2.7039
				16QAM	8-4	1.5276
					15-0	2.7067
				64QAM	8-4	1.5137
					15-0	2.7159
			5	QPSK	12-7	2.2911
					25-0	4.5007
				16QAM	12-7	2.2782
					25-0	4.4948
				64QAM	12-7	2.2637
					25-0	4.4950
			10	QPSK	25-12	4.6453
					50-0	8.9891
				16QAM	25-12	4.6502
					50-0	8.9915
				64QAM	25-12	4.6734
					50-0	8.9786
			15	QPSK	36-20	6.7438
					75-0	13.4772
				16QAM	36-20	6.7119
					75-0	13.4661
				64QAM	36-20	6.6786
					75-0	13.4899
			20	QPSK	50-24	9.1875
					100-0	17.9258
				16QAM	50-24	9.1929
					100-0	17.9124
				64QAM	50-24	9.1977
					100-0	17.8980

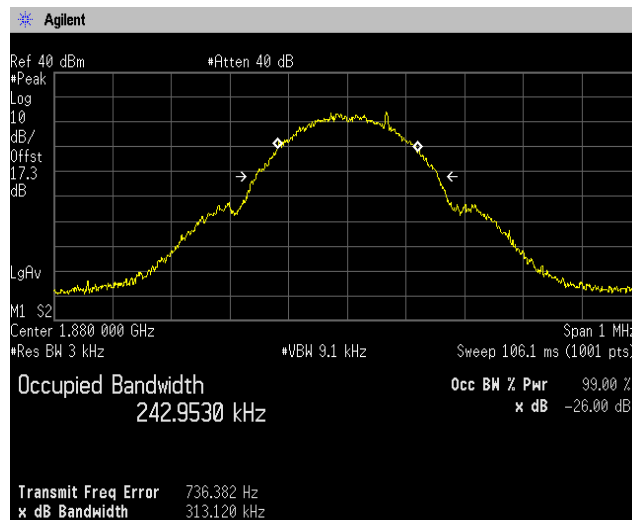
4.3.4 Trace data

[GSM1900]

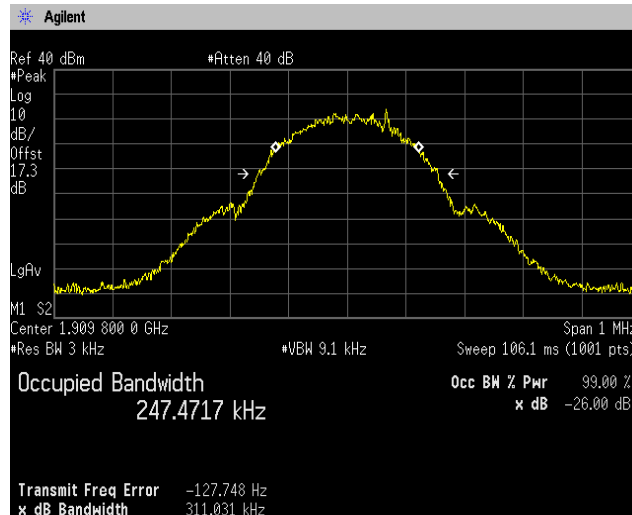
Channel: 512



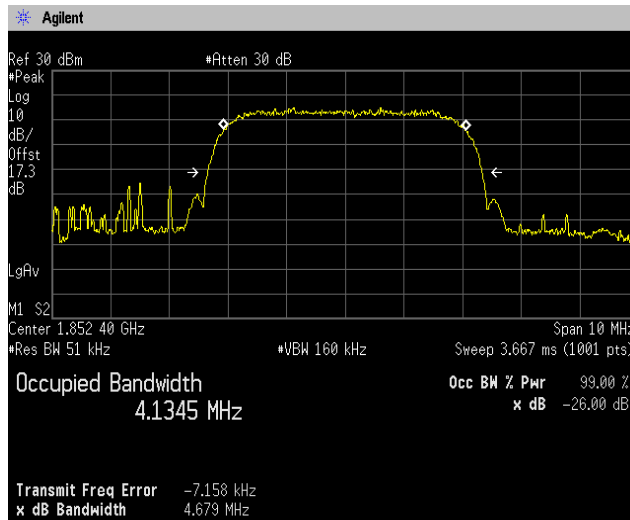
Channel: 661



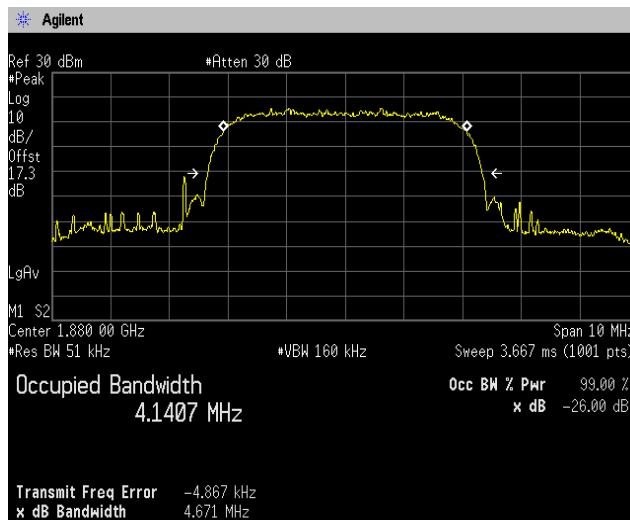
Channel: 810



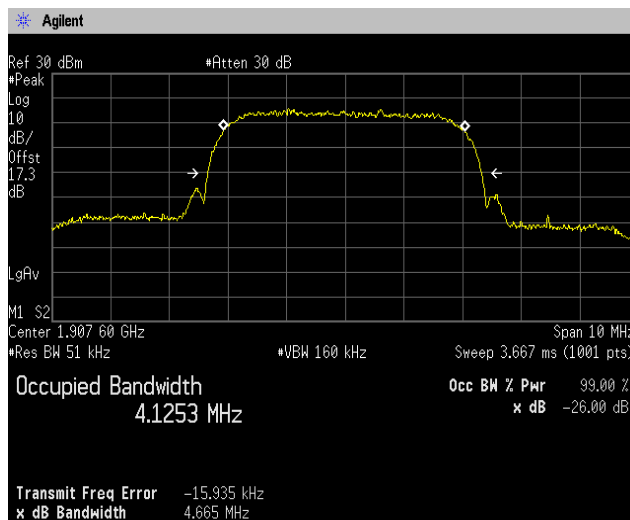
**[WCDMA Band II]
Channel: 9262**



Channel: 9400



Channel: 9538

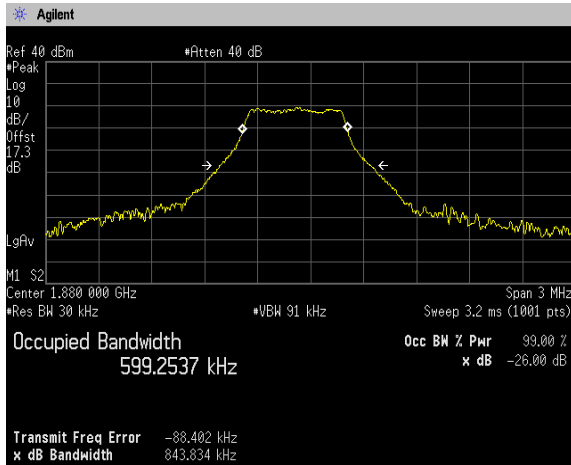




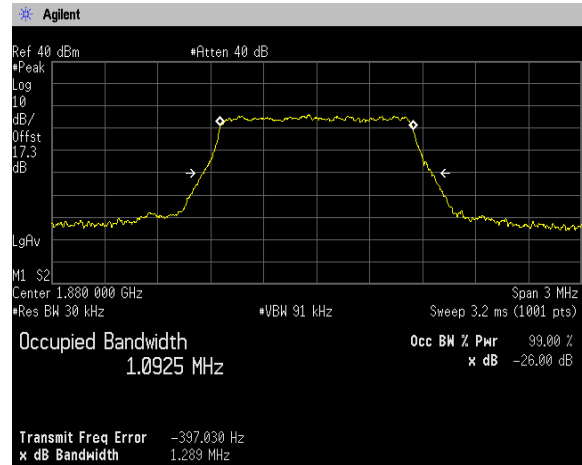
[LTE Band II]
Channel: 18900

QPSK, BW 1.4MHz

RB3-1

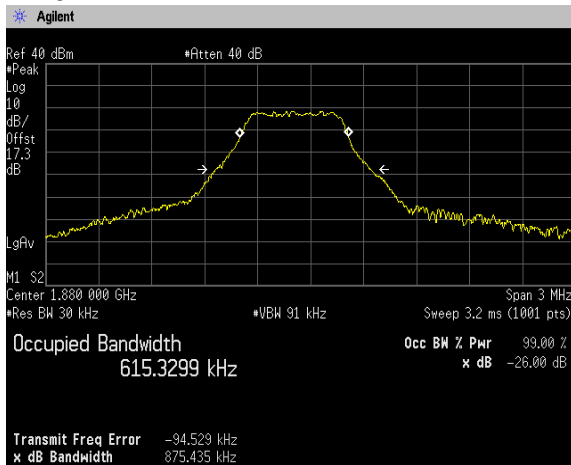


RB6-0

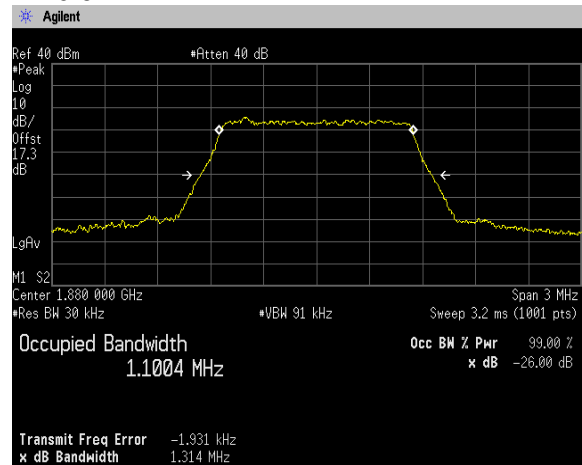


16QAM, BW 1.4MHz

RB3-1

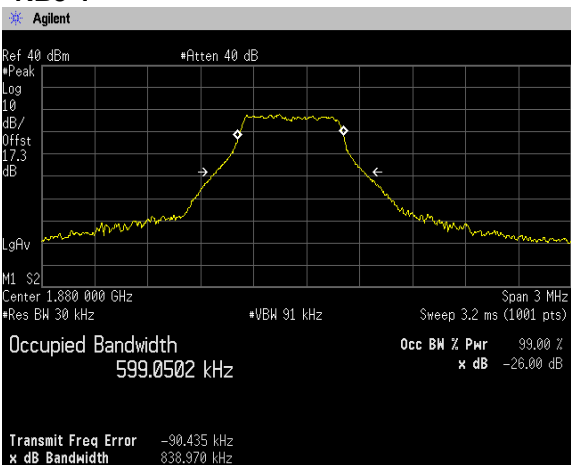


RB6-0

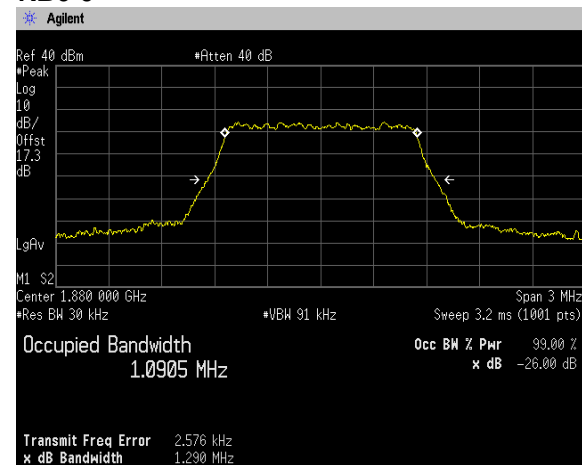


64QAM, BW 1.4MHz

RB3-1



RB6-0

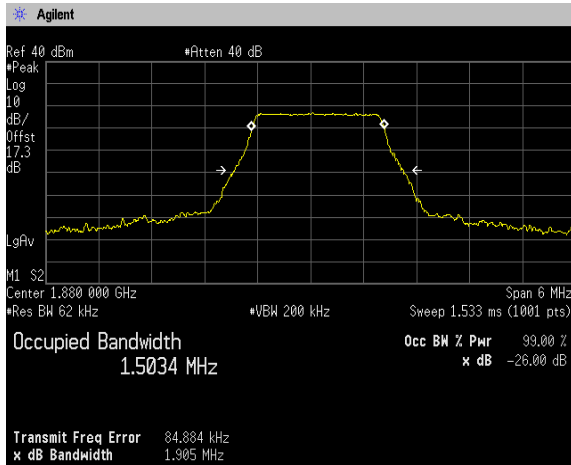




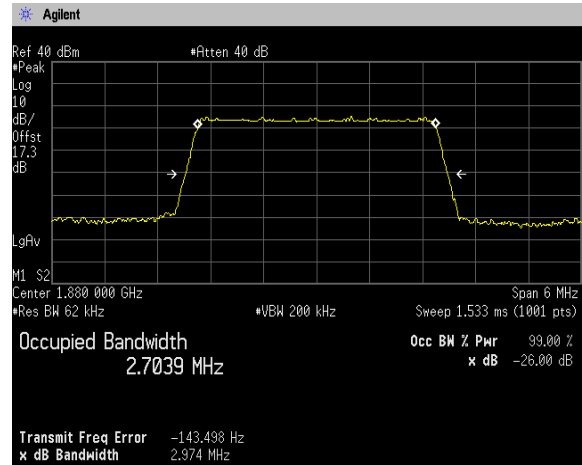
[LTE Band II]
Channel: 18900

QPSK, BW 3MHz

RB8-4

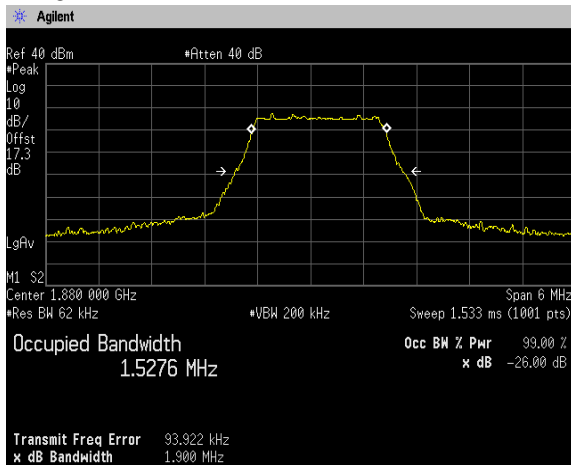


RB15-0

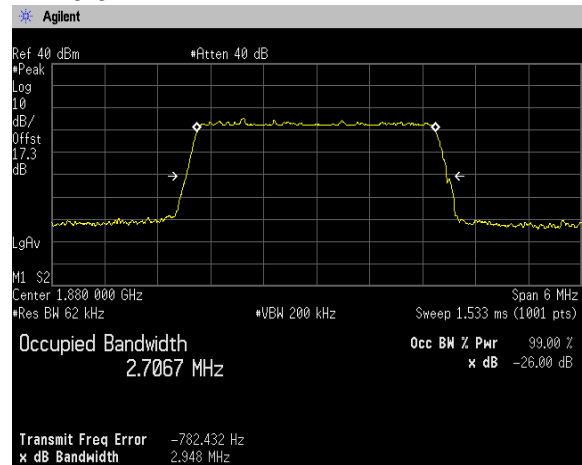


16QAM, BW 3MHz

RB8-4

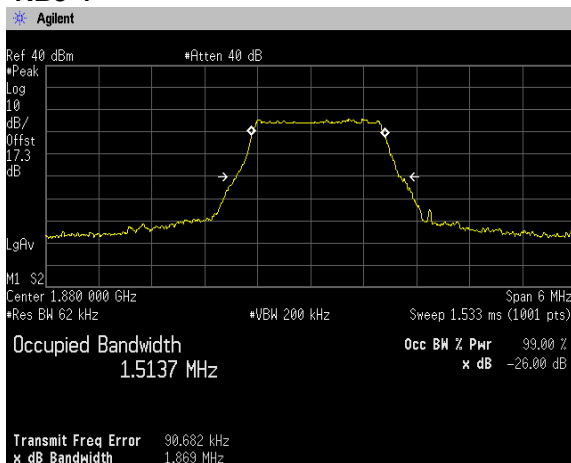


RB15-0

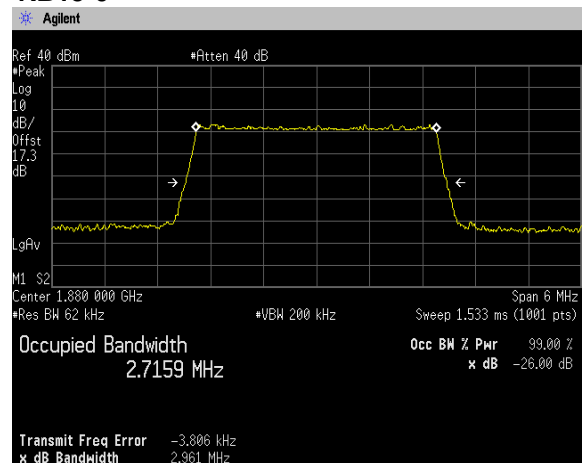


64QAM, BW 3MHz

RB8-4



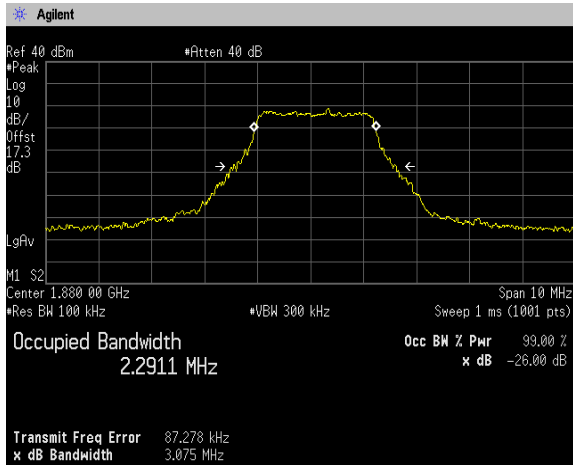
RB15-0



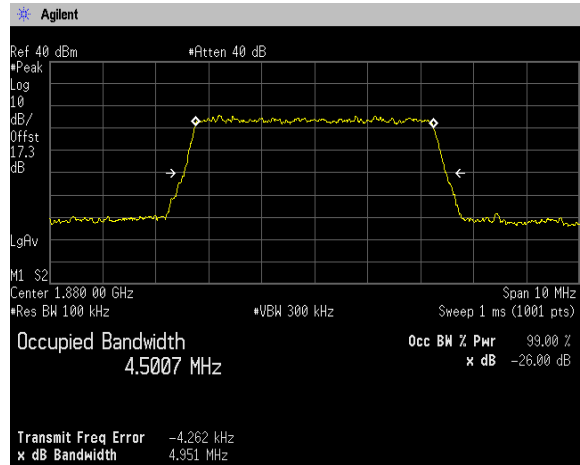


[LTE Band II]
Channel: 18900

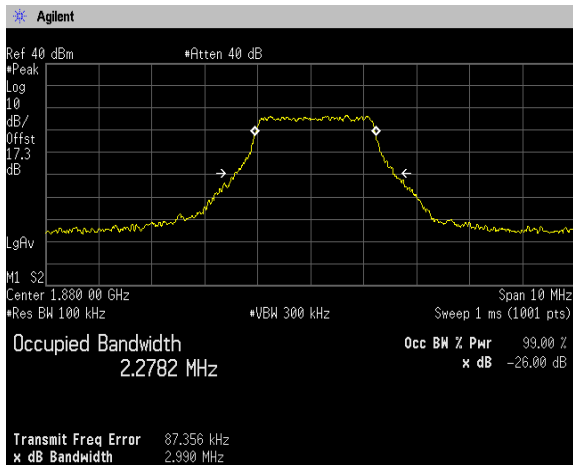
QPSK, BW 5MHz
RB12-7



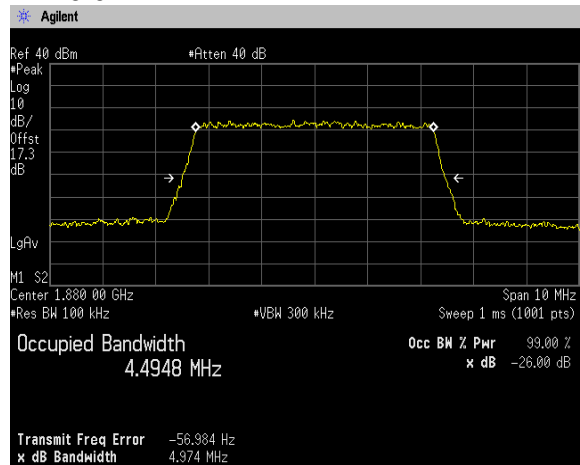
RB25-0



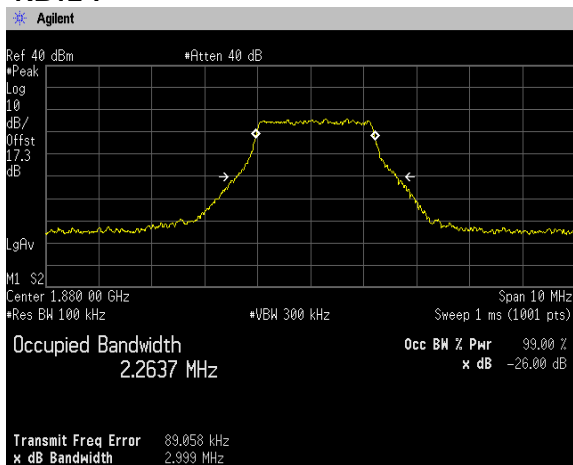
16QAM, BW 5MHz
RB12-7



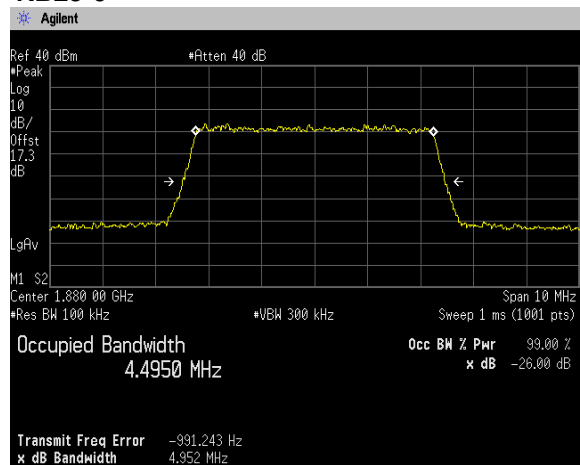
RB25-0



64QAM, BW 5MHz
RB12-7



RB25-0

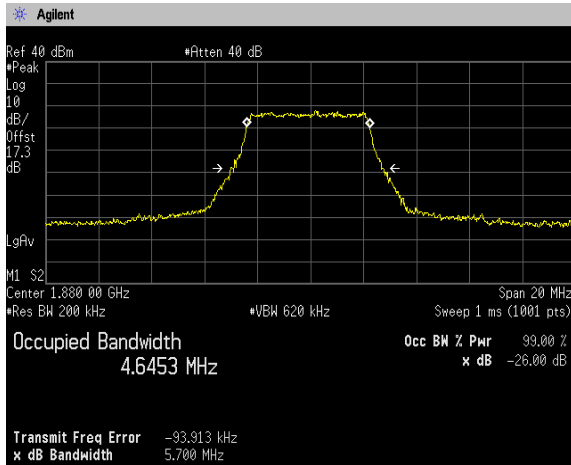




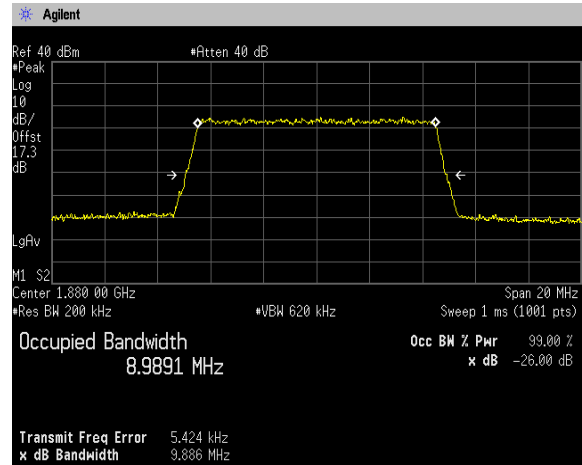
[LTE Band II]
Channel: 18900

QPSK, BW 10MHz

RB25-12

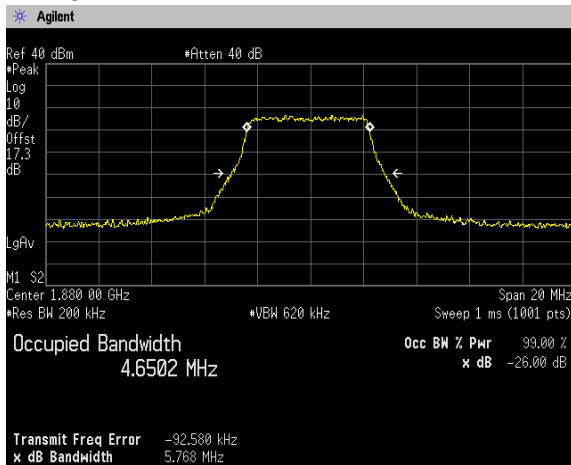


RB50-0

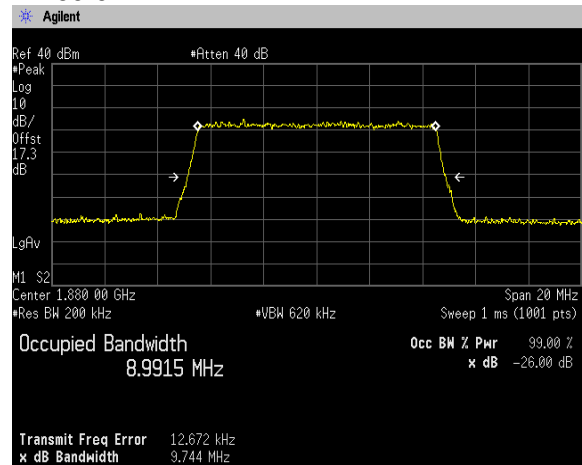


16QAM, BW 10MHz

RB25-12

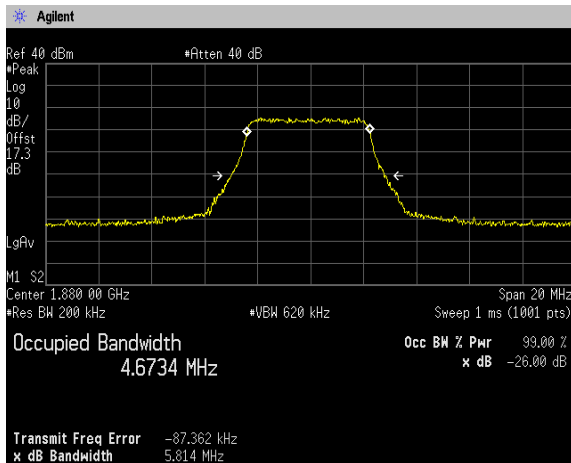


RB50-0

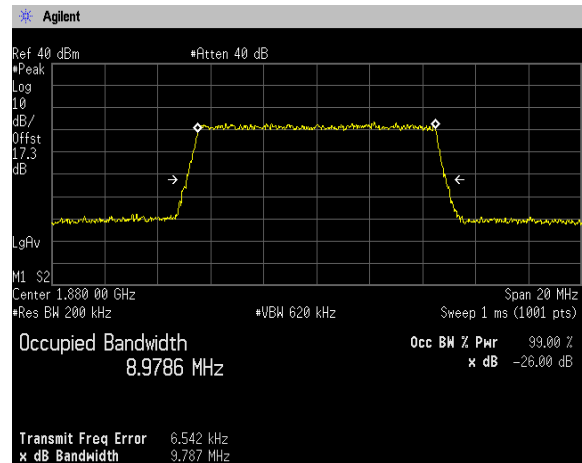


64QAM, BW 10MHz

RB25-12



RB50-0

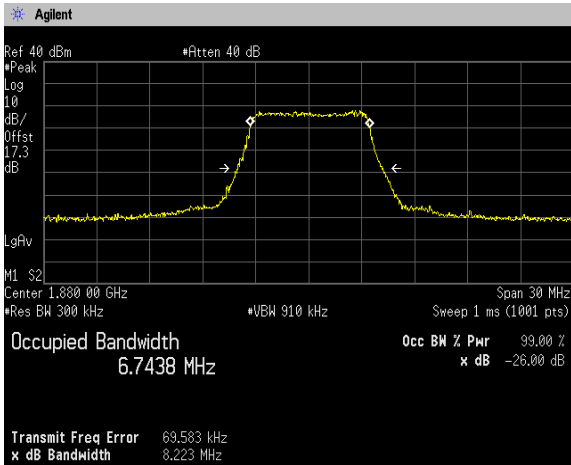




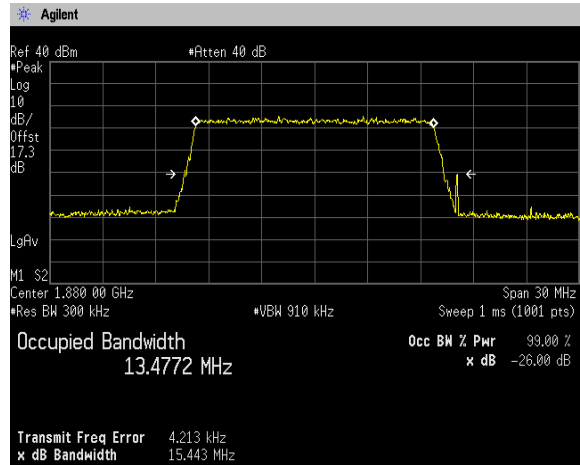
[LTE Band II]
Channel: 18900

QPSK, BW 15MHz

RB36-20

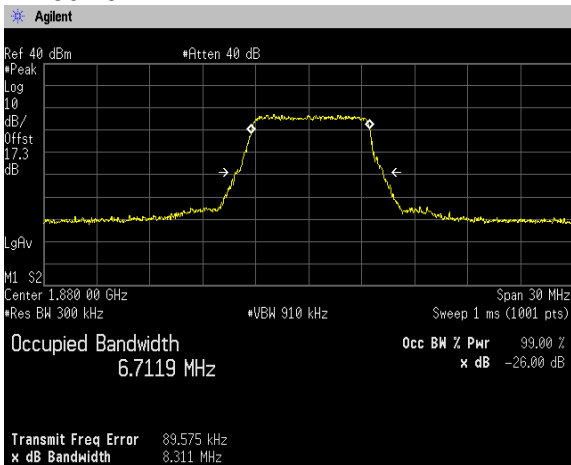


RB75-0

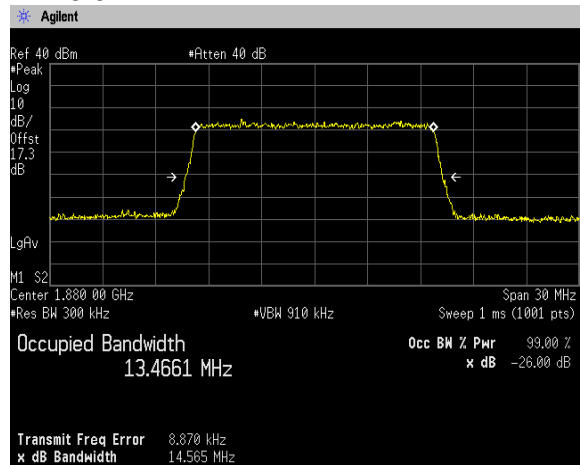


16QAM, BW 15MHz

RB36-20

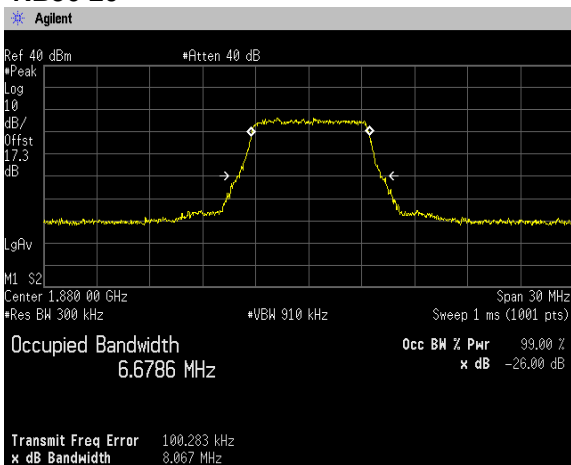


RB75-0

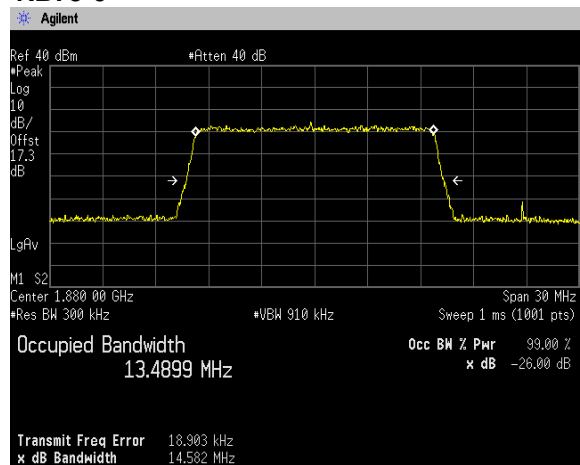


64QAM, BW 15MHz

RB36-20



RB75-0

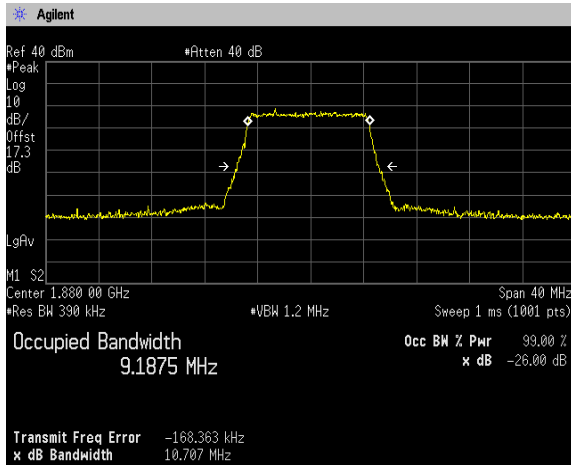




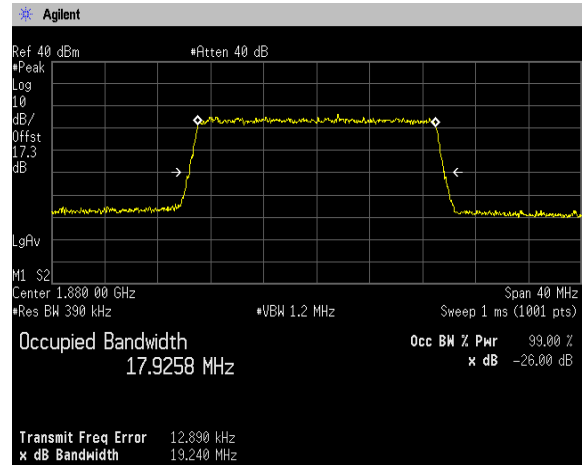
[LTE Band II]
Channel: 18900

QPSK, BW 20MHz

RB50-24

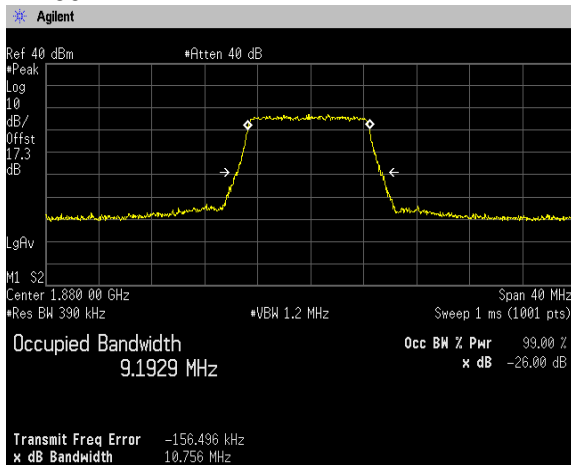


RB100-0

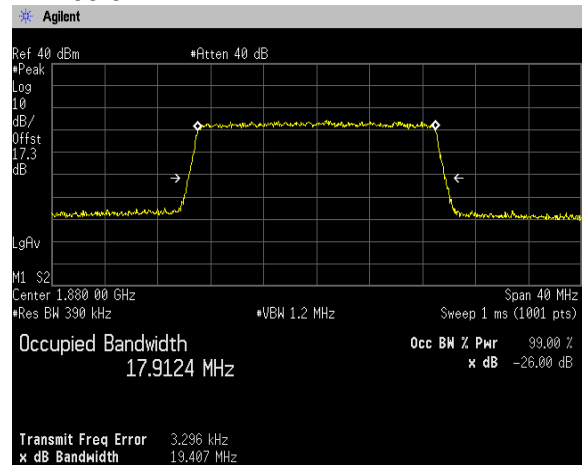


16QAM, BW 20MHz

RB50-24

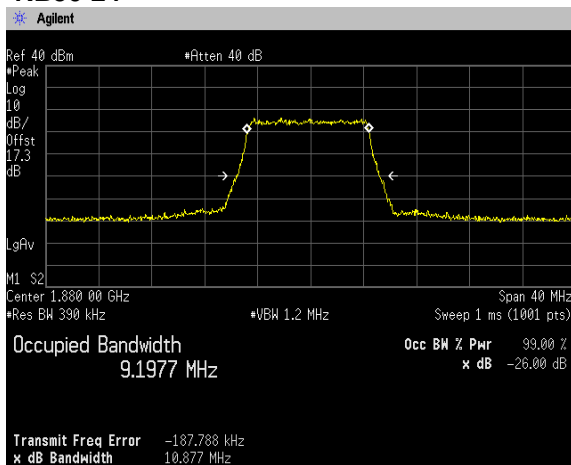


RB100-0

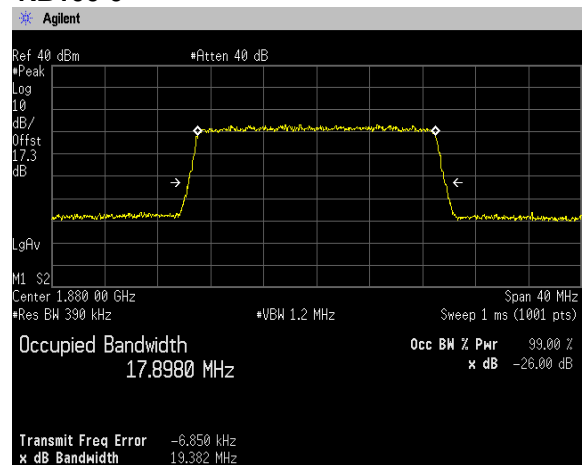


64QAM, BW 20MHz

RB50-24



RB100-0



4.4 Band Edge Spurious and Harmonic at Antenna Terminals

4.4.1 Measurement procedure

[FCC 24.238(a), 2.1051]

The band edge spurious and harmonic was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;

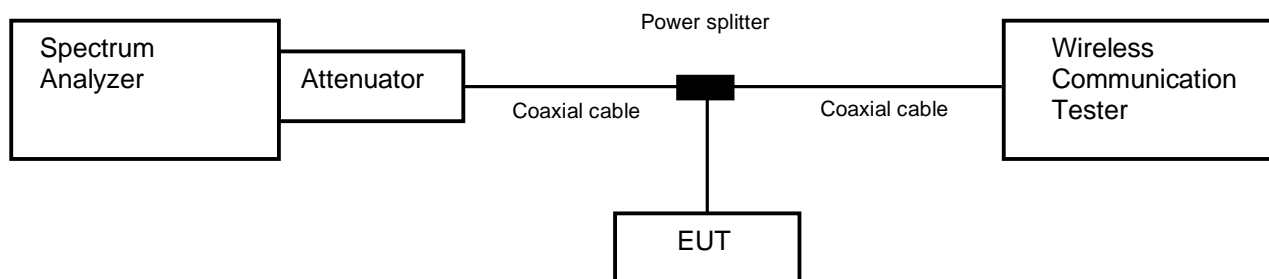
<Band Edge>

- Span was set large enough so as to capture all out of band emissions near the band edge
- RBW \geq 1% of the emission bandwidth or 2% of the emission bandwidth
- VBW \geq 3 x RBW
- Detector = RMS
- Trace mode = Max hold
- Sweep time = auto-couple
- Number of sweep point \geq 2 x span / RBW

<Spurious Emissions>

- RBW = 1MHz & VBW \geq 3 x RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep time = auto-couple
- Number of sweep point \geq 2 x span / RBW

- Test configuration



4.4.2 Limit

-13 dBm or less



4.4.3 Measurement result

Date : 5-August-2023
 Temperature : 23.9 [°C]
 Humidity : 51.8 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 6-August-2023
 Temperature : 23.6 [°C]
 Humidity : 54.9 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 7-August-2023
 Temperature : 23.9 [°C]
 Humidity : 56.1 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 8-August-2023
 Temperature : 23.1 [°C]
 Humidity : 55.7 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 9-August-2023
 Temperature : 23.4 [°C]
 Humidity : 53.9 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

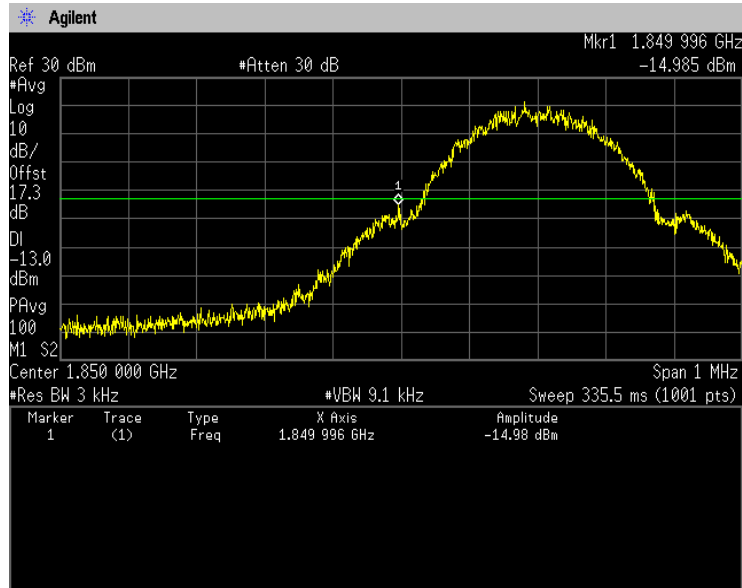
Band	Channel	Frequency [MHz]	Limit [dBm]	Results	
GSM1900	512	1850.2	-13.0	See the trace data	PASS
	810	1909.8	-13.0	See the trace data	PASS
WCDMA Band II	9262	1852.4	-13.0	See the trace data	PASS
	9538	1907.6	-13.0	See the trace data	PASS

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]	Limit [dBm]	Results	
LTE Band II	QPSK, 16QAM, 64QAM	1.4	18607	1850.7	-13.0	See the trace data	PASS
			19193	1909.3	-13.0	See the trace data	PASS
		3	18615	1851.5	-13.0	See the trace data	PASS
			19185	1908.5	-13.0	See the trace data	PASS
		5	18625	1852.5	-13.0	See the trace data	PASS
			19175	1907.5	-13.0	See the trace data	PASS
		10	18650	1855.0	-13.0	See the trace data	PASS
			19150	1905.0	-13.0	See the trace data	PASS
		15	18675	1857.5	-13.0	See the trace data	PASS
			19125	1902.5	-13.0	See the trace data	PASS
		20	18700	1860.0	-13.0	See the trace data	PASS
			19100	1900.0	-13.0	See the trace data	PASS

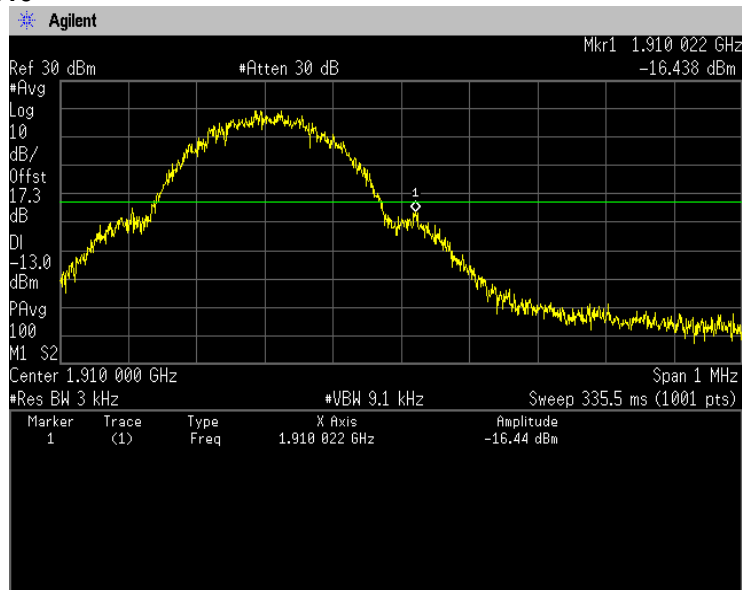
4.4.4 Trace data

[GSM1900]
(Band Edge)

Channel: 512



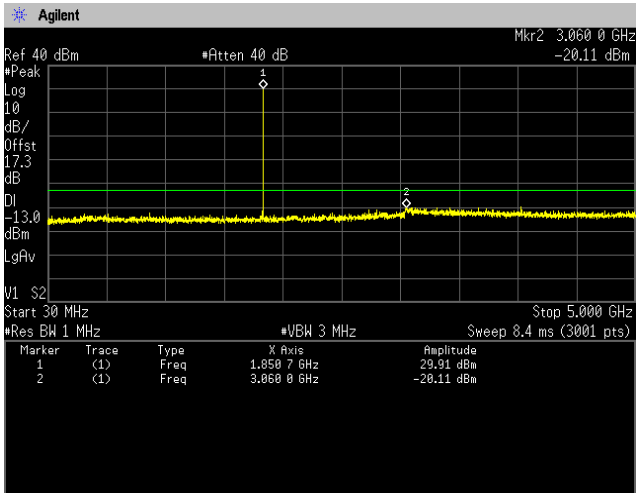
Channel: 810



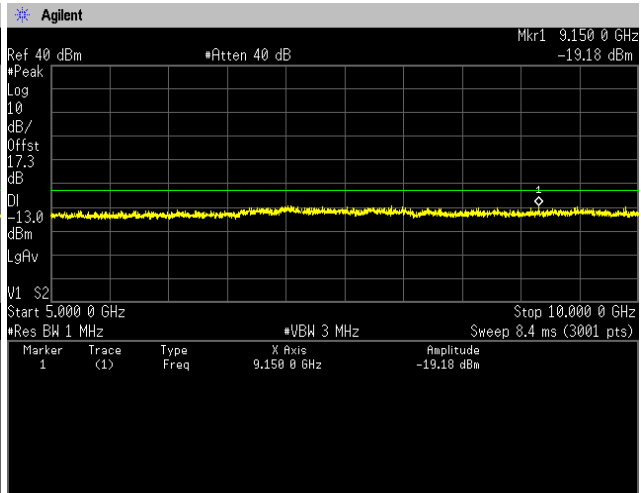
**[GSM1900]
(Spurious Emissions)**

Note: Conducted spurious test was measured in the worst case of conducted output power.

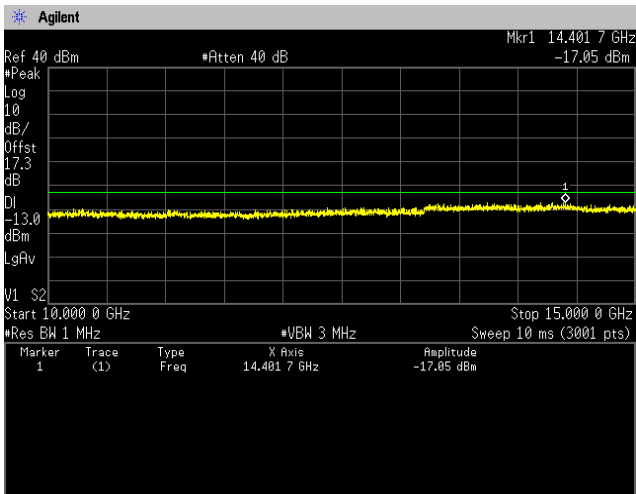
**Channel: 512
30MHz-5GHz**



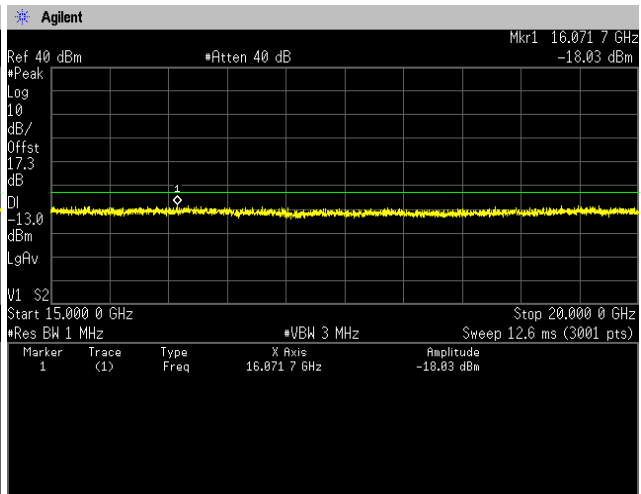
5GHz-10GHz



10GHz-15GHz



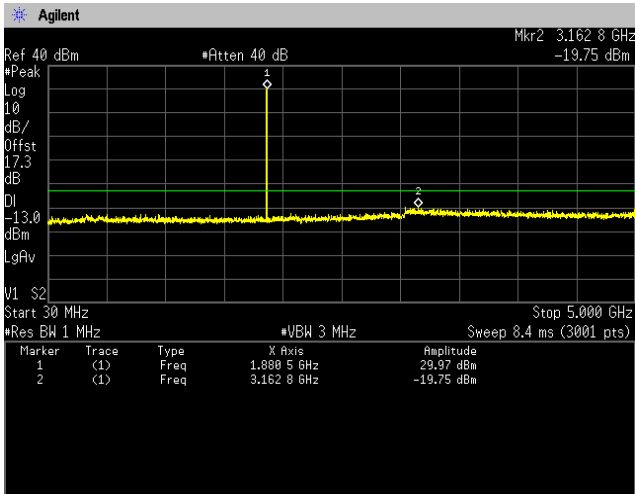
15GHz-20GHz



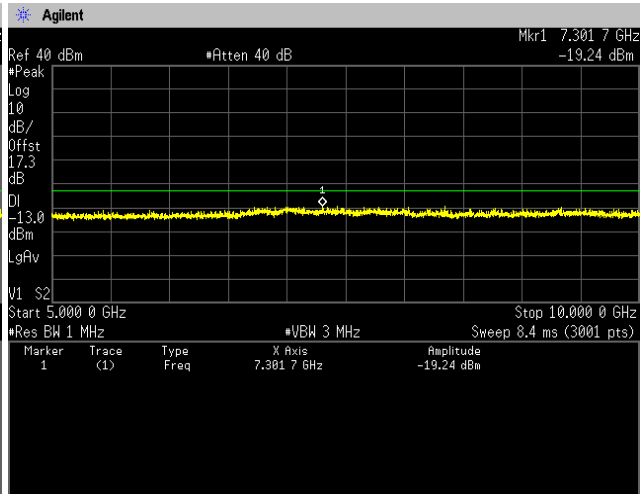


**[GSM1900]
(Spurious Emissions)**

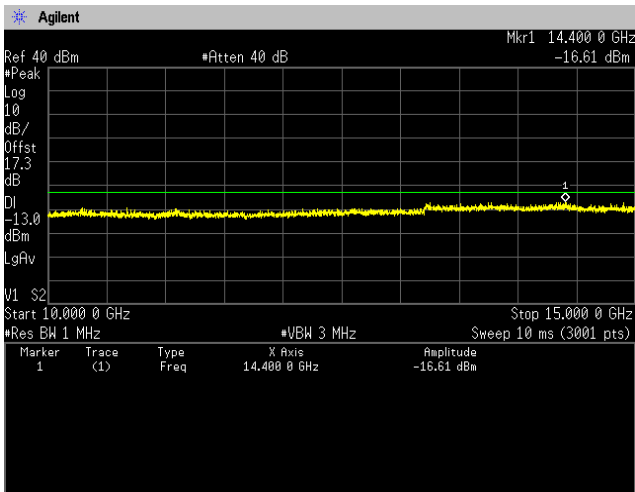
**Channel: 661
30MHz-5GHz**



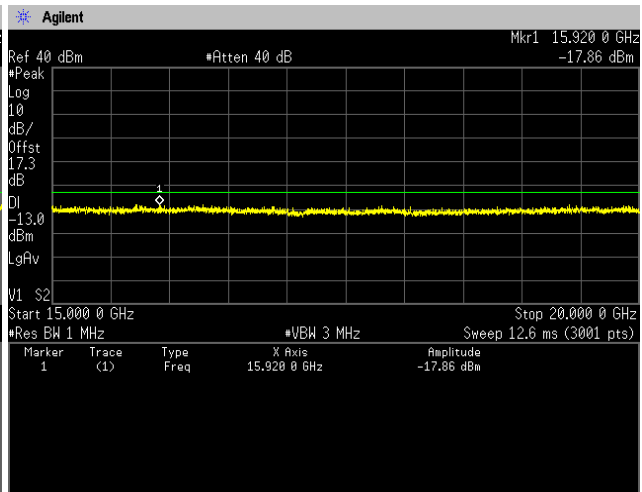
5GHz-10GHz



10GHz-15GHz



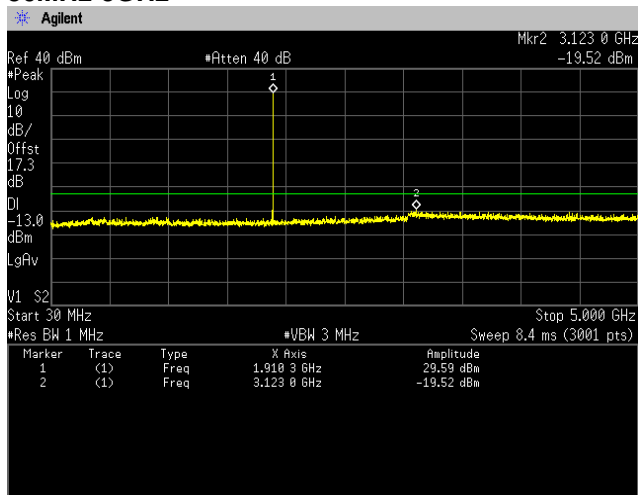
15GHz-20GHz



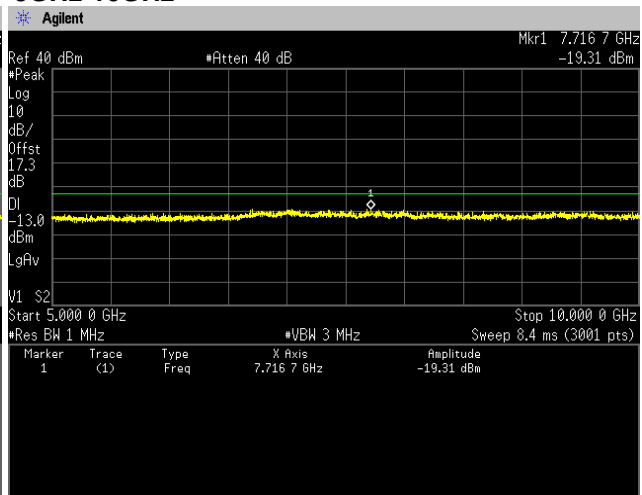


**[GSM1900]
(Spurious Emissions)**

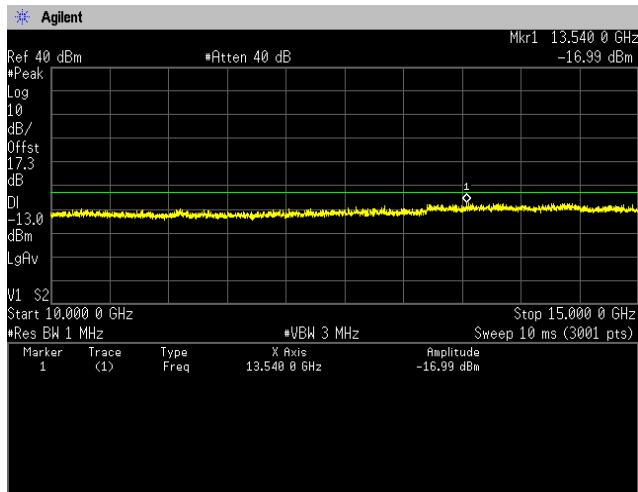
**Channel: 810
30MHz-5GHz**



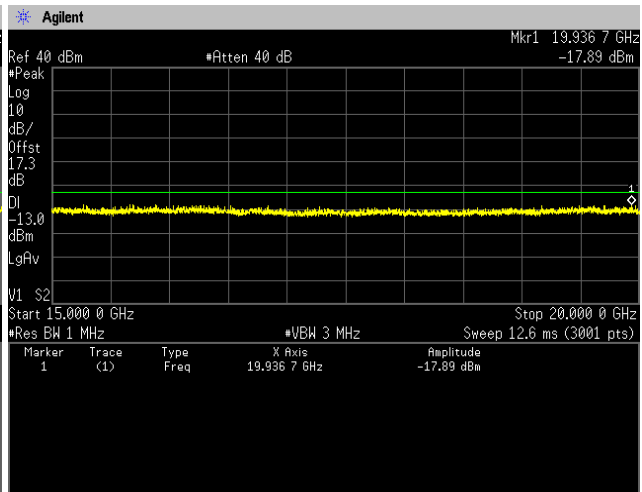
5GHz-10GHz



10GHz-15GHz



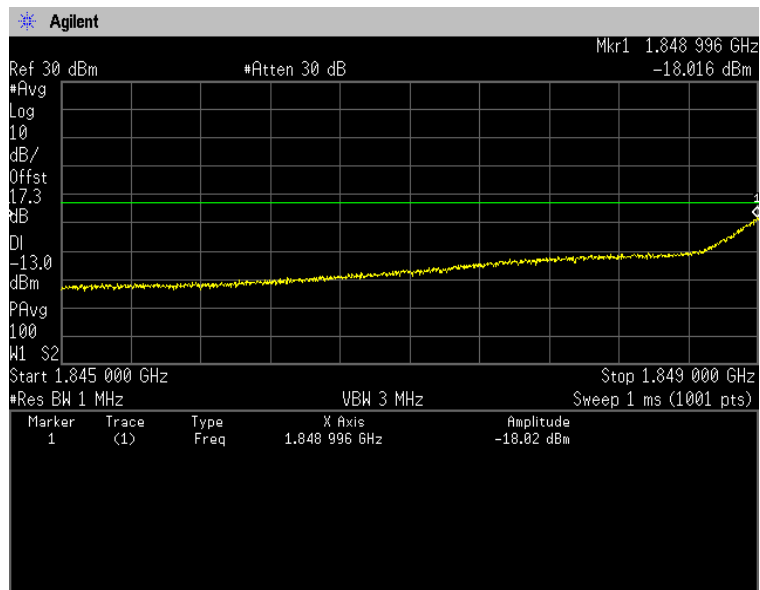
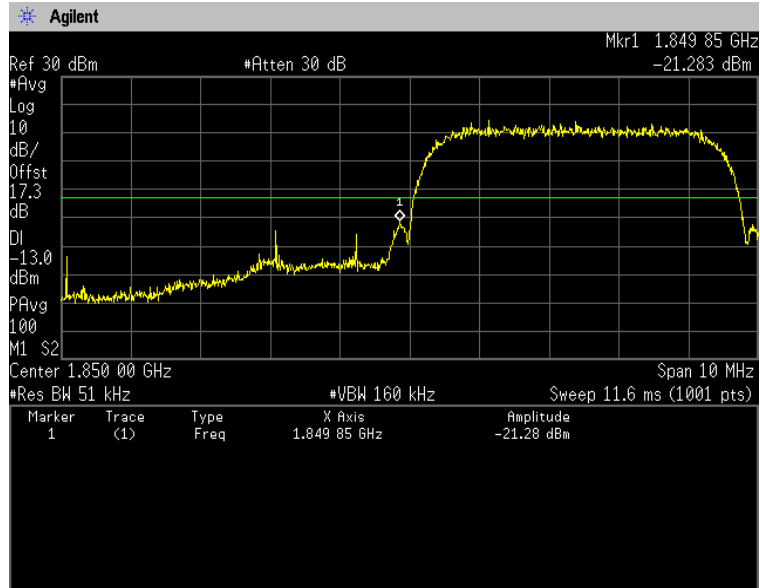
15GHz-20GHz





[WCDMA Band II]
(Band Edge)

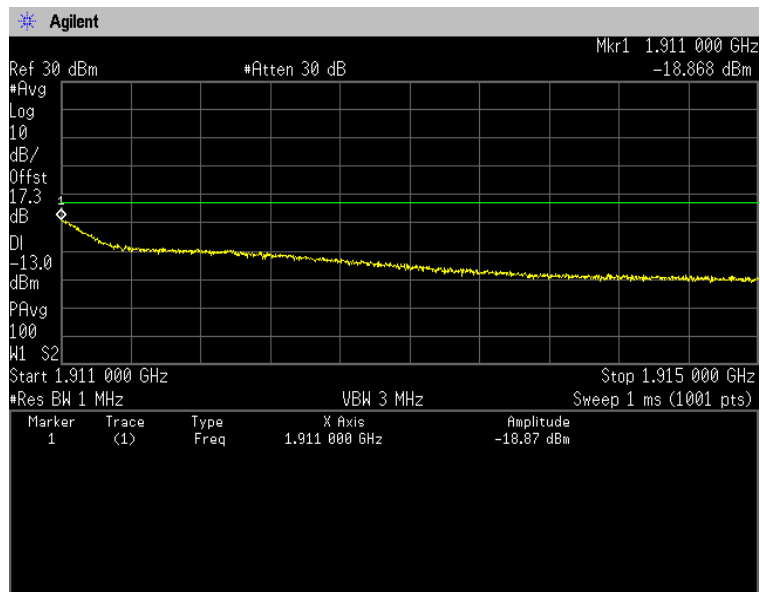
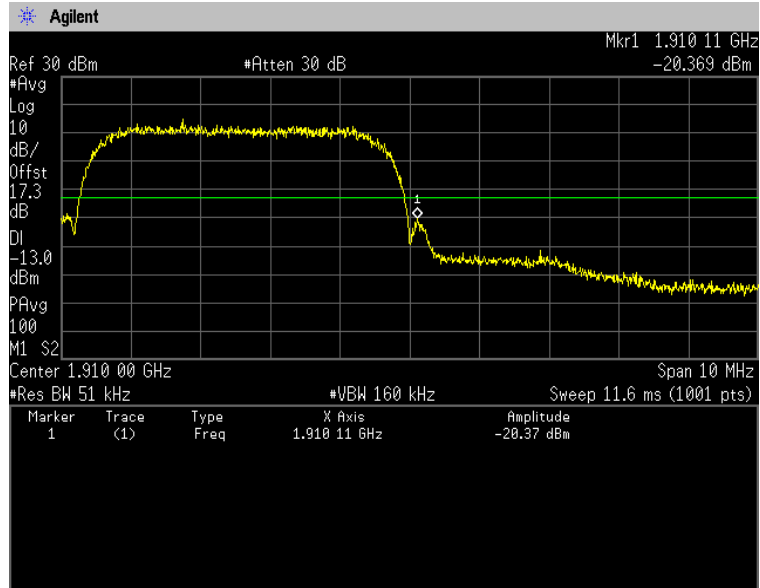
Channel: 9262





[WCDMA Band II]
(Band Edge)

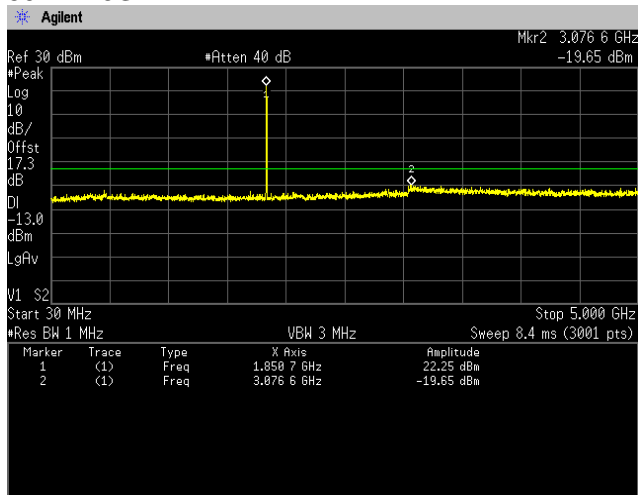
Channel: 9538



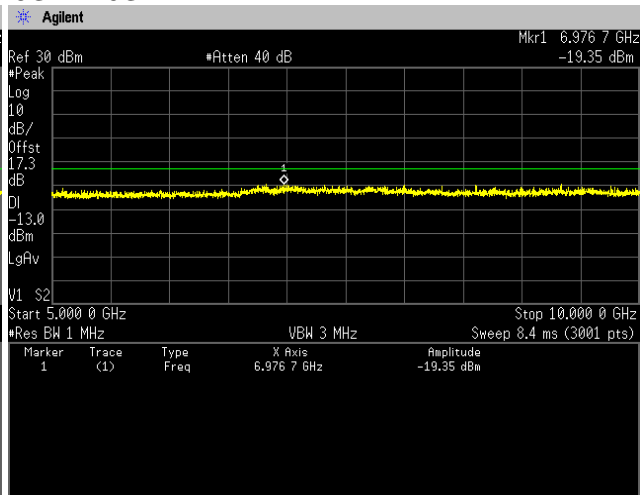
**[WCDMA Band II]
(Spurious Emissions)**

Note: Conducted spurious test was measured in the worst case of conducted output power.

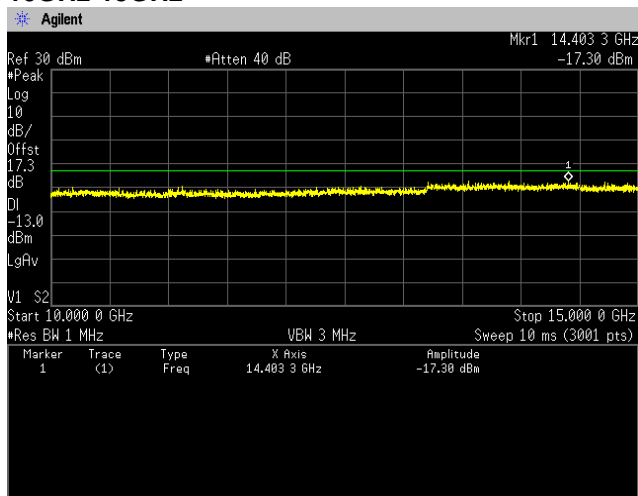
**Channel: 9262
30MHz-5GHz**



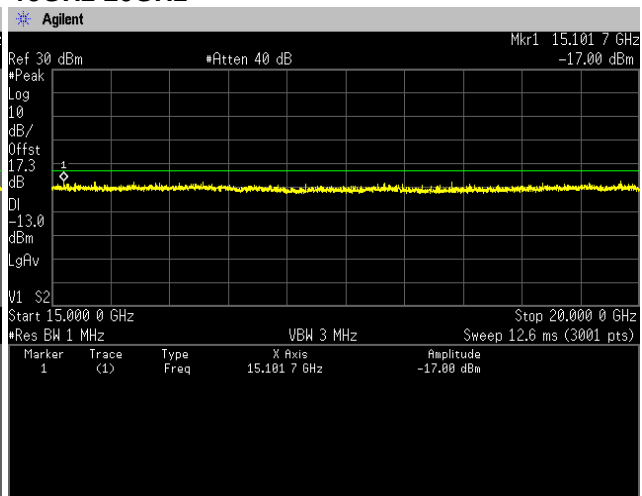
5GHz-10GHz



10GHz-15GHz



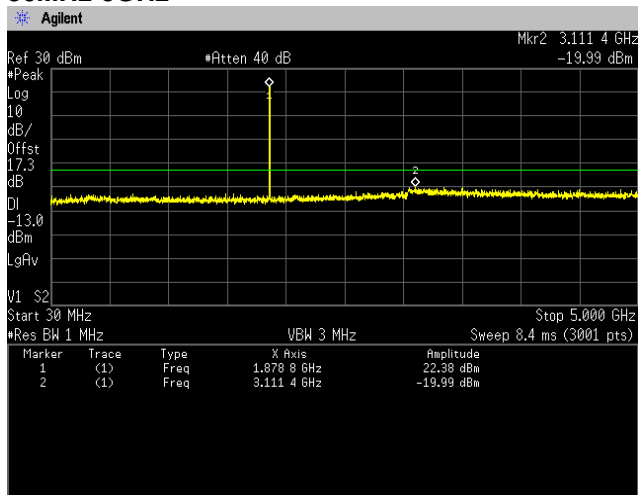
15GHz-20GHz



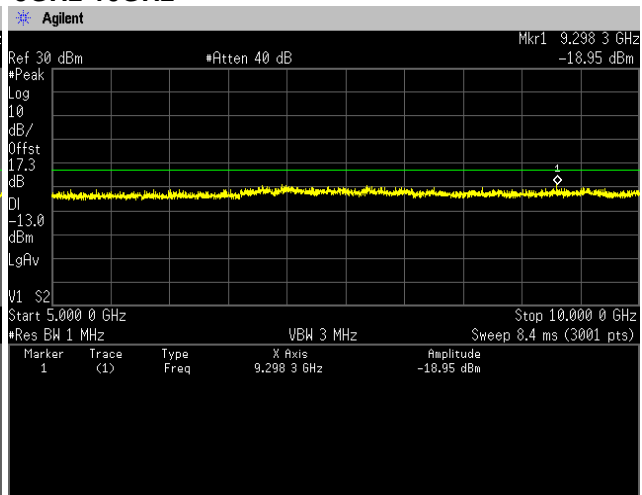


**[WCDMA Band II]
(Spurious Emissions)**

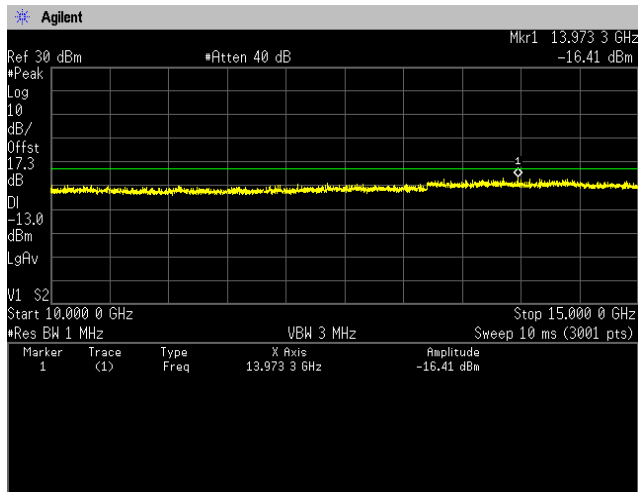
**Channel: 9400
30MHz-5GHz**



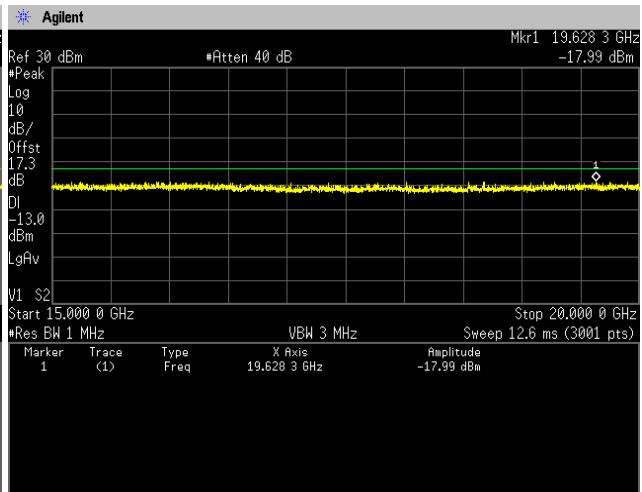
5GHz-10GHz



10GHz-15GHz



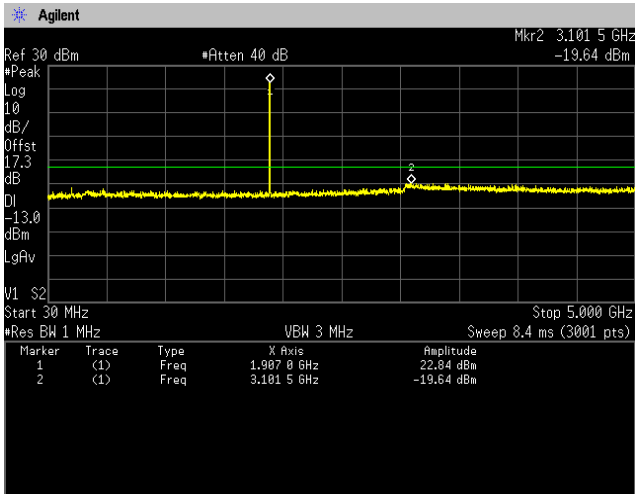
15GHz-20GHz



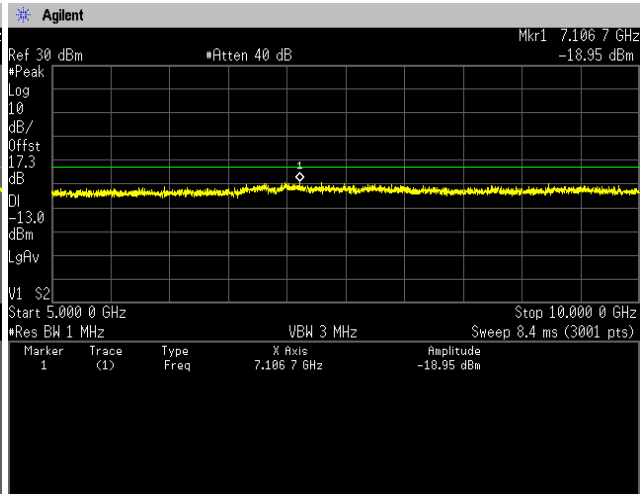


**[WCDMA Band II]
(Spurious Emissions)**

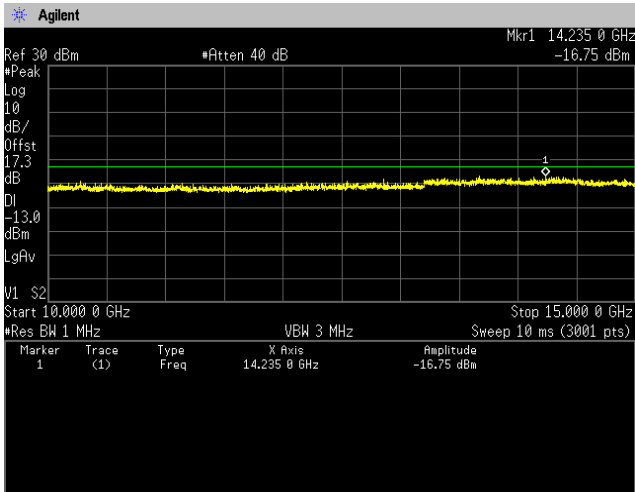
**Channel: 9538
30MHz-5GHz**



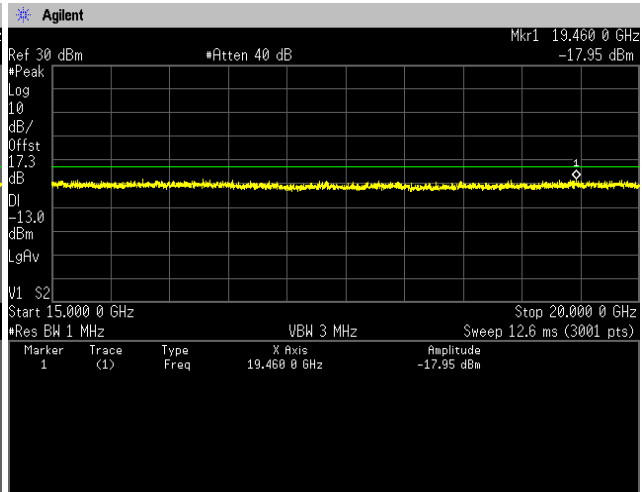
5GHz-10GHz



10GHz-15GHz



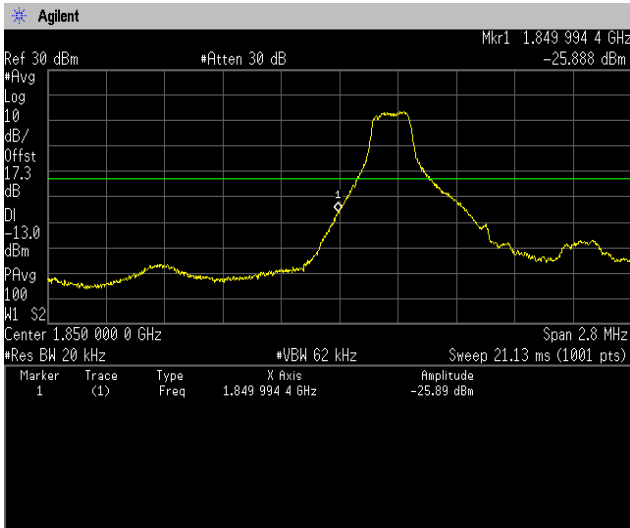
15GHz-20GHz



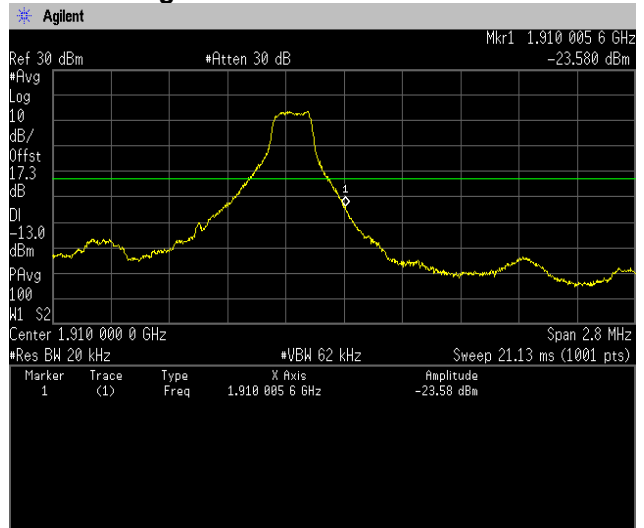


[LTE Band II]
(Band Edge)

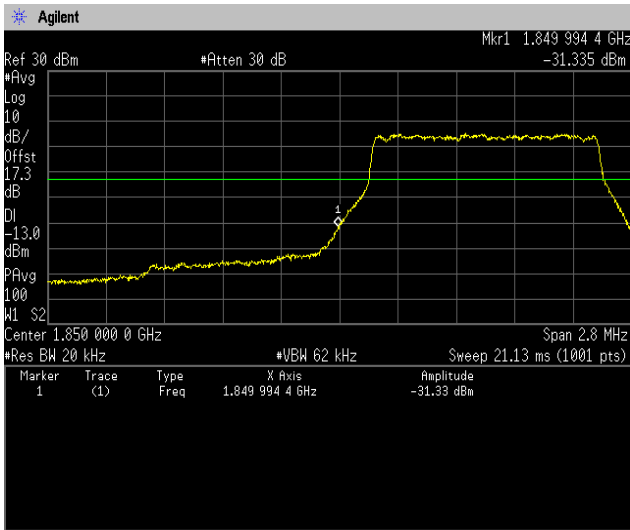
QPSK, BW 1.4MHz, RB1-0
Channel: Low



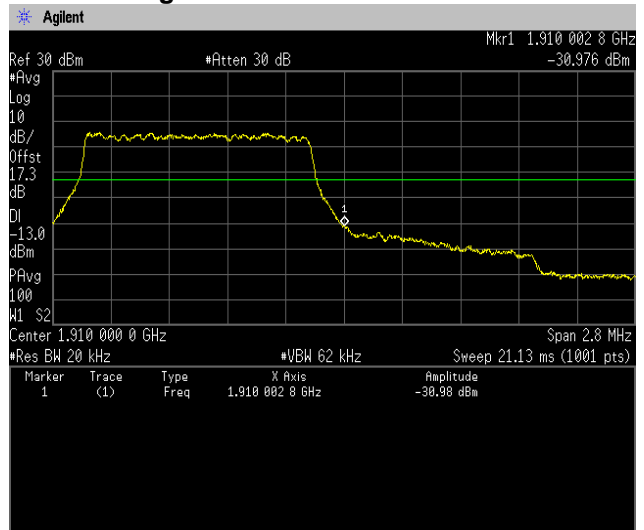
RB1-5
Channel: High



QPSK, BW 1.4MHz, RB6-0
Channel: Low



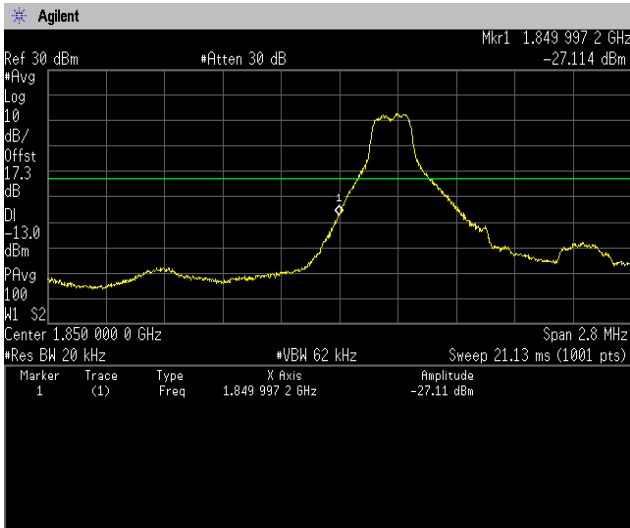
Channel: High



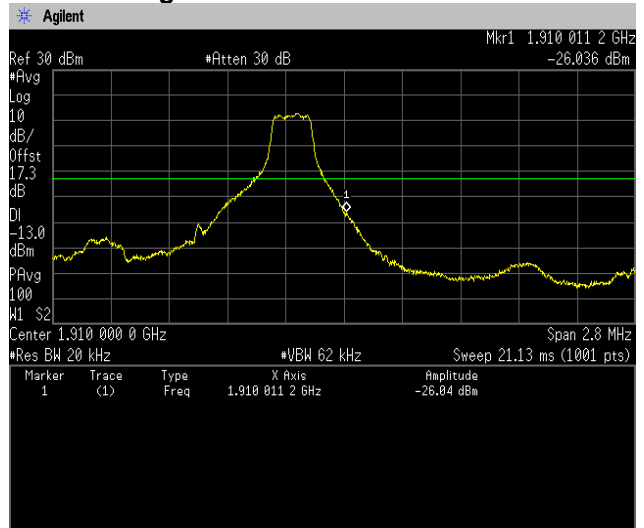


[LTE Band II]
(Band Edge)

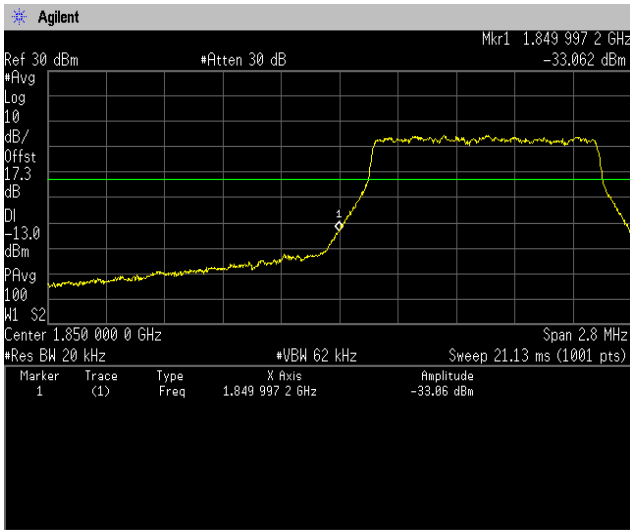
16QAM, BW 1.4MHz, RB1-0
Channel: Low



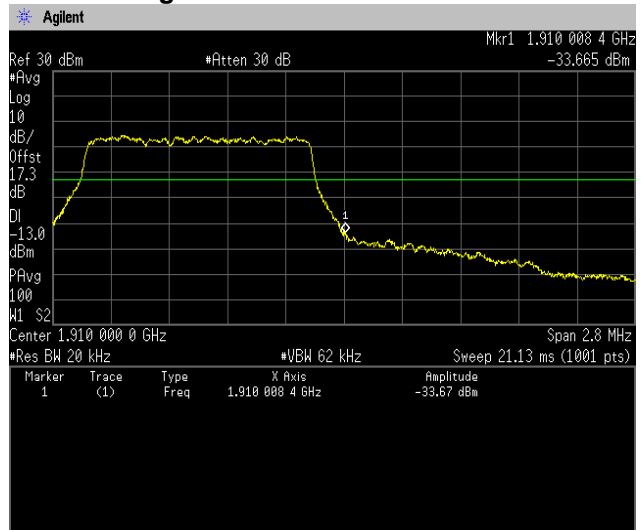
RB1-5
Channel: High



16QAM, BW 1.4MHz, RB6-0
Channel: Low

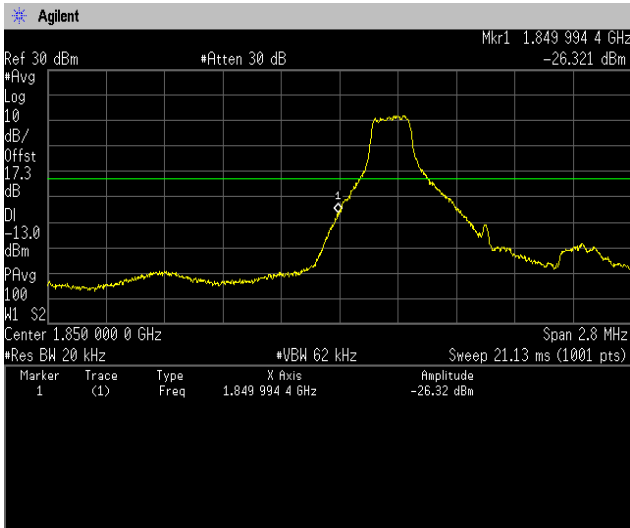


Channel: High

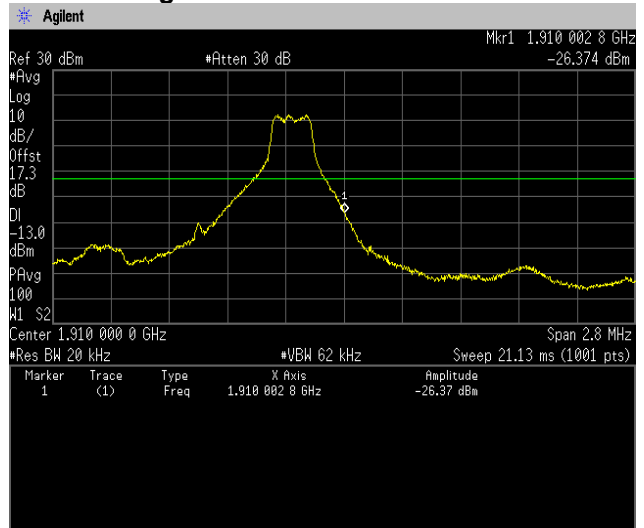


[LTE Band II]
(Band Edge)

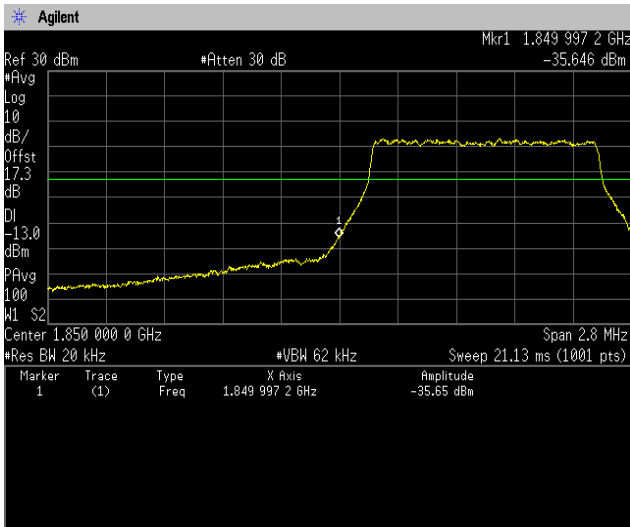
64QAM, BW 1.4MHz, RB1-0
Channel: Low



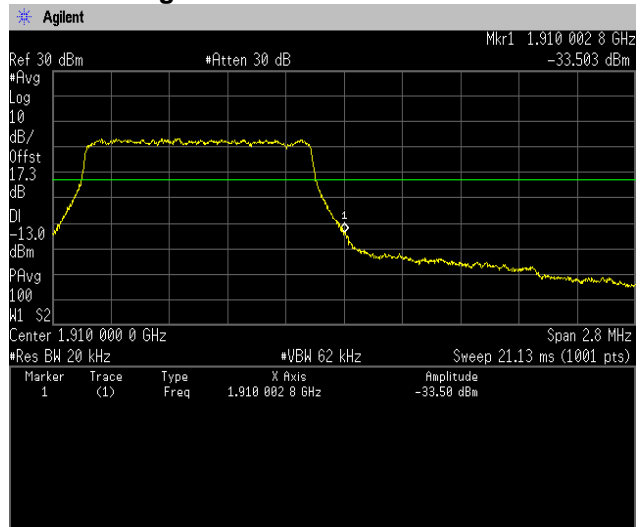
RB1-5
Channel: High



64QAM, BW 1.4MHz, RB6-0
Channel: Low



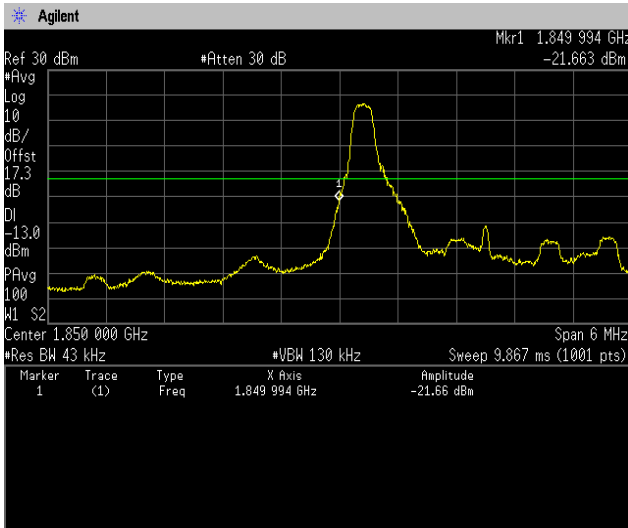
Channel: High



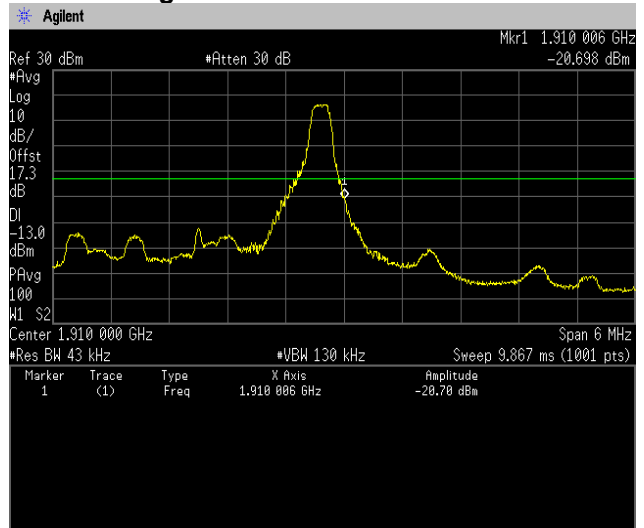


[LTE Band II]
(Band Edge)

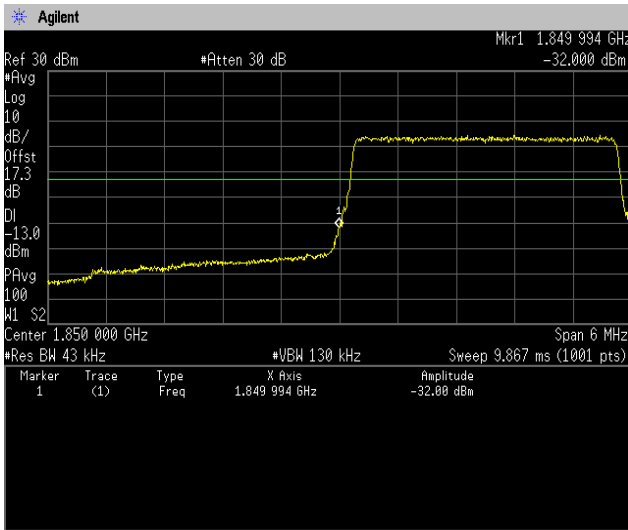
QPSK, BW 3MHz, RB1-0
Channel: Low



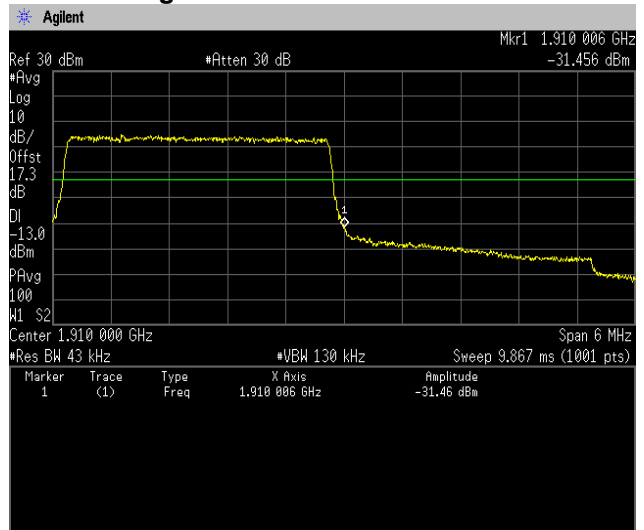
RB1-14
Channel: High



QPSK, BW 3MHz, RB15-0
Channel: Low



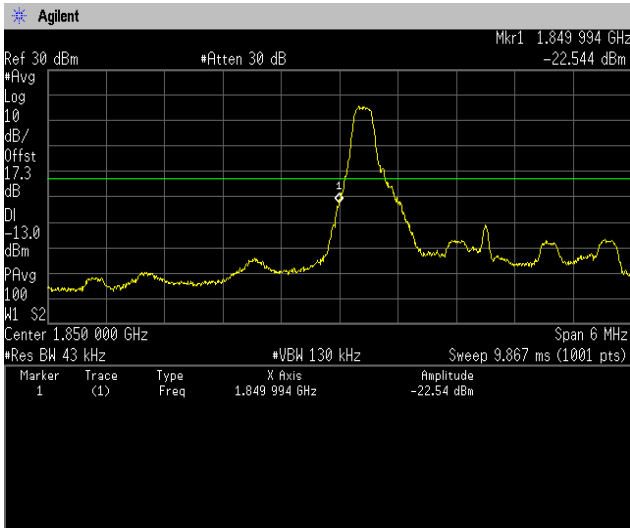
Channel: High



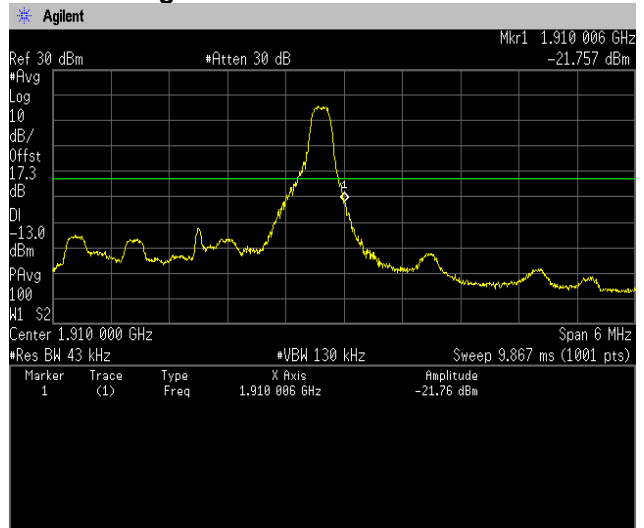


[LTE Band II]
(Band Edge)

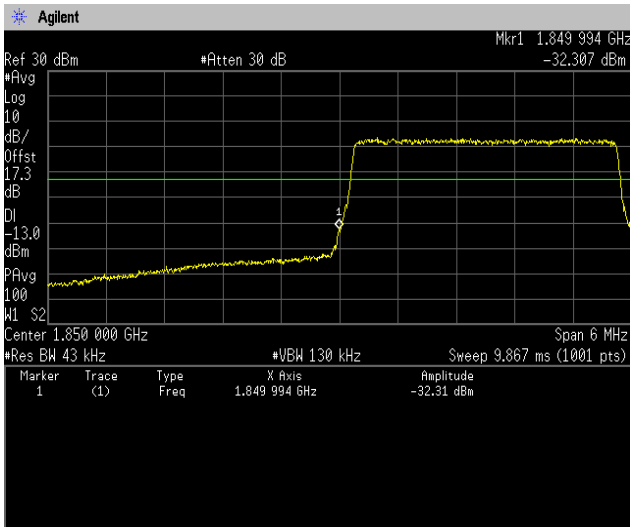
16QAM, BW 3MHz, RB1-0
Channel: Low



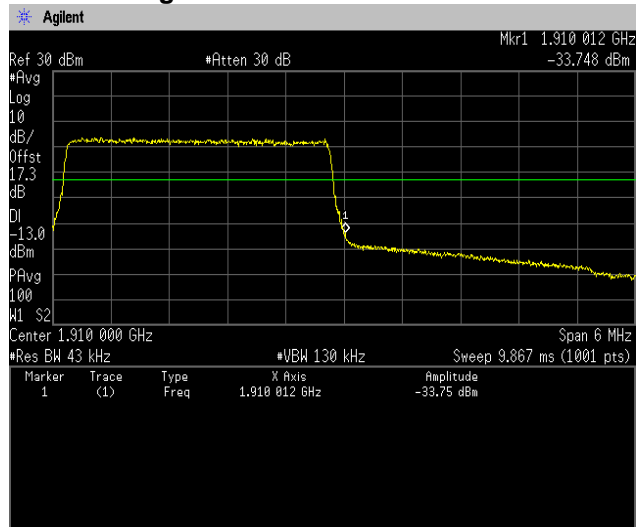
RB1-14
Channel: High



16QAM, BW 3MHz, RB15-0
Channel: Low



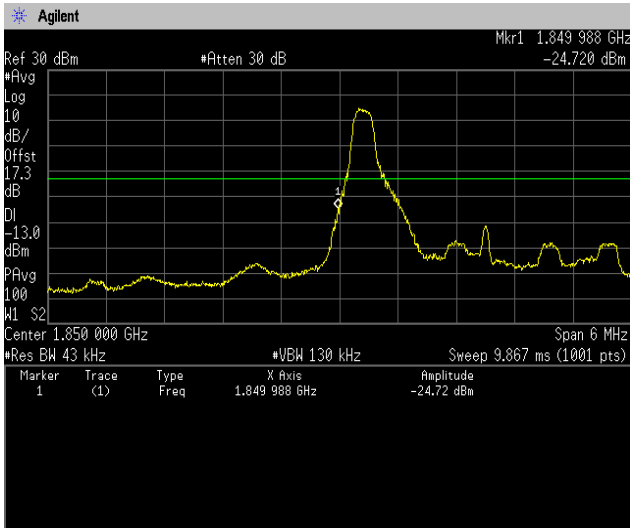
Channel: High



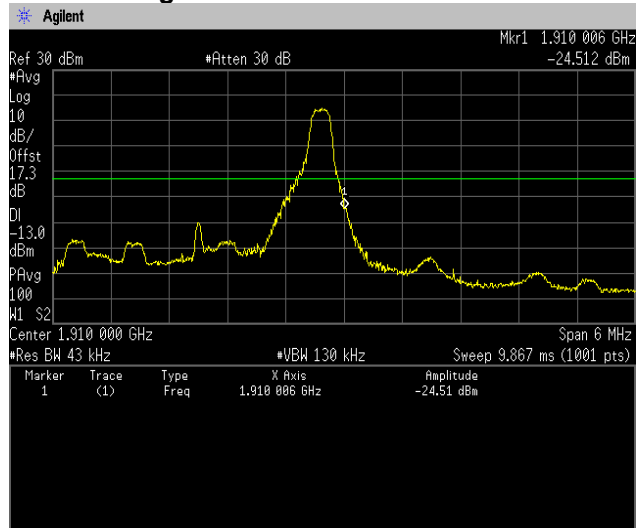


[LTE Band II]
(Band Edge)

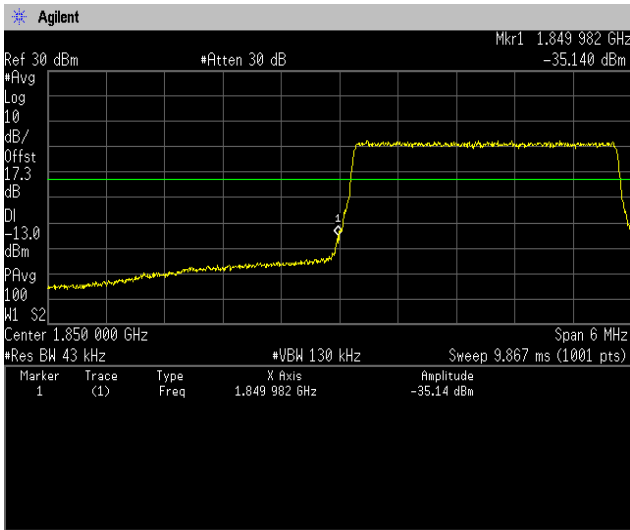
64QAM, BW 3MHz, RB1-0
Channel: Low



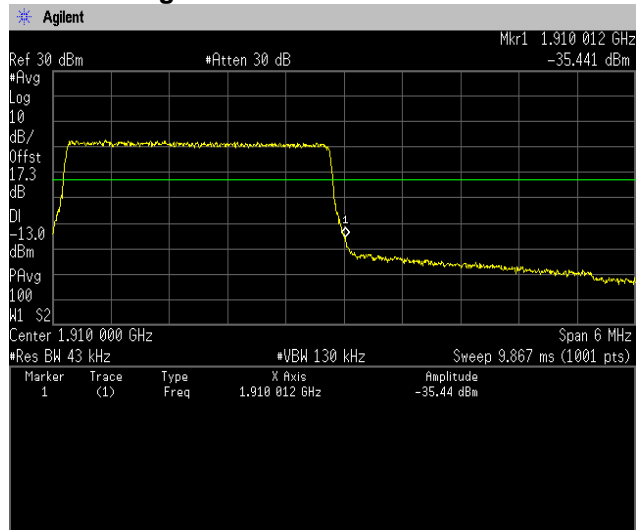
RB1-14
Channel: High



64QAM, BW 3MHz, RB15-0
Channel: Low



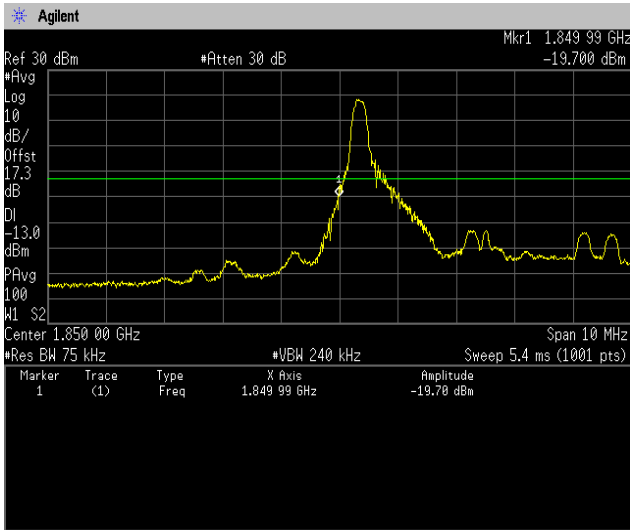
Channel: High



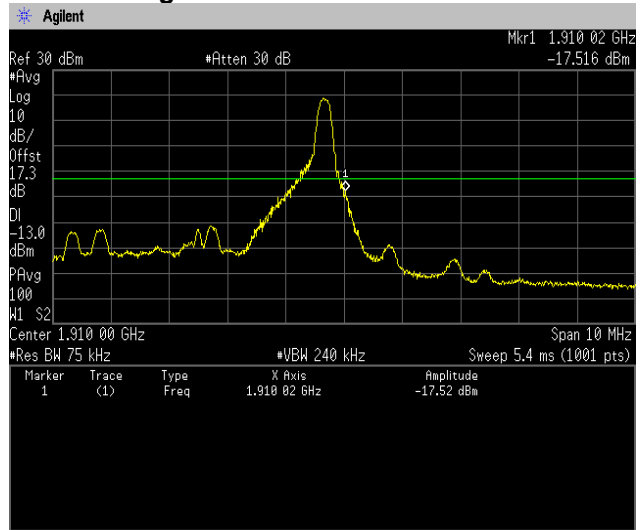


[LTE Band II]
(Band Edge)

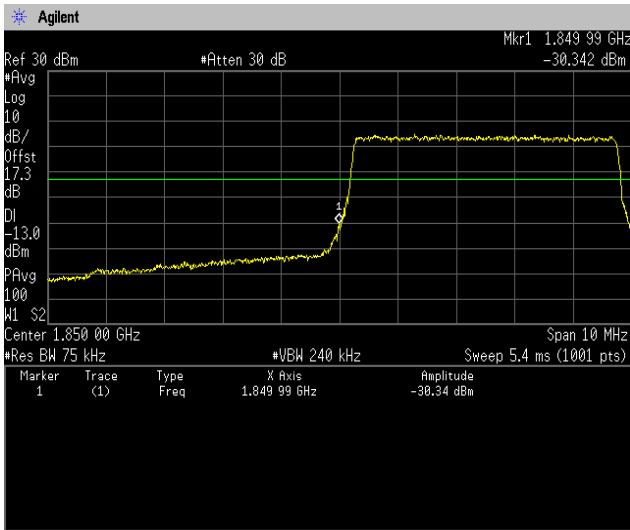
QPSK, BW 5MHz, RB1-0
Channel: Low



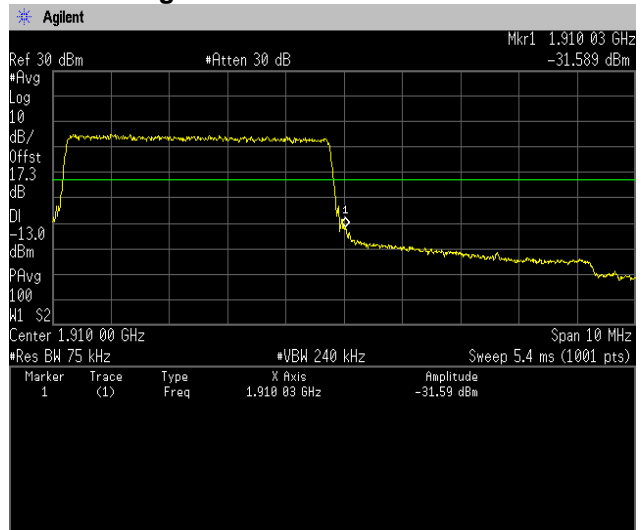
RB1-24
Channel: High



QPSK, BW 5MHz, RB25-0
Channel: Low

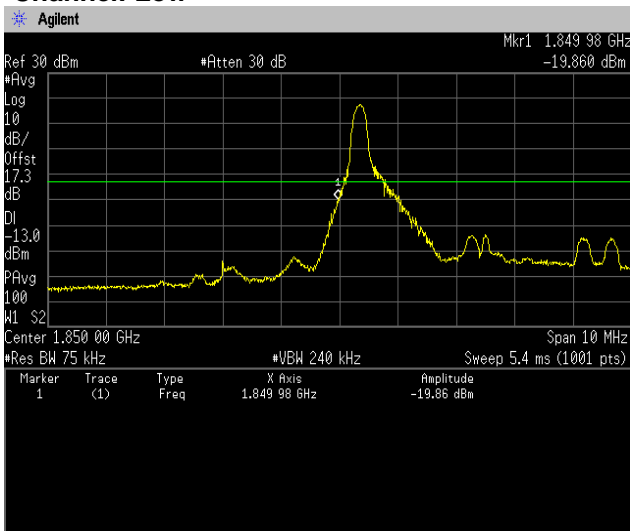


Channel: High

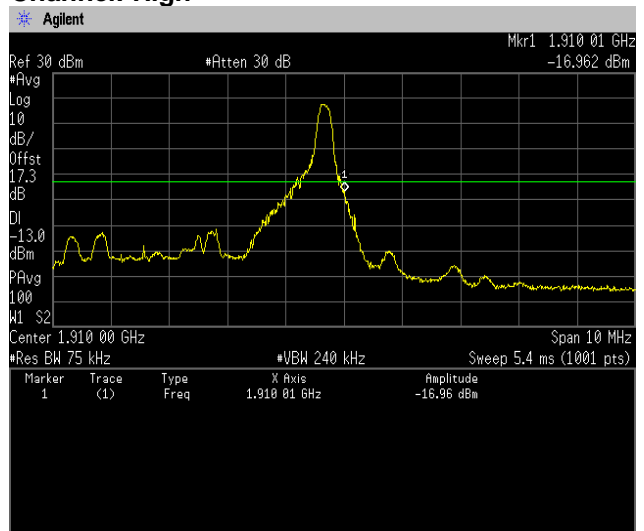


[LTE Band II]
(Band Edge)

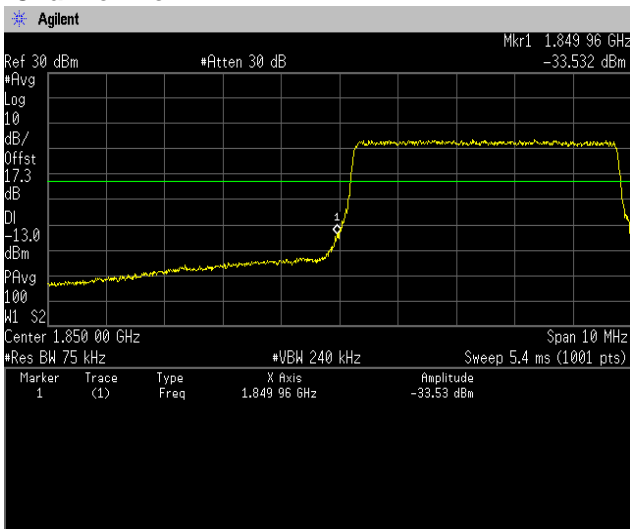
16QAM, BW 5MHz, RB1-0
Channel: Low



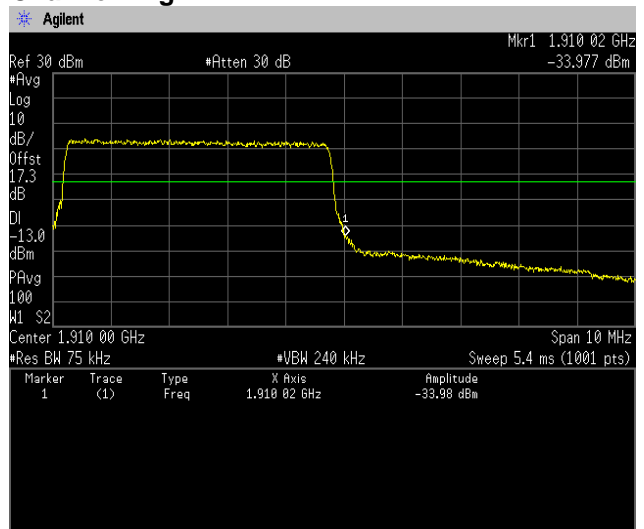
RB1-24
Channel: High



16QAM, BW 5MHz, RB25-0
Channel: Low

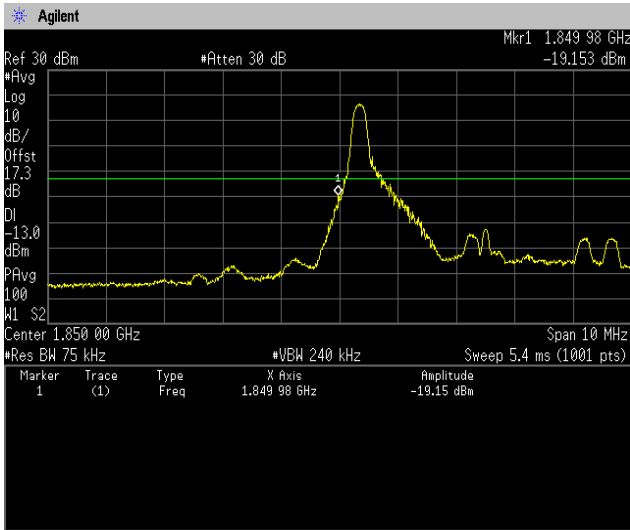


Channel: High

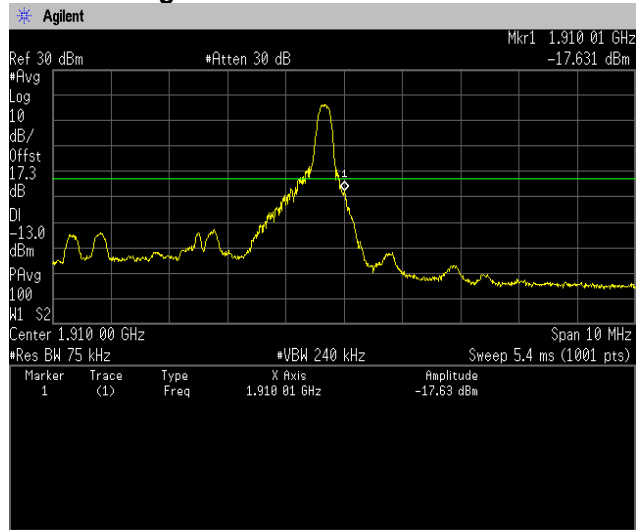


[LTE Band II]
(Band Edge)

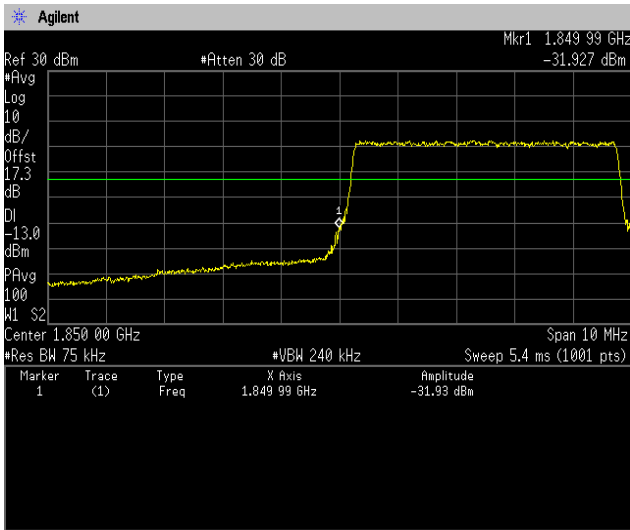
64QAM, BW 5MHz, RB1-0
Channel: Low



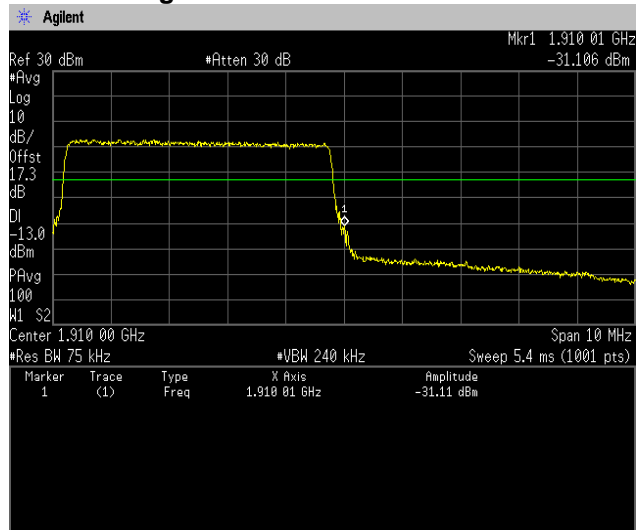
RB1-24
Channel: High



64QAM, BW 5MHz, RB25-0
Channel: Low

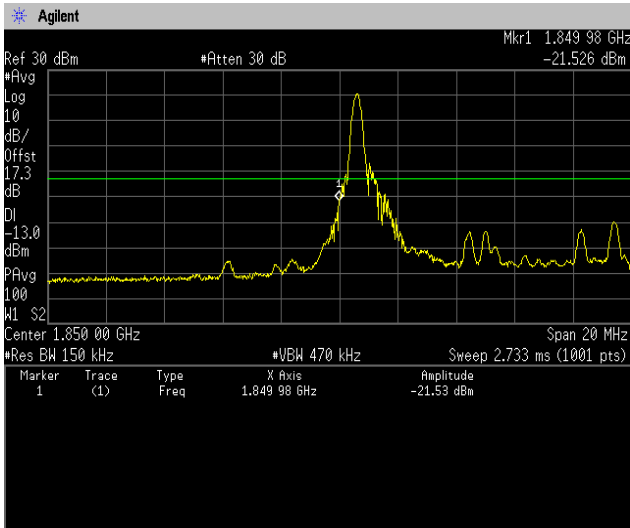


Channel: High

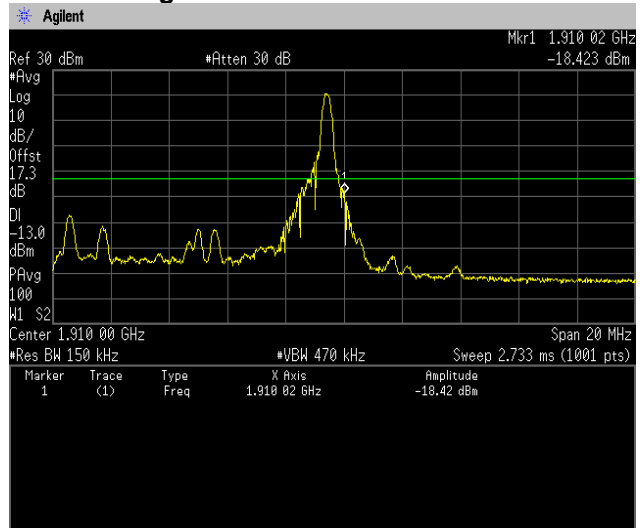


[LTE Band II]
(Band Edge)

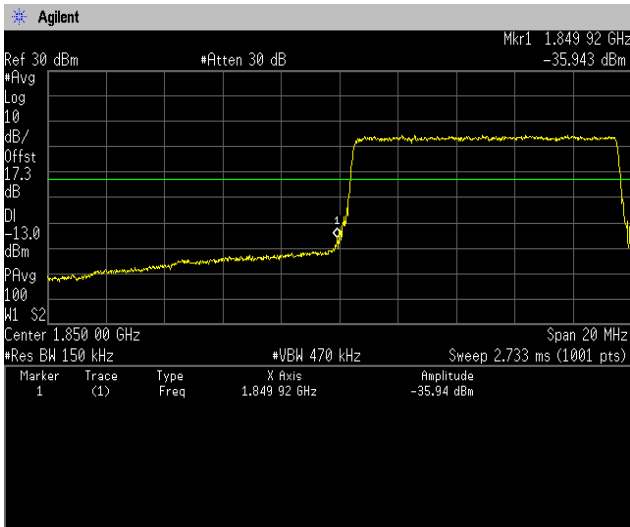
QPSK, BW 10MHz, RB1-0
Channel: Low



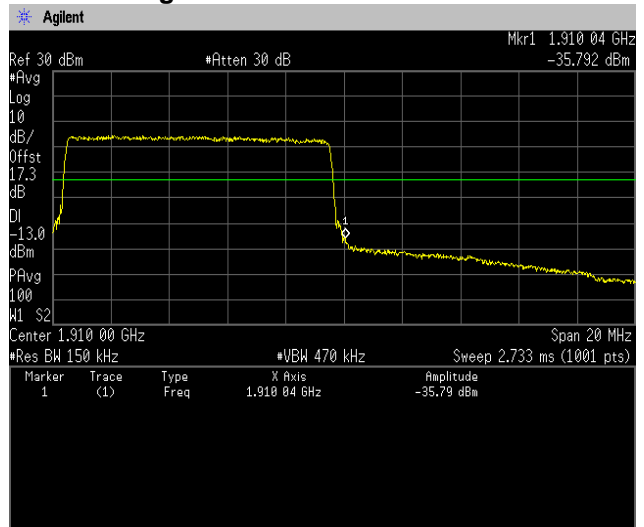
RB1-49
Channel: High



QPSK, BW 10MHz, RB50-0
Channel: Low



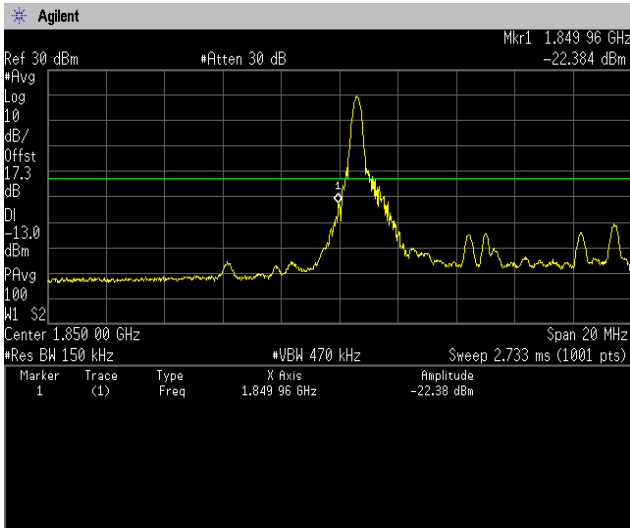
Channel: High



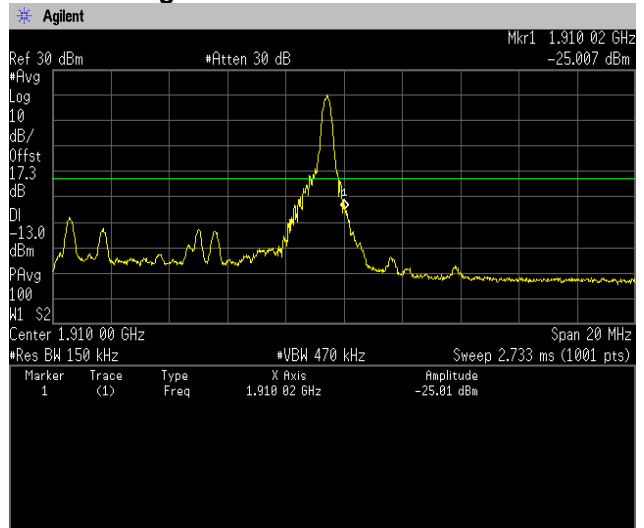


[LTE Band II]
(Band Edge)

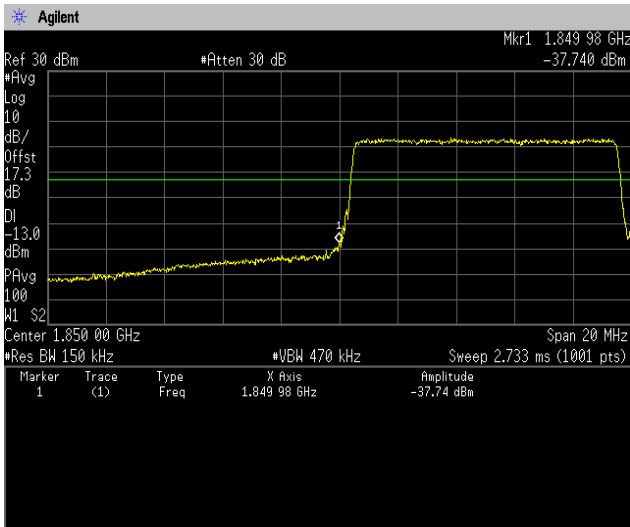
16QAM, BW 10MHz, RB1-0
Channel: Low



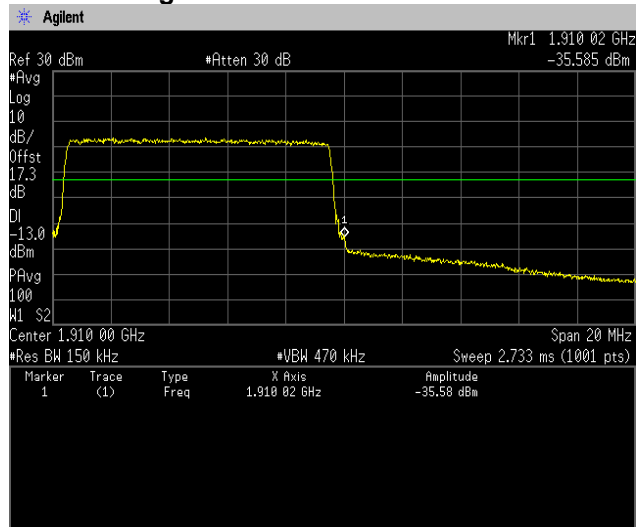
RB1-49
Channel: High



16QAM, BW 10MHz, RB50-0
Channel: Low

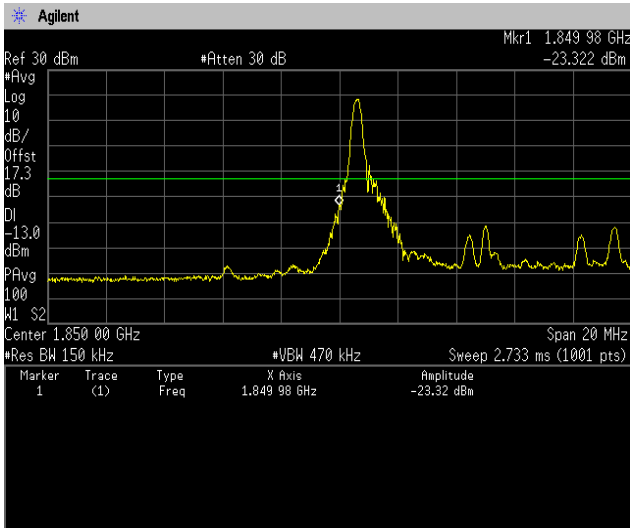


Channel: High

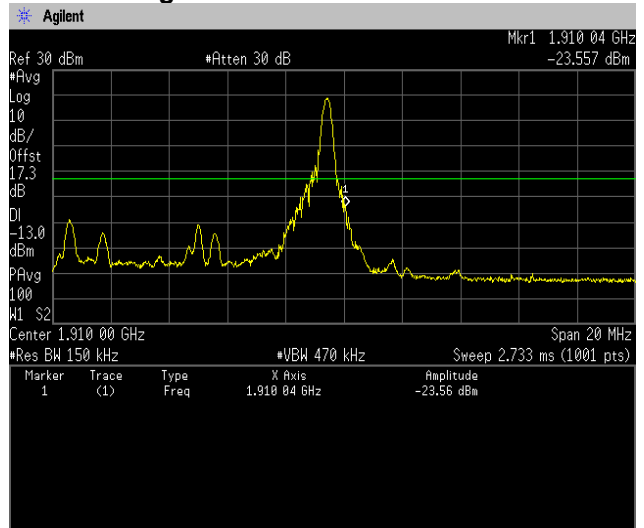


[LTE Band II]
(Band Edge)

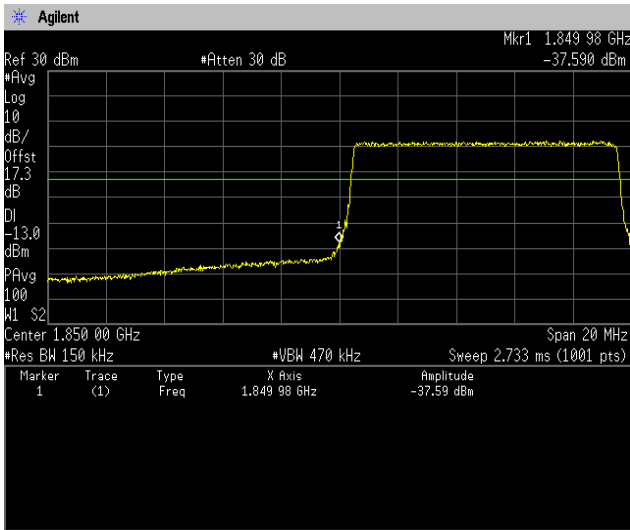
64QAM, BW 10MHz, RB1-0
Channel: Low



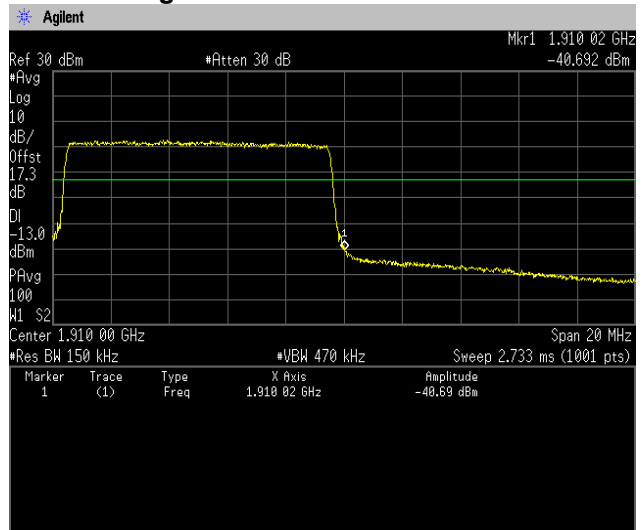
RB1-49
Channel: High



64QAM, BW 10MHz, RB50-0
Channel: Low

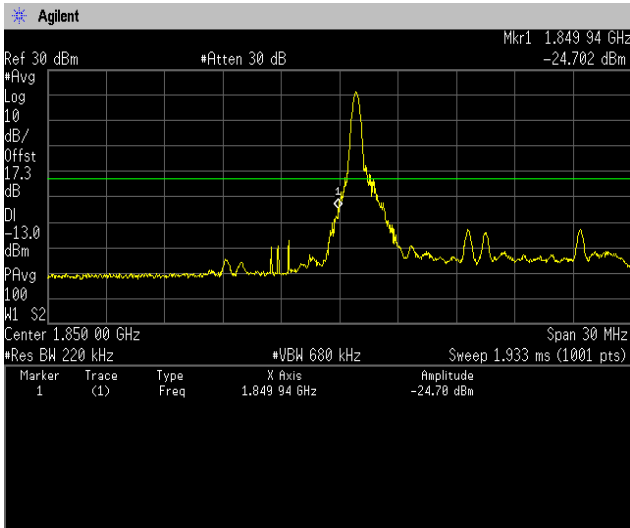


Channel: High

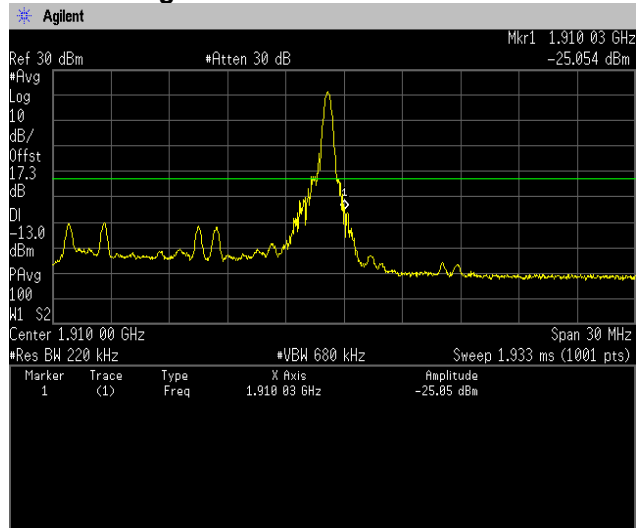


[LTE Band II]
(Band Edge)

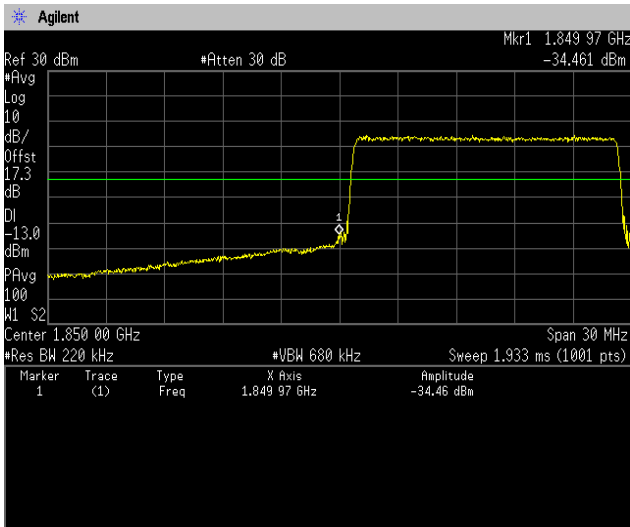
QPSK, BW 15MHz, RB1-0
Channel: Low



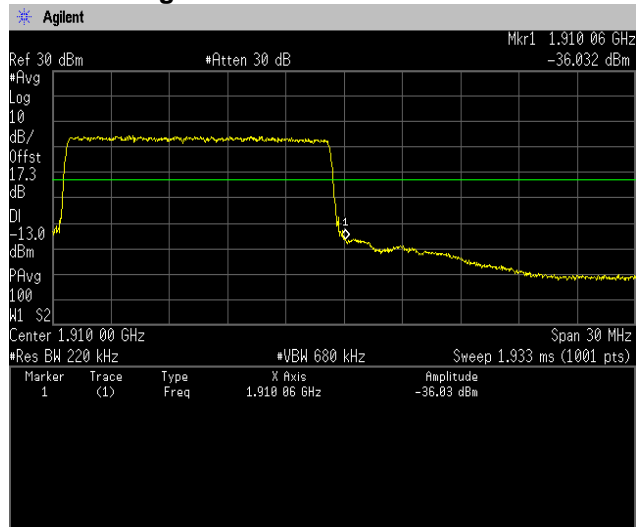
RB1-74
Channel: High



QPSK, BW 15MHz, RB75-0
Channel: Low



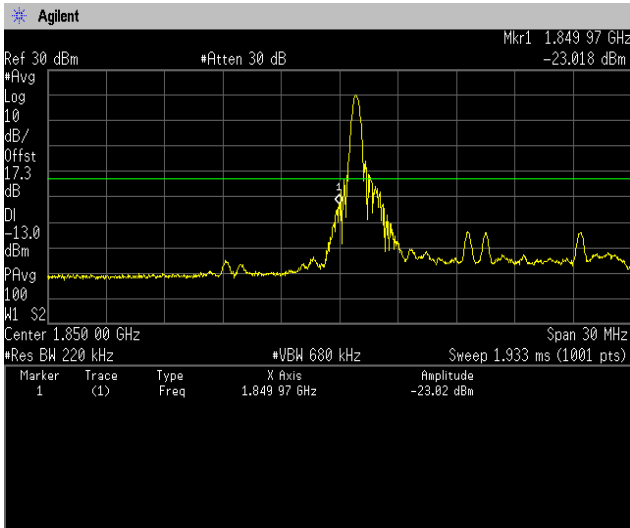
Channel: High



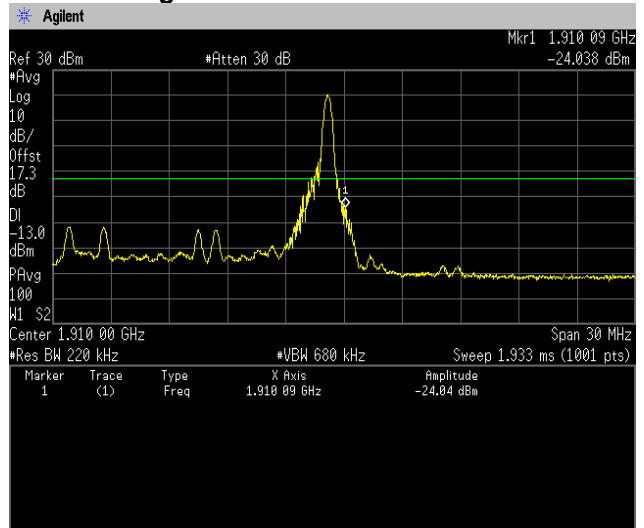


[LTE Band II]
(Band Edge)

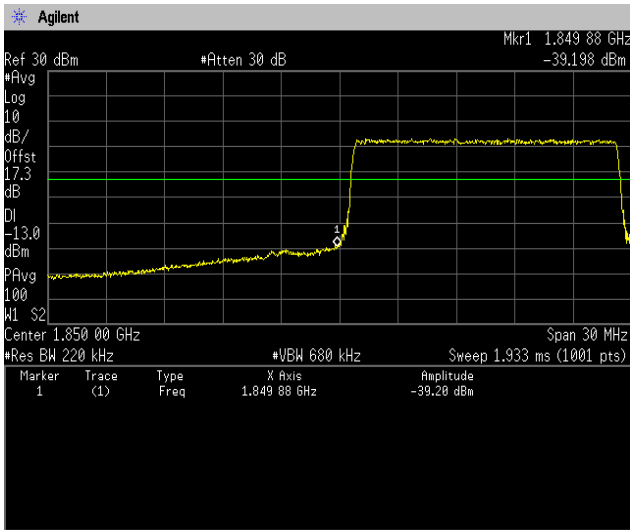
16QAM, BW 15MHz, RB1-0
Channel: Low



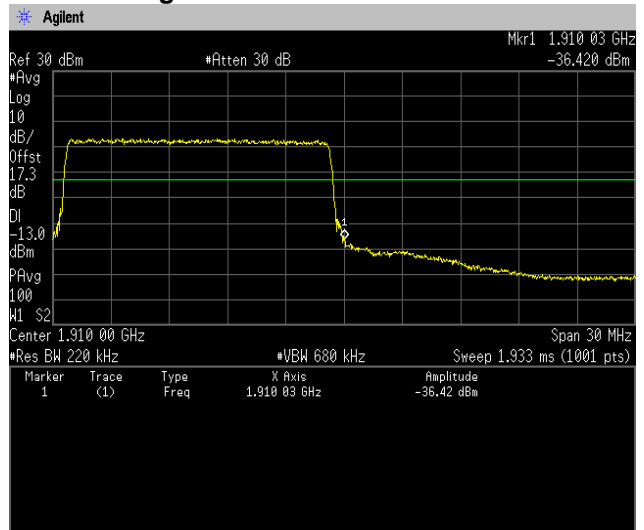
RB1-74
Channel: High



16QAM, BW 15MHz, RB75-0
Channel: Low



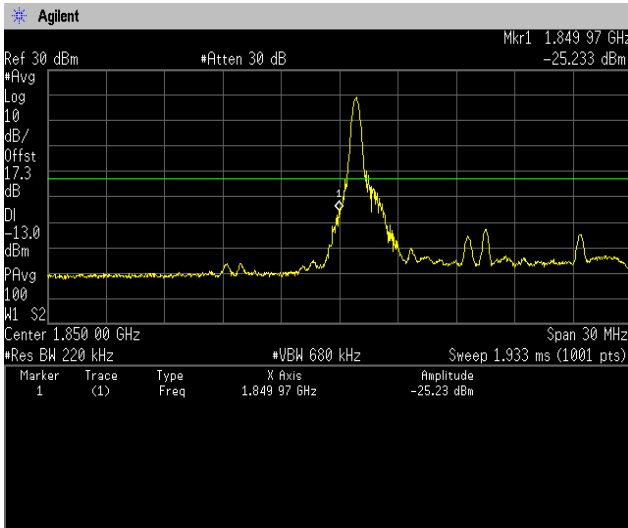
Channel: High



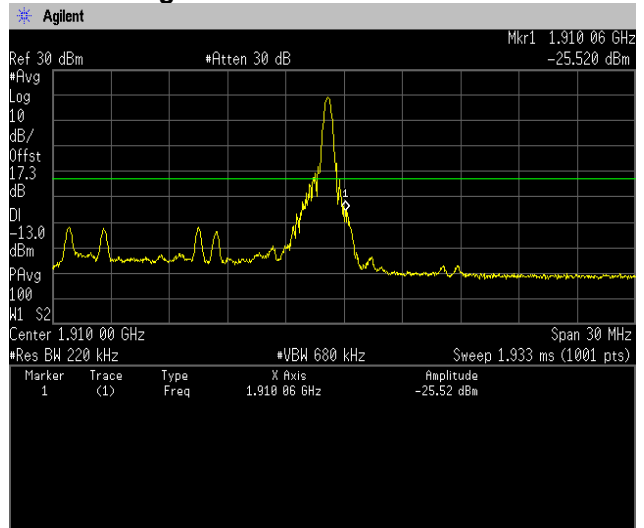


**[LTE Band II]
(Band Edge)**

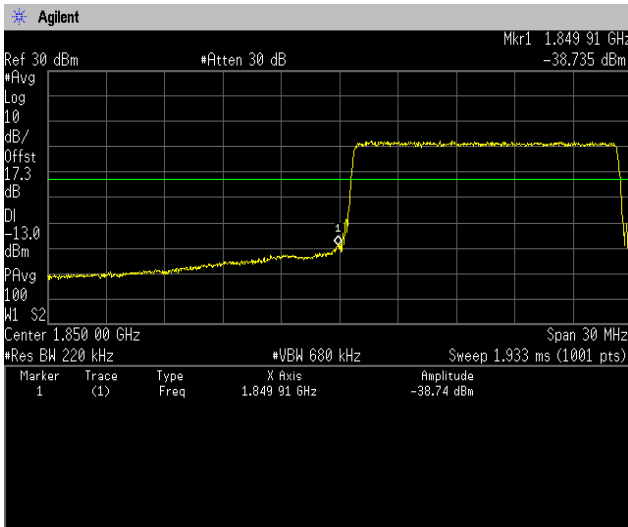
**64QAM, BW 15MHz, RB1-0
Channel: Low**



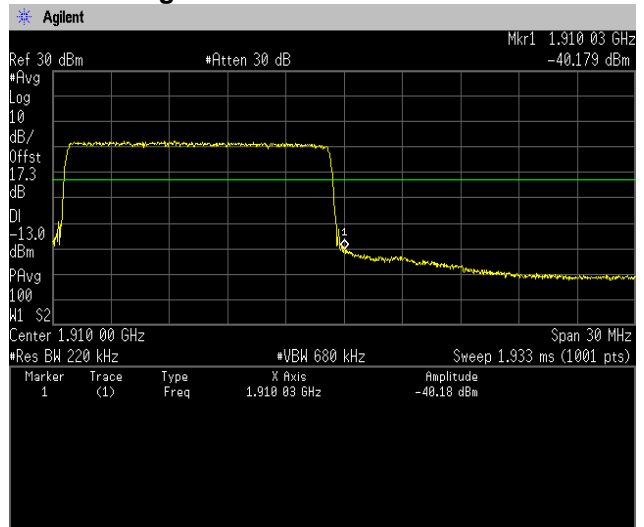
**RB1-74
Channel: High**



**64QAM, BW 15MHz, RB75-0
Channel: Low**



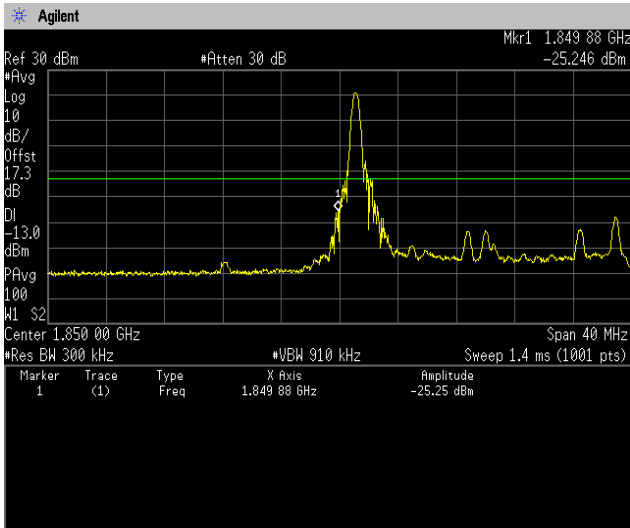
Channel: High



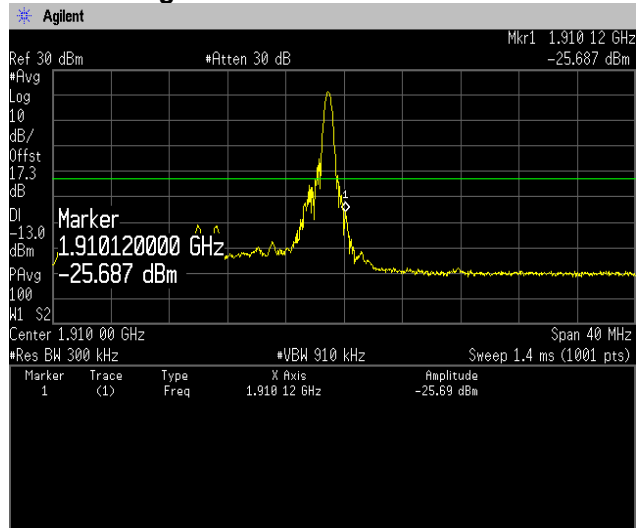


[LTE Band II]
(Band Edge)

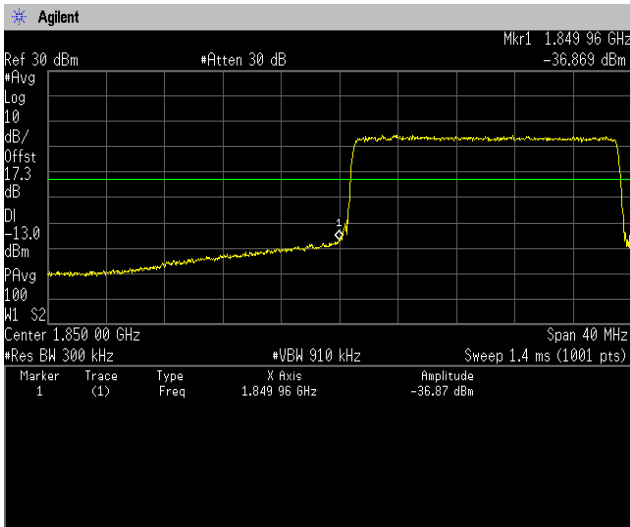
QPSK, BW 20MHz, RB1-0
Channel: Low



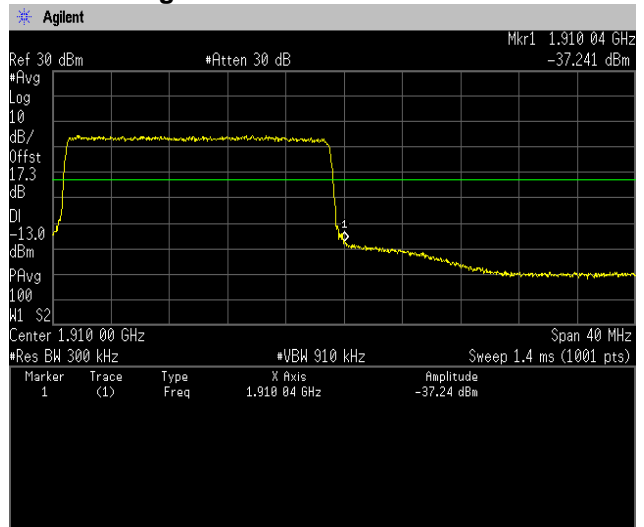
RB1-99
Channel: High



QPSK, BW 20MHz, RB100-0
Channel: Low



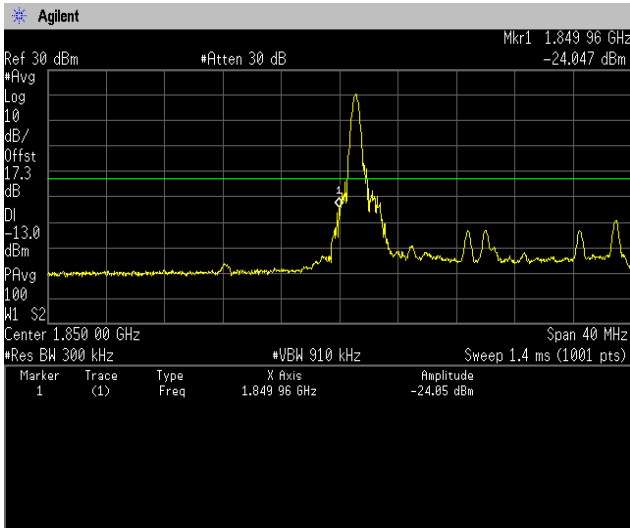
Channel: High



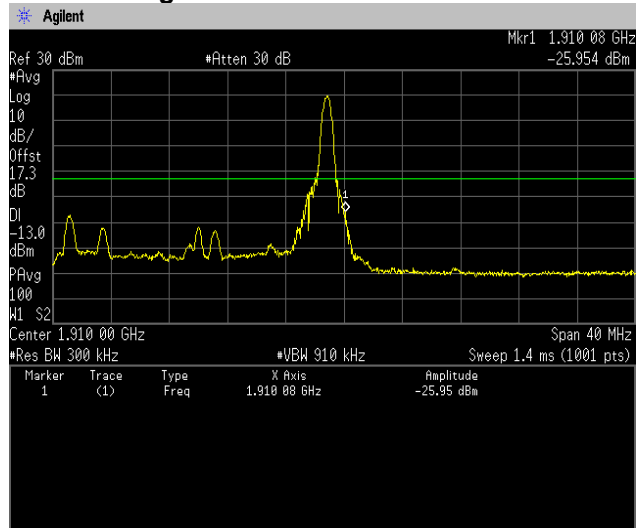


[LTE Band II]
(Band Edge)

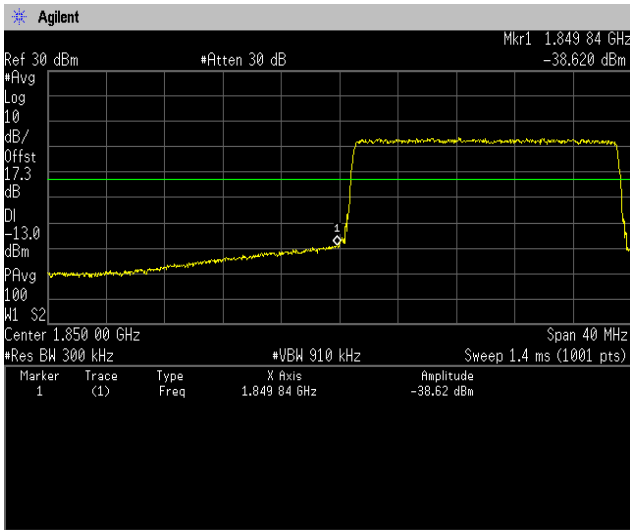
16QAM, BW 20MHz, RB1-0
Channel: Low



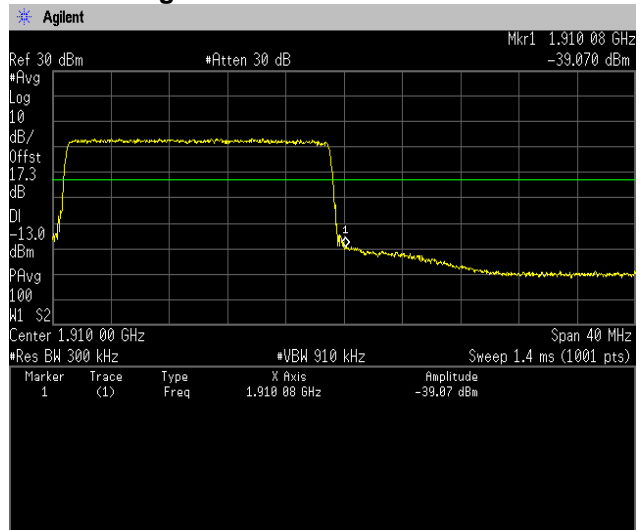
RB1-99
Channel: High



16QAM, BW 20MHz, RB100-0
Channel: Low

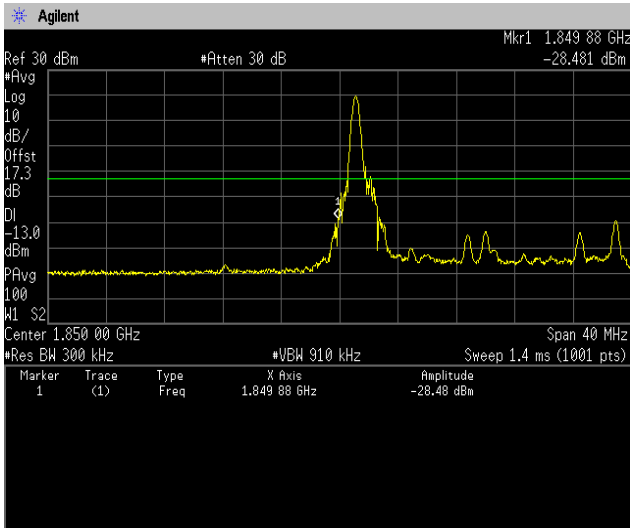


Channel: High

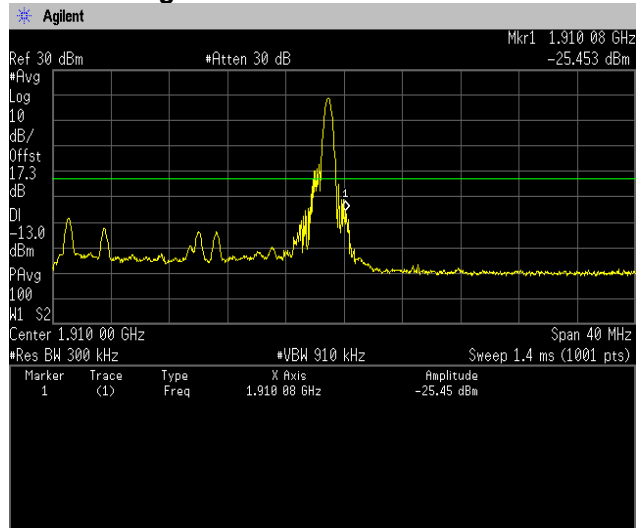


[LTE Band II]
(Band Edge)

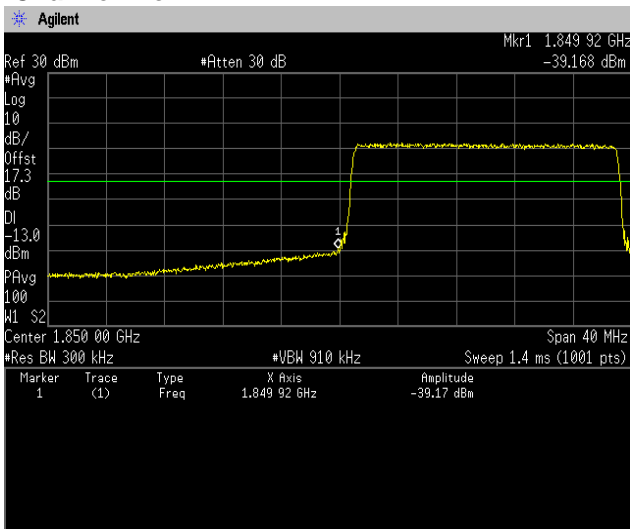
64QAM, BW 20MHz, RB1-0
Channel: Low



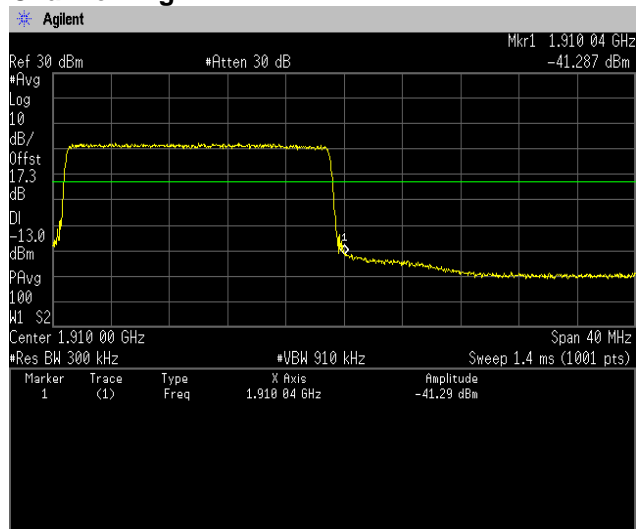
RB1-99
Channel: High



64QAM, BW 20MHz, RB100-0
Channel: Low



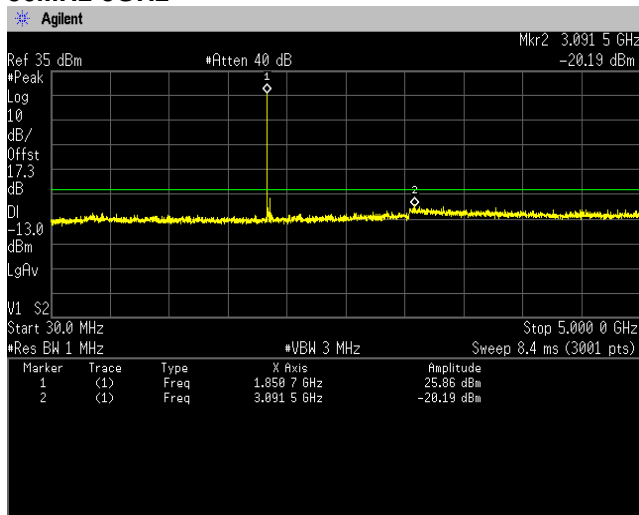
Channel: High



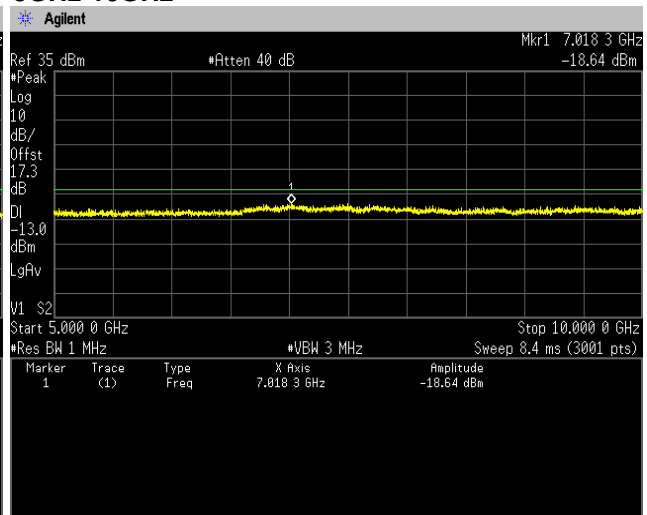
**[LTE Band II]
(Spurious Emissions)**

Note: Conducted spurious test was measured in the worst case of Equivalent Isotropic Radiated Power.

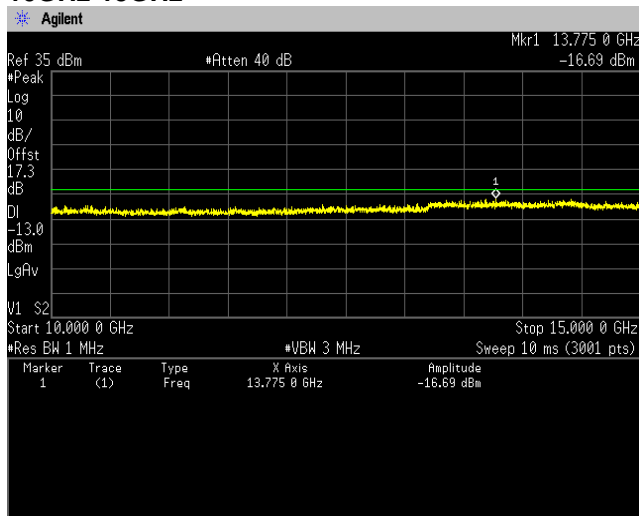
**QPSK, BW 15MHz, RB 1-0
Channel: Low
30MHz-5GHz**



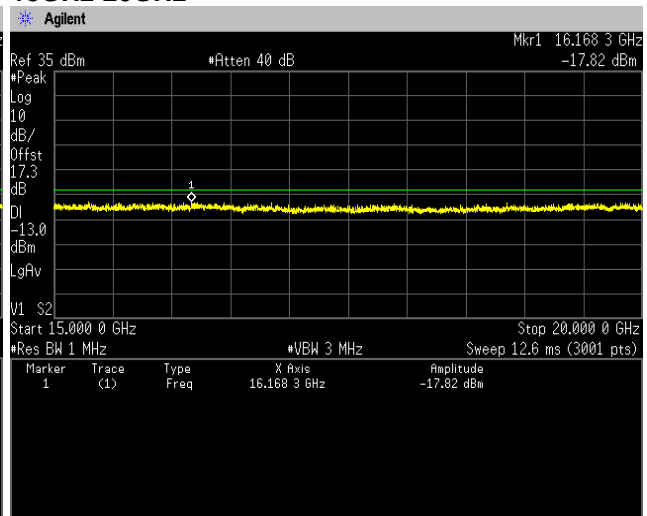
5GHz-10GHz



10GHz-15GHz

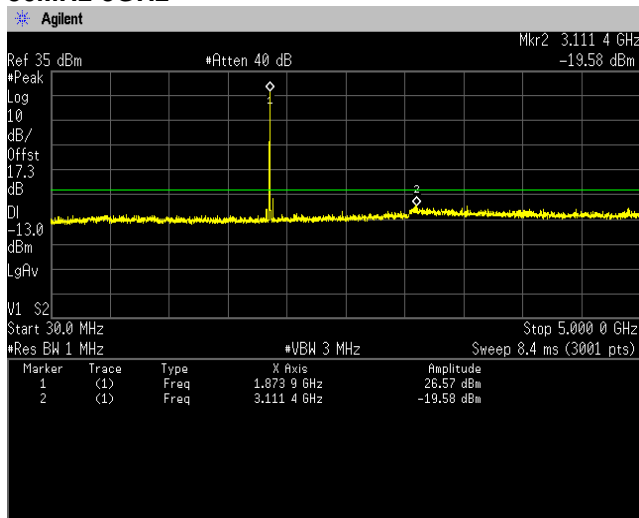


15GHz-20GHz

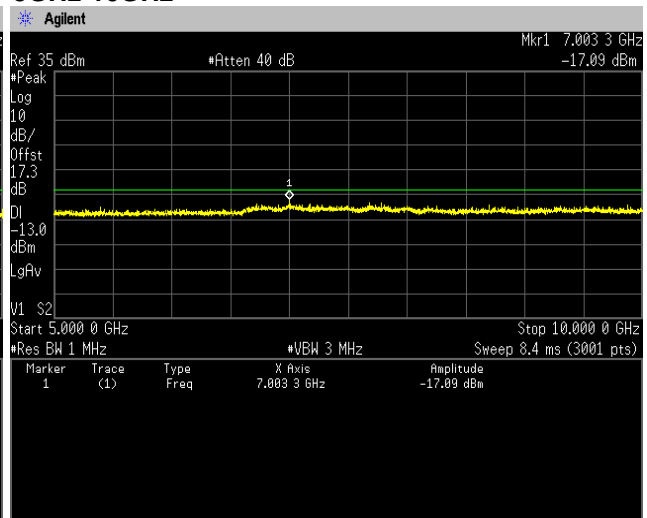


[LTE Band II]
(Spurious Emissions)

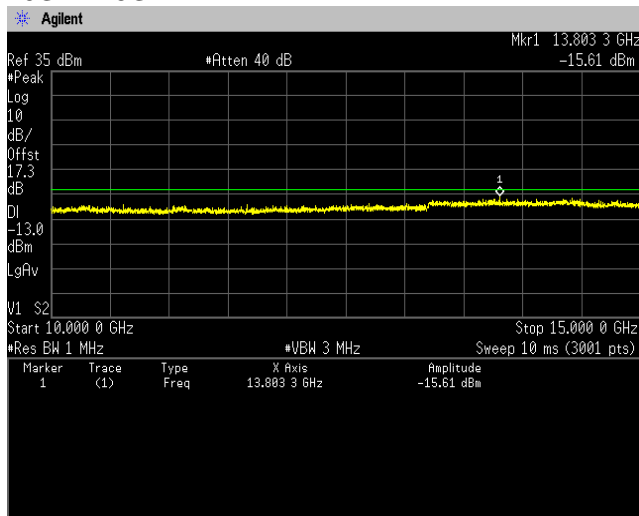
Channel: Middle
30MHz-5GHz



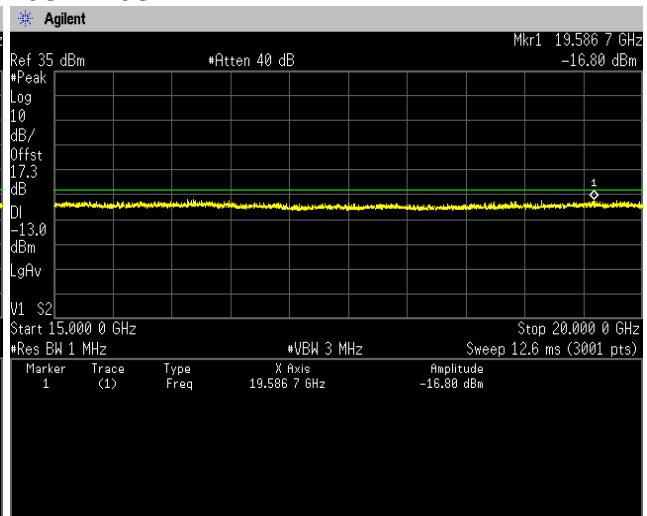
5GHz-10GHz



10GHz-15GHz

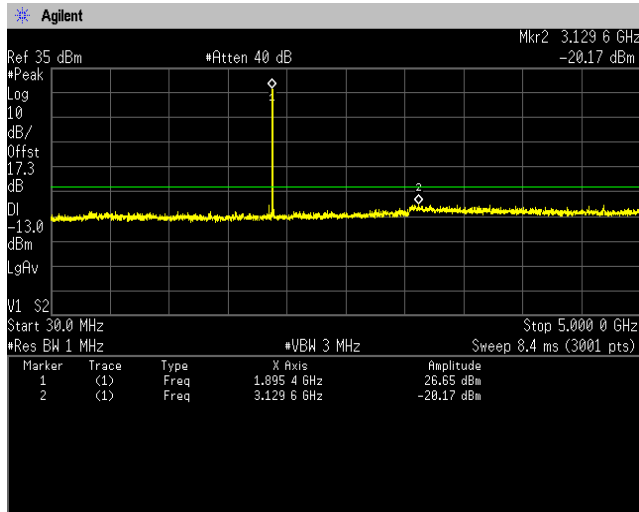


15GHz-20GHz

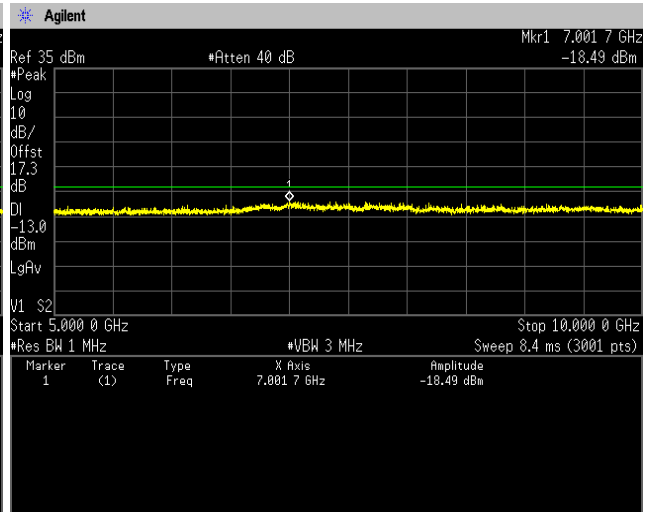


[LTE Band II]
(Spurious Emissions)

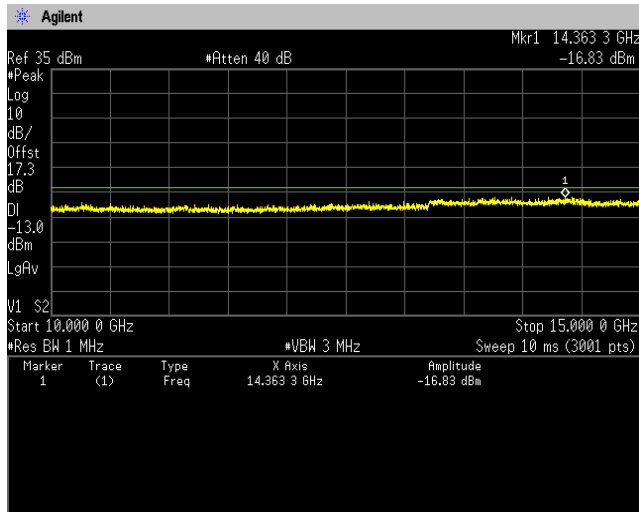
Channel: High
30MHz-5GHz



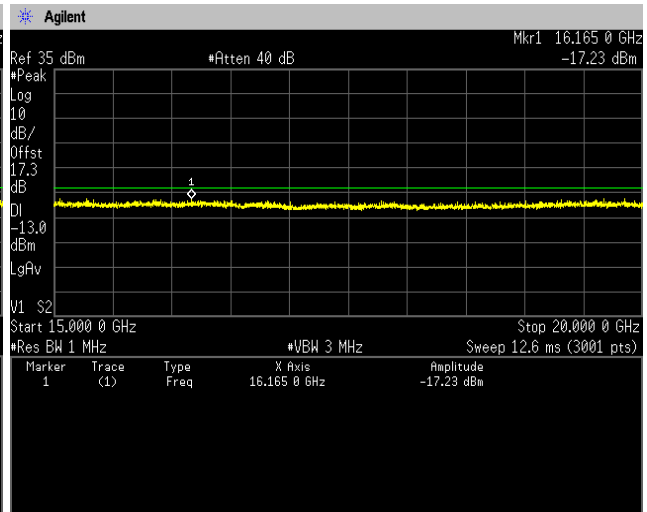
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz



4.5 Radiated Emissions and Harmonic Emissions

4.5.1 Measurement procedure

[FCC 24.238(a), 2.1053]

<Step 1>

The EUT and support equipment are placed on a 1 meter x 0.8 meter surface, 0.8 meter height (Below 1GHz) or 0.6 meter x 0.6 meter surface, 1.5 meter height (Above 1GHz) styrene foam table. Radiated emission measurements are performed at 3 meter distance with the broadband antenna (Biconical antenna, Log periodic antenna and double ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission.

The bandwidth of the spectrum analyzer is set to 1 MHz. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission. The frequency is investigated up to 10 times the carrier wave.

<Step 2>

The substitution antenna is replaced by the transmitter antenna (EUT).

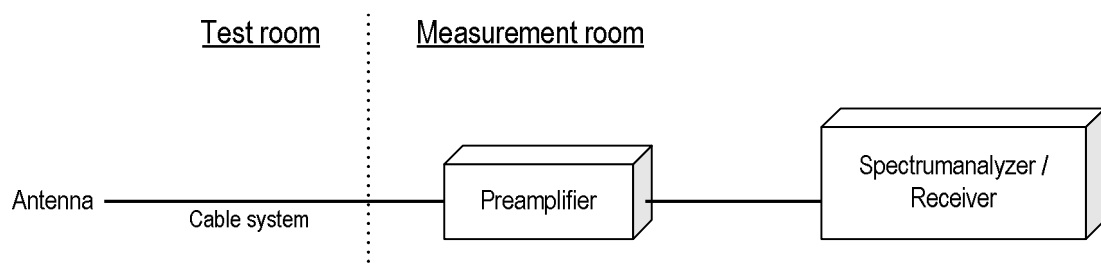
The frequency of the signal generator is adjusted to the measurement frequency.

Level of the signal generator is adjusted to the level that is obtained from step 1, and record the emission level of signal generator.

The spectrum analyzer is set to;

- RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW \geq 3 x RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep time = auto-couple

- Test configuration





4.5.2 Calculation method

Result (EIRP) = Ant. Input - Cable loss + Antenna Gain
 Margin = Limit – Result (EIRP)

Example:

Limit @ 3760.0 MHz: -13.0 dBm
 Ant. Input = -55.6 dBm Cable loss = 1.6 dB Ant. Gain = 9.2 dBi
 Result = -55.6 - 1.6 + 9.2 = -48.0 dBm
 Margin = -13.0 - (-48.0) = 35.0 dB

4.5.3 Limit

-13 dBm or less

4.5.4 Test data

Date	: 1~2-August-2023		
Temperature	: 24.2 [°C]		
Humidity	: 60.9 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Chiaki Kanno</u>
Date	: 2~3-August-2023		
Temperature	: 23.4 [°C]		
Humidity	: 62.6 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Chiaki Kanno</u>
Date	: 3-August-2023		
Temperature	: 22.6 [°C]		
Humidity	: 76.9 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Tadahiro Seino</u>
Date	: 8~9-August-2023		
Temperature	: 24.3 [°C]		
Humidity	: 70.0 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Chiaki Kanno</u>

[GSM1900]**Channel: 512**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3700.4	-56.2	-55.2	1.6	8.3	-48.6	-13.0	35.6

Channel: 661

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.5	-55.1	1.7	8.2	-48.6	-13.0	35.6

Channel: 810

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3819.6	-56.5	-55.0	1.7	8.1	-48.6	-13.0	35.6

[WCDMA Band II]**Channel: 9262**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3704.8	-56.6	-55.3	1.6	8.3	-48.7	-13.0	35.7

Channel: 9400

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.5	-55.2	1.7	8.2	-48.7	-13.0	35.7

Channel: 9538

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.2	-56.6	-55.4	1.7	8.1	-49.0	-13.0	36.0

**[LTE Band II]
QPSK, BW 1.4MHz
Channel: 18607**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3701.4	-56.3	-55.0	1.6	8.3	-48.4	-13.0	35.4

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.7	-55.4	1.7	8.2	-48.9	-13.0	35.9

Channel: 19193

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3818.6	-56.6	-54.8	1.7	8.1	-48.4	-13.0	35.4

**16QAM, BW 1.4MHz
Channel: 18607**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3701.4	-56.6	-55.3	1.6	8.3	-48.7	-13.0	35.7

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.6	-55.3	1.7	8.2	-48.8	-13.0	35.8

Channel: 19193

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3818.0	-56.7	-54.9	1.7	8.1	-48.5	-13.0	35.5

**64QAM, BW 1.4MHz
Channel: 18607**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3701.4	-56.6	-55.3	1.6	8.3	-48.7	-13.0	35.7

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19193

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3818.6	-56.8	-55.0	1.7	8.1	-48.6	-13.0	35.6

**[LTE Band II]
QPSK, BW 3MHz
Channel: 18615**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3703.0	-56.5	-54.7	1.6	8.3	-48.1	-13.0	35.1

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.6	-55.3	1.7	8.2	-48.8	-13.0	35.8

Channel: 19185

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3817.0	-56.6	-54.9	1.7	8.1	-48.5	-13.0	35.5

16QAM, BW 3MHz

Channel: 18615

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3703.0	-56.7	-54.9	1.6	8.3	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.6	-55.3	1.7	8.2	-48.8	-13.0	35.8

Channel: 19185

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3717.0	-56.8	-55.1	1.6	8.2	-48.5	-13.0	35.5

64QAM, BW 3MHz

Channel: 18615

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3703.0	-56.7	-54.9	1.6	8.3	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.7	-55.4	1.7	8.2	-48.9	-13.0	35.9

Channel: 19185

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3817.0	-56.8	-55.1	1.7	8.1	-48.7	-13.0	35.7

**[LTE Band II]
QPSK, BW 5MHz
Channel: 18625**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3705.0	-56.7	-54.8	1.6	8.3	-48.2	-13.0	35.2

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.5	-55.2	1.7	8.2	-48.7	-13.0	35.7

Channel: 19175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.0	-56.5	-54.6	1.7	8.1	-48.2	-13.0	35.2

**16QAM, BW 5MHz
Channel: 18625**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3705.0	-56.8	-54.9	1.6	8.3	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.0	-56.5	-54.6	1.7	8.1	-48.2	-13.0	35.2

**64QAM, BW 5MHz
Channel: 18625**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3705.0	-56.9	-55.0	1.6	8.3	-48.4	-13.0	35.4

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-57.0	-55.7	1.7	8.2	-49.2	-13.0	36.2

Channel: 19175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3819.6	-56.8	-54.9	1.7	8.1	-48.5	-13.0	35.5

**[LTE Band II]
QPSK, BW 10MHz
Channel: 18650**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3710.0	-56.8	-54.9	1.6	8.3	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19150

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3810.0	-56.8	-55.1	1.7	8.1	-48.7	-13.0	35.7

**16QAM, BW 10MHz
Channel: 18650**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3710.0	-57.0	-55.1	1.6	8.3	-48.5	-13.0	35.5

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.7	-55.4	1.7	8.2	-48.9	-13.0	35.9

Channel: 19150

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3810.0	-57.0	-55.3	1.7	8.1	-48.9	-13.0	35.9

**64QAM, BW 10MHz
Channel: 18650**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3710.0	-57.0	-55.1	1.6	8.3	-48.5	-13.0	35.5

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19150

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3810.0	-57.0	-55.3	1.7	8.1	-48.9	-13.0	35.9

**[LTE Band II]
QPSK, BW 15MHz
Channel: 18675**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3715.0	-56.6	-54.7	1.6	8.3	-48.1	-13.0	35.1

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19125

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3805.0	-56.9	-55.2	1.7	8.1	-48.7	-13.0	35.7

**16QAM, BW 15MHz
Channel: 18675**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3715.0	-56.8	-54.9	1.6	8.3	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19125

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3805.0	-57.0	-55.3	1.7	8.1	-48.8	-13.0	35.8

**64QAM, BW 15MHz
Channel: 18675**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3715.0	-56.8	-54.9	1.6	8.3	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.9	-55.6	1.7	8.2	-49.1	-13.0	36.1

Channel: 19125

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3805.0	-57.0	-55.3	1.7	8.1	-48.8	-13.0	35.8

**[LTE Band II]
QPSK, BW 20MHz
Channel: 18700**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3720.0	-56.8	-54.9	1.6	8.2	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19100

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3800.0	-56.5	-54.9	1.7	8.1	-48.4	-13.0	35.4

16QAM, BW 20MHz

Channel: 18700

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3720.0	-56.7	-54.8	1.6	8.2	-48.2	-13.0	35.2

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-57.0	-55.7	1.7	8.2	-49.2	-13.0	36.2

Channel: 19100

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3800.0	-56.7	-55.1	1.7	8.1	-48.6	-13.0	35.6

64QAM, BW 20MHz

Channel: 18700

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3720.0	-56.8	-54.9	1.6	8.2	-48.3	-13.0	35.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-56.8	-55.5	1.7	8.2	-49.0	-13.0	36.0

Channel: 19100

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3800.0	-56.8	-55.2	1.7	8.1	-48.7	-13.0	35.7

All other emissions measured were greater than 20dB below the specification limit.

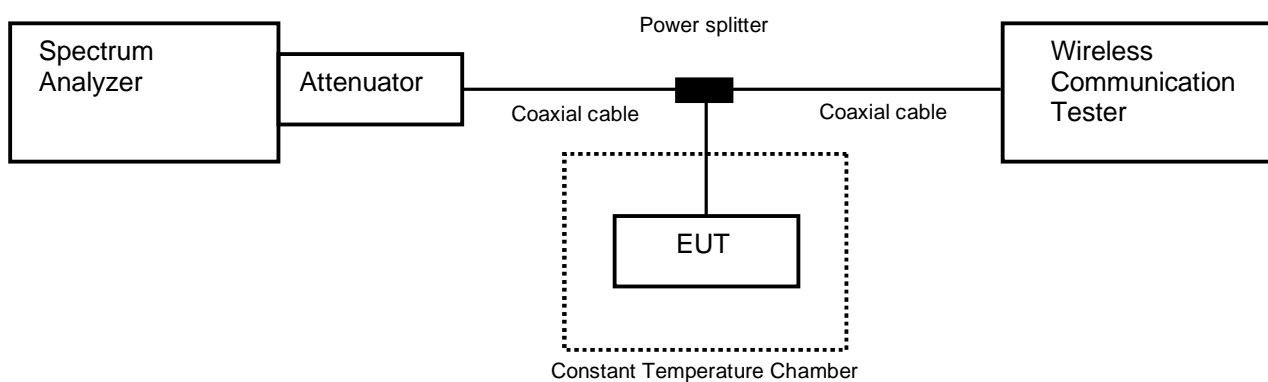
4.6 Frequency Stability

4.6.1 Measurement procedure

[FCC 24.235, 2.1055]

The EUT was placed of an inside of a constant temperature chamber as the temperature in the chamber was varied between -30°C and $+50^{\circ}\text{C}$. The temperature was incremented by 10°C intervals and the unit was allowed to stabilize at each measurement. The frequency drift was measured with the normal Temperature and voltage tolerance and it is presented as the ppm unit.

- Test configuration



4.6.2 Limit

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.



4.6.3 Measurement result

Date : 5-August-2023
 Temperature : 23.9 [°C]
 Humidity : 51.8 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 19-August-2023
 Temperature : 23.5 [°C]
 Humidity : 52.9 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 20-August-2023
 Temperature : 23.6 [°C]
 Humidity : 56.8 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

**[GSM1900]
 Channel: 661**

Power Supply [V]	Temperature [°C]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Result
3.87	25(Ref.)	1,879,999,985	0.00000	Pass
	50	1,879,999,965	-0.01066	Pass
	40	1,879,999,976	-0.00517	Pass
	30	1,879,999,978	-0.00409	Pass
	20	1,879,999,987	0.00069	Pass
	10	1,879,999,981	-0.00222	Pass
	0	1,879,999,983	-0.00117	Pass
	-10	1,879,999,984	-0.00064	Pass
	-20	1,879,999,976	-0.00483	Pass
	-30	1,879,999,986	0.00024	Pass
3.48	25	1,879,999,977	-0.00419	Pass
4.26	25	1,879,999,983	-0.00143	Pass

Calculation;
 Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

[WCDMA Band II]
Channel: 9400

Power Supply [V]	Temperature [°C]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Result
3.87	25(Ref.)	1,880,000,008	0.00000	Pass
	50	1,879,999,994	-0.00730	Pass
	40	1,880,000,007	-0.00026	Pass
	30	1,880,000,006	-0.00112	Pass
	20	1,880,000,004	-0.00167	Pass
	10	1,880,000,008	0.00036	Pass
	0	1,880,000,009	0.00082	Pass
	-10	1,880,000,009	0.00093	Pass
	-20	1,880,000,009	0.00056	Pass
	-30	1,880,000,009	0.00072	Pass
3.48	25	1,880,000,006	-0.00093	Pass
4.26	25	1,880,000,006	-0.00068	Pass

Calculation;

Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

[LTE Band II]
QPSK, BW 10MHz, RB 50-0
Channel: 18900

Power Supply [V]	Temperature [°C]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Result
3.87	25(Ref.)	1,880,000,011	0.00000	Pass
	50	1,880,000,011	0.00004	Pass
	40	1,880,000,014	0.00160	Pass
	30	1,880,000,011	0.00009	Pass
	20	1,880,000,013	0.00129	Pass
	10	1,880,000,017	0.00348	Pass
	0	1,880,000,018	0.00378	Pass
	-10	1,880,000,017	0.00324	Pass
	-20	1,880,000,018	0.00408	Pass
	-30	1,880,000,009	-0.00076	Pass
3.48	25	1,880,000,015	0.00249	Pass
4.26	25	1,880,000,006	-0.00271	Pass

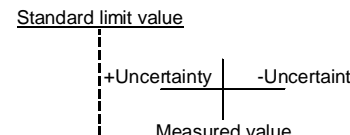


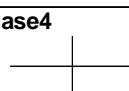
Calculation;

Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

5 Measurement Uncertainty

Expanded uncertainties stated are calculated with a coverage Factor k=2.
 Please note that these results are not taken into account when measurement uncertainty considerations contained in ETSI TR 100 028 Parts 1 and 2 determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission, AMN (9 kHz – 150 kHz)	±3.7 dB
Conducted emission, AMN (150 kHz – 30 MHz)	±3.3 dB
Radiated emission (9kHz – 30 MHz)	±3.8 dB
Radiated emission (30 MHz – 1000 MHz)	±5.4 dB
Radiated emission (1 GHz – 6 GHz)	±4.6 dB
Radiated emission (6 GHz – 18 GHz)	±4.7 dB
Radiated emission (18 GHz – 40 GHz)	±6.4 dB
Radio Frequency	±1.3 * 10 ⁻⁸
RF power, conducted	±0.7 dB
Adjacent channel power	±1.5 dB
Temperature	±0.6 °C
Humidity	±1.2 %
Voltage (DC)	±0.4 %
Voltage (AC, <10kHz)	±0.2 %

Judge	Measured value and standard limit value
PASS	<p>Case1</p>  <p>Even if it takes uncertainty into consideration, a standard limit value is fulfilled.</p>
	<p>Case2</p>  <p>Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.</p>
FAIL	<p>Case3</p>  <p>Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.</p>
	<p>Case4</p>  <p>Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.</p>



Japan

6 Laboratory Information

Testing was performed and the report was issued at:

TÜV SÜD Japan Ltd. Yonezawa Testing Center

Address: 5-4149-7 Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan

Phone: +81-238-28-2881

Accreditation and Registration

A2LA

Certificate #3686.03

VLAC

Accreditation No.: VLAC-013

BSMI

Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

Innovation, Science and Economic Development Canada

ISED#: 4224A

VCCI Council

Registration number: A-0166

Appendix A. Test Equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	30-Sep-2023	05-Sep-2022
Attenuator	HUBER+SUHNER	6810.19.A	N/A(S450)	31-Dec-2023	19-Dec-2022
Microwave cable	Junkosha Inc.	MWX221/1m	N/A(S400)	31-Mar-2024	16-Mar-2023
Power divider	Keysight	11636B	MY51359874	30-Sep-2023	28-Sep-2022
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	31-Aug-2023	15-Aug-2022
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	116338	31-Aug-2023	04-Aug-2022
Temperature and humidity chamber	ESPEC	PL1KP	14007261	30-Jun-2024	30-Jun-2023

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESW44	103171	30-Sep-2023	20-Sep-2022
Preamplifier	SONOMA	310	372170	30-Sep-2023	15-Sep-2022
Biconical antenna	Schwarzbeck	VHBB9124/BBA9106	1145	31-Jul-2024	14-Jul-2023
Log periodic antenna	Schwarzbeck	VUSLP9111B	346	30-Nov-2023	16-Nov-2022
Attenuator	TOYO Connector	NA-PJ-6/6dB	N/A(S541)	30-Sep-2023	28-Sep-2022
Attenuator	TAMAGAWA.ELEC	CFA-10/3dB	N/A(S503)	31-Jul-2024	20-Jul-2023
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	31-Dec-2023	22-Dec-2022
Attenuator	AEROFLEX	26A-10	081217-08	31-Dec-2023	19-Dec-2022
Double ridged guide antenna	ETS LINDGREN	3117	00052315	30-Jun-2024	22-Jun-2023
Attenuator	HUBER+SUHNER	6803.17.B	N/A(2340)	31-Dec-2023	22-Dec-2022
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	31-Aug-2023	19-Aug-2022
Preamplifier	TSJ	MLA-1840-B03-35	1240332	31-Aug-2023	19-Aug-2022
Band rejection filter	Micro-Tronics	BRC50720	014	31-Dec-2023	20-Dec-2022
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	31-Dec-2023	16-Dec-2022
RF power amplifier	R&K	CGA020M602-2633R	B40240	30-Jun-2024	21-Jun-2023
Attenuator	Qualwave Inc.	QFA2620-26.5-20-S	22295089	30-Sep-2023	05-Sep-2022
Microwave cable	HUBER+SUHNER	SUCOFLEX102/2m	31648	31-Mar-2024	16-Mar-2023
Dipole antenna	Schwarzbeck	VHAP	1021	31-Jul-2024	06-Jul-2023
Dipole antenna	Schwarzbeck	UHAP	993	31-Jul-2024	06-Jul-2023
Double ridged guide antenna	ETS LINDGREN	3117	00218815	31-Dec-2023	19-Dec-2022
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	31-Aug-2023	15-Aug-2022
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	116338	31-Aug-2023	04-Aug-2022
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	800690/4	31-Oct-2023	26-Oct-2022
		SUCOFLEX104/1m	my24610/4	31-Dec-2023	19-Dec-2022
		SUCOFLEX104/9m	2001099/4	31-Dec-2023	22-Dec-2022
		SUCOFLEX104/1m	MY32976/4	31-Dec-2023	22-Dec-2022
		SUCOFLEX104/2m	SN MY28404/4	31-Dec-2023	19-Dec-2022
		SUCOFLEX104/7m	41625/6	31-Dec-2023	22-Dec-2022
Software	TOYO Technica	ES10/RE-AJ	Ver.2023.01.001	N/A	N/A
Absorber	RIKEN	PPF30	N/A	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-NSA)	31-May-2024	28-May-2023
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	31-May-2024	29-May-2023

*: The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.