

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: EB1073
FCC ID: JOYEB1073

In accordance with FCC Part 24 Subpart E

Prepared for: KYOCERA Corporation
Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku
Yokohama-shi, Kanagawa, Japan
Phone: +81-45-943-6253 Fax: +81-45-943-6314



Japan

**Add value.
Inspire trust.**

COMMERCIAL-IN-CONFIDENCE

Document Number: JPD-TR-21191-0

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Hiroaki Suzuki	Deputy Manager of RF Group	Approved Signatory	2021.10.20

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Japan Ltd. document control rules.

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.



ACCREDITED
Certificate #3686.03

DISCLAIMER AND COPYRIGHT

The results in this report are applicable only to the equipment tested.
This report shall not be re-produced except in full without the written approval of TÜV SÜD Japan Ltd.

Client provided data, for which TÜV SÜD Japan Ltd. take no responsibility, which can affect validity of results within this report is clearly identified.

ACCREDITATION

This test report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government.

TÜV SÜD Japan Ltd.
Yonezawa Testing Center
5-4149-7 Hachimanpara,
Yonezawa-shi, Yamagata,
992-1128 Japan

Phone: +81 (0) 238 28 2881
www.tuvsud.com/ja-jp

Contents

1	Summary of Test	3
1.1	Modification history of the test report.....	3
1.2	Standards	3
1.3	Test methods.....	3
1.4	Deviation from standards.....	3
1.5	List of applied test(s) of the EUT	3
1.6	Test information	3
1.7	Test set up.....	3
1.8	Test period.....	3
2	Equipment Under Test	4
2.1	EUT information.....	4
2.2	Modification to the EUT	6
2.3	Variation of family model(s).....	6
2.4	Description of test mode.....	6
3	Configuration of Equipment	7
3.1	Equipment used.....	7
3.2	System configuration	7
4	Test Result	8
4.1	Equivalent Isotropic Radiated Power.....	8
4.2	Peak to Average Ratio.....	13
4.3	Occupied Bandwidth.....	23
4.4	Band Edge Spurious and Harmonic at Antenna Terminals	33
4.5	Radiated Emissions and Harmonic Emissions	83
4.6	Frequency Stability	92
5	Measurement Uncertainty.....	95
6	Laboratory Information	96
	Appendix A. Test Equipment.....	97

1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-21191-0	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

Table-top

1.8 Test period

5-September-2021 - 7-October-2021

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	EB1073
Serial number	352886910002738, 352886910002902
Trade name	Kyocera
Number of sample(s)	2
EUT condition	Pre-Production
Power rating	Battery: DC 3.87 V
Size	(W) 69.0 mm × (D) 13.7 mm × (H) 123.0 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20 °C to 60 °C
Hardware version	DMT
Software version	V0.101PO
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: 1850.0-1910.0MHz Down Link GSM1900: 1930.2-1989.8 MHz WCDMA Band II: 1932.4-1987.6MHz LTE Band II: 1930.0-1990.0MHz
Modulation type	GSM1900: GMSK WCDMA Band II: QPSK, 16QAM LTE Band II: QPSK, 16QAM, 64QAM
Emission designator	GSM1900: 243KGXW WCDMA Band II: 4M14F9W LTE Band II: BW 1.4M QPSK: 1M09G7D, 16QAM: 1M10W7D, 64QAM: 1M09W7D BW 3M QPSK: 2M71G7D, 16QAM: 2M73W7D, 64QAM: 2M71W7D BW 5M QPSK: 4M52G7D, 16QAM: 4M50W7D, 64QAM: 4M51W7D BW 10M QPSK: 8M98G7D, 16QAM: 8M98W7D, 64QAM: 8M97W7D BW 15M QPSK: 13M5G7D, 16QAM: 13M5W7D, 64QAM: 13M5W7D BW 20M QPSK: 17M9G7D, 16QAM: 18M0W7D, 16QAM: 17M9W7D



Japan

Equivalent Isotropic Radiated Power (E.I.R.P)	GSM1900: 0.110 W (20.4dBm) WCDMA Band II: 0.022W (13.4dBm) LTE Band II: 0.029W (14.6dBm)
Antenna type	Internal antenna
Antenna gain	GSM1900: -4.2dBi WCDMA Band II: -4.2dBi LTE Band II: -4.2dBi

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: EB1073, Serial Number: 352886910002738, 352886910002902			
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)

Not applicable

2.3.2 Reason for selection of EUT

Not applicable

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	-	9262, 9400, 9538	1852.4, 1880.0, 1907.6
	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 Z-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	EB1073	352886910002738, 352886910002902	JOYEB1073	EUT

3.2 System configuration

1. Mobile Phone
(EUT)

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 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.

<Step 2>

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

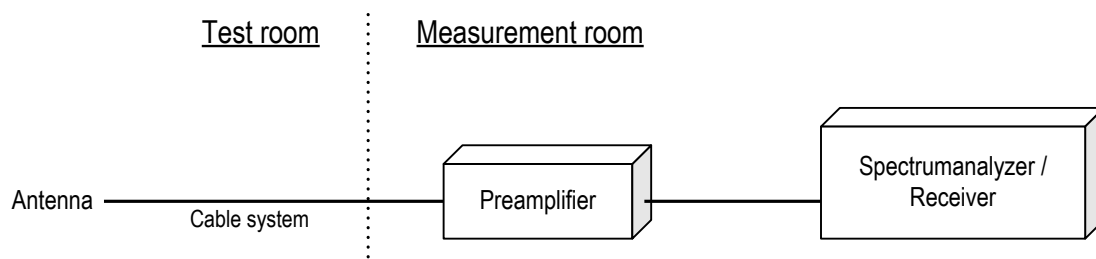
The frequency of the signal generator is adjusted to the measurement frequency.

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 : 5-September-2021
 Temperature : 22.9 [°C]
 Humidity : 62.3 [%]
 Test place : 3m Semi-anechoic chamber

Test engineer : Chiaki Kanno

Date : 30-September-2021
 Temperature : 21.4 [°C]
 Humidity : 56.1 [%]
 Test place : 3m Semi-anechoic chamber

Test engineer : Chiaki Kanno

Date : 4-October-2021
 Temperature : 21.7 [°C]
 Humidity : 60.1 [%]
 Test place : 3m Semi-anechoic chamber

Test engineer : Chiaki Kanno

[GSM1900]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1850.2	-41.2	16.5	1.1	4.7	20.1	33.0	12.9
H	1880.0	-40.8	16.8	1.1	4.7	20.4	33.0	12.6
H	1909.8	-42.2	15.9	1.2	4.6	19.3	33.0	13.7

[WCDMA Band II]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1852.4	-38.4	9.8	1.1	4.7	13.4	33.0	19.6
H	1880.0	-38.4	9.8	1.1	4.7	13.3	33.0	19.7
H	1907.6	-38.9	9.8	1.2	4.6	13.3	33.0	19.7

[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]	Limit [dBm]	Margin [dB]
H	1850.7	-38.0	10.4	1.1	4.7	14.0	33.0	19.0
H	1880.0	-39.1	9.2	1.1	4.7	12.7	33.0	20.3
H	1909.3	-40.0	8.7	1.2	4.6	12.2	33.0	20.8

16QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1850.7	-38.6	9.8	1.1	4.7	13.4	33.0	19.6
H	1880.0	-39.8	8.5	1.1	4.7	12.0	33.0	21.0
H	1909.3	-40.6	8.1	1.2	4.6	11.6	33.0	21.4

64QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1850.7	-39.7	8.7	1.1	4.7	12.3	33.0	20.7
H	1880.0	-40.8	7.5	1.1	4.7	11.0	33.0	22.0
H	1909.3	-41.3	7.4	1.2	4.6	10.9	33.0	22.1

QPSK, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1851.5	-37.5	10.9	1.1	4.7	14.5	33.0	18.5
H	1880.0	-38.7	9.6	1.1	4.7	13.1	33.0	19.9
H	1908.5	-39.0	9.6	1.2	4.6	13.1	33.0	19.9

16QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1851.5	-38.1	10.3	1.1	4.7	13.9	33.0	19.1
H	1880.0	-39.7	8.6	1.1	4.7	12.1	33.0	20.9
H	1908.5	-40.4	8.2	1.2	4.6	11.7	33.0	21.3

64QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1851.5	-39.1	9.3	1.1	4.7	12.9	33.0	20.1
H	1880.0	-40.6	7.7	1.1	4.7	11.2	33.0	21.8
H	1908.5	-41.0	7.6	1.2	4.6	11.1	33.0	21.9

QPSK, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1852.5	-37.3	10.8	1.1	4.7	14.4	33.0	18.6
H	1880.0	-38.1	10.2	1.1	4.7	13.7	33.0	19.3
H	1907.5	-38.6	10.2	1.2	4.6	13.7	33.0	19.3

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1852.5	-38.1	10.0	1.1	4.7	13.6	33.0	19.4
H	1880.0	-38.7	9.6	1.1	4.7	13.1	33.0	19.9
H	1907.5	-39.1	9.7	1.2	4.6	13.2	33.0	19.8

64QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1852.5	-39.2	8.9	1.1	4.7	12.5	33.0	20.5
H	1880.0	-39.5	8.8	1.1	4.7	12.3	33.0	20.7
H	1907.5	-40.3	8.5	1.2	4.6	12.0	33.0	21.0

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1855.0	-37.8	10.4	1.1	4.7	14.0	33.0	19.0
H	1880.0	-38.1	9.2	1.1	4.7	12.7	33.0	20.3
H	1905.0	-40.0	9.2	1.2	4.6	12.6	33.0	20.4

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1855.0	-38.7	9.5	1.1	4.7	13.1	33.0	19.9
H	1880.0	-39.4	9.2	1.1	4.7	12.7	33.0	20.3
H	1905.0	-40.9	8.3	1.2	4.6	11.7	33.0	21.3

64QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1855.0	-39.8	8.4	1.1	4.7	12.0	33.0	21.0
H	1880.0	-40.5	9.2	1.1	4.7	12.7	33.0	20.3
H	1905.0	-41.8	7.4	1.2	4.6	10.8	33.0	22.2

QPSK, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1857.5	-36.7	11.0	1.1	4.7	14.6	33.0	18.4
H	1880.0	-37.8	10.5	1.1	4.7	14.0	33.0	19.0
H	1902.5	-39.1	10.2	1.2	4.7	13.7	33.0	19.3

16QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1857.5	-37.5	10.2	1.1	4.7	13.8	33.0	19.2
H	1880.0	-38.6	9.7	1.1	4.7	13.2	33.0	19.8
H	1902.5	-39.8	9.5	1.2	4.7	13.0	33.0	20.0

64QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1857.5	-38.6	9.1	1.1	4.7	12.7	33.0	20.3
H	1880.0	-39.4	8.9	1.1	4.7	12.4	33.0	20.6
H	1902.5	-40.6	8.7	1.2	4.7	12.2	33.0	20.8

QPSK, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1860.0	-37.1	10.5	1.1	4.7	14.1	33.0	18.9
H	1880.0	-38.3	10.0	1.1	4.7	13.5	33.0	19.5
H	1900.0	-38.7	10.7	1.2	4.7	14.2	33.0	18.8

16QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1860.0	-38.0	9.6	1.1	4.7	13.2	33.0	19.8
H	1880.0	-39.2	9.1	1.1	4.7	12.6	33.0	20.4
H	1900.0	-39.6	9.8	1.2	4.7	13.3	33.0	19.7

64QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1860.0	-39.0	8.6	1.1	4.7	12.2	33.0	20.8
H	1880.0	-40.3	8.0	1.1	4.7	11.5	33.0	21.5
H	1900.0	-40.5	8.9	1.2	4.7	12.4	33.0	20.6

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;

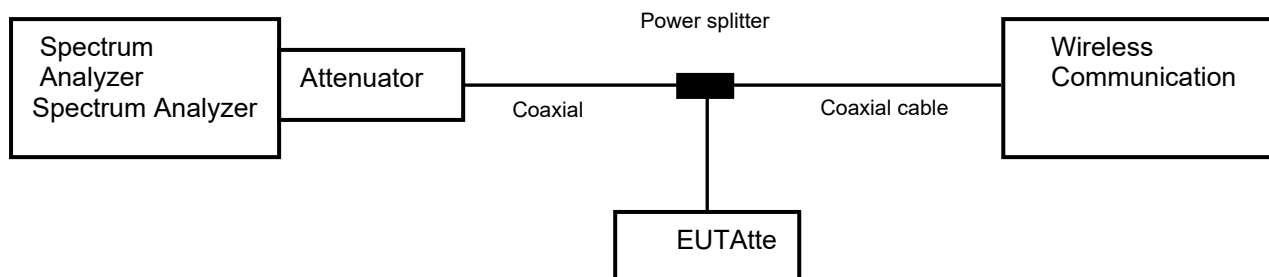
[GSM1900]

- 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 : 9-September-2021
 Temperature : 24.1 [°C]
 Humidity : 68.9 [%]
 Test place : Shielded room No.3

Test engineer : Tadahiro Seino

Date : 17-September-2021
 Temperature : 24.4 [°C]
 Humidity : 47.4 [%]
 Test place : Shielded room No.3

Test engineer : Tadahiro Seino

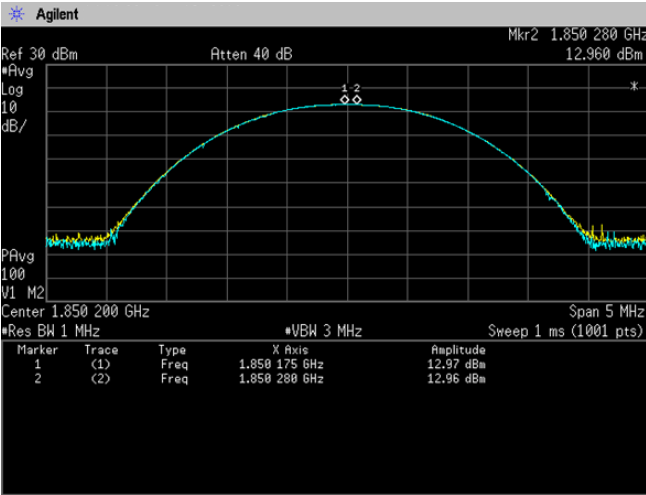
Band	Channel	Frequency [MHz]	Peak to Average Power Ratio [dB]	Limit [dB]
GSM1900	512	1850.2	0.01	13.0
	661	1880.0	0.01	
	810	1909.8	0.03	
WCDMA Band II	9262	1852.4	2.89	13.0
	9400	1880.0	2.83	
	9538	1907.6	2.87	

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	4.38	13.0
				3	15-0	5.00	
				5	25-0	5.24	
				10	50-0	4.58	
				15	75-0	5.85	
				20	100-0	6.56	
			16QAM	1.4	6-0	5.38	
				3	15-0	5.39	
				5	25-0	5.61	
				10	50-0	6.05	
				15	75-0	8.29	
				20	100-0	7.38	
			64QAM	1.4	6-0	6.82	
				3	15-0	6.48	
				5	25-0	6.40	
				10	50-0	6.48	
				15	75-0	8.41	
				20	100-0	7.32	

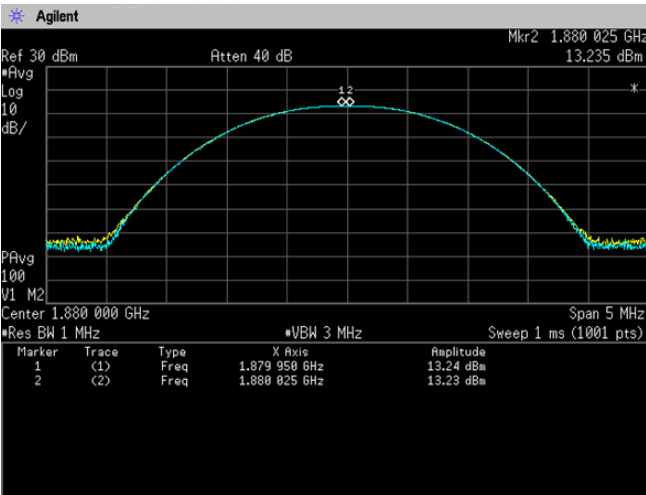
4.2.4 Trace data

[GSM1900]

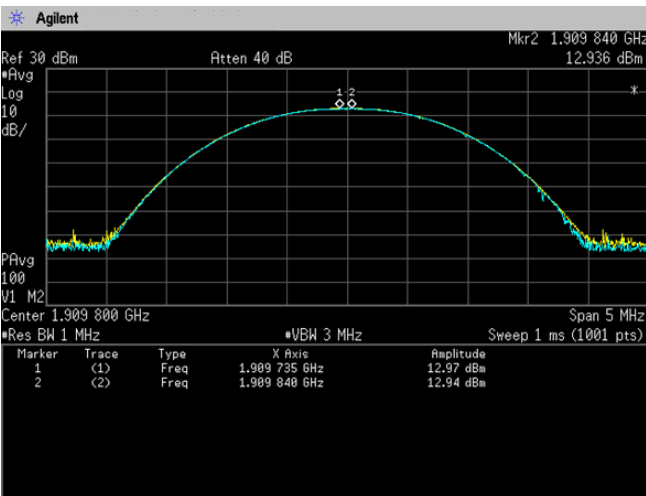
Channel: 512



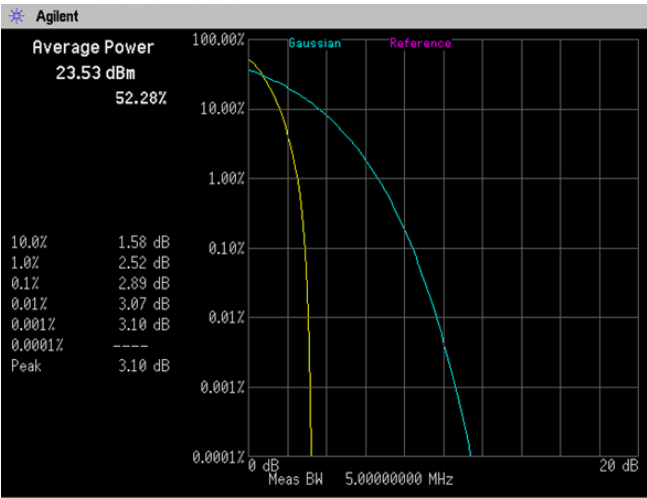
Channel: 661



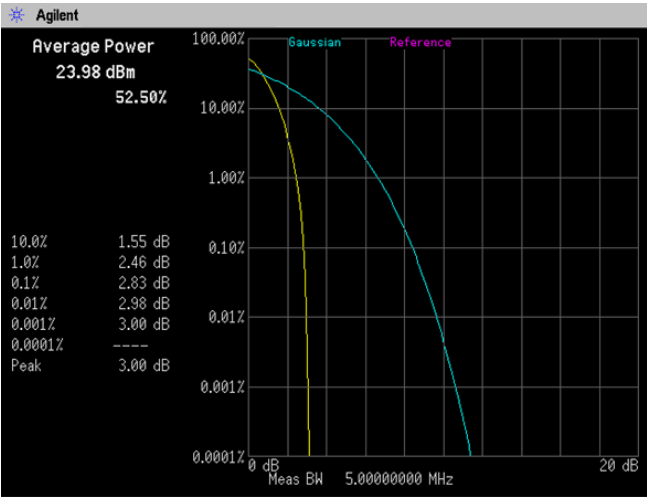
Channel: 810



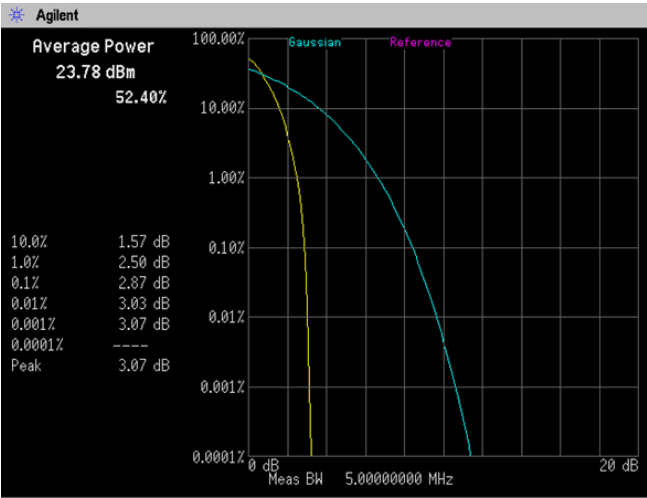
[WCDMA Band II]
Channel: 9262

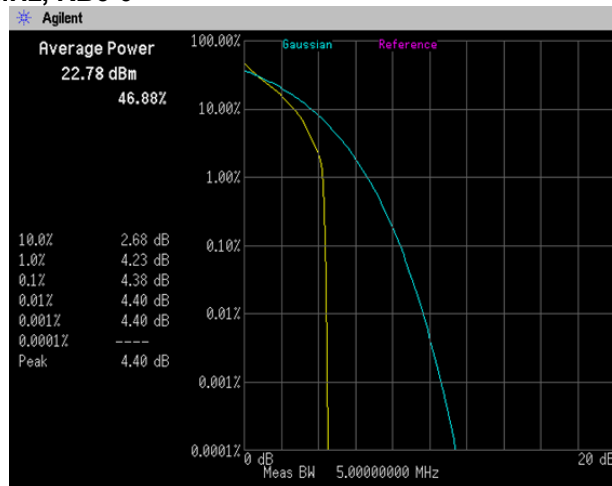
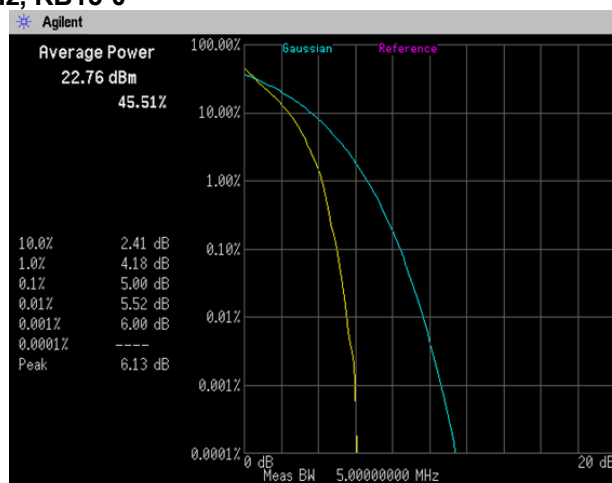
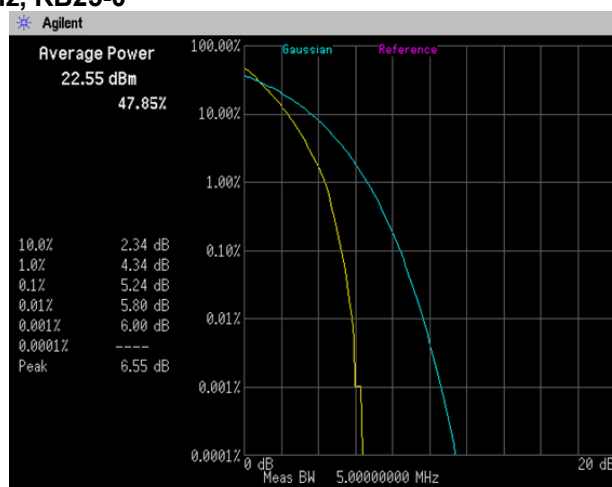


Channel: 9400



Channel: 9538

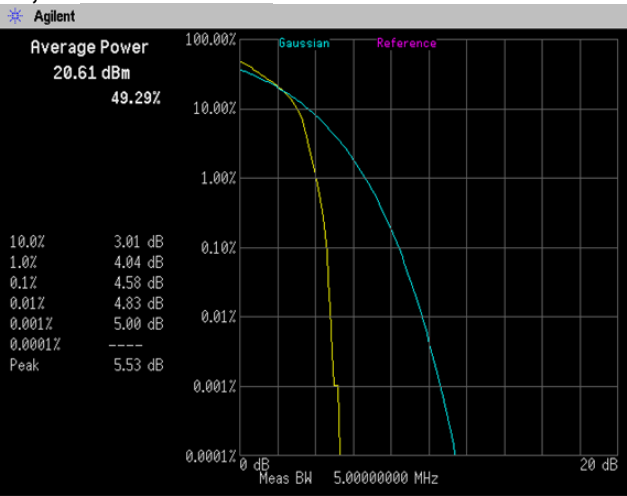


[LTE Band II]**Channel: 18900****QPSK, BW 1.4MHz, RB6-0****QPSK, BW 3MHz, RB15-0****QPSK, BW 5MHz, RB25-0**

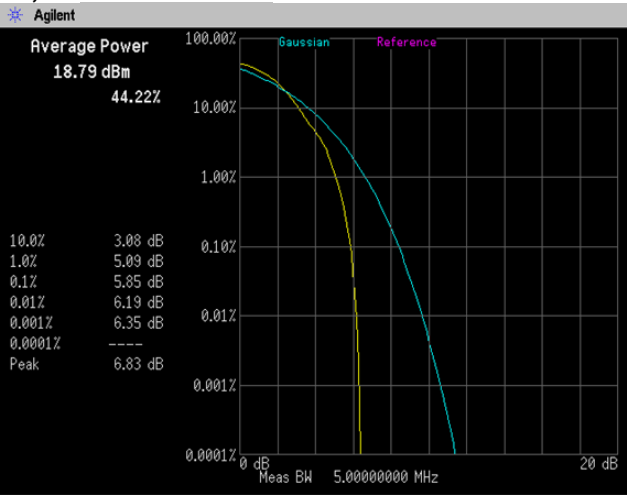


Japan

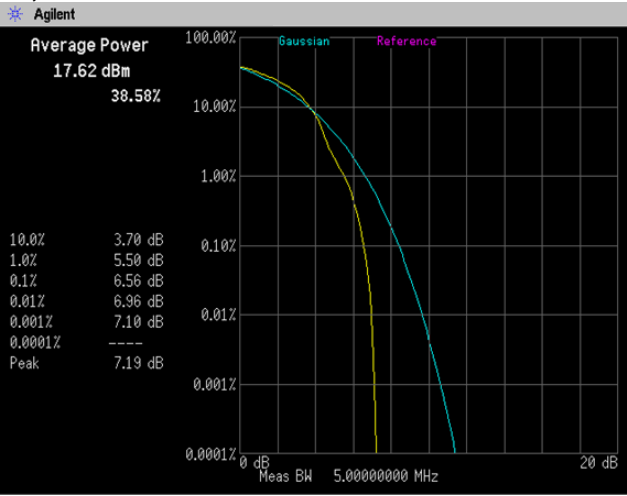
Channel: 18900
QPSK, BW 10MHz, RB50-0



QPSK, BW 15MHz, RB75-0



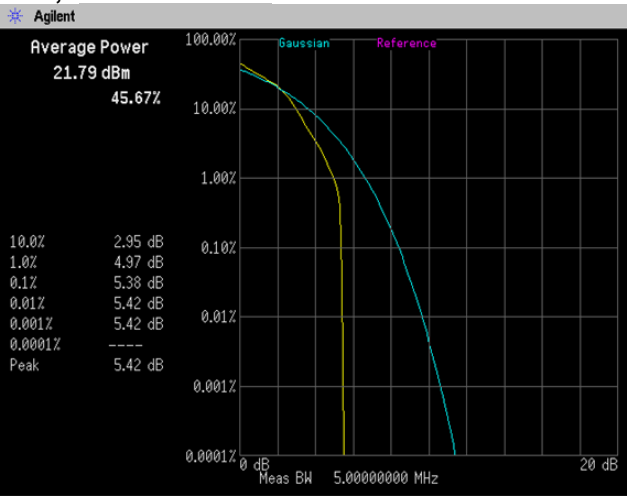
QPSK, BW 20MHz, RB100-0



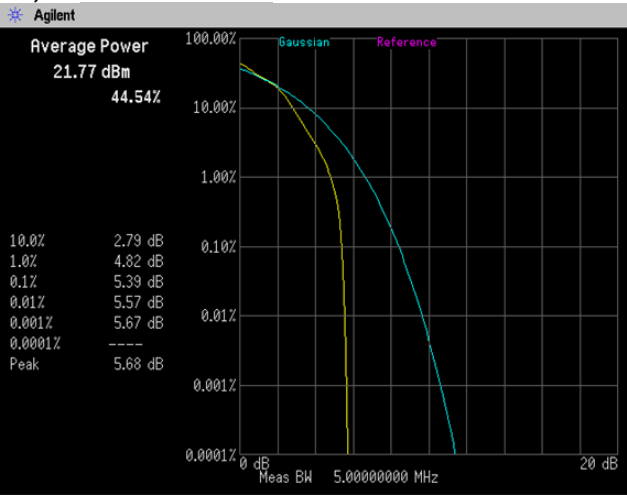


Japan

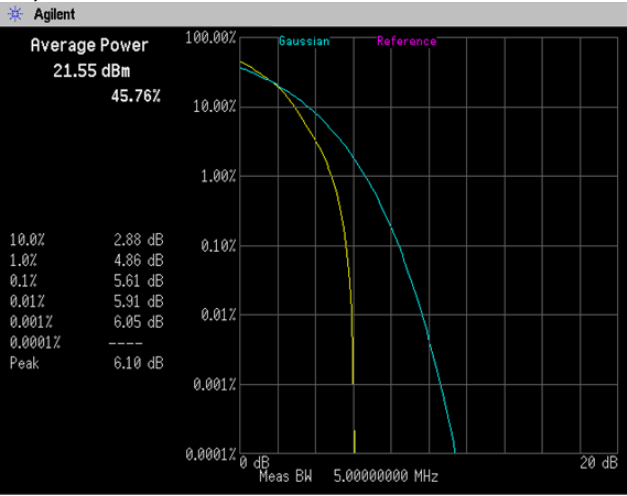
Channel: 18900
16QAM, BW 1.4MHz, RB6-0



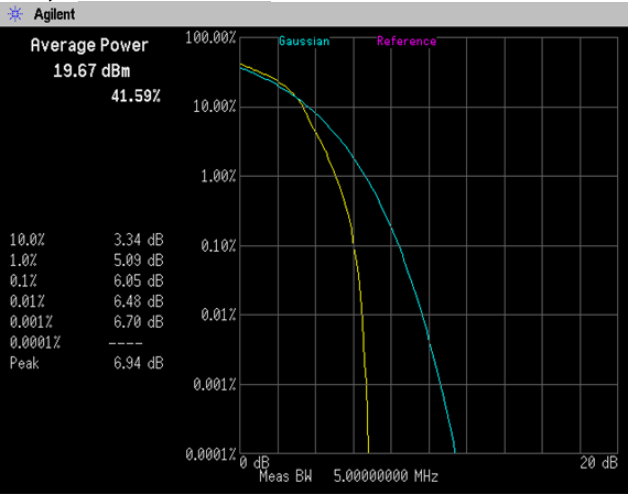
16QAM, BW 3MHz, RB15-0



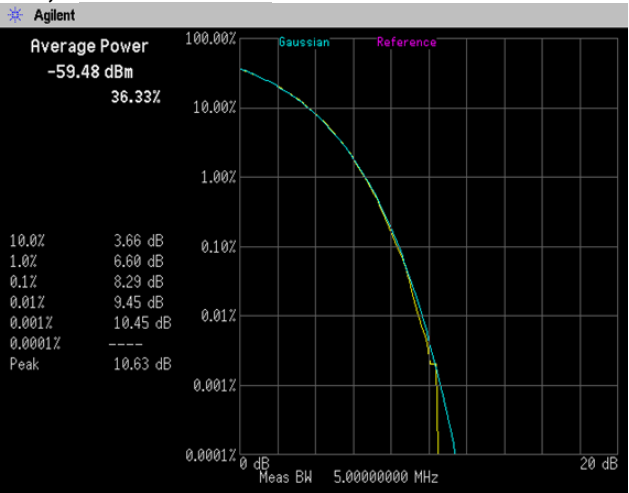
16QAM, BW 5MHz, RB25-0



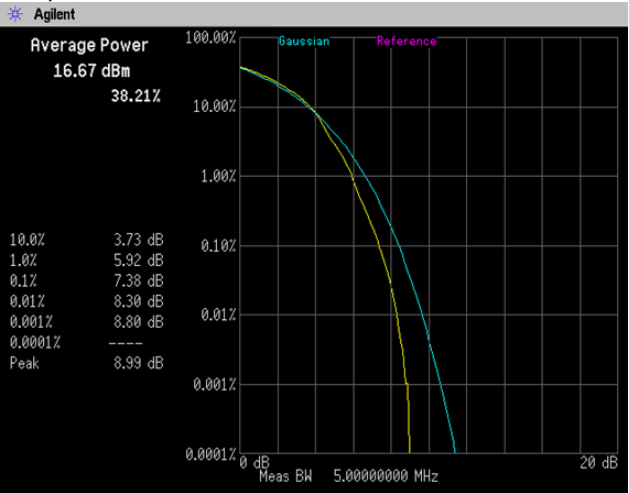
Channel: 18900
16QAM, BW 10MHz, RB50-0



16QAM, BW 15MHz, RB75-0



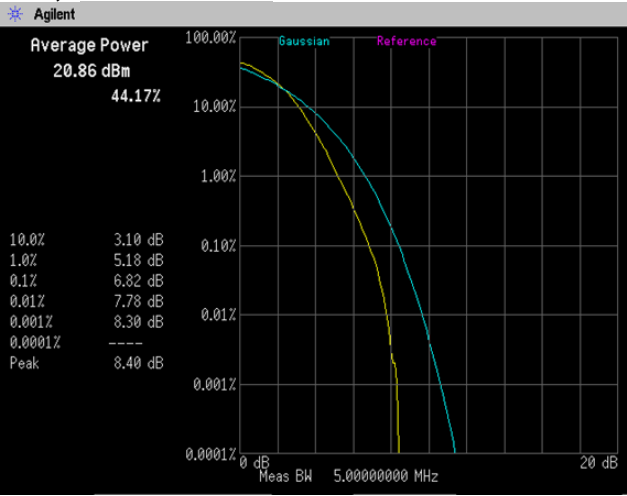
16QAM, BW 20MHz, RB100-0



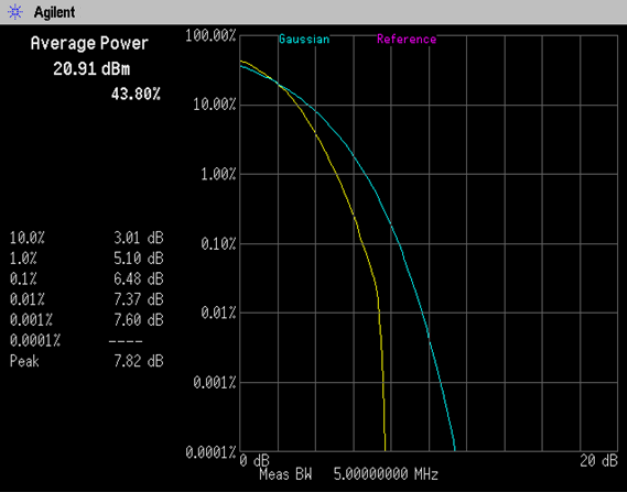


Japan

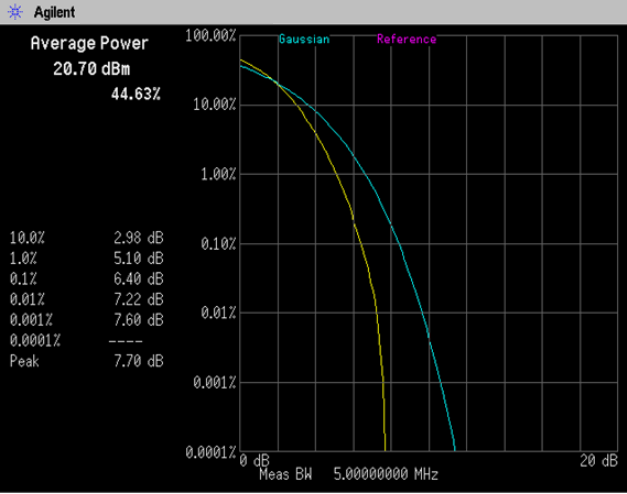
Channel: 18900
64QAM, BW 1.4MHz, RB6-0



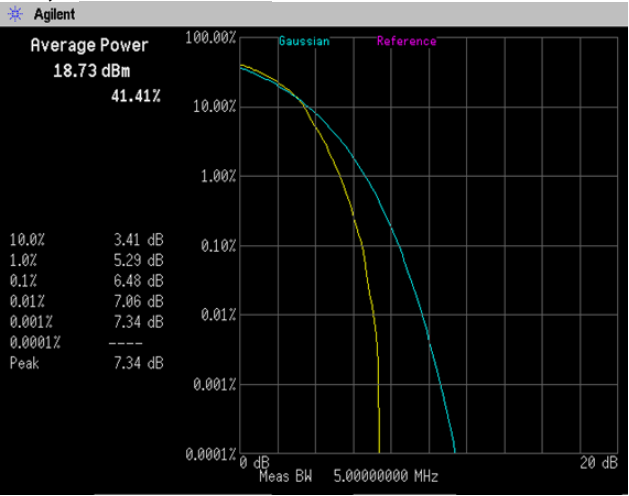
64QAM, BW 3MHz, RB15-0



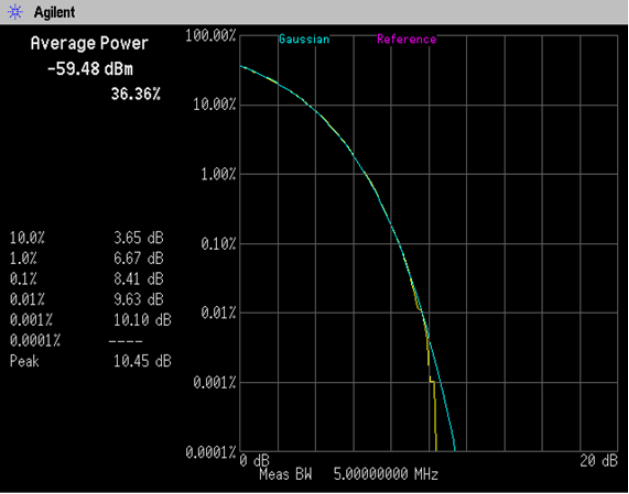
64QAM, BW 5MHz, RB25-0



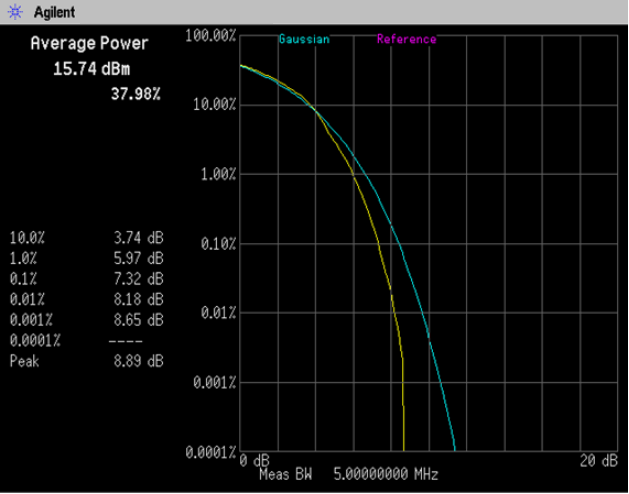
Channel: 18900
64QAM, BW 10MHz, RB50-0



64QAM, BW 15MHz, RB75-0



64QAM, BW 20MHz, RB100-0



4.3 Occupied Bandwidth

4.3.1 Measurement procedure

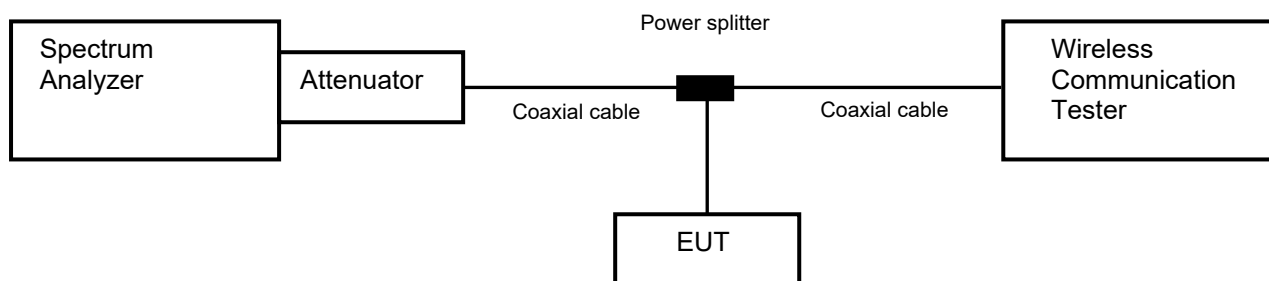
[FCC 24.238(a), 2.1049]

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 $\geq 3 \times$ 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 : 9-September-2021
 Temperature : 24.1 [°C]
 Humidity : 68.9 [%]
 Test place : Shielded room No.3

Test engineer : Tadahiro Seino

Date : 17-September-2021
 Temperature : 24.4 [°C]
 Humidity : 47.4 [%]
 Test place : Shielded room No.3

Test engineer : Tadahiro Seino

Band	Channel	Frequency [MHz]	Test Result [kHz]
GSM1900	512	1850.2	238.8518
	661	1880.0	242.7316
	810	1909.8	241.9122

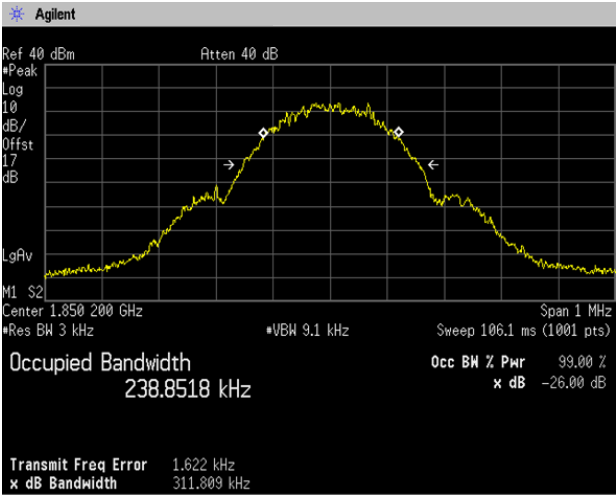
Band	Channel	Frequency [MHz]	Test Result [kHz]
WCDMA Band II	9262	1852.4	4139.1
	9400	1880.0	4136.0
	9538	1907.6	4142.6

Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band II	18900	1880.0	1.4	QPSK	3-1	0.6122
					6-0	1.0917
				16QAM	3-1	0.6120
					6-0	1.0978
				64QAM	3-1	0.6008
					6-0	1.0889
			3	QPSK	8-4	1.5545
					15-0	2.7105
				16QAM	8-4	1.5584
					15-0	2.7255
				64QAM	8-4	1.5341
					15-0	2.7081
			5	QPSK	12-7	2.3654
					25-0	4.5243
				16QAM	12-7	2.3308
					25-0	4.5042
				64QAM	12-7	2.2944
					25-0	4.5094
			10	QPSK	25-12	4.6579
					50-0	8.9809
				16QAM	25-12	4.6879
					50-0	8.9758
				64QAM	25-12	4.6444
					50-0	8.9733
			15	QPSK	36-20	6.8133
					75-0	13.4698
				16QAM	36-20	6.8386
					75-0	13.4480
				64QAM	36-20	6.7933
					75-0	13.4503
			20	QPSK	50-24	9.2822
					100-0	17.9440
				16QAM	50-24	9.2736
					100-0	17.9907
				64QAM	50-24	9.2399
					100-0	17.8947

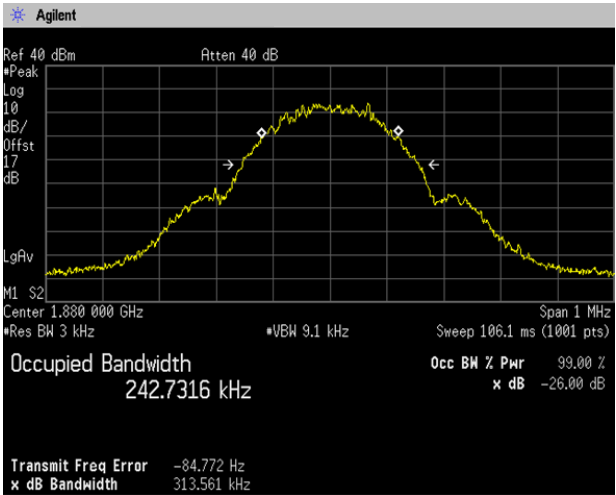
4.3.4 Trace data

[GSM1900]

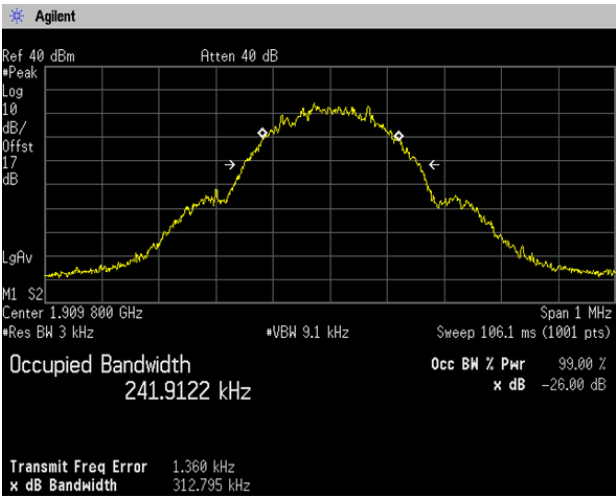
Channel: 512



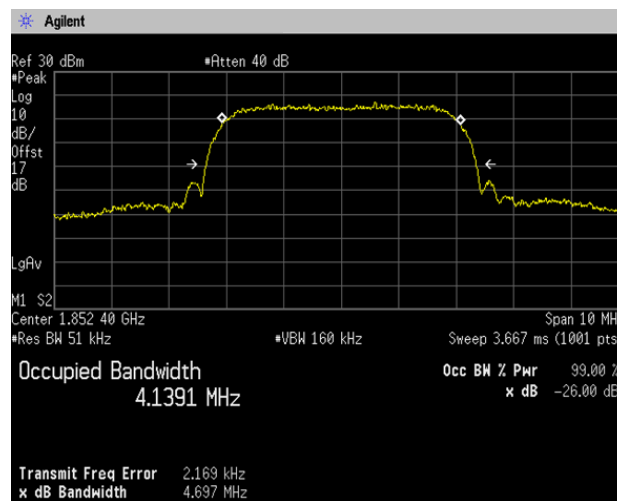
Channel: 661



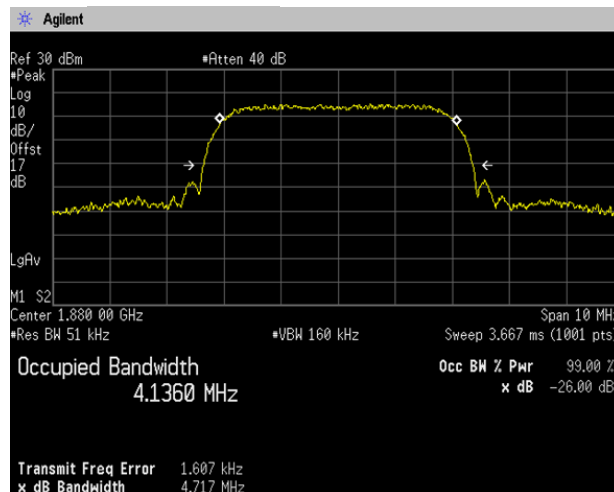
Channel: 810



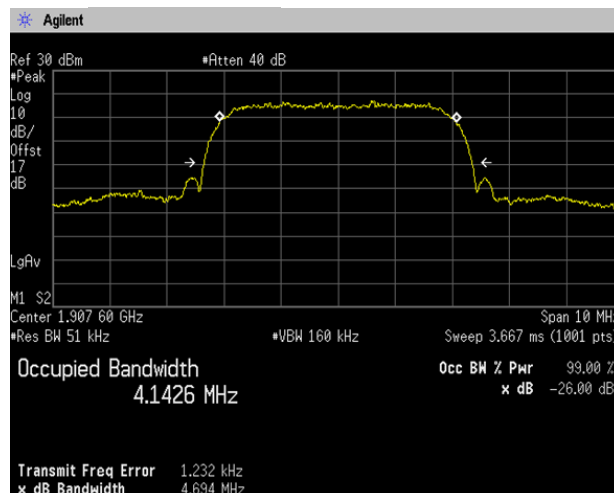
[WCDMA Band II]
Channel: 9262



Channel: 9400



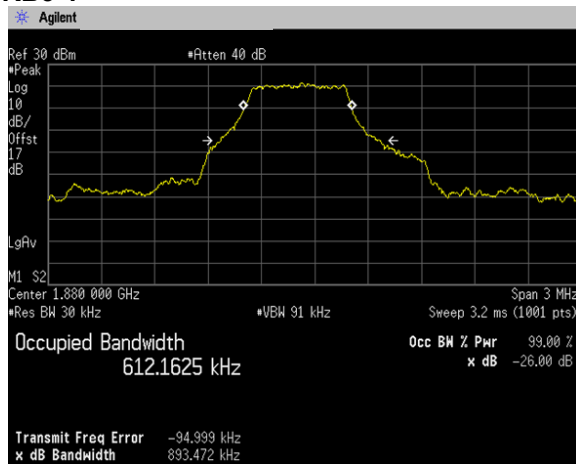
Channel: 9538



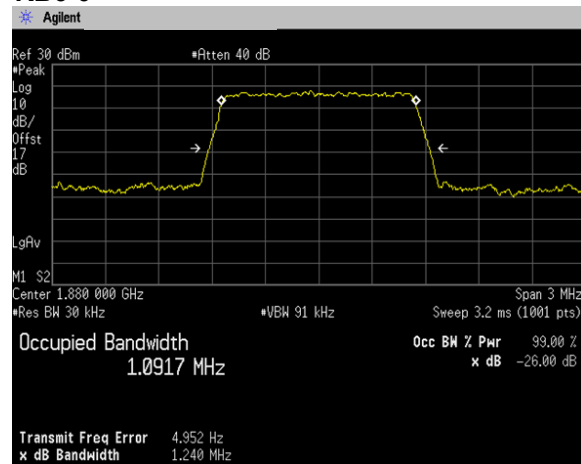
[LTE Band II]
Channel: 18900

QPSK, BW 1.4MHz

RB3-1

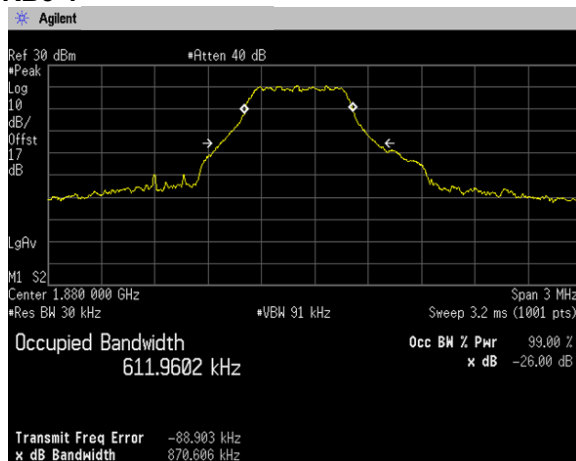


RB6-0

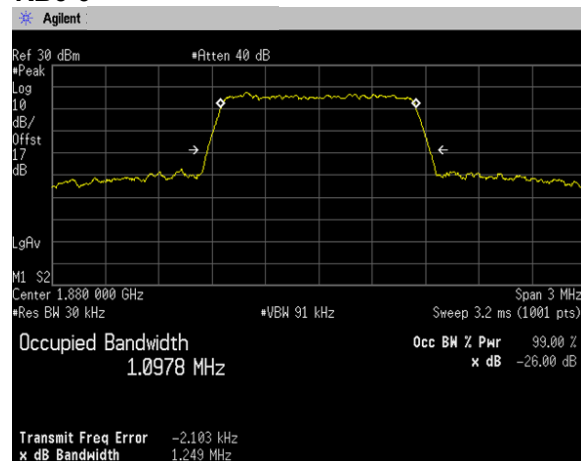


16QAM, BW 1.4MHz

RB3-1

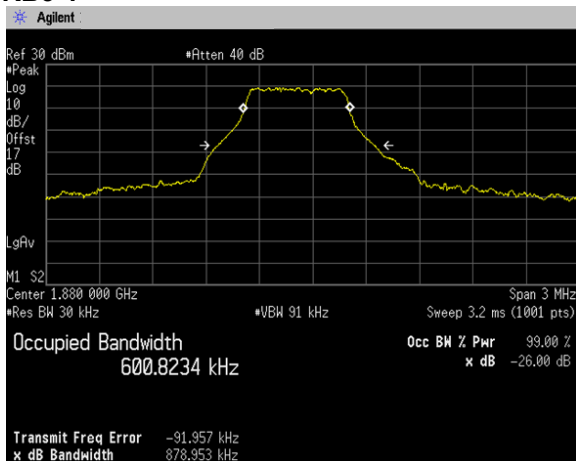


RB6-0

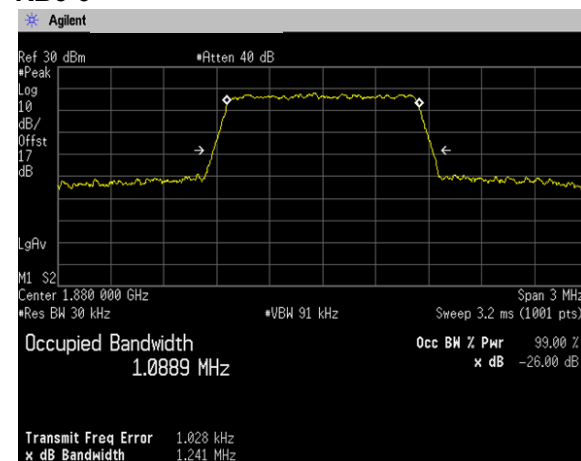


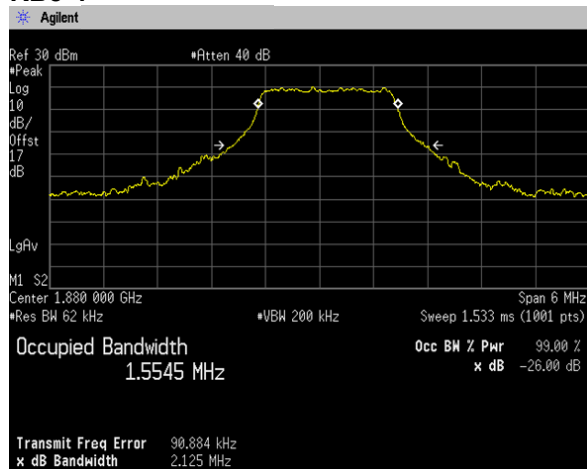
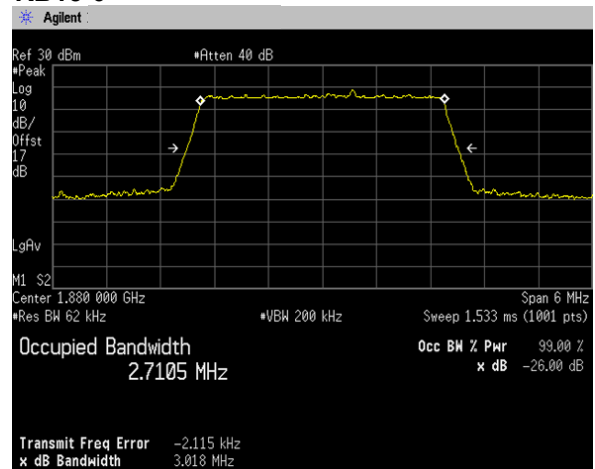
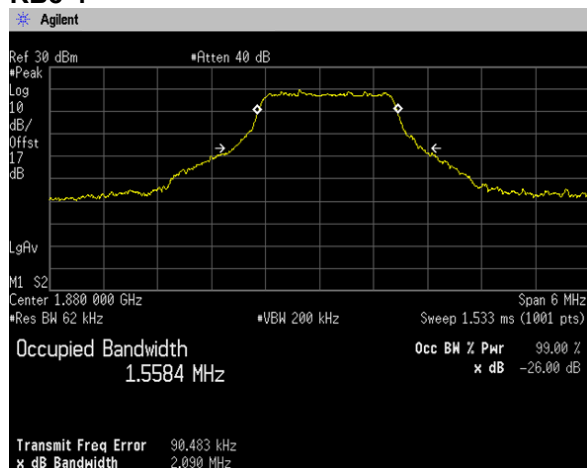
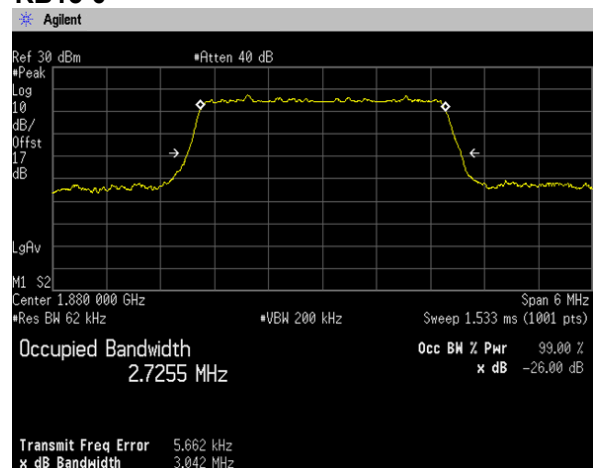
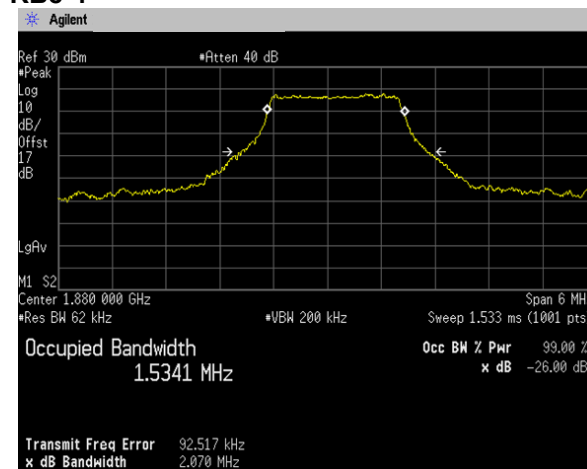
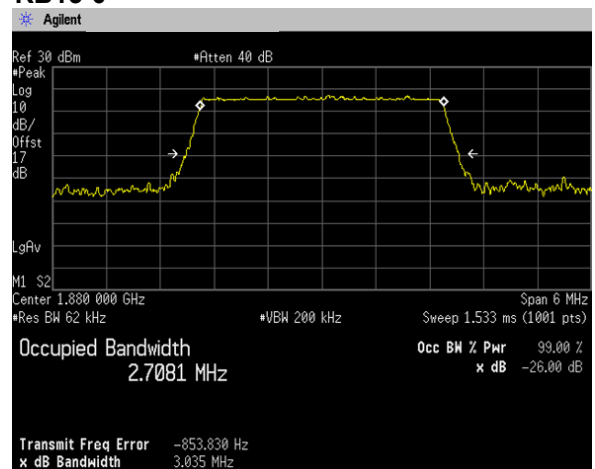
64QAM, BW 1.4MHz

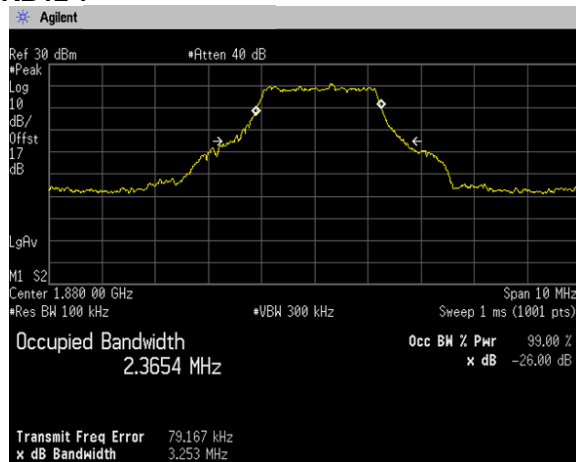
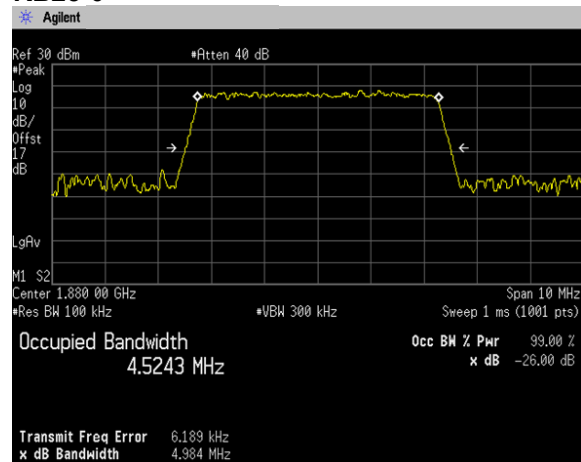
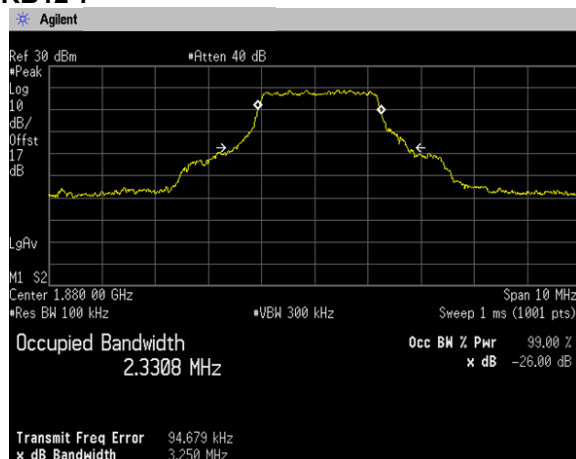
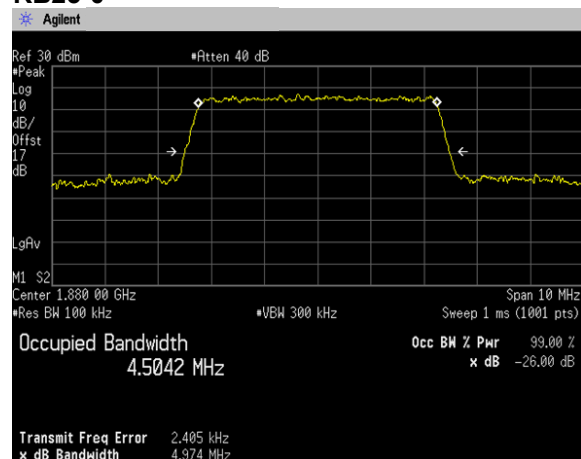
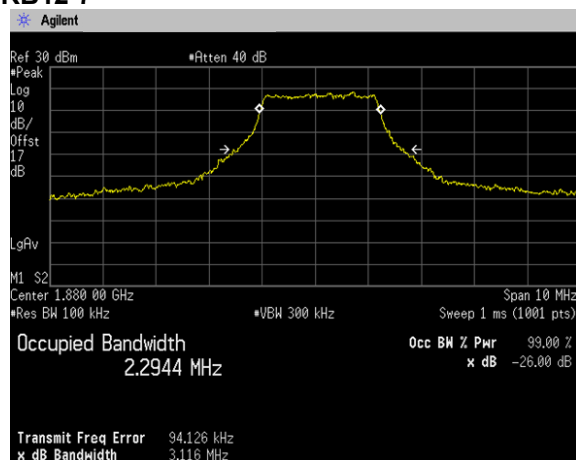
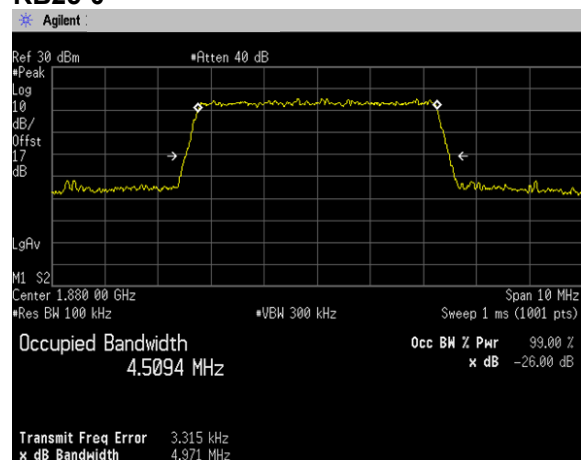
RB3-1

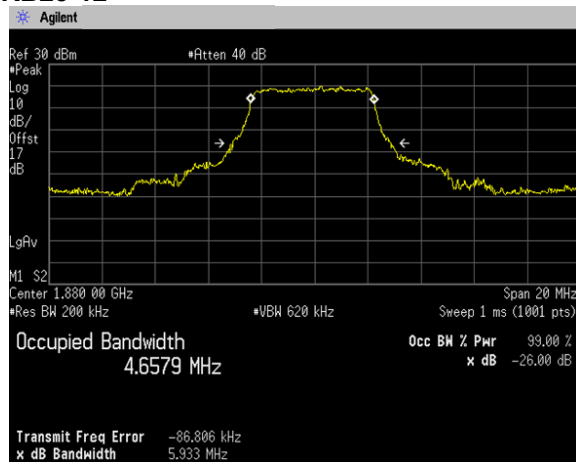
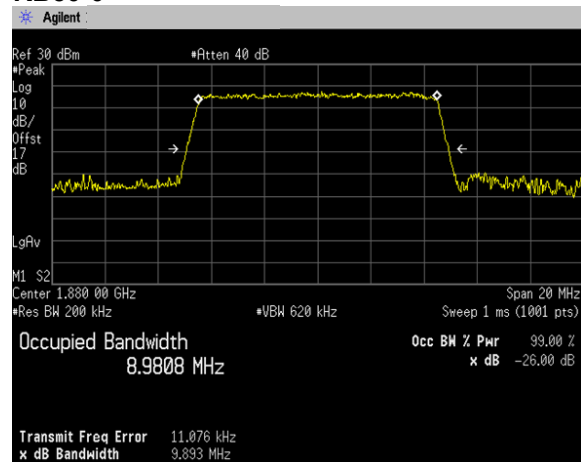
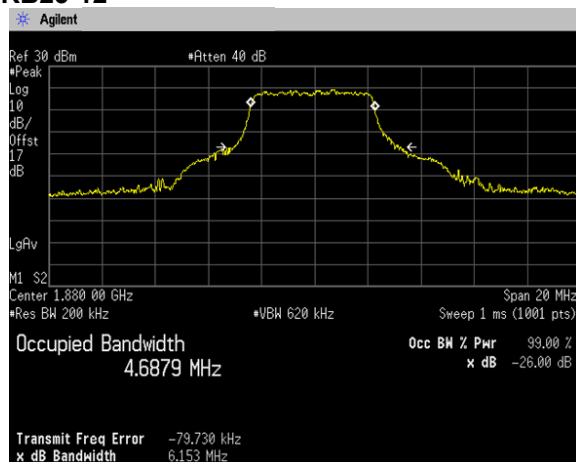
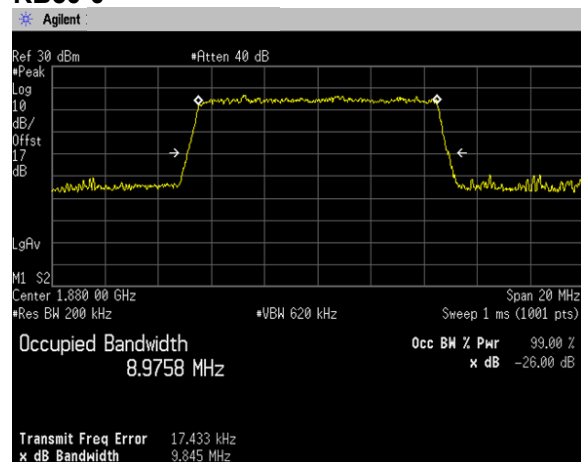
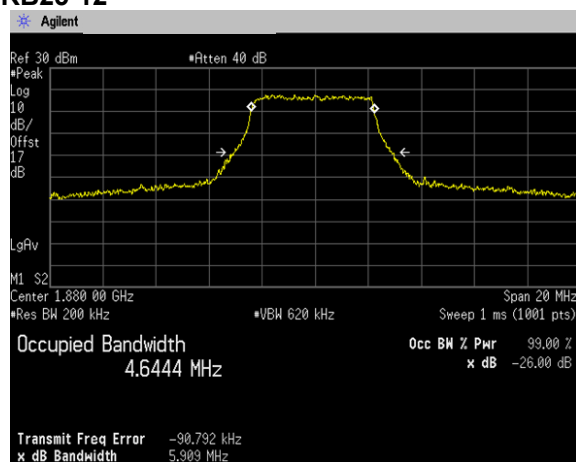
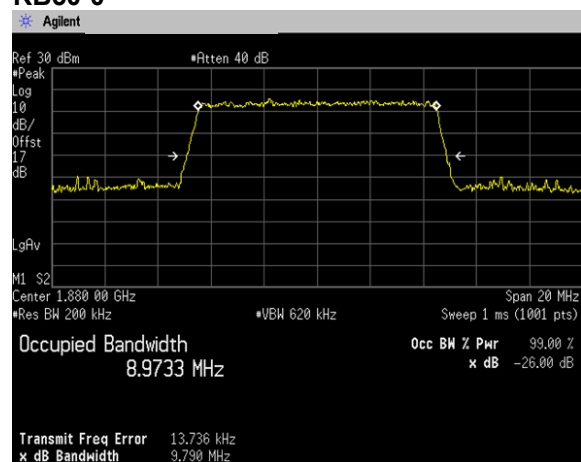


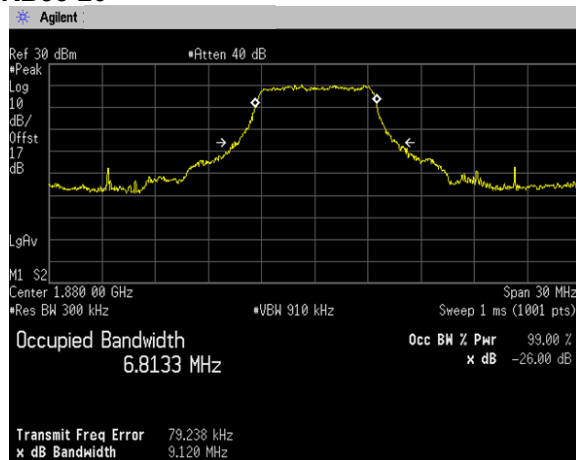
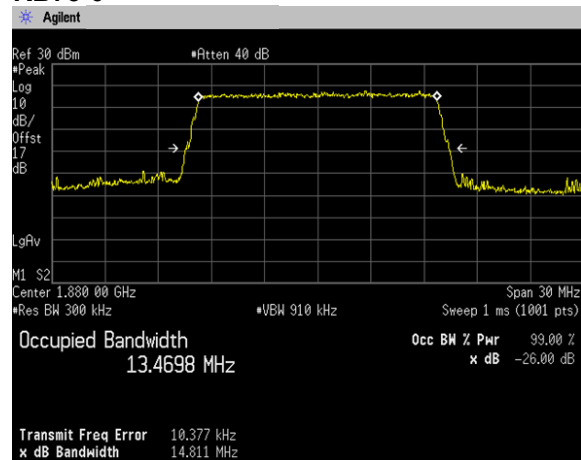
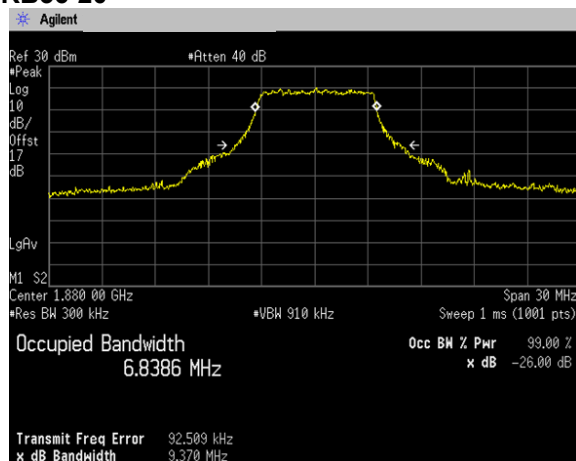
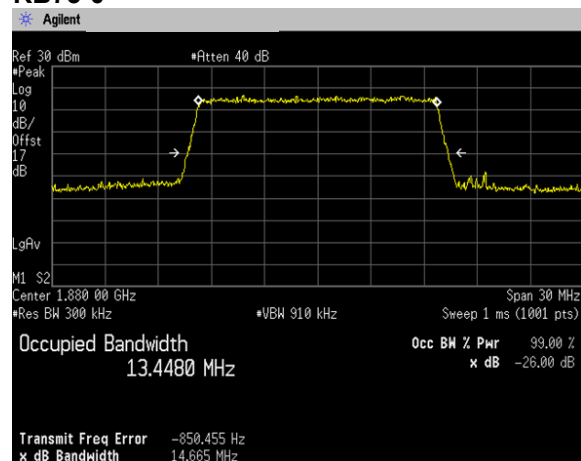
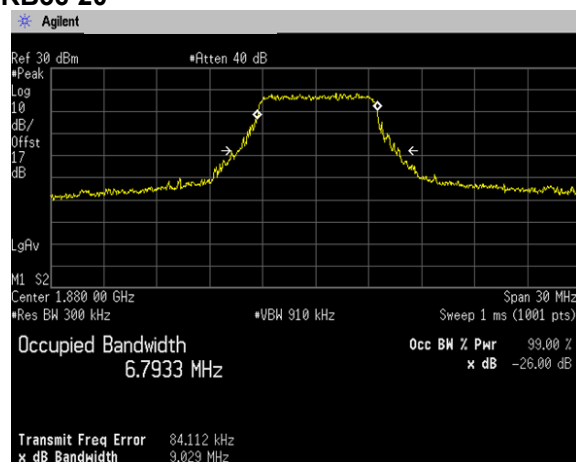
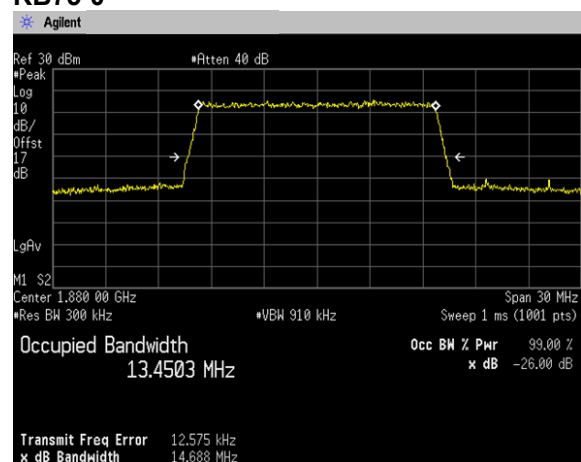
RB6-0

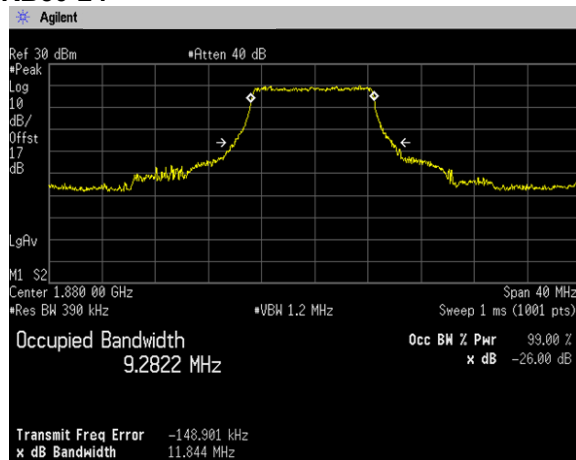
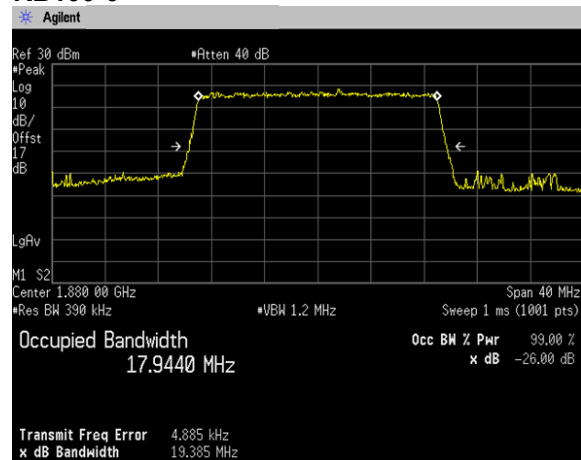
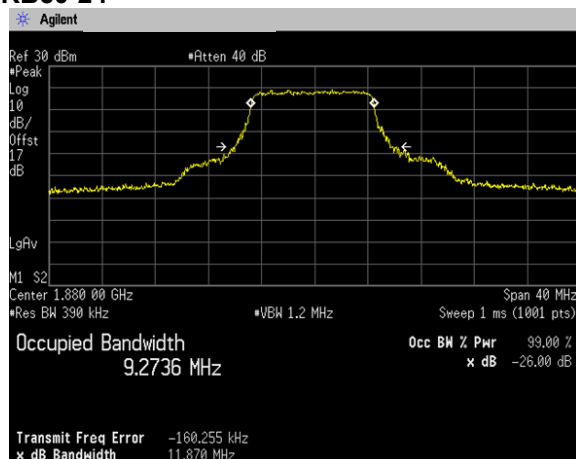
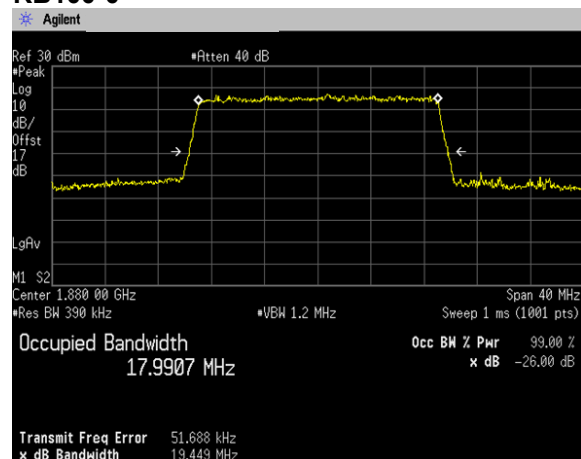
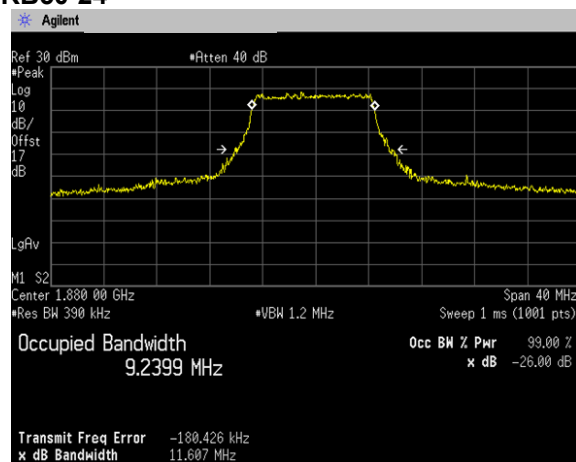
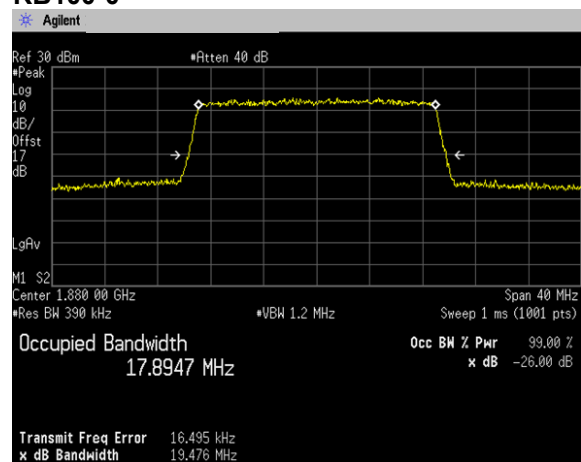


QPSK, BW 3MHz**RB8-4****RB15-0****16QAM, BW 3MHz****RB8-4****RB15-0****64QAM, BW 3MHz****RB8-4****RB15-0**

QPSK, BW 5MHz**RB12-7****RB25-0****16QAM, BW 5MHz****RB12-7****RB25-0****64QAM, BW 5MHz****RB12-7****RB25-0**

QPSK, BW 10MHz**RB25-12****RB50-0****16QAM, BW 10MHz****RB25-12****RB50-0****64QAM, BW 10MHz****RB25-12****RB50-0**

QPSK, BW 15MHz**RB36-20****RB75-0****16QAM, BW 15MHz****RB36-20****RB75-0****64QAM, BW 15MHz****RB36-20****RB75-0**

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;

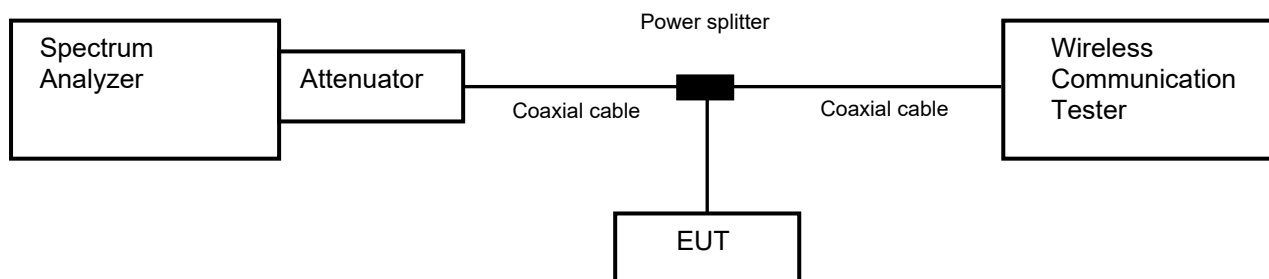
<Band Edge>

- a) Span was set large enough so as to capture all out of band emissions near the band edge
- b) $RBW \geq 1\%$ of the emission bandwidth or 2% of the emission bandwidth
- c) $VBW \geq 3 \times RBW$
- d) Detector = RMS
- e) Trace mode = Max hold
- f) Sweep time = auto-couple
- g) Number of sweep point $\geq 2 \times \text{span} / RBW$

<Spurious Emissions>

- a) $RBW = 1\text{MHz}$ & $VBW \geq 3 \times RBW$
- b) Detector = Peak
- c) Trace mode = Max hold
- d) Sweep time = auto-couple
- e) Number of sweep point $\geq 2 \times \text{span} / RBW$

- Test configuration



4.4.2 Limit

-13 dBm or less

4.4.3 Measurement result

Date : 9-September-2021
 Temperature : 24.1 [°C]
 Humidity : 68.9 [%]
 Test place : Shielded room No.3

Test engineer : Tadahiro Seino

Date : 17-September-2021
 Temperature : 24.4 [°C]
 Humidity : 47.4 [%]
 Test place : Shielded room No.3

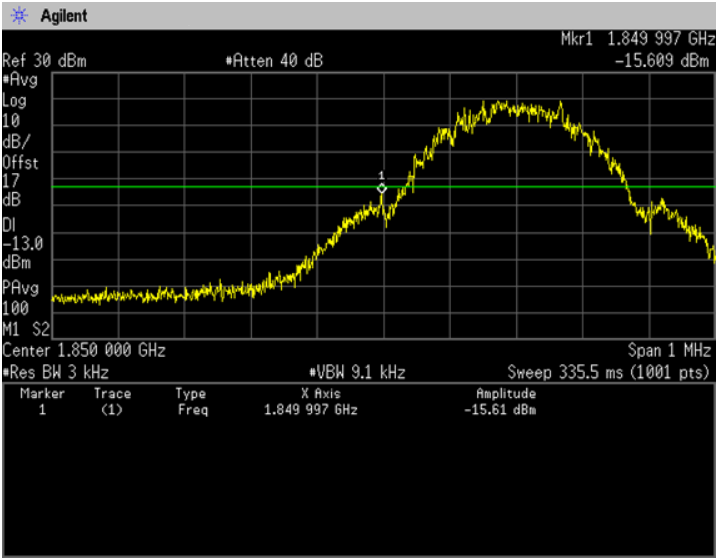
Test engineer : Tadahiro Seino

Band	Channel	Frequency [MHz]	Limit [dB]	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

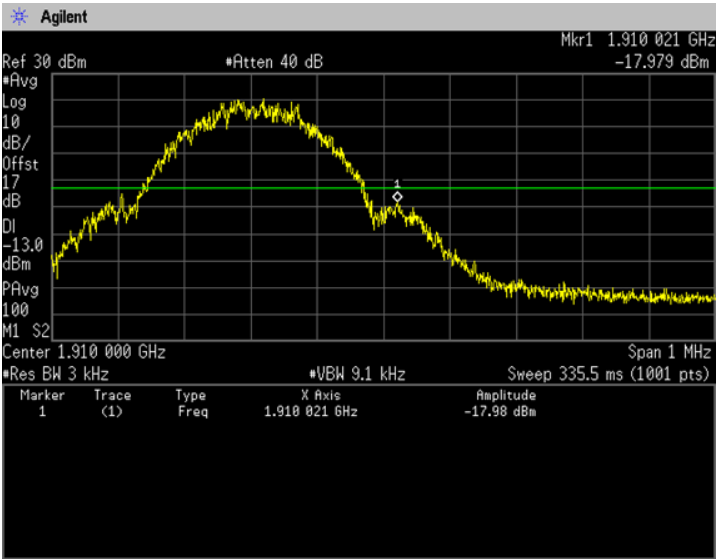
Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]	Limit [dB]	Results	
LTE Band II	QPSK, 16QAM, 64QAM	1.4	18607	1850.7	-13.0	See the trace data	PASS
			19193	1909.3	-13.0	See the trace data	PASS
		3	18615	1851.5	-13.0	See the trace data	PASS
			19185	1908.5	-13.0	See the trace data	PASS
		5	18625	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

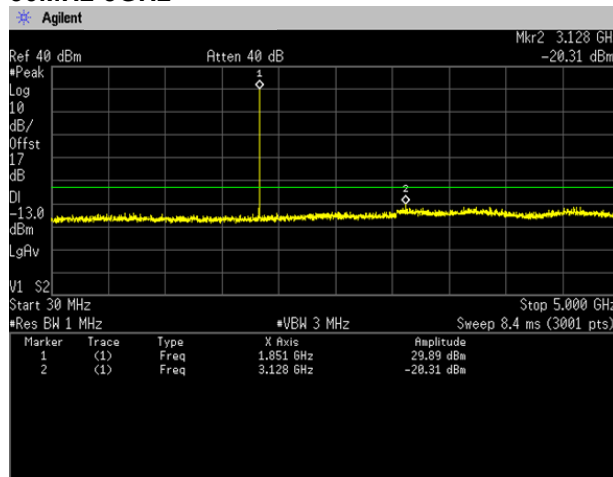
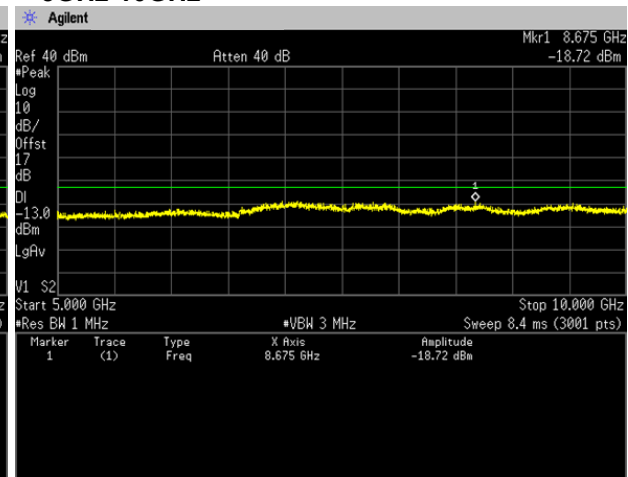
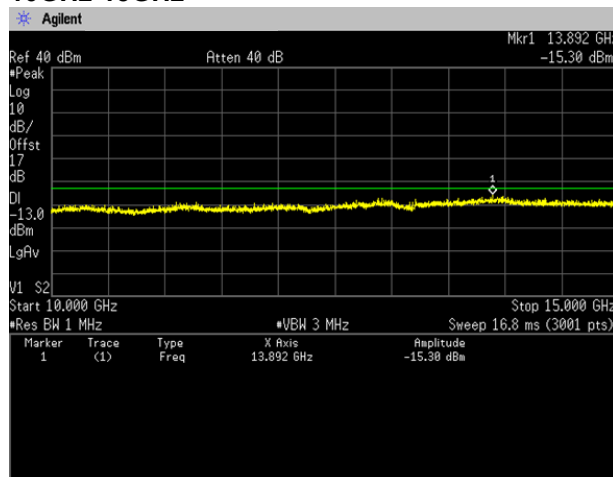
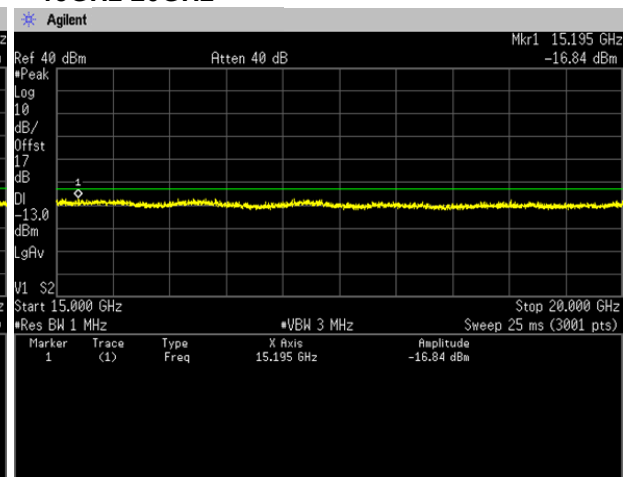


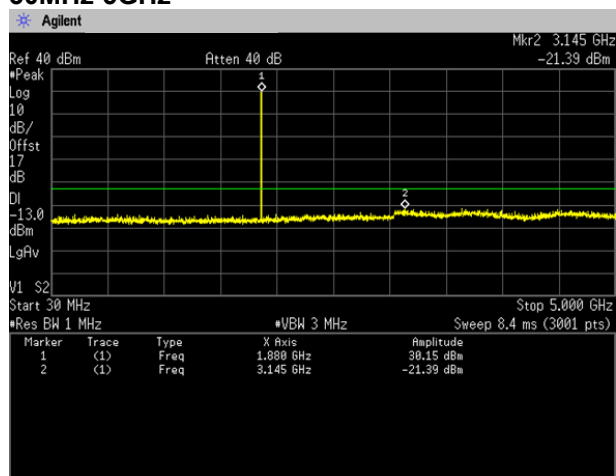
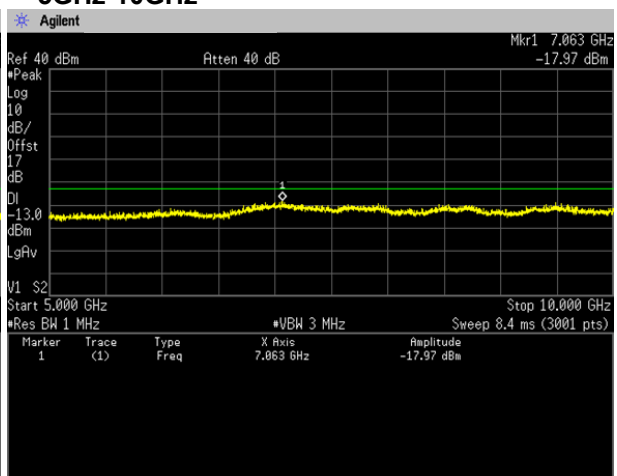
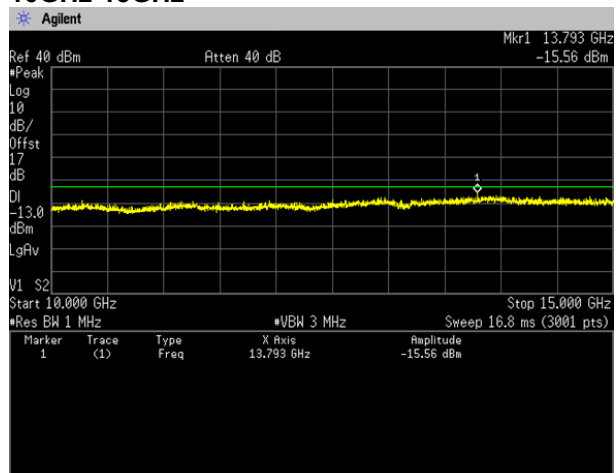
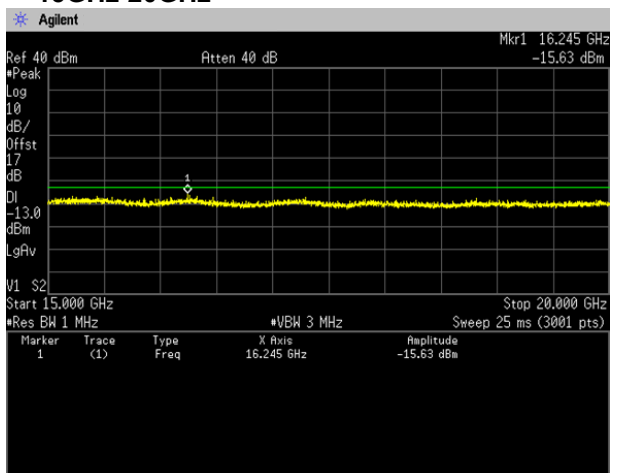
Channel: 810

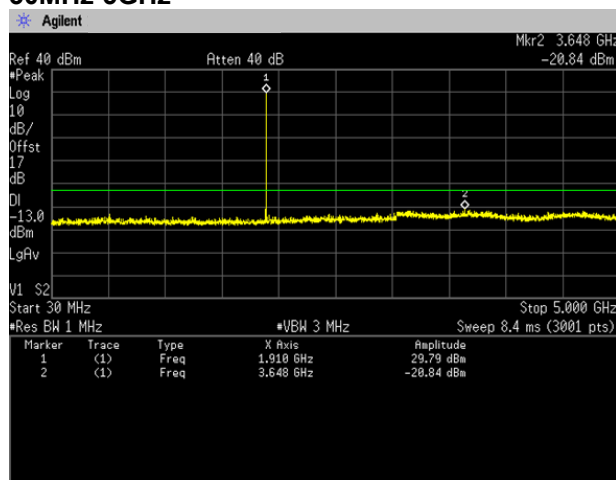
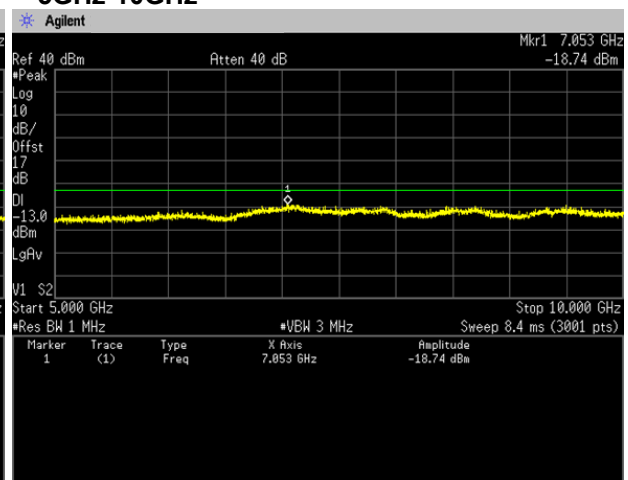
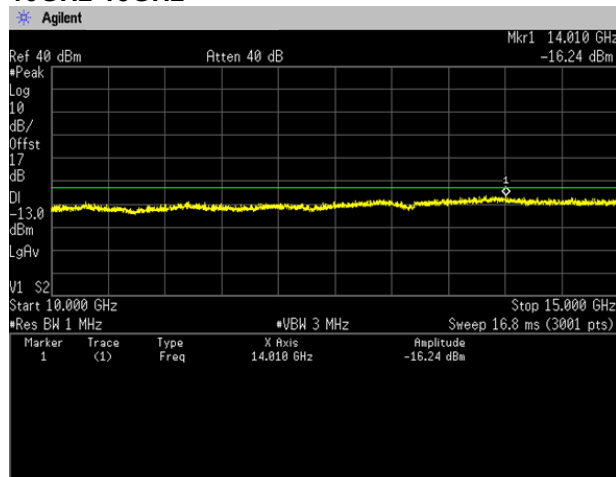
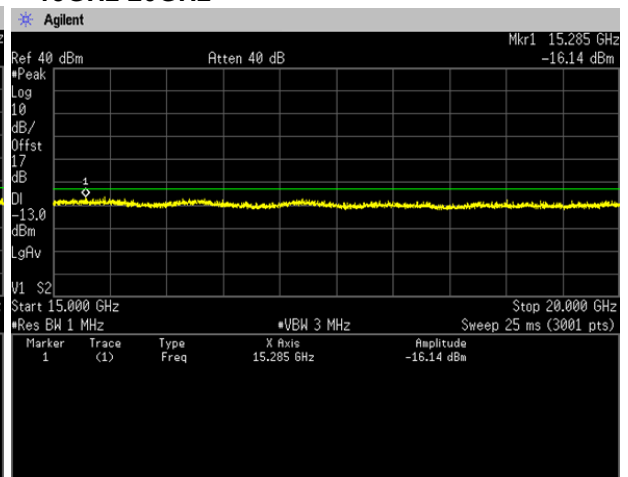


(Spurious Emissions)

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

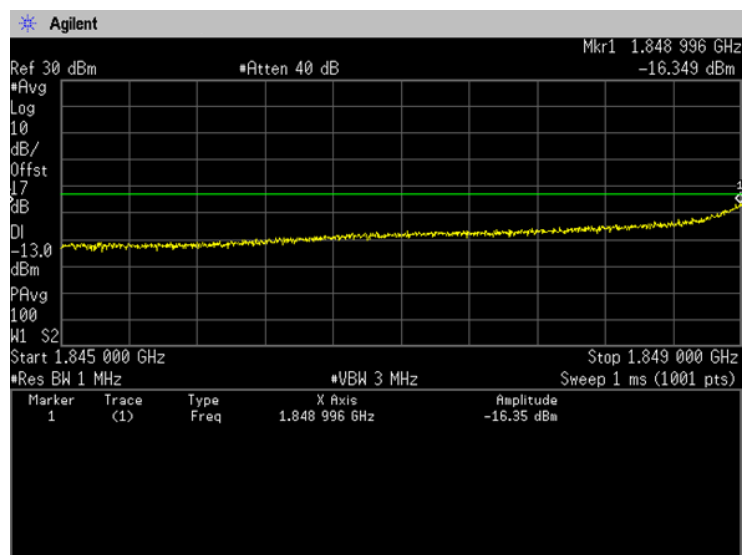
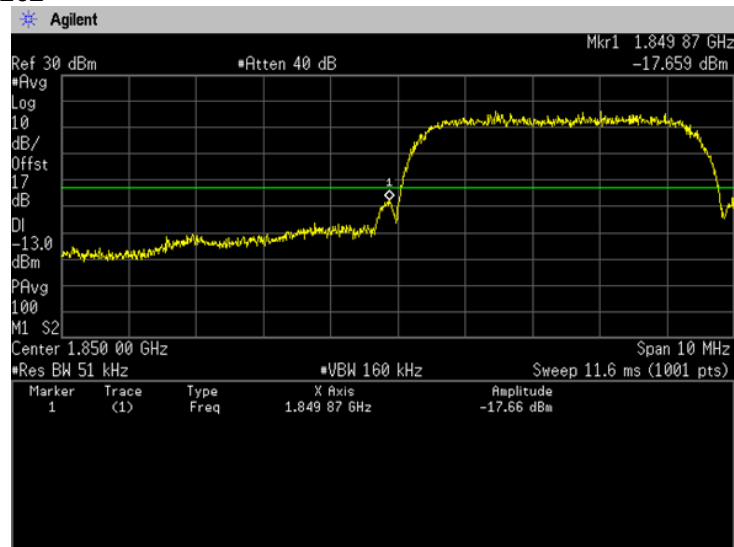
Channel: 512**30MHz-5GHz****5GHz-10GHz****10GHz-15GHz****15GHz-20GHz**

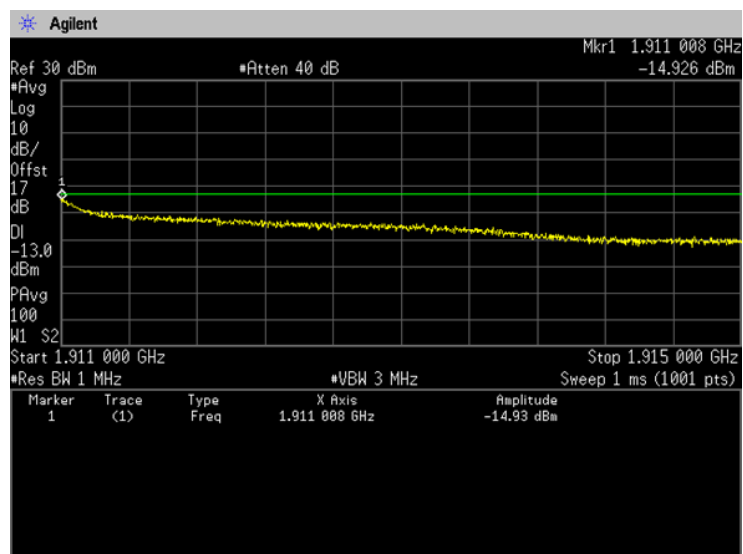
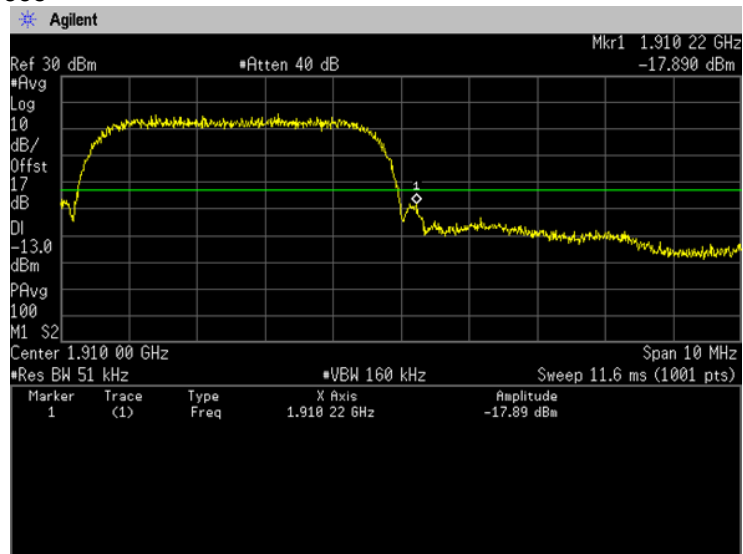
Channel: 661
30MHz-5GHz

5GHz-10GHz

10GHz-15GHz

15GHz-20GHz


Channel: 810
30MHz-5GHz**5GHz-10GHz****10GHz-15GHz****15GHz-20GHz**

Japan

**[WCDMA Band II]
(Band Edge)
Channel: 9262**



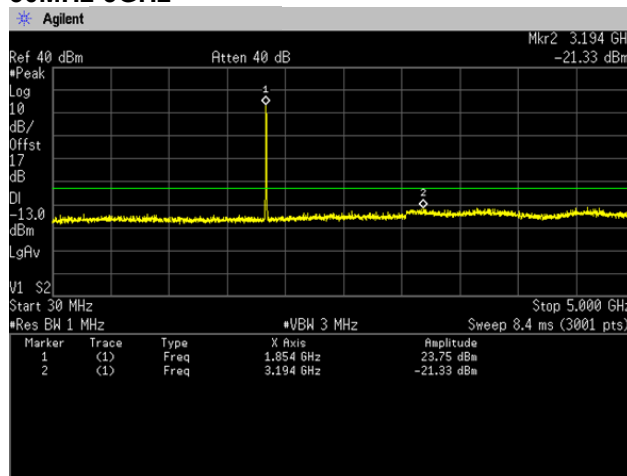
Channel: 9538

(Spurious Emissions)

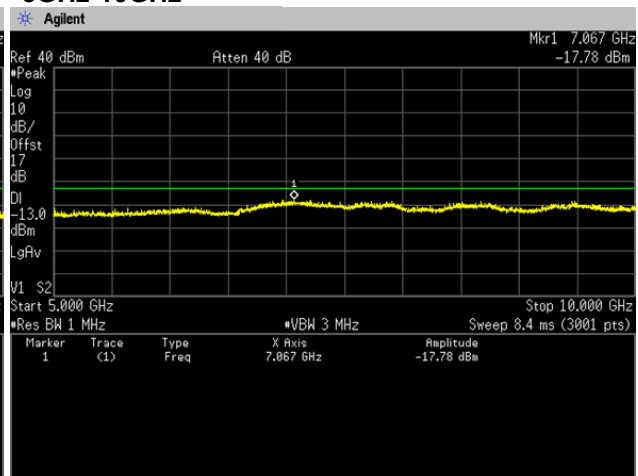
Note: Conducted spurious test was measured in the worst case of conducted output power.

Channel: 9262

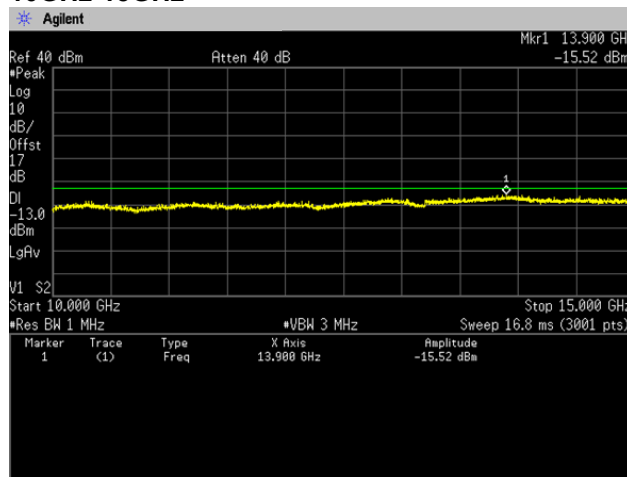
30MHz-5GHz



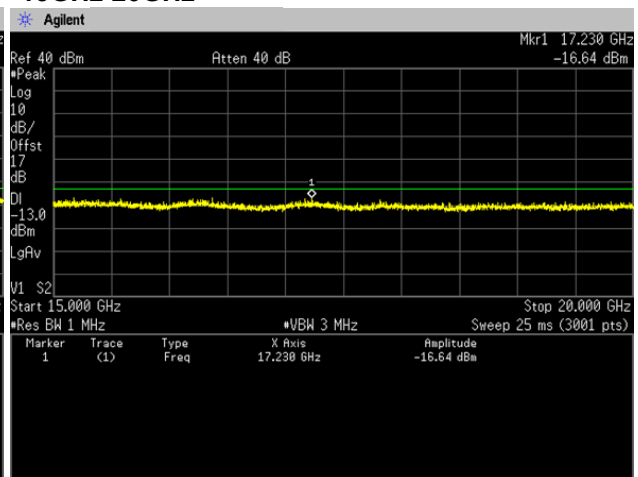
5GHz-10GHz

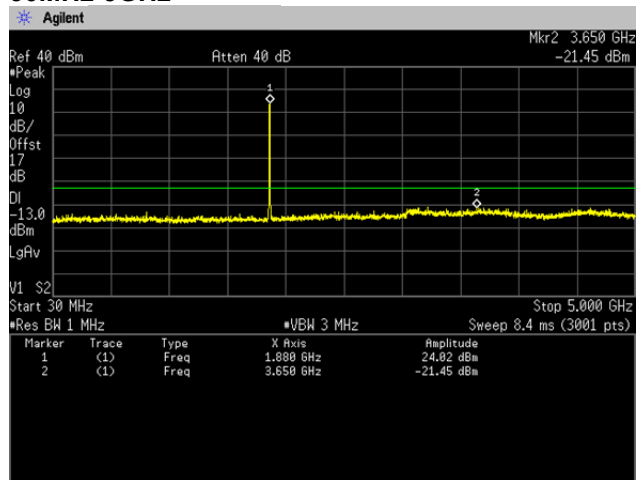
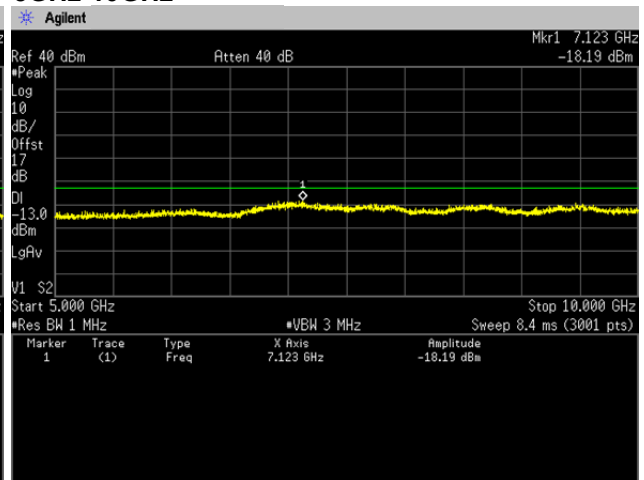
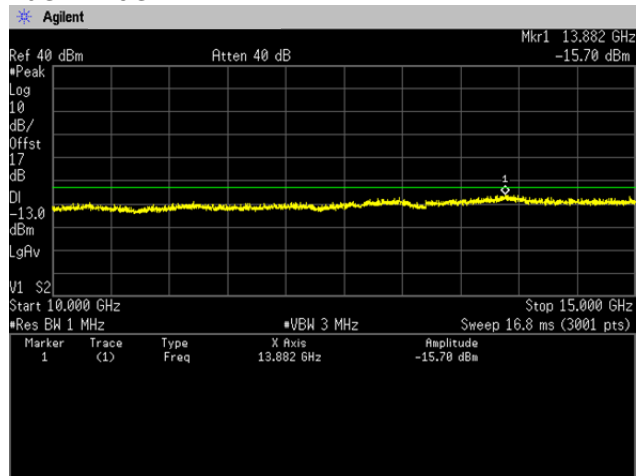
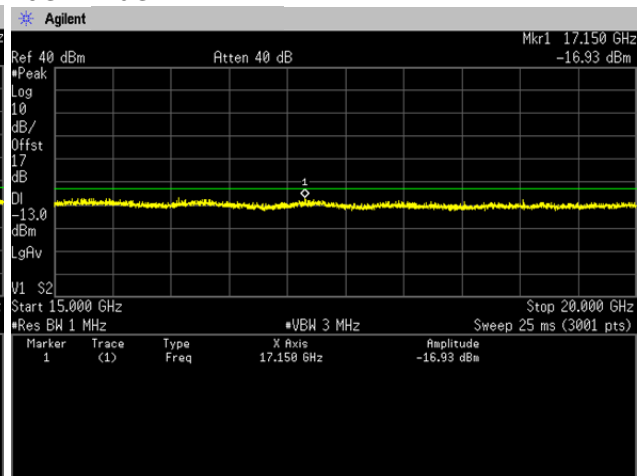


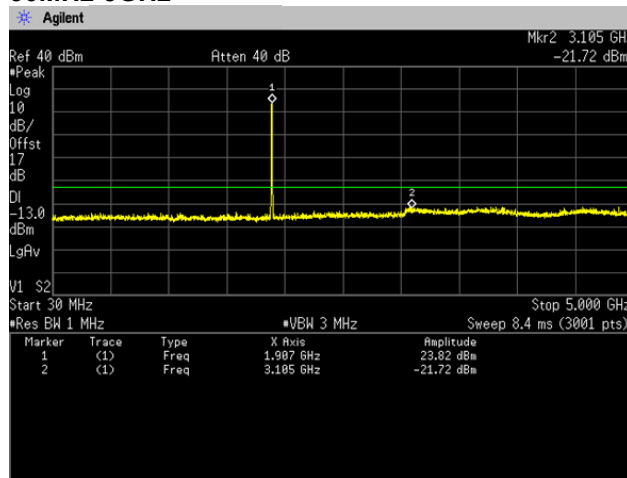
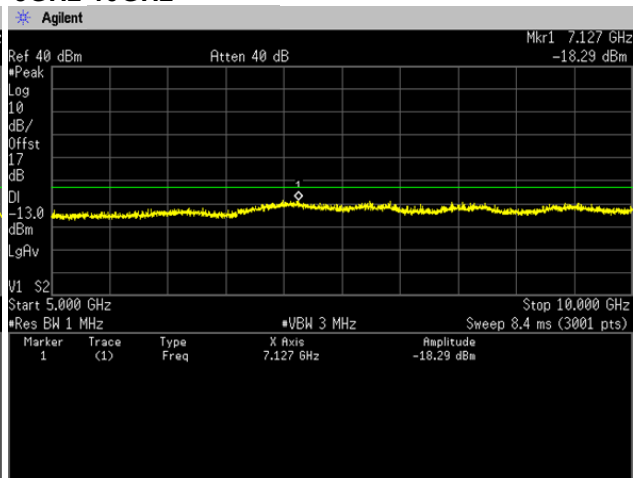
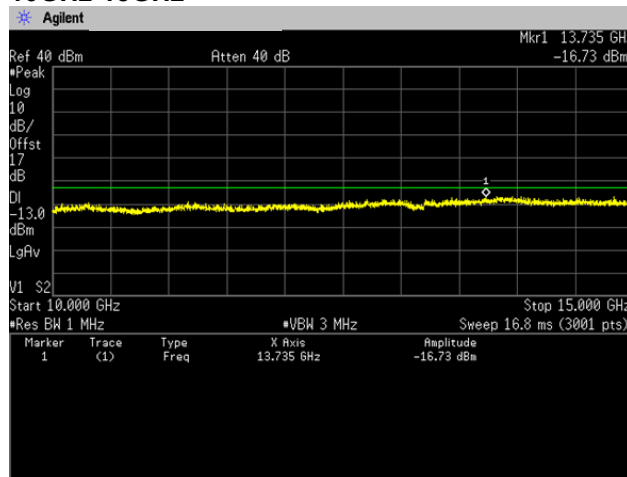
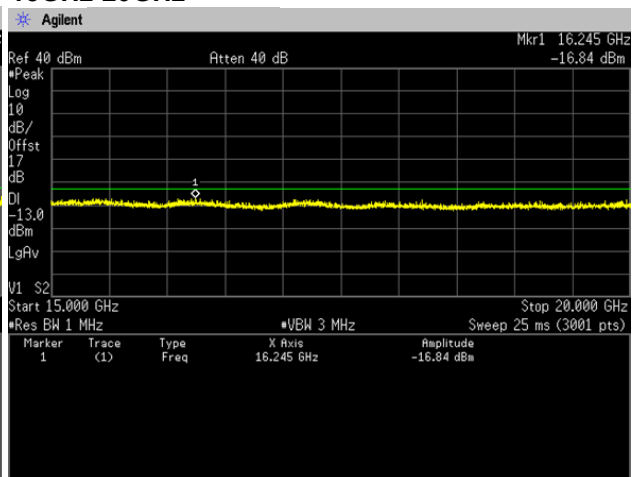
10GHz-15GHz



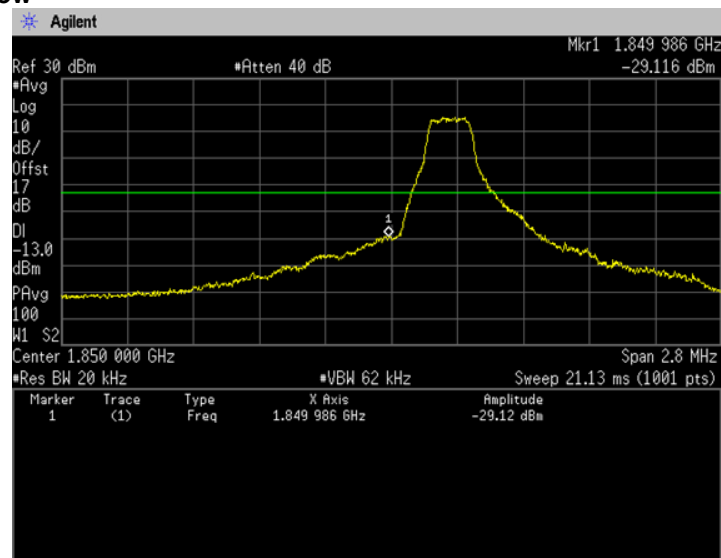
15GHz-20GHz



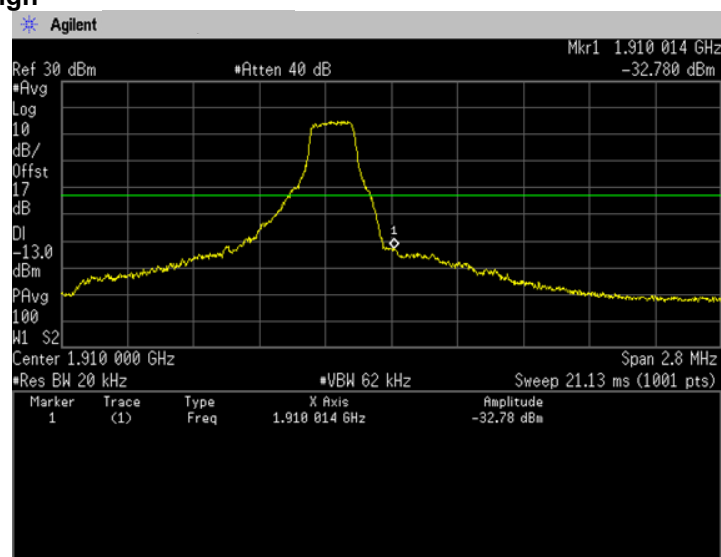
Channel: 9400
30MHz-5GHz**5GHz-10GHz****10GHz-15GHz****15GHz-20GHz**

Channel: 9538
30MHz-5GHz**5GHz-10GHz****10GHz-15GHz****15GHz-20GHz**

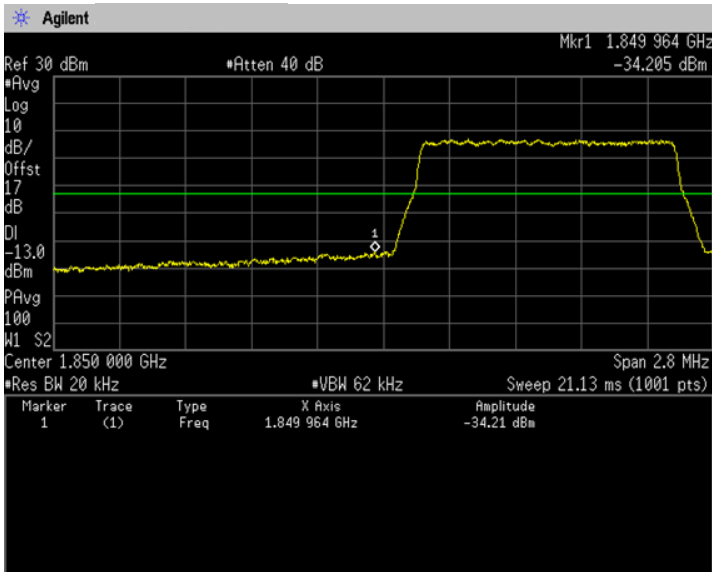
[LTE Band II]
(Band Edge)
QPSK, BW 1.4MHz, RB1-0
Channel: Low



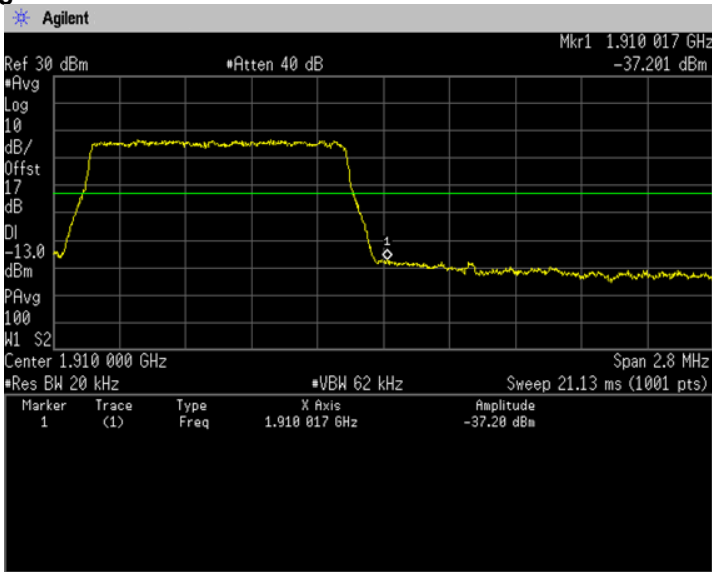
QPSK, BW 1.4MHz, RB1-5
Channel: High



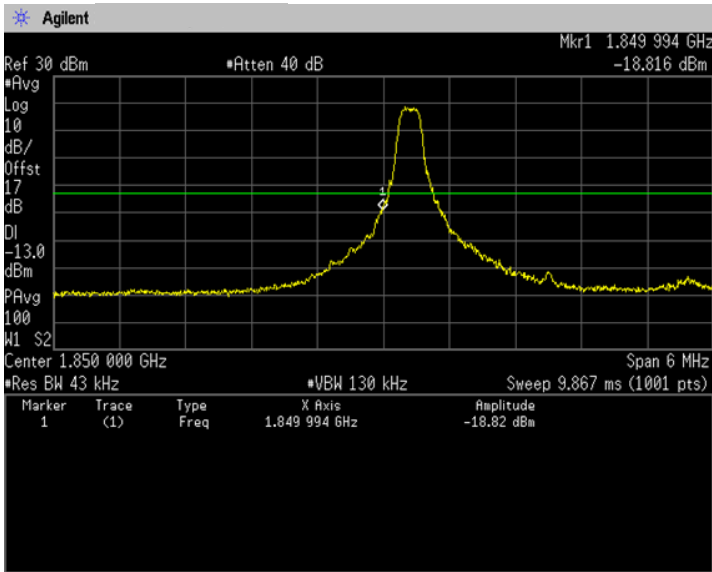
QPSK, BW 1.4MHz, RB6-0
Channel: Low



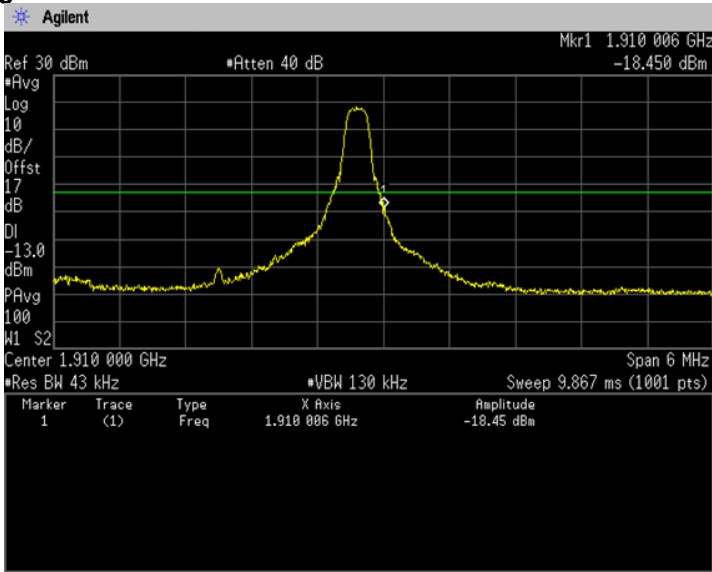
QPSK, BW 1.4MHz, RB6-0
Channel: High



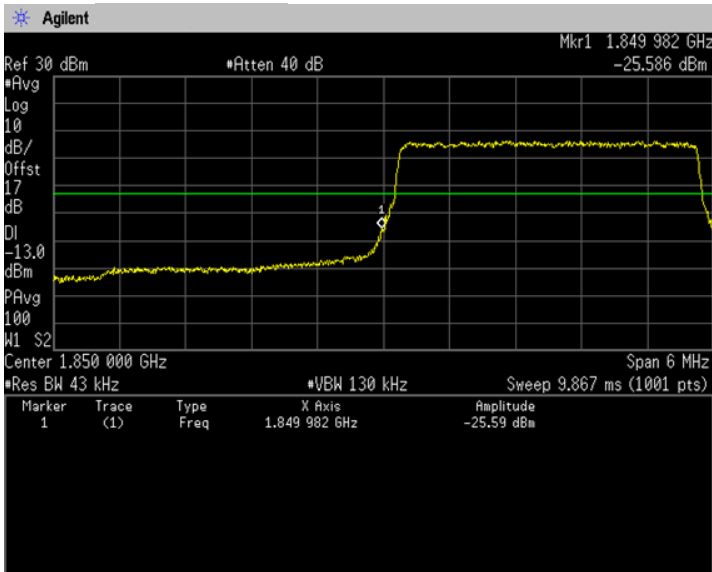
QPSK, BW 3MHz, RB1-0
Channel: Low



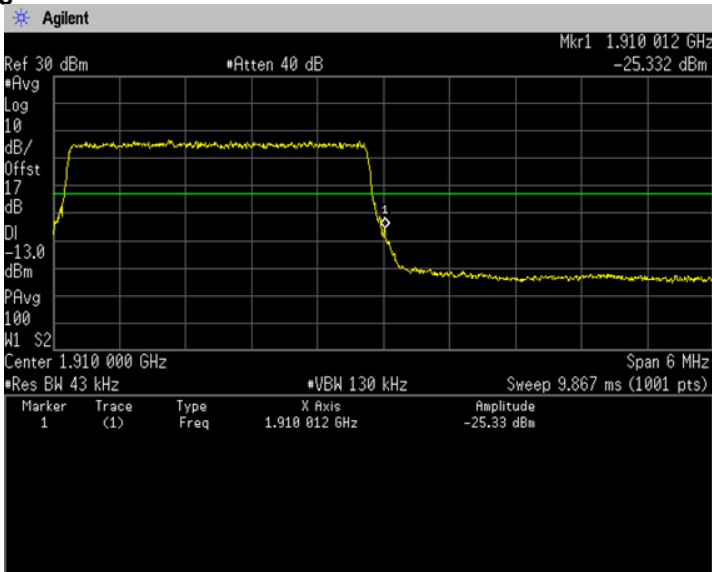
QPSK, BW 3MHz, RB1-14
Channel: High



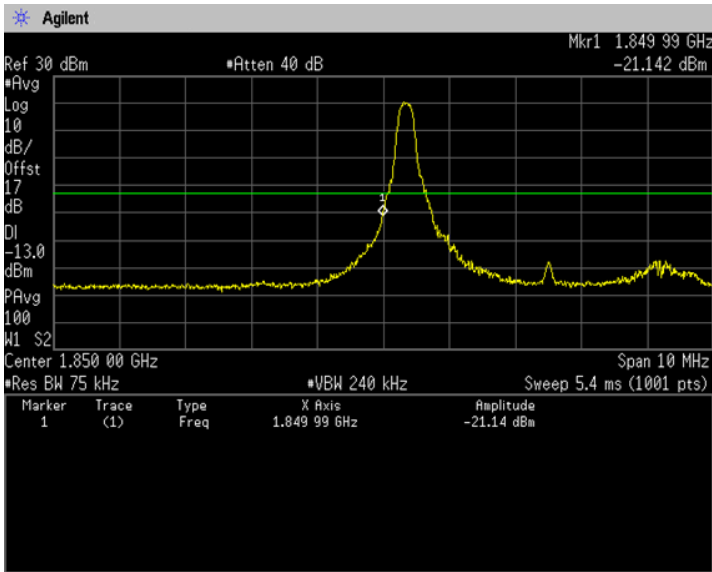
QPSK, BW 3MHz, RB15-0
Channel: Low



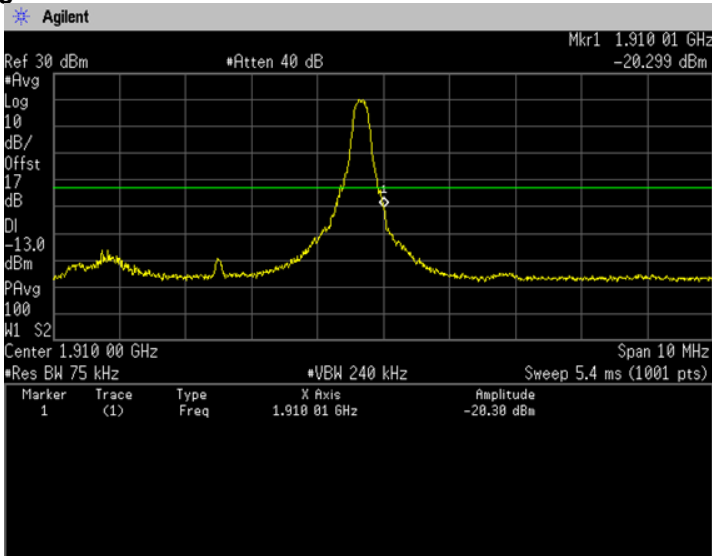
QPSK, BW 3MHz, RB15-0
Channel: High



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



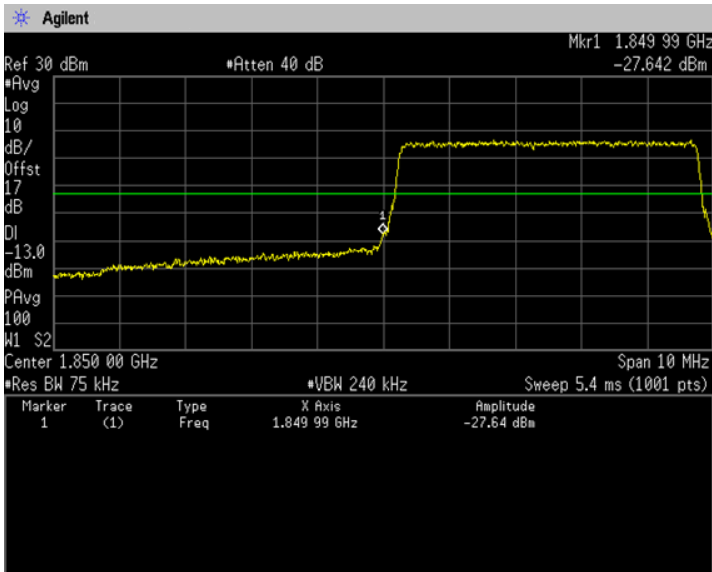
QPSK, BW 5MHz, RB1-24
Channel: High



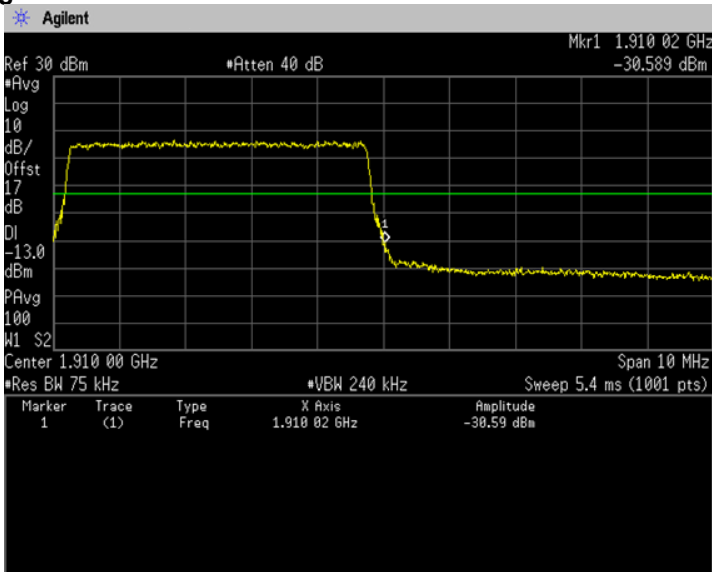


Japan

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



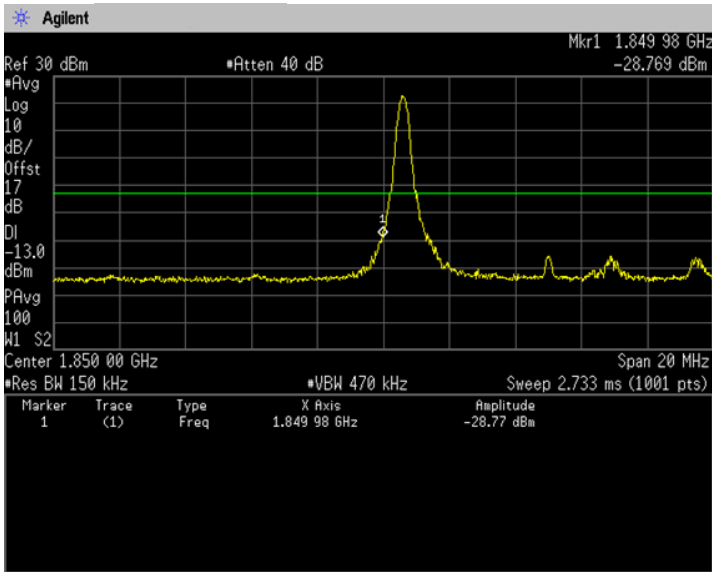
QPSK, BW 5MHz, RB25-0
Channel: High



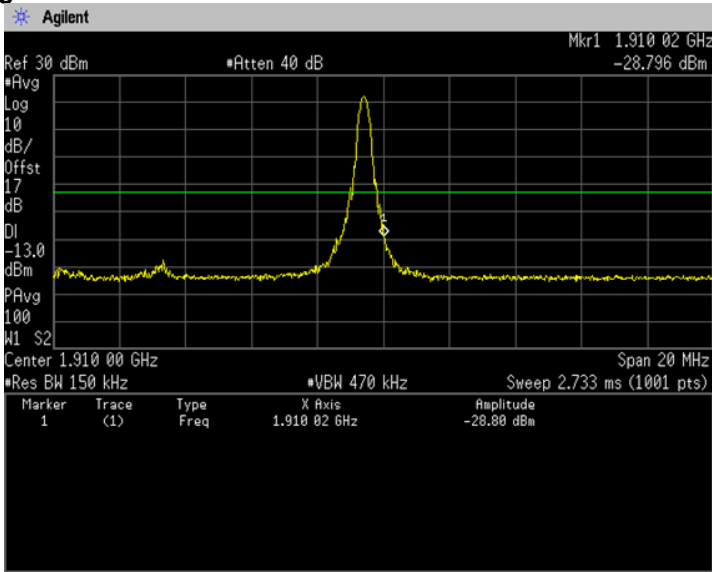


Japan

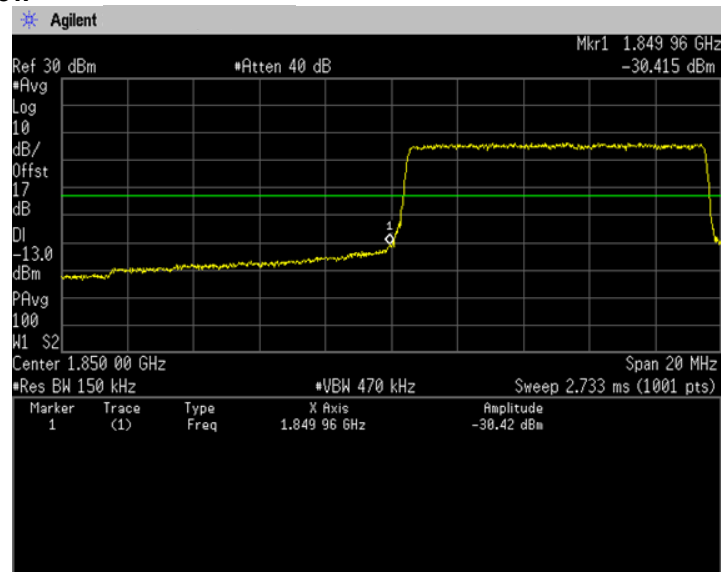
QPSK, BW 10MHz, RB1-0
Channel: Low



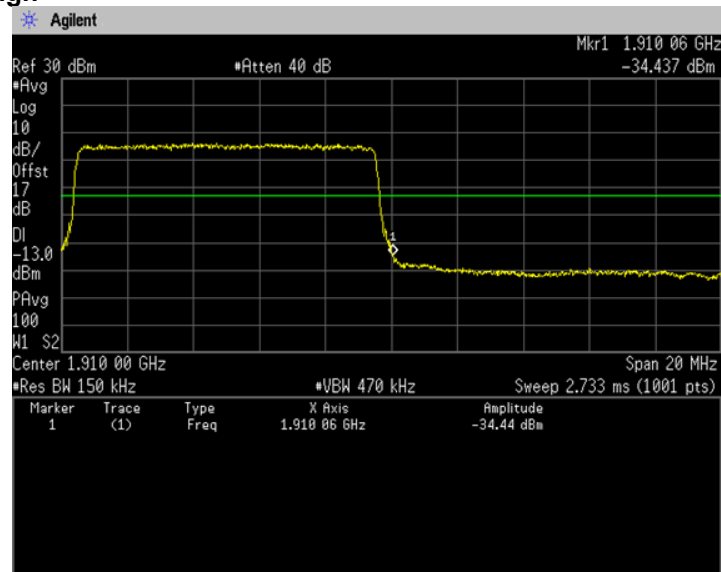
QPSK, BW 10MHz, RB1-49
Channel: High



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



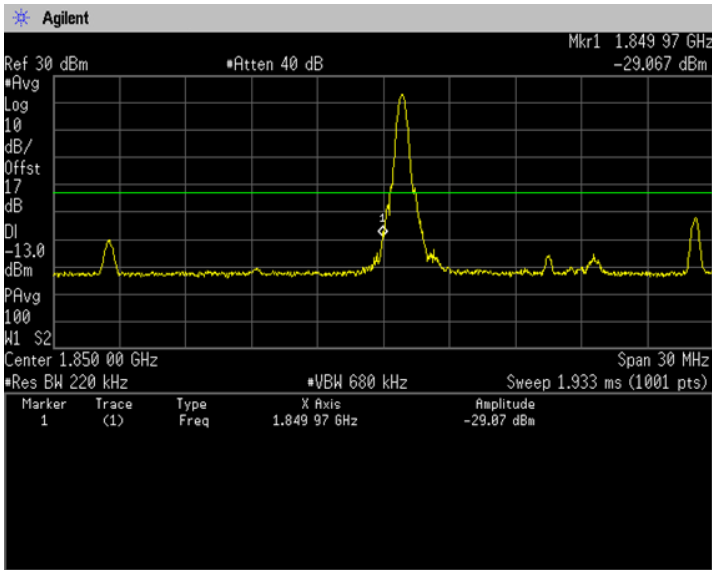
QPSK, BW 10MHz, RB50-0
Channel: High



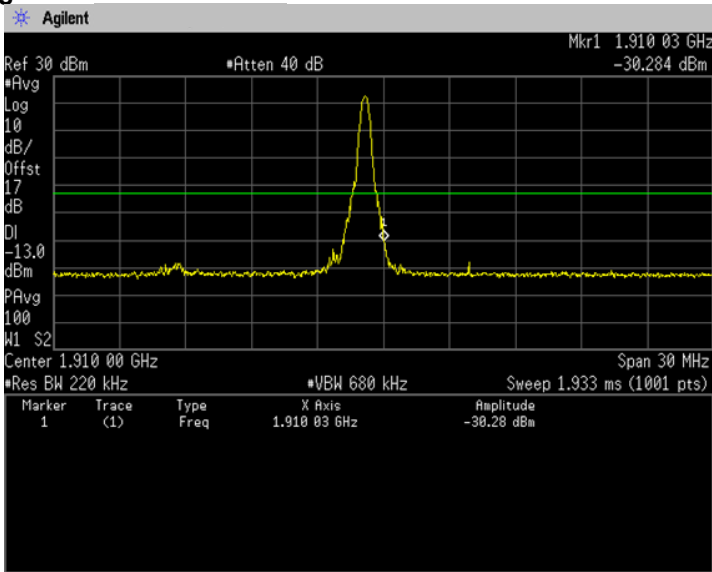


Japan

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



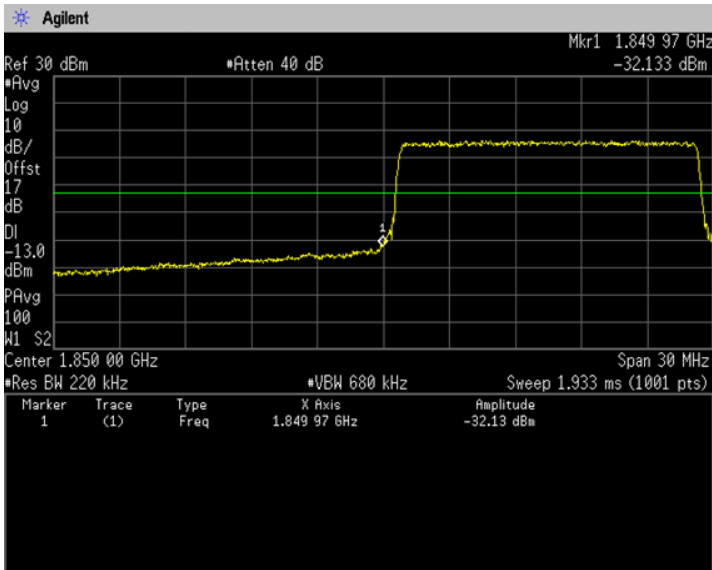
QPSK, BW 15MHz, RB1-74
Channel: High



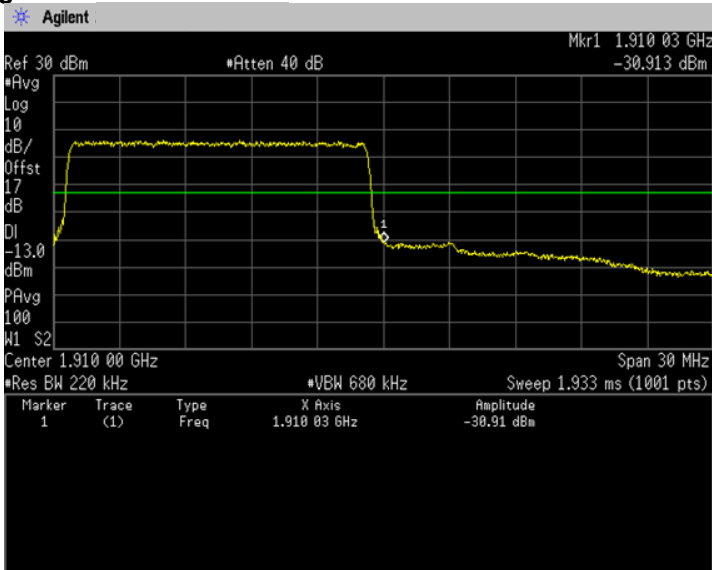


Japan

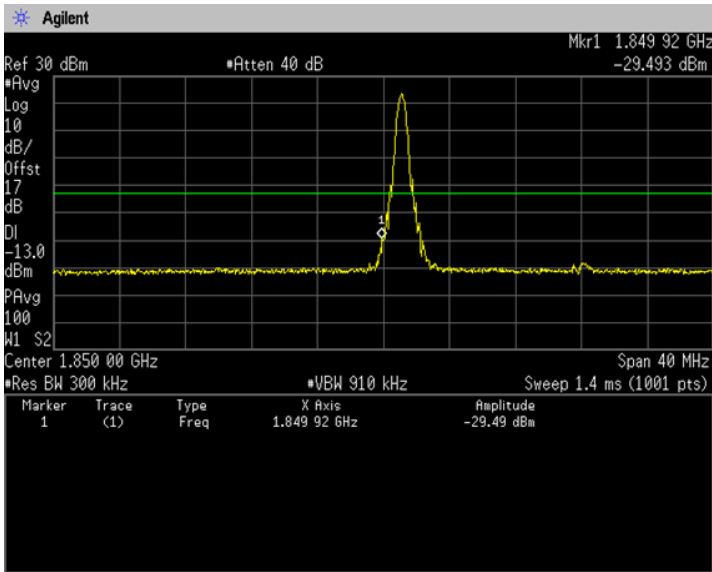
QPSK, BW 15MHz, RB75-0
Channel: Low



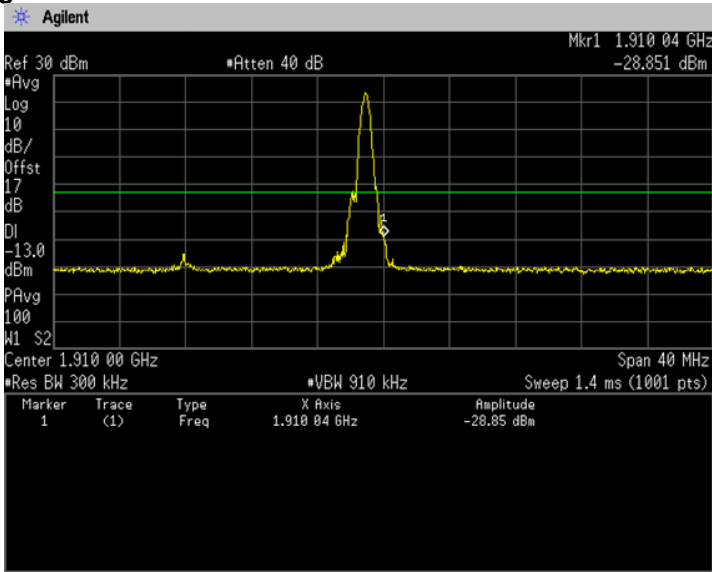
QPSK, BW 15MHz, RB75-0
Channel: High



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



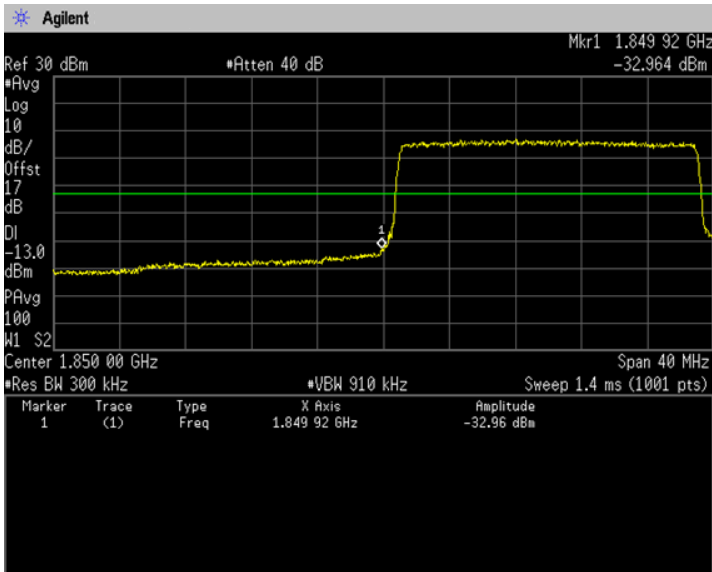
QPSK, BW 20MHz, RB1-99
Channel: High





Japan

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



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

