Zacta

TEST REPORT

Report number : JPD-TR-17198-0
Issue date : October 20, 2017

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

FCC Part 27 Subpart C
FCC Part 27 Subpart H

The test results are traceable to the international or national standards.

Applicant	:	KYOCERA Corporation
Equipment under test (EUT)	:	Mobile Phone
Model number	:	EA23
FCC ID	:	JOYEA23

Date of test : September 5, 6, 7, 11, 12, 19, 2017
Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
5-4149-7, Hachimanpara, Yonezawa-shi,
Yamagata, 992-1128 Japan
Phone: +81-238-28-2881 Fax: +81-238-28-2888
Test results : Complied

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 Zacta Ltd.
This test report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ILAC-MRA, or any agency of the federal government.

Tested by : Tadahiro Seino Chiaki Kanno
Tadahiro Seino Chiaki Kanno

Approved by : Hiro Suzuki
Hiroaki Suzuki
Lab Manager of RF Lab

NVLAP TESTING
NVLAP LAB CODE 200306-0

ilac-MRA

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 27 Subpart C and Subpart H.

1.2 Standards

CFR47 FCC Part 27 Subpart C
CFR47 FCC Part 27 Subpart H

1.2.1 Test Methods

KDB 971168 D01 Power Meas License Digital Systems v02r02
ANSI/TIA/EIA-603-D-2010

1.2.2 Deviation from standards

None

1.3 List of applied test to the EUT

Test items Section	Test items	Condition	Result
2.1046	Conducted Output Power	Conducted	PASS Note 1
27.50	Effective Radiated Power	Radiated	PASS
27.50	Peak to Average Ratio	Conducted	PASS
2.1049	Occupied Bandwidth	Conducted	PASS
27.53 2.1051	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS
27.53 2.1053	Radiated emissions and Harmonic Emissions	Radiated	PASS
27.54 2.1055	Frequency Stability	Conducted	PASS

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

1.3.1 Test set up

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1.4 Modification to the EUT by laboratory

None

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2. Equipment Under Test

2.1 General Description of equipment

EUT is the Mobile Phone.

2.2 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	:	Mobile Phone
Trade name	:	Kyocera
Model number	:	EA23
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	Battery: DC 3.8V
Size	:	(W) 71.3 × (D) 9.9 × (H) 144.3mm
Environment	:	Indoor and Outdoor use
Terminal limitation	:	-20˚C to 60˚C
RF Specification		
Frequency of Operation	:	Up Link LTE Band X VII: 704-716MHz Down Link LTE Band X VII: 734-746MHz
Modulation type	:	QPSK, 16QAM
Emission designator	:	BW 5M QPSK: 4M55G7D, 16QAM: 4M51W7D BW 10M QPSK: 8M95G7D, 16QAM: 8M99W7D
Effective Radiated Power (E.R.P.)	:	QPSK: 0.132W (21.2dBm) 16QAM: 0.132W (21.2dBm)
Antenna type	:	Internal antenna
Antenna gain	:	-5.5 dBi

2.3 Variation of the family model(s)

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	Channel	Frequency [MHz]
LTE Band X VII	QPSK	5MHz	23755	706.5
			23790	710.0
			23825	713.5
		10MHz	23780	709.0
			23790	710.0
			23800	711.0
	16QAM	5MHz	23755	706.5
			23790	710.0
			23825	713.5
		10MHz	23780	709.0
			23790	710.0
			23800	711.0

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 X axis and the worst case recorded.

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3. Configuration of equipment

3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Mobile Phone	KYOCERA	EA23	N/A	JOYEA23	EUT

3.2 System configuration

1. Mobile Phone
   (EUT)

Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “3.1 Equipment(s) used”.

4. Effective Radiated Power

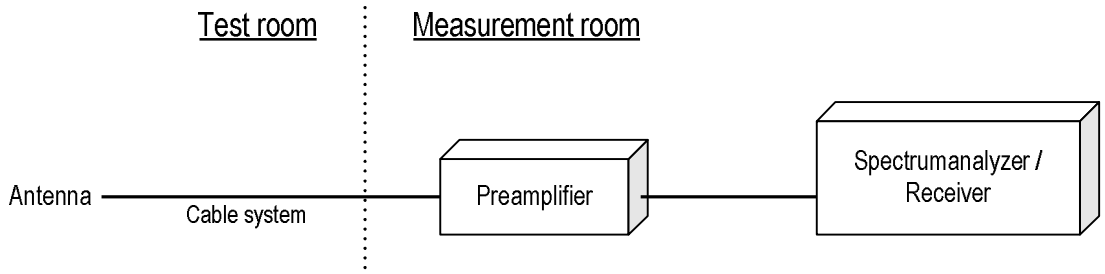
4.1 Measurement procedure [FCC 27.50]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1 meter surface, 0.8 meter height styrene foam table. Radiated emission measurements are performed at 3 meter distance with the broadband antenna (Log periodic 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 1MHz. 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 1MHz
c) VBW ≥ 3 x RBW
d) Number of sweep points ≥ 2 x 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 ≥ 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



4.2 Calculation method

Result(EIRP) = S.G Reading - Cable loss + Antenna Gain
Margin = Limit – Result (EIRP)

Example:
Limit @ 710MHz : 34.7dBm
S.G Reading = 25.5dBm Cable loss = 0.7dB Ant. Gain = -10.1dBd
Result = 25.5 - 0.7 + (-10.1) = 14.8dBm
Margin = 34.7 – 14.8 = 19.9dB

4.3 Limit

3 W (34.7dBm)

4.4 Test data

Date : September 7, 2017
Temperature : 22.8 [˚C]
Humidity : 68.7 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Tadahiro Seino

Date : September 19, 2017
Temperature : 22.8 [˚C]
Humidity : 54.0 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Tadahiro Seino

[LTE Band X VII]
QPSK, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	706.5	-18.2	27.5	0.7	-5.9	21.0	34.7	13.7
H	710.0	-18.3	27.4	0.7	-5.9	20.8	34.7	13.9
H	713.5	-18.3	27.5	0.7	-5.9	20.9	34.7	13.8

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	706.5	-20.7	24.9	0.7	-5.9	18.4	34.7	16.3
H	710.0	-19.8	25.9	0.7	-5.9	19.3	34.7	15.4
H	713.5	-20.3	25.7	0.7	-5.9	19.1	34.7	15.6

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	709.0	-18.0	27.6	0.7	-5.9	21.0	34.7	13.7
H	710.0	-17.9	27.8	0.7	-5.9	21.2	34.7	13.5
H	711.0	-18.2	27.5	0.7	-5.9	20.9	34.7	13.8

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	709.0	-18.0	27.7	0.7	-5.9	21.1	34.7	13.6
H	710.0	-17.9	27.8	0.7	-5.9	21.2	34.7	13.5
H	711.0	-18.2	27.6	0.7	-5.9	21.0	34.7	13.7

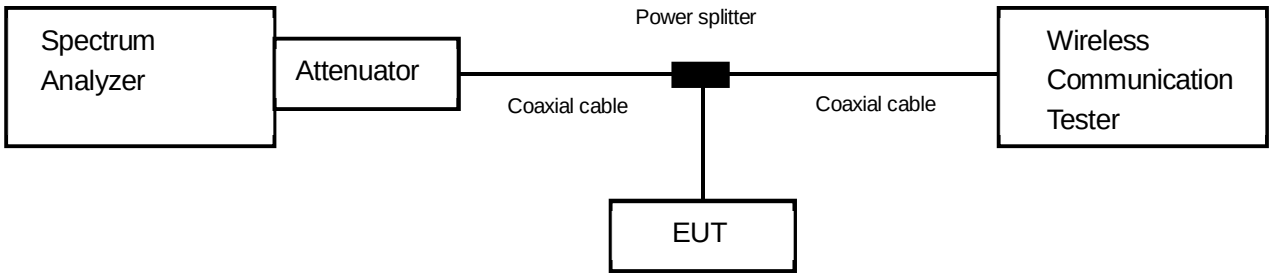
5. Peak to Average Ratio

5.1 Measurement procedure [FCC 27.50]

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

The spectrum analyzer is set to;
a) Power Stat CCDF mode
b) Set resolution / measurement bandwidth ≥ 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



5.2 Limit

13dB or less

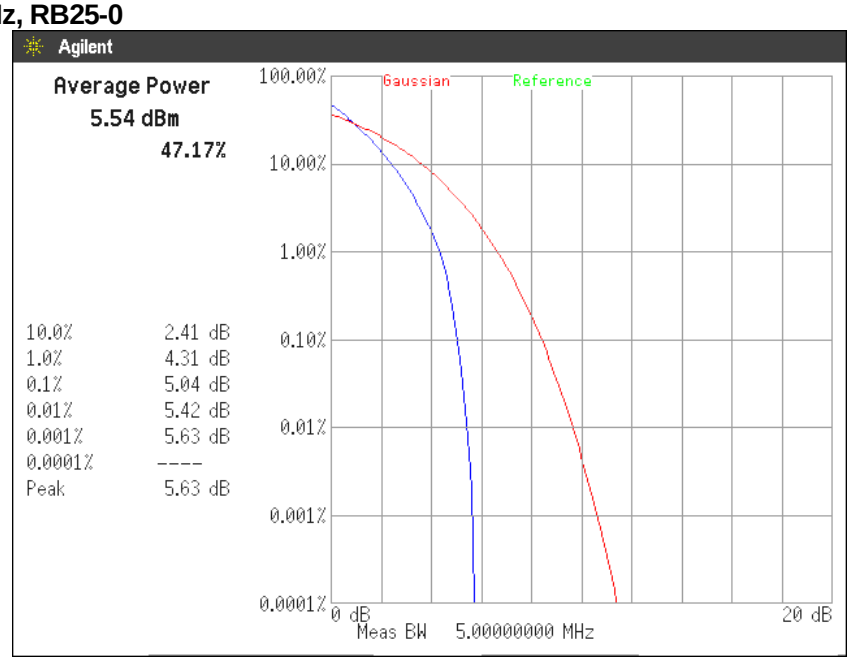
5.3 Measurement result

Date : September 5, 2017
Temperature : 22.9 [˚C]
Humidity : 53.8 [%]
Test place : Shielded room No.4
Test engineer : Chiaki Kanno

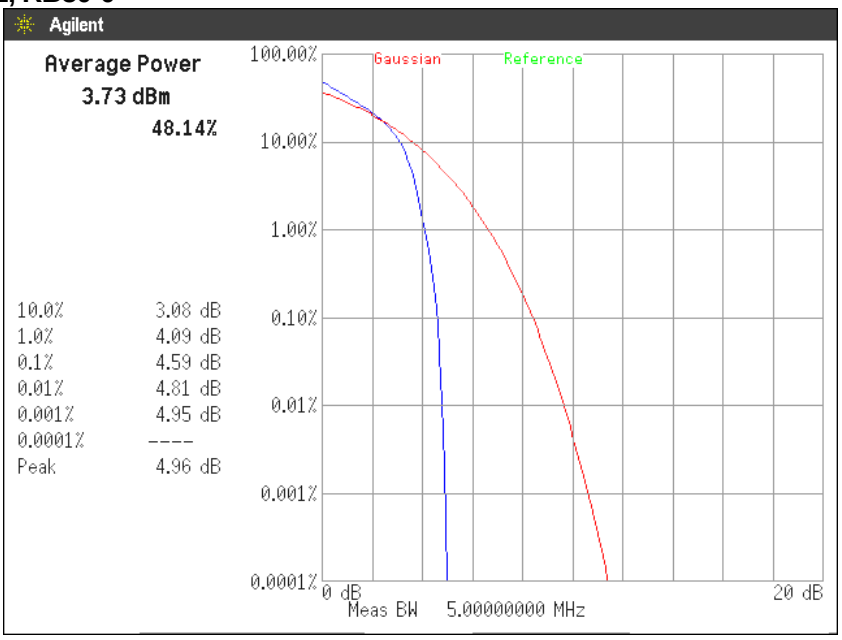
Band	Channel	Frequency [MHz]	Modulation	BW [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band X VII	23790	710.0	QPSK	5	25-0	5.04	13
				10	50-0	4.59	13
			16QAM	5	25-0	5.95	13
				10	50-0	6.24	13

5.4 Trace data

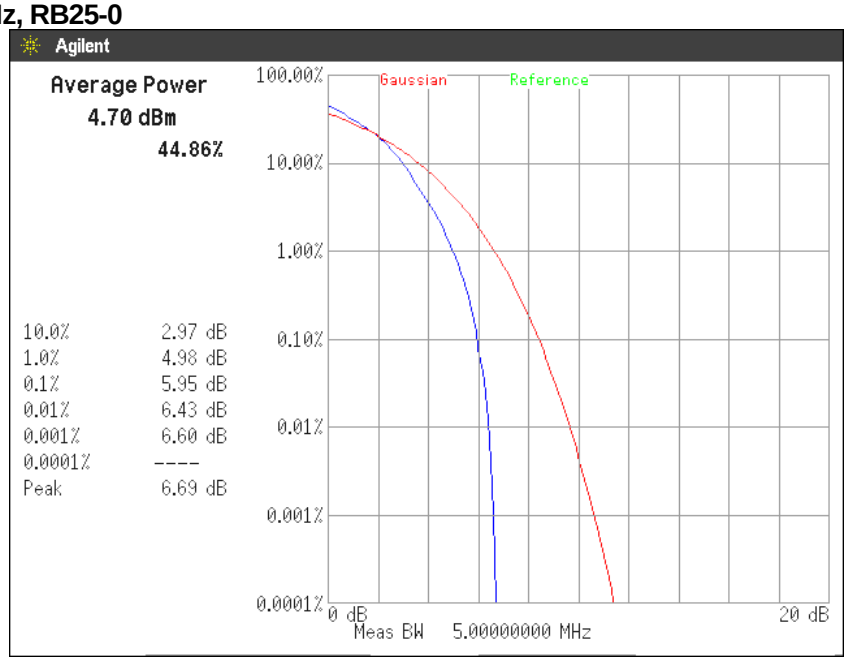
[LTE Band X VII]
Channel: 23790
QPSK, BW 5MHz, RB25-0



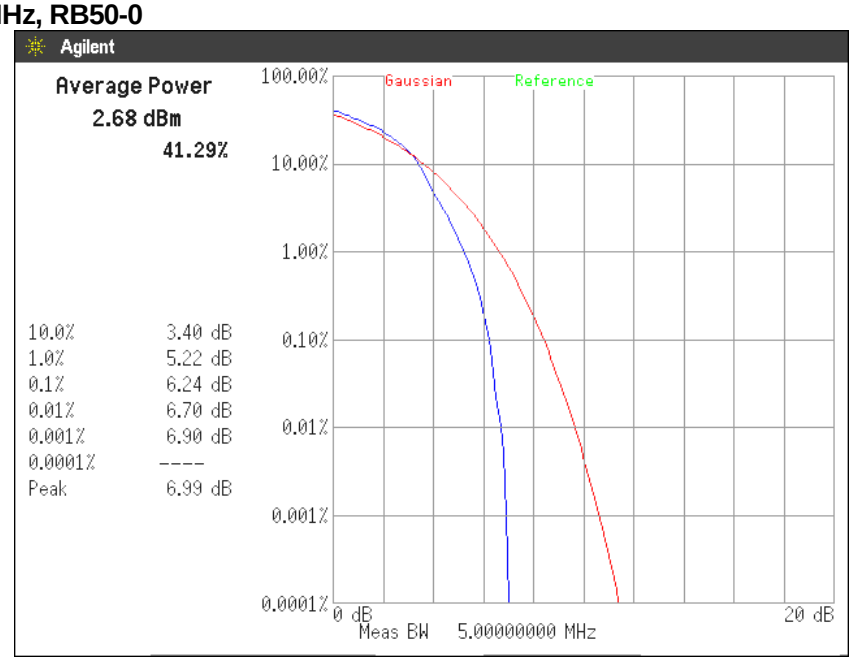
QPSK, BW 10MHz, RB50-0



16QAM, BW 5MHz, RB25-0



16QAM, BW 10MHz, RB50-0



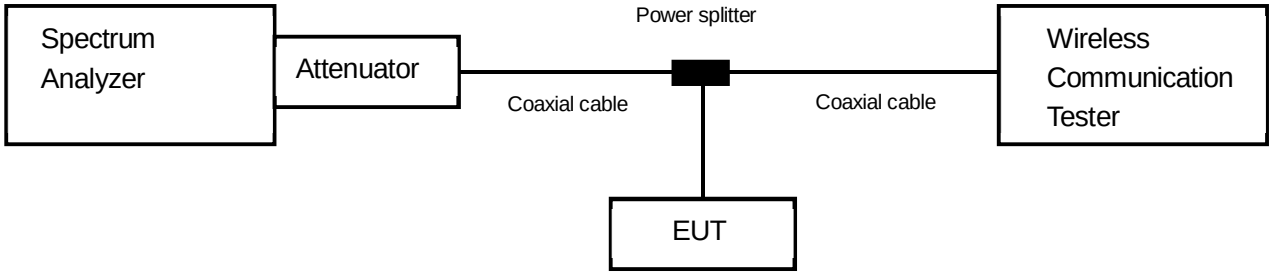
6. Occupied Bandwidth

6.1 Measurement procedure [FCC 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



6.2 Limit

None

6.3 Measurement result

Date : September 5, 2017
Temperature : 22.9 [˚C]
Humidity : 53.8 [%]
Test place : Shielded room No.4

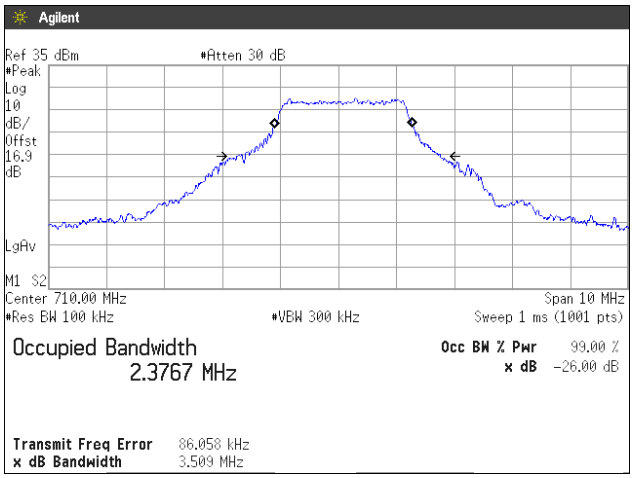
Test engineer : Chiaki Kanno

BW	Mode	UL RB Allocation	UL RB Start	Frequency [MHz]	26dB Bandwidth [MHz]	99% OBW [MHz]
5MHz	QPSK	12	7	710.0	3.509	2.3767
		25	0		5.043	4.5478
5MHz	16QAM	12	7	710.0	3.200	2.3277
		25	0		5.007	4.5140
10MHz	QPSK	25	12	710.0	5.747	4.6711
		50	0		9.914	8.9549
10MHz	16QAM	25	12	710.0	5.860	4.6652
		50	0		9.879	8.9866

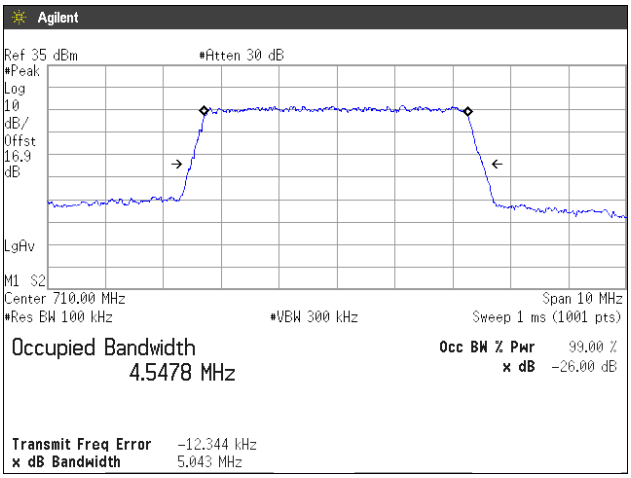
6.4 Trace data
[LTE Band X VII]
Channel: 23790

QPSK, BW 5MHz

RB12-7

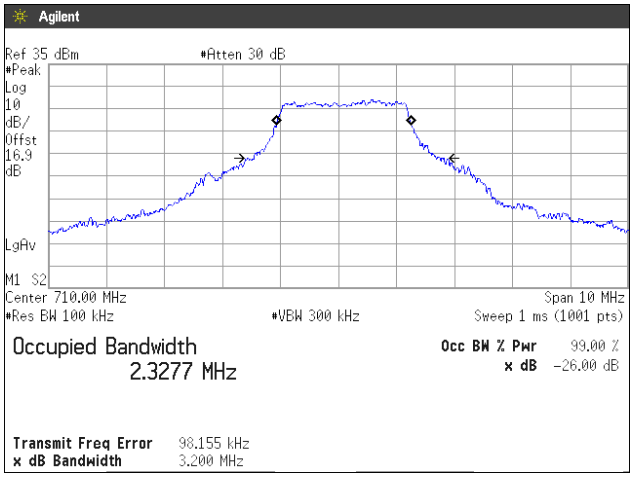


RB25-0

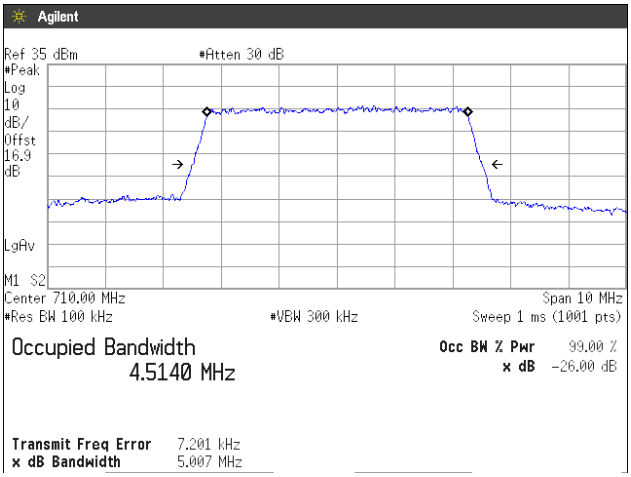


16QAM, BW 5MHz

RB12-7

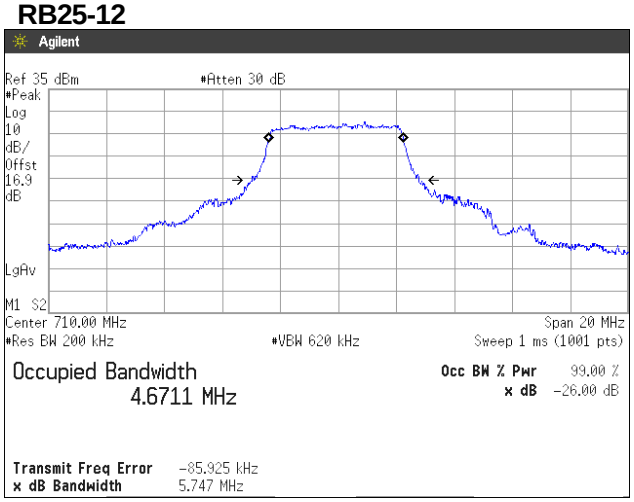


RB25-0

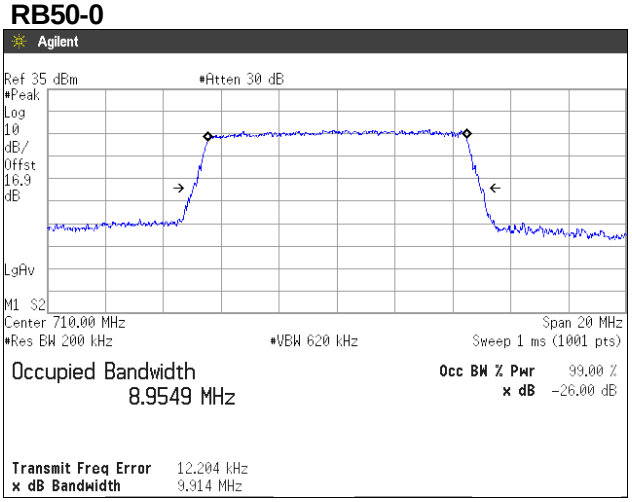


QPSK, BW 10MHz

RB25-12

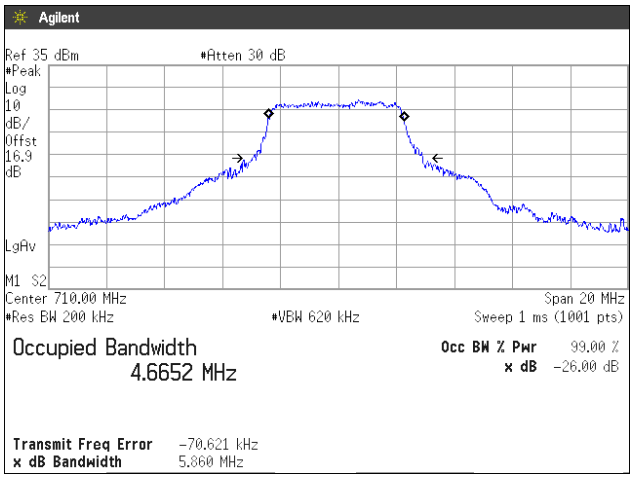


RB50-0

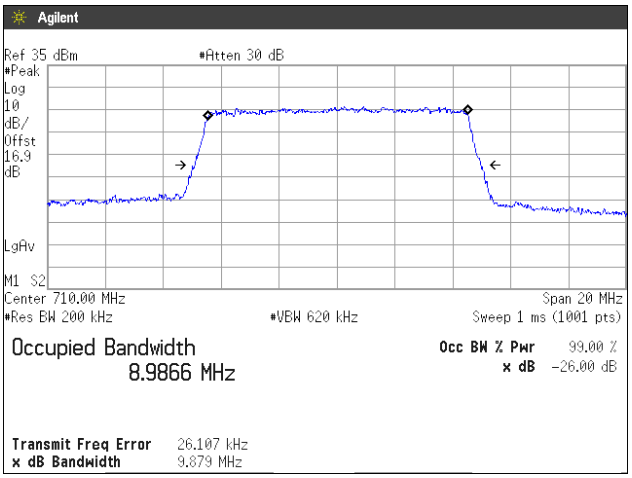


16QAM, BW 10MHz

RB25-12



RB50-0



7. Band Edge Spurious and Harmonic at Antenna Terminals

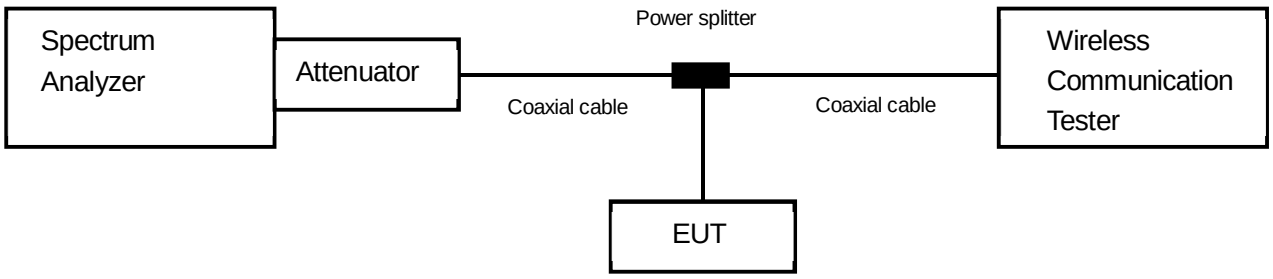
7.1 Measurement procedure [FCC 27.53, 2.1051]

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 ≥ 1% of the emission bandwidth or 2% of the emission bandwidth
c) VBW ≥ 3 x RBW
d) Detector = RMS
e) Trace mode = Max hold
f) Sweep time = auto-couple
g) Number of sweep point ≥ 2 x span / RBW

<Spurious Emissions>
a) RBW = 1MHz & VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple
e) Number of sweep point ≥ 2 x span / RBW

- Test configuration



7.2 Limit

-13dB or less

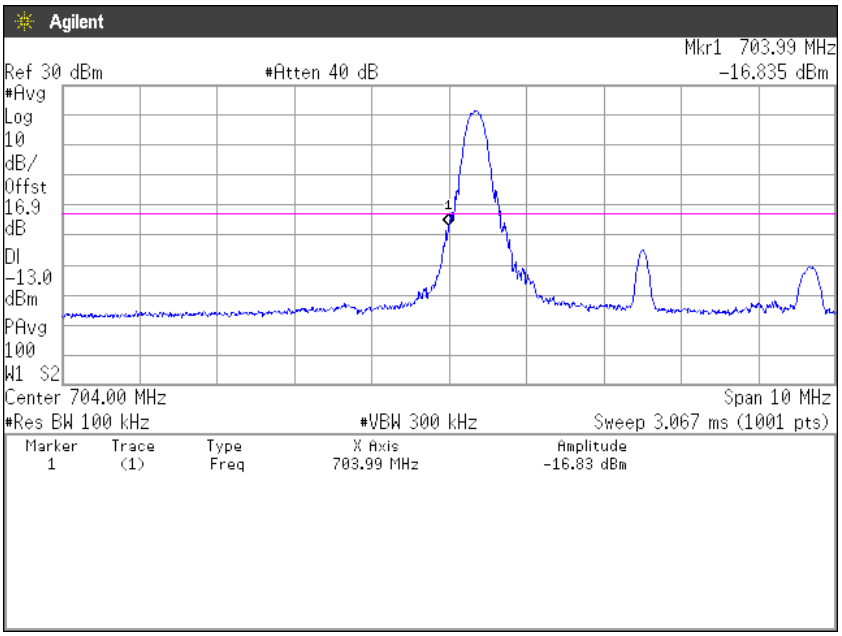
7.3 Measurement result

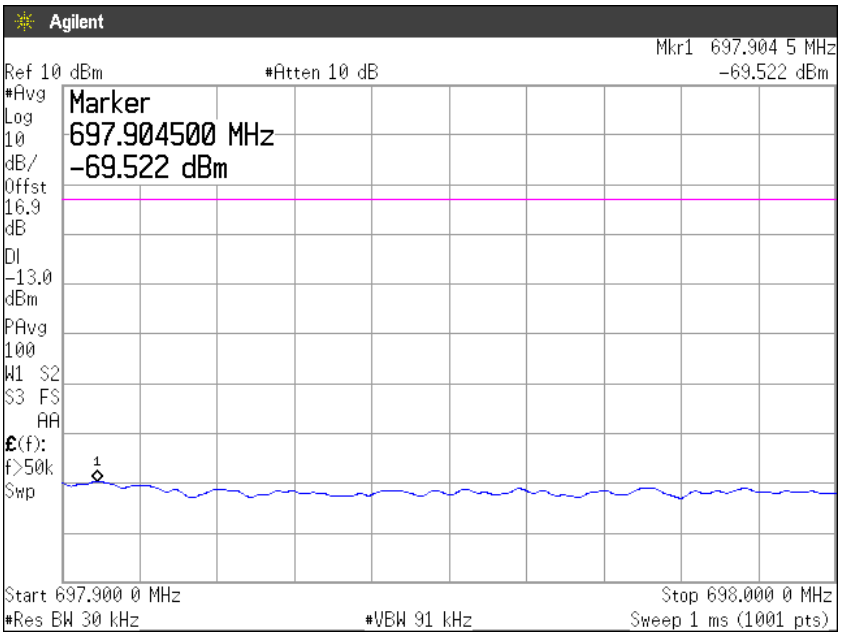
Date	:	September 5, 2017		
Temperature	:	22.9 [˚C]		
Humidity	:	53.8 [%]	Test engineer	:
Test place	:	Shielded room No.4		Chiaki Kanno

Band	Modulation	Bandwidth	Results	
LTE Band X VII	QPSK	5MHz	See the trace data	PASS
		10MHz	See the trace data	PASS
	16QAM	5MHz	See the trace data	PASS
		10MHz	See the trace data	PASS

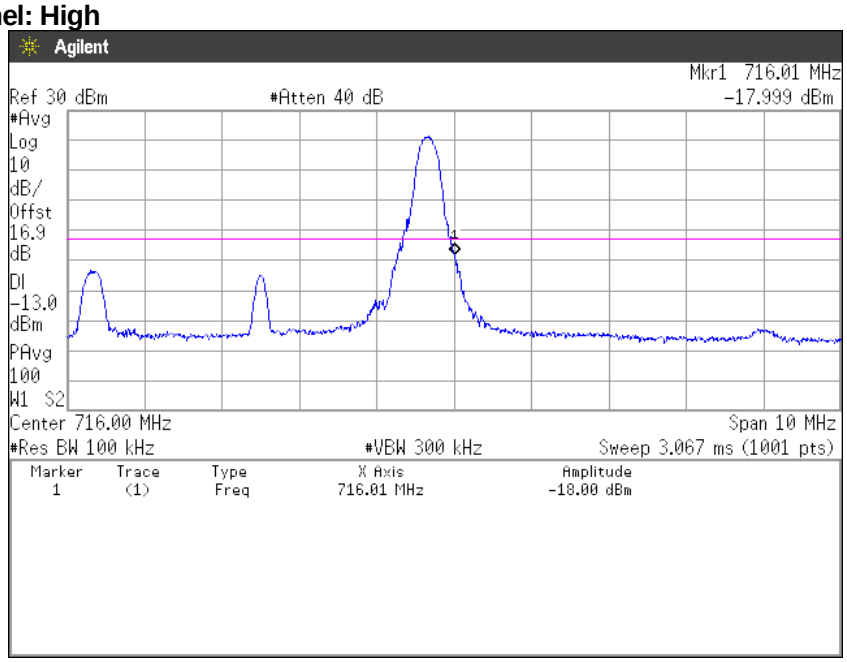
7.4 Trace data

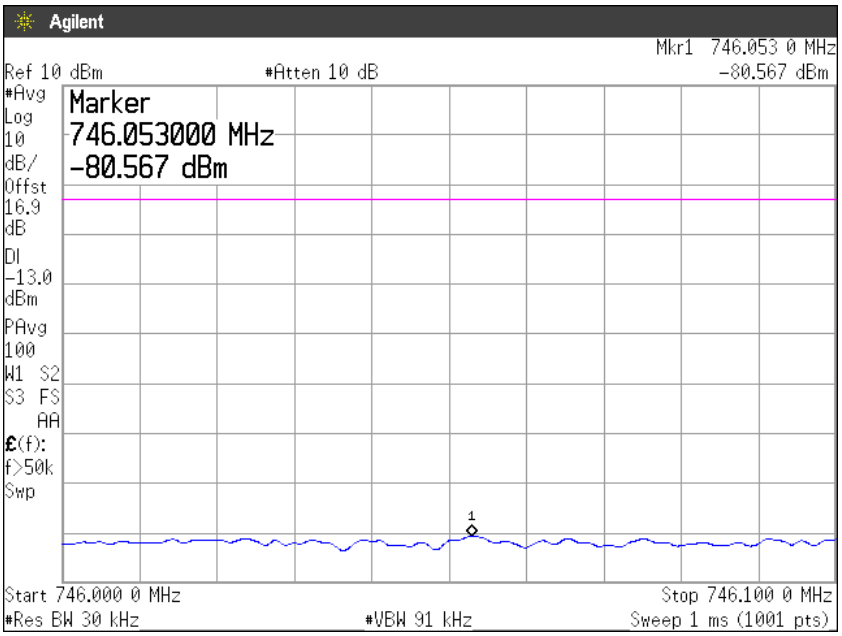
[LTE Band X VII]
(Band Edge)
QPSK, BW 5MHz, RB1-0
Channel: Low



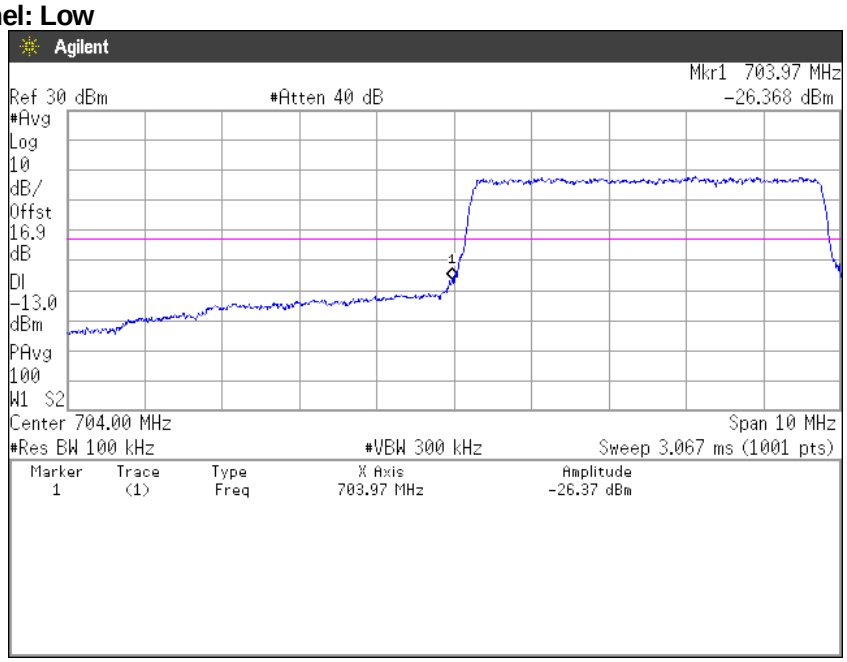


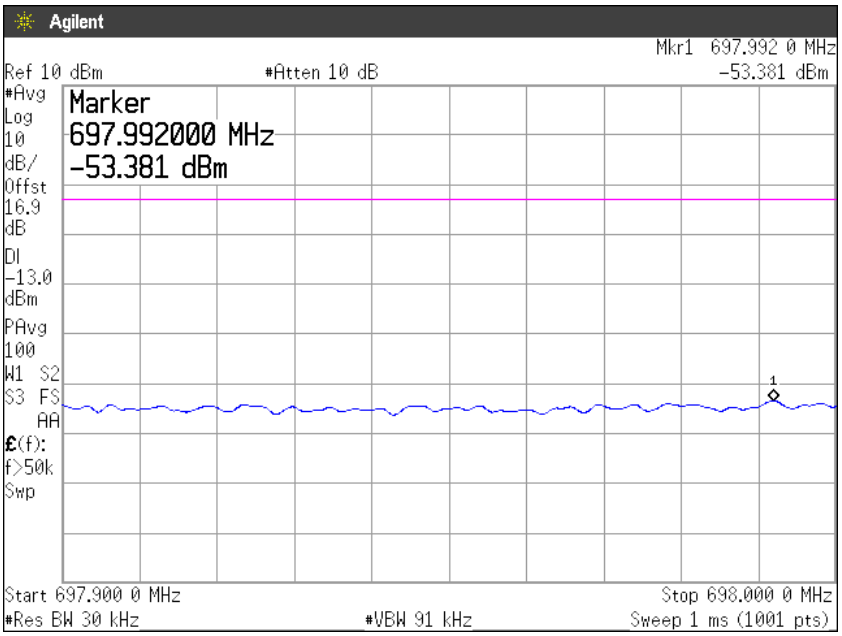
QPSK, BW 5MHz, RB1-24
Channel: High



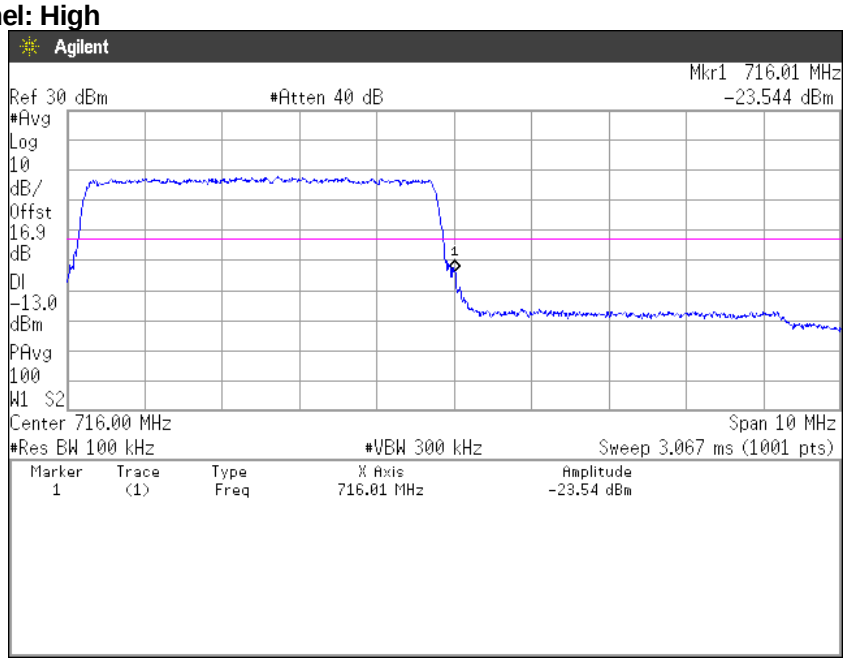


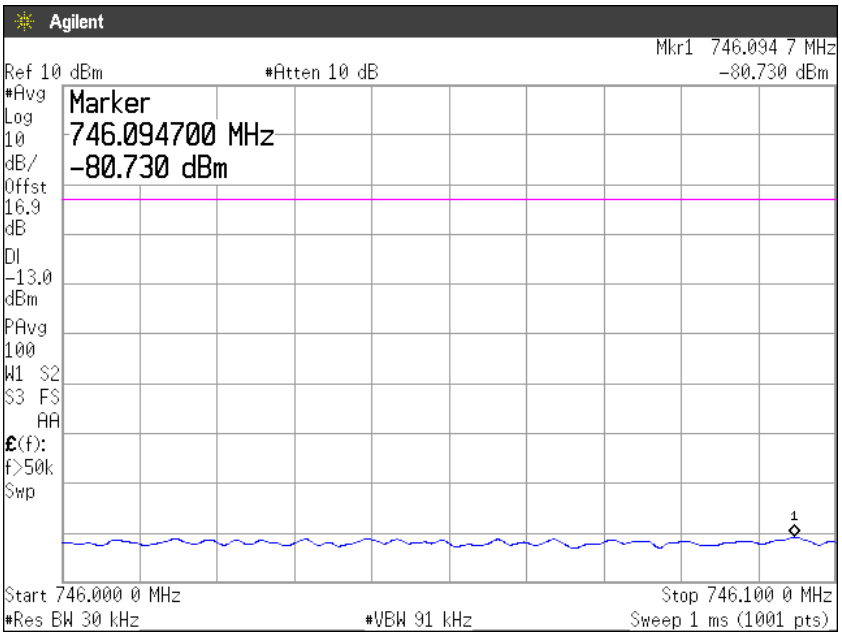
QPSK, BW 5MHz, RB25-0
Channel: Low



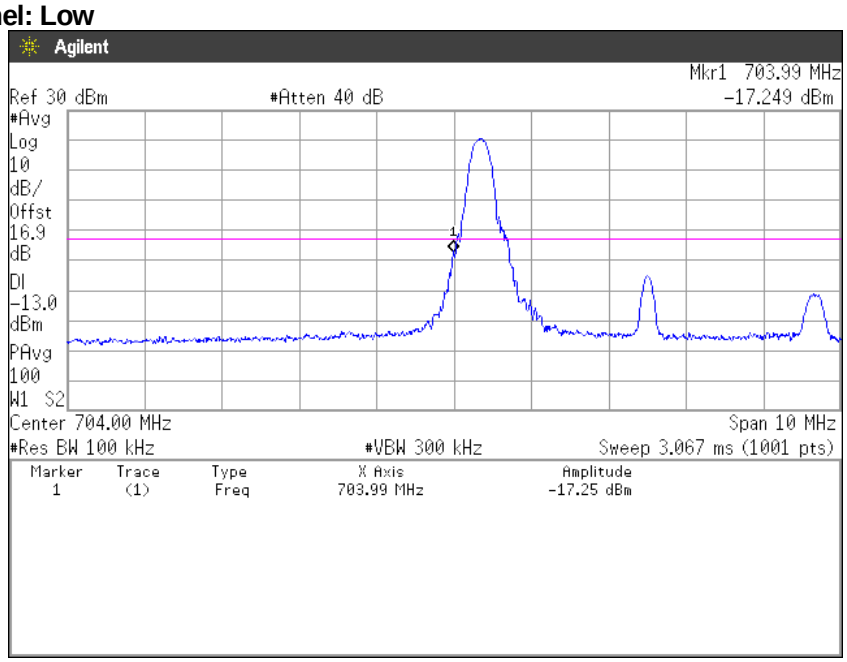


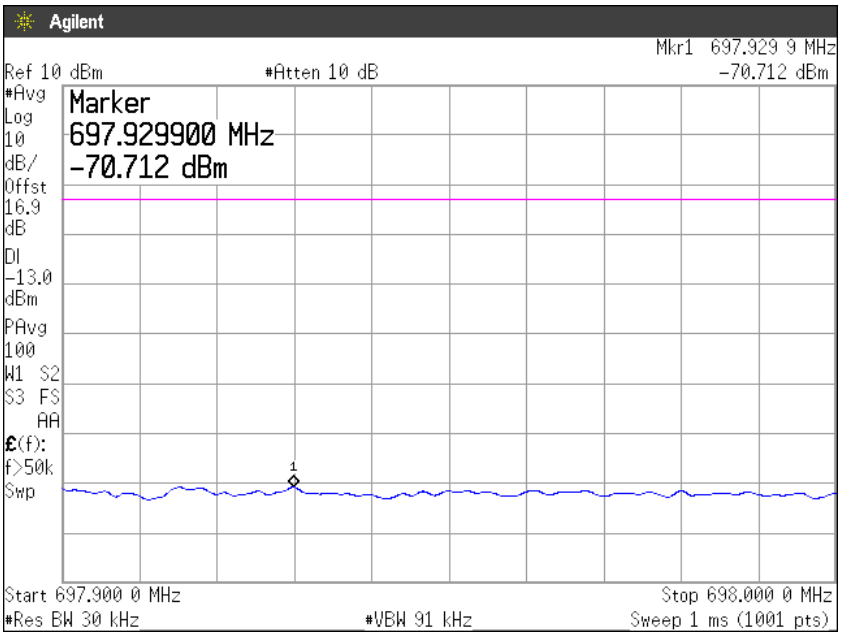
QPSK, BW 5MHz, RB25-0
Channel: High



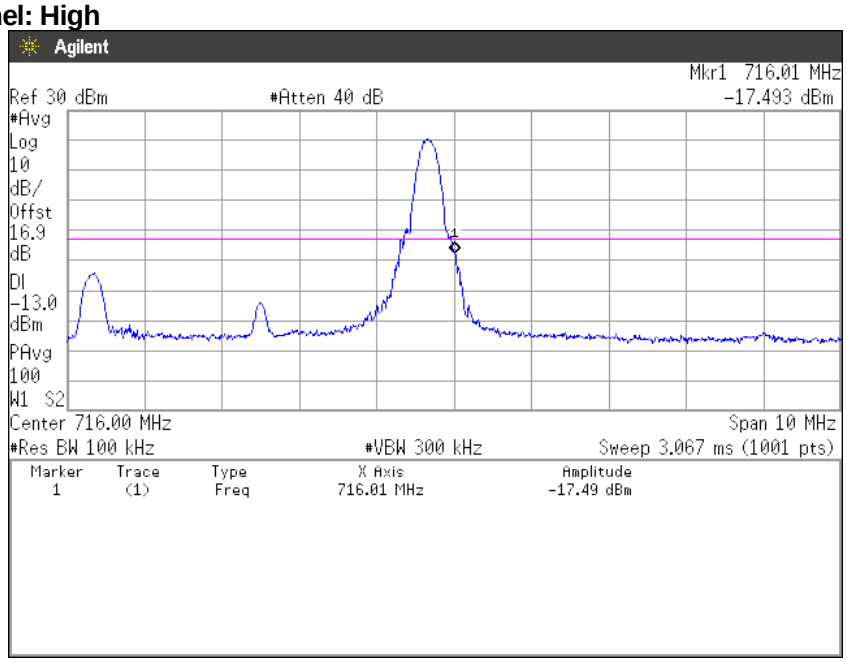


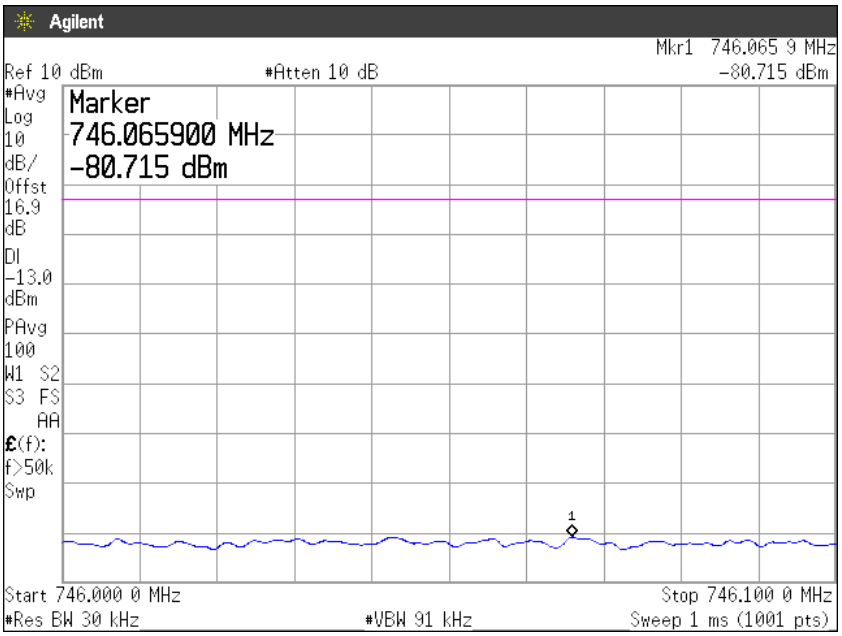
16QAM, BW 5MHz, RB1-0
Channel: Low



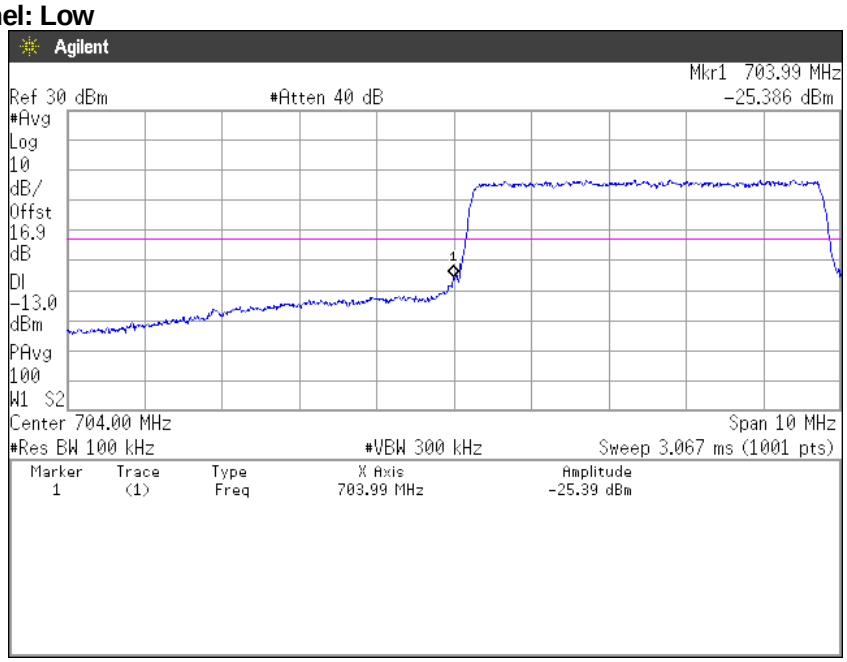


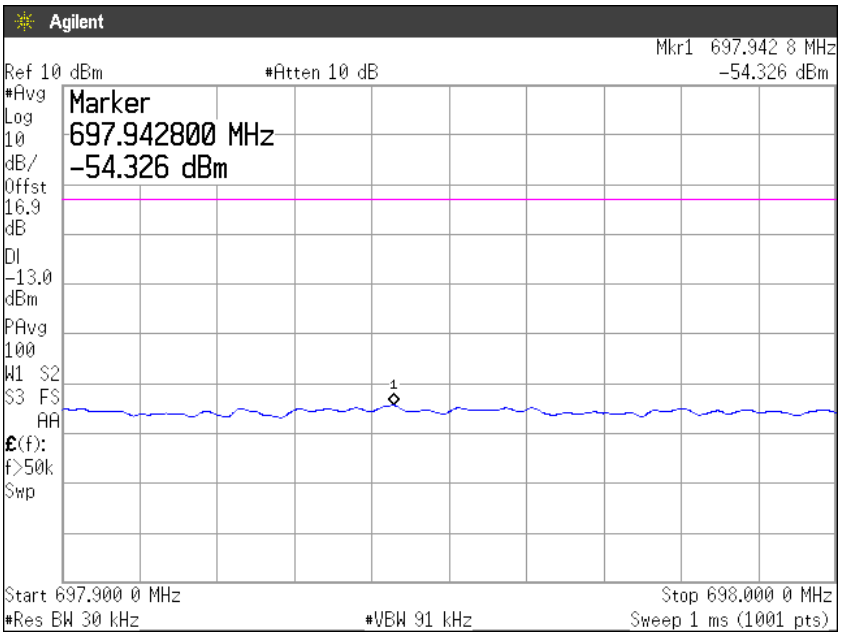
16QAM, BW 5MHz, RB1-24
Channel: High



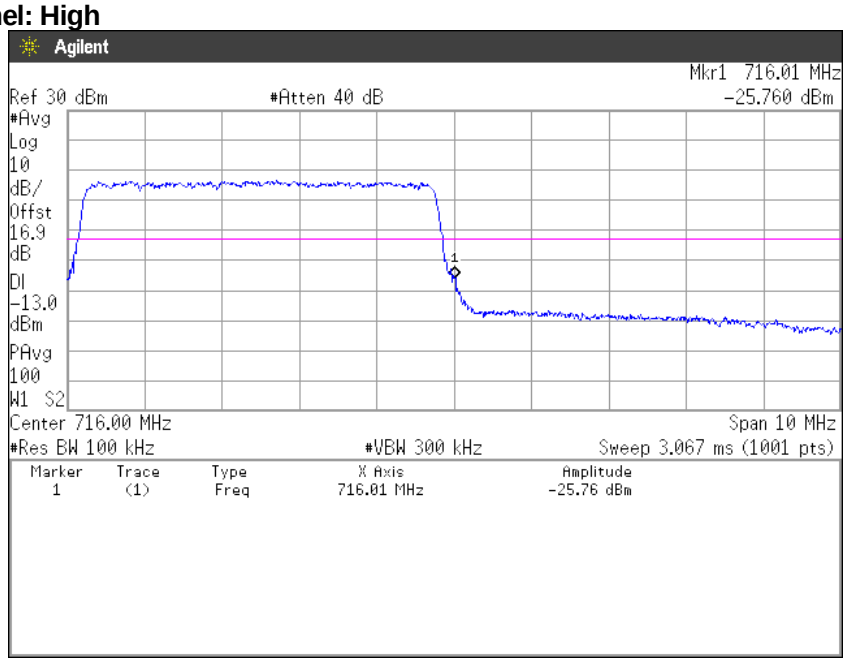


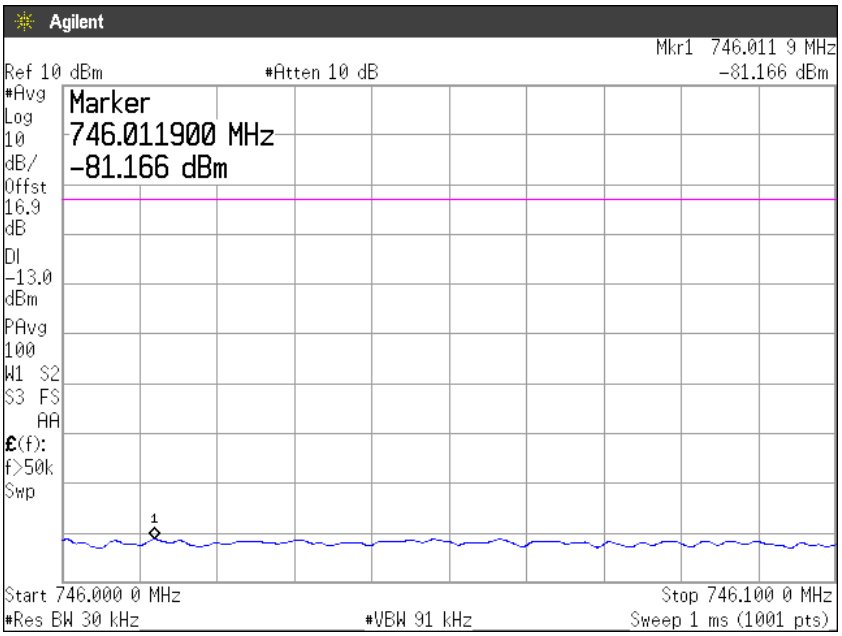
16QAM, BW 5MHz, RB25-0
Channel: Low



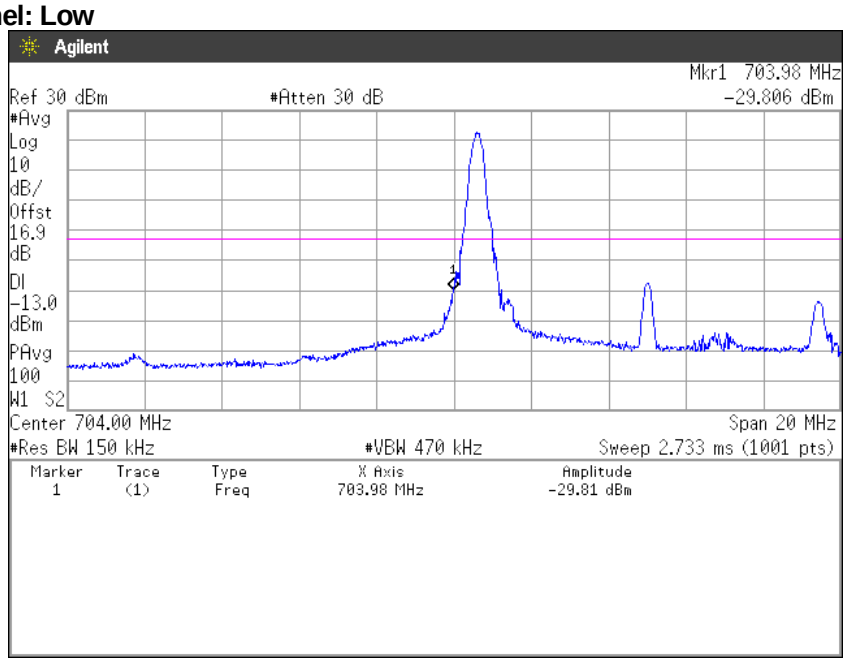


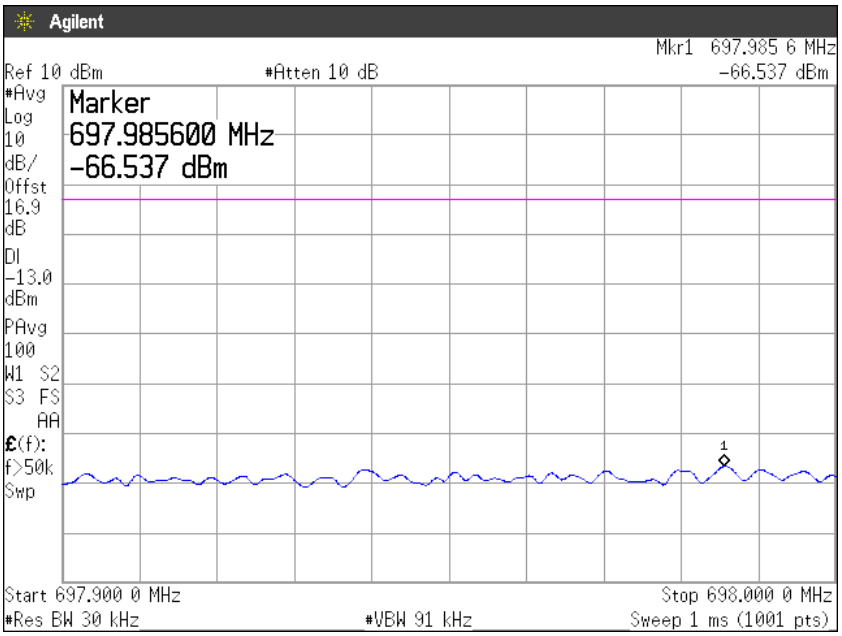
16QAM, BW 5MHz, RB25-0
Channel: High



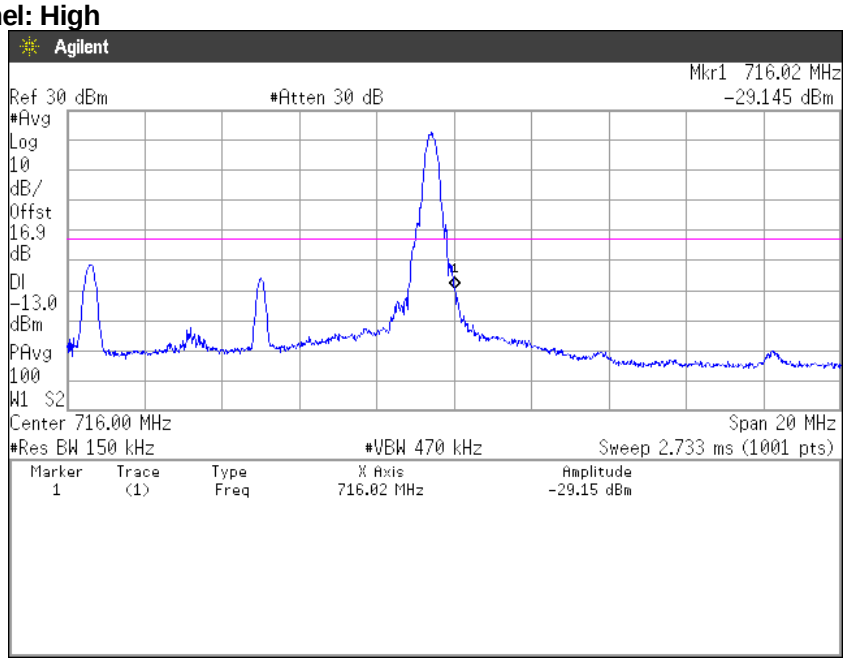


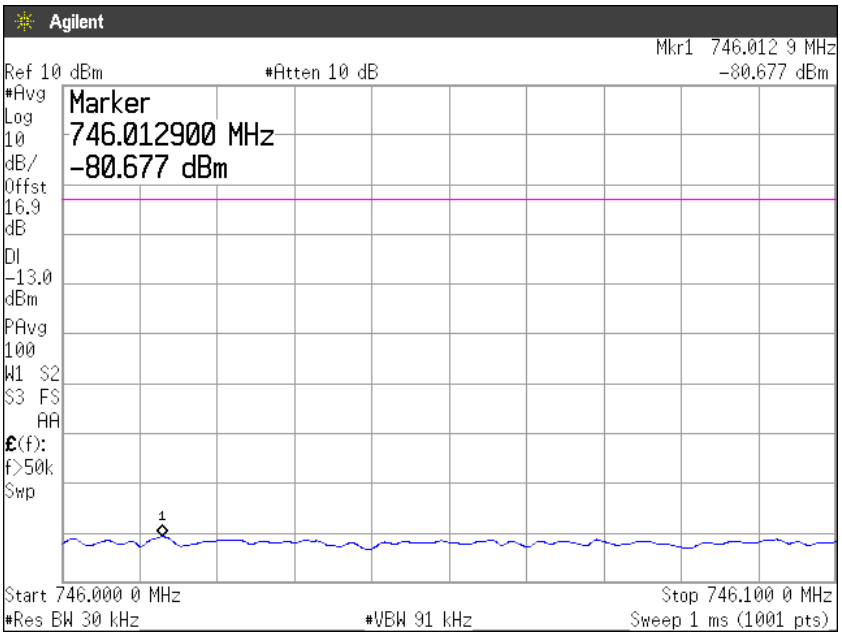
QPSK, BW 10MHz, RB1-0
Channel: Low



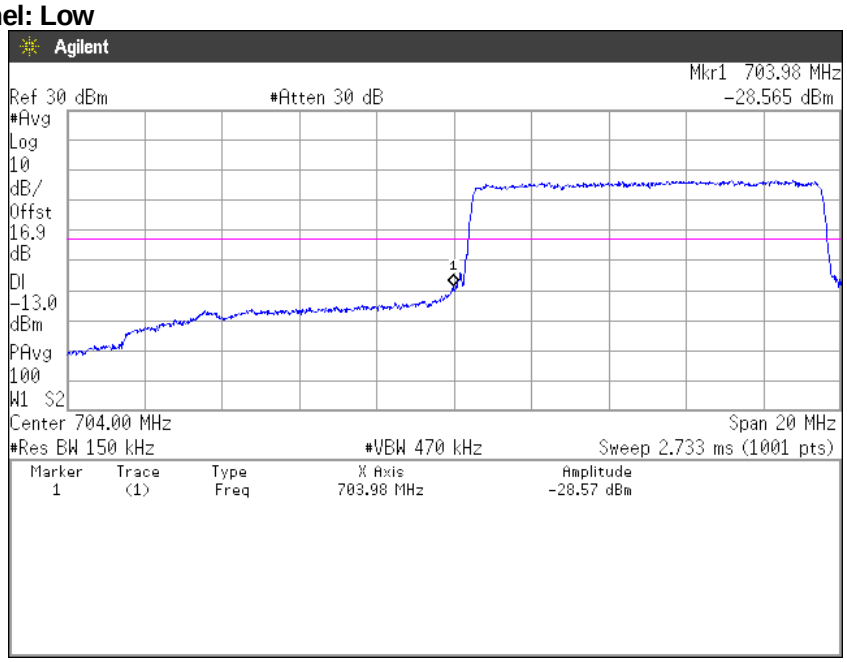


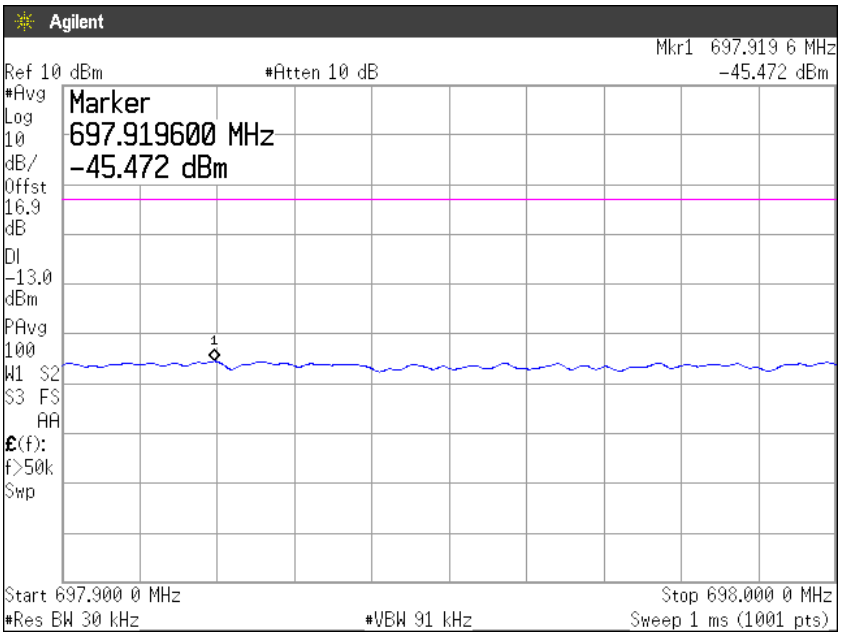
QPSK, BW 10MHz, RB1-49
Channel: High



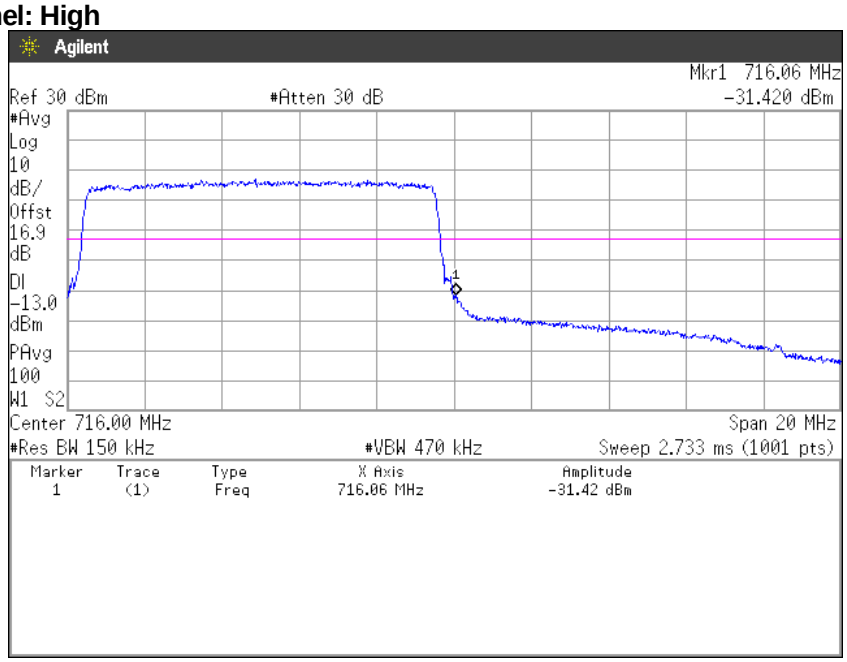


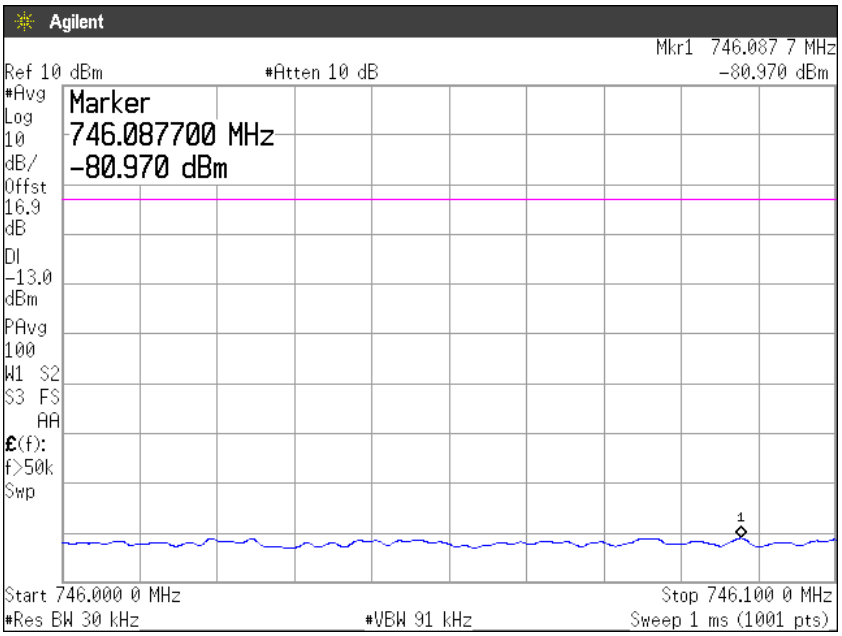
QPSK, BW 10MHz, RB50-0
Channel: Low



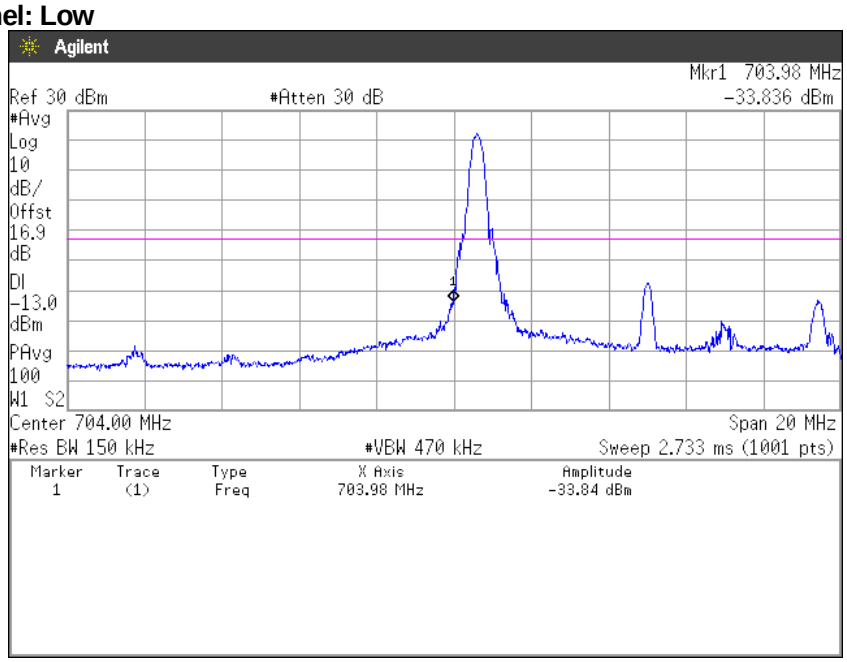


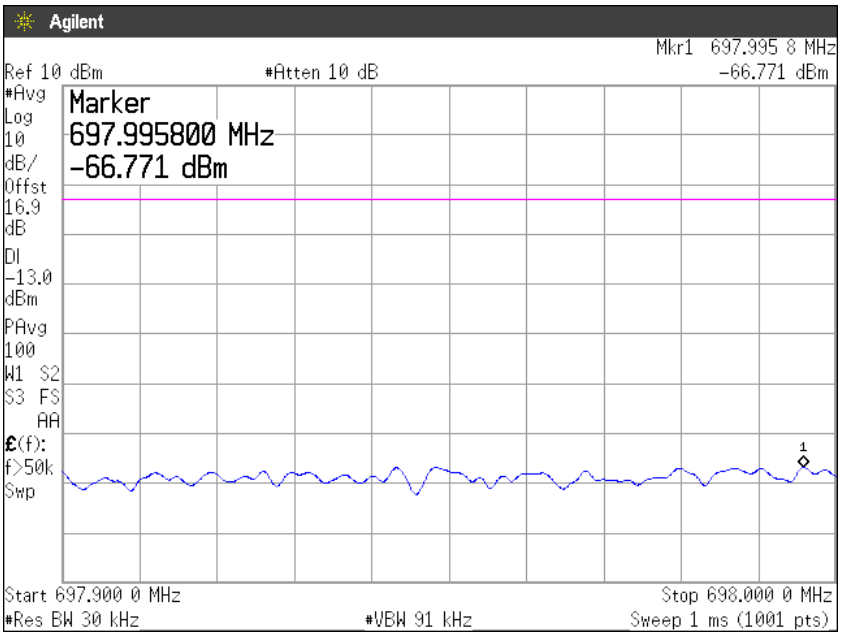
QPSK, BW 10MHz, RB50-0
Channel: High



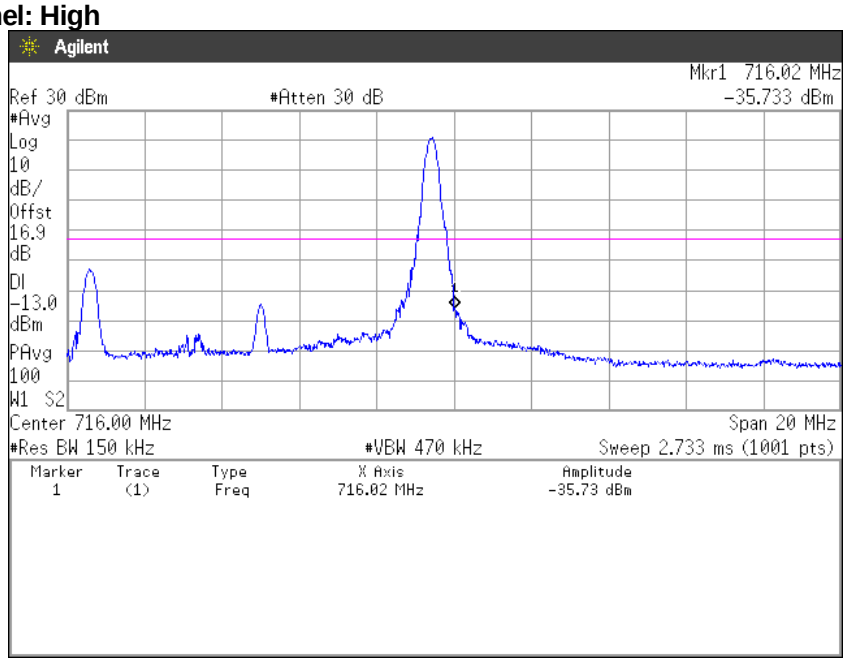


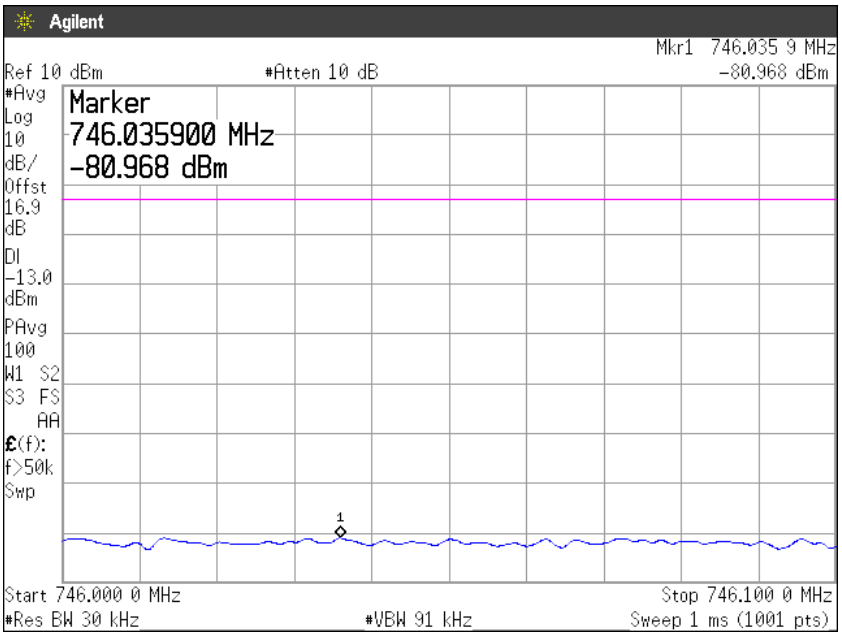
16QAM, BW 10MHz, RB1-0
Channel: Low





16QAM, BW 10MHz, RB1-49
Channel: High





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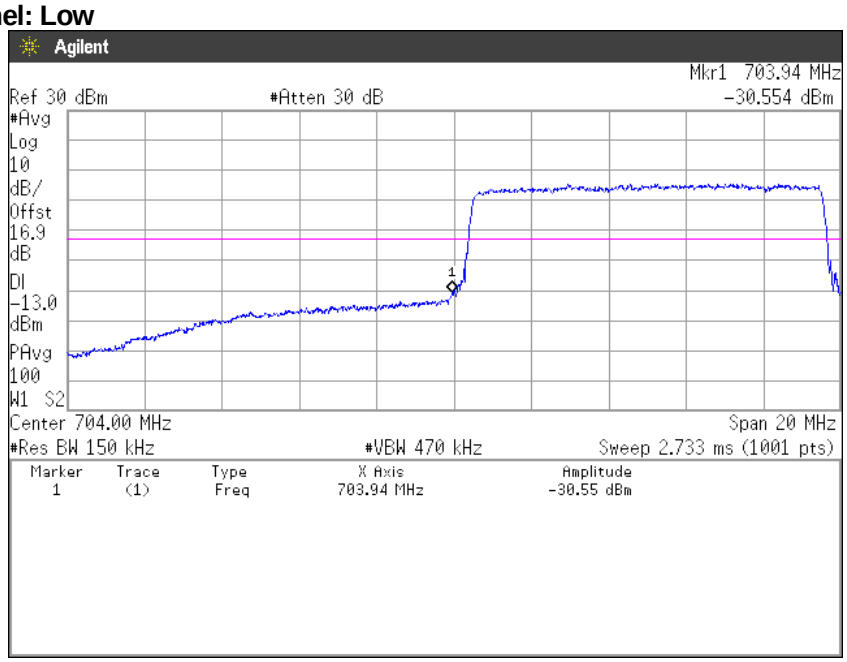
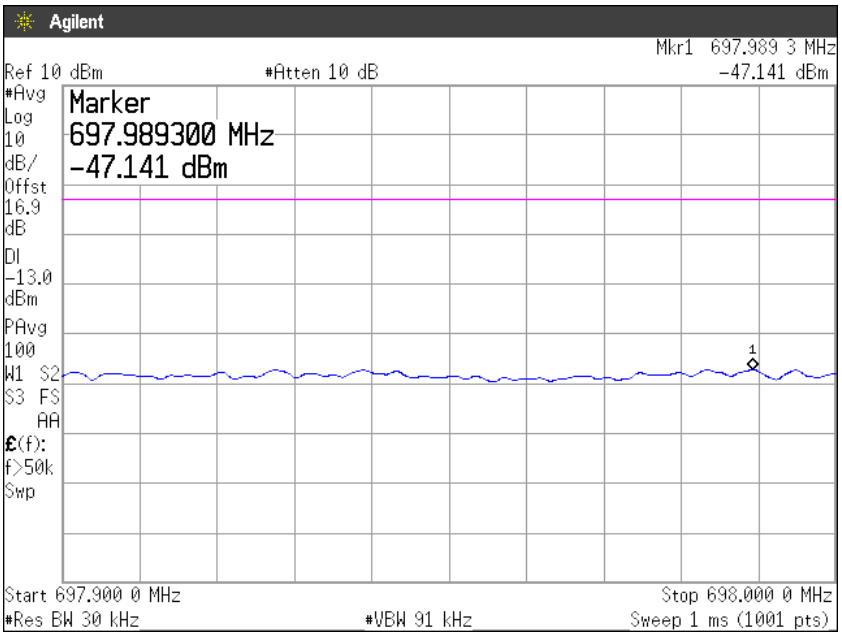
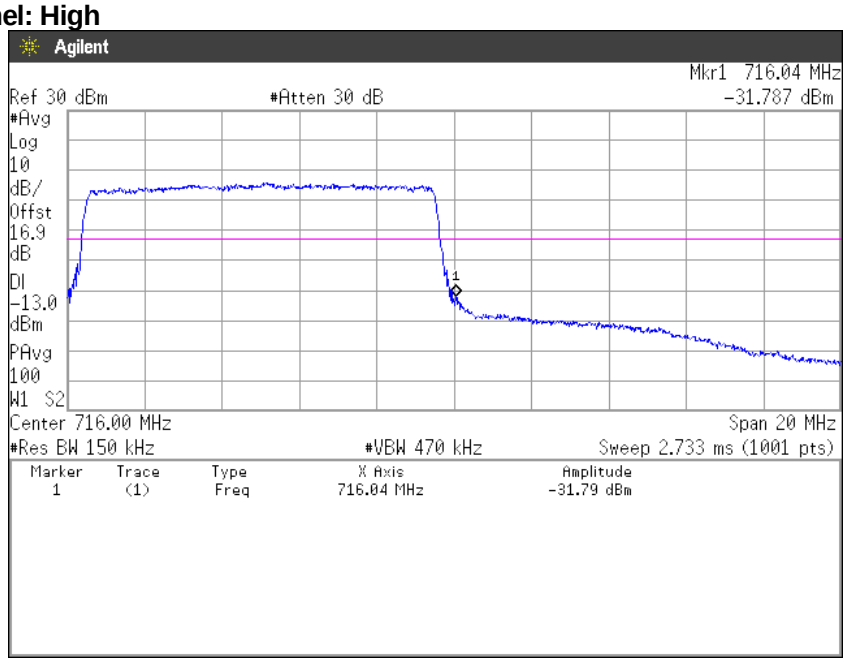
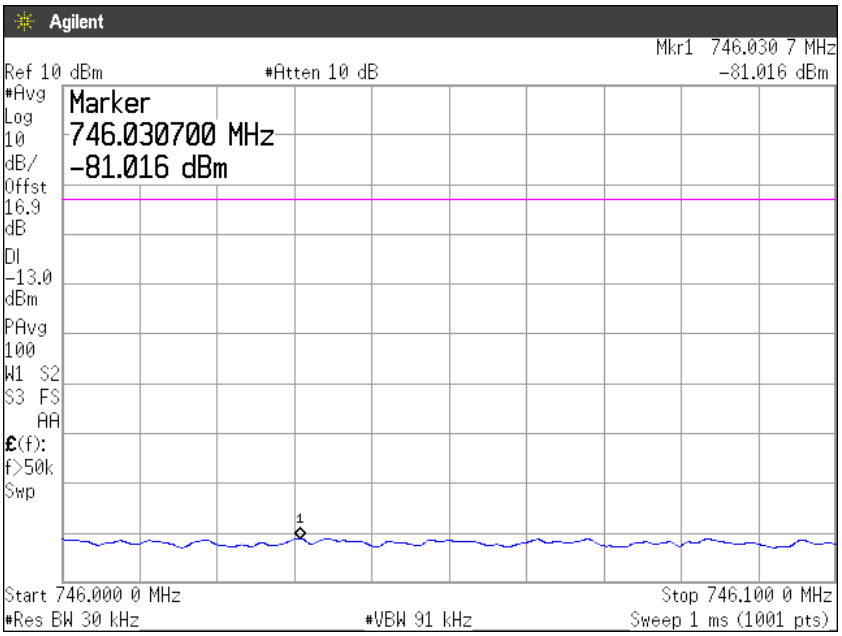
16QAM, BW 10MHz, RB50-0
Channel: Low





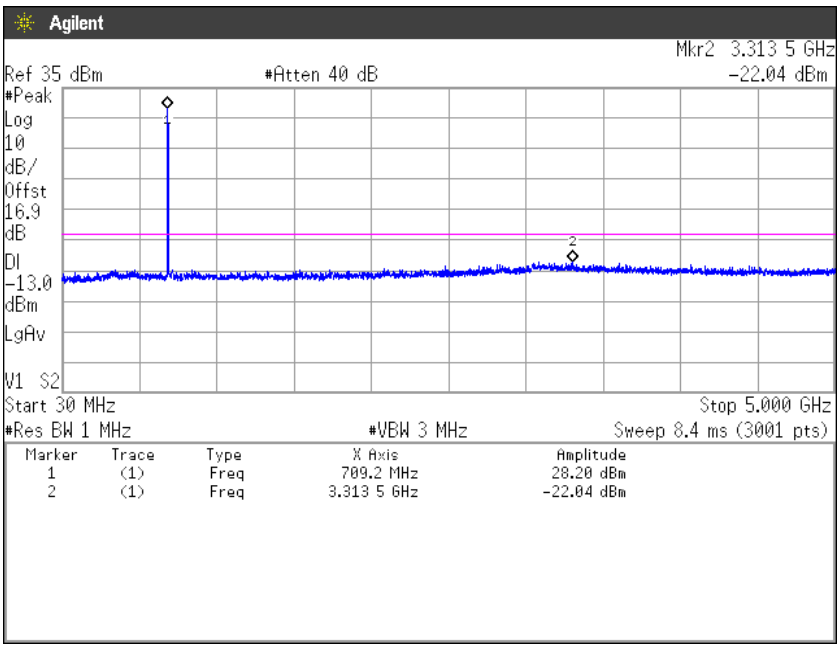
16QAM, BW 10MHz, RB50-0
Channel: High



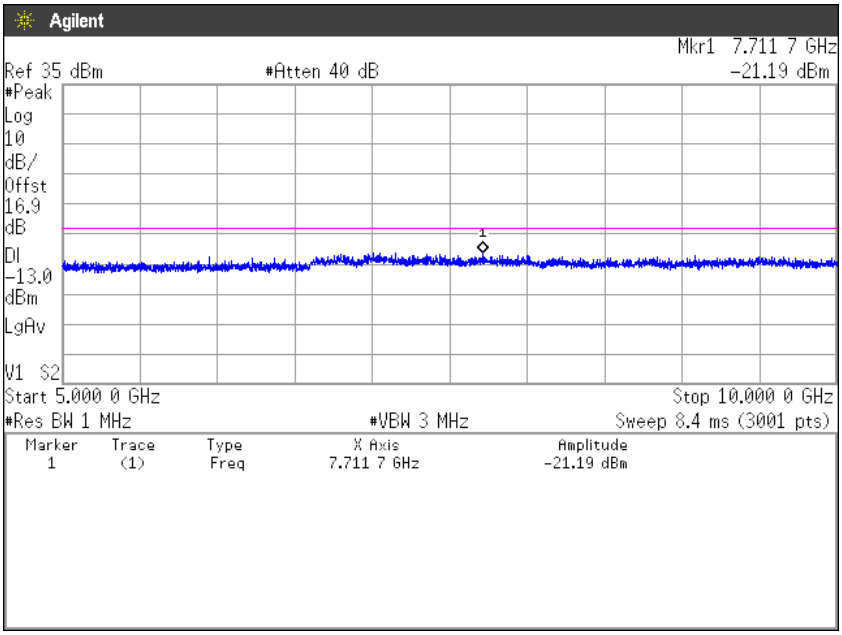


(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of Effective Radiated Power.

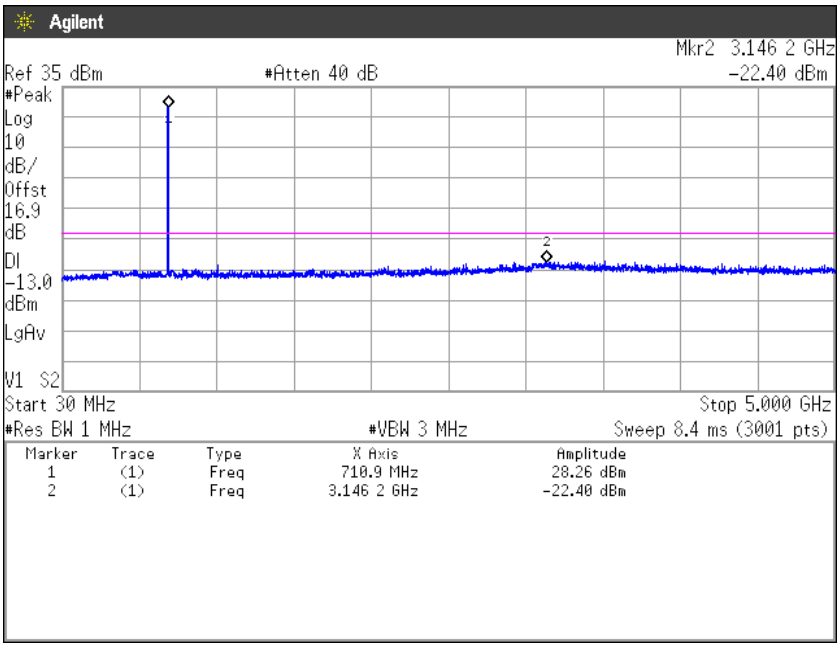
QPSK, BW 10MHz, RB1-25
Channel: 23780
30MHz-5GHz



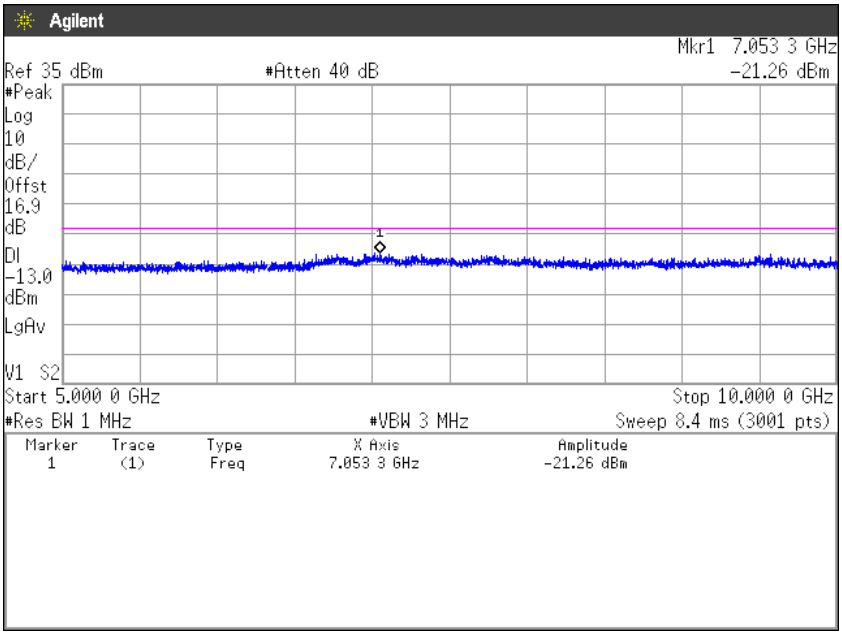
5GHz-10GHz



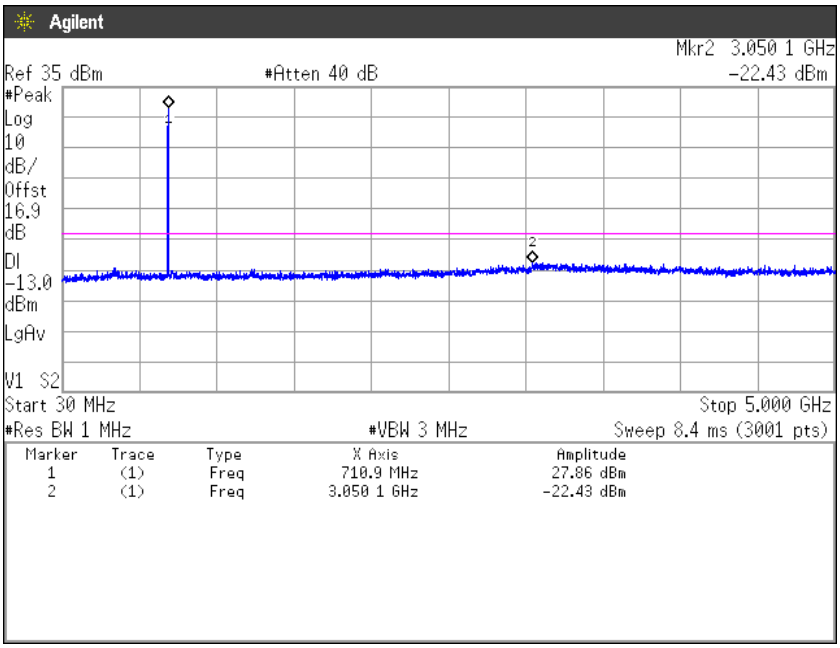
Channel: 23790
30MHz-5GHz



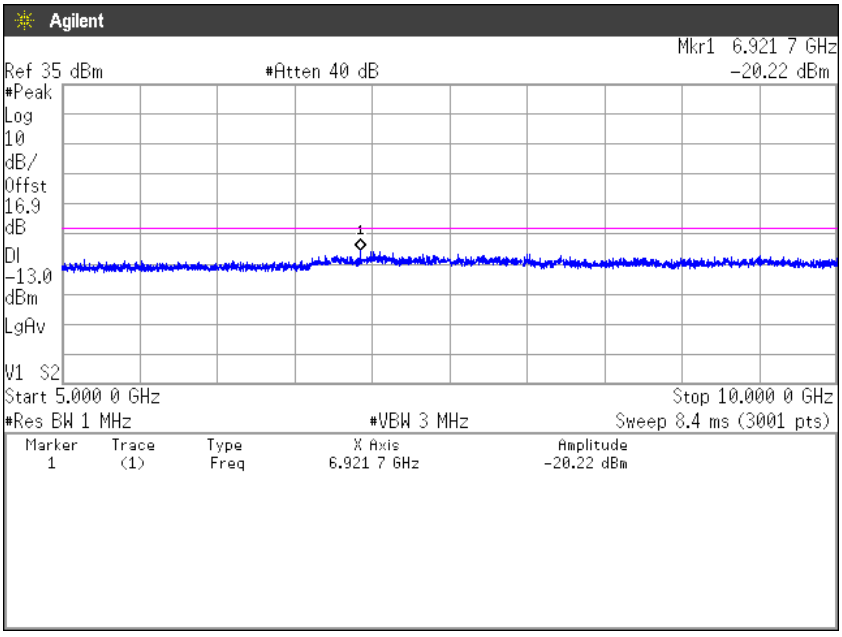
5GHz-10GHz



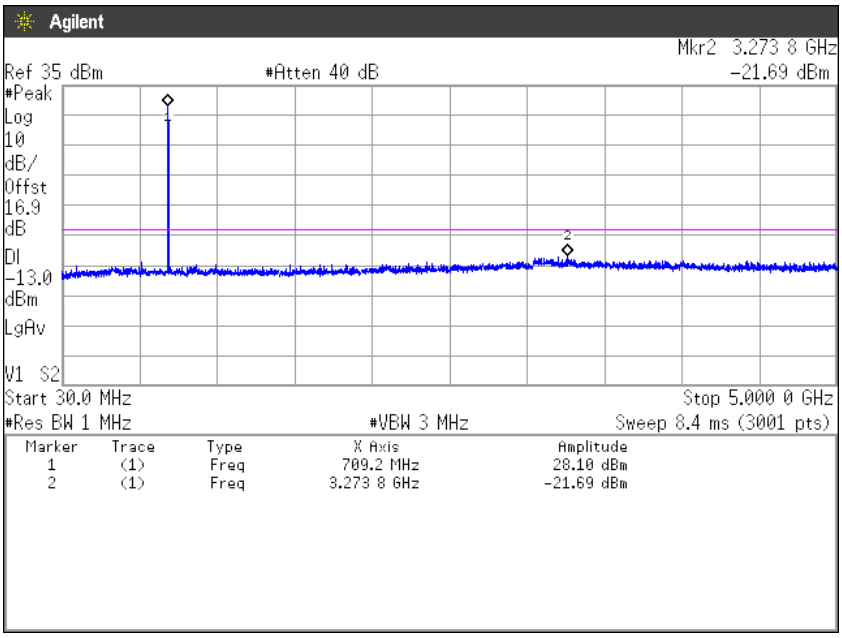
Channel: 23800
30MHz-5GHz



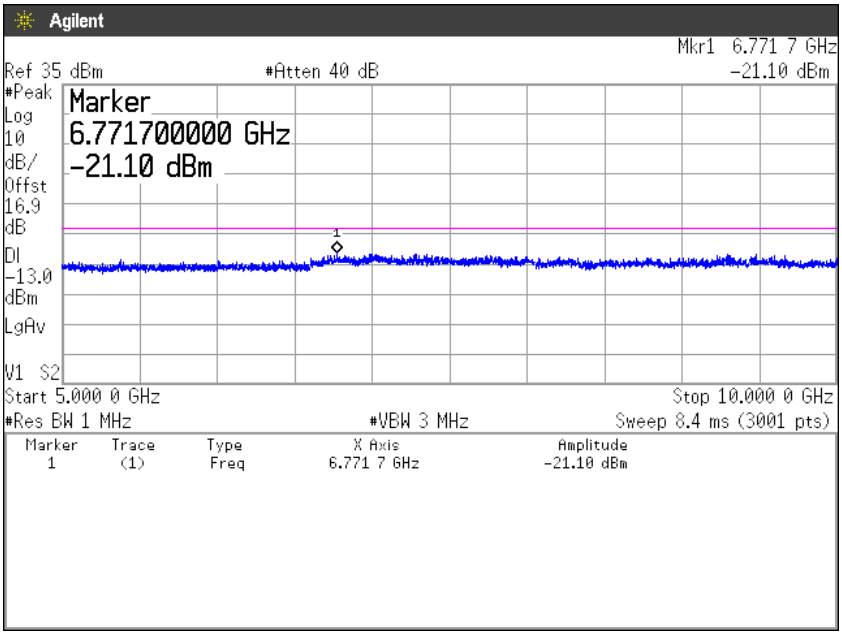
5GHz-10GHz



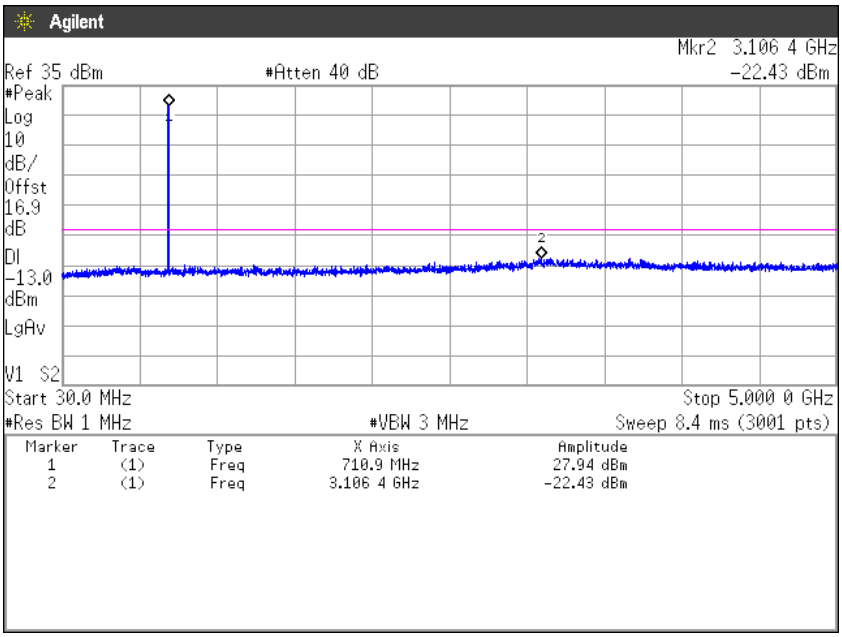
16QAM, BW 10MHz, RB1-25
Channel: 23780
30MHz-5GHz



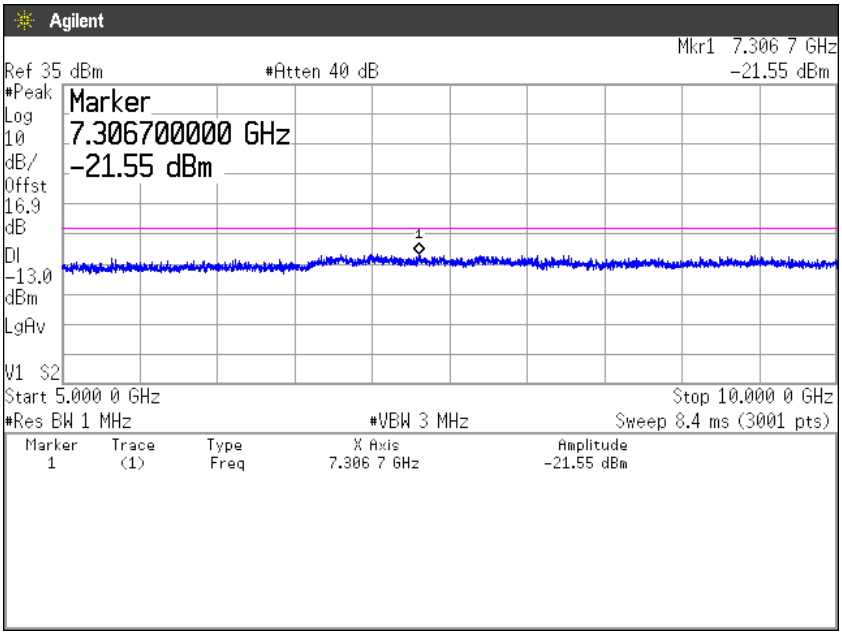
5GHz-10GHz



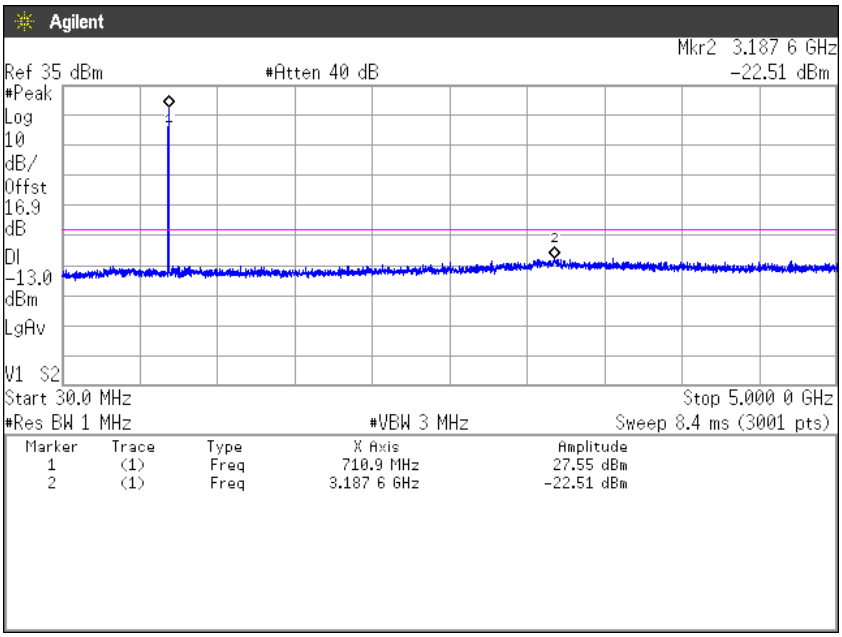
Channel: 23790
30MHz-5GHz



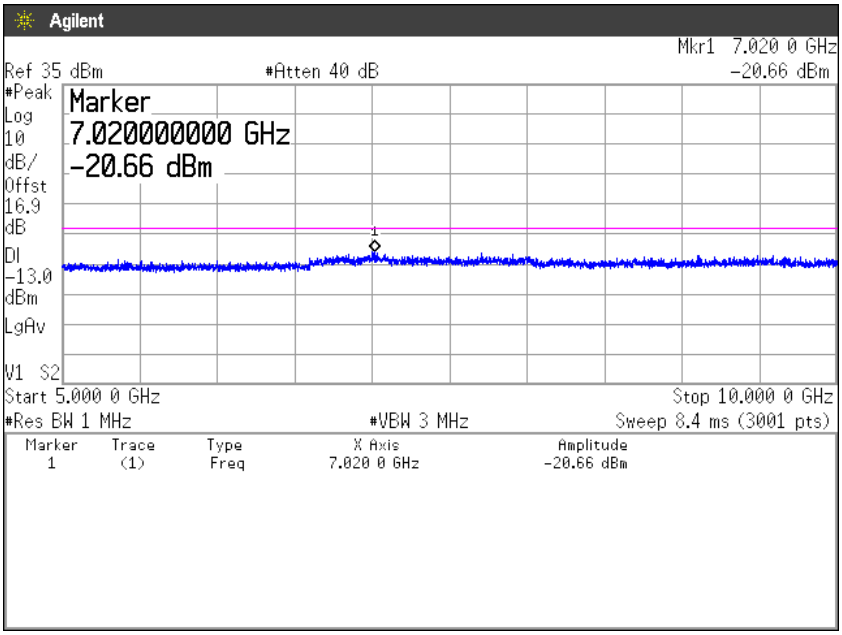
5GHz-10GHz



Channel: 23800
30MHz-5GHz



5GHz-10GHz



8. Radiated Emissions and Harmonic Emissions

8.1 Measurement procedure [FCC 27.53, 2.1053]

<Step 1>

The EUT and support equipment are placed on a 1 meter x 1 meter surface, 0.8 meter height 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 1MHz. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission. The frequency is investigated up to 20GHz.

<Step 2>

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

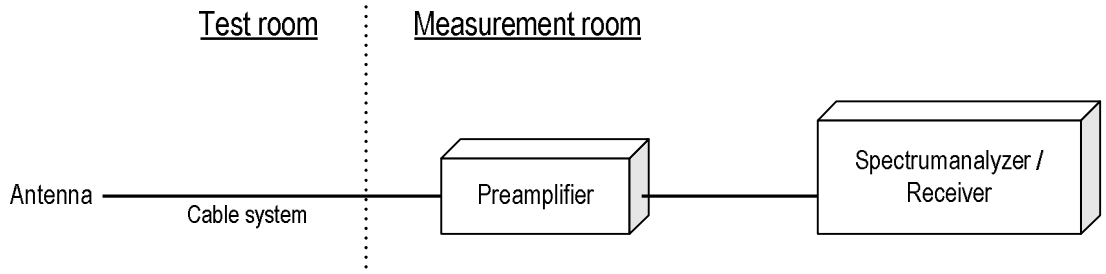
The frequency of the signal generator is adjusted to the measurement frequency.

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) RBW = 100kHz for below 1GHz and 1MHz for above 1GHz / VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple

- Test configuration



8.2 Calculation method

Result(EIRP) = S.G Reading - Cable loss + Antenna Gain
Margin = Limit – Result (EIRP)

Example:
Limit @ 1413MHz : -13.0dBm
S.G Reading = -55.6dBm Cable loss = 1.0dB Ant. Gain = 5.9dBd
Result = -55.6 - 1.0 + 5.9 = -50.7dBm
Margin = -13.0 - (-50.7) = 37.7dB

8.3 Limit

-13dBm or less

8.4 Test data

Date	:	September 7, 2017			
Temperature	:	22.8 [˚C]			
Humidity	:	68.7 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino
Date	:	September 11, 2017			
Temperature	:	23.9 [˚C]			
Humidity	:	67.6 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino
Date	:	September 12, 2017			
Temperature	:	23.4 [˚C]			
Humidity	:	66.4 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino
Date	:	September 19, 2017			
Temperature	:	22.8 [˚C]			
Humidity	:	54.0 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

[LTE Band X VII]
QPSK, BW 5MHz
Channel: 23755

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1413.0	-43.0	-41.1	1.0	10.1	-32.0	-13.0	19.0
V	1413.0	-52.0	-55.5	1.0	10.1	-46.4	-13.0	33.4

Channel: 23790

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1420.0	-39.0	-36.3	1.0	10.1	-27.2	-13.0	14.2
V	1420.0	-49.2	-50.3	1.0	10.1	-41.2	-13.0	28.2

Channel: 23825

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1427.0	-37.9	-35.1	1.0	10.1	-26.0	-13.0	13.0
V	1427.0	-47.9	-48.4	1.0	10.1	-39.3	-13.0	26.3

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16QAM, BW 5MHz
Channel: 23755

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1415.0	-42.2	-40.0	1.0	10.1	-30.9	-13.0	17.9
V	1415.0	-52.1	-56.0	1.0	10.1	-46.9	-13.0	33.9

Channel: 23790

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1420.0	-38.9	-36.3	1.0	10.1	-27.2	-13.0	14.2
V	1420.0	-49.2	-50.2	1.0	10.1	-41.1	-13.0	28.1

Channel: 23825

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1427.0	-38.1	-35.2	1.0	10.1	-26.1	-13.0	13.1
V	1427.0	-48.5	-49.2	1.0	10.1	-40.1	-13.0	27.1

QPSK, BW 10MHz
Channel: 23780

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1418.0	-39.3	-36.6	1.0	10.1	-27.5	-13.0	14.5
V	1418.0	-48.3	-48.6	1.0	10.1	-39.5	-13.0	26.5

Channel: 23790

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1420.0	-39.8	-37.2	1.0	10.1	-28.1	-13.0	15.1
V	1420.0	-48.1	-48.4	1.0	10.1	-39.3	-13.0	26.3

Channel: 23800

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1422.0	-39.5	-36.9	1.0	10.1	-27.8	-13.0	14.8
V	1422.0	-48.8	-49.8	1.0	10.1	-40.7	-13.0	27.7

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16QAM, BW 10MHz

Channel: 23780

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1418.0	-39.3	-36.6	1.0	10.1	-27.5	-13.0	14.5
V	1418.0	-48.3	-48.6	1.0	10.1	-39.5	-13.0	26.5

Channel: 23790

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1420.0	-39.8	-37.2	1.0	10.1	-28.1	-13.0	15.1
V	1420.0	-48.1	-48.2	1.0	10.1	-39.1	-13.0	26.1

Channel: 23800

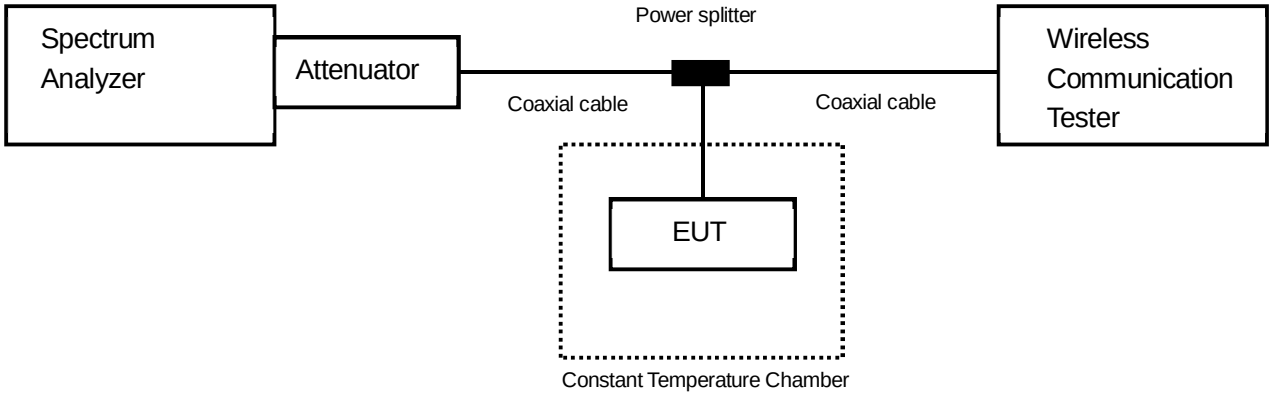
H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1422.0	-39.5	-36.8	1.0	10.1	-27.7	-13.0	14.7
V	1422.0	-48.8	-49.6	1.0	10.1	-40.5	-13.0	27.5

9. Frequency Stability

9.1 Measurement procedure [FCC 27.54, 2.1055]

The EUT was placed of an inside of an constant temperature chamber as the temperature in the chamber was varied between -30˚C and +50˚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



9.2 Limit

±2.5ppm

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9.3 Measurement result

Date	:	September 6, 2017		
Temperature	:	23.4 [˚C]		
Humidity	:	63.7 [%]	Test engineer	:
Test place	:	Shielded room No.4		Chiaki Kanno

[LTE Band X VII]

(Channel: 23790)

Limit: ±0.00025% = ±2.5ppm					
Power Supply [V]	**Temperature [ºC]**	**Measurements Frequency [Hz]**	**Frequency Tolerance [ppm]**	**Limit [ppm]**	**Result**
3.80	25(Ref.)	709,999,997	0.00000	±2.5	Pass
	50	709,999,996	-0.00159	±2.5	Pass
	40	709,999,997	-0.00113	±2.5	Pass
	30	709,999,997	-0.00059	±2.5	Pass
	20	710,000,003	0.00723	±2.5	Pass
	10	710,000,003	0.00825	±2.5	Pass
	0	710,000,004	0.00906	±2.5	Pass
	-10	710,000,003	0.00772	±2.5	Pass
	-20	710,000,003	0.00721	±2.5	Pass
	-30	709,999,997	-0.00083	±2.5	Pass
3.42	25	709,999,996	-0.00177	±2.5	Pass
4.18	25	709,999,997	-0.00046	±2.5	Pass

Calculation;

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

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10. Uncertainty of measurement

Expanded uncertainties stated are calculated with a coverage Factor k=2.
Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission, AMN (9kHz – 150kHz)	±3.8dB
Conducted emission, AMN (150kHz – 30MHz)	±3.3dB
Radiated emission (9kHz – 30MHz)	±3.0dB
Radiated emission (30MHz – 1000MHz)	±4.7dB
Radiated emission (1GHz – 6GHz)	±4.9dB
Radiated emission (6GHz – 26GHz)	±5.2dB

11. Laboratory Information

1. Location

Name: Yonezawa Testing Center
Address: 5-4149-7, Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan
Phone: +81-238-28-2881
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2. Accreditation and Registration

1) NVLAP
LAB CODE: 200306-0

2) VLAC
Accreditation No.: VLAC-013

3) BSMI
Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

4) Industry Canada

Site number	Facility	Expiration date
4224A-4	3m Semi-anechoic chamber	2017-12-03
4224A-5	10m Semi-anechoic chamber No.1	2017-12-03
4224A-6	10m Semi-anechoic chamber No.2	2019-12-14

5) VCCI Council

Registration number	Expiration date
A-0166	2019-07-03

Appendix A. Test equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	Jun. 30, 2018	Jun. 28, 2017
Attenuator	Weinschel	56-10	J4993	Nov. 30, 2017	Nov. 1, 2016
Microwave cable	HUBER+SUHNER	SUCOFLEX102	MY3385/2	Feb. 28, 2018	Feb. 2, 2017
Power divider	ANRITSU	K240B	1301239	Jul. 31, 2018	Jul. 21, 2017
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	1201.0002K50-126079-rh	Oct. 31, 2017	Oct. 7, 2016
Temperature and humidity chamber	ESPEC	PL1KP	14007261	Jan. 31, 2018	Jan. 20, 2017

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Sep. 30, 2017	Sep. 8, 2016
				Sep. 30, 2018	Sep. 13, 2017
Spectrum analyzer	Agilent Technologies	E4447A	MY46180188	Mar. 31, 2018	Mar. 15, 2017
Preamplifier	ANRITSU	MH648A	M96057	Feb. 28, 2018	Feb. 1, 2017
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2155	Jul. 31, 2018	Jul. 18, 2017
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	Jul. 31, 2018	Jul. 18, 2017
Attenuator	TME	CFA-01NPJ-6	N/A(S275)	Feb. 28, 2018	Feb. 3, 2017
Attenuator	TME	CFA-01NPJ-3	N/A(S272)	Feb. 28, 2018	Feb. 2, 2017
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	Feb. 28, 2018	Feb. 3, 2017
Attenuator	AEROFLEX	26A-10	081217-08	May 31, 2018	May 24, 2017
Double ridged guide antenna	ETS LINDGREN	3117	00052315	Feb. 28, 2018	Feb. 23, 2017
Attenuator	Agilent Technologies	8491B	MY39268633	Feb. 28, 2018	Feb. 2, 2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170189	Jun. 30, 2018	Jun. 7, 2017
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	Aug. 31, 2018	Aug. 8, 2017
Preamplifier	TSJ	MLA-1840-B03-35	1240332	Aug. 31, 2018	Aug. 8, 2017
Notch Filter	Micro-Tronics	BRM50706	003	Jul. 31, 2018	Jul. 20, 2017
High Pass Filter	Micro-Tronics	HPM50115	004	Jul. 31, 2018	Jul. 20, 2017
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	Jun. 30, 2018	Jun. 12, 2017
RF power amplifier	R&K	CGA020M602-2633R	B40240	May 31, 2018	May 26, 2017
Microwave cable	HUBER+SUHNER	SUCOFELX102/2m	31648	Mar. 31, 2018	Mar. 13, 2017
Dipole antenna	Schwarzbeck	VHAP	1020	Oct. 31, 2017	Oct. 27, 2016
Dipole antenna	Schwarzbeck	UHAP	994	Oct. 31, 2017	Oct. 26, 2016
Double ridged guide antenna	EMCO	3115	00058532	Dec. 31, 2017	Dec. 6, 2016
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	1201.0002K50-126079-rh	Oct. 31, 2017	Oct. 7, 2016
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	MY30037/4	Feb. 28, 2018	Feb. 3, 2017
		SUCOFLEX104/1m	my24610/4	Feb. 28, 2018	Feb. 3, 2017
		SUCOFLEX104/8m	SN MY30031/4	Feb. 28, 2018	Feb. 2, 2017
		SUCOFLEX104	MY32976/4	Dec. 31, 2017	Dec. 2, 2016
		SUCOFLEX104/1.5m	MY19309/4	Feb. 28, 2018	Feb. 3, 2017
		SUCOFLEX104/7m	41625/6	Feb. 28, 2018	Feb. 3, 2017
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.6.0	N/A	N/A
Absorber	RIKEN	PFP30	N/A	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-NSA)	May 31, 2018	May 30, 2017
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	May 31, 2018	May 31, 2017

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