Zacta

TEST REPORT

Report number : Z101C-15105

Issue date : October 29, 2015

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

FCC Part 27 Subpart C

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

Applicant	:	KYOCERA Corporation
Equipment under test (EUT)	:	Mobile Phone
Model number	:	KA85
FCC ID	:	JOYKA85

Date of test	:	September 24, 25, 30, 2015 October 1, 7, 8, 9, 2015
Test place	:	TÜV SÜD Zacta Ltd. Yonezawa Testing Center 4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan Phone: +81-238-28-2880 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, or any agency of the federal government.

Tested by : Taiki Watanabe, Tadahiro Seino

Tested by : Hikaru Shibata, Kazunori Saito

Authorized by : Eiji Akiba
Deputy General Manager of EMC Technical Department

NVLAP LAB CODE 200306-0

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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.

1.2 Standards

CFR47 FCC Part 27 Subpart C

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
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

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	:	KA85
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	Battery: DC 3.8V
Size	:	(W) 71.0 × (D) 10.1 × (H) 141.4 mm
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: 4M54G7D, 16QAM: 4M53W7D BW 10M QPSK: 9M03G7D, 16QAM: 9M04W7D
Output power	:	QPSK: 0.216W (23.34dBm) 16QAM: 0.210W (23.22dBm)
Antenna type	:	Internal antenna
Antenna gain	:	-3.0 dBi

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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	23775 23790 23825	706.5 710.0 713.5
		10MHz	23780 23790 23800	709.0 710.0 711.0
	16QAM	5MHz	23775 23790 23825	706.5 710.0 713.5
		10MHz	23780 23790 23800	709.0 710.0 711.0

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.

3. Configuration of equipment

3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Mobile Phone	KYOCERA	KA85	N/A	JOYKA85	EUT

3.2 System configuration

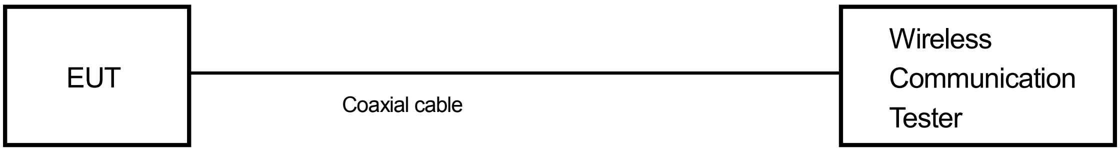
Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “3.1 Equipment(s) used”.

4. Conducted Output Power

4.1 Measurement procedure
[FCC 2.1046]

The conducted output power was measured with a wireless communication tester connected to the antenna terminal. The wireless communication tester parameters were set to produce the maximum power from the EUT.

- Test configuration



4.2 Measurement result

Date : September 24, 2015
Temperature : 20.3 [˚C]
Humidity : 41.4 [%]
Test place : Shielded room No.4

Test engineer : Tadahiro Seino

Band	BW [MHz]	Mode	RB Allocation	RB offset	Target MPR	Avg Power[dBm]		
						23755	23790	23825
						706.5 MHz	710.0 MHz	713.5 MHz
LTE Band 17	5	QPSK	1	0	0	23.20	22.90	23.27
			1	12	0	**23.33**	22.86	23.31
			1	24	0	23.02	22.94	23.05
			12	0	1	22.22	22.11	22.22
			12	7	1	22.23	22.15	22.18
			12	13	1	22.17	22.27	22.23
			25	0	1	22.20	22.16	22.20
		16QAM	1	0	1	**23.01**	21.76	21.89
			1	12	1	22.76	22.02	22.40
			1	24	1	22.92	21.98	22.27
			12	0	2	21.29	20.91	21.25
			12	7	2	21.19	21.04	21.15
			12	13	2	21.05	21.15	20.99
			25	0	2	21.08	21.21	21.20

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Date : September 25, 2015
Temperature : 20.3 [˚C]
Humidity : 41.4 [%]
Test place : Shielded room No.4

Test engineer : Tadahito Seino

Band	BW [MHz]	Mode	RB Allocation	RB offset	Target MPR	Avg Power[dBm] 23780 709.0 MHz	23790 710.0 MHz	23800 711.0 MHz
LTE Band 17	10	QPSK	1	0	0	23.16	23.25	**23.34**
			1	25	0	23.16	23.27	23.27
			1	49	0	23.24	23.30	23.13
			25	0	1	22.35	22.25	22.19
			25	12	1	22.22	22.33	22.25
			25	25	1	22.17	22.23	22.22
			50	0	1	22.16	22.19	22.13
		16QAM	1	0	1	22.70	22.80	22.09
			1	25	1	22.61	23.05	22.09
			1	49	1	22.58	**23.22**	21.85
			25	0	2	21.30	21.11	21.16
			25	12	2	21.21	21.22	21.30
			25	25	2	21.20	21.16	21.24
			50	0	2	21.32	21.06	21.06

5. Effective Radiated Power

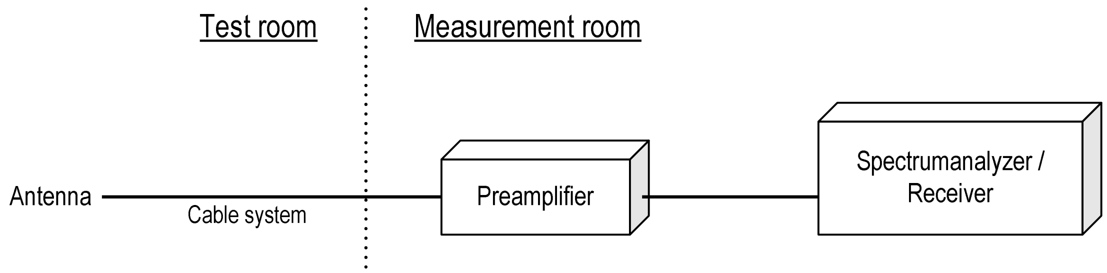
5.1 Measurement procedure
[FCC 27.50]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1.5 meter surface, 0.8 meter height FRP 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 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



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5.2 Calculation method

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

5.3 Limit

3 W (34.7dBm)

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5.4 Test data

Date	:	September 30, 2015		
Temperature	:	23.3 [˚C]		
Humidity	:	30.9 [%]	Test engineer	:
Test place	:	3m Semi-anechoic chamber		Taiki Watanabe

Date	:	October 8, 2015		
Temperature	:	23.4 [˚C]		
Humidity	:	31.2 [%]	Test engineer	:
Test place	:	3m Semi-anechoic chamber		Kazunori Saito

[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	704.4	-17.1	27.0	0.7	-10.0	16.3	34.7	18.4
H	707.8	-16.7	27.0	0.7	-10.0	16.3	34.7	18.4
H	711.4	-16.8	24.0	0.7	-10.1	13.2	34.7	21.5

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	704.4	-18.2	25.9	0.7	-10.0	15.2	34.7	19.5
H	707.8	-18.1	25.6	0.7	-10.0	14.9	34.7	19.8
H	711.4	-18.0	22.8	0.7	-10.1	12.0	34.7	22.7

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	713.4	-17.3	23.5	0.7	-10.1	12.7	34.7	22.0
H	714.4	-16.9	24.0	0.7	-10.1	13.2	34.7	21.5
H	715.4	-17.3	22.8	0.7	-10.1	12.0	34.7	22.7

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	713.4	-15.8	25.0	0.7	-10.1	14.2	34.7	20.5
H	714.4	-15.9	25.0	0.7	-10.1	14.2	34.7	20.5
H	715.4	-16.1	24.0	0.7	-10.1	13.2	34.7	21.5

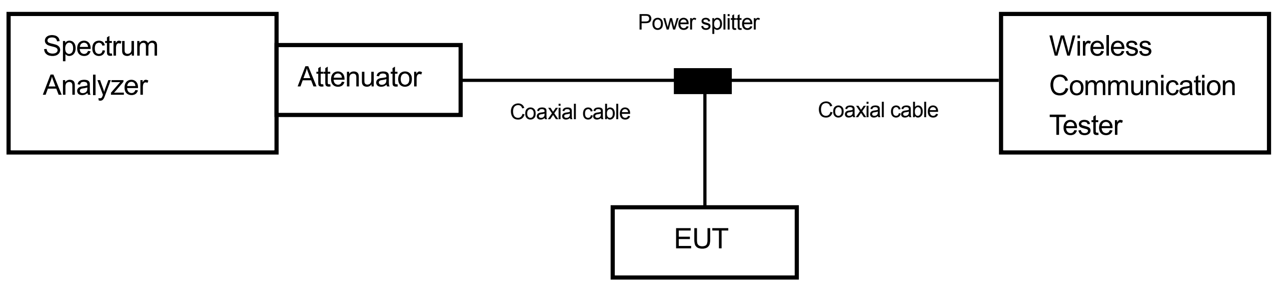
6. Peak to Average Ratio

6.1 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



6.2 Limit

13dB or less

6.3 Measurement result

Date : October 8, 2015
Temperature : 21.7 [˚C]
Humidity : 48.3 [%]
Test place : Shielded room No.4

Test engineer : Hikaru Shibata

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	5.29	13
				10	50-0	6.26	13
			16QAM	5	25-0	4.68	13
				10	50-0	6.38	13

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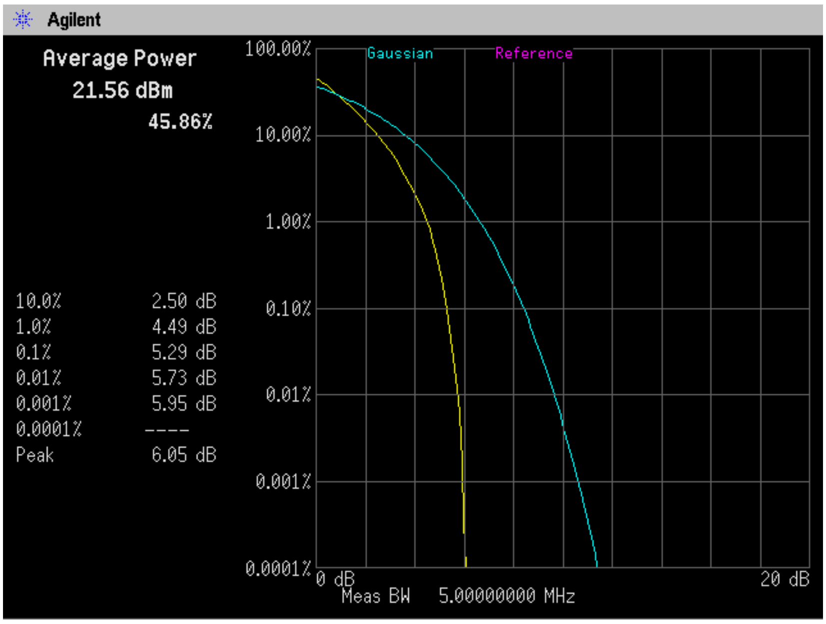
6.4 Trace data

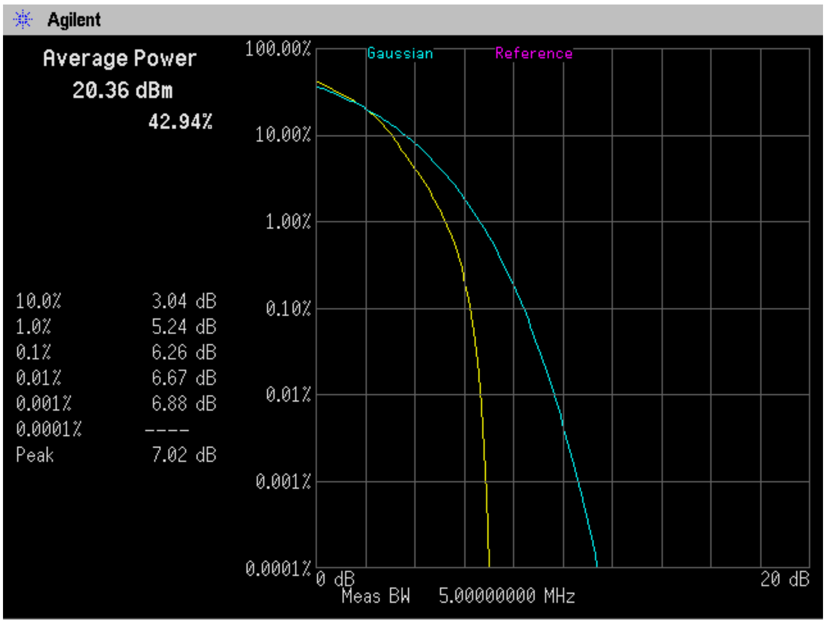
[LTE Band X VII]

Channel: 23790

QPSK, BW 5MHz, RB25-0



QPSK, BW 10MHz, RB50-0



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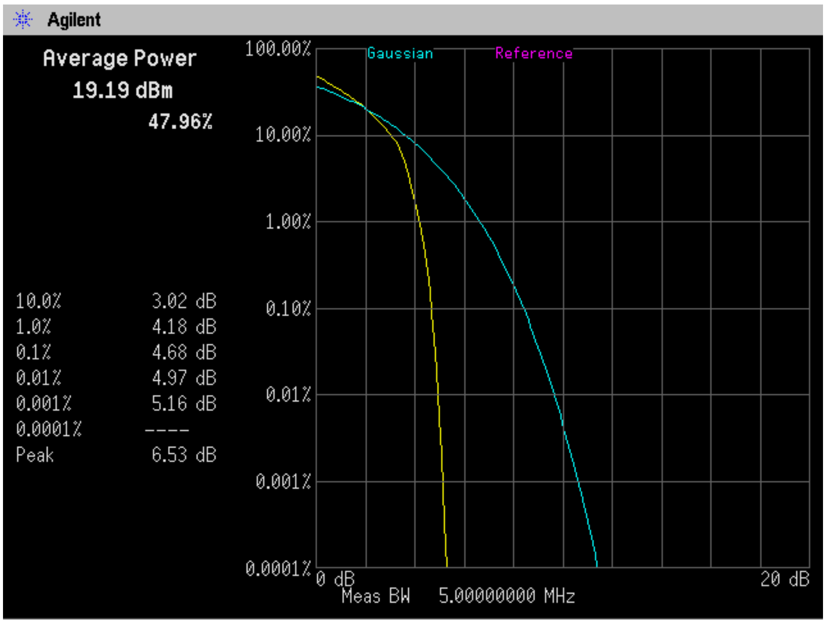
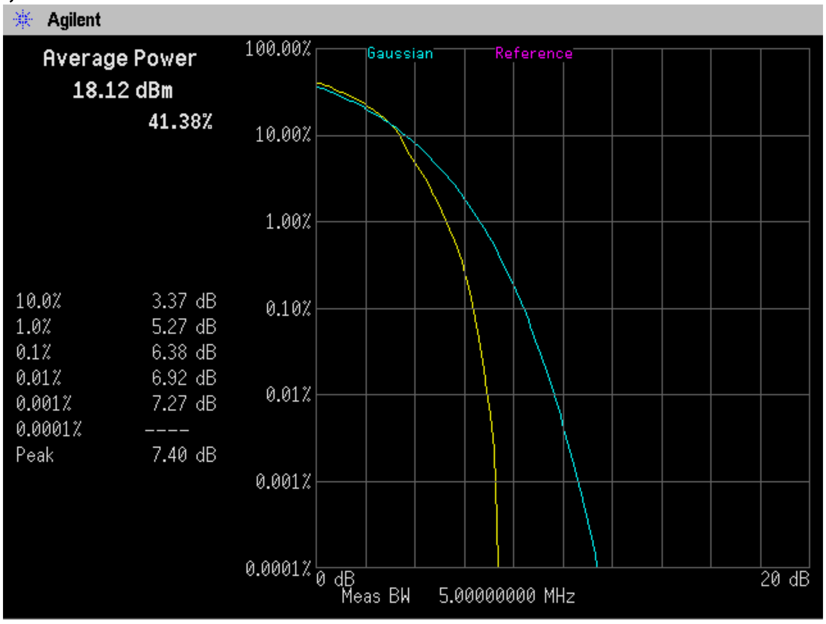
16QAM, BW 5MHz, RB25-0



16QAM, BW 10MHz, RB50-0



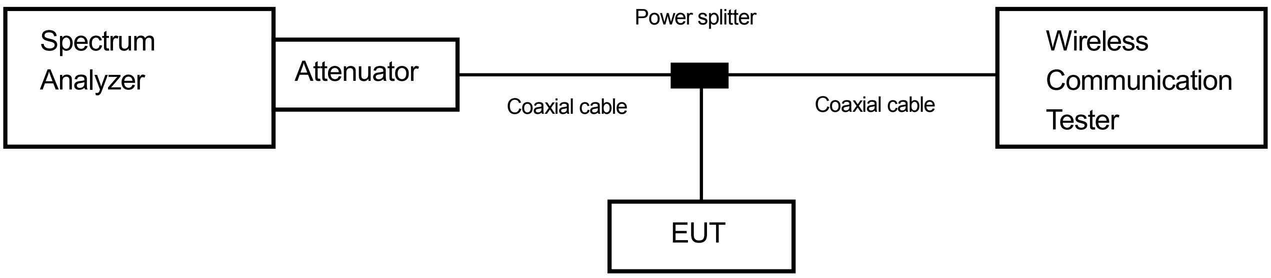
7. Occupied Bandwidth

7.1 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



7.2 Limit

None

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7.3 Measurement result

Date : October 8, 2015
Temperature : 21.7 [˚C]
Humidity : 48.3 [%] Test engineer :
Test place : Shielded room No.4 Hikaru Shibata

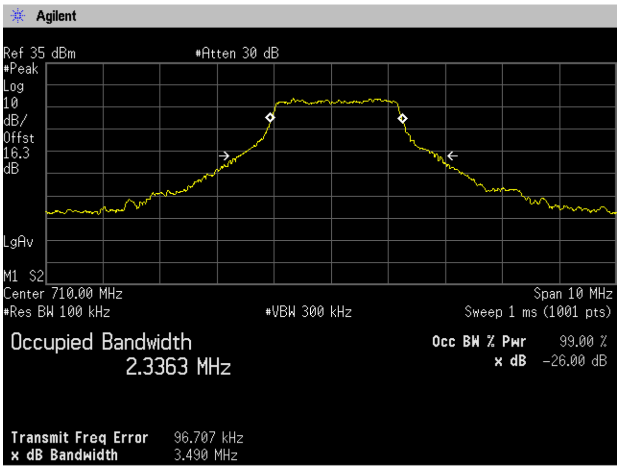
BW	Mode	UL RB Allocation	UL RB Start	Frequency [MHz]	26dB Bandwidth [MHz]	99% OBW [MHz]
5MHz	QPSK	12	7	710.0	3.490	2.3363
		25	0		4.987	4.5367
5MHz	16QAM	12	7	710.0	3.492	2.3637
		25	0		5.030	4.5343
10MHz	QPSK	25	12	710.0	5.933	4.6827
		50	0		10.061	9.0316
10MHz	16QAM	25	12	710.0	6.691	4.6965
		50	0		10.052	9.0367

7.4 Trace data

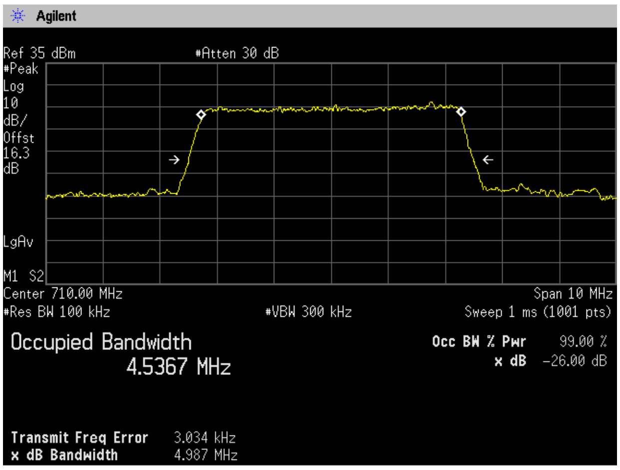
[LTE Band X VII]

Channel: 23790

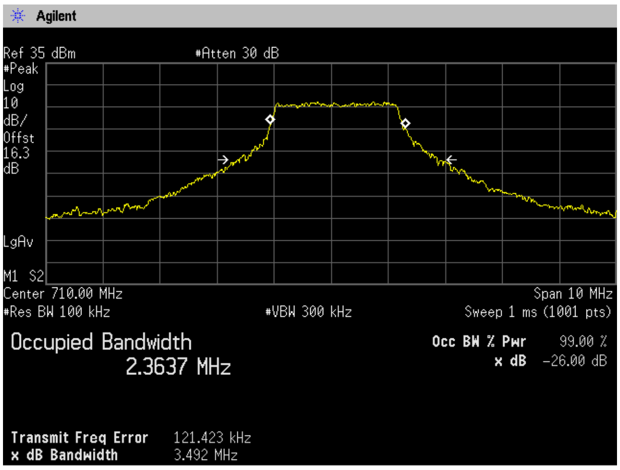
RB12-7



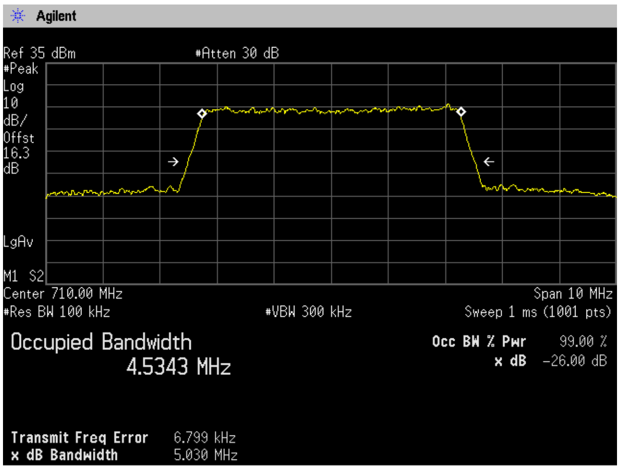
RB25-0



RB12-7



RB25-0



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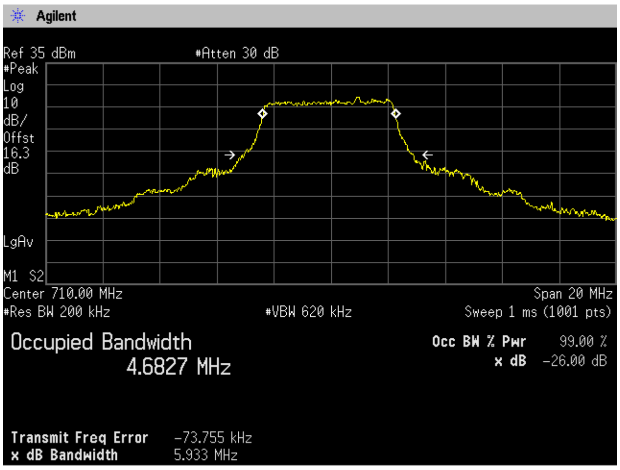
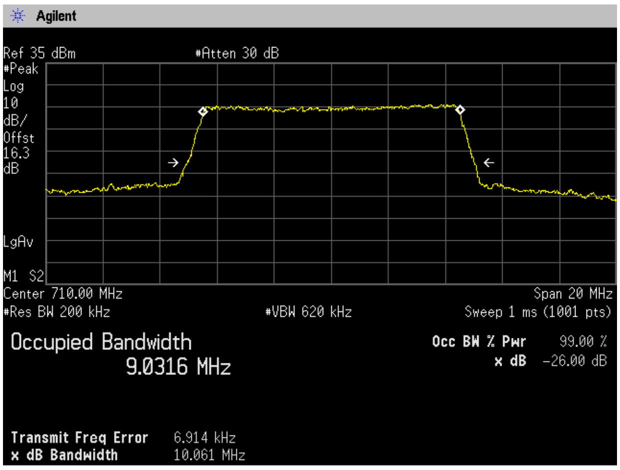
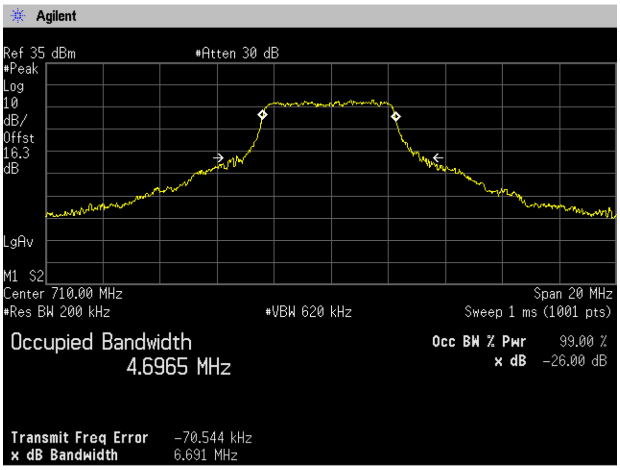
RB25-12



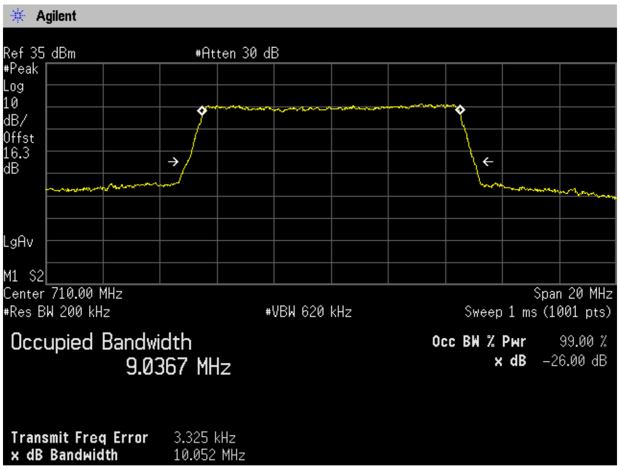
RB50-0



RB25-12



RB50-0



8. Band Edge Spurious and Harmonic at Antenna Terminals

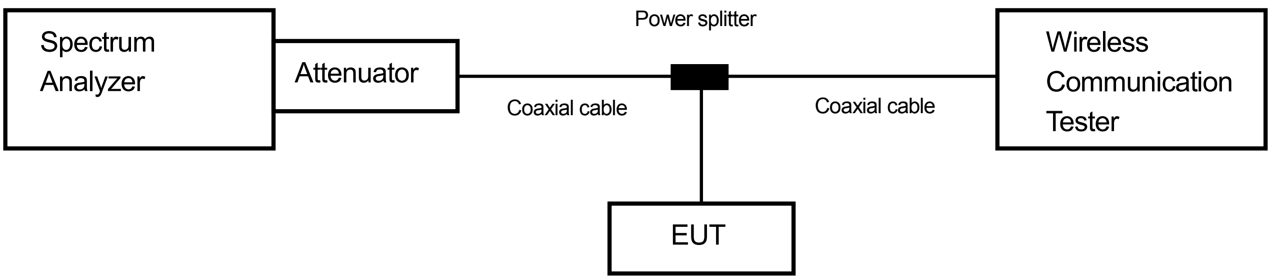
8.1 Measurement procedure
[FCC 27.53, 2.1051]

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



8.2 Limit

-13dBm or less

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8.3 Measurement result

Date	: October 9, 2015		
Temperature	: 22.3 [˚C]		
Humidity	: 46.2 [%]	Test engineer	:
Test place	: Shielded room No.4		Hikaru Shibata

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

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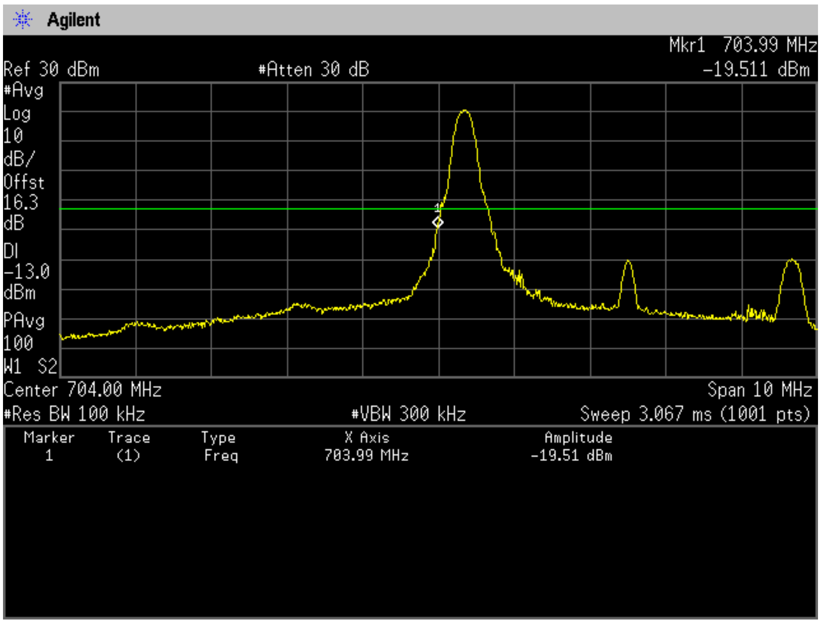
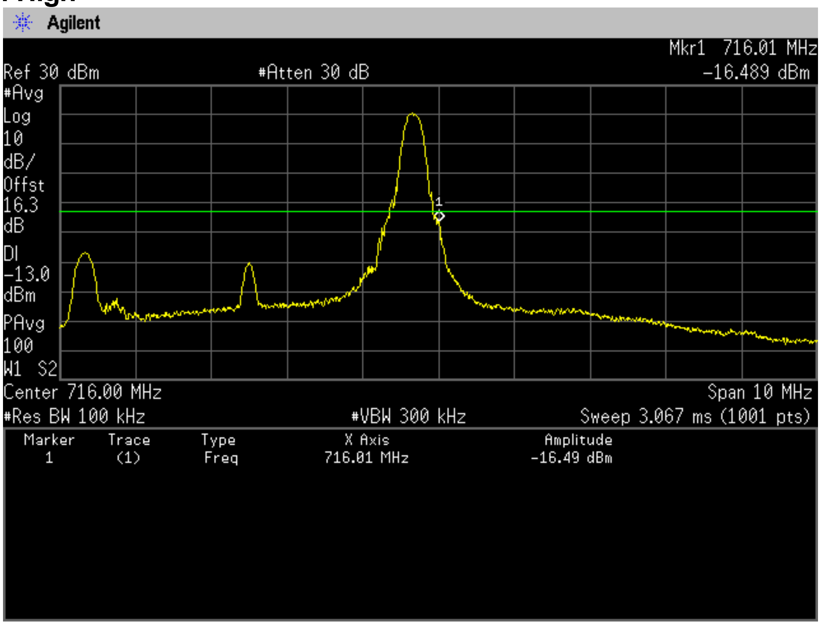
8.4 Trace data
[LTE Band X VII]
(Band Edge)
QPSK, BW 5MHz, RB1-0
Channel: Low



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



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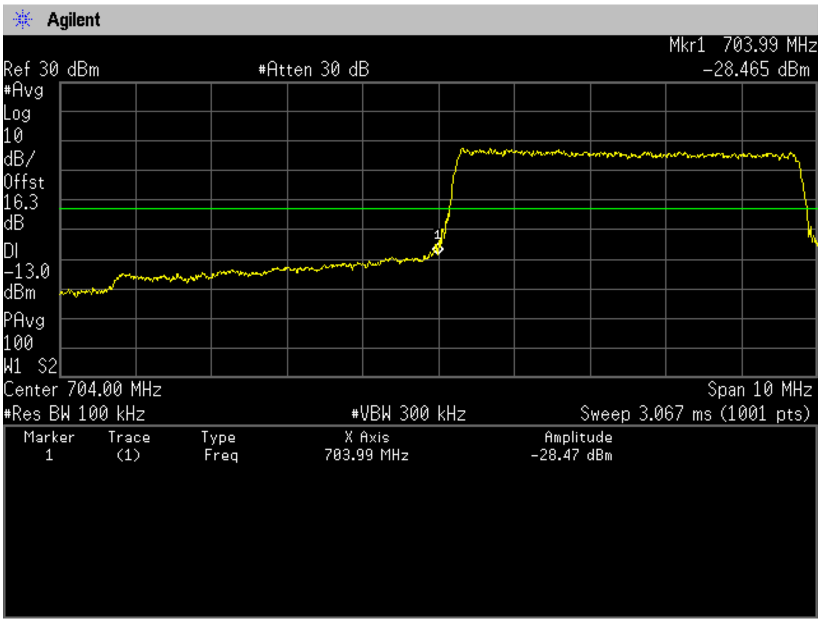
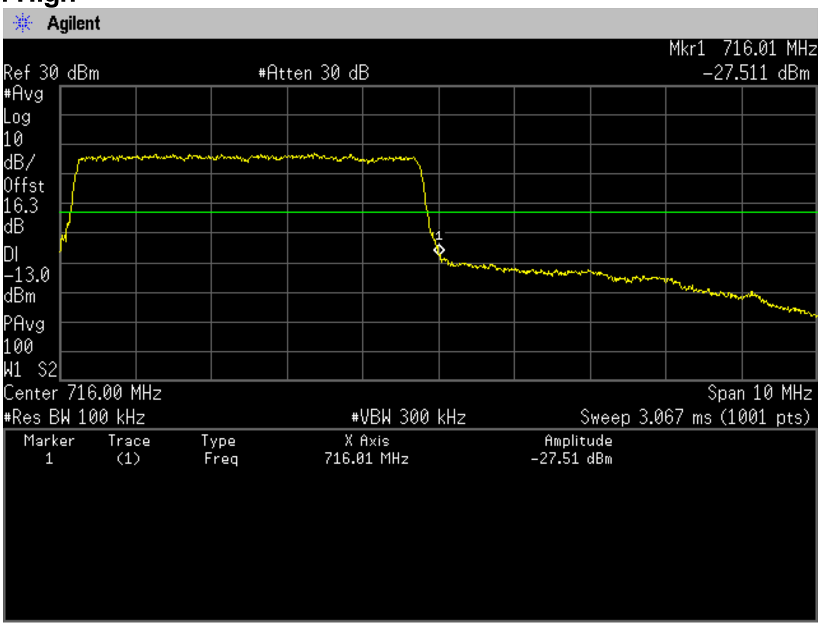
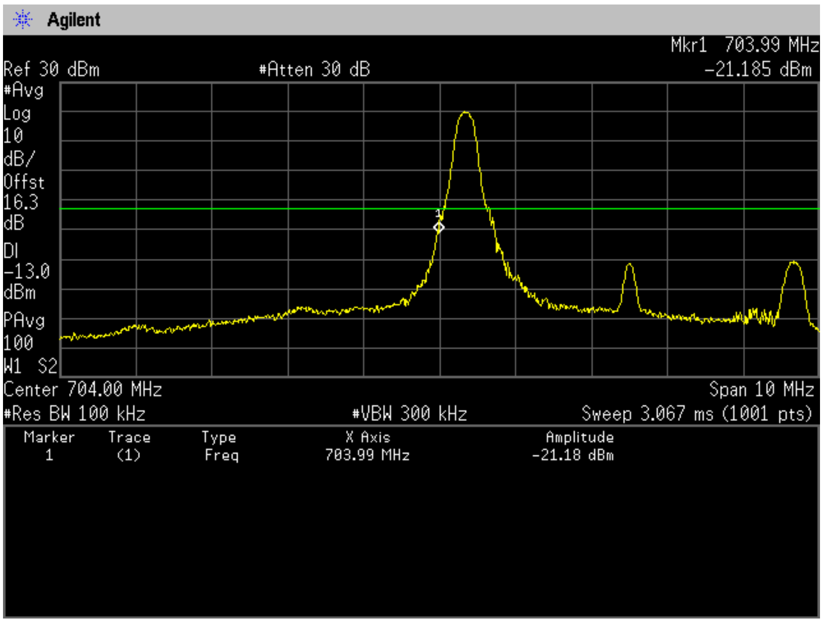
QPSK, BW 5MHz, RB25-0
Channel: Low



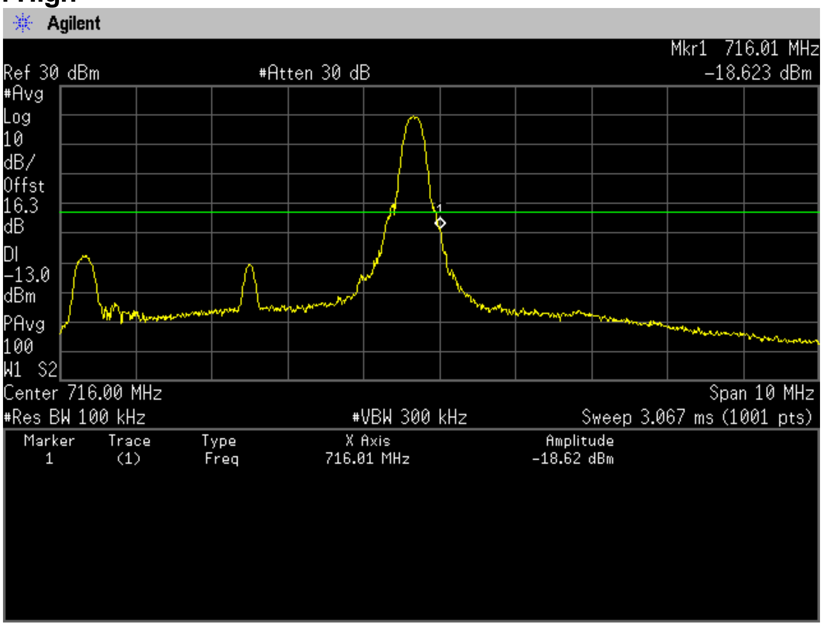
QPSK, BW 5MHz, RB25-0
Channel: High



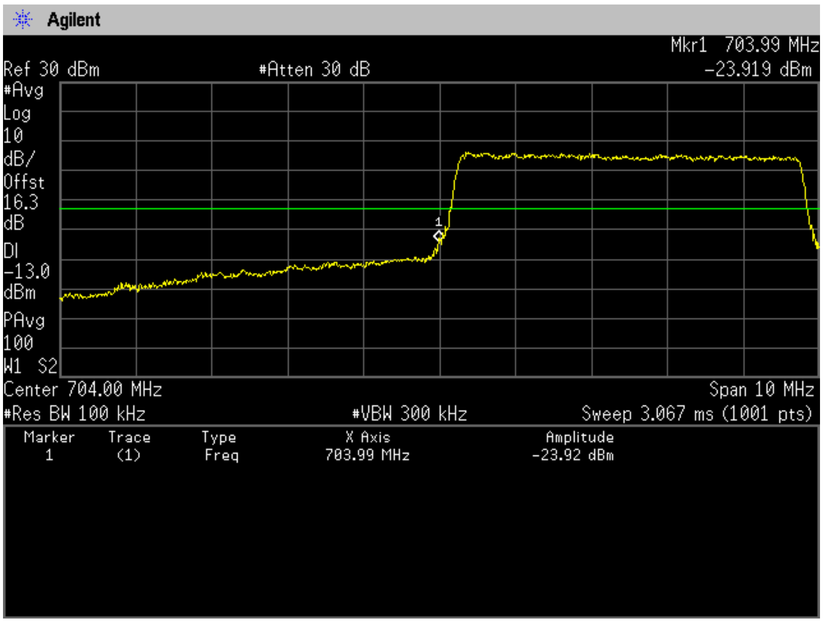
16QAM, BW 5MHz, RB1-0
Channel: Low



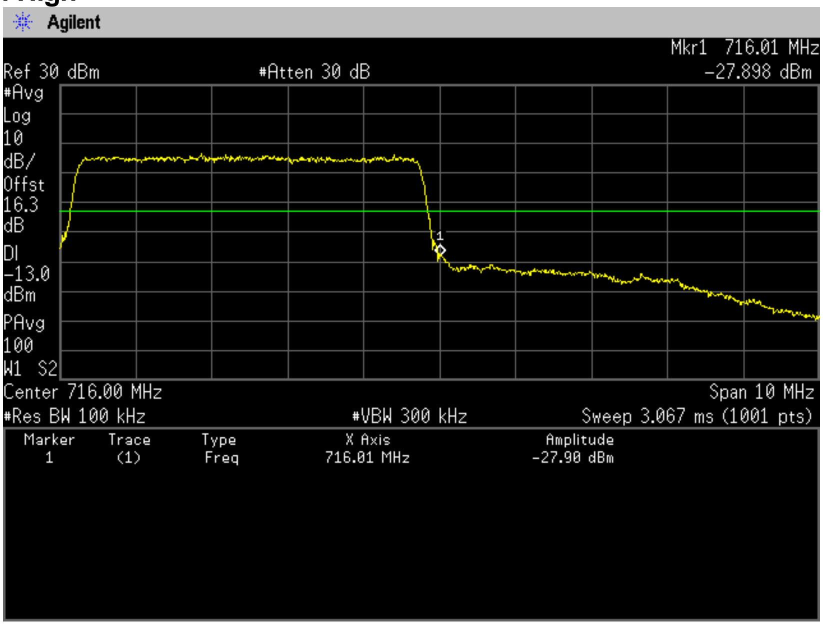
16QAM, BW 5MHz, RB1-24
Channel: High



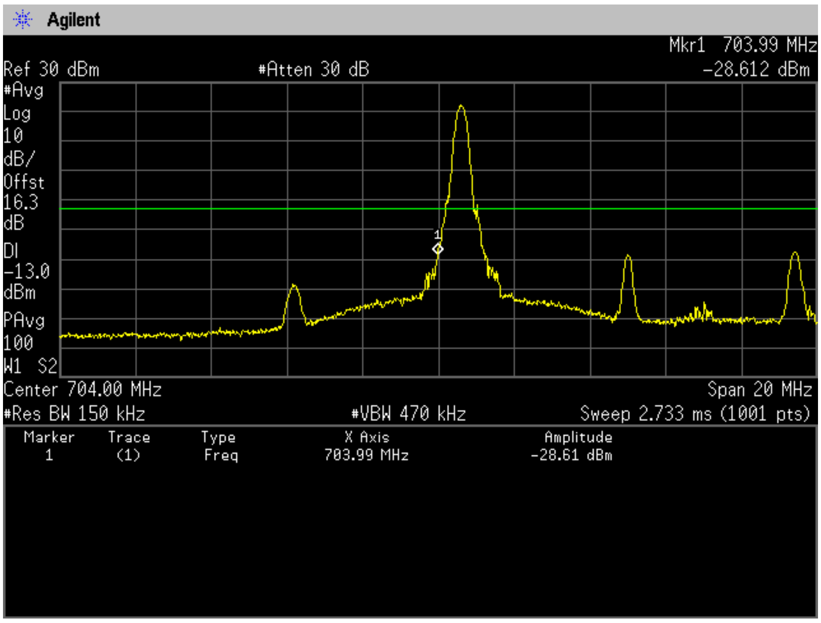
16QAM, BW 5MHz, RB25-0
Channel: Low



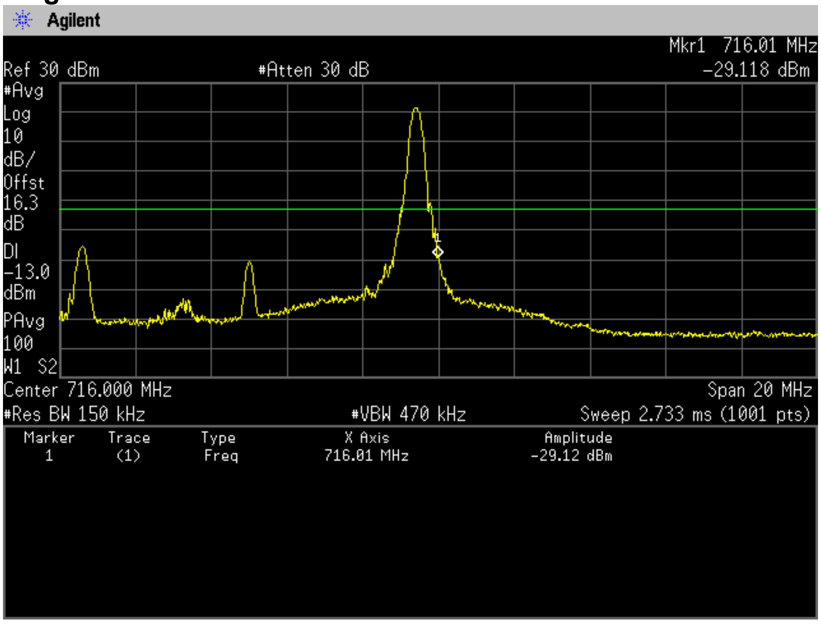
16QAM, BW 5MHz, RB25-0
Channel: High



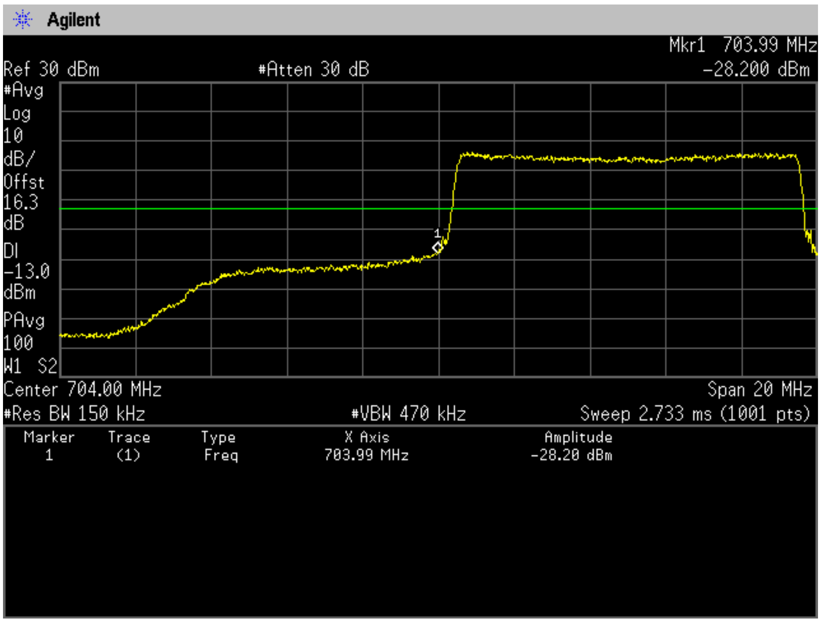
QPSK, BW 10MHz, RB1-0
Channel: Low



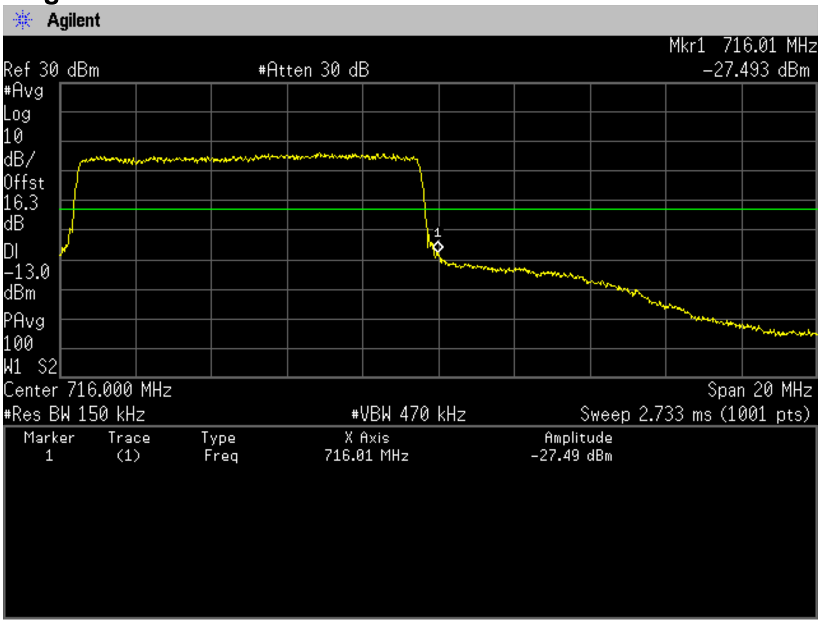
QPSK, BW 10MHz, RB1-49
Channel: High



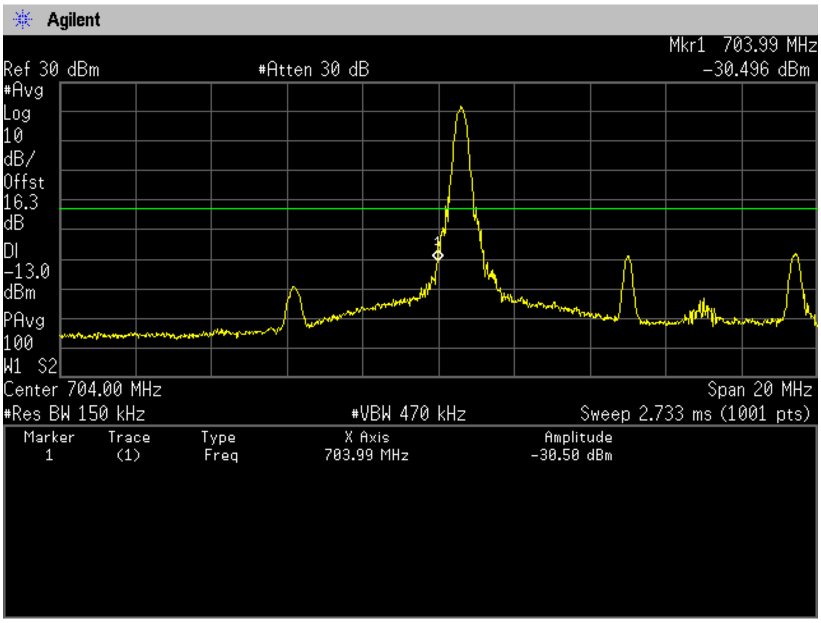
QPSK, BW 10MHz, RB50-0
Channel: Low



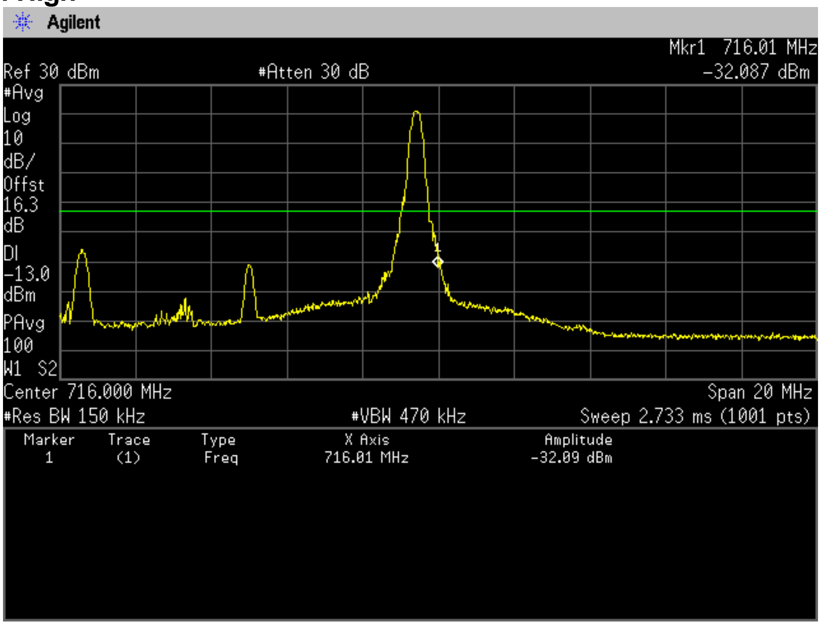
QPSK, BW 10MHz, RB50-0
Channel: High



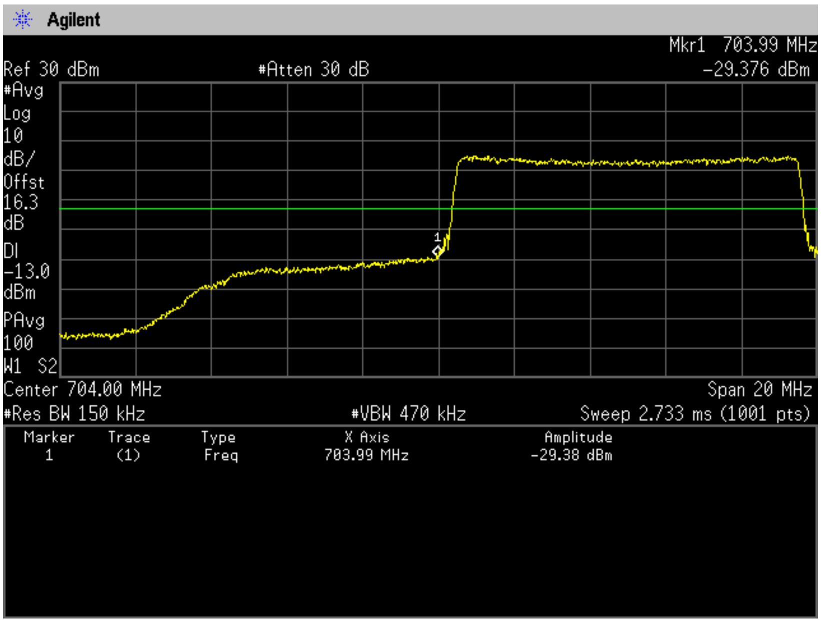
16QAM, BW 10MHz, RB1-0
Channel: Low



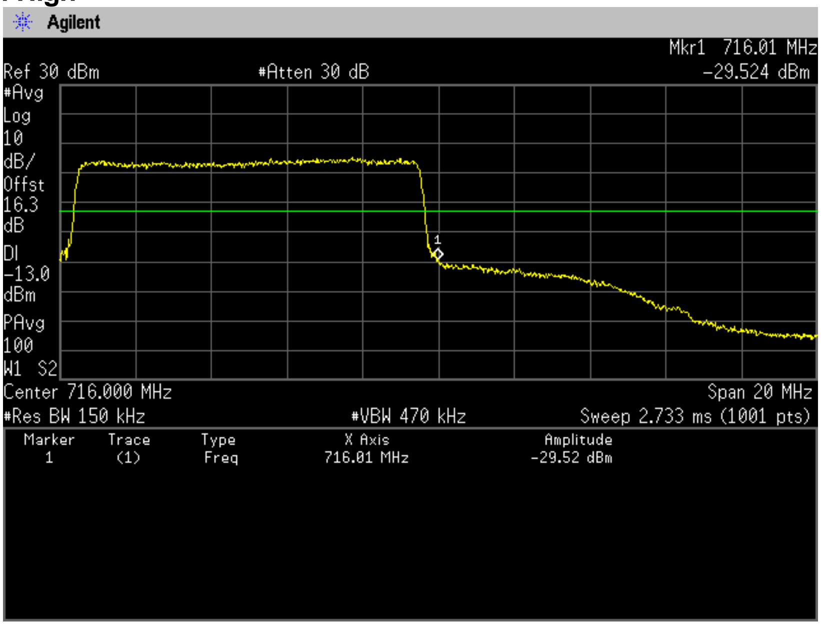
16QAM, BW 10MHz, RB1-49
Channel: High



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

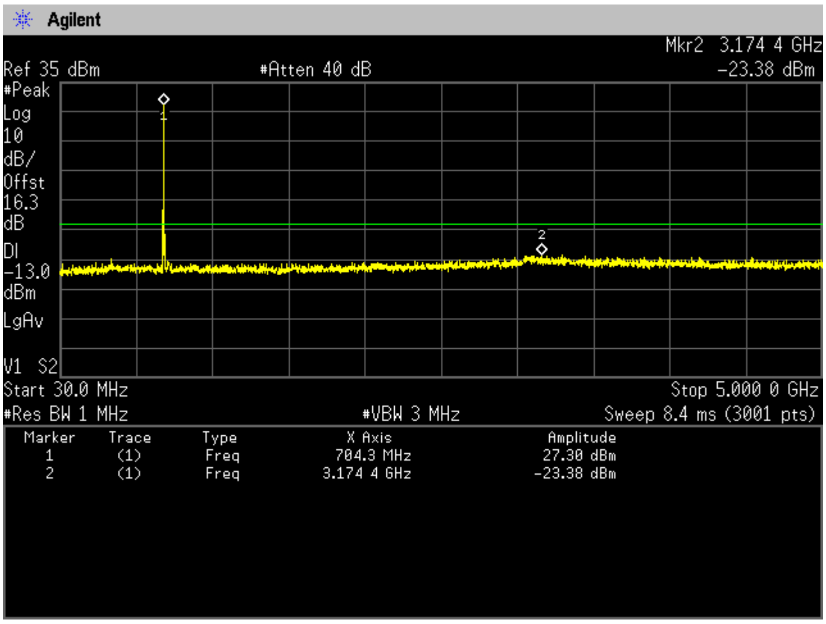


16QAM, BW 10MHz, RB50-0
Channel: High

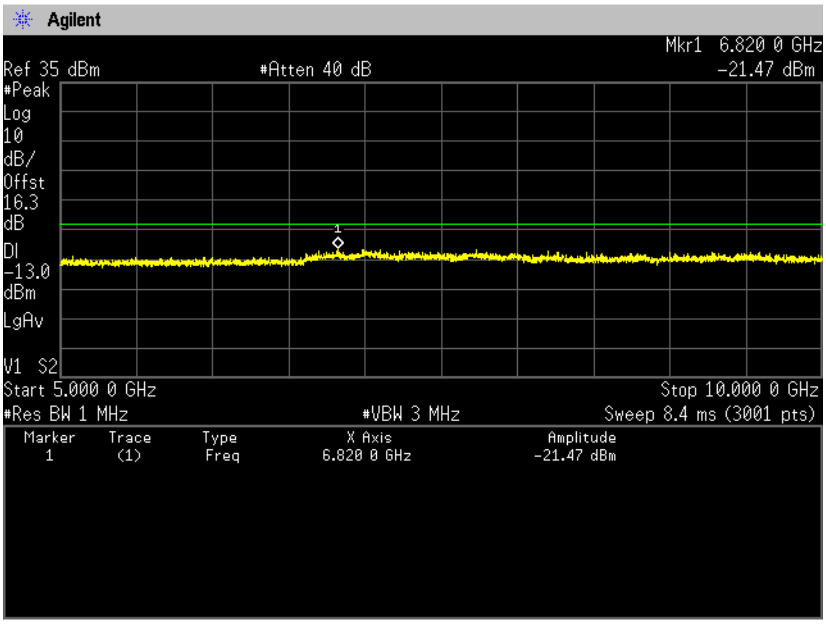


(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

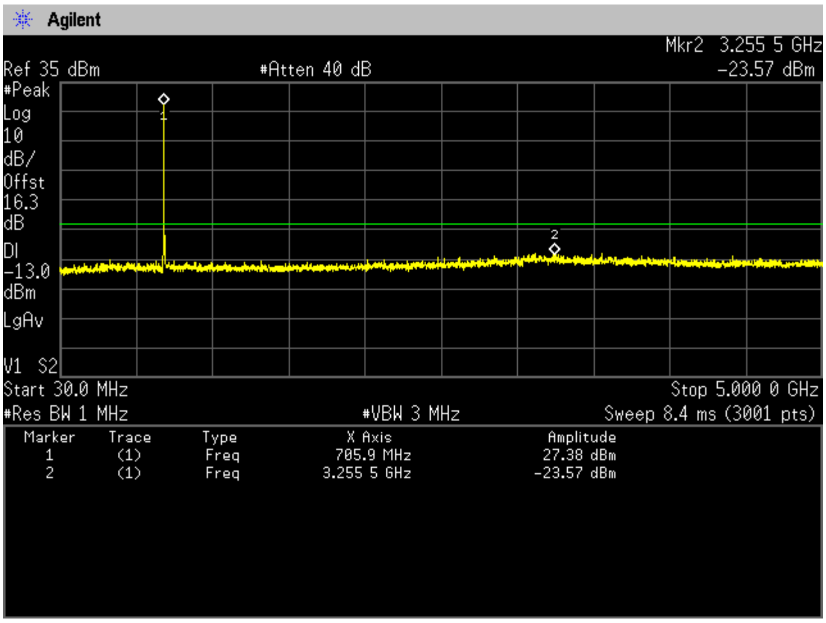
1QPSK, BW 10MHz, RB1-0
Channel: 23780
30MHz-5GHz



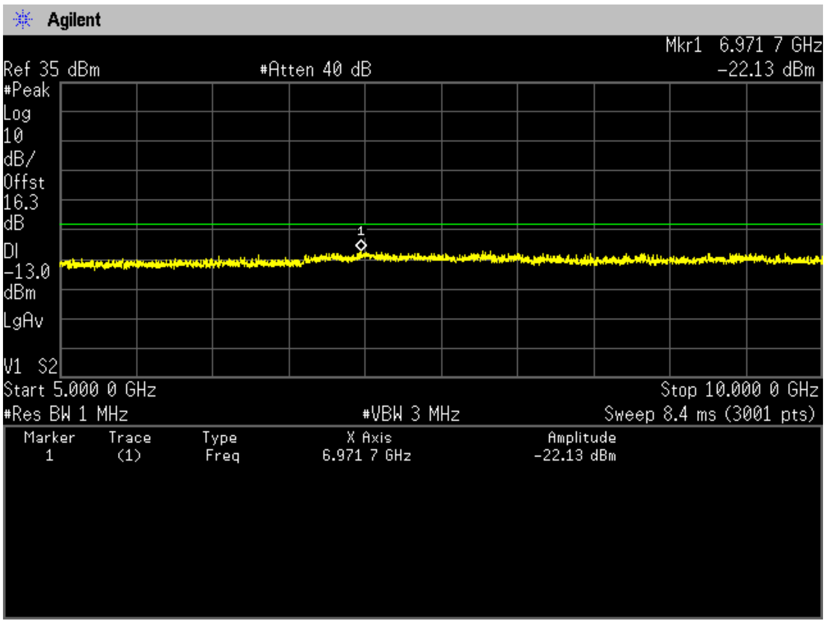
5GHz-10GHz



Channel: 23790
30MHz-5GHz



5GHz-10GHz



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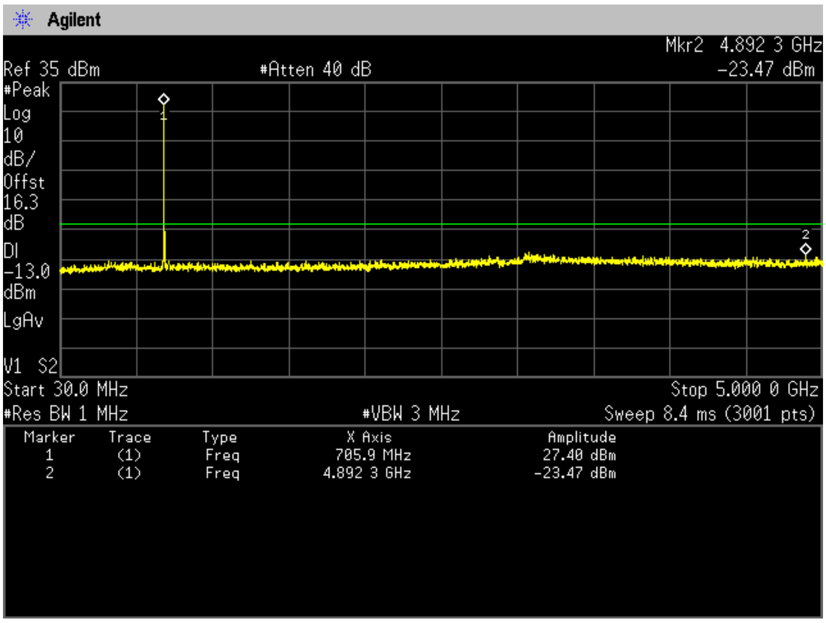
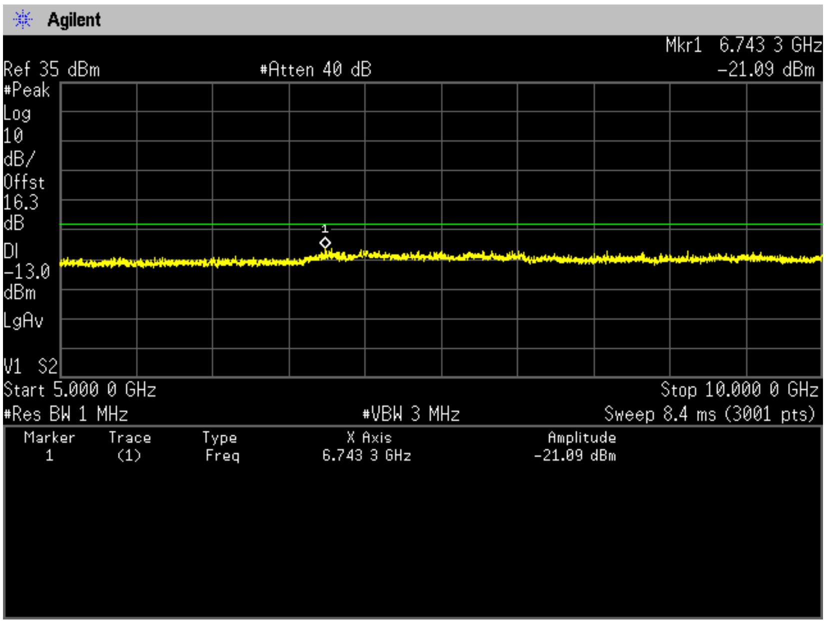
Channel: 23800
30MHz-5GHz



5GHz-10GHz



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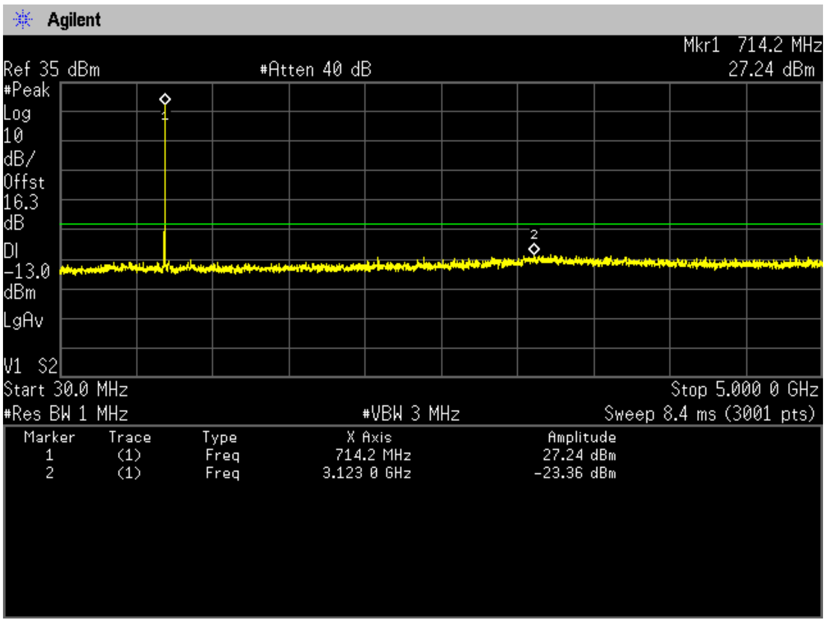
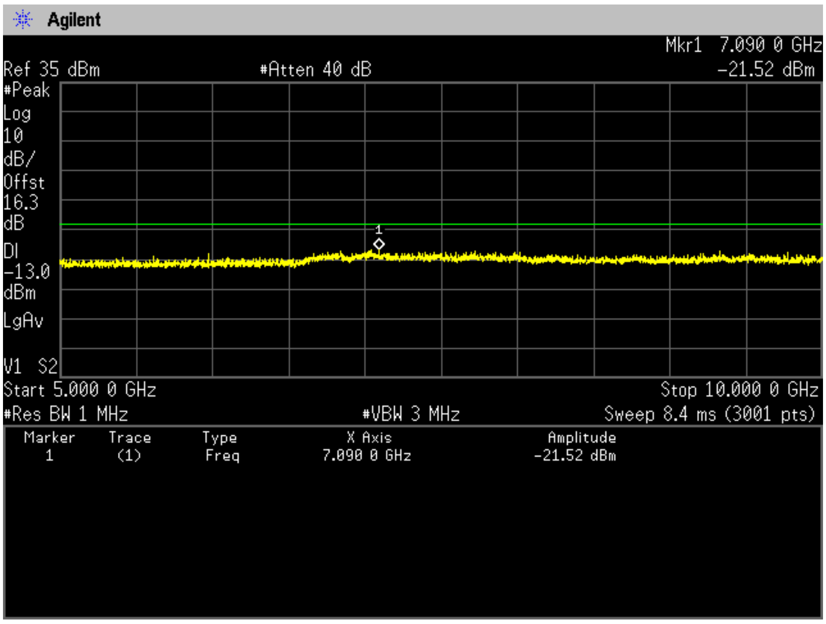
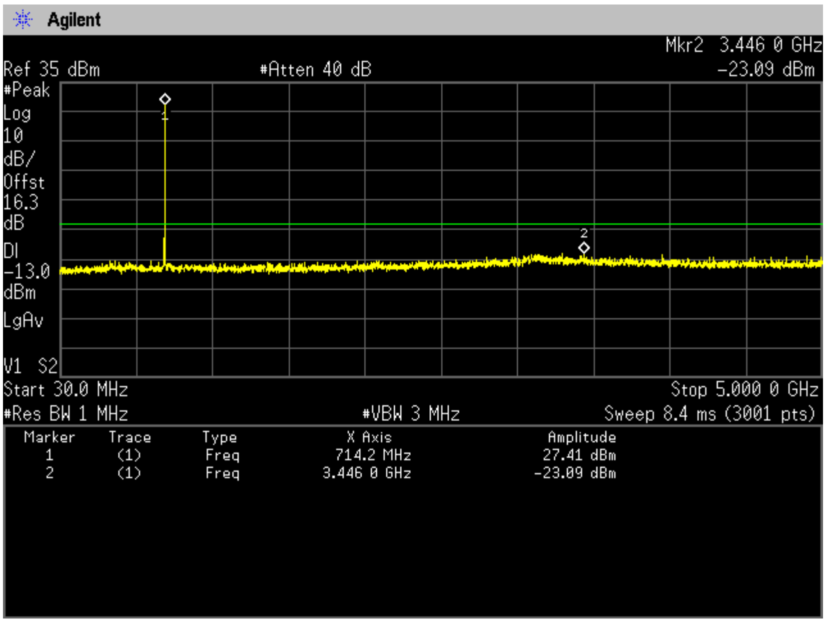
16QAM, BW 10MHz, RB1-49
Channel: 23780
30MHz-5GHz



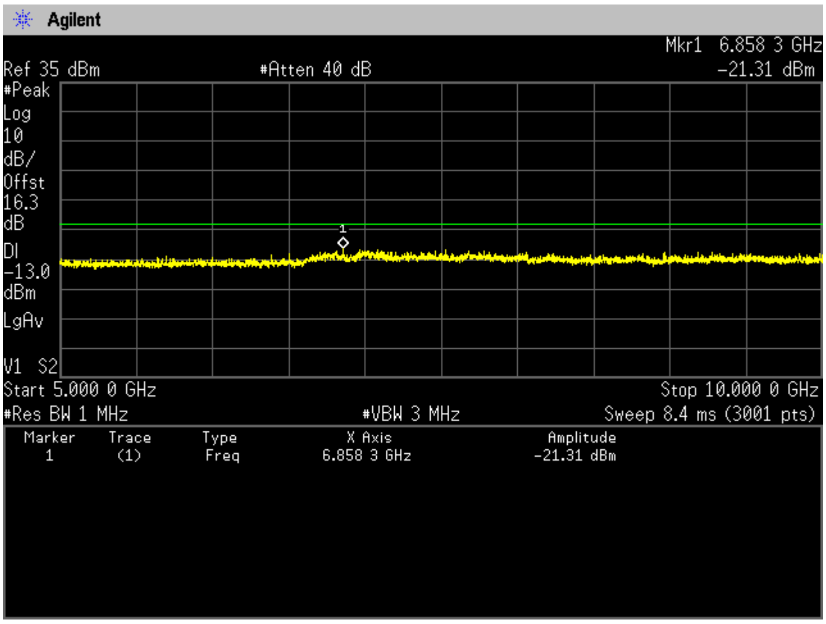
5GHz-10GHz



Channel: 23790
30MHz-5GHz



5GHz-10GHz



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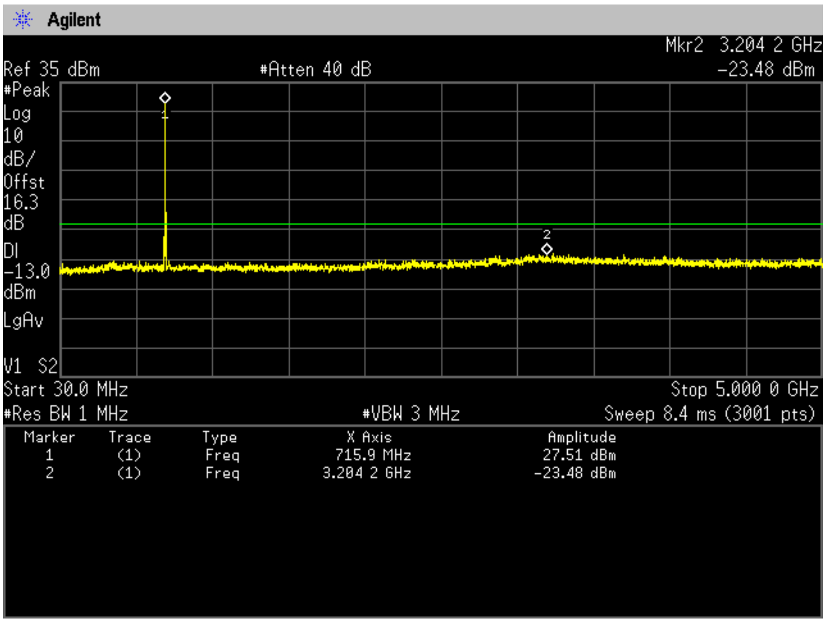
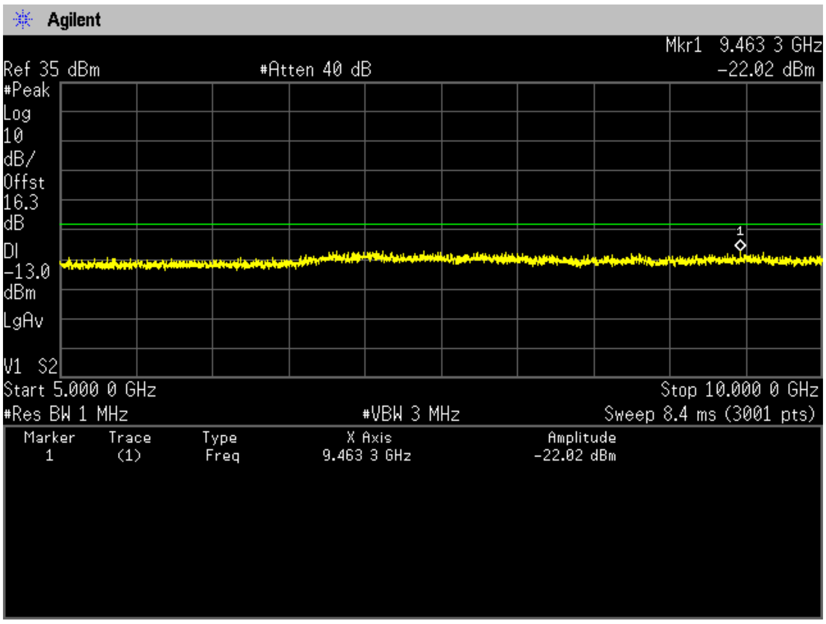
Channel: 23800
30MHz-5GHz



5GHz-10GHz



9. Radiated Emissions and Harmonic Emissions

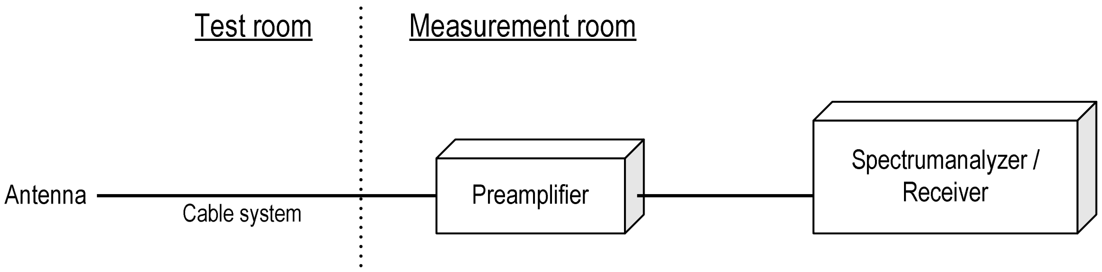
9.1 Measurement procedure
[FCC 27.53, 2.1053]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1.5 meter surface, 0.8 meter height FRP 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



9.2 Calculation method

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

9.3 Limit

-13dBm or less

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9.4 Test data

Date : Spetember 30, 2015
Temperature : 23.3 [˚C]
Humidity : 30.9 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Taiki Watanabe

Date : October 1, 2015
Temperature : 20.9 [˚C]
Humidity : 44.9 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Kazunori Saito

Date : October 8, 2015
Temperature : 23.4 [˚C]
Humidity : 31.2 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Kazunori Saito

[LTE Band X VII]
QPSK, BW 5MHz
Channel: 23775

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	-53.9	-61.0	1.0	5.9	-56.0	-13.0	43.0
V	1413.0	-55.1	-61.6	1.0	5.9	-56.6	-13.0	43.6

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	-54.8	-62.0	1.0	6.0	-57.0	-13.0	44.0
V	1420.0	-55.3	-62.5	1.0	6.0	-57.5	-13.0	44.5

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	-55.7	-63.0	1.0	6.1	-57.9	-13.0	44.9
V	1427.0	-55.1	-61.5	1.0	6.1	-56.4	-13.0	43.4

16QAM, BW 5MHz
Channel: 23775

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	1408.8	-54.0	-61.0	1.0	5.9	-56.1	-13.0	43.1
V	1408.8	-55.1	-62.5	1.0	5.9	-57.6	-13.0	44.6

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	1415.8	-52.9	-60.0	1.0	6.0	-55.0	-13.0	42.0
V	1415.8	-54.9	-62.5	1.0	6.0	-57.5	-13.0	44.5

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	1422.6	-53.3	-61.0	1.0	6.0	-56.0	-13.0	43.0
V	1422.6	-54.7	-61.7	1.0	6.0	-56.7	-13.0	43.7

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	1409.2	-53.2	-60.0	1.0	5.9	-55.1	-13.0	42.1
V	1409.2	-53.5	-60.0	1.0	5.9	-55.1	-13.0	42.1

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	1411.2	-52.4	-58.7	1.0	5.9	-53.7	-13.0	40.7
V	1411.2	-54.3	-61.0	1.0	5.9	-56.0	-13.0	43.0

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	1413.2	-53.0	-60.8	1.0	5.9	-55.8	-13.0	42.8
V	1413.2	-55.2	-62.0	1.0	5.9	-57.0	-13.0	44.0

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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	1426.8	-51.1	-58.4	1.0	6.0	-53.3	-13.0	40.3
V	1426.8	-54.0	-60.5	1.0	6.0	-55.4	-13.0	42.4

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	1428.8	-50.6	-57.0	1.0	6.1	-51.9	-13.0	38.9
V	1428.8	-53.8	-60.0	1.0	6.1	-54.9	-13.0	41.9

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	1430.8	-50.5	-57.0	1.0	6.1	-51.9	-13.0	38.9
V	1430.8	-53.6	-60.5	1.0	6.1	-55.4	-13.0	42.4

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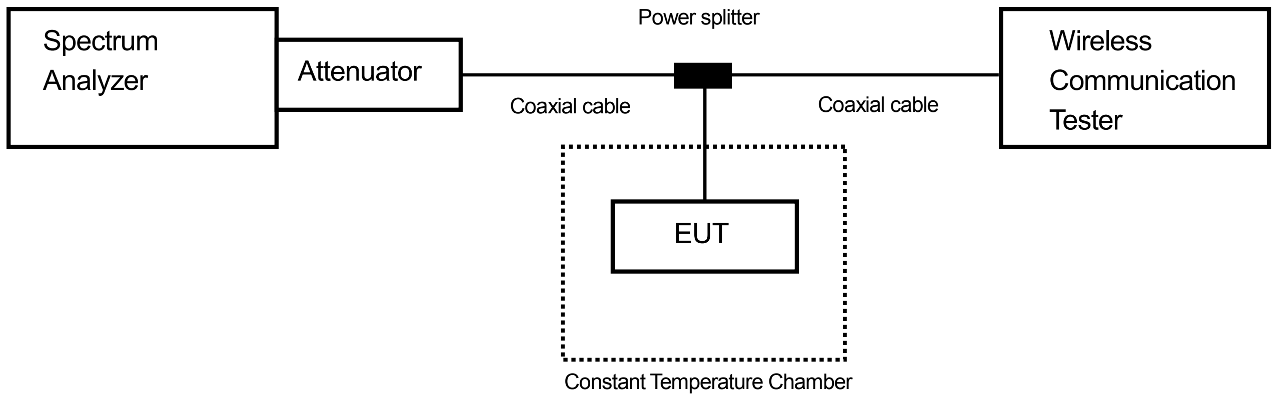
10. Frequency Stability

10.1 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



10.2 Limit

±2.5ppm

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10.3 Measurement result

Date : October 7, 2014
Temperature : 19.4 [˚C]
Humidity : 45.5 [%]
Test place : Shielded room No.4

Test engineer : Hikaru Shibata

[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.)	710,000,002	0.00000	±2.5	Pass
	50	710,000,001	-0.00120	±2.5	Pass
	40	710,000,003	0.00052	±2.5	Pass
	30	710,000,001	-0.00137	±2.5	Pass
	20	710,000,002	0.00000	±2.5	Pass
	10	710,000,001	-0.00125	±2.5	Pass
	0	710,000,002	0.00028	±2.5	Pass
	-10	710,000,000	-0.00306	±2.5	Pass
	-20	710,000,001	-0.00120	±2.5	Pass
	-30	710,000,002	-0.00069	±2.5	Pass
3.230	25	710,000,001	-0.00125	±2.5	Pass
4.370	25	710,000,004	0.00211	±2.5	Pass

Calculation;

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

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11. 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 at mains port	±3.0dB
Radiated emission (9kHz – 30MHz)	±4.4dB
Radiated emission (30MHz – 1000MHz)	±4.5dB
Radiated emission (1000MHz – 26GHz)	±3.9dB

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12. Laboratory description

1. Location:

TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880   Fax: +81-238-28-2888

2. Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) VLAC accreditation: Lab. code: VLAC-013

<table>
<tr><th>Site name</th><th>Radiated emission</th><th>Conducted emission for mains port</th><th>Conducted emission for telecom port</th><th>Radiated emission (CMAD)</th><th>Expiry Date</th></tr>
<tr><td>3m Semi-anechoic chamber</td><td colspan="3" rowspan="3">VLAC-013</td><td>-</td><td rowspan="4">Jul. 3, 2017</td></tr>
<tr><td>10m Semi-anechoic chamber No.1</td><td rowspan="2">VLAC-013</td></tr>
<tr><td>10m Semi-anechoic chamber No.2</td></tr>
<tr><td>Shielded room No.1</td><td>-</td><td colspan="2">VLAC-013</td><td>-</td></tr>
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3) FCC filing:

<table>
<tr><th>Site name</th><th>Registration Number</th><th>Expiry Date</th></tr>
<tr><td>Site 3</td><td>91065</td><td>Oct. 1, 2017</td></tr>
<tr><td>3m Semi-anechoic chamber</td><td rowspan="4">540072</td><td rowspan="4">Feb. 20, 2017</td></tr>
<tr><td>10m Semi-anechoic chamber No.1</td></tr>
<tr><td>10m Semi-anechoic chamber No.2</td></tr>
<tr><td>Shielded room No.1</td></tr>
</table>

4) Industry Canada Oats site filing:

<table>
<tr><th>Site name</th><th>Sites on file: Oats 3m/10m</th><th>Expiry Date</th></tr>
<tr><td>Site 3</td><td>4224A-3</td><td rowspan="3">Dec. 3, 2017</td></tr>
<tr><td>3m Semi-anechoic chamber</td><td>4224A-4</td></tr>
<tr><td>10m Semi-anechoic chamber No.1</td><td>4224A-5</td></tr>
<tr><td>10m Semi-anechoic chamber No.2</td><td>4224A-6</td><td>Jan. 15, 2017</td></tr>
</table>

5) VCCI site filing:

<table>
<tr><th>Site name</th><th>Radiated emission</th><th>Conducted emission for mains port</th><th>Conducted emission for telecom port</th><th>Expiry Date</th></tr>
<tr><td>Site 3</td><td>R-138</td><td>C-134</td><td>T-1222</td><td>Nov. 16, 2017</td></tr>
<tr><td>3m Semi-anechoic chamber</td><td colspan="3" rowspan="3">A-0166</td><td rowspan="4">Jul. 3, 2017</td></tr>
<tr><td>10m Semi-anechoic chamber No.1</td></tr>
<tr><td>10m Semi-anechoic chamber No.2</td></tr>
<tr><td>Shielded room No.1</td><td>-</td><td colspan="2">A-0166</td></tr>
</table>

6) TÜV SÜD PS authorization:
Authorized as an EMC test laboratory

7) TÜV Rheinland authorization:
Authorized as an EMC test laboratory

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, 2016	Jun. 11, 2015
Microwave cable	RS	YH_13S5	N/A (S403)	May 31, 2016	May 10, 2015
Attenuator	Weinschel	56-10	J4180	Nov. 30, 2015	Nov. 12, 2014
Microwave cable	SUHNER	SUCOFLEX104/1.5m	199121/4	Oct. 31, 2015	Oct. 7, 2014
Microwave cable	SUHNER	SUCOFLEX104/1.5m	322086/4	May 31, 2016	May 29, 2015
Power splitter	ANRITSU	K240B	020205	Jul. 31, 2016	Jul. 12, 2015
Power meter	ROHDE&SCHWARZ	NRP2	103269	Jun. 20, 2016	Jun. 25, 2015
Power sensor	ROHDE&SCHWARZ	NRP-Z81	102467	Jun. 20, 2016	Jun. 25, 2015
Wideband radio frequency tester	ROHDE&SCHWARZ	CMW500	116338	Apr. 30, 2016	Apr. 2, 2015
Operation type temperature controlled bath	Espec	PL1KP	14007261	Jan. 31, 2016	Jan. 9, 2015

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100764	Aug. 31, 2016	Aug. 21, 2015
Preamplifier	ANRITSU	MH648A	M96057	Jun. 30, 2016	Jun. 30, 2015
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2125	Jun. 30, 2016	Jun. 4, 2015
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	Jun. 30, 2016	Jun. 4, 2015
Attenuator	TME	CFA-01NPJ-6	N/A (S275)	Jun. 30, 2016	Jun. 23, 2015
Attenuator	TME	CFA-01NPJ-3	N/A (S272)	Jun. 30, 2016	Jun. 23, 2015
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	Jul. 31, 2016	Jul. 23, 2015
Preamplifier	Agilent Technologies	8449B	3008A1008	Dec. 31, 2015	Dec. 5, 2014
Dipole antenna	Schwarzbeck	VHAP	1021	Oct. 31, 2016	Oct. 2, 2015
Dipole antenna	Schwarzbeck	UHAP	993	Oct. 31, 2016	Oct. 2, 2015
Double ridged guide antenna	EMCO	3115	5205	Feb. 29, 2016	Feb. 16, 2015
Attenuator	Agilent Technologies	8491B	MY39268633	Feb. 29, 2016	Feb. 1, 2015
Double ridged guide antenna	EMCO	3115	000058532	Oct. 31, 2015	Oct. 14, 2014
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	Jun. 30, 2016	Jun. 19, 2015
Power amplifier	R&K	CGA020M602-2633R	B40240	Mar. 31, 2016	Mar. 23, 2015
Microwave cable	SUHNER	SUCOFELX102/2m	31648/2	Mar. 31, 2016	Mar. 10, 2015
High pass filter	Micro-Tronics	HPM50115	004	Jul. 31, 2016	Jul. 12, 2015
High pass filter	Wainwright	WHKX2.8/18G-6SS	1	Jul. 31, 2016	Jul. 29, 2015
Wideband radio frequency tester	ROHDE&SCHWARZ	CMW500	126079	Sep. 30, 2016	Sep. 15, 2015
Microwave cable	SUHNER	SUCOFLEX104/9m	346316/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/1m	322084/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/1.5m	317226/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/7m	41625/6	Oct. 31, 2015	Oct. 31, 2014
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.3.61	N/A	N/A
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-NSA)	Apr. 30, 2016	Apr. 27, 2015
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-SVSWR)	Apr. 30, 2016	Apr. 27, 2015

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