



# FCC Radio Test Report

**Equipment** : Wireless for HDMI 60 GHz  
**Brand Name** : Acer  
**Model No.** : MWIR1  
**FCC ID** : HLZMWIR1  
**Standard** : 47 CFR FCC Part 15.255  
**Applicant** : Acer Inc.  
8F, 88, Sec 1, Hsin Tai Wu Rd Hsichih, Taipei  
Hsien, 221 Taiwan  
**Manufacturer** : Abocom Systems, Inc.  
No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County  
35059, Taiwan R.O.C.

The product sample received on Sep. 18, 2014 and completely tested on Nov. 28, 2014. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009, 47 CFR FCC Part 15.255, KDB200443 D02 RF Detector Method v01, Millimeter Wave Test Procedures and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Sam Chen  
SPORTON INTERNATIONAL INC.





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## SUMMARY OF TEST RESULT

Standard Requirements and Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Result	Remark
3.1	FCC 15.207	AC Power Conducted Emissions	Complied	-
3.2	FCC 15.255(e)	Occupied Bandwidth	Complied	-
3.3	FCC 15.255(b)(1)	EIRP Power	Complied	-
3.4	FCC 15.255(e)	Peak Conducted Power	Complied	-
3.5	FCC 15.255(c)	Transmitter Spurious Emissions	Complied	-
3.6	FCC 15.255(f)	Frequency Stability	Complied	-
3.7	FCC 15.255(d)	Publicly-accessible Coordination Channel	Complied	-
3.8	FCC 15.255(a),(h)	Operation Restriction and Group Installation	Complied	-



# REVISION HISTORY



## 1 General Description

### 1.1 Information

#### 1.1.1 The Channel Plan(s)

The Channel Plan(s)	
Low-rate PHY (LRP) Band	Channel 2 LRP: 60.16-60.80 GHz Channel 3 LRP: 62.32-62.96 GHz
LRP Channel List	Channel 2 LRP: 60.16-60.80 GHz: 60.16 +n x 0.16 (n=0, 1, 2, 3, 4) GHz Channel 3 LRP: 62.32-62.96 GHz: 62.32 +n x 0.16 (n=0, 1, 2, 3, 4) GHz

#### 1.1.2 Transmit Operating Modes

The Different Transmit Operating Modes	
<input checked="" type="checkbox"/>	Operating mode 1: Smart Antenna Systems - with beam forming
<input type="checkbox"/>	Operating mode 2: Smart Antenna Systems - without beam forming
<input type="checkbox"/>	Operating mode 3: Single Antenna Equipment

#### 1.1.3 Antenna Information

Antenna Information	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna
Integral antenna gain	16 dBi for LRP
	<input type="checkbox"/> Temporary RF connector provided
	<input checked="" type="checkbox"/> No temporary RF connector provided
<input type="checkbox"/>	External antenna (dedicated antennas)
	<input type="checkbox"/> Single power level with corresponding antenna(s)
	<input type="checkbox"/> Multiple power settings and corresponding antenna(s)



### 1.1.4 Power Levels

<b>Worst Power Levels for LRP (Channel 2 LRP: 60.16-60.80)</b>				
Applicable power levels	<input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP			
Antenna gain	16 dBi			
Frequency (GHz)	Highest setting ( $P_{high}$ ): (dBm)			
	Modulation	Data Rate (Mb/s)	AV Power	Peak Power
60.16	BPSK	20.337	27.30	30.40

<b>Worst Power Levels for LRP (Channel 3 LRP: 62.32-62.96)</b>				
Applicable power levels	<input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP			
Antenna gain	16 dBi			
Frequency (GHz)	Highest setting ( $P_{high}$ ): (dBm)			
	Modulation	Data Rate (Mb/s)	AV Power	Peak Power
62.64	BPSK	20.337	26.45	30.55

### 1.1.5 Extreme Operating

<b>The Extreme Operating Temperature Range that Apply to the Equipment</b>				
<input checked="" type="checkbox"/> -20 °C to +50 °C				
<input type="checkbox"/> 0 °C to +40 °C				
<input type="checkbox"/> Other:				
EUT Power Type	From Host System			
Supply Voltage	<input type="checkbox"/> AC	State AC voltage	V	
Supply Voltage	<input checked="" type="checkbox"/> DC	State DC voltage	5	V

### 1.1.6 Equipment Use Condition

<b>Equipment Use Condition</b>				
<input type="checkbox"/> Fixed field disturbance sensors at 61-61.5GHz				
<input type="checkbox"/> Except fixed field disturbance sensors at 61-61.5GHz				
<input checked="" type="checkbox"/> Except fixed field disturbance sensors				



## 1.2 Additional Information Provided by the Submitter

### 1.2.1 Modulation

Modulation		
The LRP modulation is BPSK / data rate is 20.337 Mb/s.		
Can the transmitter operate un-modulated:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

### 1.2.2 Duty Cycle

Duty Cycle		Duty Cycle Factor
The transmitter is intended for	LRP	9.38 %



### 1.3 Accessories

N/A

### 1.4 Support Equipment

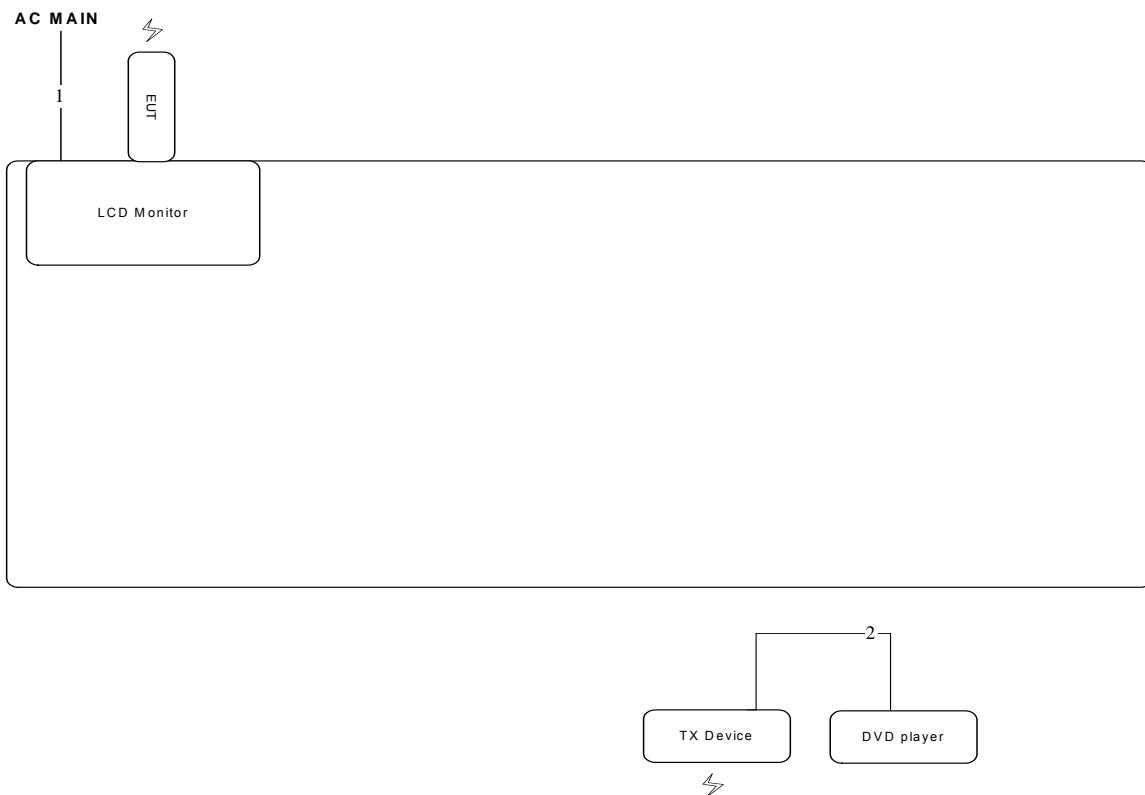
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	DVD Player	Pioneer	DV-600AV-S	DoC
2	LCD Monitor	BenQ	EW2740-B	DoC
3	Wireless for HDMI 60 GHz (TX Device)	Acer	MWIT1	HLZMWIT1

### 1.5 EUT Operation during Test

High Definition Audio / Video in the 1080p format was sent from the TX device to the receiver via the wireless link. A Blu-Ray player furnished HD A/V to the TX device. The receiver furnished HD A/V to the television. The television was placed outside the chamber. A laptop computer with test software was utilized to vary the radio configuration and antenna beam orientation for testing purposes. This computer was not connected during measurements. For Extreme environmental tests, an external Variable DC power supply was utilized in place of the AC/DC adapter to furnish power to the EUT.

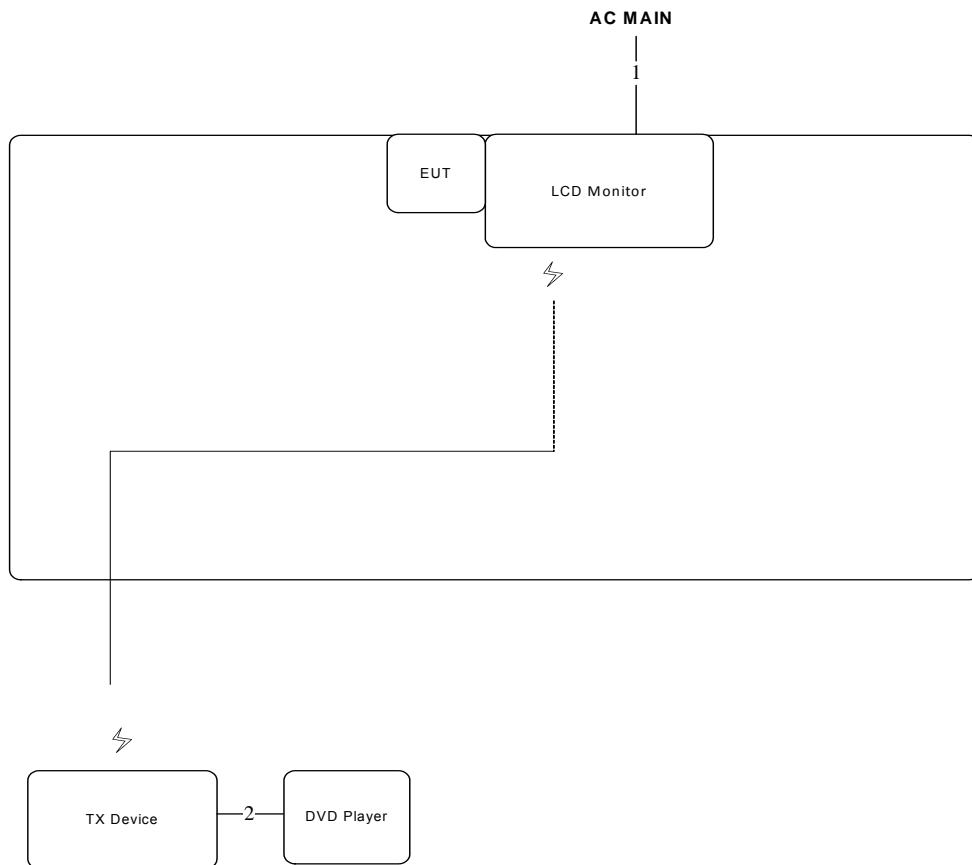
## 1.6 Test Setup Diagram

**Test Setup Diagram - AC Power Conducted Emissions**



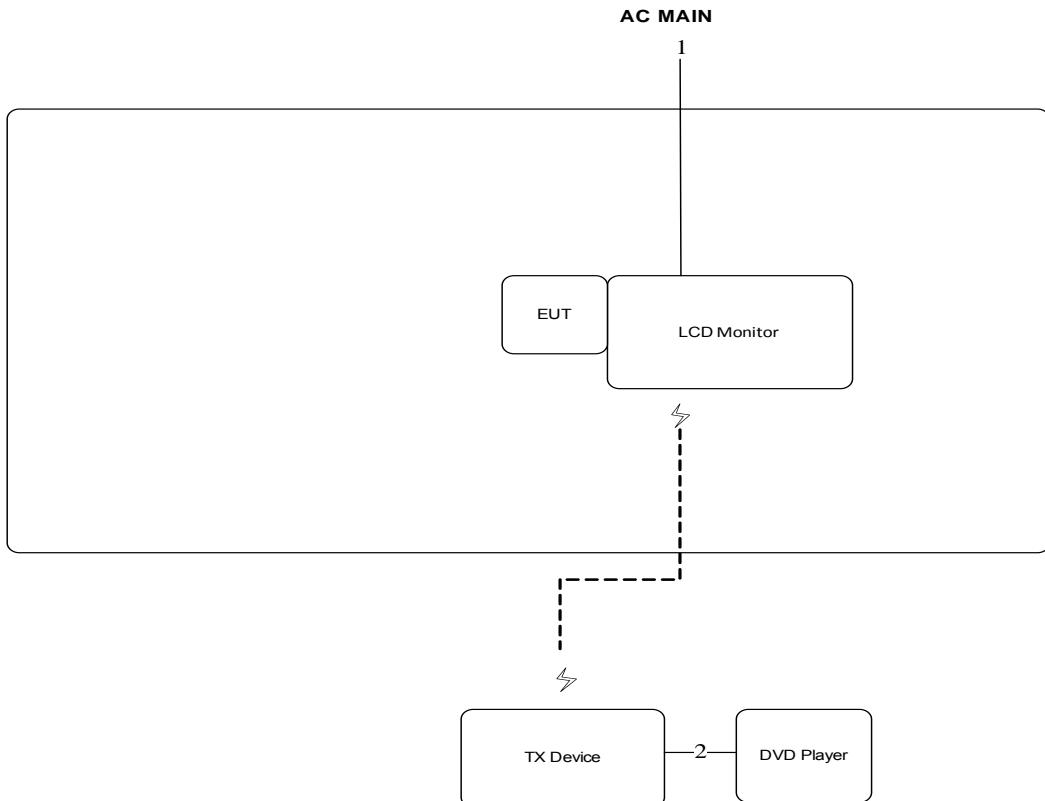
Item	Connection	Shielded	Length
1	Power cable	No	2.8m
2	HDMI cable	Yes	1.2m

**Test Setup Diagram - Transmitter Spurious Emissions below 1 GHz**



Item	Connection	Shielded	Length
1	Power cable	No	2.8m
2	HDMI cable	Yes	1.2m

**Test Setup Diagram - Transmitter Spurious Emissions above 1 GHz**



Item	Connection	Shielded	Length
1	Power cable	No	2.8m
2	HDMI cable	Yes	1.2m



## 1.7 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.255
- ♦ ANSI C63.10-2009
- ♦ KDB200443 D02 RF Detector Method v01
- ♦ Millimeter Wave Test Procedures

## 1.8 Testing Location

Testing Location				
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL : 886-3-327-3456	FAX : 886-3-327-0973	
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.		
		TEL : 886-3-656-9065	FAX : 886-3-656-9085	
Test Site No.				
CO01-CB		03CH01-CB		TH01-CB



## 2 Test Configuration of Equipment under Test

### 2.1 Test Channel Frequencies

Nominal Channel Bandwidth			
Channel Plan (GHz)	Low Channel (GHz)	Middle Channel (GHz)	High Channel (GHz)
Channel 2 LRP: 60.16-60.80	60.16	60.48	60.80
Channel 3 LRP: 62.32-62.96	62.32	62.64	62.96

### 2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
	Channel Plan 2&3
	LRP
AC Power Conducted Emissions	Normal Link
Occupied Bandwidth	60.16, 60.48, 60.80 & 62.32, 62.64, 62.96
EIRP Power and Power Density	60.16, 60.48, 60.80 & 62.32, 62.64, 62.96
Peak Conducted Power	60.16, 60.48, 60.80 & 62.32, 62.64, 62.96
Transmitter Spurious Emissions (below 1 GHz)	Normal Link
Transmitter Spurious Emissions (1 GHz-40 GHz)	Normal Link
Transmitter Spurious Emissions (above 40 GHz)	60.48 & 62.64
Frequency Stability	Un-Modulation

### 3 Transmitter Test Result

#### 3.1 AC Power Conducted Emissions

##### 3.1.1 Limit of AC Power Conducted Emissions

AC Power Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note: \* Decreases with the logarithm of the frequency.

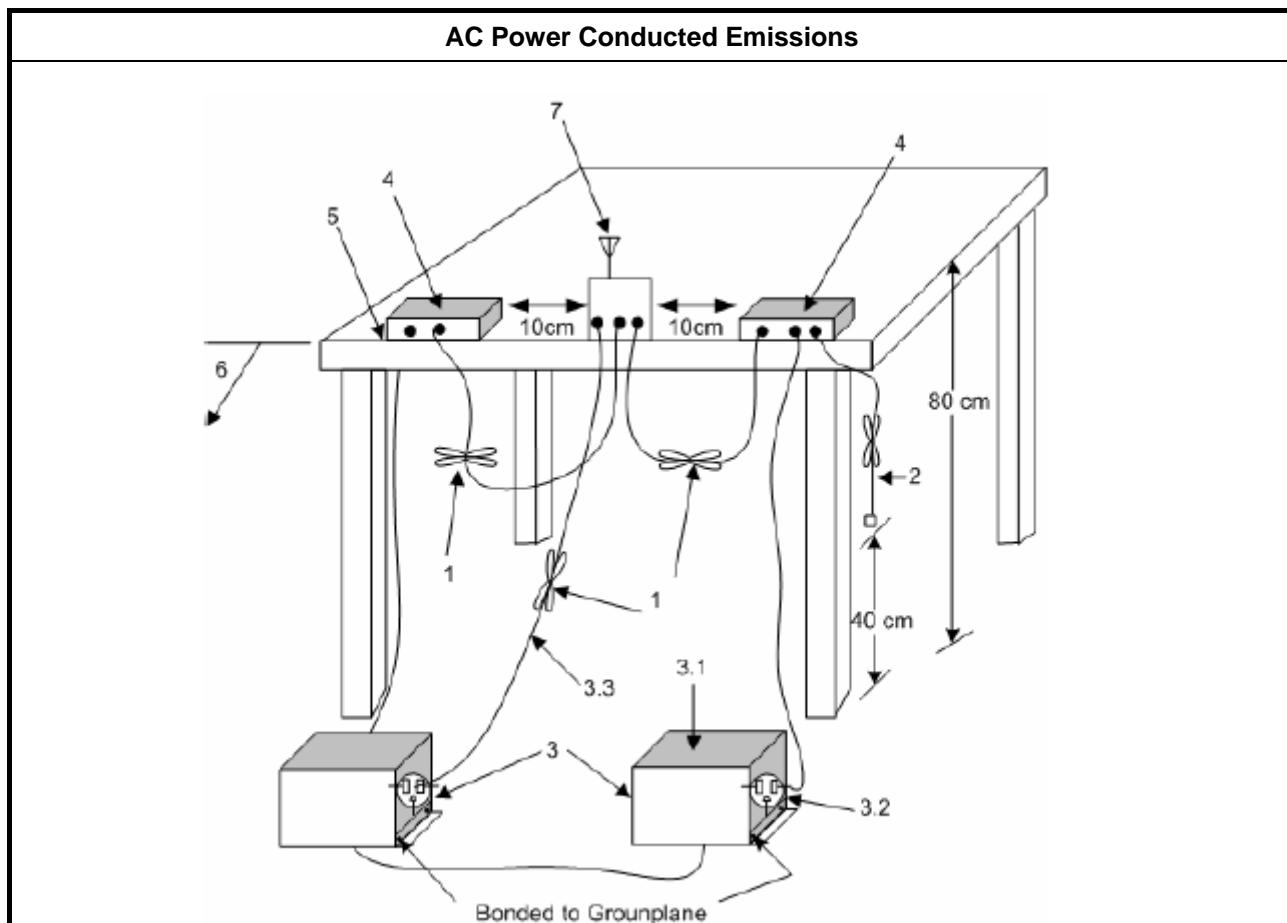
##### 3.1.2 Measuring Instruments

Refer a measuring instruments list in this test report.

##### 3.1.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2009, clause 6.2.

##### 3.1.4 Test Setup



**AC Power Conducted Emissions**

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long (see ANSI C63.10, clause 6.2.3.1).
2. I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m (see ANSI C63.10, clause 6.2.2).
3. EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 ohm loads. LISN can be placed on top of, or immediately beneath, reference ground plane (see ANSI C63.10, clauses 6.2.2 and 6.2.3).
  - 3.1. All other equipment powered from additional LISN(s).
  - 3.2. A multiple-outlet strip can be used for multiple power cords of non-EUT equipment.
  - 3.3. LISN at least 80 cm from nearest part of EUT chassis.
4. Non-EUT components of EUT system being tested.
5. Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop (see ANSI C63.10, clause 6.2.3.1).
6. Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane (see ANSI C63.10, clause 6.2.2 for options).
7. Antenna may be integral or detachable. If detachable, the antenna shall be attached for this test.

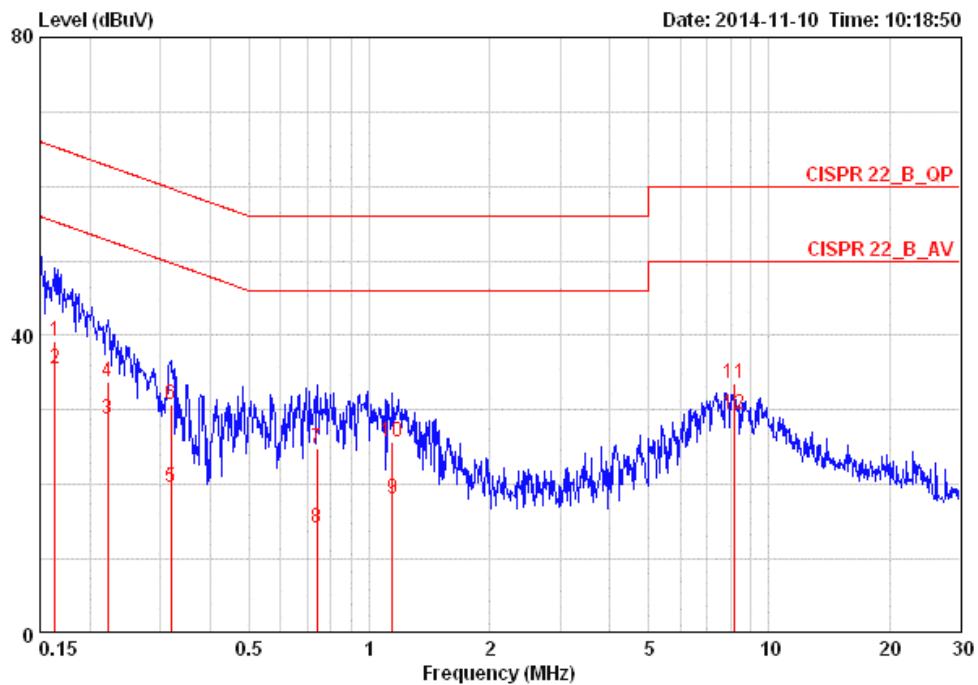
**3.1.5 Test Result of AC Power Conducted Emissions****Test Conditions** see ANSI C63.10, clause 5.11**Test Setup** see ANSI C63.10, clause 6.2.3

NOTE 1: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.

NOTE 2: “>20dB” means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit, see ANSI C63.4, clause 10.1.8.1.



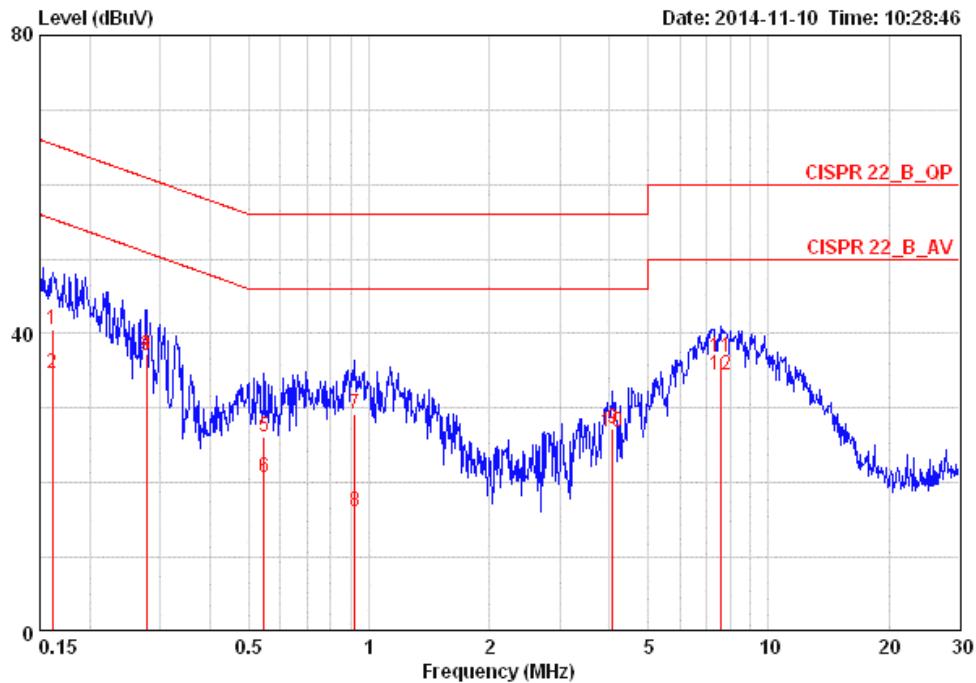
Temp	23°C	Humidity	53%
Test Engineer	Edison Lin	Phase	Line
Configuration	Normal Link		



Freq	Level	Over	Limit	Read	LISN	Cable	Pol/Phase	
		Limit	Line	Level	Factor	Loss		
MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.16327	39.34	-25.96	65.30	29.22	9.96	0.16 QP	LINE
2	0.16327	35.61	-19.69	55.30	25.49	9.96	0.16 AVERAGE	LINE
3	0.22201	28.79	-23.96	52.74	18.66	9.96	0.17 AVERAGE	LINE
4	0.22201	33.69	-29.06	62.74	23.56	9.96	0.17 QP	LINE
5	0.31830	19.59	-30.16	49.75	9.46	9.95	0.18 AVERAGE	LINE
6	0.31830	30.81	-28.94	59.75	20.68	9.95	0.18 QP	LINE
7	0.73910	24.81	-31.19	56.00	14.63	9.98	0.19 QP	LINE
8	0.73910	14.08	-31.92	46.00	3.90	9.98	0.19 AVERAGE	LINE
9	1.141	18.08	-27.93	46.00	7.86	10.01	0.21 AVERAGE	LINE
10	1.141	25.64	-30.37	56.00	15.42	10.01	0.21 QP	LINE
11	8.148	33.61	-26.39	60.00	23.06	10.19	0.36 QP	LINE
12	8.148	29.40	-20.60	50.00	18.85	10.19	0.36 AVERAGE	LINE



Temp	23°C	Humidity	53%
Test Engineer	Edison Lin	Phase	Neutral
Configuration	Normal Link		



Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
		Limit	Line	Level	Factor	Loss		
MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.16155	40.53	-24.85	65.38	30.42	9.95	0.16 QP	NEUTRAL
2	0.16155	34.67	-20.71	55.38	24.56	9.95	0.16 AVERAGE	NEUTRAL
3	0.27734	37.05	-23.85	60.90	26.93	9.95	0.17 QP	NEUTRAL
4	0.27734	37.37	-13.53	50.90	27.25	9.95	0.17 AVERAGE	NEUTRAL
5	0.54644	26.09	-29.91	56.00	15.95	9.96	0.19 QP	NEUTRAL
6	0.54644	20.69	-25.31	46.00	10.55	9.96	0.19 AVERAGE	NEUTRAL
7	0.92330	29.11	-26.89	56.00	18.93	9.99	0.20 QP	NEUTRAL
8	0.92330	16.20	-29.80	46.00	6.02	9.99	0.20 AVERAGE	NEUTRAL
9	4.070	27.35	-18.65	46.00	17.00	10.05	0.30 AVERAGE	NEUTRAL
10	4.070	26.86	-29.14	56.00	16.51	10.05	0.30 QP	NEUTRAL
11	7.566	36.76	-23.24	60.00	26.25	10.15	0.36 QP	NEUTRAL
12	7.566	34.46	-15.54	50.00	23.95	10.15	0.36 AVERAGE	NEUTRAL

## 3.2 Occupied Bandwidth

### 3.2.1 Limit of Occupied Bandwidth

<b>6dBc Bandwidth</b> (see Note 1)	None
<b>26dBc Bandwidth</b>	None
<b>99% Occupied Bandwidth</b> (see Note 2)	None

NOTE 1: The 6dBc bandwidth is the frequency bandwidth of the signal power at the -6 dBc points when measured with a 100 kHz resolution bandwidth. These measurements shall also be performed at normal test conditions.

NOTE 2: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions.

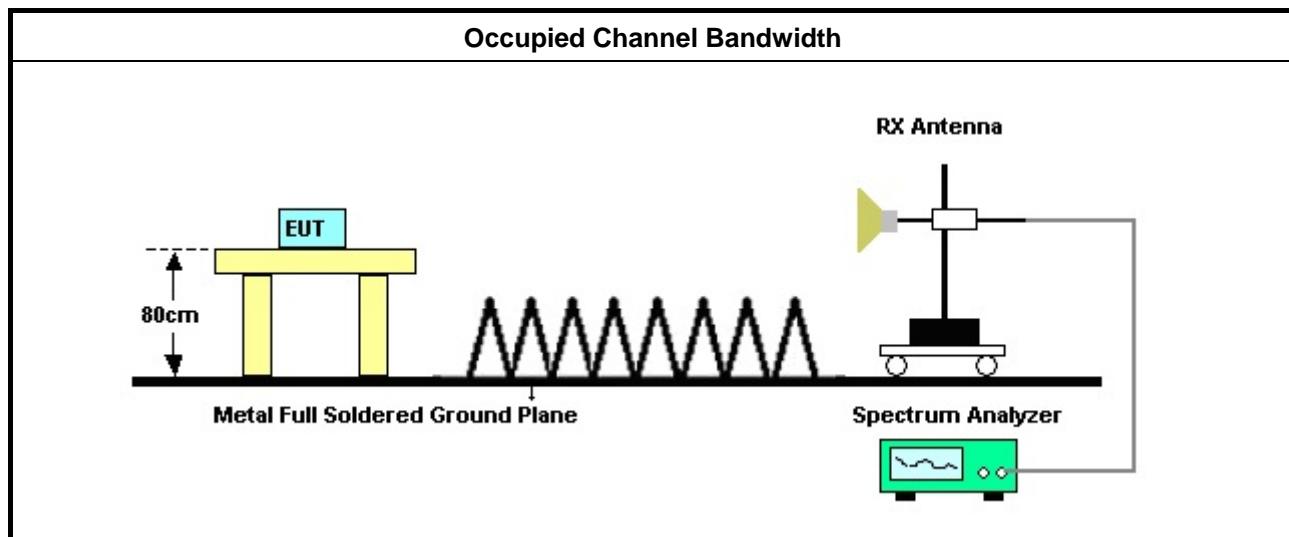
### 3.2.2 Measuring Instruments

Refer a measuring instruments list in this test report.

### 3.2.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2009, clauses 6.9.1 and 7.8.5.

### 3.2.4 Test Setup



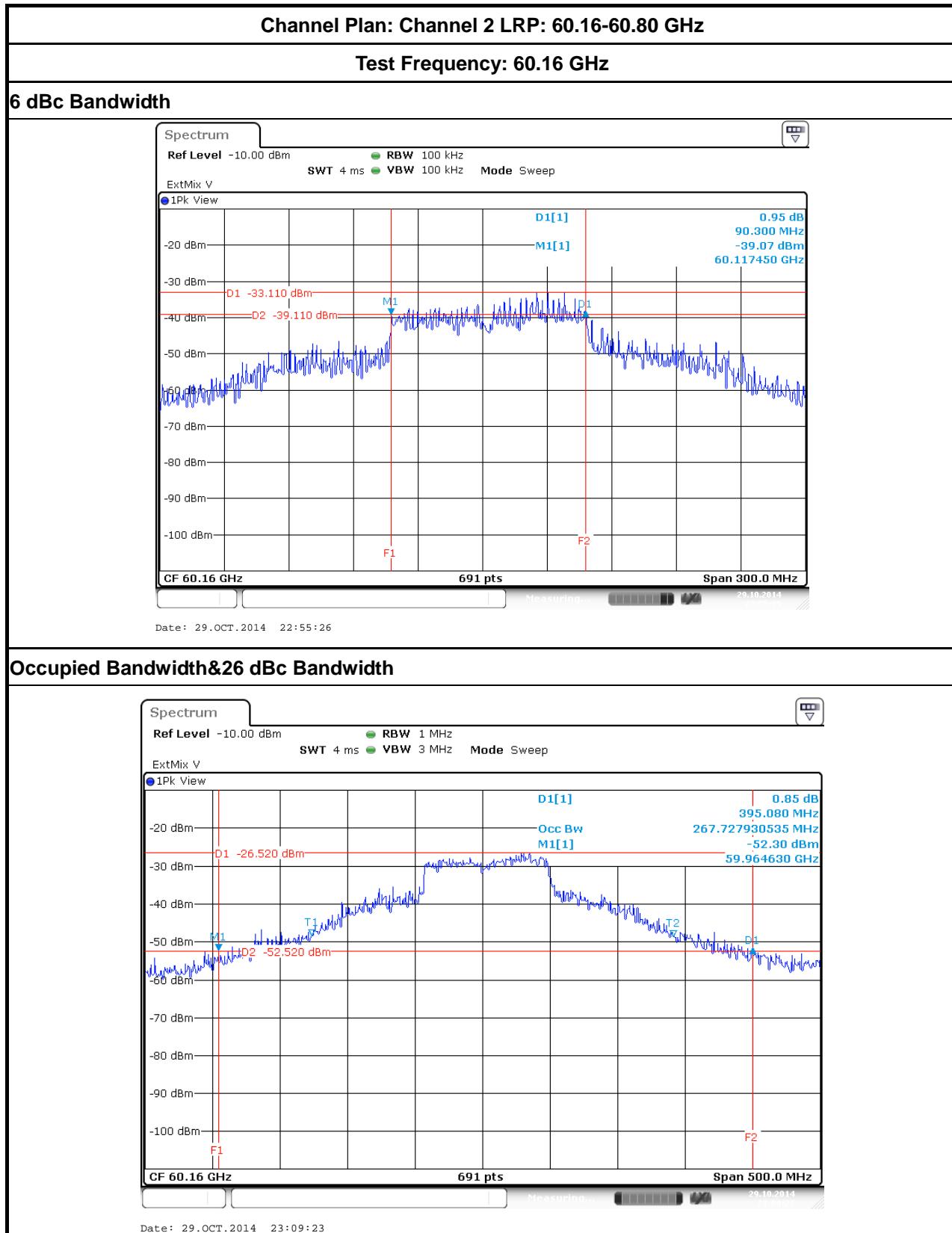


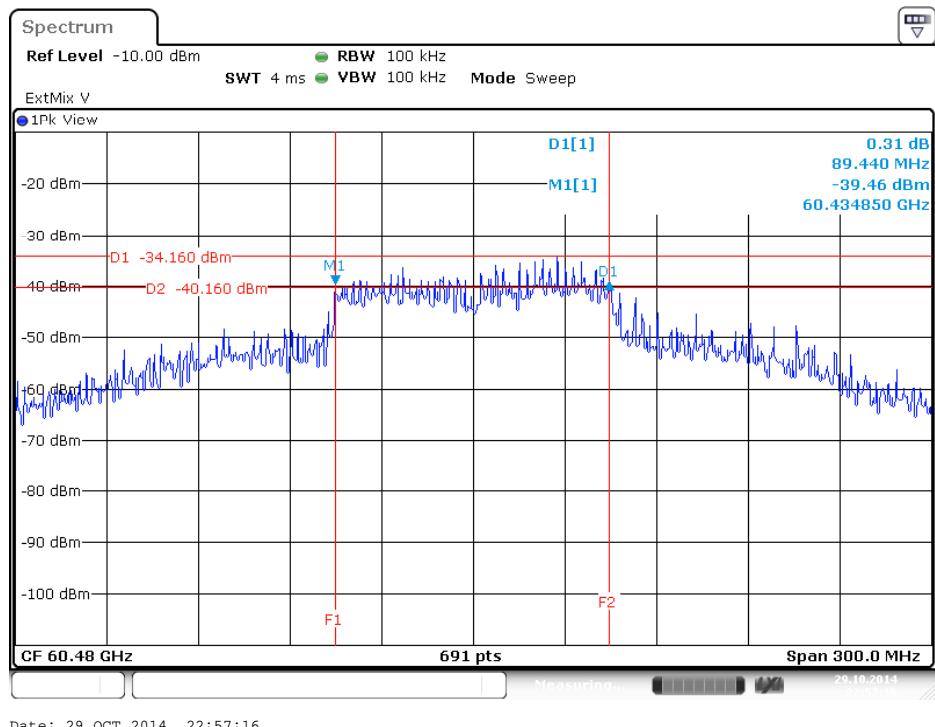
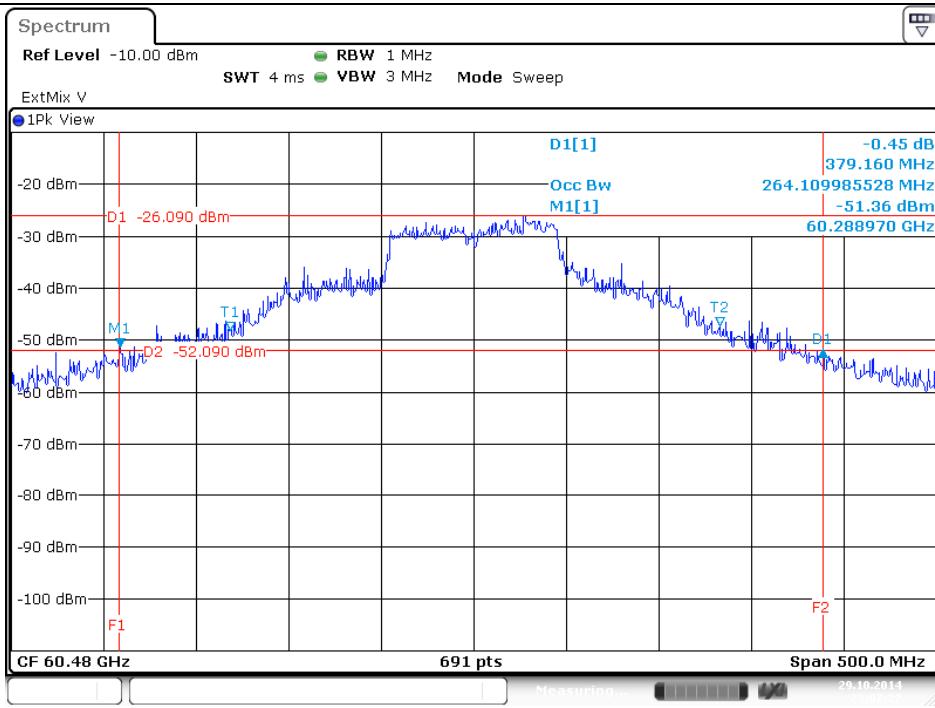
### 3.2.5 Test Result of Occupied Bandwidth

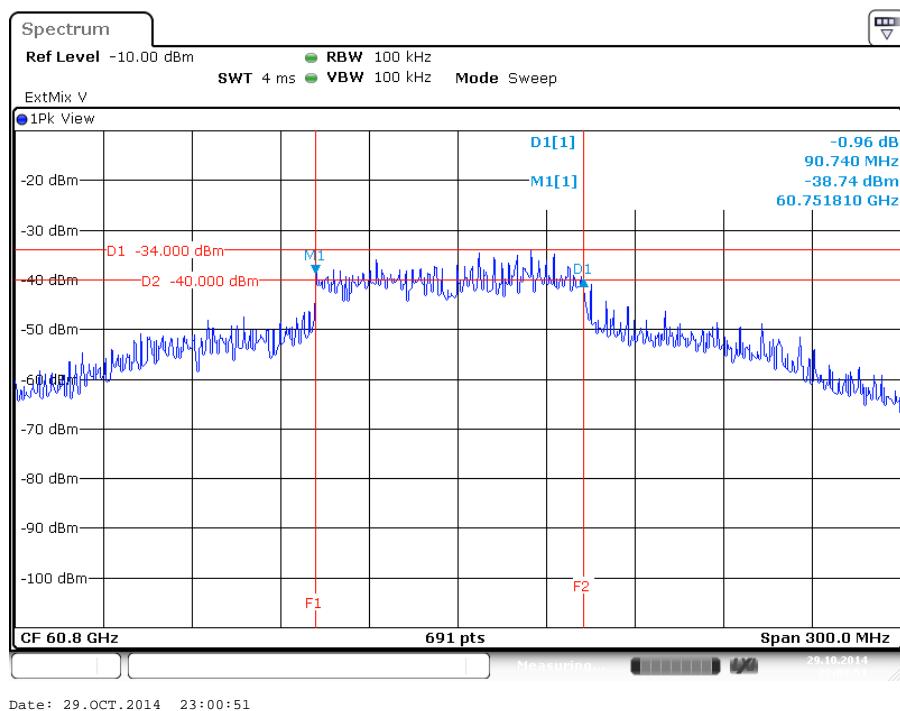
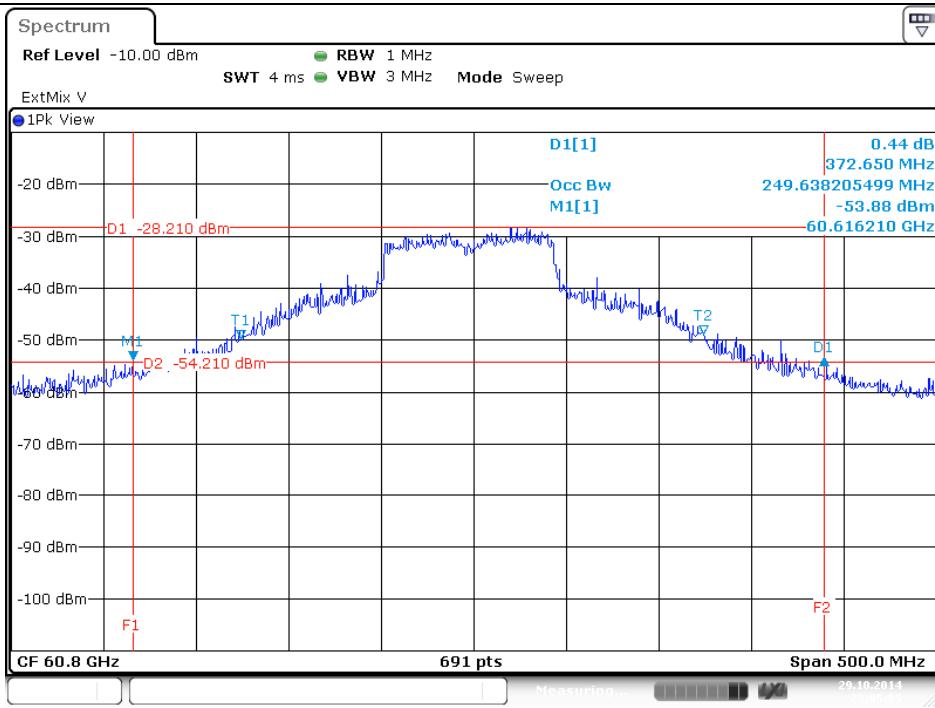
<b>Test Conditions</b>	see ANSI C63.10, clause 5.12
<b>Test Setup</b>	see ANSI C63.10, clause 7.8.5
NOTE: If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Refer as ANSI C63.10, clause 6.9.1, observe and record with plotted graphs or photographs the worst-case (i.e., widest) occupied bandwidth produced by these different modulation sources.	

<b>Temp</b>	23°C	<b>Humidity</b>	61%			
<b>Test Engineer</b>	Satoshi Yang					
<b>Test Results</b>						
<b>Channel Plan (GHz)</b>	<b>Test Freq. (GHz)</b>	<b>6 dBc Bandwidth (MHz)</b>	<b>Occupied Bandwidth (MHz)</b>	<b>26 dBc Bandwidth (MHz)</b>	<b>Limit (MHz)</b>	<b>Margin (MHz)</b>
Channel 2 LRP: 60.16-60.80	60.16	90.30	267.73	395.08	N/A	N/A
	60.48	89.44	264.11	379.16	N/A	N/A
	60.80	90.74	249.64	372.65	N/A	N/A
Channel 3 LRP: 62.32-62.96	62.32	90.30	269.18	392.91	N/A	N/A
	62.64	87.70	273.52	392.74	N/A	N/A
	62.96	90.30	291.61	461.65	N/A	N/A

### 3.2.5.1 Bandwidth Plots



**Test Frequency: 60.48 GHz**
**6 dBc Bandwidth**

**Occupied Bandwidth&26 dBc Bandwidth**


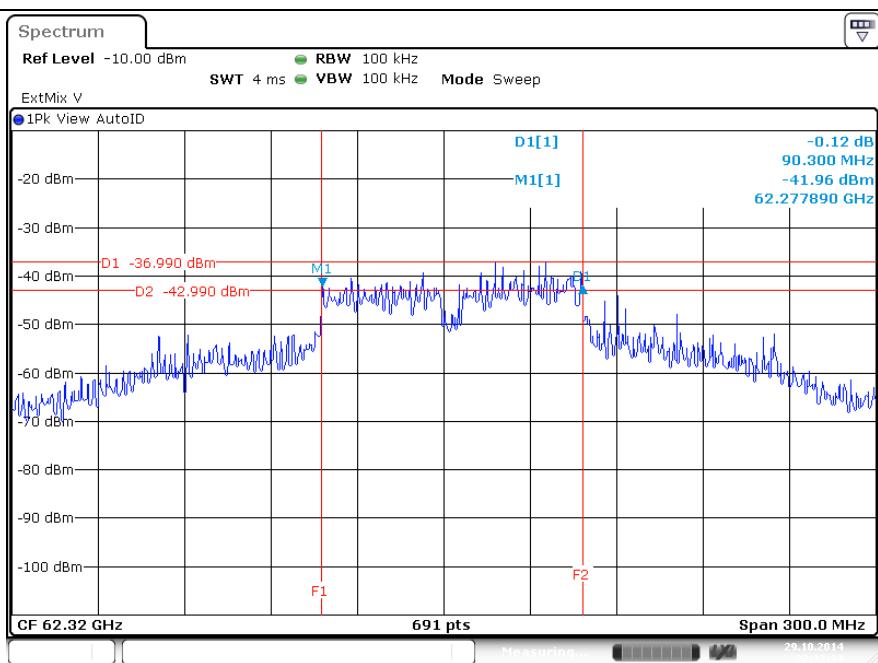
**Test Frequency: 60.80 GHz**
**6 dBc Bandwidth**

**Occupied Bandwidth&26 dBc Bandwidth**




## Channel Plan: Channel 3 LRP: 62.32-62.96 GHz

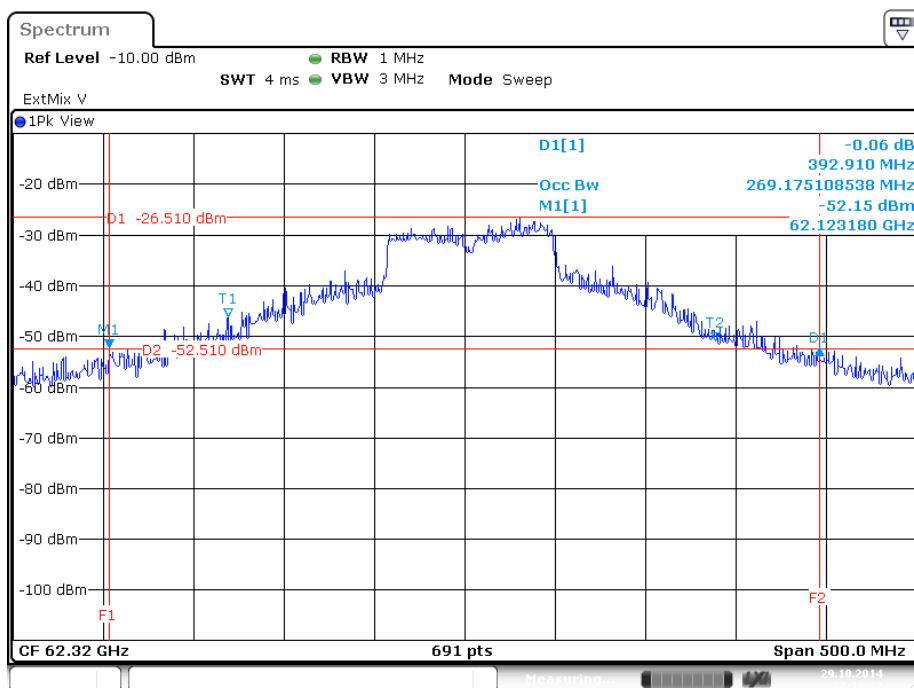
Test Frequency: 62.32 GHz

## 6 dBc Bandwidth

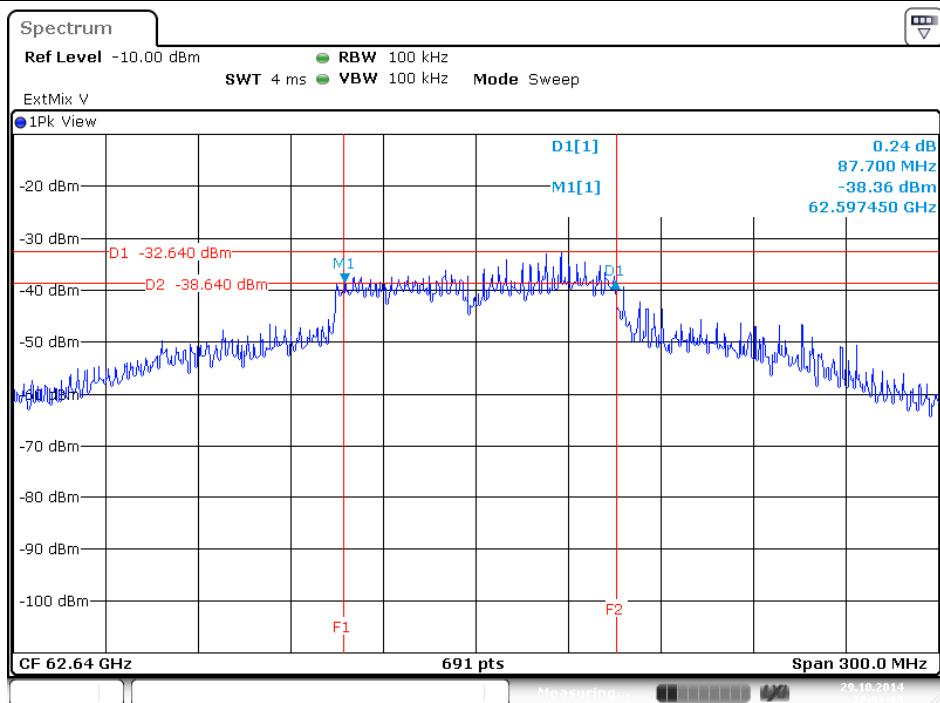
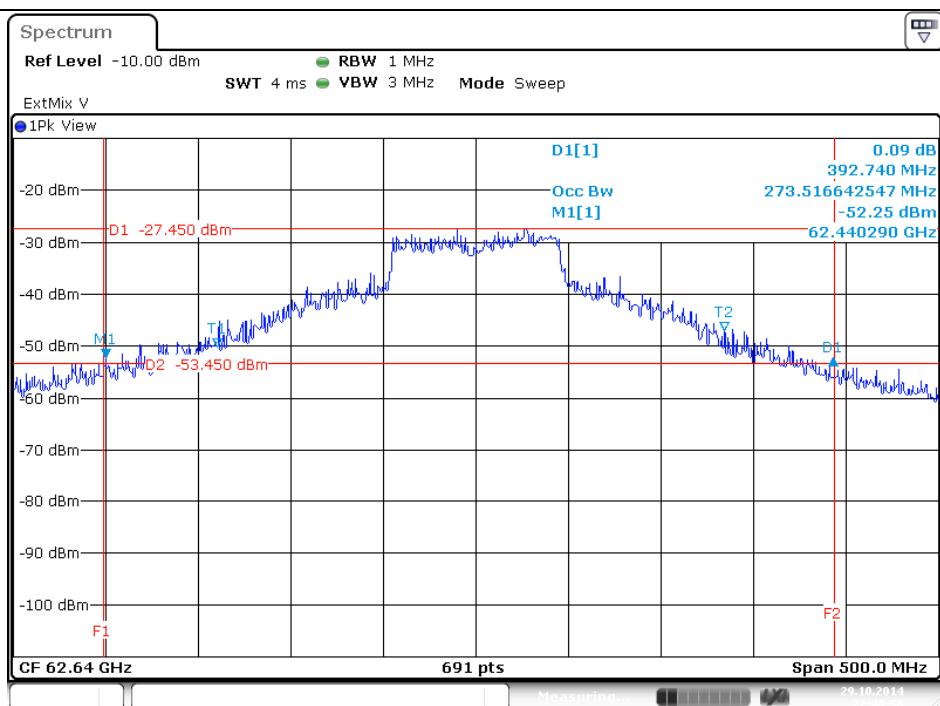


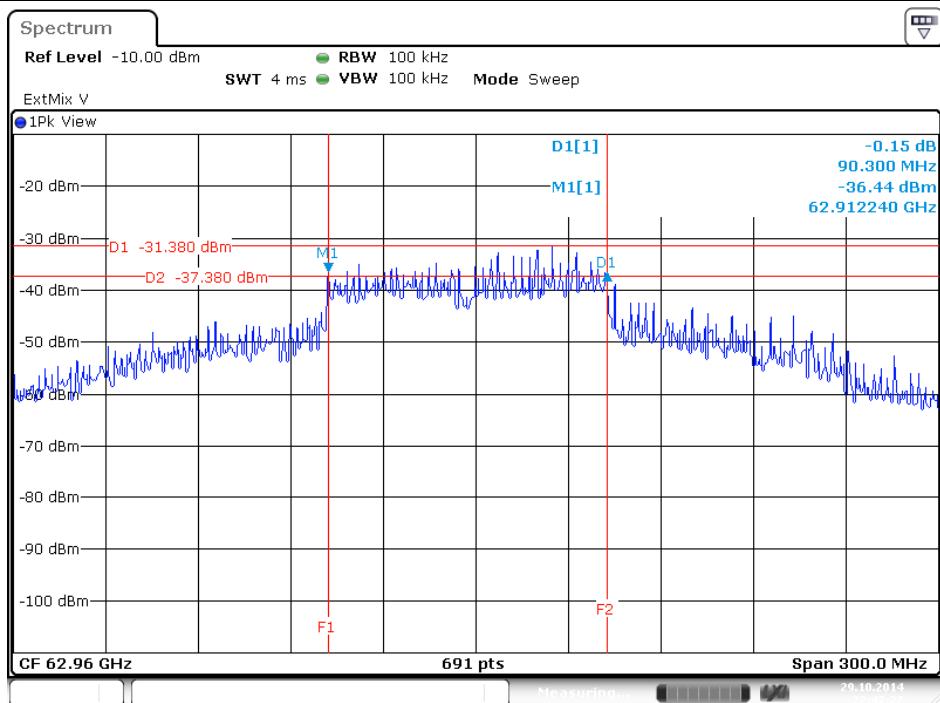
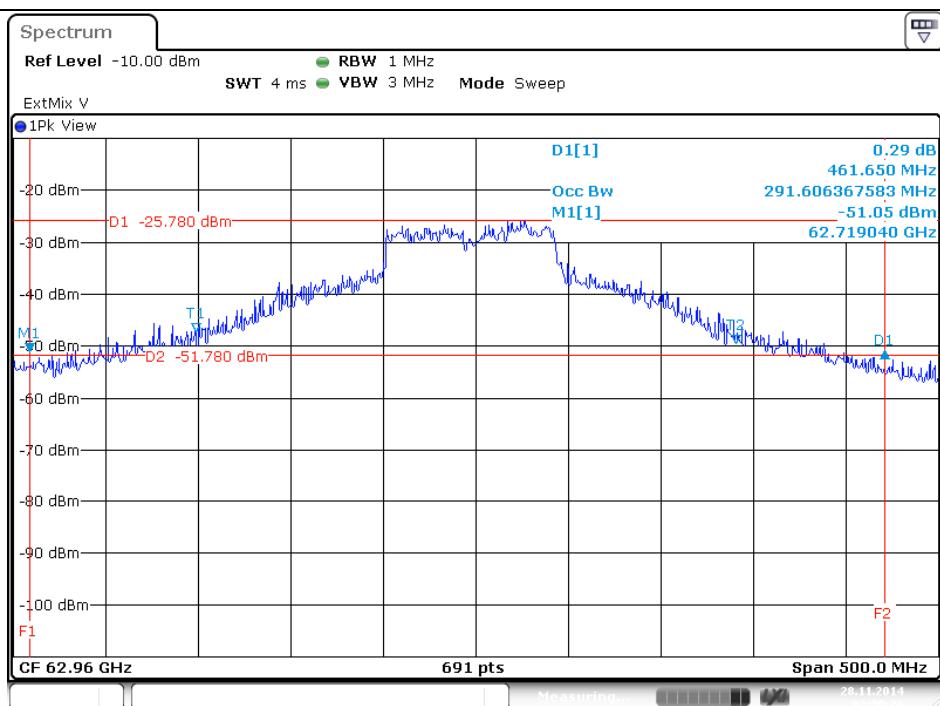
Date: 29.OCT.2014 22:32:34

## Occupied Bandwidth&amp;26 dBc Bandwidth



Date: 29.OCT.2014 22:38:27

**Test Frequency: 62.64 GHz**
**6 dBc Bandwidth**

**Occupied Bandwidth&26 dBc Bandwidth**


**Test Frequency: 62.96 GHz**
**6 dBc Bandwidth**

**Occupied Bandwidth&26 dBc Bandwidth**


### 3.3 EIRP Power

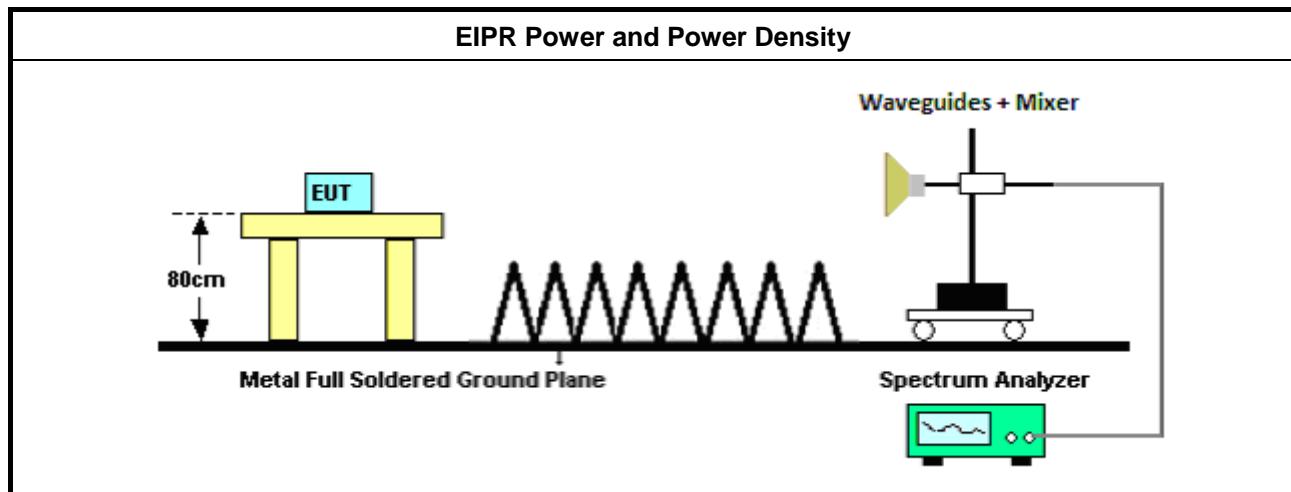
#### 3.3.1 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.3.2 Test Procedures

Method of measurement: Refer as KDB200443 D02 RF Detector Method v01 clause 4.

#### 3.3.3 Test Setup





### 3.3.4 Test Result of EIRP Power

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & KDB200443 D02 RF Detector Method v01 clauses 4.
<b>Test Setup</b>	see ANSI C63.10, clause 7.8.6
NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.	

### 3.3.5 Test Result of EIRP Power

<b>Temp</b>	23°C		<b>Humidity</b>	61%					
<b>Test Engineer</b>	Satoshi Yang		<b>Test Distance</b>	1 m					
<b>Test Results</b>									
<b>Channel Plan (GHz)</b>	<b>Test Freq. (GHz)</b>	<b>Measured Power (dBm)</b>		<b>EIRP (dBm)</b>		<b>EIRP Limit (dBm) (note 1)</b>		<b>Margin (dB)</b>	
		AV	Peak	AV	Peak	AV	Peak	AV	Peak
Channel 2 LRP: 60.16-60.80	60.16	-21.22	-18.12	27.30	30.40	40.08	43.08	12.78	12.68
	60.48	-21.31	-18.24	27.25	30.32	40.08	43.08	12.83	12.76
	60.80	-21.53	-18.26	27.08	30.35	40.08	43.08	13.00	12.73
Channel 3 LRP: 62.32-62.96	62.32	-22.56	-18.44	26.26	30.38	40.08	43.08	13.82	12.70
	62.64	-22.42	-18.32	26.45	30.55	40.08	43.08	13.63	12.53
	62.96	-22.48	-18.40	26.43	30.51	40.08	43.08	13.65	12.57

The measured power level is converted to EIRP using the Friis equation:

For radiated emissions, calculate the field strength (F.S.) in dB $\mu$ V/meter.

$$F.S. = P + 107 + AF$$

where:

F.S. is field strength in dB $\mu$ V/meter

P is power in dBm

AF is antenna factor of test antenna

For radiated emissions, calculate the EIRP (dBm). If the measurement was performed in the far field, calculate the EIRP.

$$EIRP = F.S. - 104.8 + 20\log(d)$$

where:

d = measurement distance

NOTE 1: For the applicable limit, see FCC 15.255 (b).

## 3.4 Peak Conducted Power

### 3.4.1 Limit of Peak Conducted Power

Peak Conducted Power Limit	
6dBc Bandwidth	Peak Conducted Power (note 1)
> 100MHz	500mW
≤ 100MHz	500mW x (BW/100) (see note 2)

NOTE 1: For the applicable limit, see FCC 15.255(e)

NOTE 2: BW= 6dB bandwidth (measured at RBW 100kHz)

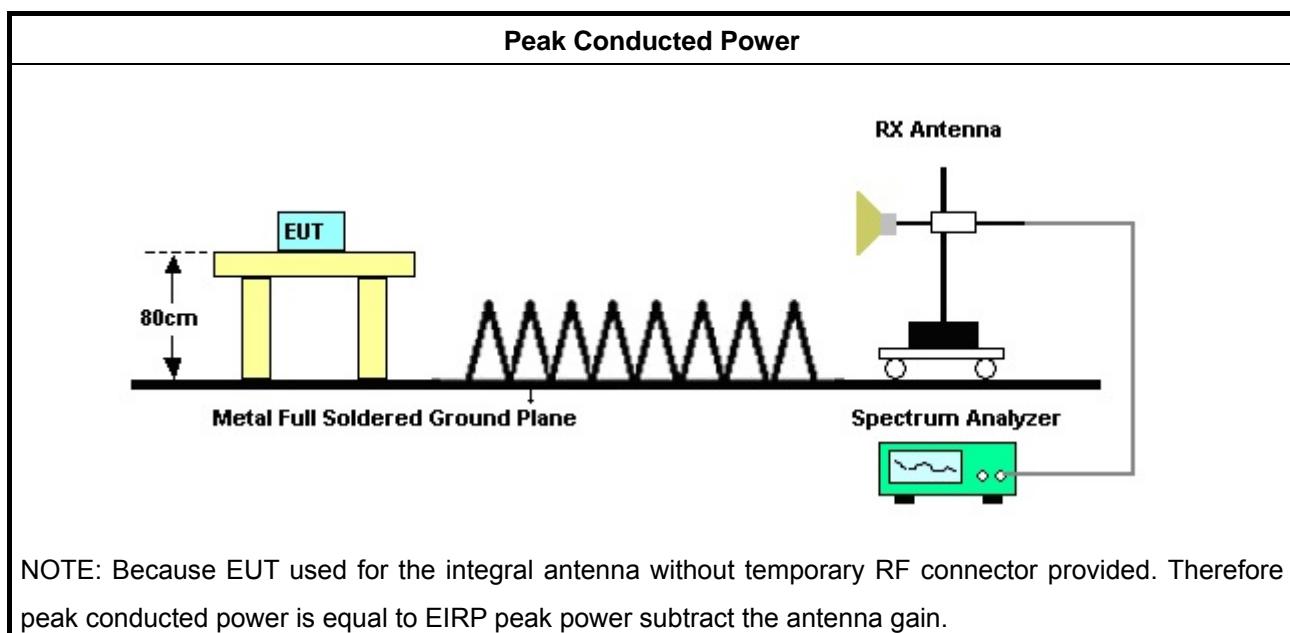
### 3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

### 3.4.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2009, clauses 7.8.3 and 7.8.6. & KDB200443 D02 RF Detector Method v01 clause 4.

### 3.4.4 Test Setup





### 3.4.5 Test Result of Peak Conducted Power

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & KDB200443 D02 RF Detector Method v01 clause 4
<b>Test Setup</b>	see ANSI C63.10, clause 7.8.6
NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.	

#### 3.4.5.1 Peak Conducted Power

<b>Temp</b>	23°C		<b>Humidity</b>	61%									
<b>Test Engineer</b>	Satoshi Yang		<b>Test Distance</b>	1 m									
<b>Test Date</b>	Nov. 01, 2014												
<b>Test Results</b>													
<b>Channel Plan (GHz)</b>	<b>Test Freq. (GHz)</b>	<b>EIRP (dBm)</b>	<b>Max. Ant. Gain</b>	<b>Peak Power (dBm) (note1)</b>	<b>Peak Power (mW)</b>	<b>6dBc BW (MHz) (note2)</b>	<b>Peak Power Limit (mW) (note3)</b>	<b>Margin (mW)</b>					
Channel 2 LRP: 60.16-60.80	60.16	30.40	16	14.40	27.529	90.30	451.50	423.971					
	60.48	30.32	16	14.32	27.065	89.44	447.20	420.135					
	60.80	30.35	16	14.35	27.226	90.74	453.70	426.470					
Channel 3 LRP: 62.32-62.96	62.32	30.38	16	14.38	27.443	90.30	451.50	424.057					
	62.64	30.55	16	14.55	28.503	87.70	438.50	409.997					
	62.96	30.51	16	14.51	28.269	90.30	451.50	423.231					

NOTE 1: Because EUT used for the integral antenna without temporary RF connector provided. Therefore peak conducted power is equal to EIRP power subtract the antenna gain.

NOTE 2: For the 6dBc bandwidth, see test report clause 3.2.5.

NOTE 3: For the applicable limit, see FCC 15.255(e)

NOTE 4: Determine the 6 dB bandwidth of the signal. If the bandwidth is less than 100 MHz, calculate the peak power limit from equation.

$$P_{\text{Limit}} = \left( \frac{BW}{100} \right) * 500mW$$

NOTE 5: For radiated emission measurements, calculate conducted transmitter output power P(cond)(dBm)

$$P(\text{cond}) = \text{EIRP} - G(\text{dBi})$$

where:

G(dBi) is gain of EUT antenna.

### 3.5 Transmitter Spurious Emissions

#### 3.5.1 Limit of Transmitter Spurious Emissions

Frequency Range	Limit
Radiated emissions below 40 GHz	FCC 15.209
Radiated emissions above 40 GHz – 200GHz	90 pW/cm <sup>2</sup> @ 3 m (Equivalent EIRP 102 µW, -9.91dBm)

NOTE: Spurious emissions shall not exceed the level of the fundamental emission.

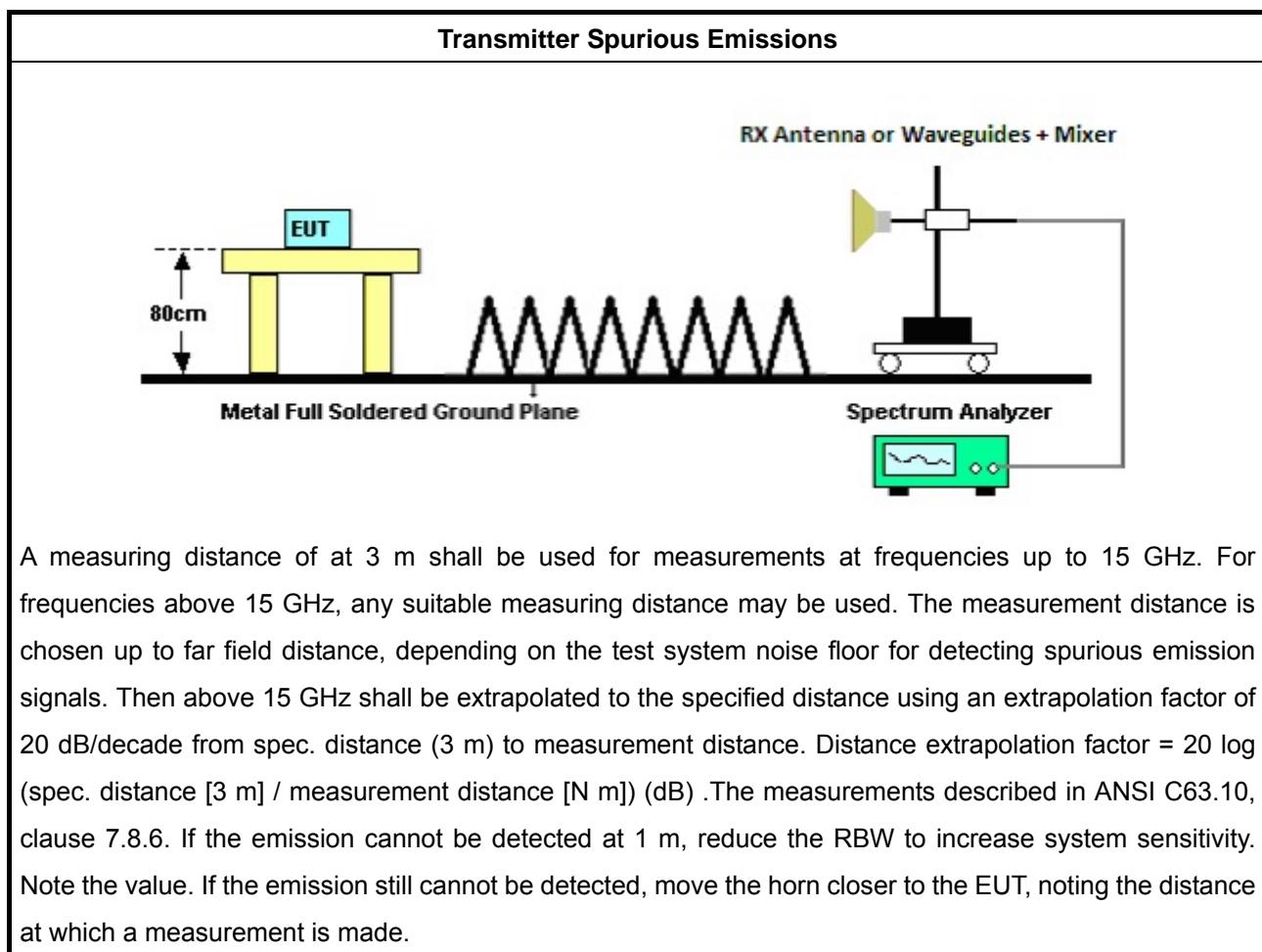
#### 3.5.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.5.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2009, clauses 6.3, 6.4, 6.5, 6.6 and 7.8.6. & KDB200443 D02 RF Detector Method v01 clauses 5.

#### 3.5.4 Test Setup



**3.5.5 Test Result of Transmitter Spurious Emissions**

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & KDB200443 D02 RF Detector Method v01 clauses 5.
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<b>Test Setup</b>	see ANSI C63.10, clauses 6.3, 6.4, 6.5, 6.6 and 7.8.6
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NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.
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### 3.5.5.1 Test Result of Transmitter Spurious Emissions

Temp	23°C	Humidity	61%
Test Engineer	Satoshi Yang	Test Distance	3 m
Test Range	30 MHz – 1000 MHz	Test Configuration	Normal Link

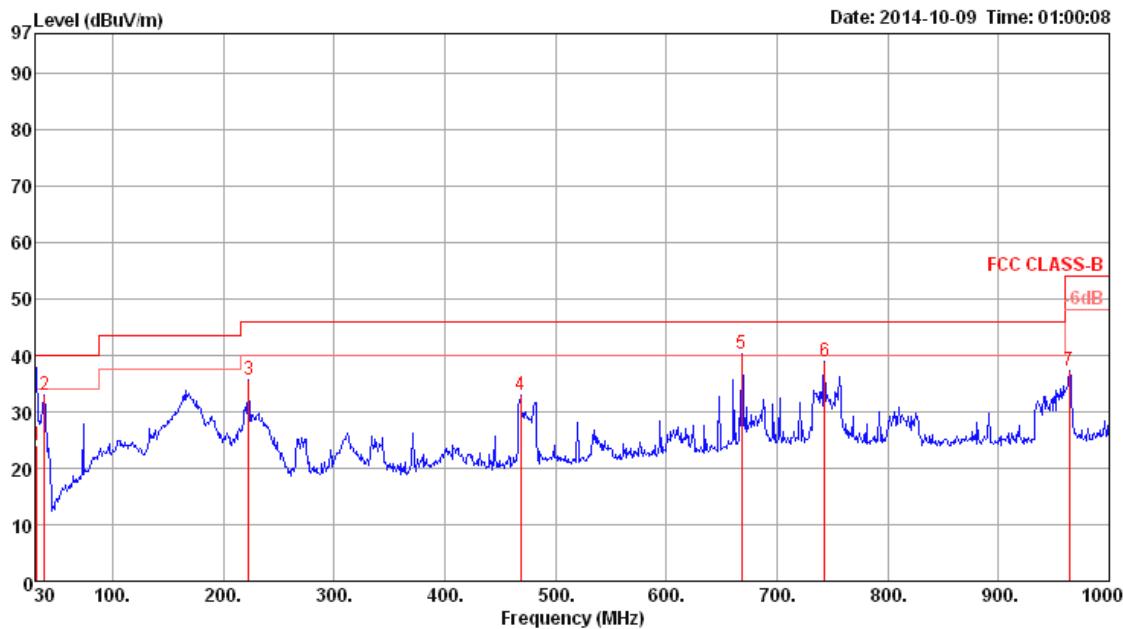
Vertical



Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor			
1	30.97	36.80	40.00	-3.20	45.75	0.63	18.22	27.80	Peak	400	0 VERTICAL
2	37.76	34.12	40.00	-5.88	46.94	0.68	14.30	27.80	Peak	400	0 VERTICAL
3	73.65	35.31	40.00	-4.69	55.25	0.94	6.83	27.71	Peak	400	0 VERTICAL
4	223.03	42.55	46.00	-3.45	57.11	1.72	10.77	27.05	QP	100	148 VERTICAL
5	466.50	34.19	46.00	-11.81	42.48	2.54	17.10	27.93	Peak	400	0 VERTICAL
6	668.26	35.51	46.00	-10.49	41.52	3.03	18.99	28.03	Peak	400	0 VERTICAL



## Horizontal



Freq	Level	Limit	Over	Read	Cable			Antenna	Preamp	A/Pos	T/Pos	Pol/Phase
					Line	Limit	Level					
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg			
1	31.94	23.93	40.00	-16.07	33.39	0.65	17.69	27.80	QP	162	160	HORIZONTAL
2	38.73	33.05	40.00	-6.95	46.48	0.67	13.70	27.80	Peak	100	0	HORIZONTAL
3	223.03	35.56	46.00	-10.44	50.12	1.72	10.77	27.05	Peak	100	0	HORIZONTAL
4	468.44	32.93	46.00	-13.07	41.20	2.54	17.13	27.94	Peak	100	0	HORIZONTAL
5	668.26	40.25	46.00	-5.75	46.26	3.03	18.99	28.03	Peak	100	0	HORIZONTAL
6	742.95	39.04	46.00	-6.96	44.30	3.19	19.38	27.83	Peak	100	0	HORIZONTAL
7	964.11	37.19	54.00	-16.81	39.74	3.57	21.02	27.14	Peak	100	0	HORIZONTAL



<b>Temp</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Satoshi Yang	<b>Test Distance</b>	3 m
<b>Test Range</b>	1 GHz – 18 GHz	<b>Test Configuration</b>	Normal Link

## Vertical

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dB			dBuV	dB	dB/m	dB	cm		
1	1707.75	36.98	54.00	-17.02	44.83	3.11	25.62	36.58	101	155	VERTICAL	Average
2	1707.81	42.50	74.00	-31.50	50.35	3.11	25.62	36.58	101	155	VERTICAL	Peak
3	2227.52	38.99	54.00	-15.01	43.21	3.58	27.91	35.71	190	190	VERTICAL	Average
4	2227.84	47.26	74.00	-26.74	51.47	3.59	27.91	35.71	190	190	VERTICAL	Peak
5	4454.36	48.28	74.00	-25.72	46.27	5.24	31.98	35.21	107	176	VERTICAL	Peak
6	4455.06	38.44	54.00	-15.56	36.43	5.24	31.98	35.21	107	176	VERTICAL	Average
7	8909.71	42.19	54.00	-11.81	32.49	7.60	37.70	35.60	159	171	VERTICAL	Average
8	8909.85	54.49	74.00	-19.51	44.79	7.60	37.70	35.60	159	171	VERTICAL	Peak

## Horizontal

Freq	Level	Limit		Over Limit	Read Level	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
		Line	dB			dBuV	dB	dB/m	dB	cm		
1	1707.19	44.60	74.00	-29.40	52.45	3.11	25.62	36.58	123	278	HORIZONTAL	Peak
2	1707.77	38.08	54.00	-15.92	45.93	3.11	25.62	36.58	123	278	HORIZONTAL	Average
3	2227.28	62.31	74.00	-11.69	66.53	3.58	27.91	35.71	124	114	HORIZONTAL	Peak
4	2227.59	51.44	54.00	-2.56	55.66	3.58	27.91	35.71	124	114	HORIZONTAL	Average
5	4454.76	48.10	74.00	-25.90	46.09	5.24	31.98	35.21	100	145	HORIZONTAL	Peak
6	4454.96	34.72	54.00	-19.28	32.71	5.24	31.98	35.21	100	145	HORIZONTAL	Average
7	8909.28	41.98	54.00	-12.02	32.28	7.60	37.70	35.60	100	155	HORIZONTAL	Average
8	8909.92	56.25	74.00	-17.75	46.55	7.60	37.70	35.60	100	155	HORIZONTAL	Peak



Temp	23°C	Humidity	61%
Test Engineer	Satoshi Yang	Test Distance	1 m
Test Range	18 GHz – 26.5 GHz	Test Configuration	Normal Link

## Vertical

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
MHz	dBuV/m	dBuV/m	dB						cm	deg	
1	25014.50	49.05	63.54	-14.49	33.44	11.71	39.09	35.19	Average	100	147 VERTICAL
2	25014.50	59.28	83.54	-24.26	43.67	11.71	39.09	35.19	Peak	100	147 VERTICAL

## Horizontal

Freq	Level	Limit		Over Limit	Read Level	Cable Antenna Preamp			A/Pos	T/Pos	Pol/Phase
		Line	dB			dBuV	dB	dB/m			
MHz	dBuV/m	dBuV/m	dB						cm	deg	
1	24945.00	48.57	63.54	-14.97	33.04	11.67	39.09	35.23	Average	100	20 HORIZONTAL
2	24945.00	61.68	83.54	-21.86	46.15	11.67	39.09	35.23	Peak	100	20 HORIZONTAL



<b>Temp</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Satoshi Yang	<b>Test Distance</b>	1 m
<b>Test Range</b>	26.5 GHz – 40 GHz	<b>Test Configuration</b>	Normal Link

## Vertical

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase	
		Line	dB			dBuV	dB	dB/m							
MHz	dBuV/m	dBuV/m	dB										cm	deg	
1	31547.97	52.22	63.54	-11.32	41.73	11.71	40.02	41.24	Average			100	357	VERTICAL	
2	31553.21	72.09	83.54	-11.45	61.53	11.71	40.02	41.17	Peak			100	357	VERTICAL	

## Horizontal

Freq	Level	Limit		Over Limit	Read Level	Cable			Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase	
		Line	dB			dBuV	dB	dB/m							
MHz	dBuV/m	dBuV/m	dB										cm	deg	
1	31544.40	53.59	63.54	-9.95	43.10	11.71	40.02	41.24	Average			100	37	HORIZONTAL	
2	31544.40	69.40	83.54	-14.14	58.91	11.71	40.02	41.24	Peak			100	37	HORIZONTAL	



Temp	23°C	Humidity	61%
Test Engineer	Satoshi Yang	Test Date	Nov. 01, 2014
Test Range	40GHz – 200GHz		

## Test Plan: Channel 2 LRP: 60.16-60.80

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
60.48	23	0.5	41.62	-69.45
EIRP (dBm)	Specification Distance (m)	Power Density (pW/m^2)	Limit (pW/cm^2)	Test Result
-33.64	3	3.8224	90.00	Complied

## Test Plan: Channel 3 LRP: 62.32-62.96

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
62.64	23	0.5	40.44	-70.29
EIRP (dBm)	Specification Distance (m)	Power Density (pW/m^2)	Limit (pW/cm^2)	Test Result
-34.73	3	2.9741	90.00	Complied

## 3.6 Frequency Stability

### 3.6.1 Limit of Frequency Stability

Frequency Stability	Limit
Refer as FCC 15.255(f) and KDB200443 D02 RF Detector Method v01 clauses 6.	within the frequency bands

Note: These measurements shall also be performed at normal and extreme test conditions.

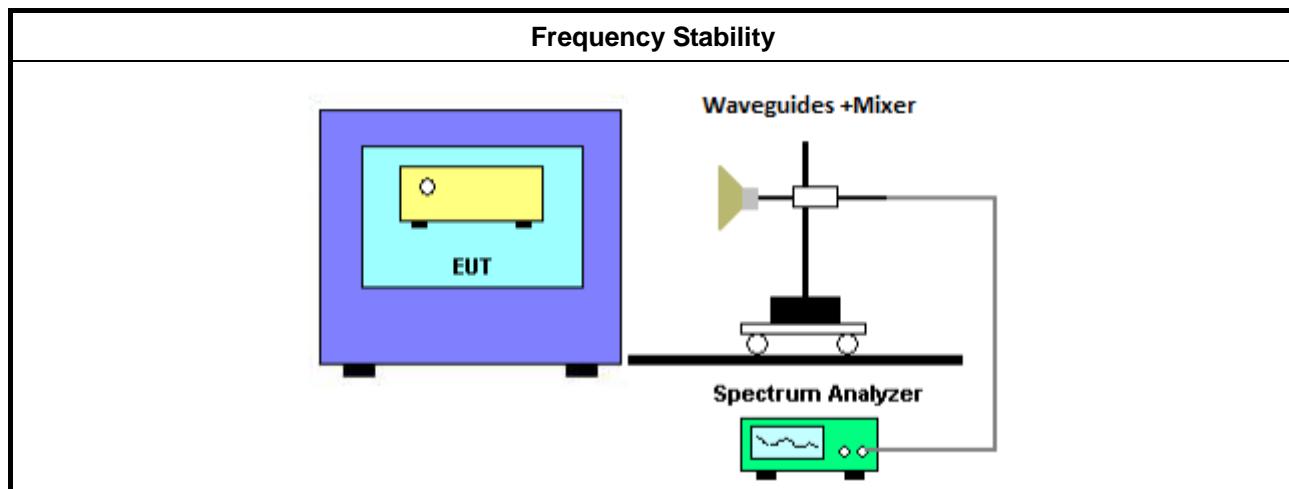
### 3.6.2 Measuring Instruments

Refer a measuring instruments list in this test report.

### 3.6.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2009, clauses 6.8 and 7.8.7.

### 3.6.4 Test Setup





### 3.6.5 Test Result of Frequency Stability

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & KDB200443 D02 RF Detector Method v01 clauses 6.
<b>Test Setup</b>	see ANSI C63.10, clauses 6.8 and 7.8.7
NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.	

#### 3.6.5.1 Frequency Stability with Respect to Ambient Temperature

Frequency Stability with Respect to Ambient Temperature			
Temp	23°C	Humidity	61%
Test Engineer	Satoshi Yang	Test Date	Nov. 01, 2014
Test Results			
Test Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
-20	60.47999	0	within band
-10	60.47999	0	within band
0	60.47999	0	within band
10	60.48000	0	within band
20	60.47999	Reference	within band
30	60.47999	0.00087	within band
40	60.47999	0.00304	within band
50	60.47999	-0.00304	within band

NOTE:

1. For the applicable limit, see FCC 15.255(f).
2. The EUT is intended for indoor use only with a manufacturer's specified temperature range of 0 to °C.



### 3.6.5.2 Frequency Stability When Varying Supply Voltage

Frequency Stability When Varying Supply Voltage			
Temp	23°C	Humidity	61%
Test Engineer	Satoshi Yang	Test Date	Nov. 01, 2014
Test Results			
Test Voltage: (Vdc)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
4.25	60.47999	0	within band
5	60.47999	Reference	within band
5.75	60.47999	0	within band

NOTE: For the applicable limit, see FCC 15.255(f).

### 3.7 Publicly-accessible Coordination Channel

#### 3.7.1 Limit of Publicly-accessible Coordination Channel

Frequency Range	Limit
57 GHz-57.05 GHz	No emissions appear in the range 57-57.05 GHz

NOTE: For the applicable limit, see FCC 15.255(d)

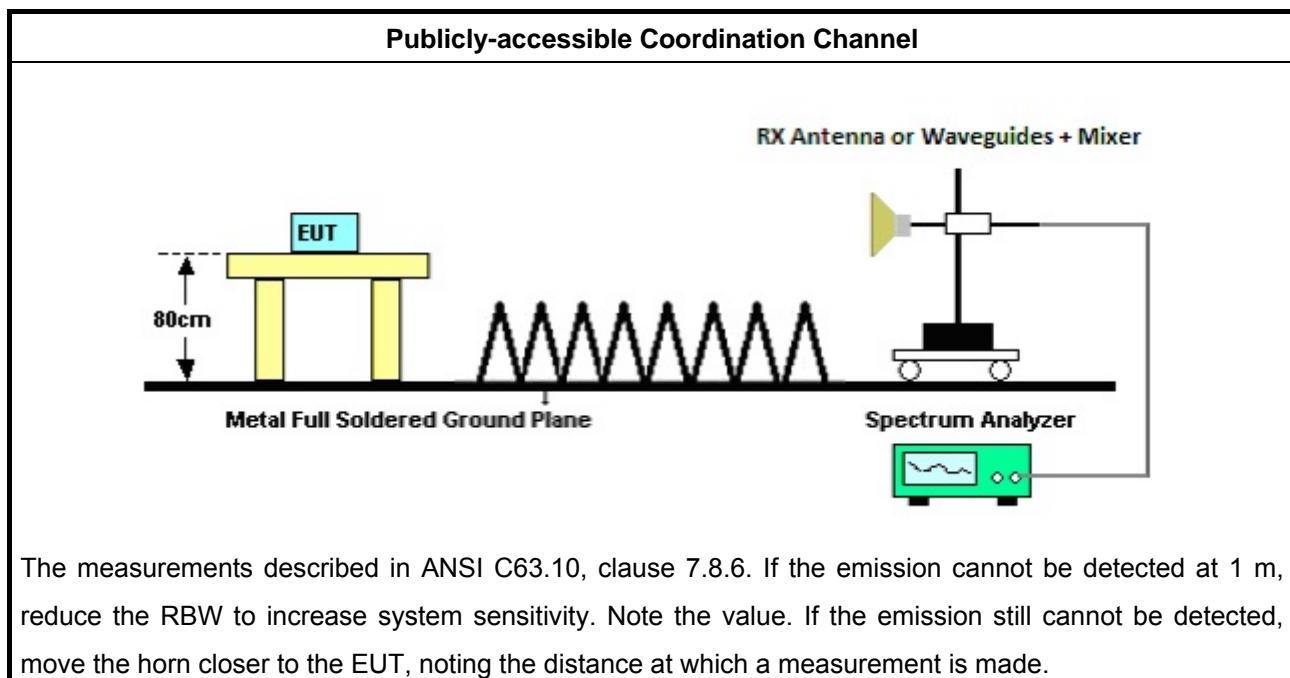
#### 3.7.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.7.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2009, clauses 6.3, 6.4, 6.5, 6.6 and 7.8.6. & KDB200443 D02 RF Detector Method v01 clauses 5.

#### 3.7.4 Test Setup



#### 3.7.5 Test Result of Publicly-accessible Coordination Channel

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & KDB200443 D02 RF Detector Method v01 clauses 5.
<b>Test Setup</b>	see ANSI C63.10, clauses 6.3, 6.4, 6.5, 6.6 and 7.8.6

NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.



## 3.7.5.1.1 Radiated Testing

<b>Temp</b>	23°C	<b>Humidity</b>	61%		
<b>Test Engineer</b>	Satoshi Yang	<b>Test Distance</b>	0.5 m		
<b>Test Range</b>	57 GHz - 57.05 GHz	<b>Test Date</b>	Nov. 01, 2014		
<b>Test Results</b>					
<b>Test Range</b>	<b>Emission Frequency (MHz)</b>	<b>Emission Observed (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Remark</b>
57 GHz - 57.05 GHz	57.02	-22.03	-9.91	-12.12	-



### 3.8 Operation Restriction and Group Installation

#### 3.8.1 Limit of Operation Restriction and Group Installation

Item	Limit
Operation Restriction	<p>Operation is not permitted for the following products:</p> <ul style="list-style-type: none"><li>♦ Equipment used on aircraft or satellites. (Refer as FCC 15.255 (a))</li><li>♦ Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. (Refer as FCC 15.255 (a))</li></ul>
Group Installation	<p>Operation is not permitted for the following products:</p> <ul style="list-style-type: none"><li>♦ External phase-locking (Refer as FCC 15.255 (h))</li></ul>

#### 3.8.2 Result of Operation Restriction

Manufacturer declares that EUT will not be used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for used on aircraft or satellites. EUT is a wireless video area network (WVAN) for the connection of consumer electronic (CE) audio and video devices.

#### 3.8.3 Result of Group Installation

The frequency, amplitude and phase of the transmit signal are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array.



## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 23, 2014	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2013	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	--	26GHz ~ 40GHz	Feb. 17, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO 2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Mixer	OML	M19HW/A	U91113-1	40 ~ 60 GHz	Dec. 17, 2013*	Radiation (03CH01-CB)
Mixer	OML	M15HW/A	V91113-1	50 ~ 75 GHz	Dec. 17, 2013*	Radiation (03CH01-CB)
Diplexer	OML	DPL313B	N/A	40~200GHz	N.C.R.	Radiation (03CH01-CB)
Mixer	OML	M12HW/A	E91113-1	60 ~ 90 GHz	Dec. 17, 2013*	Radiation (03CH01-CB)
Mixer	OML	M08HW/A	F91113-1	90 ~ 140 GHz	Dec. 17, 2013*	Radiation (03CH01-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	N.C.R.	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO19R	U91113-A	40 ~ 60 GHz	N.C.R.	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO15R	V91113-A	50 ~ 75 GHz	N.C.R.	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO12R	E91113-A	60 ~ 90 GHz	N.C.R.	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO08R	F91113-A	90 ~ 140 GHz	N.C.R.	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO05R	G91113-A	140 ~ 220 GHz	N.C.R.	Radiation (03CH01-CB)
Pico Scope	Pico	Pico Scope 6402C	CX372/002	-	Nov. 15, 2013*	Radiation (03CH01-CB)
RF Detector	millitech	DET-15-RPFW0	38	50 ~ 75 GHz	Aug. 14, 2013*	Radiation (03CH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

\*Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.



## 5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 220GHz)	4.7 dB	Confidence levels of 95%
Temperature	0.7°C	Confidence levels of 95%