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# TEST REPORT

Report number : JPD-TR-17245-0

Issue date : December 28, 2017

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

## FCC Part15 Subpart C

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

Applicant	: KYOCERA Corporation
Equipment under test (EUT)	: Mobile Phone
Model number	: YKFA21
FCC ID	: JOYYKFA21

Date of test : November 28, 2017  
December 1, 4, 5, 6, 7, 11, 13, 20, 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

Tested by : Taiki Watanabe  
Taiki Watanabe

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





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## 1. Summary of Test

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### 1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 15 Subpart C.

### 1.2 Standards

CFR47 FCC Part 15 Subpart C

#### 1.2.1 Test Methods

ANSI C63.10-2013, KDB 558074 D01 DTS Meas Guidance v04

#### 1.2.2 Deviation from standards

None

### 1.3 List of applied test to the EUT

Test items Section	Test items	Condition	Result
15.247(a)(2)	DTS Bandwidth / Occupied Bandwidth (99%)	Conducted	PASS
15.247(b)(3)	Maximum conducted (average) output power	Conducted	PASS
15.247(d)	Band Edge Compliance of RF Conducted Emissions	Conducted	PASS
15.247(d) 15.205 15.209	Spurious Emissions	Conducted Radiated	PASS
15.247(d) 15.205 15.209	Restricted Bands of Operation	Radiated	PASS
15.247(e)	Transmitter Power Spectral Density	Conducted	PASS
15.207	AC Power Line Conducted Emissions	Conducted	PASS

#### 1.3.1 Test set up

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### 1.4 Modification to the EUT by laboratory

None



## 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	: YKFA21
Serial number	: N/A
EUT condition	: Pre-Production
Power ratings	: Battery: DC 3.8V
Size	: (W) 71.5mm x (D) 8.4mm x (H) 145.0mm
Environment	: Indoor and Outdoor use
Terminal limitation	: -20°C to 60°C
RF Specification Protocol	: IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20), IEEE802.11n(HT40)
Frequency range	: IEEE802.11b /11g/11n (HT20): 2412MHz-2462MHz IEEE802.11n (HT40): 2422MHz-2452MHz
Number of RF Channels	: 11 Channels
Modulation type	: IEEE802.11b: DSSS (DBPSK, DQPSK, CCK) IEEE802.11g / n (HT20) / n (HT20): OFDM (BPSK, QPSK, 16QAM, 64QAM)
Data rate	: IEEE802.11b: 1, 2, 5.5, 11Mbps IEEE802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps IEEE802.11n (HT20 LGI): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps IEEE802.11n (HT20 SGI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2Mbps IEEE802.11n (HT40 LGI): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135Mbps IEEE802.11n (HT40 SGI): 15, 30, 45, 60, 90, 120, 135, 150Mbps
Channel separation	: 5MHz
Output power	: 48.417mW (IEEE802.11b) 132.130mW (IEEE802.11g) 143.880mW (IEEE802.11n: HT20) 112.980mW (IEEE802.11n: HT40)
Antenna type	: Internal antenna
Antenna gain	: 0.4dBi

## 2.3 Variation of the family model(s)

Not applicable

## 2.4 Operating channels and frequencies

Channel	Frequency [MHz]
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

## 2.5 Operating mode

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Tested Channel	Frequency [MHz]	Frequency [MHz](11n HT40)
Low	2412	2422
Middle	2437	2437
High	2462	2452

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Tested Channel	Modulation Type	Data Rate
Low, Middle, High	IEEE802.11b: DSSS	1Mbps
Low, Middle, High	IEEE802.11g: OFDM	6Mbps
Low, Middle, High	IEEE802.11n (HT20 LGI): OFDM	MCS0 (6.5Mbps)
Low, Middle, High	IEEE802.11n (HT40 LGI): OFDM	MCS0 (13.5Mbps)

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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## 2.6 Operating flow

### [Tx mode]

- i) Test program setup to the DM tool
- ii) Select a Test mode
  - [IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20)]  
Operating frequency: Channel Low: 2412MHz, Channel Middle: 2437MHz, Channel High: 2462MHz
  - [IEEE802.11n (HT40)]  
Operating frequency: Channel Low: 2422MHz, Channel Middle: 2437MHz, Channel High: 2452MHz
- iii) Start test mode

### [Rx mode]

- i) Test program setup to the DM tool
- ii) Select a Test mode
  - [IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20)]  
Operating frequency: Channel Low: 2412MHz, Channel Middle: 2437MHz, Channel High: 2462MHz
  - [IEEE802.11n (HT40)]  
Operating frequency: Channel Low: 2422MHz, Channel Middle: 2437MHz, Channel High: 2452MHz
- iii) Start test mode

### 3. Configuration of equipment

#### 3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Mobile Phone	KYOCERA	YKFA21	N/A	JOYYKFA21	EUT
2	AC Adapter	KYOCERA	AD03KC	N/A	N/A	*
3	USB conversion connector	ANKER	N/A	N/A	N/A	*

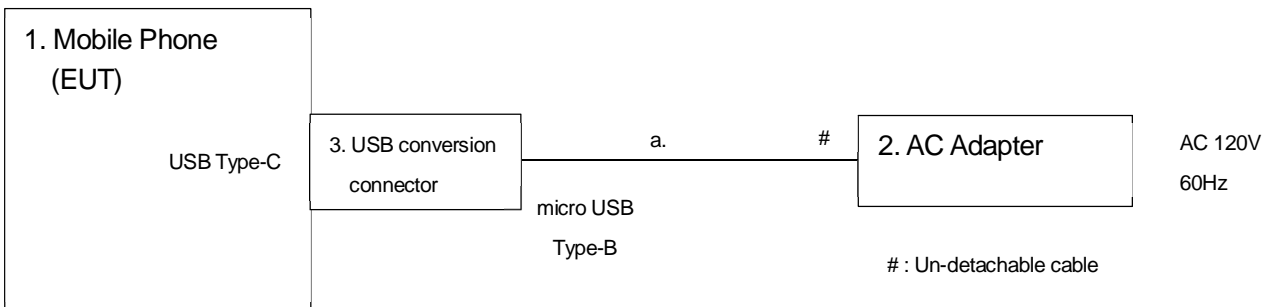
\*: AC power line Conducted Emission Test.

#### 3.2 Cable(s) used

No.	Cable	Length[m]	Shield	Connector	Comment
a	Micro USB cable (for AC Adapter)	1.0	Yes	Metal	*

\*: AC power line Conducted Emission Test.

#### 3.3 System configuration



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in "3.1 Equipment(s) used" and "3.2 Cable(s) used".



## 4. DTS Bandwidth / Occupied Bandwidth (99%)

### 4.1 Measurement procedure

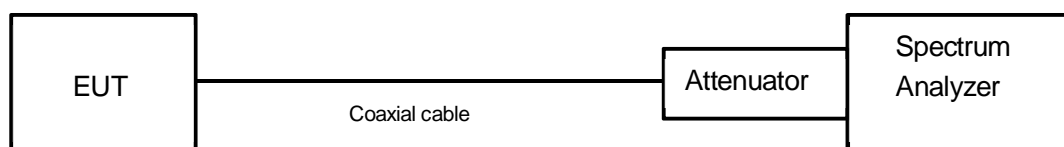
[FCC 15.247(a)(2), KDB 558074 D01 v04, Section 8.2]

The bandwidth at 6dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- RBW = 100kHz.
- VBW  $\geq 3 \times$  RBW.
- Sweep time = auto-couple.
- Detector = peak.
- Trace mode = max hold.

- Test configuration



### 4.2 Limit

The minimum permissible 6dB bandwidth is 500kHz.

### 4.3 Measurement result

Date : November 28, 2017  
 Temperature : 23.5 [°C]  
 Humidity : 36.2 [%]  
 Test place : Shielded room No.4

Test engineer : Chiaki Kanno

[IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20)]

Channel	Frequency [MHz]	DTS Bandwidth [MHz]		
		IEEE802.11b	IEEE802.11g	IEEE802.11n (HT20)
Low	2412	9.566	16.389	17.612
Middle	2437	9.591	16.391	17.611
High	2462	10.044	16.402	17.608

Channel	Frequency [MHz]	DTS Bandwidth [MHz]
		IEEE802.11n (HT40)
Low	2422	35.138
Middle	2437	35.563
High	2452	35.345



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Channel	Frequency [MHz]	Occupied Bandwidth (99%) [MHz]		
		IEEE802.11b	IEEE802.11g	IEEE802.11n (HT20)
Low	2412	13.986	16.493	17.659
Middle	2437	14.109	16.591	17.728
High	2462	14.030	16.511	17.664

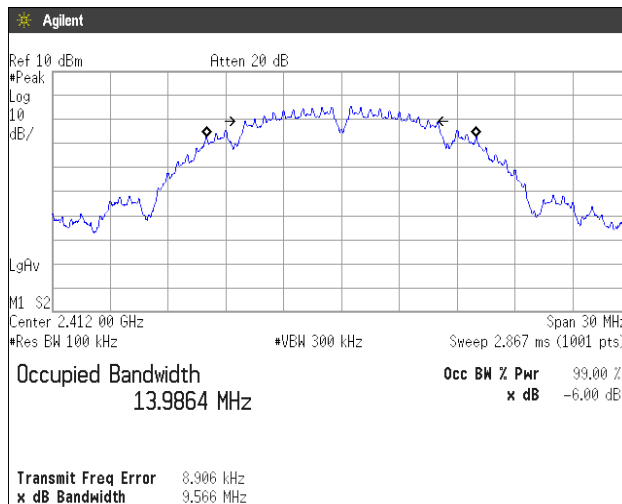
Channel	Frequency [MHz]	Occupied Bandwidth (99%) [MHz]
		IEEE802.11n (HT40)
Low	2422	35.701
Middle	2437	36.000
High	2452	35.932



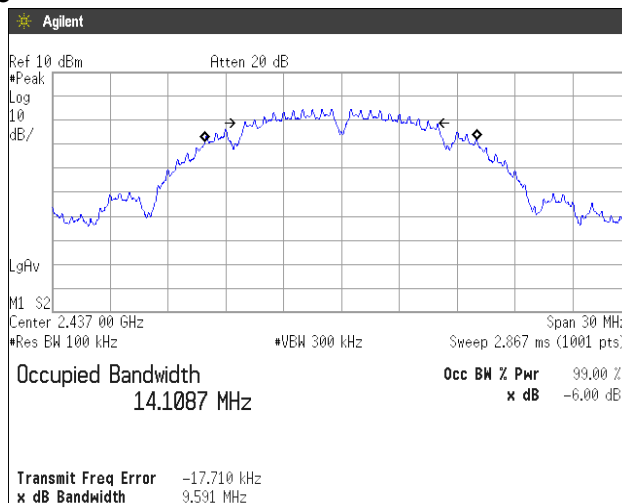
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### 4.4 Trace data [IEEE802.11b]

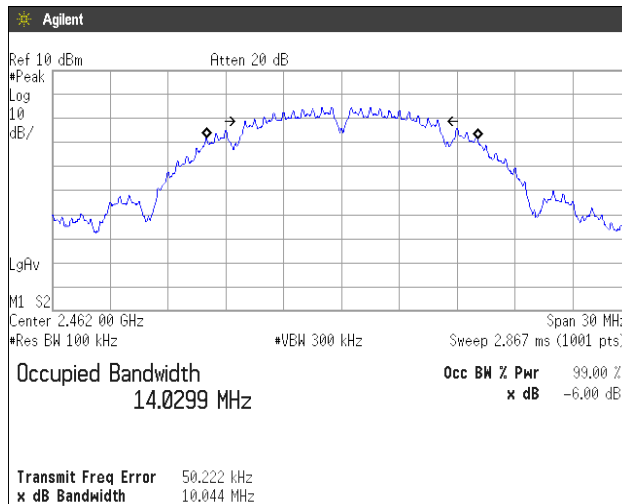
#### Channel Low



#### Channel Middle



#### Channel High

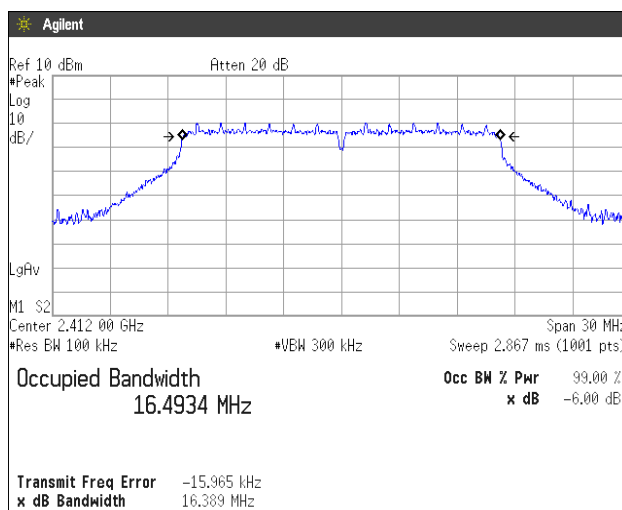




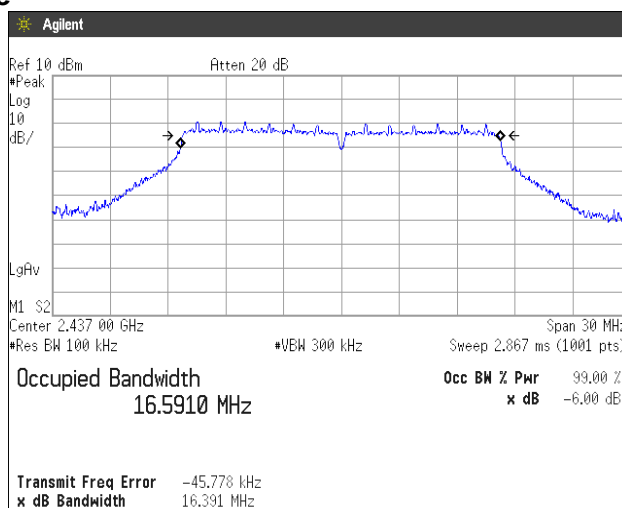
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[IEEE802.11g]

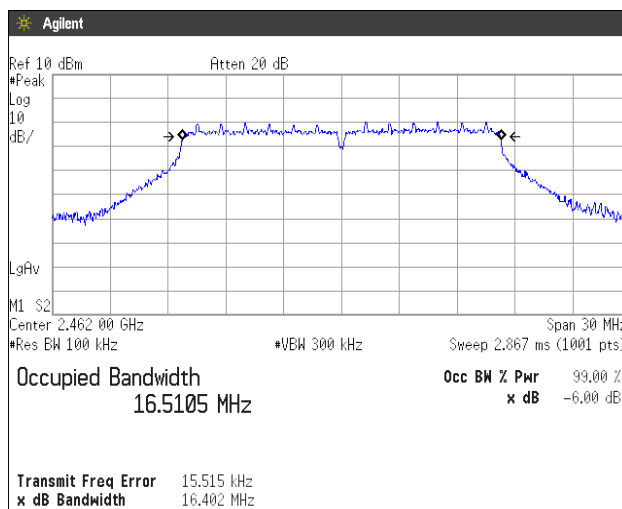
**Channel Low**



**Channel Middle**



**Channel High**

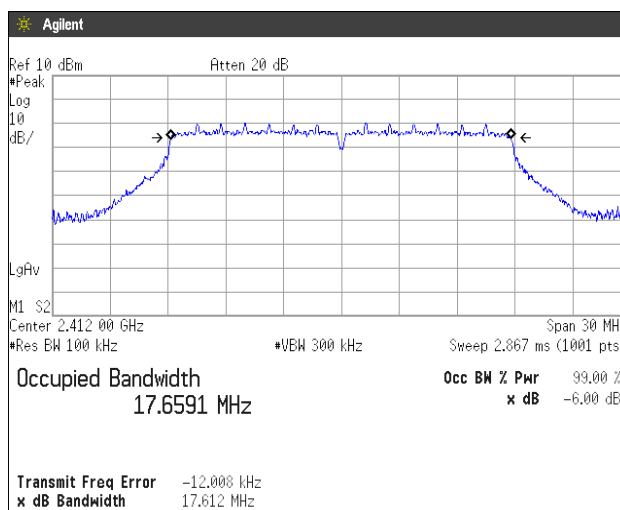




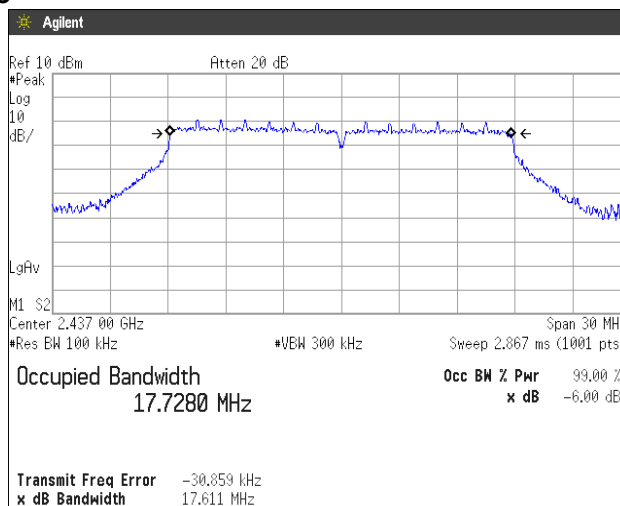
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[IEEE802.11n (HT20)]

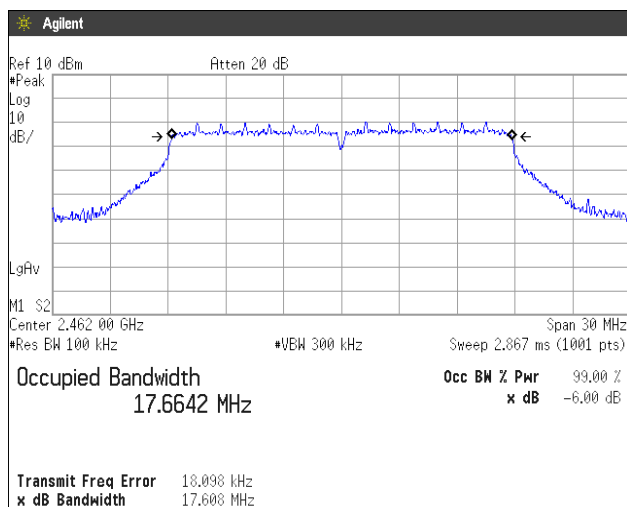
Channel Low



Channel Middle



Channel High

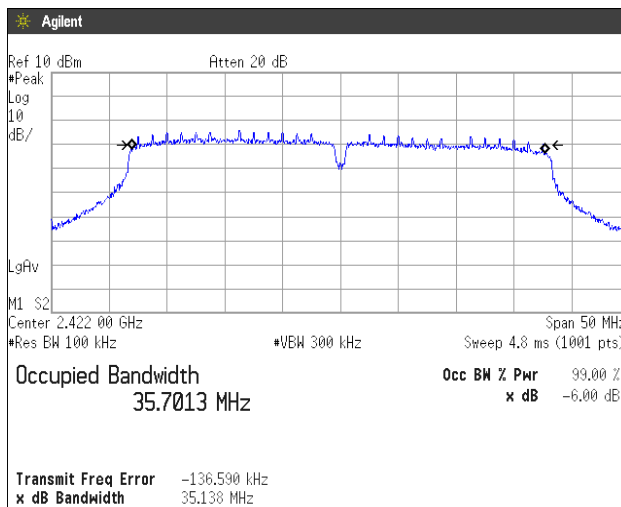




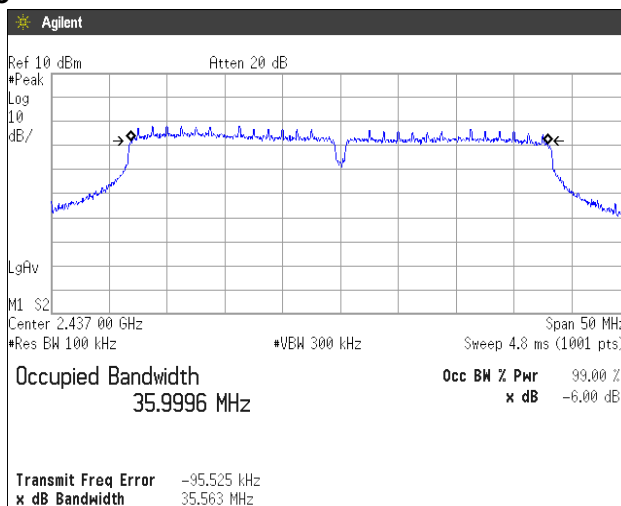
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[IEEE802.11n (HT40)]

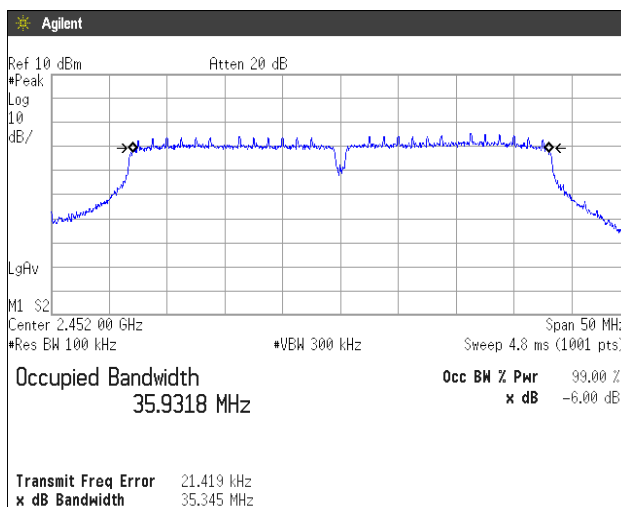
Channel Low



Channel Middle



Channel High



## 5. Maximum Conducted Output Power

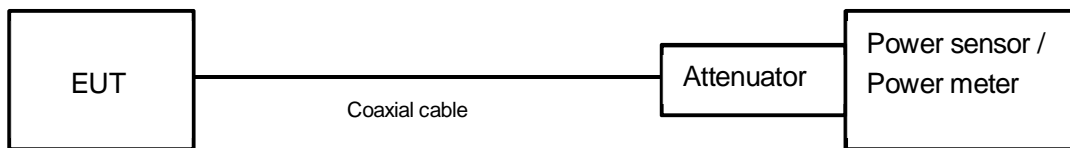
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### 5.1 Measurement procedure

[FCC 15.247(b)(3), KDB 558074 D01 v04, Section 9.1.3]

The peak power is measured with a power sensor connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

- Test configuration



### 5.2 Limit

1W(1000mW) or less

### 5.3 Measurement result

Date : November 28, 2017  
 Temperature : 23.5 [°C]  
 Humidity : 36.2 [%]  
 Test place : Shielded room No.4

Test engineer : Chiaki Kanno

**[IEEE802.11b]**  
**Battery Full**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	5.94	10.52	16.46	44.259	≤1000	PASS
Middle	2437	6.33	10.52	16.85	48.417	≤1000	PASS
High	2462	5.73	10.52	16.25	42.170	≤1000	PASS

**[IEEE802.11g]**  
**Battery Full**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	10.69	10.52	21.21	132.130	≤1000	PASS
Middle	2437	10.44	10.52	20.96	124.738	≤1000	PASS
High	2462.	10.33	10.52	20.85	121.479	≤1000	PASS

**[IEEE802.11n (HT20)]**  
**Battery Full**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	11.06	10.52	21.58	143.880	≤1000	PASS
Middle	2437	10.58	10.52	21.10	128.825	≤1000	PASS
High	2462	10.41	10.52	20.93	123.880	≤1000	PASS

**[IEEE802.11n (HT40)]**  
**Battery Full**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2422	8.37	10.52	18.89	77.446	≤1000	PASS
Middle	2437	10.01	10.52	20.53	112.980	≤1000	PASS
High	2452	8.13	10.52	18.65	73.350	≤1000	PASS

Calculation;

$$\text{Reading (dBm)} + \text{Factor (dB)} = \text{Level (dBm)}$$

$$10 \log P = \text{Level (dBm)}$$

$$P = 10^{(\text{Maximum Peak Output Power} / 10)} \text{ (mW)}$$



## 6. Band Edge Compliance of RF Conducted Emissions

---

### 6.1 Measurement procedure

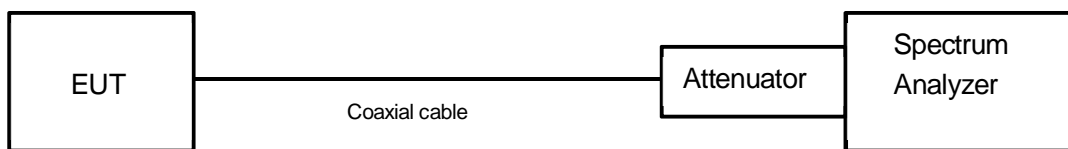
[FCC 15.247(d), KDB 558074 D01 v04, Section 11.0]

The Band Edge is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) Span = Arbitrary setting. (Setting suitable for measurement.)
- b) RBW = 100kHz.
- c) VBW  $\geq 3 \times$  RBW
- d) Sweep time = auto-couple.
- e) Detector = peak.
- f) Trace mode = max hold.

- Test configuration



### 6.2 Limit

In any 100kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

### 6.3 Measurement result

Date : November 28, 2017  
 Temperature : 23.5 [°C]  
 Humidity : 36.2 [%]  
 Test place : Shielded room No.4

Test engineer : Chiaki Kanno

#### [IEEE802.11b]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412	-5.40	2400.00	-44.86	39.46	At least 20dB below from peak of RF	PASS
High	2462	-5.97	2483.50	-66.24	60.27	At least 20dB below from peak of RF	PASS

#### [IEEE802.11g]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412	-9.93	2399.92	-44.05	34.12	At least 20dB below from peak of RF	PASS
High	2462	-10.08	2483.82	-55.32	45.24	At least 20dB below from peak of RF	PASS

#### [IEEE802.11n (HT20)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412	-9.69	2399.84	-43.44	33.75	At least 20dB below from peak of RF	PASS
High	2462	-10.06	2484.46	-53.40	43.34	At least 20dB below from peak of RF	PASS

#### [IEEE802.11n (HT40)]

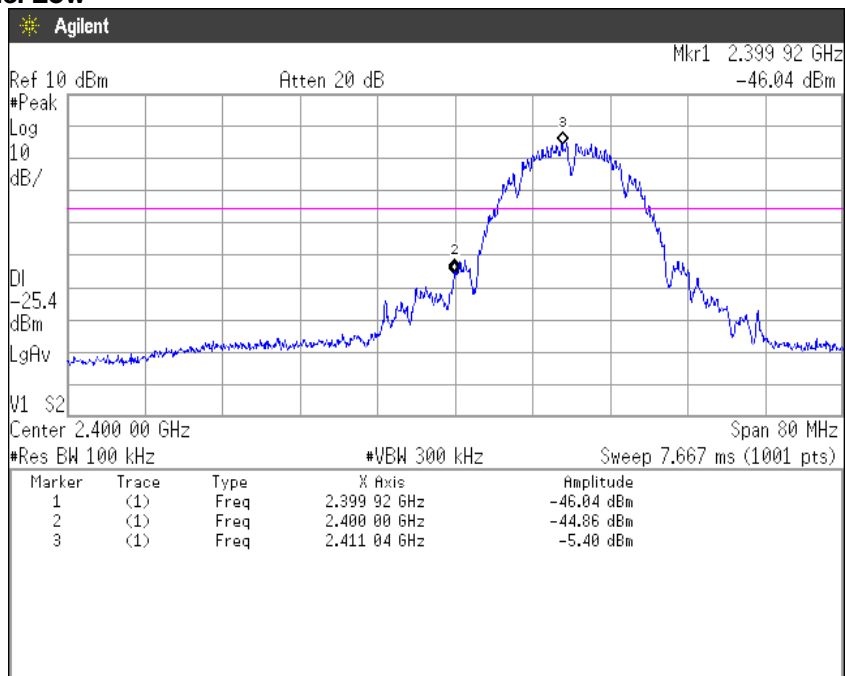
Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2422.00	-14.19	2399.68	-46.41	32.22	At least 20dB below from peak of RF	PASS
High	2452.00	-14.67	2484.46	-59.30	44.63	At least 20dB below from peak of RF	PASS



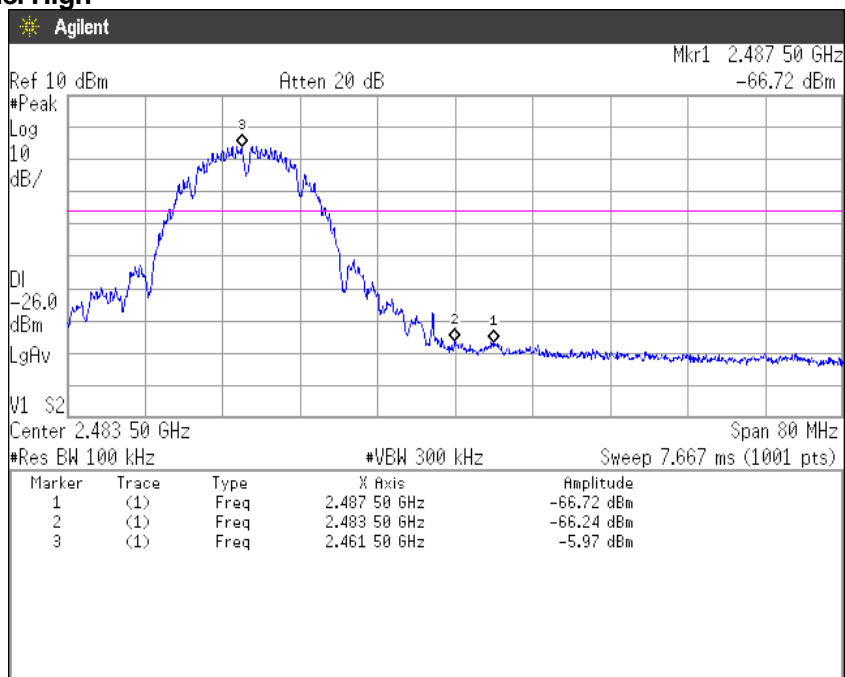
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### 6.4 Trace data [IEEE802.11b]

#### Channel Low



#### Channel High

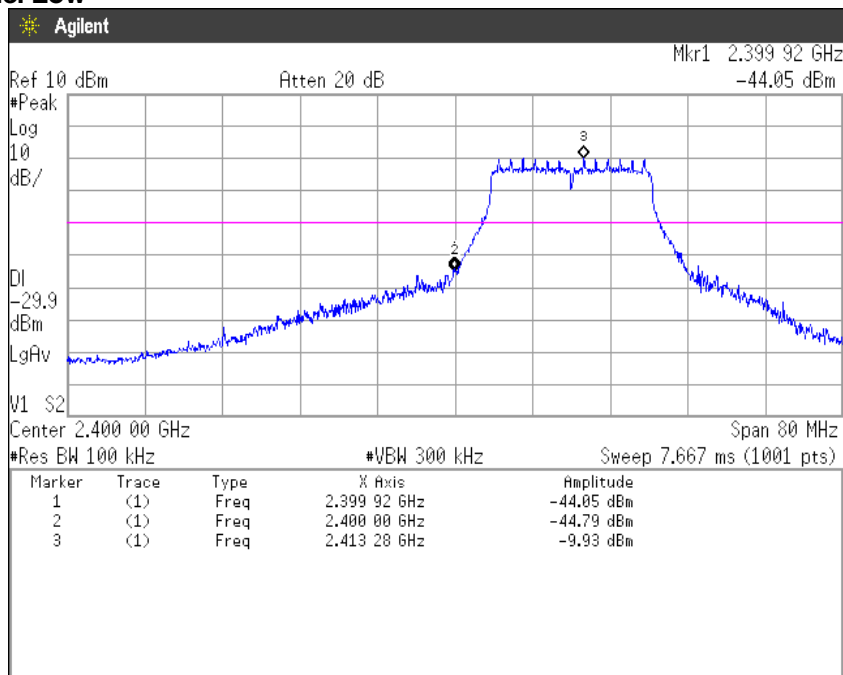




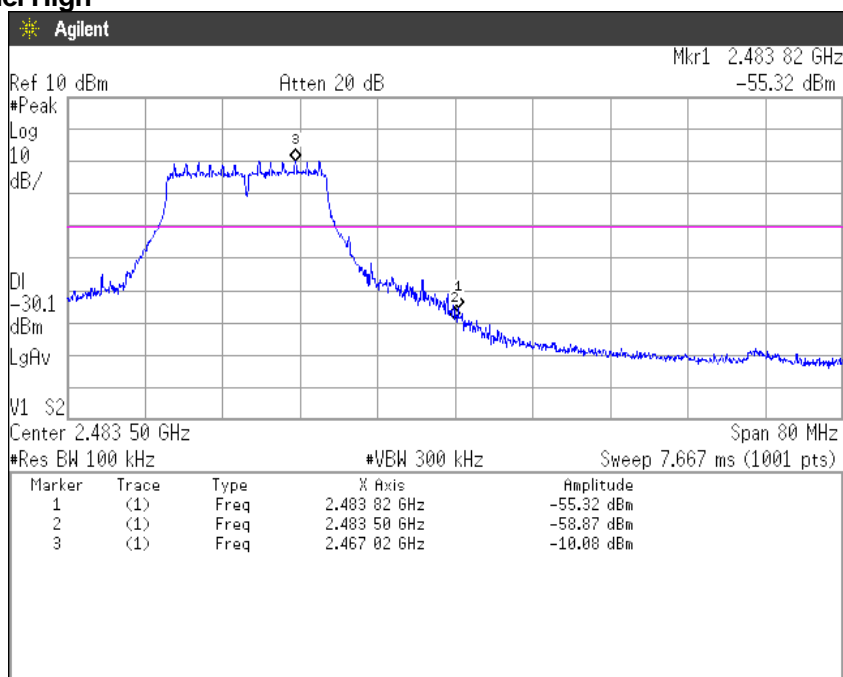
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[IEEE802.11g]

**Channel Low**



**Channel High**

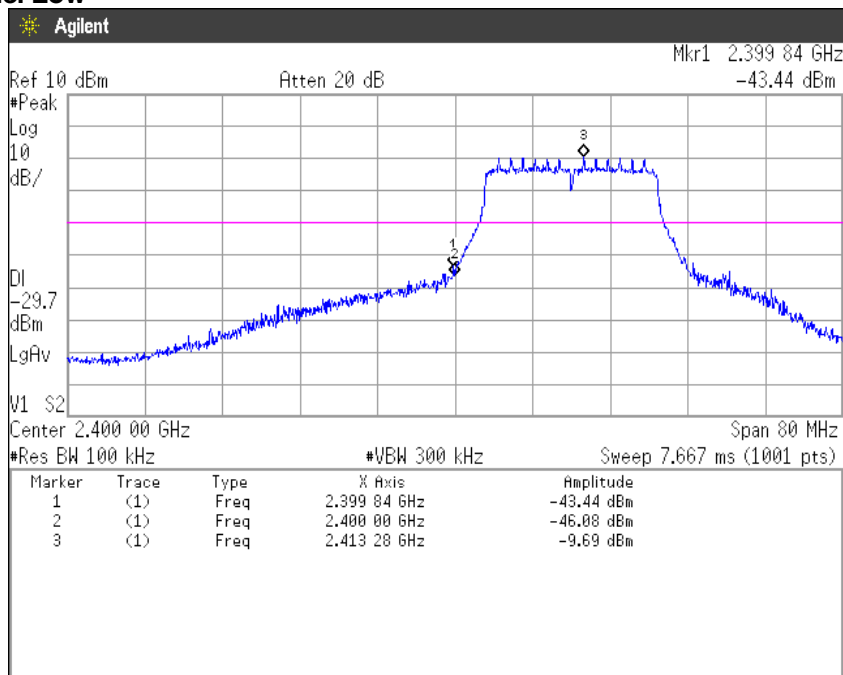




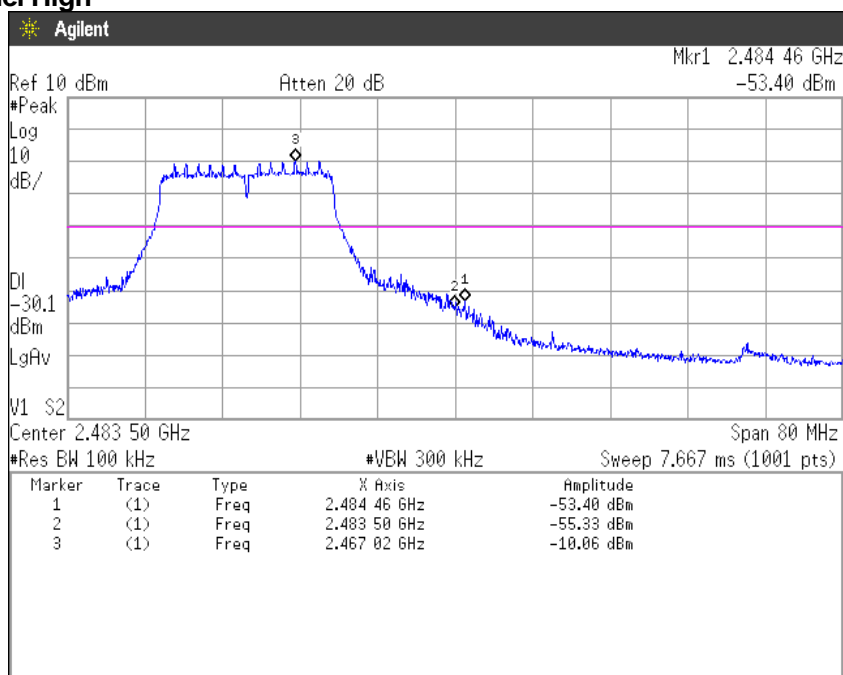
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[IEEE802.11n (HT20)]

Channel Low



Channel High

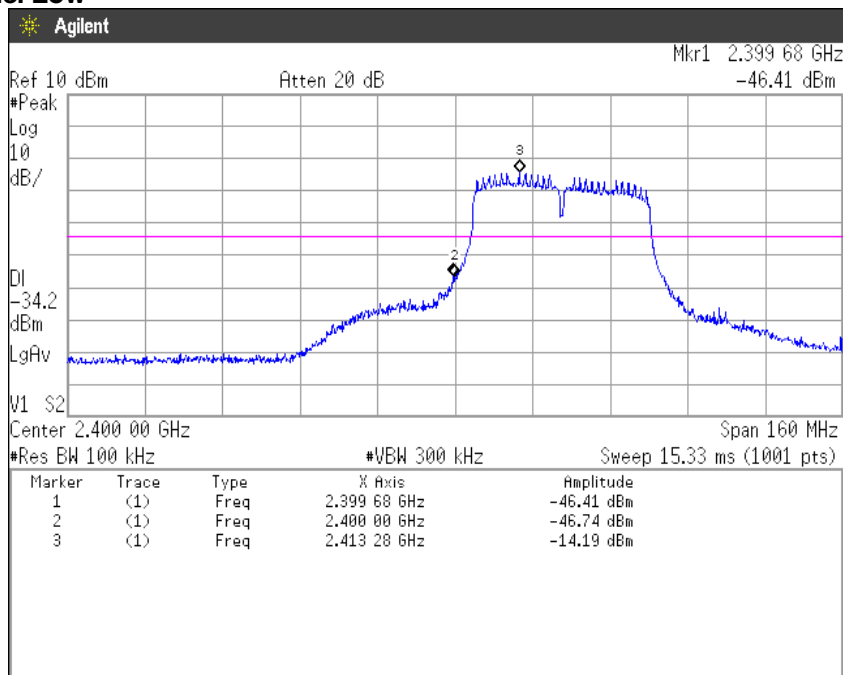




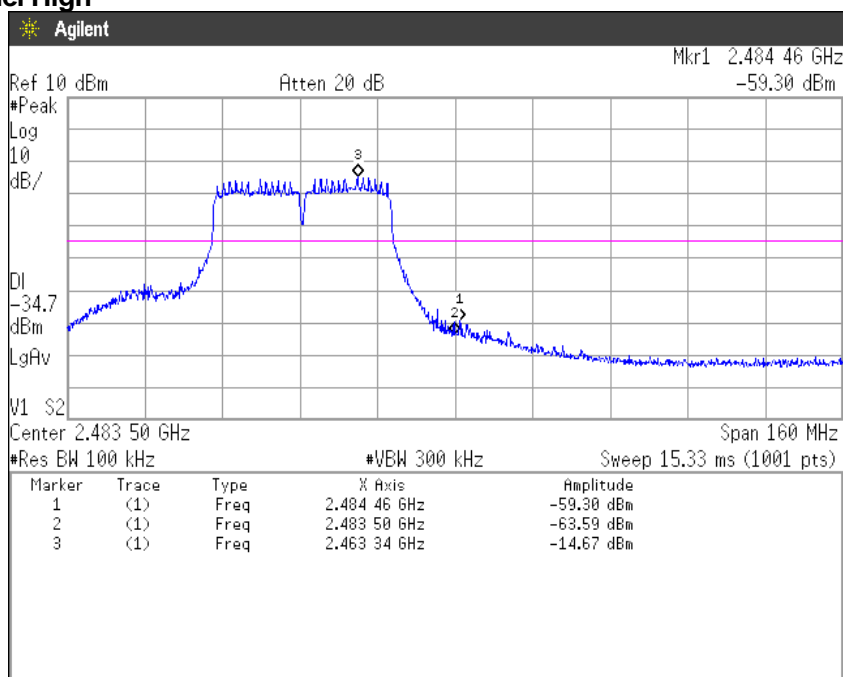
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[IEEE802.11n (HT40)]

Channel Low



Channel High



## 7. Spurious emissions - Conducted -

### 7.1 Measurement procedure

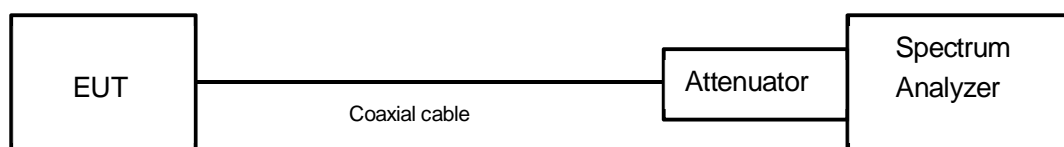
[FCC 15.247(d), KDB 558074 D01 v04, Section 11.0]

The spurious emissions (Conducted) are measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- Span = wide enough to fully capture the emission being measured.
- RBW = 100 kHz.
- VBW  $\geq$  RBW.
- Sweep time = auto-couple.
- Detector = peak.
- Trace mode = max hold.

- Test configuration



### 7.2 Limit

In any 100kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

### 7.3 Measurement result

Date : November 28, 2017  
 Temperature : 23.5 [°C]  
 Humidity : 36.2 [%]  
 Test place : Shielded room No.4

Test engineer : Chiaki Kanno

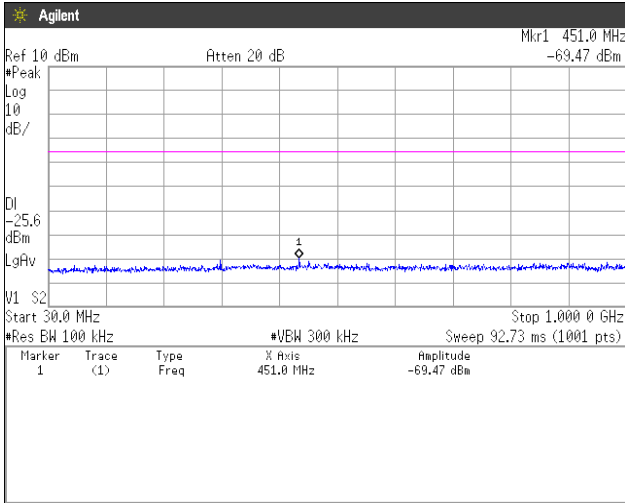
#### [IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20)]

Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2412	At least 20dB below from peak of RF	See the trace Data	PASS
Middle	2437	At least 20dB below from peak of RF	See the trace Data	PASS
High	2462	At least 20dB below from peak of RF	See the trace Data	PASS

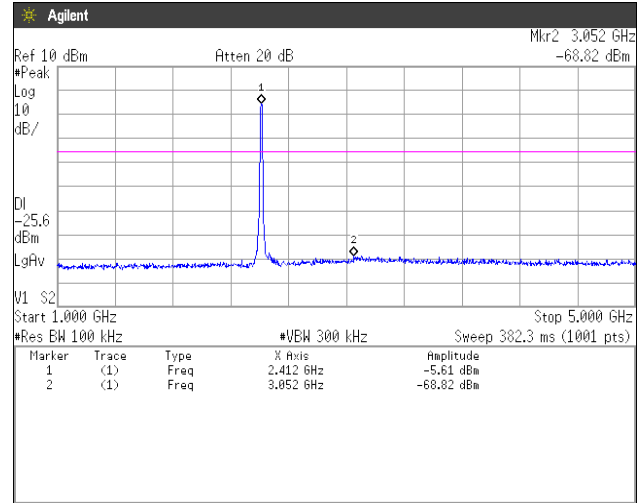
#### [IEEE802.11n (HT40)]

Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2422	At least 20dB below from peak of RF	See the trace Data	PASS
Middle	2437	At least 20dB below from peak of RF	See the trace Data	PASS
High	2452	At least 20dB below from peak of RF	See the trace Data	PASS

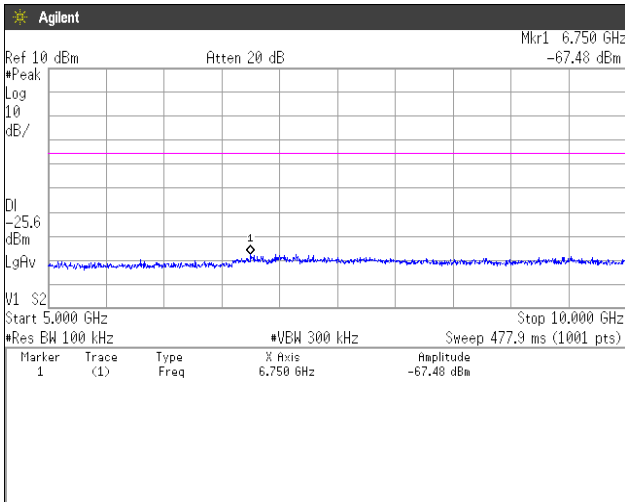
**7.4 Trace data**  
**[IEEE802.11b]**  
**Channel Low**  
**30MHz-1GHz**



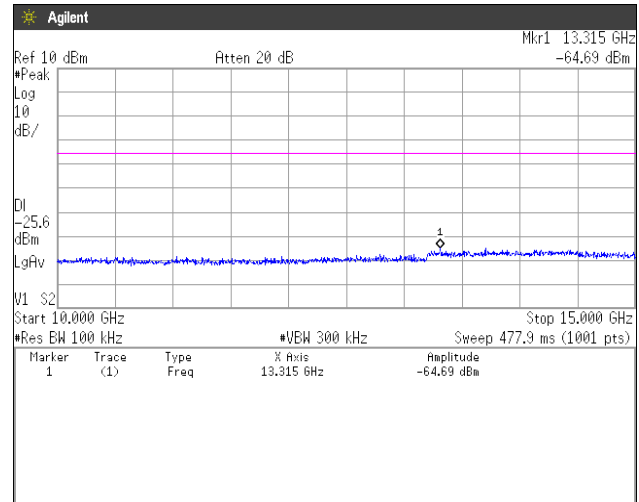
**1GHz-5GHz**



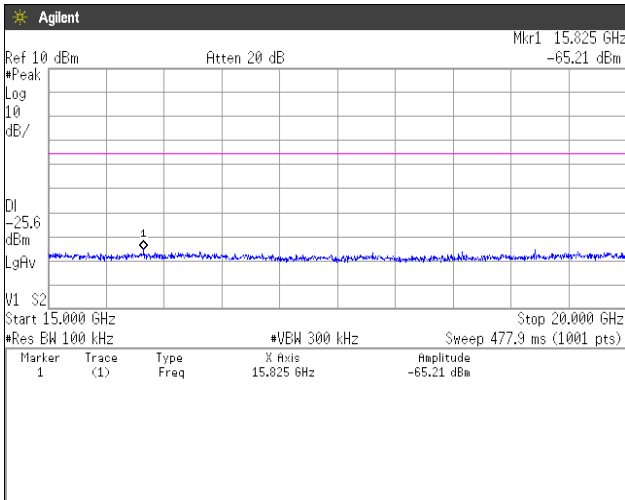
**5GHz-10GHz**



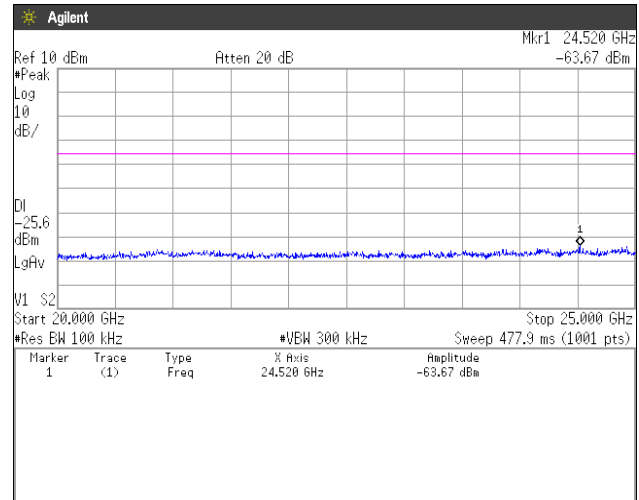
**10GHz-15GHz**



**15GHz-20GHz**



**20GHz-25GHz**

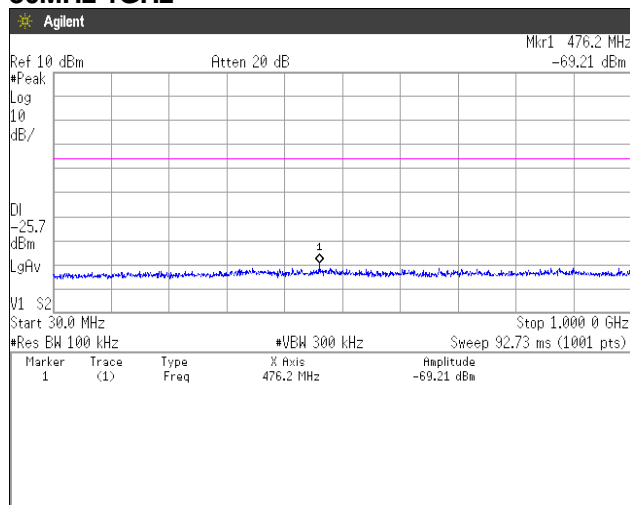




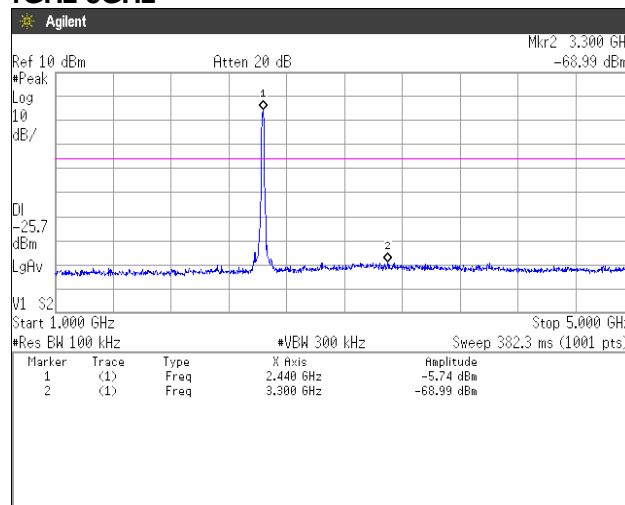


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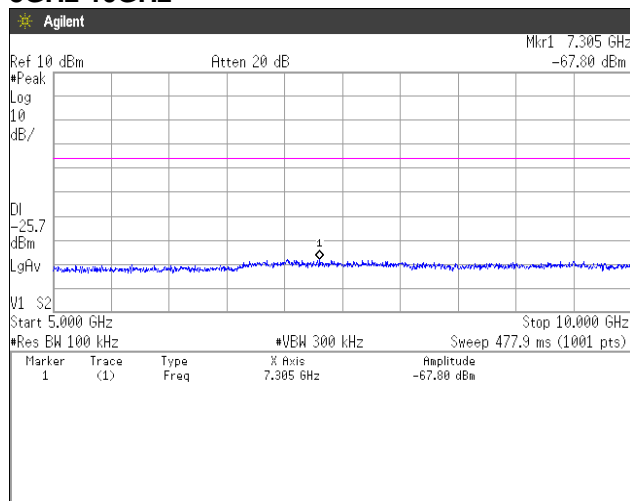
### Channel Middle 30MHz-1GHz



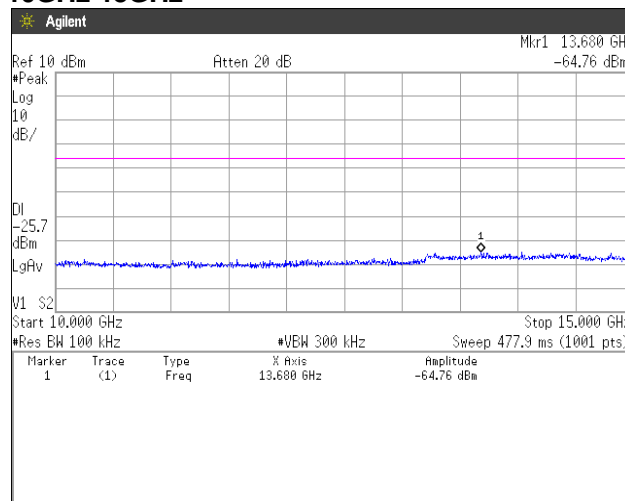
### 1GHz-5GHz



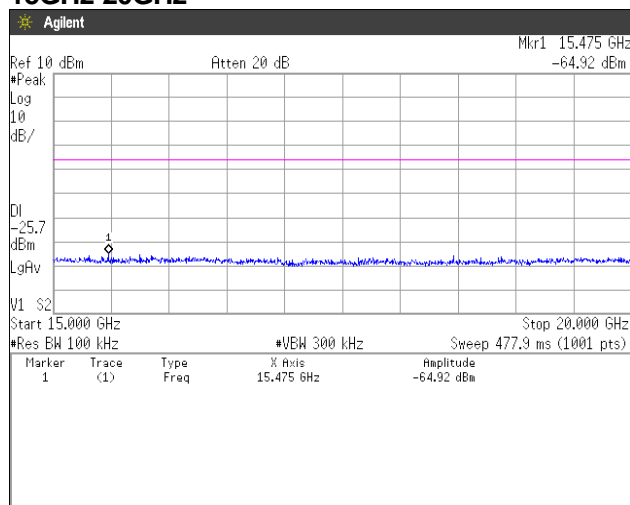
### 5GHz-10GHz



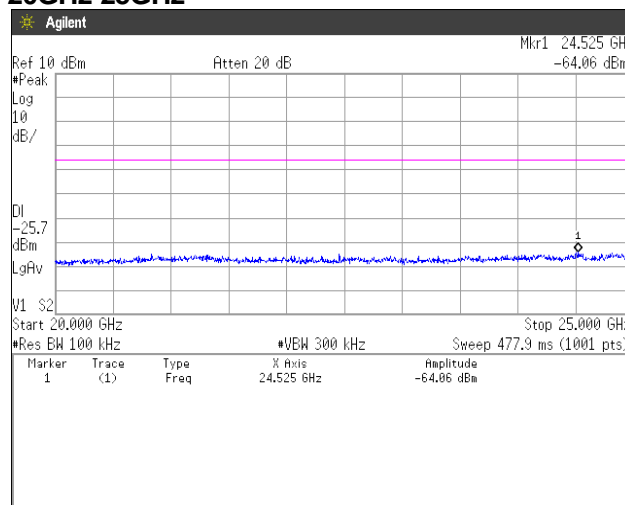
### 10GHz-15GHz



### 15GHz-20GHz



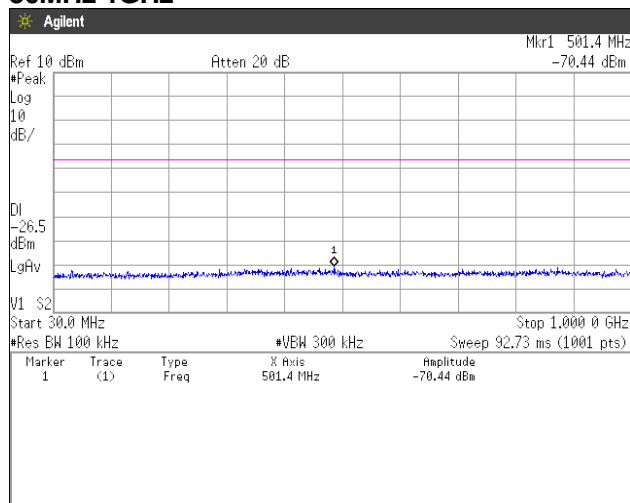
### 20GHz-25GHz



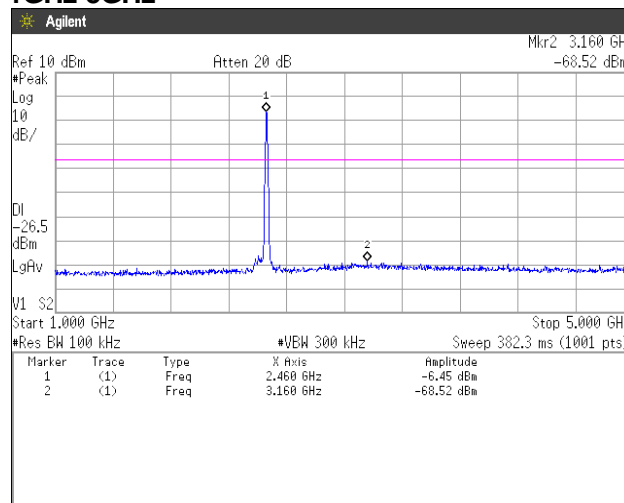


Zacta

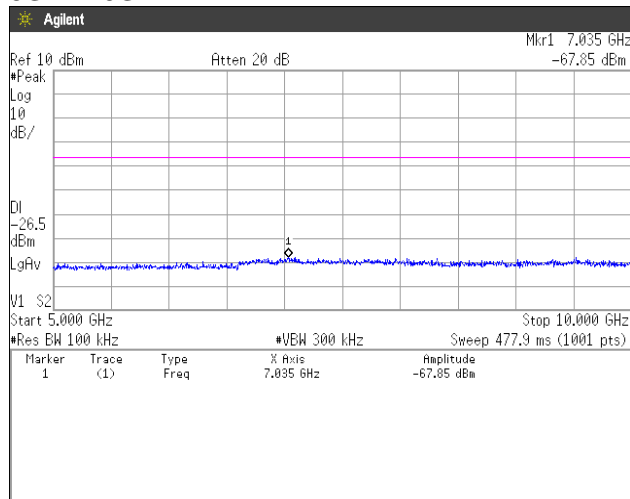
### Channel High 30MHz-1GHz



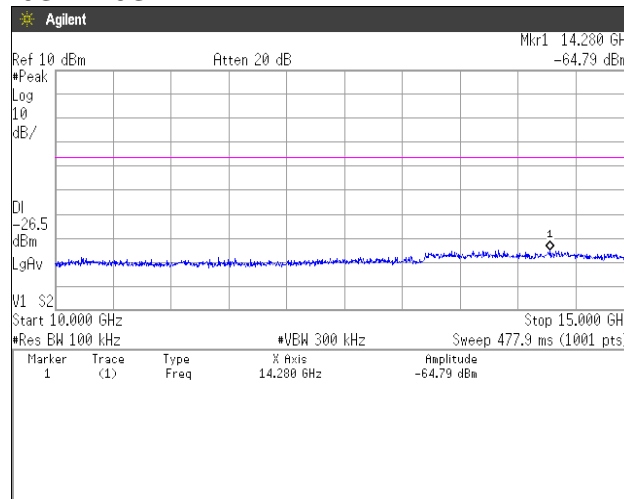
### 1GHz-5GHz



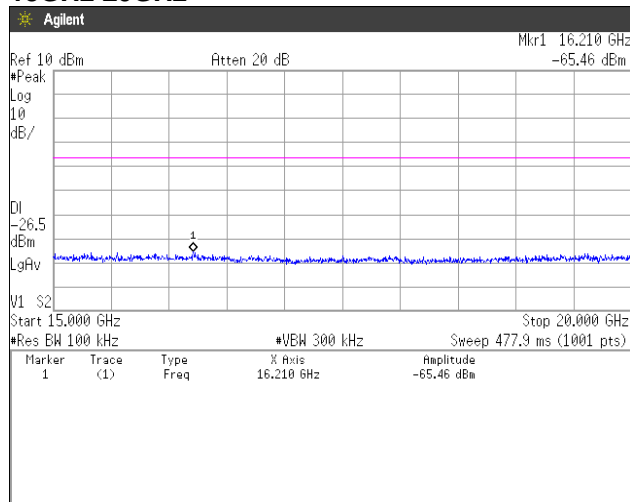
### 5GHz-10GHz



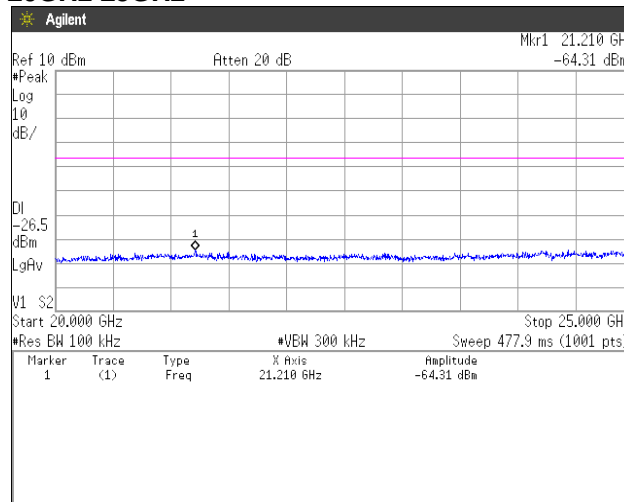
### 10GHz-15GHz



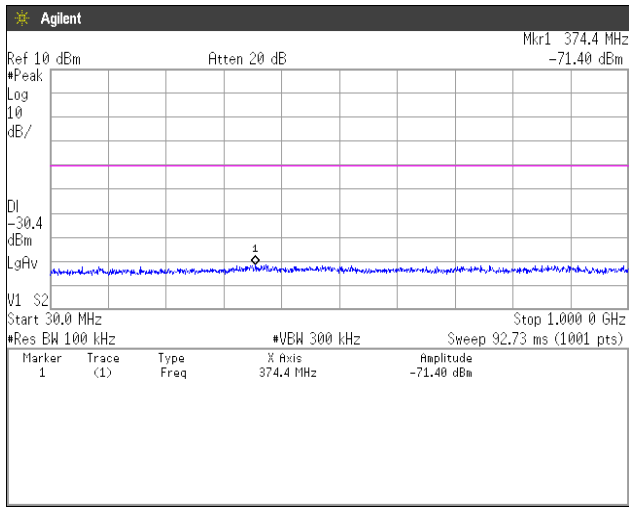
### 15GHz-20GHz



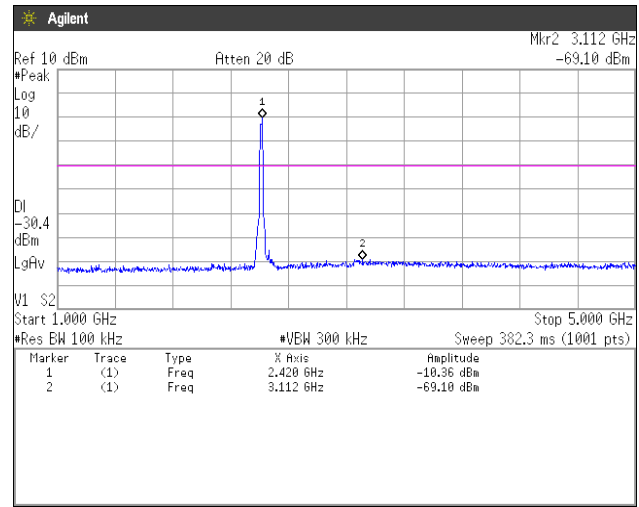
### 20GHz-25GHz



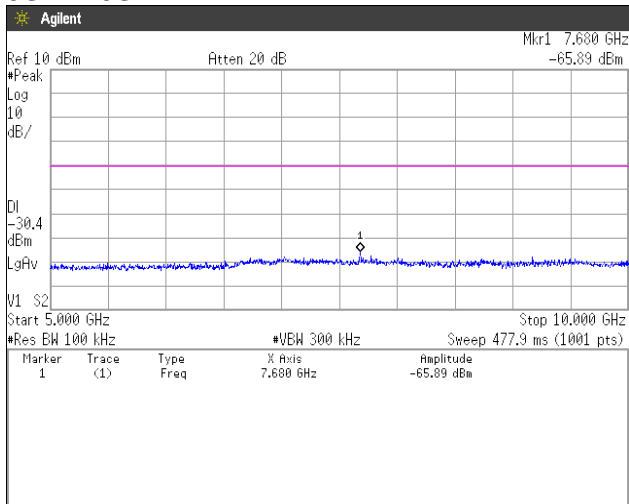
**[IEEE802.11g]  
Channel Low  
30MHz-1GHz**



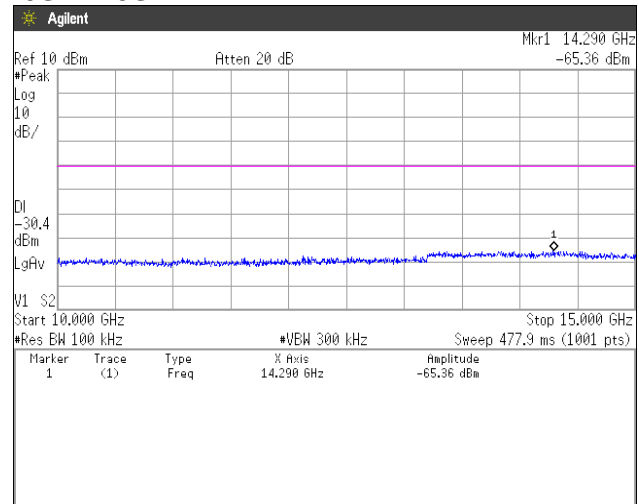
**1GHz-5GHz**



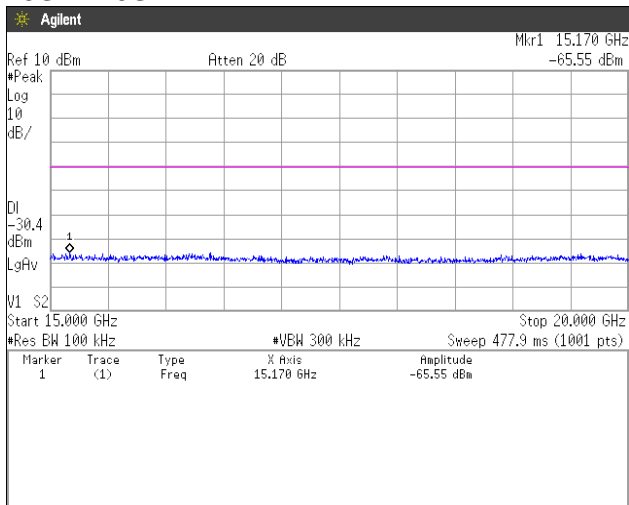
**5GHz-10GHz**



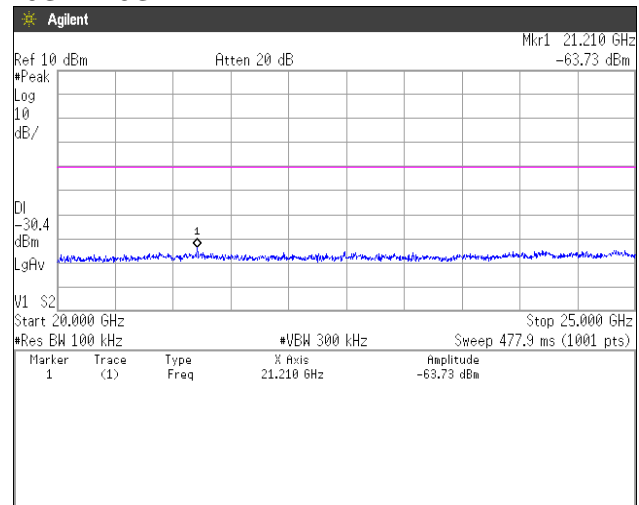
**10GHz-15GHz**



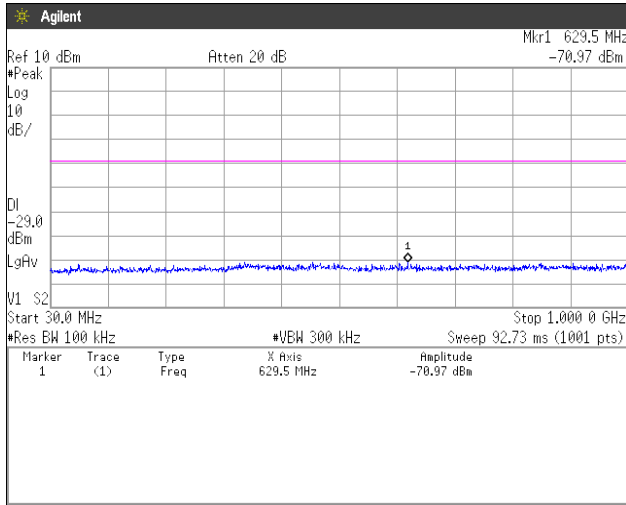
**15GHz-20GHz**



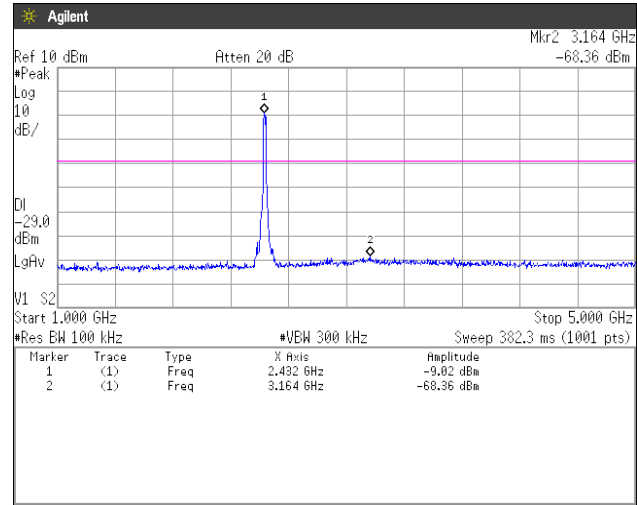
**20GHz-25GHz**



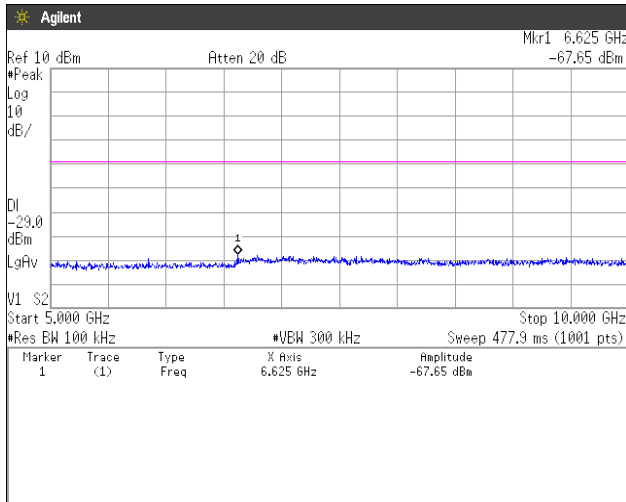
### Channel Middle 30MHz-1GHz



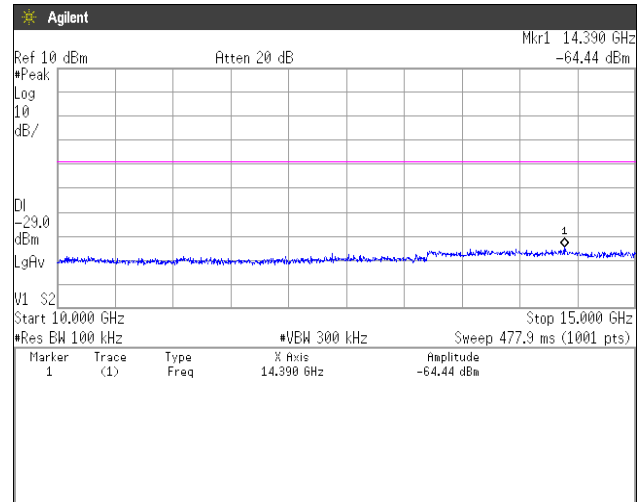
### 1GHz-5GHz



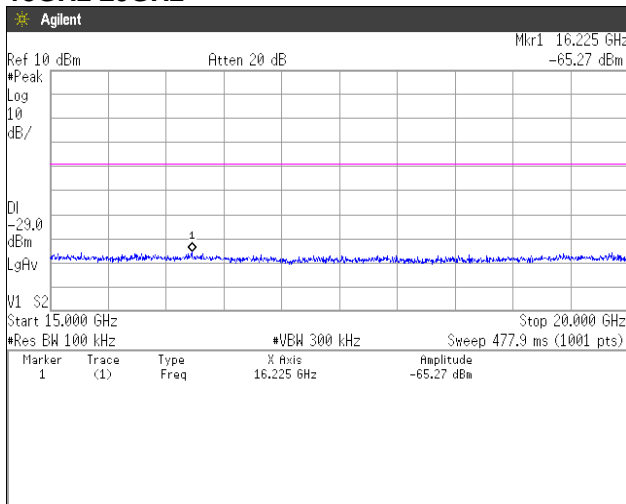
### 5GHz-10GHz



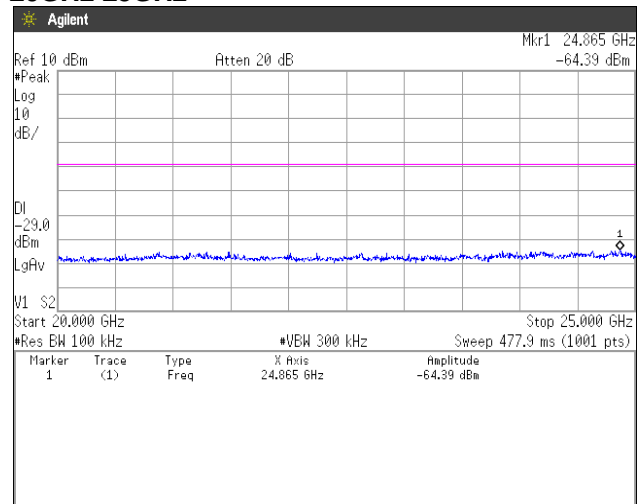
### 10GHz-15GHz



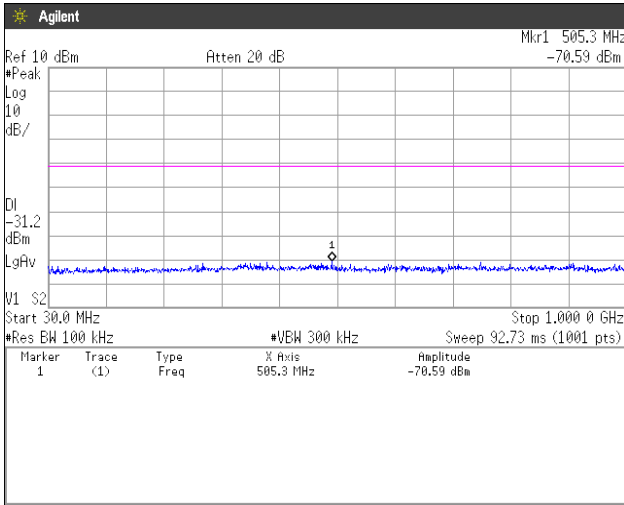
### 15GHz-20GHz



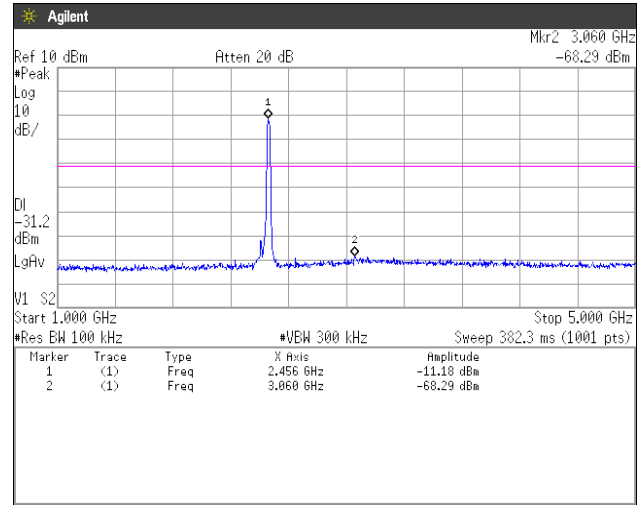
### 20GHz-25GHz



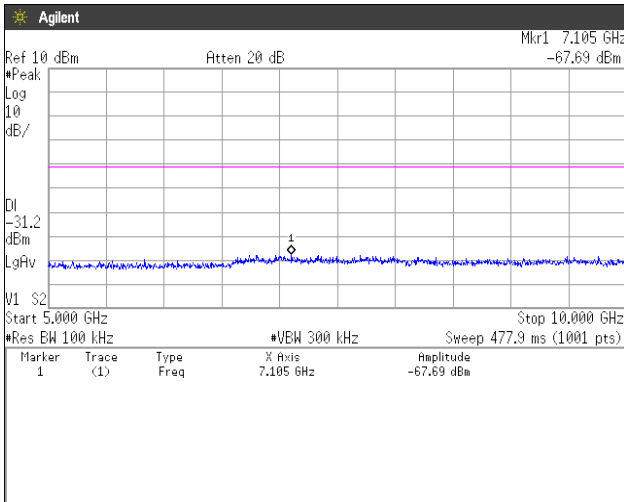
### Channel High 30MHz-1GHz



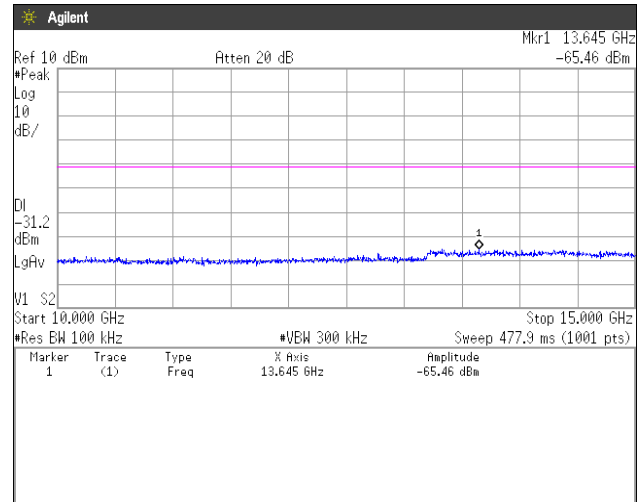
### 1GHz-5GHz



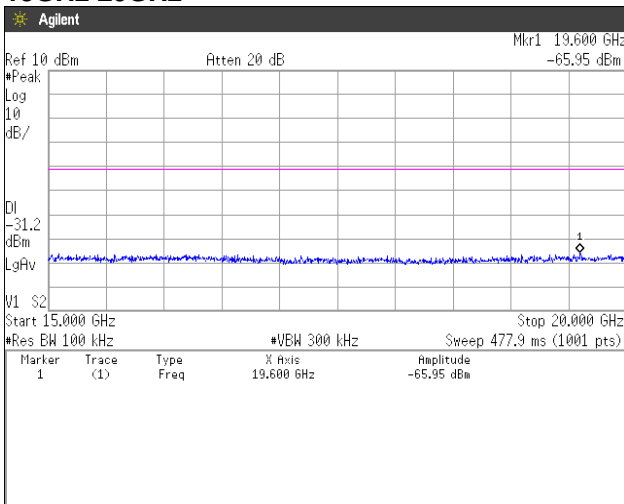
### 5GHz-10GHz



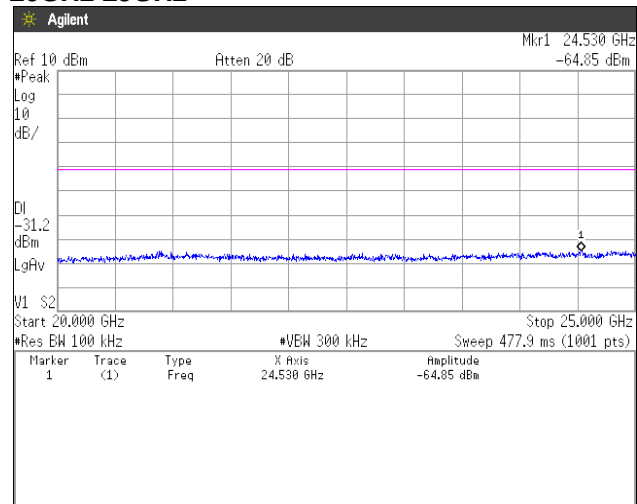
### 10GHz-15GHz



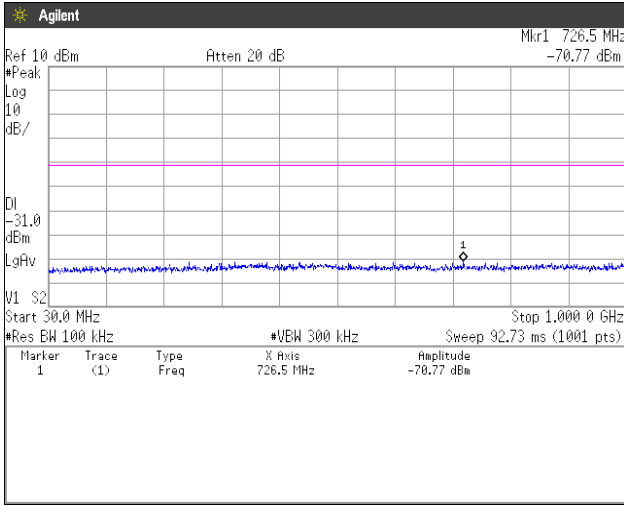
### 15GHz-20GHz



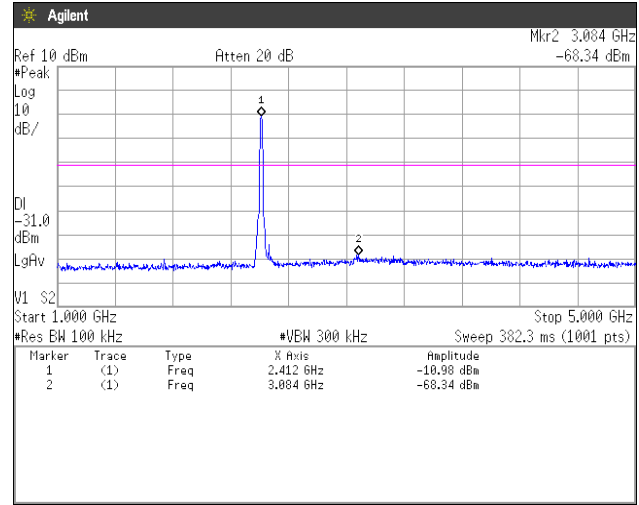
### 20GHz-25GHz



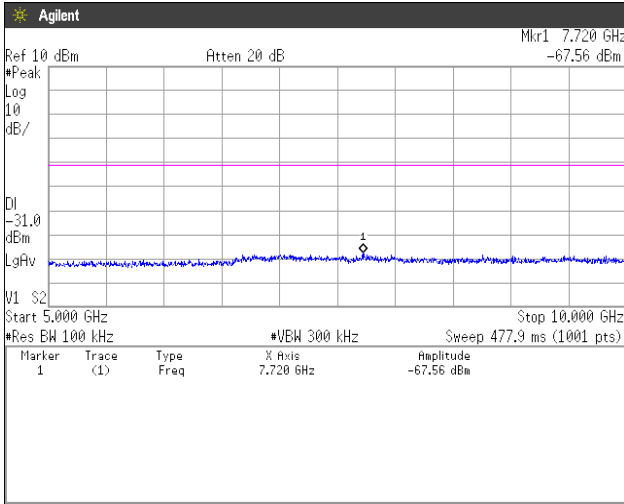
**[IEEE802.11n (HT20)]**  
**Channel Low**  
**30MHz-1GHz**



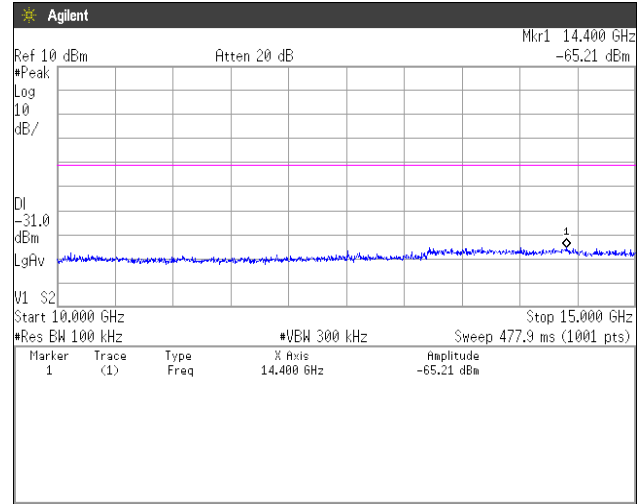
**1GHz-5GHz**



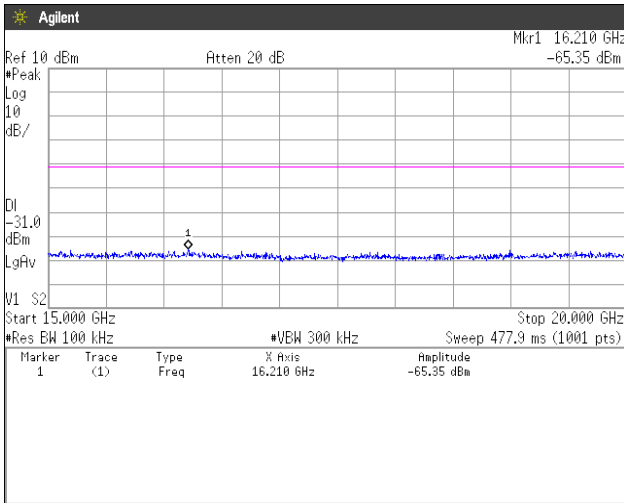
**5GHz-10GHz**



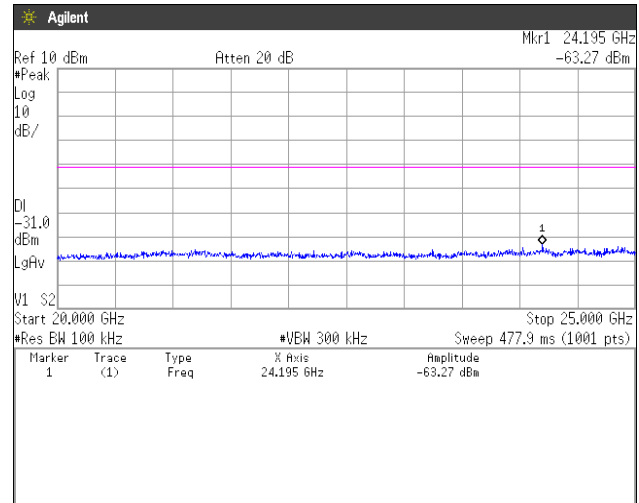
**10GHz-15GHz**



**15GHz-20GHz**



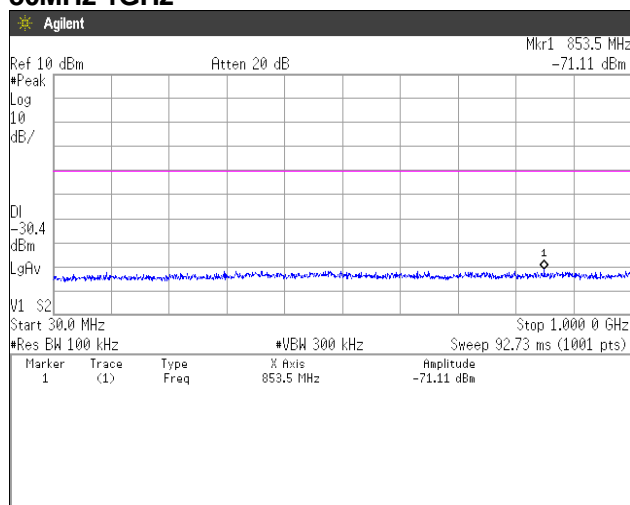
**20GHz-25GHz**



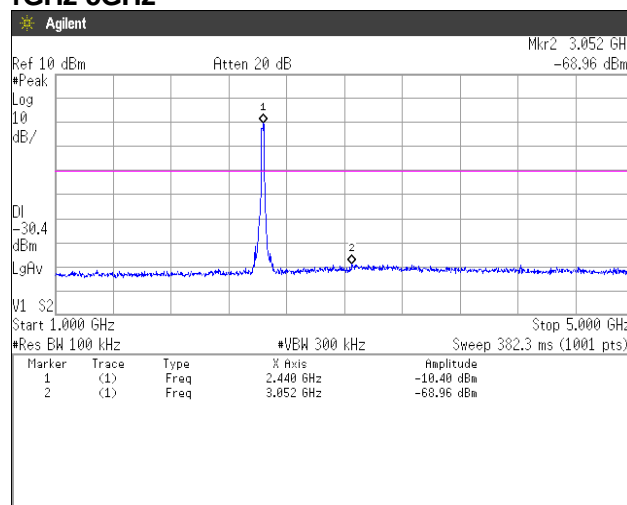


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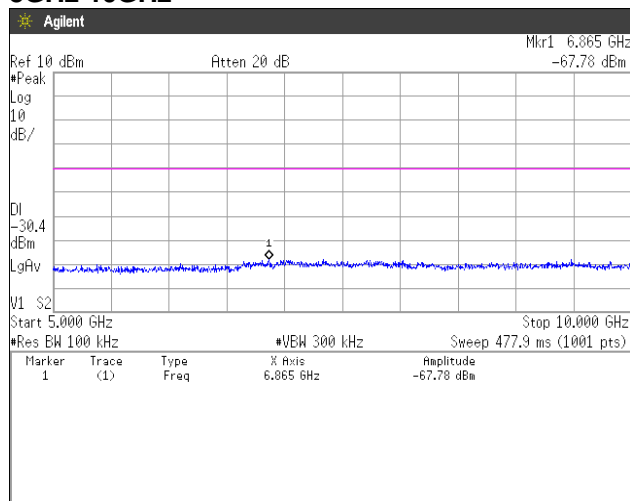
### Channel Middle 30MHz-1GHz



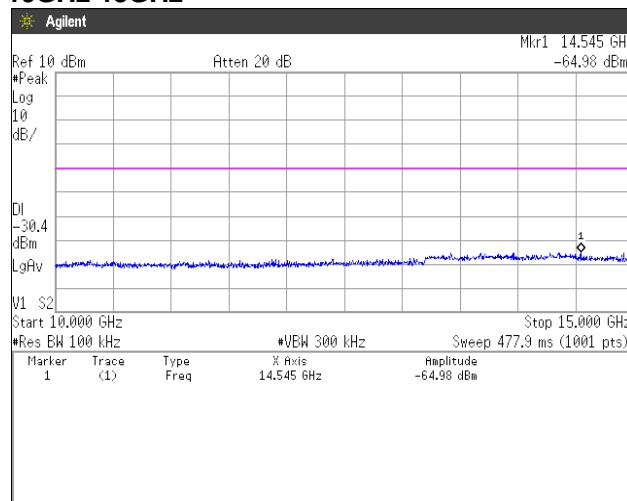
### 1GHz-5GHz



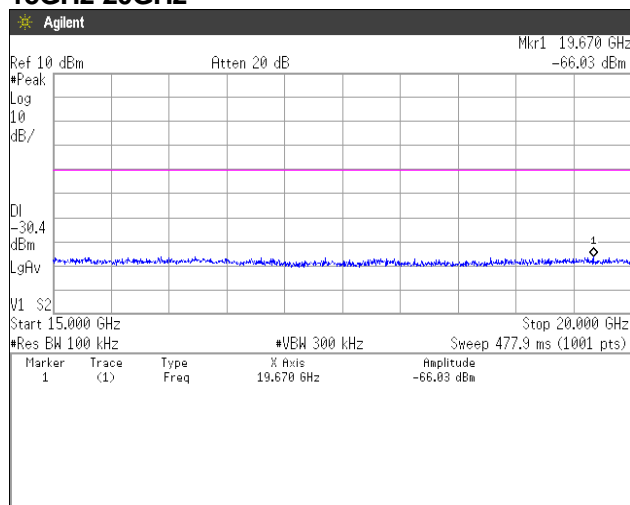
### 5GHz-10GHz



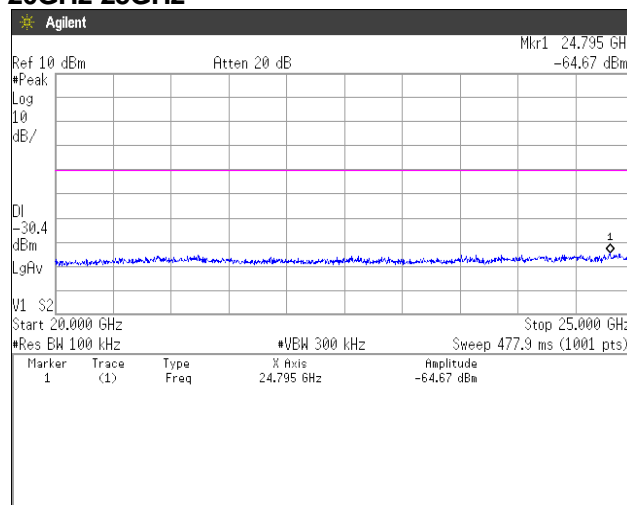
### 10GHz-15GHz



### 15GHz-20GHz



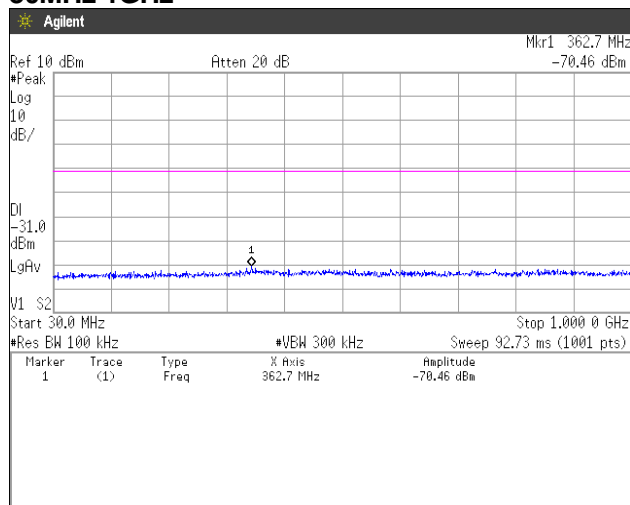
### 20GHz-25GHz



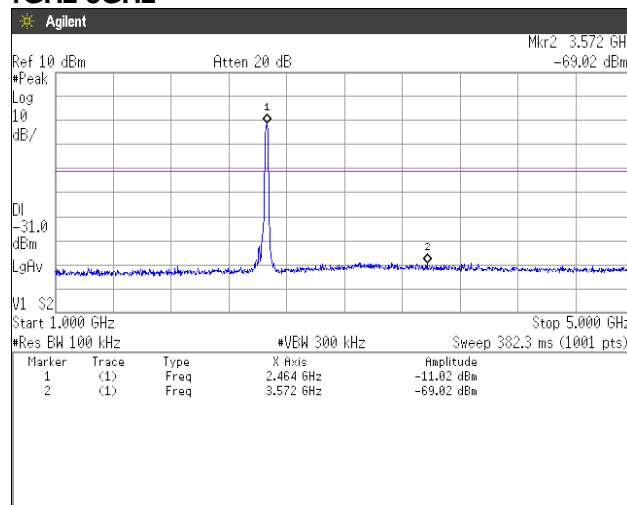


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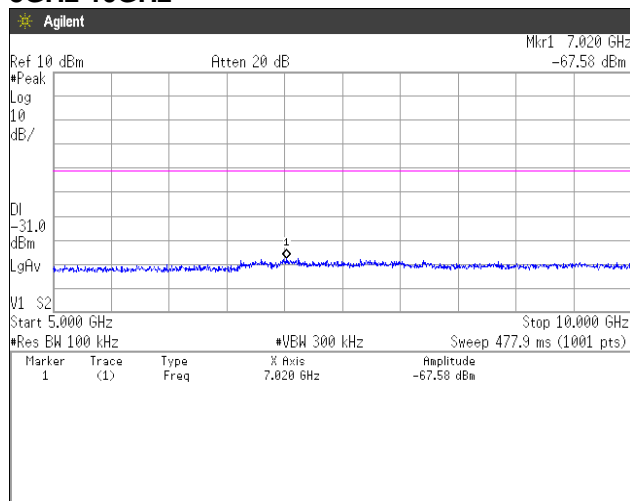
### Channel High 30MHz-1GHz



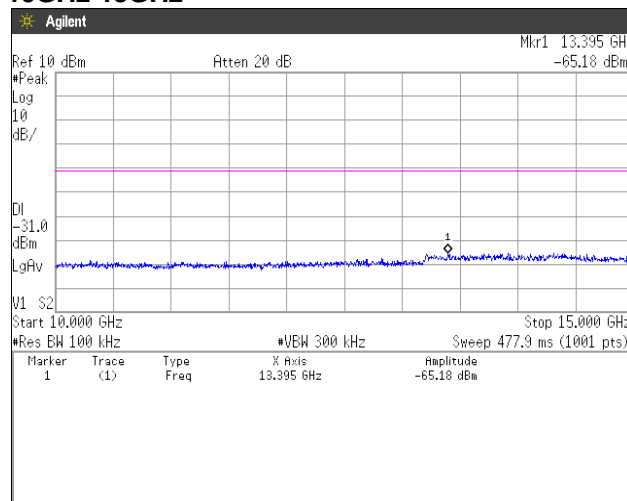
### 1GHz-5GHz



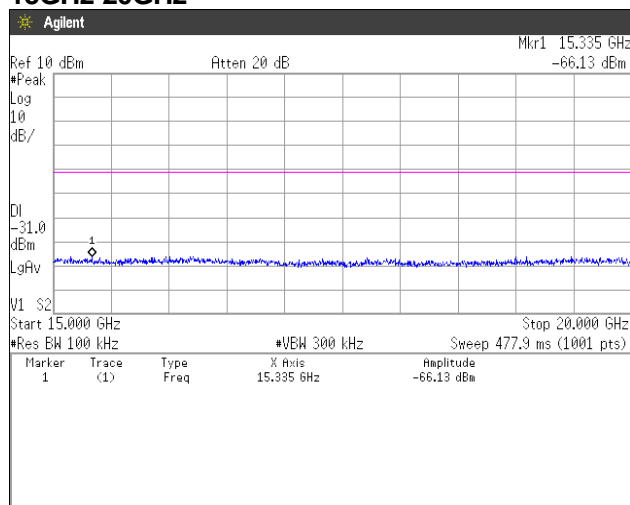
### 5GHz-10GHz



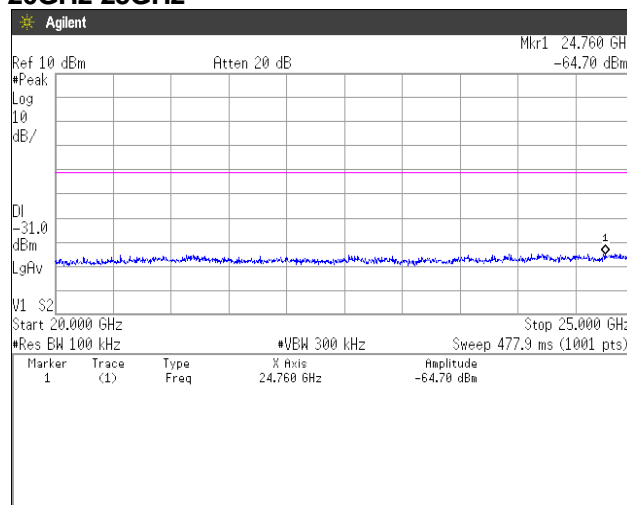
### 10GHz-15GHz



### 15GHz-20GHz

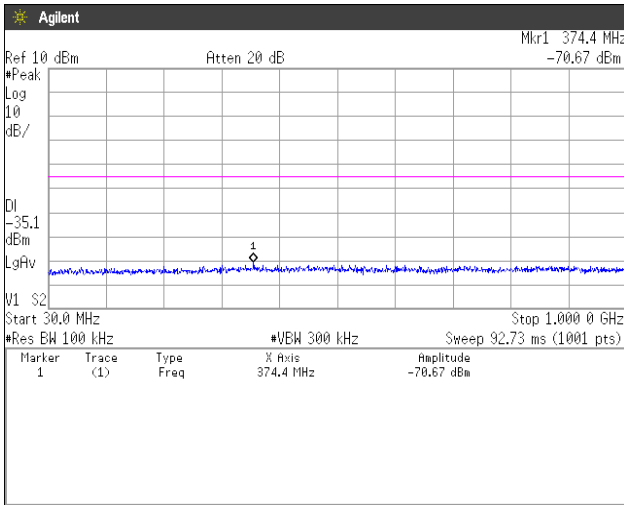


### 20GHz-25GHz

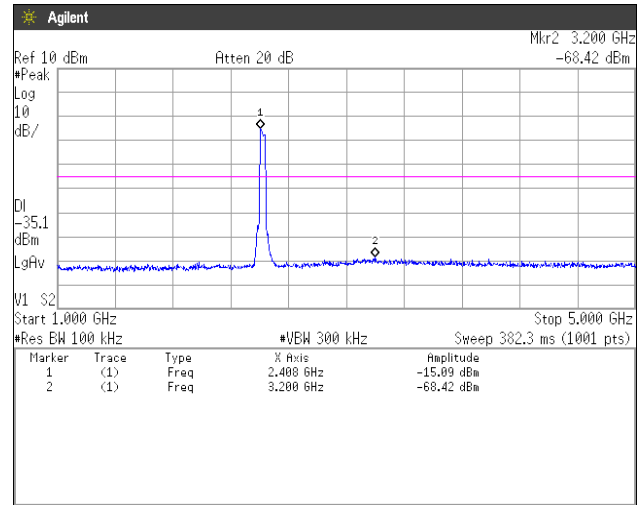




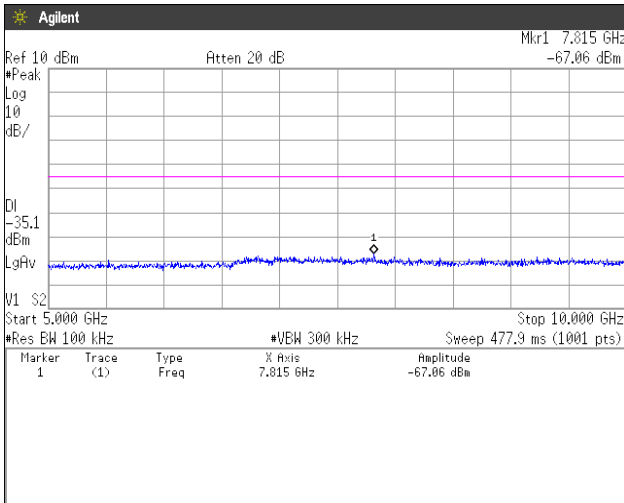
**[IEEE802.11n (HT40)]**  
**Channel Low**  
**30MHz-1GHz**



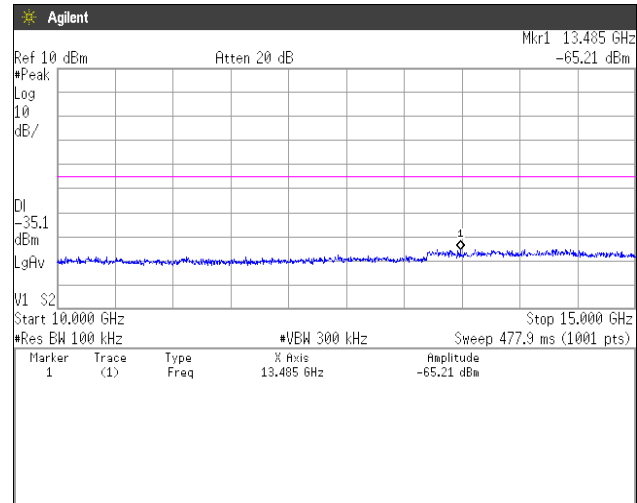
**1GHz-5GHz**



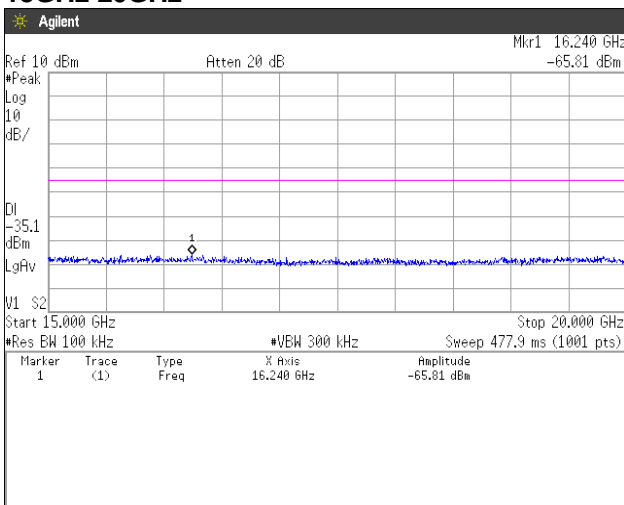
**5GHz-10GHz**



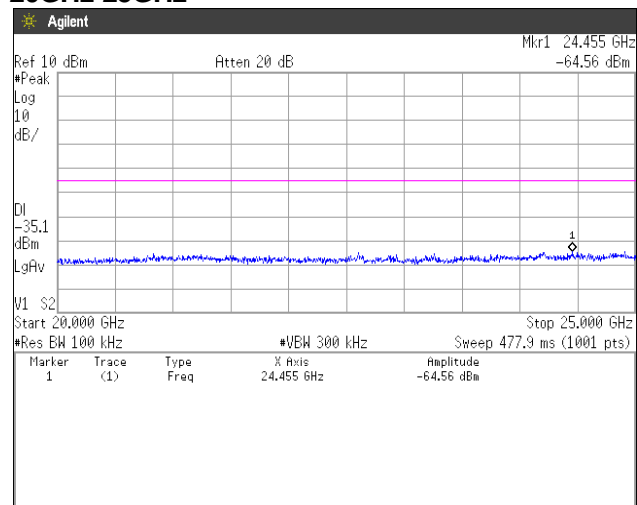
**10GHz-15GHz**



**15GHz-20GHz**



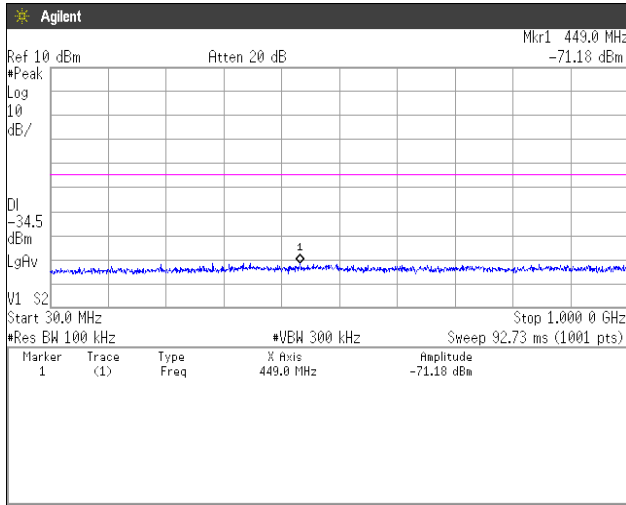
**20GHz-25GHz**



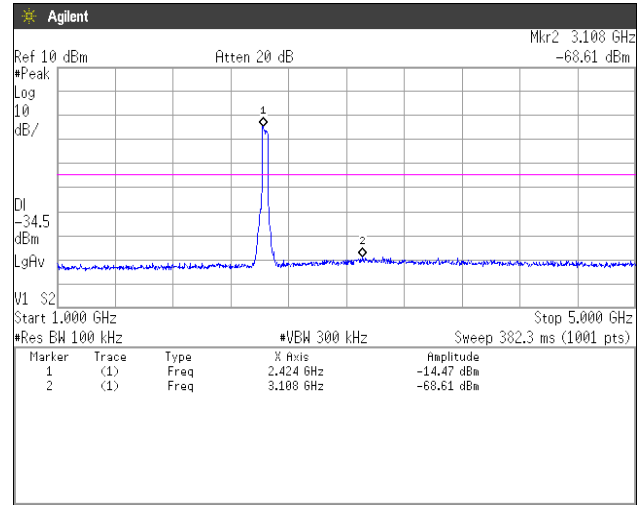


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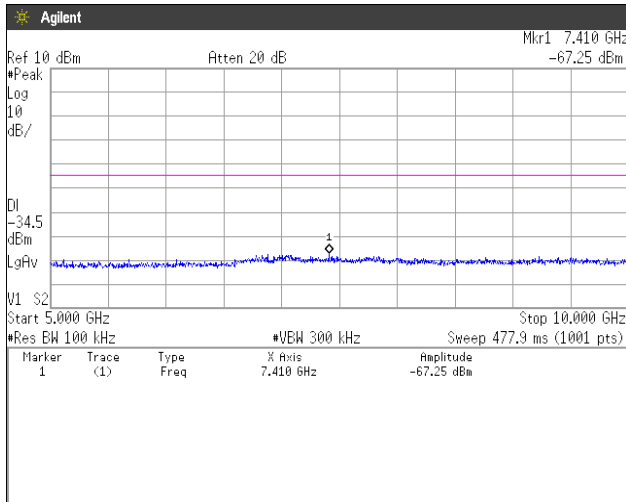
### Channel Middle 30MHz-1GHz



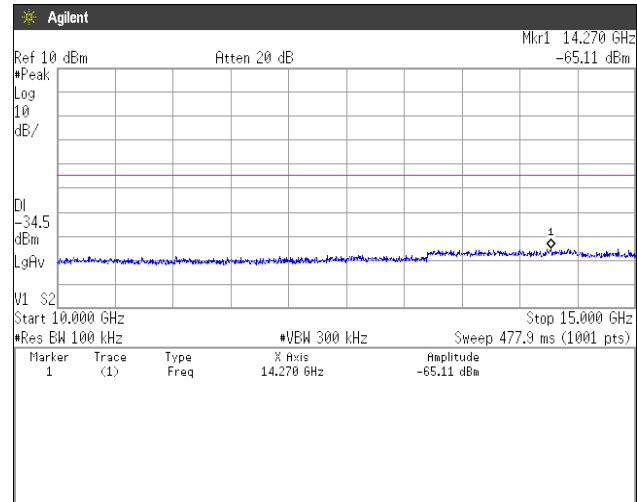
### 1GHz-5GHz



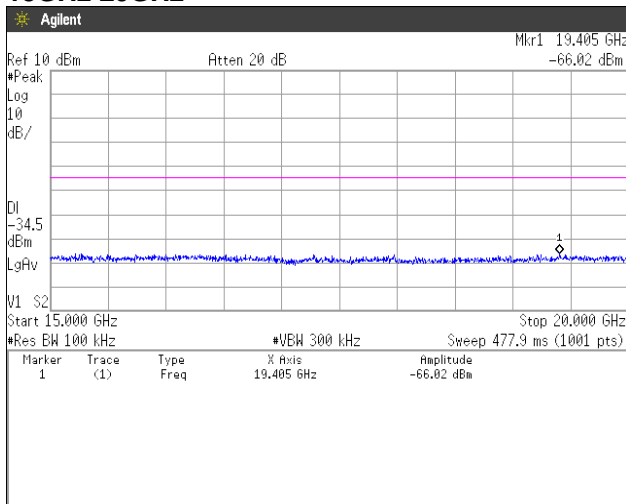
### 5GHz-10GHz



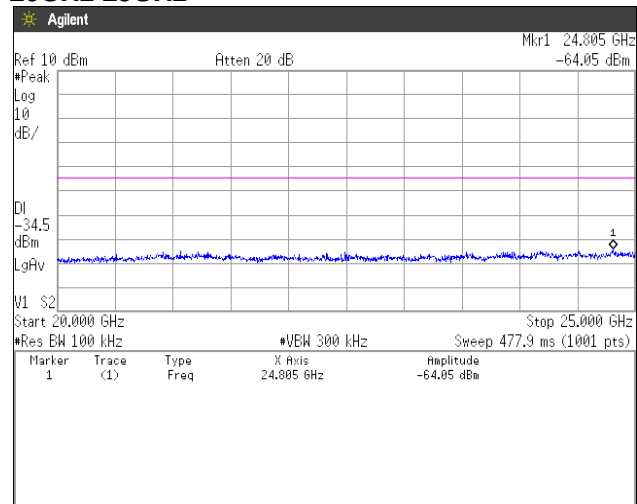
### 10GHz-15GHz



### 15GHz-20GHz



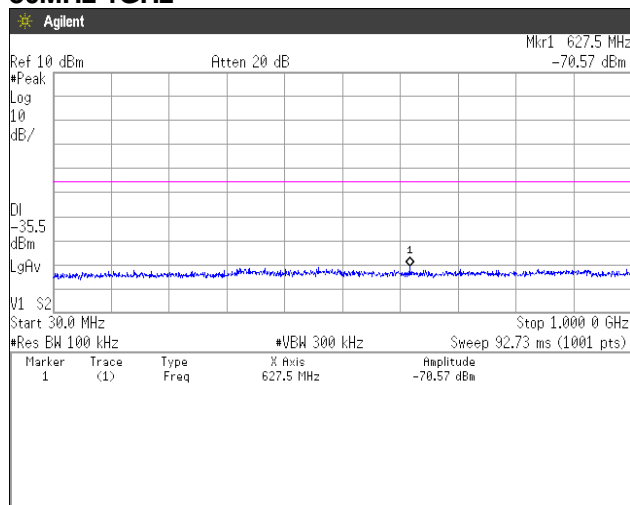
### 20GHz-25GHz



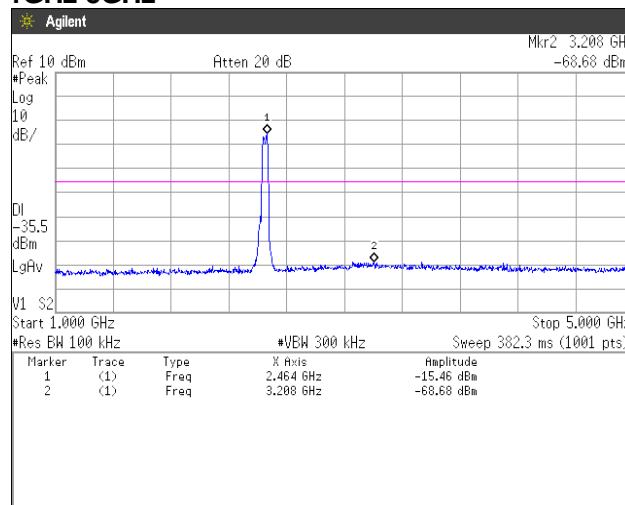


Zacta

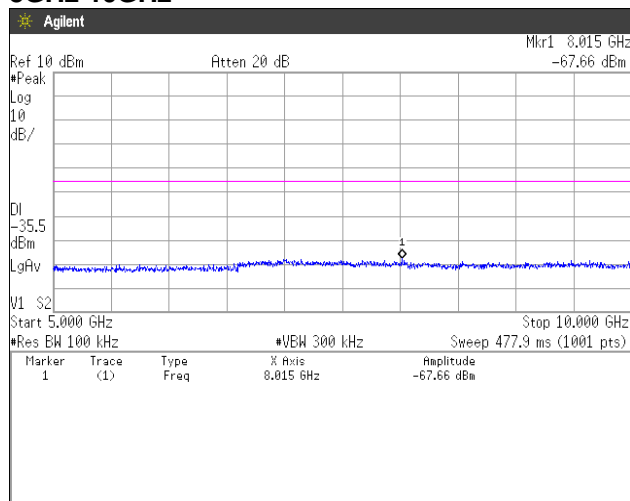
### Channel High 30MHz-1GHz



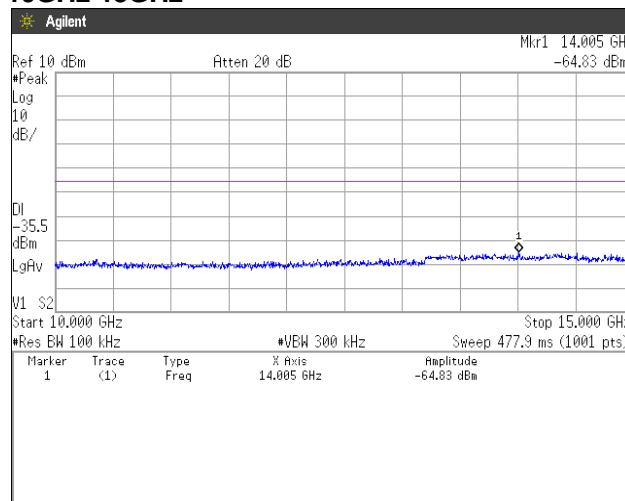
### 1GHz-5GHz



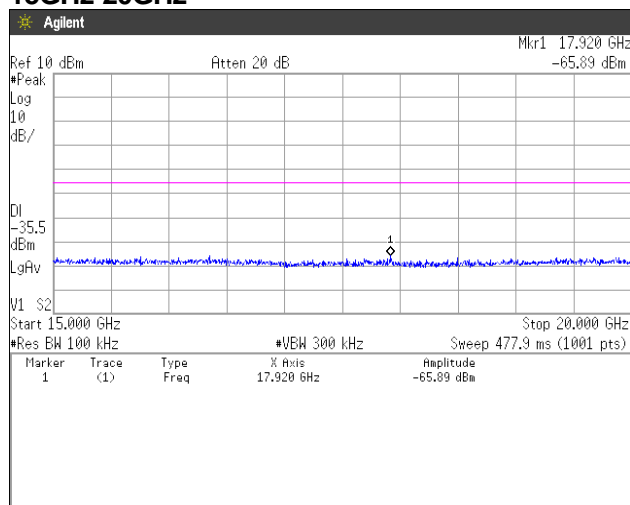
### 5GHz-10GHz



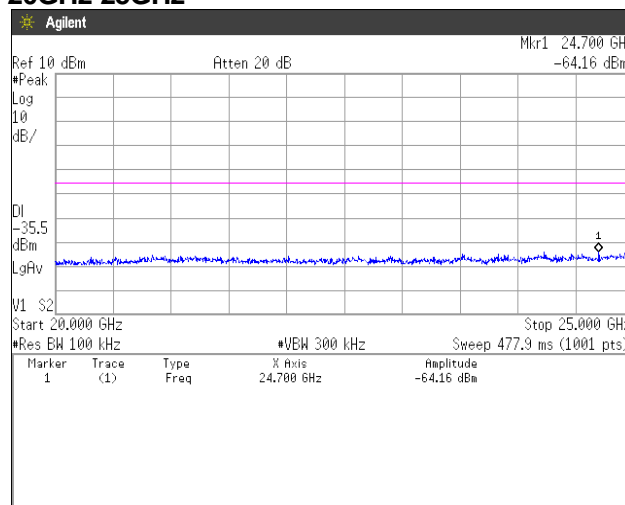
### 10GHz-15GHz



### 15GHz-20GHz



### 20GHz-25GHz



## 8. Spurious Emissions - Radiated -

### 8.1 Measurement procedure

[FCC 15.247(d), 15.205, 15.209, KDB 558074 D01 v04, Section 12.1]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Frequency range	:	9kHz to 25GHz
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m (below 1GHz) Styrofoam table / (W)0.6m × (D)0.6m × (H)1.5m (above 1GHz)
Antenna distance	:	3m
Test receiver setting	:	Below 1GHz
- Detector	:	Average (9kHz-90kHz, 110kHz-490kHz), Quasi-peak
- Bandwidth	:	200Hz, 120kHz
Spectrum analyzer setting	:	Above 1GHz
- Peak	:	RBW=1MHz, VBW=3MHz, Span=0Hz, Sweep=auto
- Average	:	RBW=1MHz, VBW=10Hz, Span=0Hz, Sweep=auto Display mode=Linear

#### Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T <sub>on</sub> (us)	T <sub>off</sub> (us)	Determined VBW Setting
IEEE802.11b	99.22	1024	8	10Hz (Duty Cycle ≥ 98%)
IEEE802.11g	99.27	1362	10	10Hz (Duty Cycle ≥ 98%)
IEEE802.11n(HT20)	99.22	1274	10	10Hz (Duty Cycle ≥ 98%)
IEEE802.11n(HT40)	98.45	636	10	10Hz (Duty Cycle ≥ 98%)

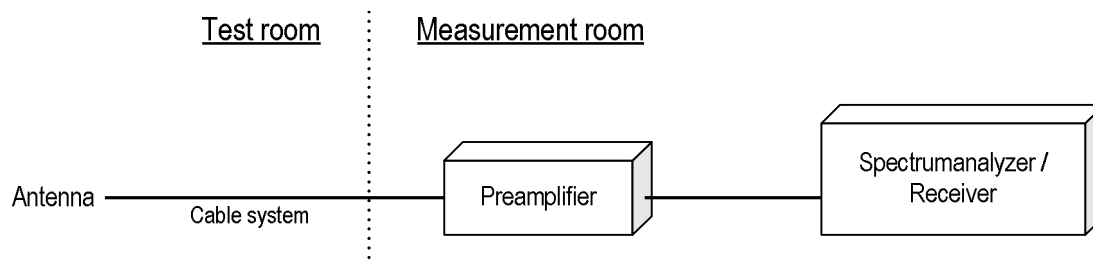
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site.

Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop 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 1m to 4m and stopped at height producing the maximum emission. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop antenna is 1m above the ground plane.

The EUT is Placed on a turntable, which is 0.8m/1.5m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. The test results represent the worst case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation. Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

- Test configuration



## 8.2 Calculation method

[9kHz to 150kHz]

Emission level = Reading + (Ant factor + Cable system loss)

Margin = Limit – Emission level

[150kHz to 25GHz]

Emission level = Reading + (Ant factor + Cable system loss - Amp. Gain)

Margin = Limit – Emission level

Example:

Limit @ 4824.0MHz : 74.0dBuV/m (Peak Limit)

S.A Reading = 49.5dBuV Cable system loss = 8.4dB

Result = 49.5 + 8.4 = 45.1dBuV/m

Margin = 74.0 - 45.1 = 16.1dB

## 8.3 Limit

Frequency [MHz]	Field strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009-0.490	2400 / F [kHz]	20logE [uV/m]	300
0.490-1.705	24000 / F [kHz]	20logE [uV/m]	30
1.705-30	30	29.5	30
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20log Emission [uV/m]
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition modulation.



Zacta

#### 8.4 Test data

Date	: December 1, 2017		
Temperature	: 22.5 [°C]		
Humidity	: 20.4 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		: <u>Tadahiro Seino</u>
Date	: December 4, 2017		
Temperature	: 23.4 [°C]		
Humidity	: 25.6 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		: <u>Tadahiro Seino</u>
Date	: December 6, 2017		
Temperature	: 20.1 [°C]		
Humidity	: 31.8 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		: <u>Taiki Watanabe</u>
Date	: December 7, 2017		
Temperature	: 21.4 [°C]		
Humidity	: 45.2 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		: <u>Taiki Watanabe</u>
Date	: December 11, 2017		
Temperature	: 21.2 [°C]		
Humidity	: 32.1 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		: <u>Taiki Watanabe</u>
Date	: December 13, 2017		
Temperature	: 20.9 [°C]		
Humidity	: 45.3 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		: <u>Taiki Watanabe</u>

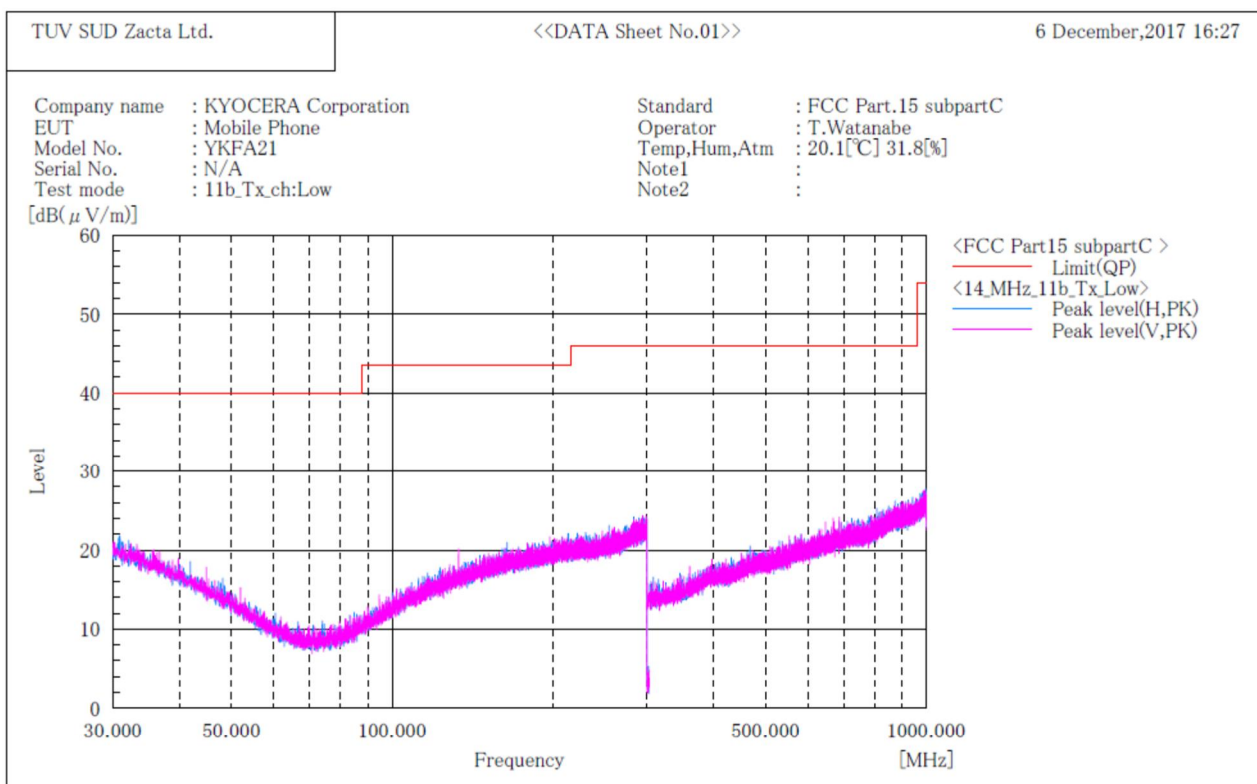


Zacta

8.4.1 Transmission mode

[11b]  
Channel Low  
BELOW 1GHz

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P) [MHz]	c. f [dB (1/m)]	Height [cm]	Angle [° ]	Remark

Note:

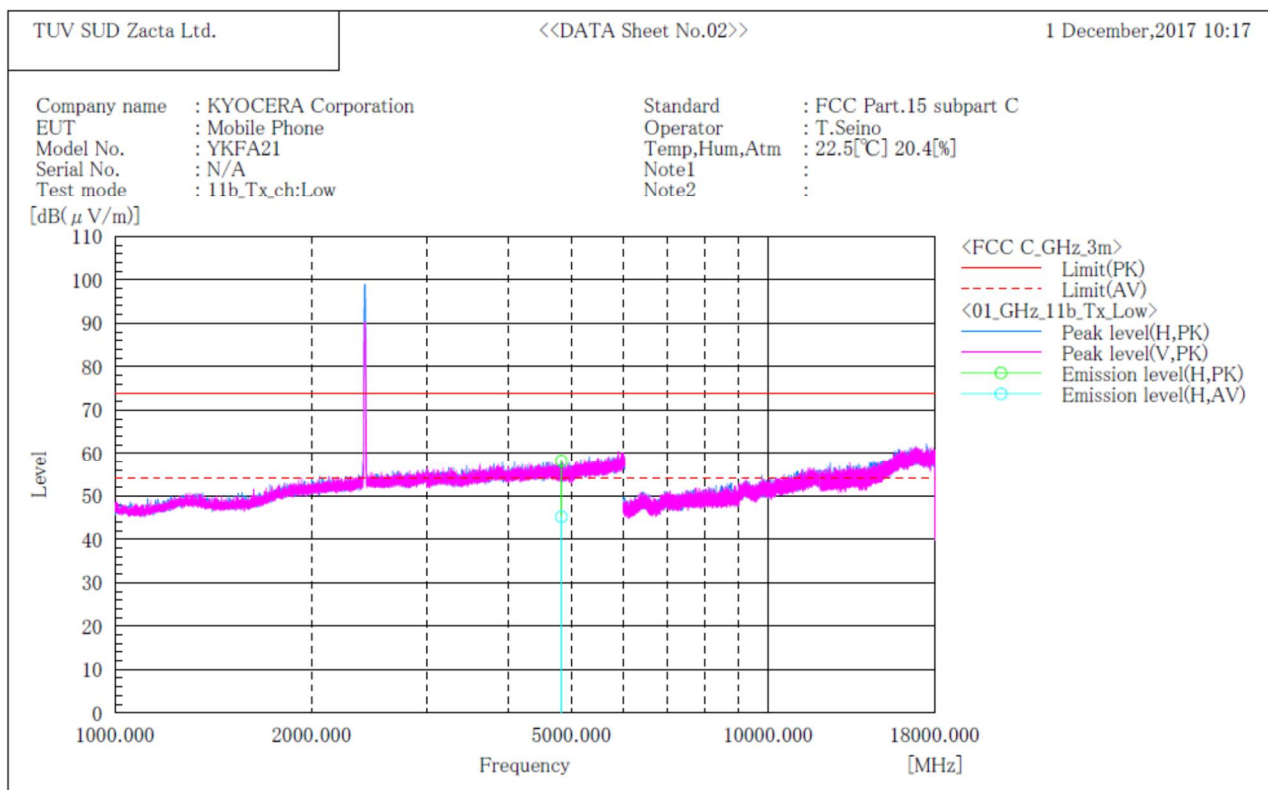
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11b]  
Channel Low  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4824.000	H	48.9	35.9	9.3	58.2	45.2	74.0	54.0	15.8	8.8	148.0	27.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

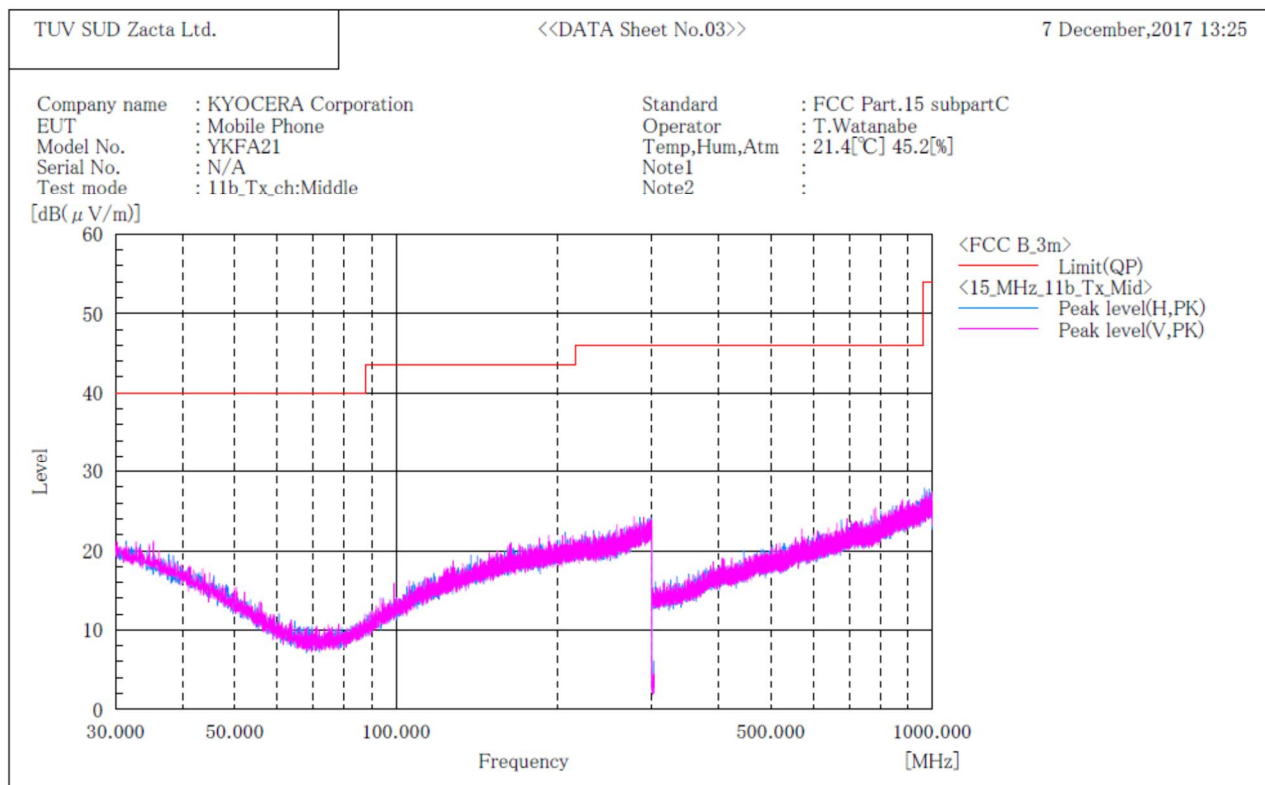




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**[11b]  
Channel Middle  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle
	[MHz]	[dB(1/m)]	[cm]	[° ]

Note:

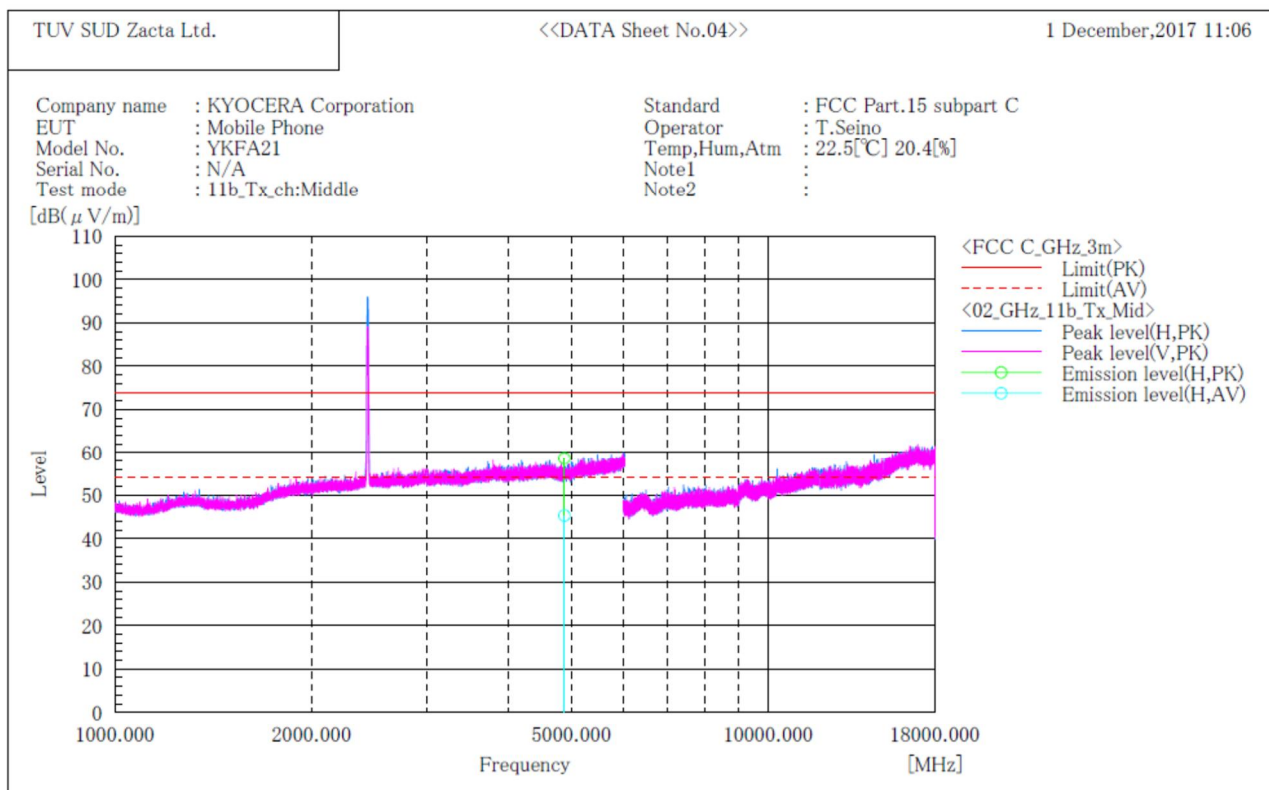
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11b]  
Channel Middle  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(µV)]	Reading AV [dB(µV)]	c. f [dB(1/m)]	Result PK [dB(µV/m)]	Result AV [dB(µV/m)]	Limit PK [dB(µV/m)]	Limit AV [dB(µV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4874.000	H	49.2	35.9	9.4	58.6	45.3	74.0	54.0	15.4	8.7	145.0	26.0

Note:

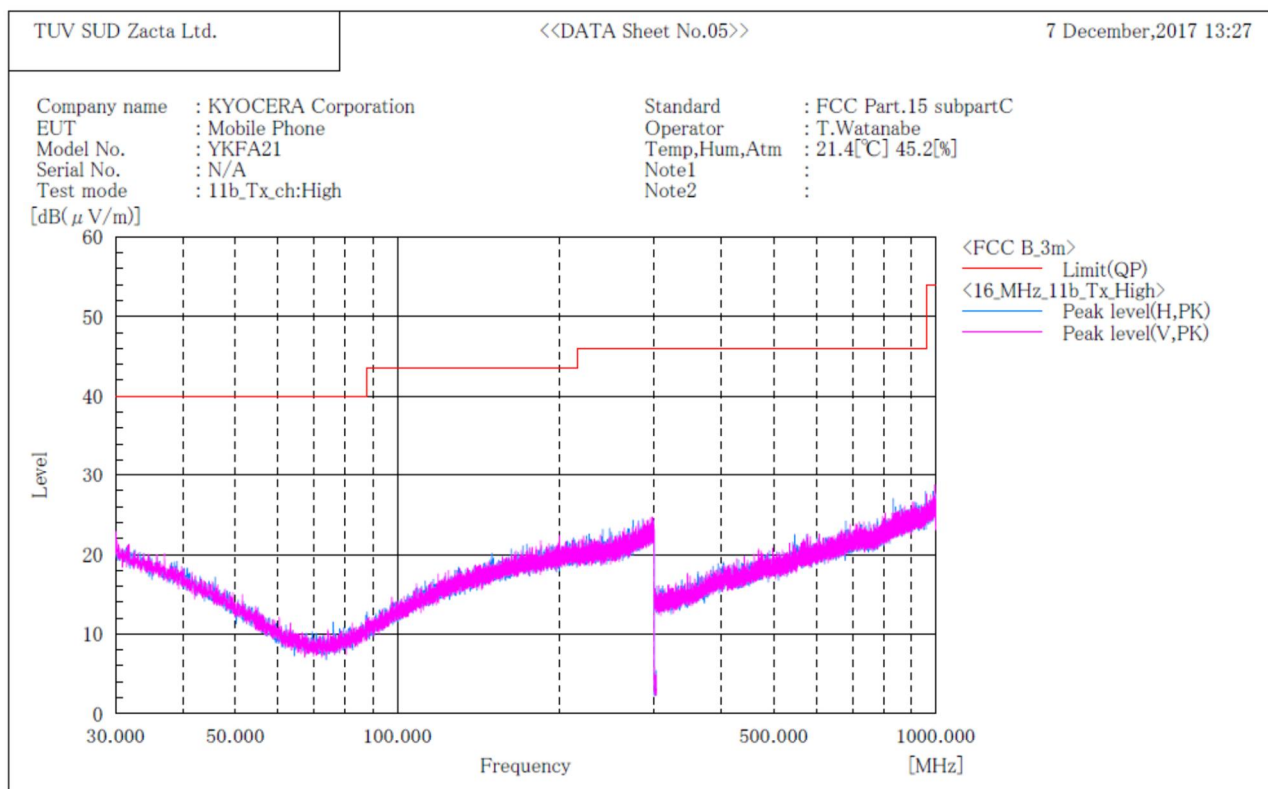
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11b]  
Channel High  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle
	[MHz]	[dB(1/m)]	[cm]	[° ]

Note:

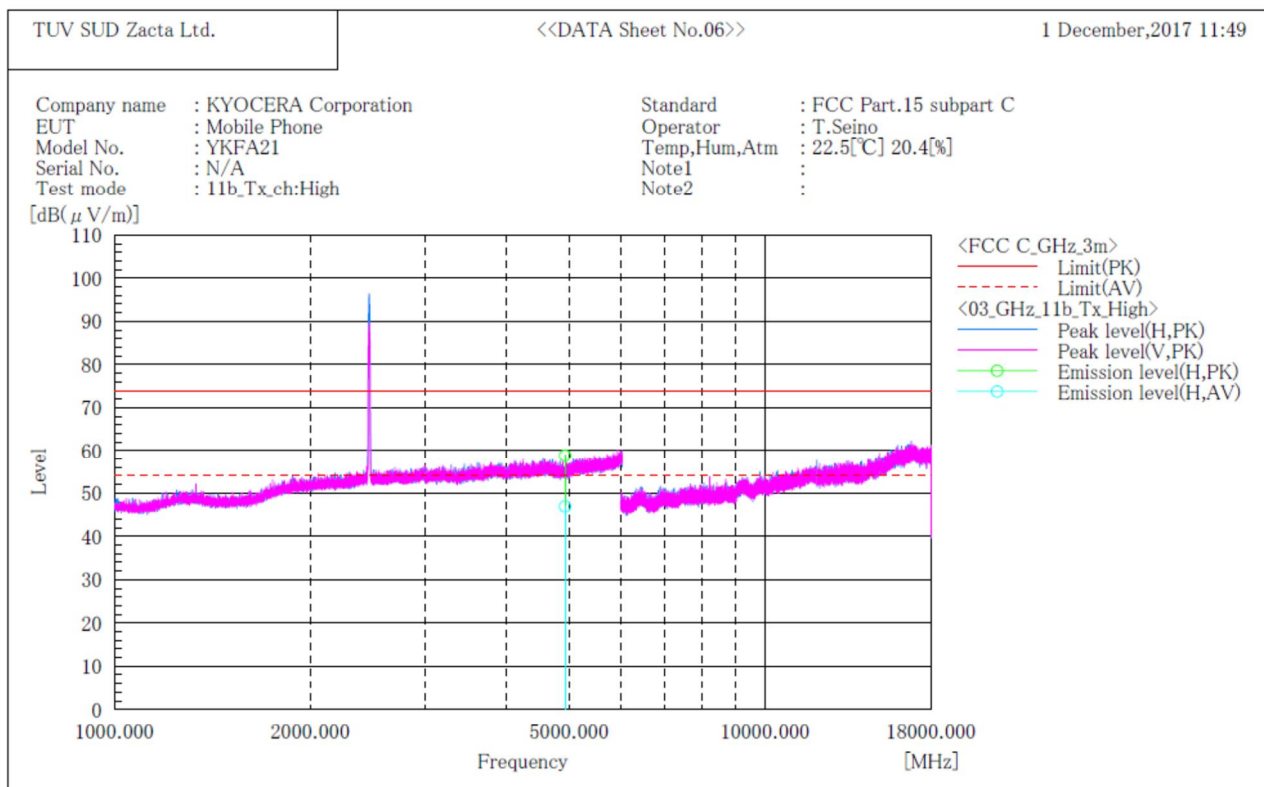
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11b]  
Channel High  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4924.000	H	49.2	37.3	9.6	58.8	46.9	74.0	54.0	15.2	7.1	147.0	31.0

Note:

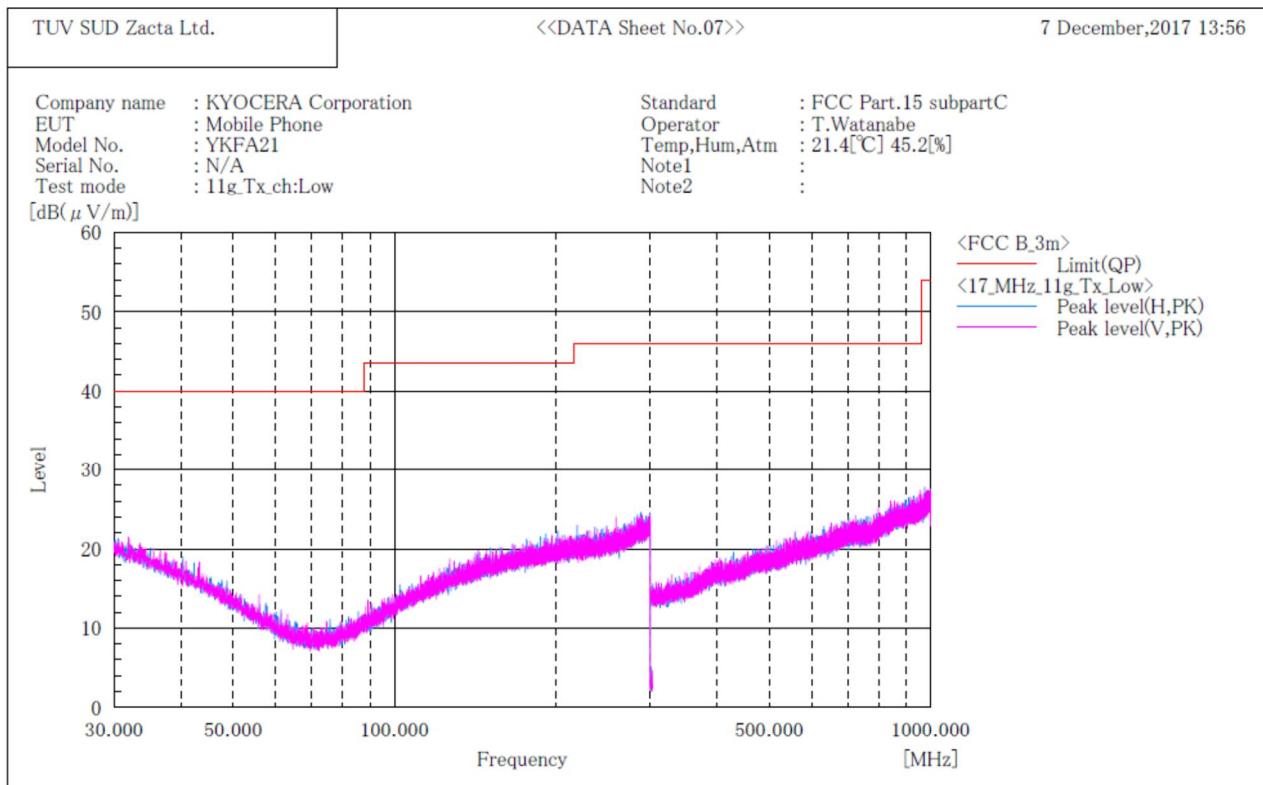
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11g]  
Channel Low  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle
	[MHz]	[dB(1/m)]	[cm]	[° ]

Note:

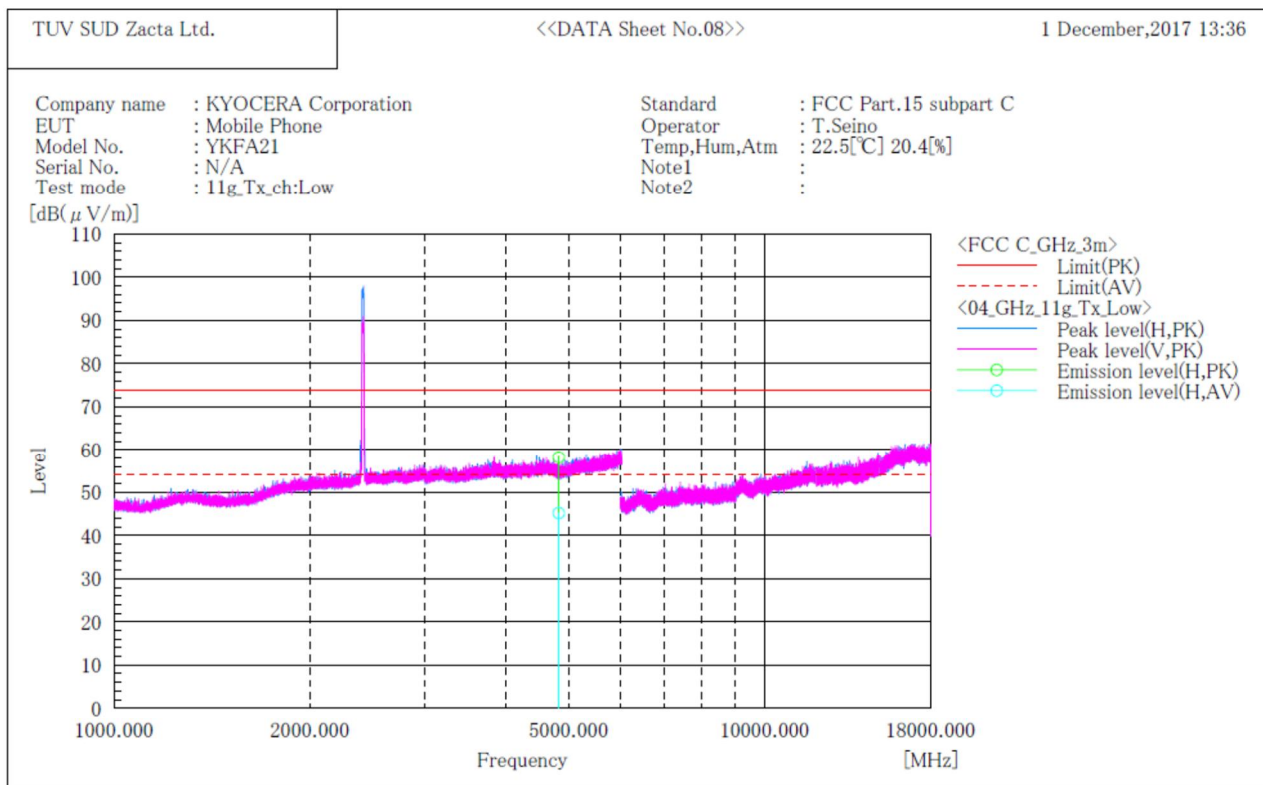
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11g]  
Channel Low  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4824.000	H	48.9	35.9	9.3	58.2	45.2	74.0	54.0	15.8	8.8	151.0	33.0

Note:

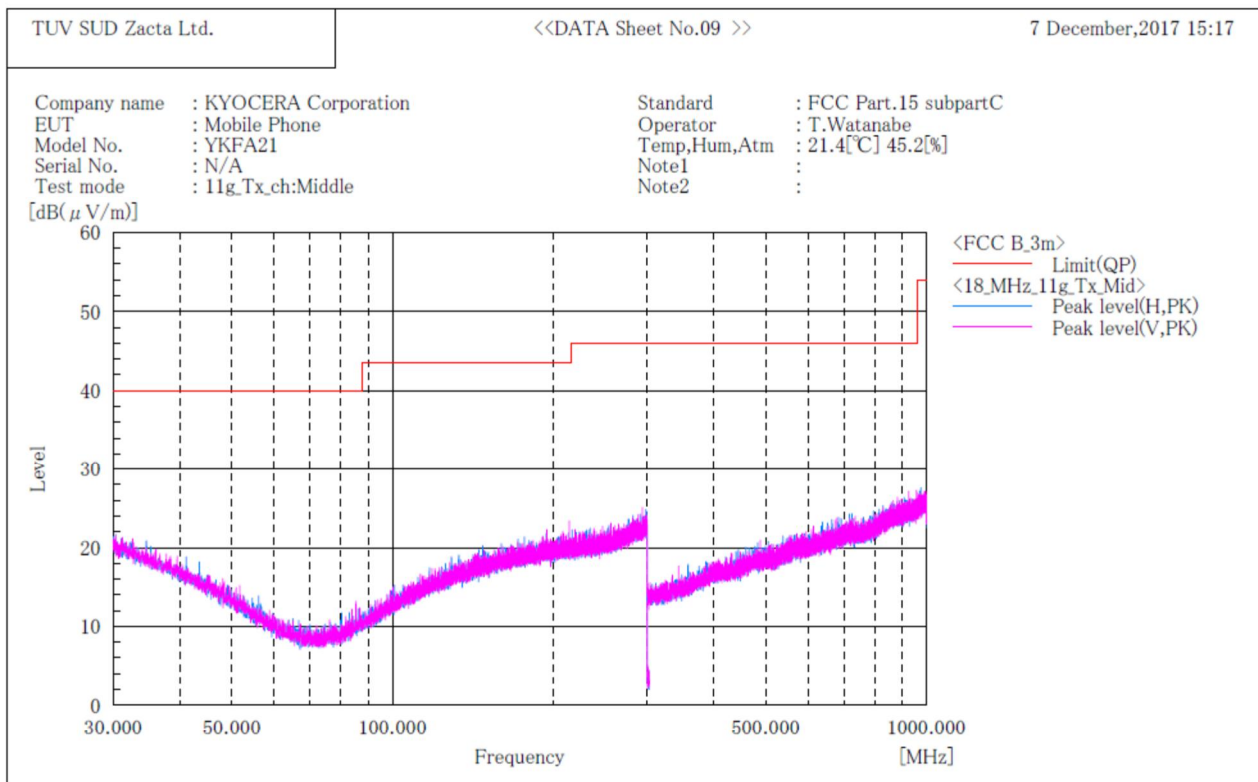
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



Zacta

**[11g]  
Channel Middle  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

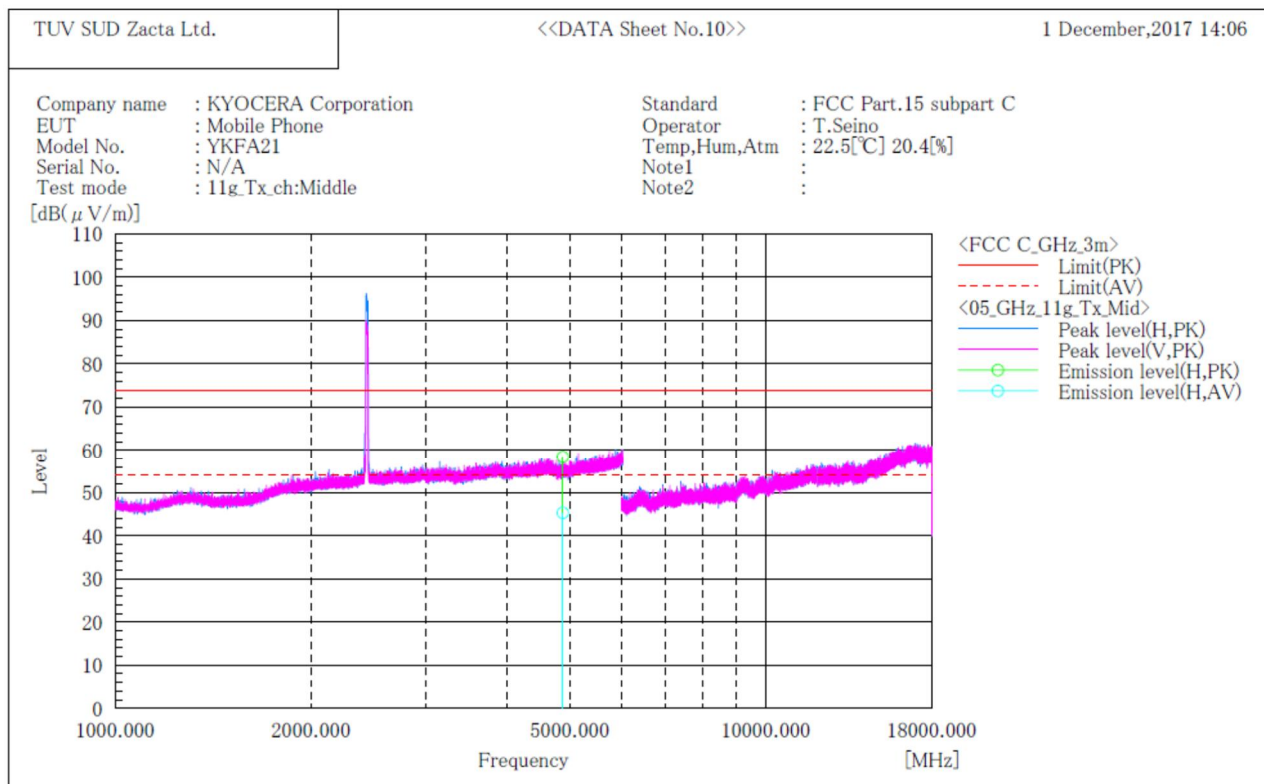
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11g]  
Channel Middle  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(µV)]	Reading AV [dB(µV)]	c.f [dB(1/m)]	Result PK [dB(µV/m)]	Result AV [dB(µV/m)]	Limit PK [dB(µV/m)]	Limit AV [dB(µV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4874.000	H	49.0	35.9	9.4	58.4	45.3	74.0	54.0	15.6	8.7	149.0	31.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

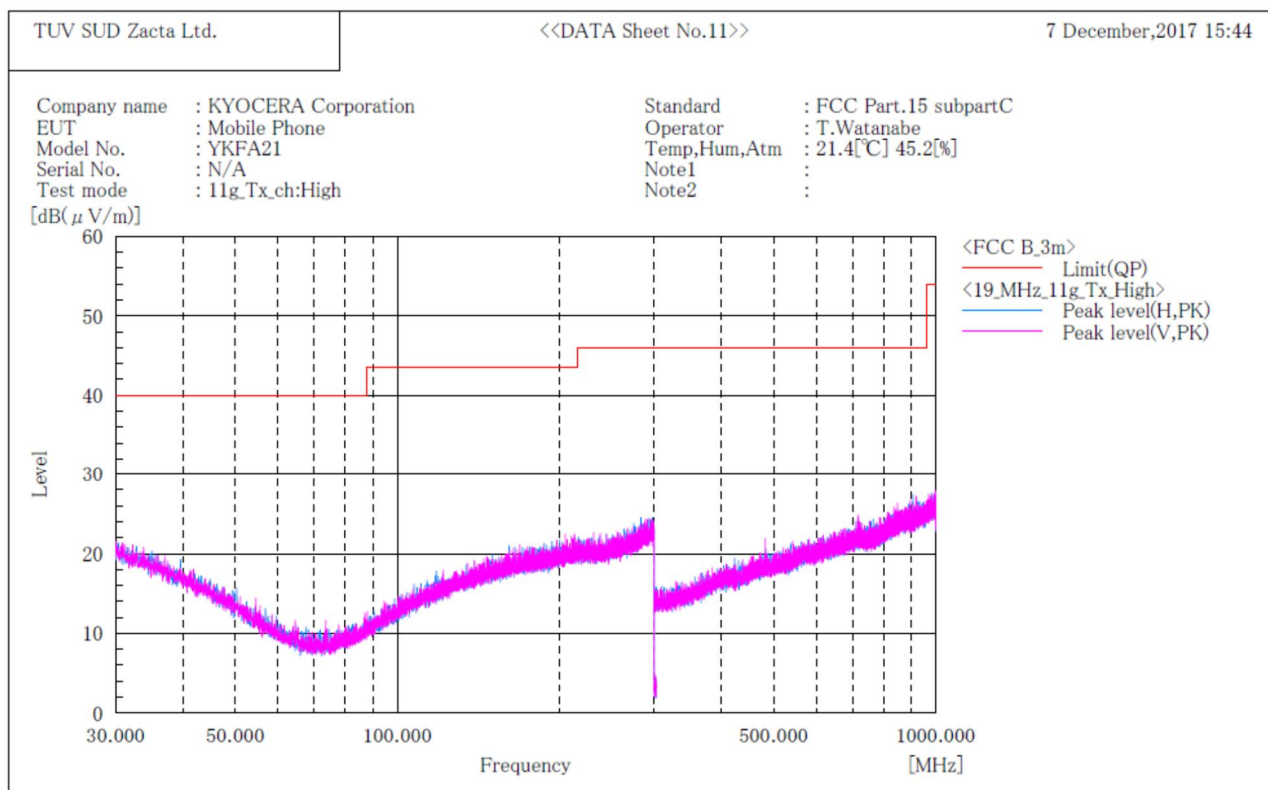




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**[11g]  
Channel High  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

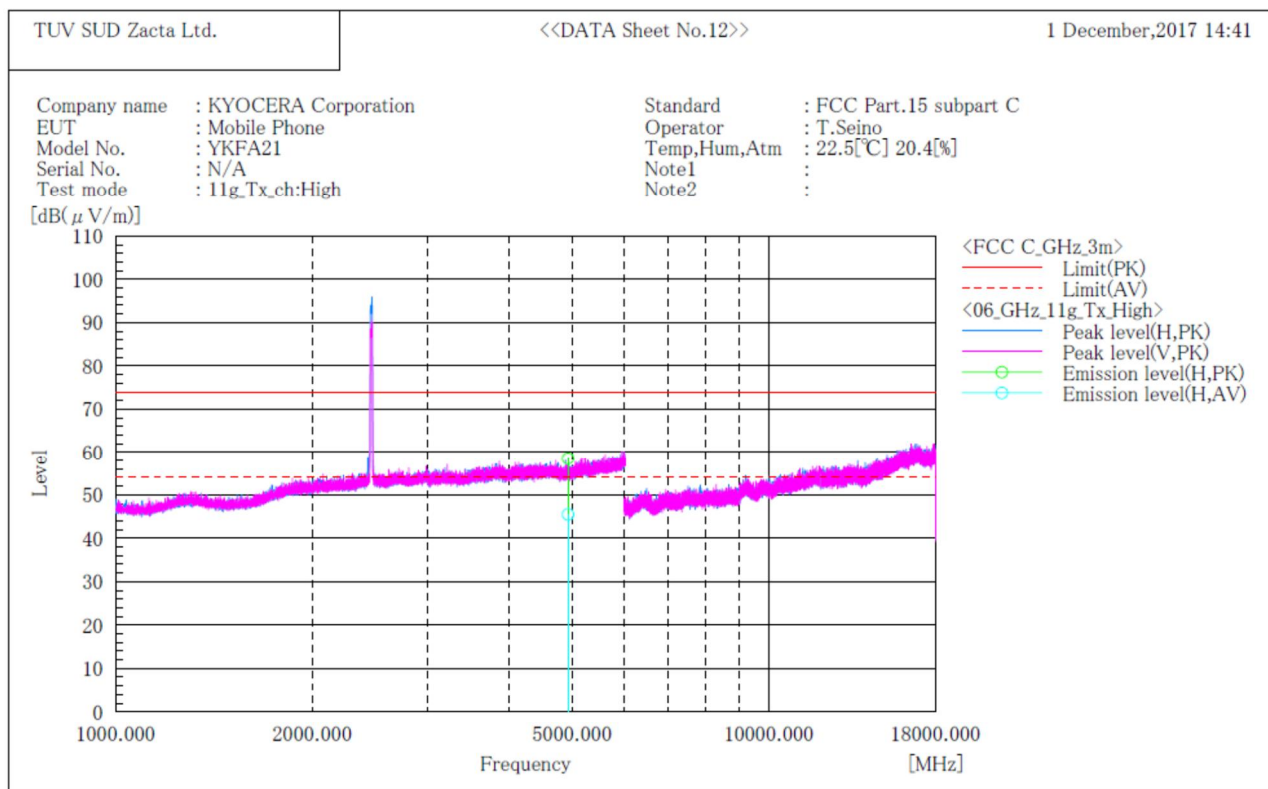
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11g]  
Channel High  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4924.000	H	48.9	35.9	9.6	58.5	45.5	74.0	54.0	15.5	8.5	149.0	31.0

Note:

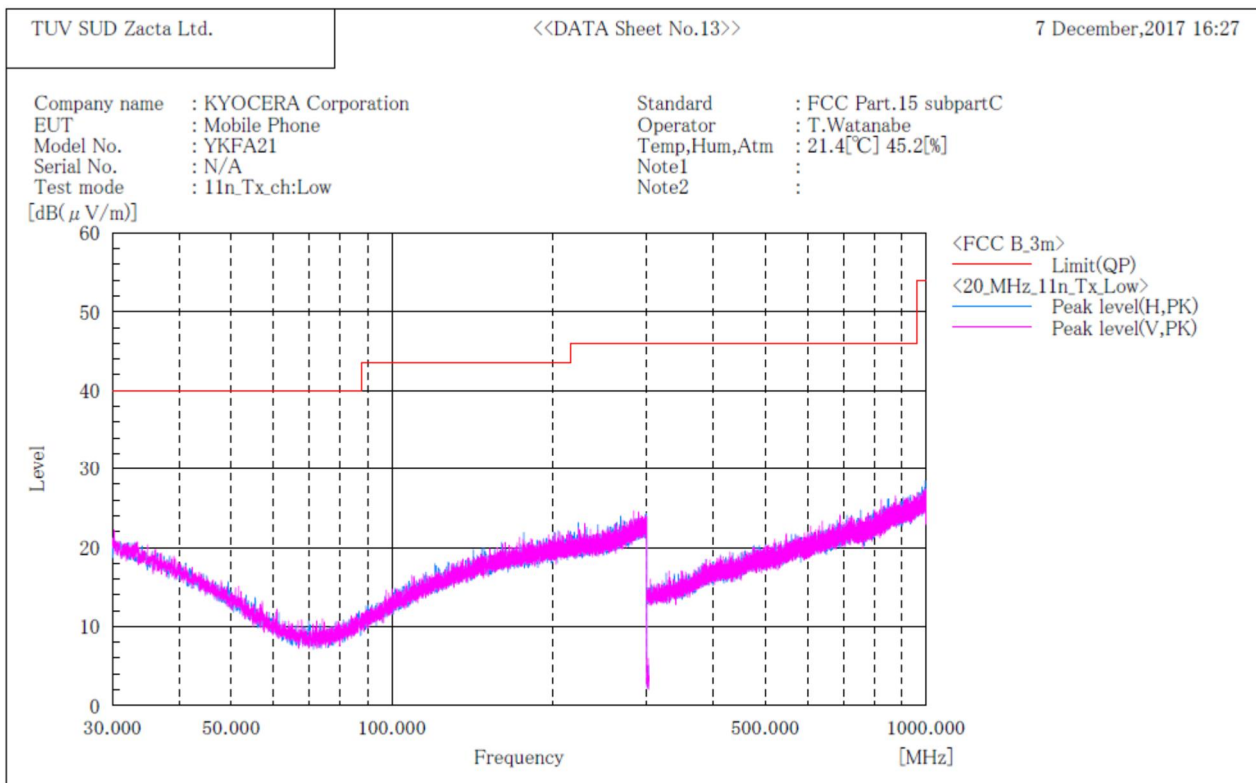
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11n(HT20)]  
Channel Low  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P) [MHz]	c.f [dB(1/m)]	Height [cm]	Angle [°]	Remark
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Note:

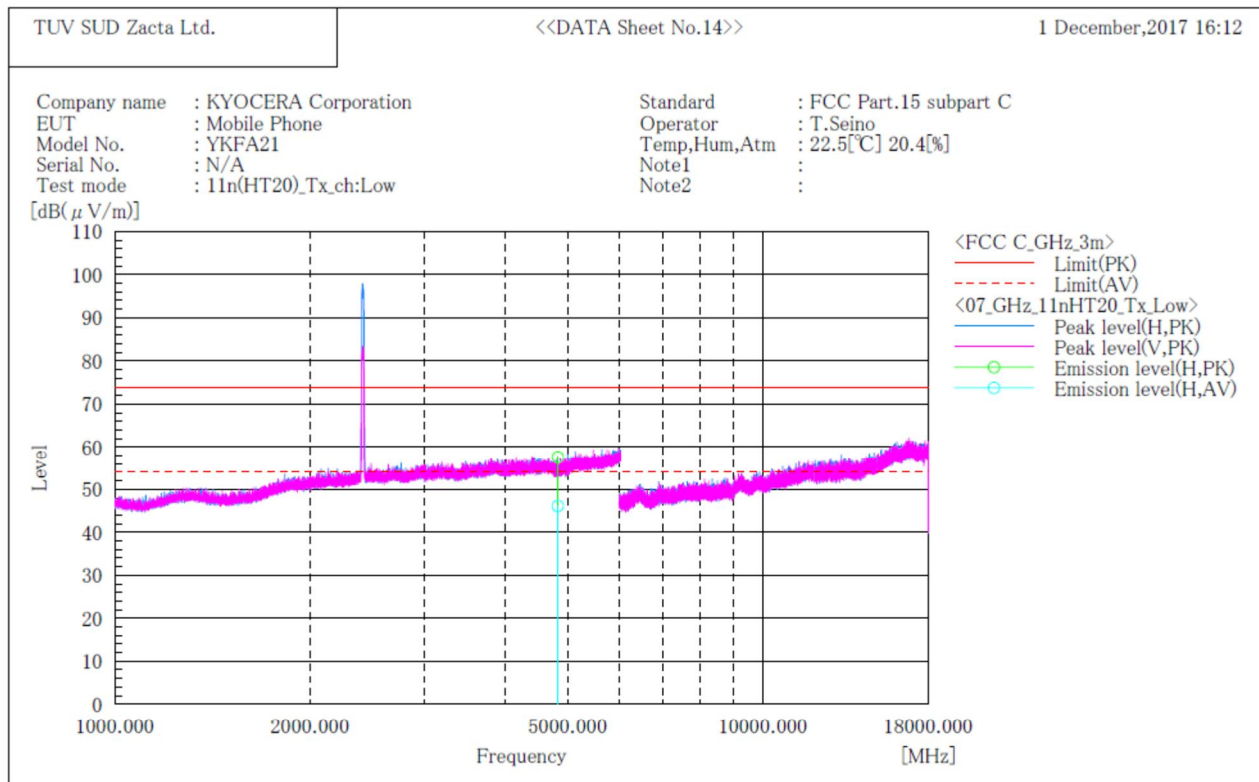
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11n(HT20)]  
Channel Low  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4824.000	H	48.3	36.8	9.3	57.6	46.1	74.0	54.0	16.4	7.9	146.0	268.0

Note:

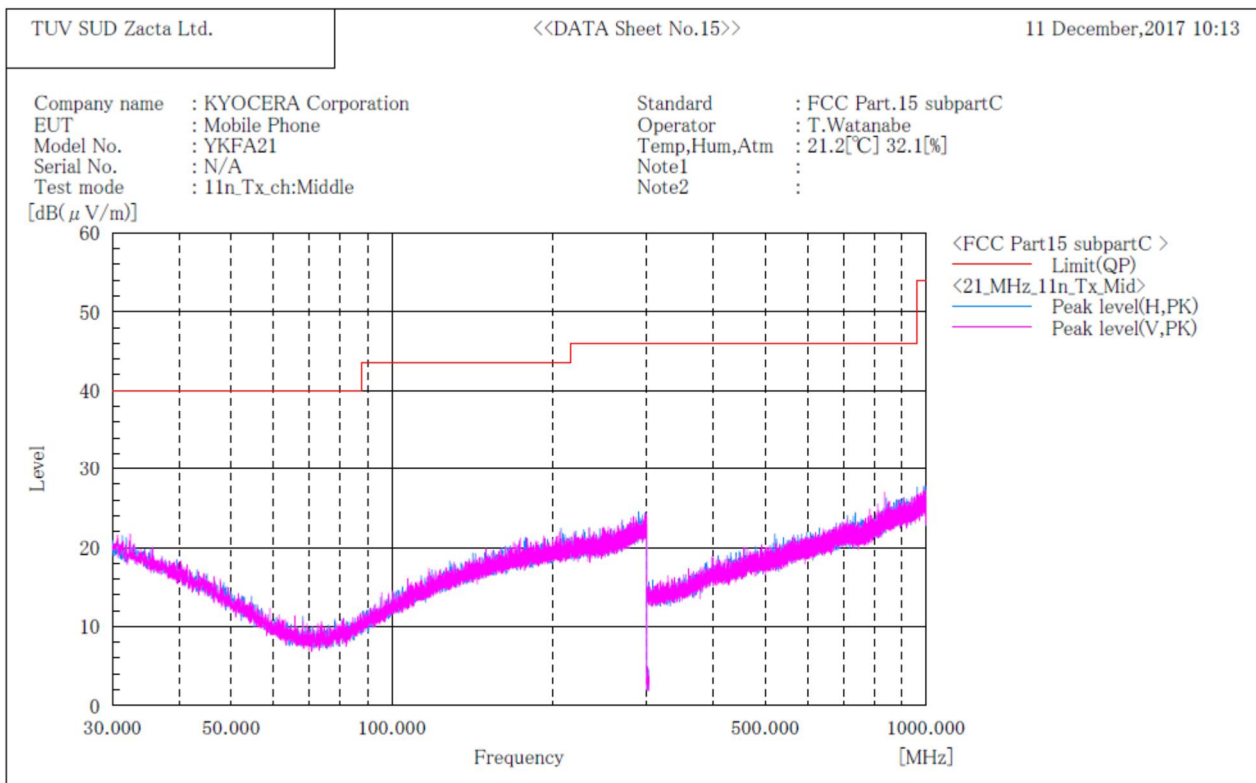
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11n(HT20)]  
Channel Middle  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P) [MHz]	c.f [dB(1/m)]	Height [cm]	Angle [° ]	Remark
-----	------------------------	------------------	----------------	---------------	--------

Note:

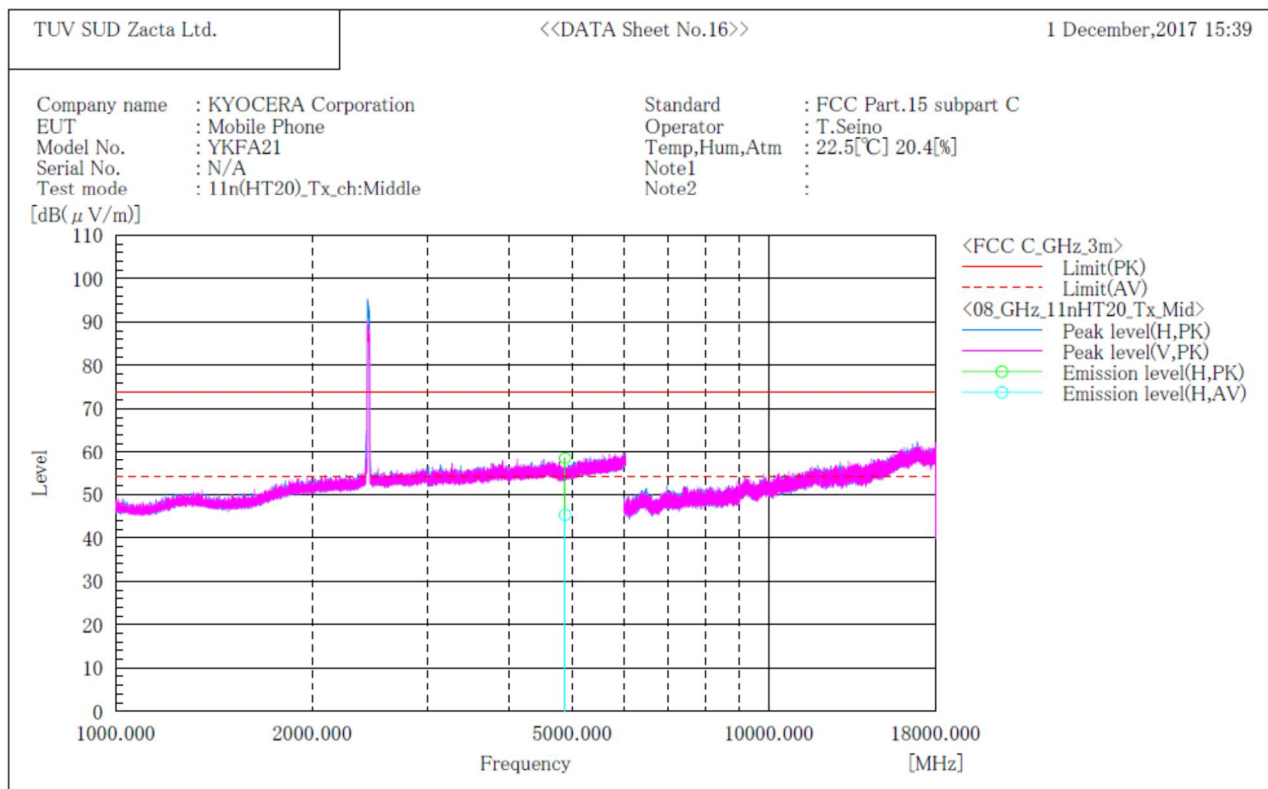
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11n(HT20)]  
Channel Middle  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4874.000	H	49.1	35.9	9.4	58.5	45.3	74.0	54.0	15.5	8.7	151.0	29.0

Note:

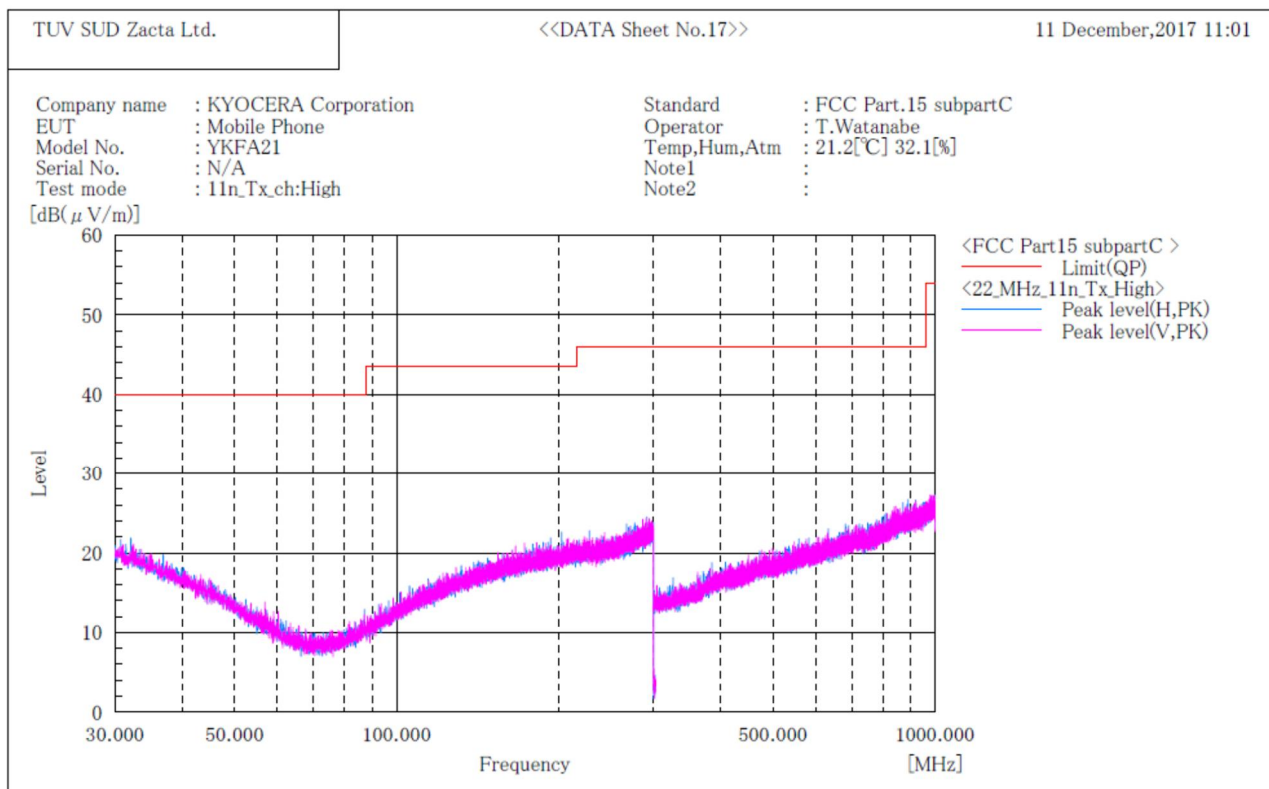
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11n(HT20)]  
Channel High  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P) [MHz]	c.f [dB(1/m)]	Height [cm]	Angle [° ]	Remark
-----	------------------------	------------------	----------------	---------------	--------

Note:

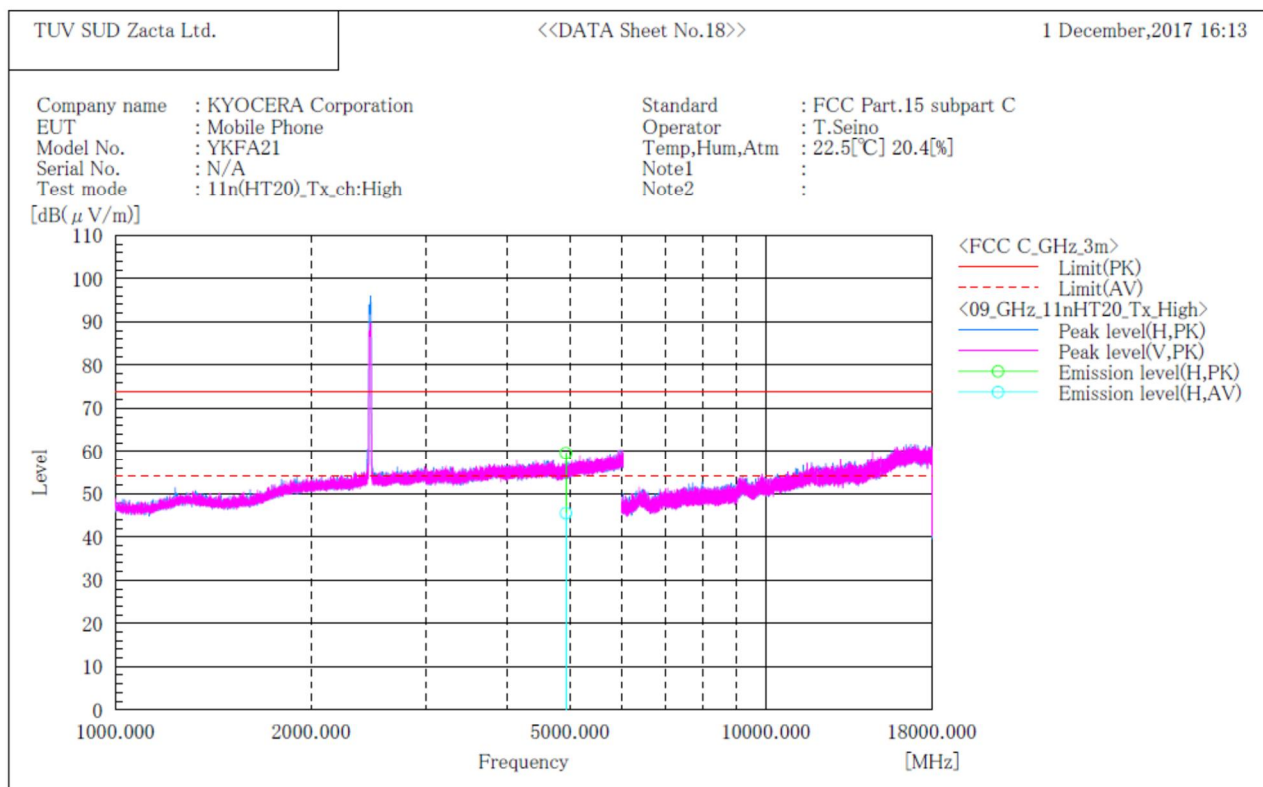
- Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
- No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11n(HT20)]  
Channel High  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4924.000	H	50.0	35.9	9.6	59.6	45.5	74.0	54.0	14.4	8.5	152.0	31.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

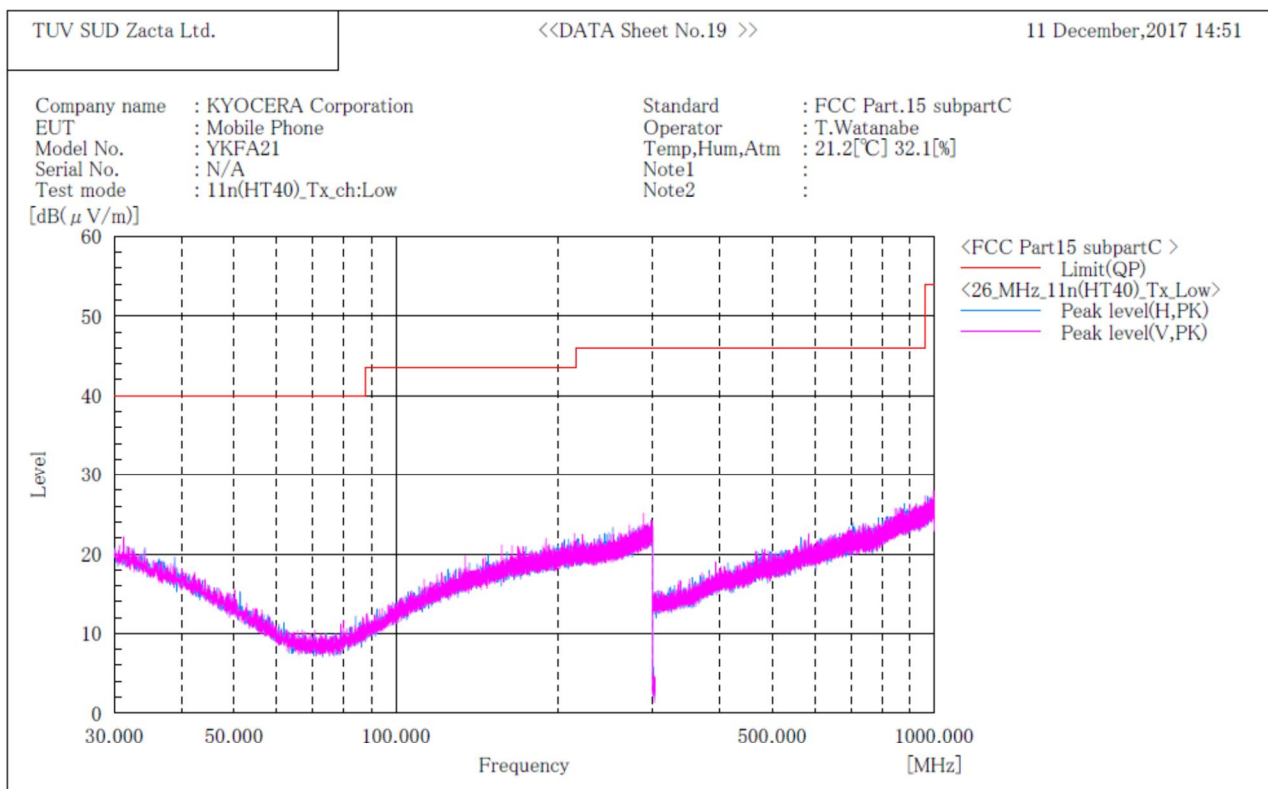




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**[11n(HT40)]  
Channel Low  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

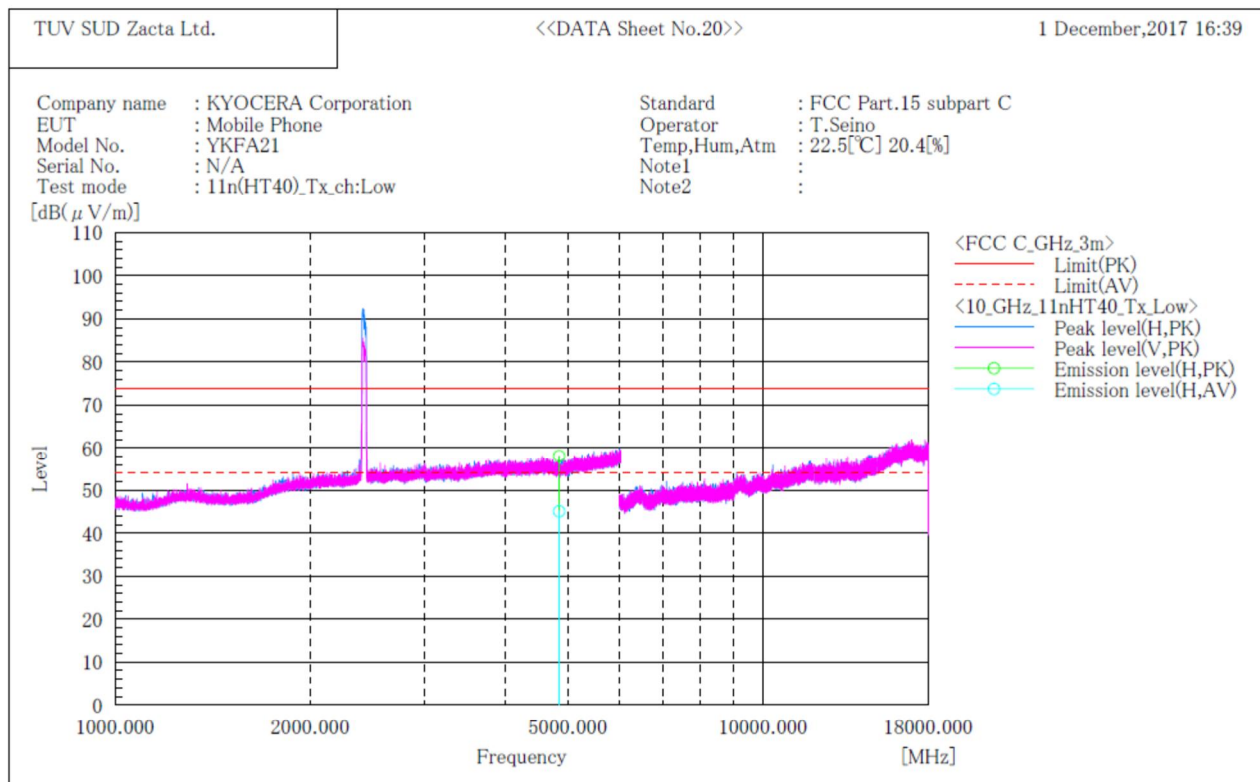
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11n(HT40)]  
Channel Low  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4844.000	H	48.8	35.8	9.3	58.1	45.1	74.0	54.0	15.9	8.9	141.0	29.0

Note:

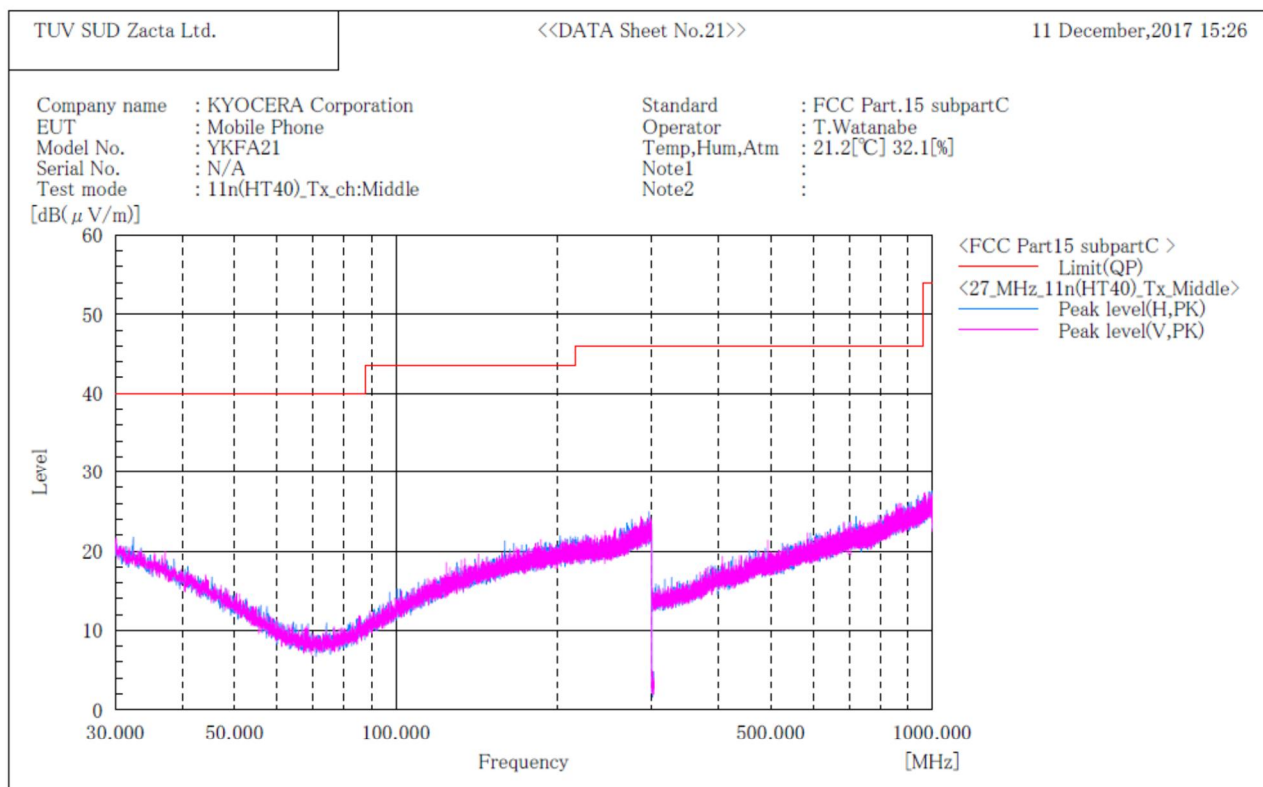
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11n(HT40)]  
Channel Middle  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P) [MHz]	c.f [dB(1/m)]	Height [cm]	Angle [° ]	Remark
-----	------------------------	------------------	----------------	---------------	--------

Note:

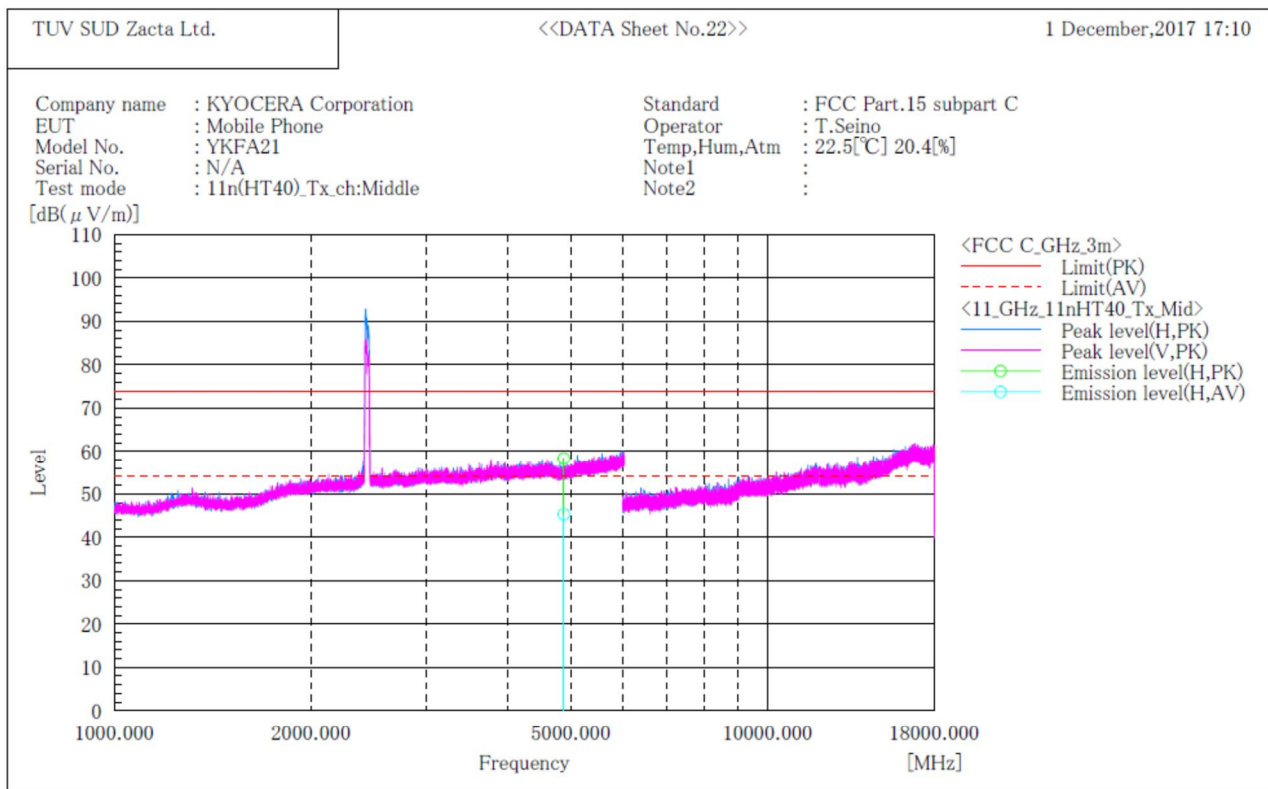
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11n(HT40)]  
Channel Middle  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4874.000	H	48.9	35.9	9.4	58.3	45.3	74.0	54.0	15.7	8.7	143.0	33.0

Note:

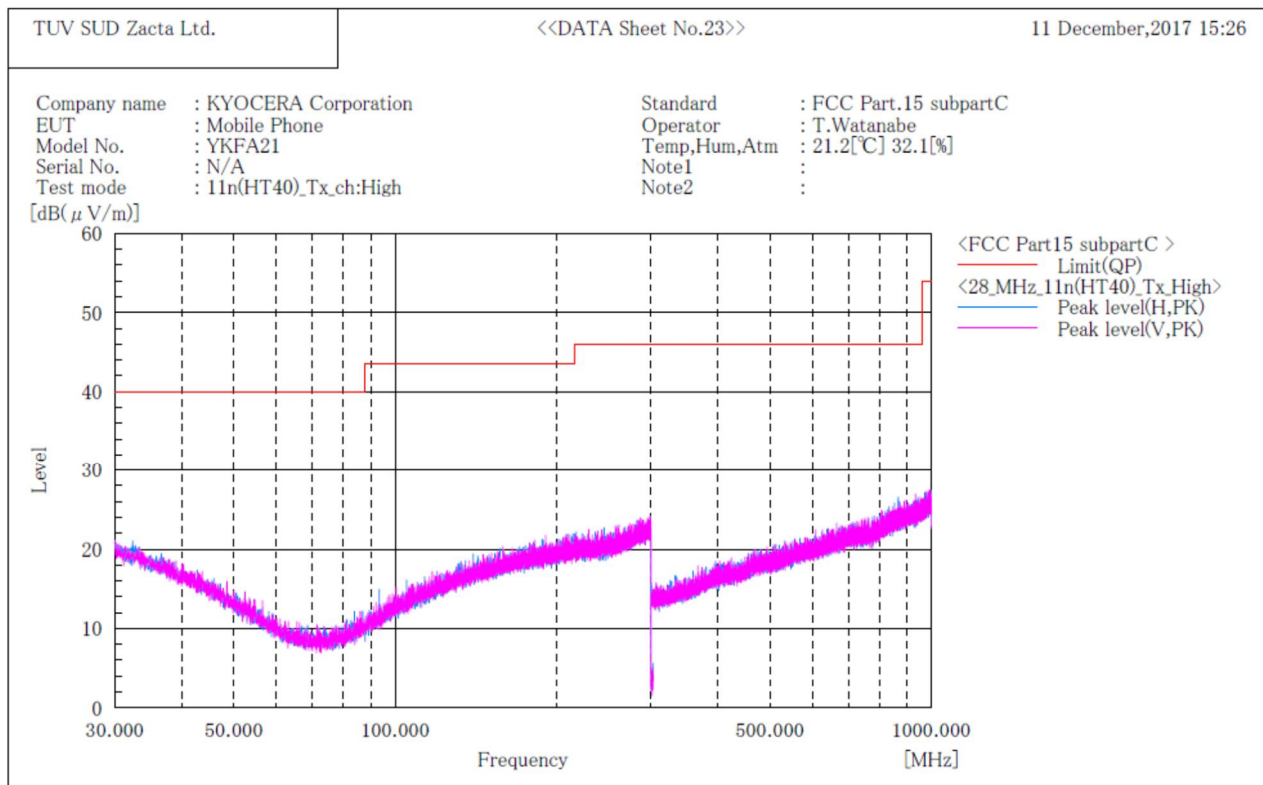
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



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**[11n(HT40)]  
Channel High  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

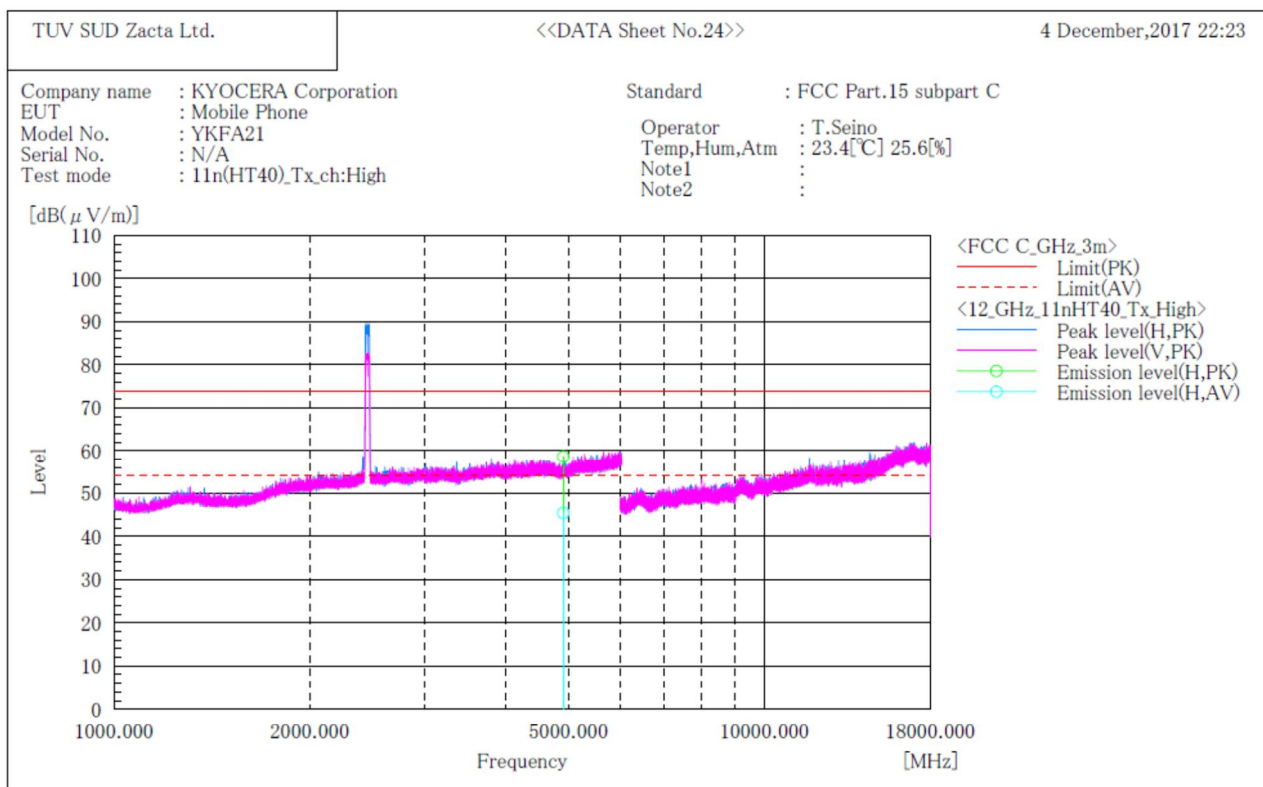
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



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**[11n(HT40)]  
Channel High  
ABOVE 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c. f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	4904.000	H	49.1	35.9	9.5	58.6	45.4	74.0	54.0	15.4	8.6	148.0	30.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

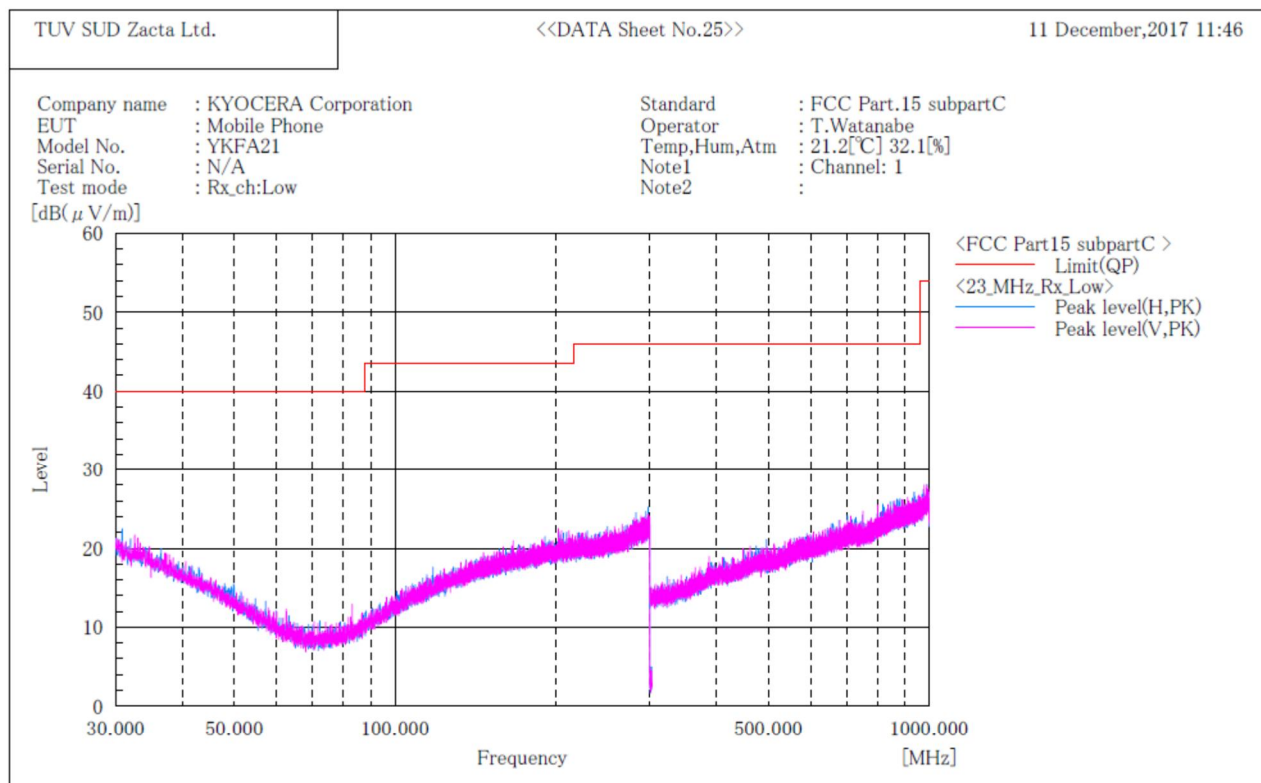


Zacta

### 8.4.2 Receive mode

Channel: 1  
BELOW 1GHz

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



#### Final Result

No.	Frequency (P)	c. f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

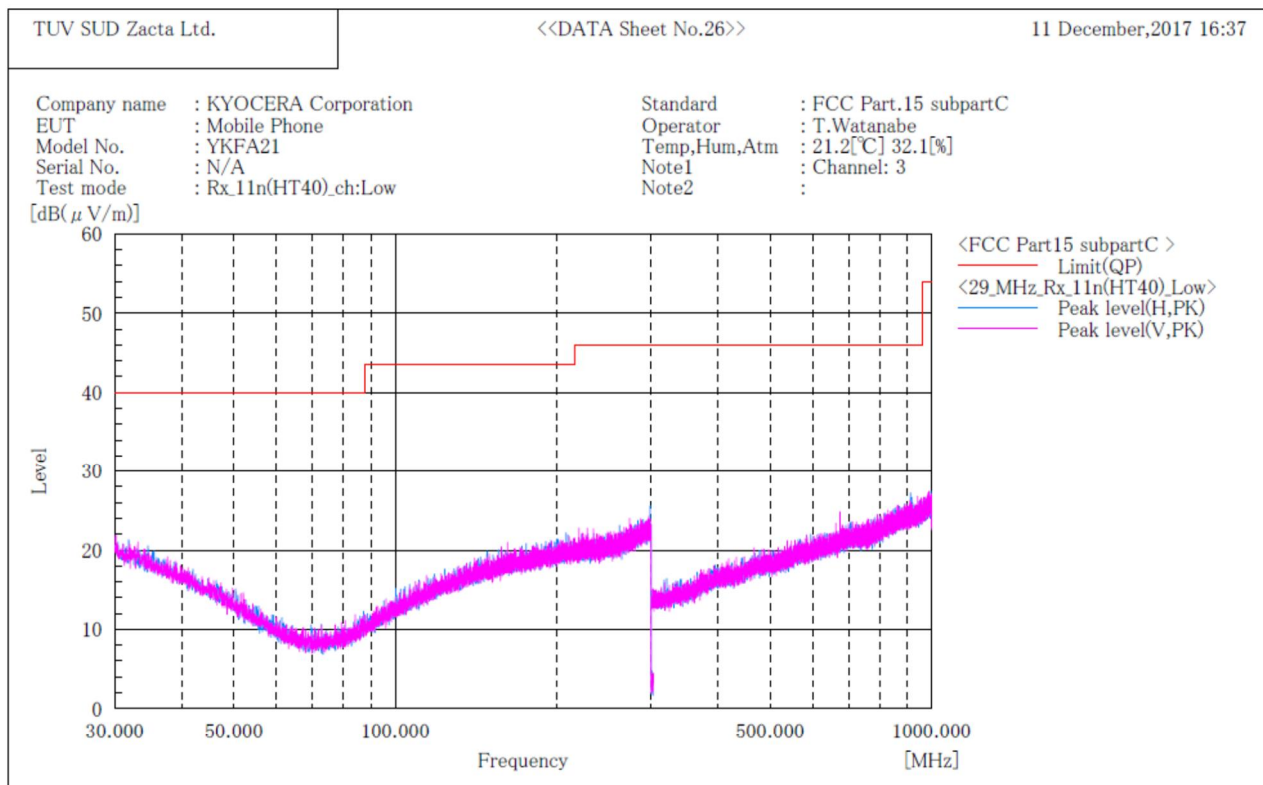
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.



Zacta

**Channel: 3  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



**Final Result**

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

**Note:**

1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.

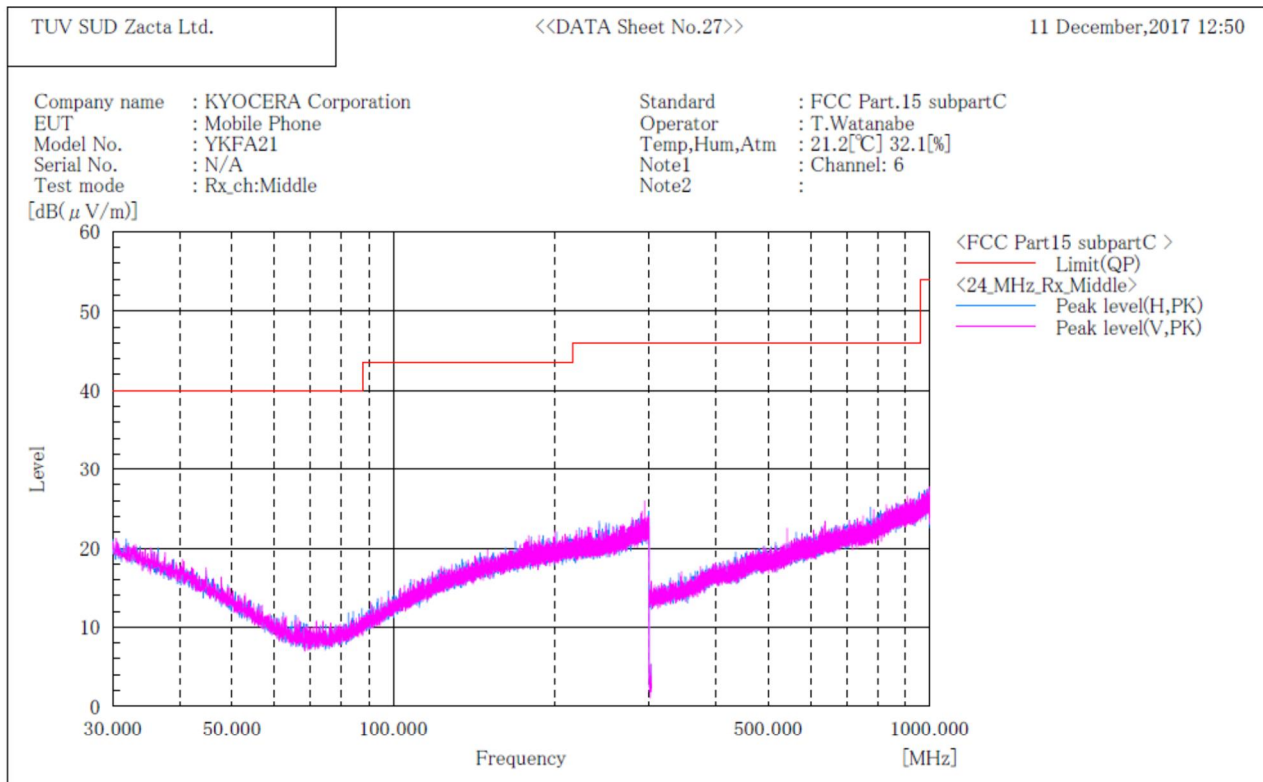




Zacta

**Channel: 6  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P) [MHz]	c.f [dB(1/m)]	Height [cm]	Angle [°]	Remark
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Note:

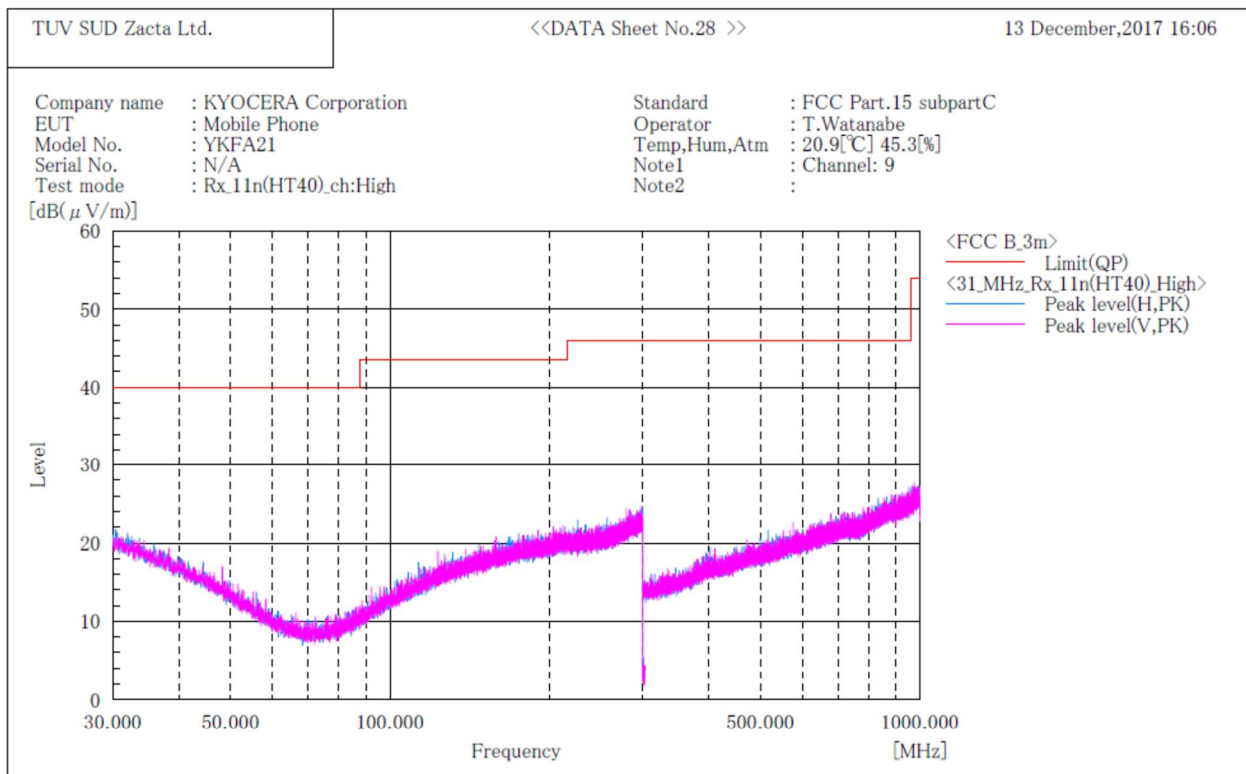
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.



Zacta

**Channel: 9  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

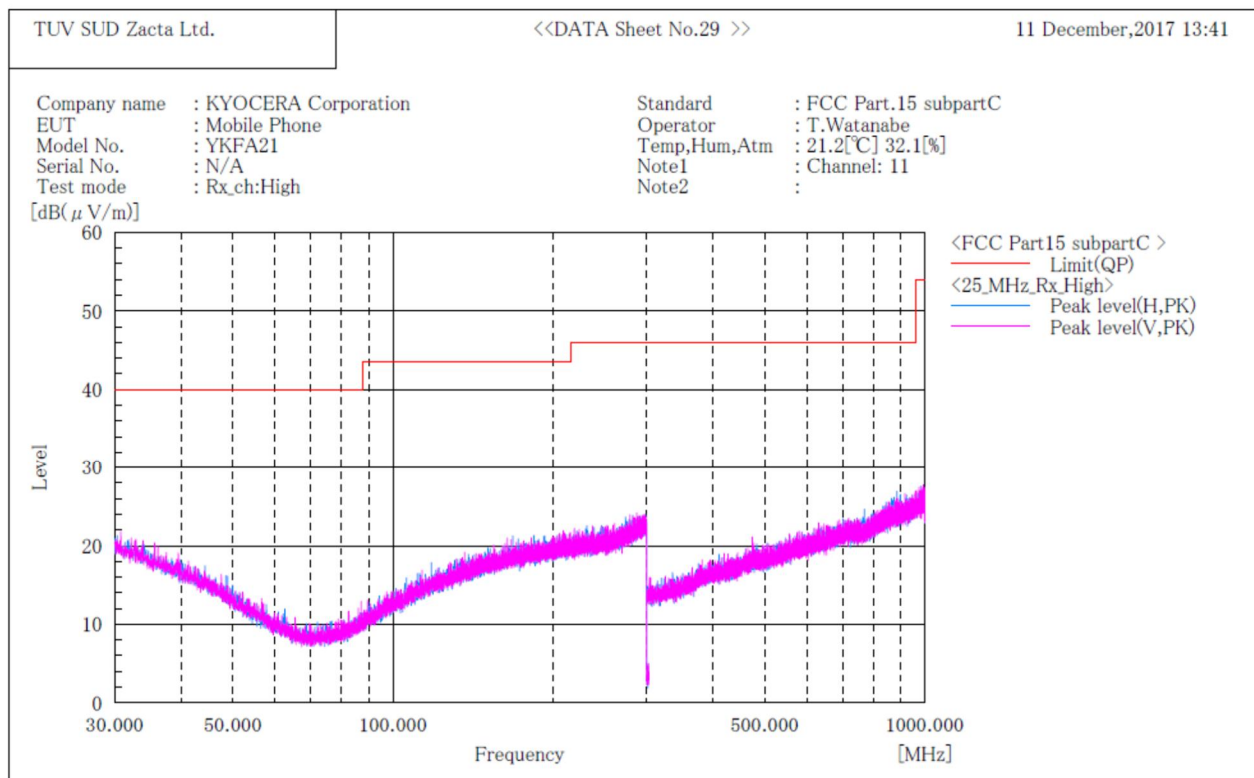
1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.



Zacta

**Channel: 11  
BELOW 1GHz**

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*  
[ 3m Semi-anechoic chamber ]



Final Result

No.	Frequency (P)	c.f	Height	Angle	Remark
	[MHz]	[dB(1/m)]	[cm]	[°]	

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor ( Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.