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# **TEST REPORT**

# Part 15 Subpart C 15.247 & RSS-247 (Issue 2)

Equipment under test CAR BLACK BOX

Model name F200 PRO

FCC ID 2ADTG-F200PRO

IC 12594A-F200PRO

Applicant THINKWARE CORPORATION

Manufacturer THINKWARE CORPORATION

Date of test(s) 2020.08.04 ~ 2020.08.10

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Issued to THINKWARE CORPORATION

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#### **Revision history**

Revision	Date of issue	Test report No.	Description
-	2020.08.24	KES-RF1-20T0131	Initial



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#### 1. General information

THINKWARE CORPORATION			
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473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea			
FCC Accreditation Designation No.: KR0100, Registration No.: 444148			
ISED Registration No.: 4769B			
15.247 / RSS-247			
2ADTG-F200PRO			
12594A-F200PRO			
Production	Pre-production	Engineering	
	A, 9FL, Samwhan Hipex, 240, Gyeonggi-do, South Korea KES Co., Ltd. 3701, 40, Simin-daero 365beor Gyeonggi-do, 14057, Korea 473-21, Gayeo-ro, Yeoju-si, Gy FCC Accreditation Designation ISED Registration No.: 4769B 15.247 / RSS-247 2ADTG-F200PRO 12594A-F200PRO	A, 9FL, Samwhan Hipex, 240, Pangyoyeok-ro, Bundang-gu, Se Gyeonggi-do, South Korea KES Co., Ltd. 3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea FCC Accreditation Designation No.: KR0100, Registration No.: ISED Registration No.: 4769B 15.247 / RSS-247 2ADTG-F200PRO 12594A-F200PRO	

#### 1.1. EUT description

Equipment under test	CAR BLACK BOX
Frequency range	$2412$ MHz ~ $2462$ MHz (11b/g/n_HT20)
	2 422 MHz ~ 2 452 MHz (11n_HT40)
Model:	F200 PRO
Modulation technique	DSSS, OFDM
Number of channels	$2 412 \text{ Mz} \sim 2 462 \text{ Mz} (11b/g/n_HT20) : 11ch$
	2 422 Mz ~ 2 452 Mz $(11n_HT40)$ : 9 ch
Antenna specification	Antenna type (2.4 $\mbox{GHz}$ WIFI) : Chip antenna, Peak gain : 3.41 dBi
Power source	DC 12 V / DC 24V
H/W version	V3.0
S/W version	V0.03.00

#### **1.2.** Test configuration

#### The THINKWARE CORPORATION // F200PRO // FCC ID: 2ADTG-F200PRO // IC : 12594A-

**F200PRO** was tested according to the specification of EUT, the EUT must comply with following standards and KDB documents. FCC Part 15.247 ISED RSS-247 Issue 2 and RSS-Gen Issue 5 KDB 558074 D01 v05 r02 ANSI C63.10-2013

**1.3.** Device modifications

N/A

#### 1.4. Accessory information

N/A

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#### 1.5. Measurement results explanation example

For all conducted test items :

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).= 1.55 + 10.00 = 11.55 (dB)

#### 1.6. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.46 dB
Uncertainty for Radiation emission test	Below 1 GHz	4.40 dB
(include Fundamental emission)	Above 10Hz	5.94 dB
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95%		

confidence level using a coverage factor of k=2.

#### **1.7.** Frequency/channel operations

Ch.	Frequency (Mz)	Mode
01	2 412	802.11b/g/n_HT20
06	2 437	802.11b/g/n_HT20
·		· .
11	2 462	802.11b/g/n_HT20

Ch.	Frequency (Mz)	Mode
03	2 422	802.11n_HT40
		· · ·
06	2 437	802.11n_HT40
		:
09	2 452	802.11n_HT40

#### 1.8. Worst case data rate

- 1. Radiated emission was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
- 2. Worst-case data rates were:

802.11b: <u>1 Mbps</u>

- 802.11g: <u>6 Mbps</u>
- 802.11n\_HT20: MCS0
- 802.11n\_HT40: <u>MCS0</u>

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### 2. Summary of tests

Section in FCC Part 15	Section in RSS-247 & Gen	Parameter	Test results
-	RSS-Gen 6.6	26 dB bandwidth & 99 % bandwidth	Pass
15.247(a)(2)	RSS-247 5.2 (a) RSS-247 6.2.4	6 dB bandwidth	Pass
15.247(b)(3)	RSS-247 5.4 (d) RSS-247 6.2.4.1	Output power	Pass
15.247(e)	RSS-247 5.2 (b) RSS-247 6.2.4.1	Power spectral density	Pass
15.205 15.209	RSS-247 5.5 RSS-Gen 8.9, 8.10	Radiated restricted band and emission	Pass
15.247(d)	RSS-247 5.5	Conducted spurious emission and band edge	Pass
15.207(a)	RSS-Gen 8.8	AC conducted emissions	Pass



# 3. Test results 3.1. 99% Occupied Bandwidth Test procedure ANSI C63.10-2013

**Test setup** 

	Attenuator	Secondaria analyzan
EUI	Attenuator	Spectrum analyzer

#### Limit

None; for reporting purpose only.

#### **Test results**

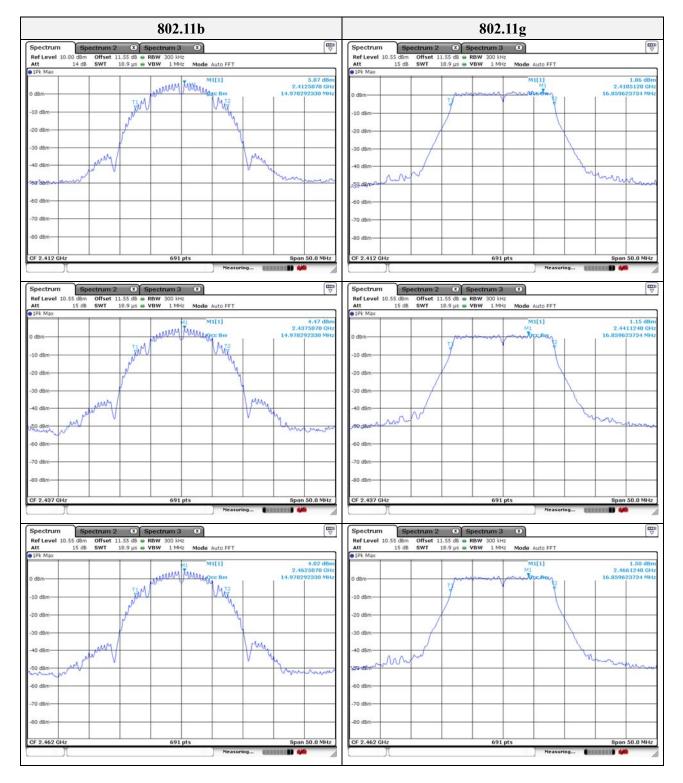
99 % bandwidth of 20 Mz bandwidth				
	Measured 99 % bandwidth(胍)			Limit(Mb)
Frequency(Mz)	802.11b	802.11g	802.11n	
2412	14.98	16.86	17.80	
2437	14.98	16.86	17.87	-
2462	14.98	16.86	17.87	

99 % bandwidth of 40 Mz bandwidth			
Measured 99 % bandwidth(Mz)			
Frequency(Mz)	802.11n	Limit(Mz)	
2422	36.01		
2437	35.89	-	
2452	35.89		



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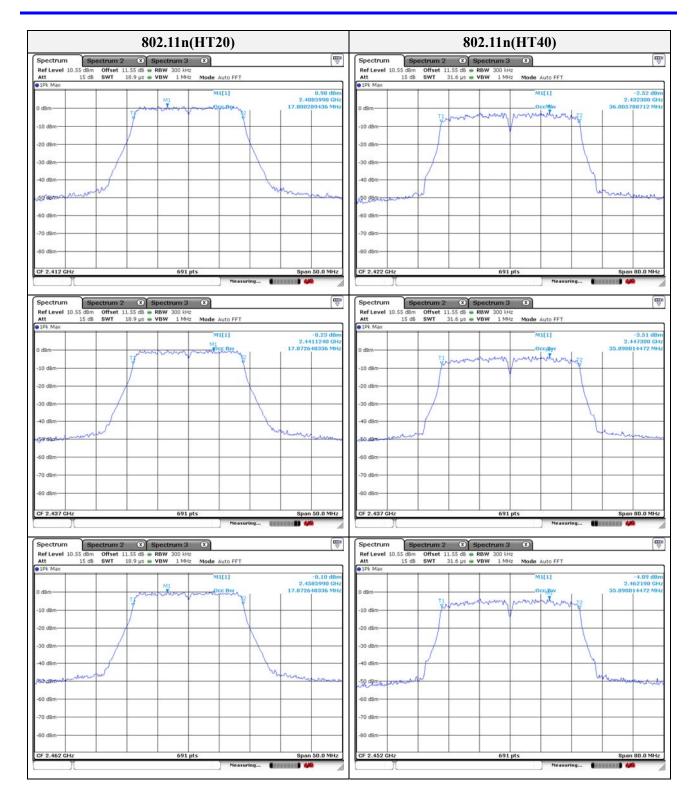
#### Test plots



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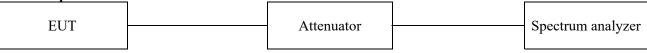


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#### 3.2. 6 dB bandwidth

Test procedure ANSI C63.10 – section 11.8

#### Test setup



#### ANSI C63.10-2013 - Section 11.8.1

- 1. RBW = 100 kHz.
- 2. VBW  $\geq$  3  $\times$  RBW.
- 3. Detector = peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### ANSI C63.10-2013 - Section 11.8.2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW  $\geq$  3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq$ 6 dB.

#### Limit

According to \$15.247(a)(2), systems using digital modulation techniques may operate  $902 \sim 928$  Mb,  $2400 \sim 2483.5$  Mb, and  $5725 \sim 5850$  Mb bands. The minimum 6 dB bandwidth shall be at least 500 kb.

According to RSS-247 5.2 (a), the minimum 6 dB bandwidth shall be 500 kHz.



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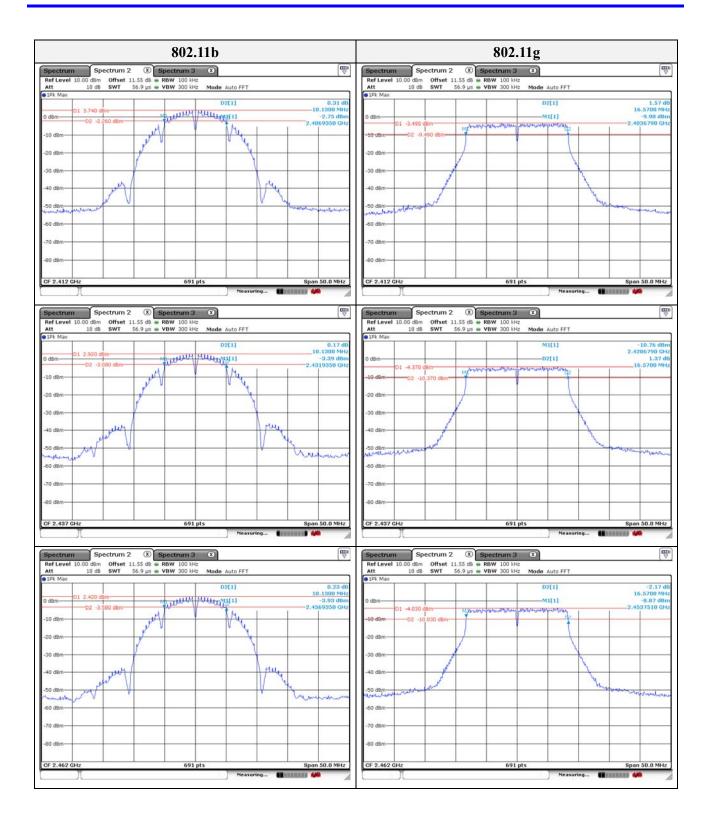
#### **Test results**

6 dB bandwidth of 20 Mz bandwidth						
	I:::+()////a)					
Frequency(Mz)	Limit(Mz)					
2412	10.13	16.57	17.80			
2437	10.13	16.57	17.84	0.5		
2462	10.13	16.57	17.80			

6 dB bandwidth of 40 Mz bandwidth						
Measured 6 dB bandwidth(Mz)						
Frequency(Mz) 802.11n Limit(Mz)						
2422	36.46					
2437	36.51	0.5				
2452	36.45					



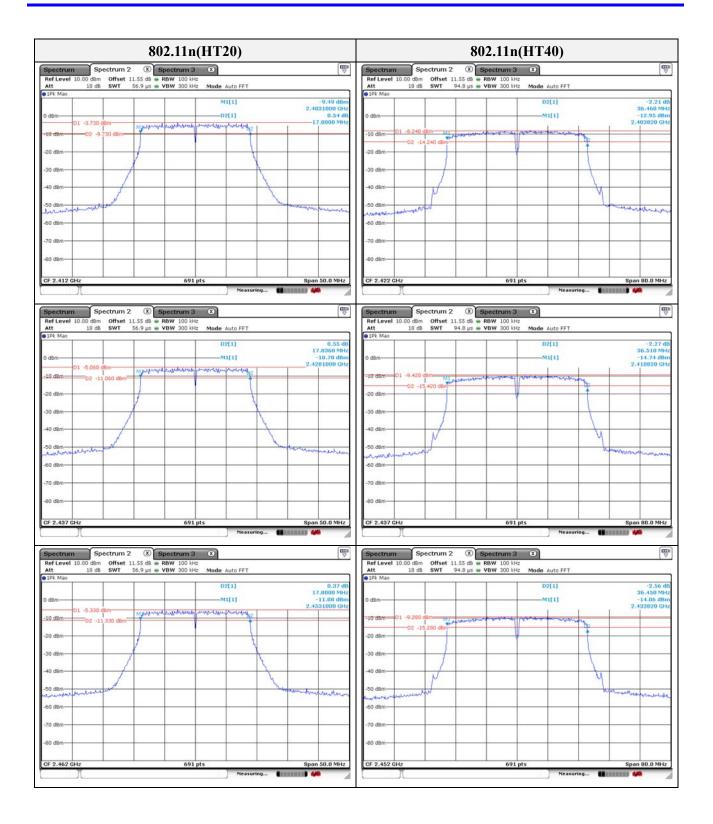
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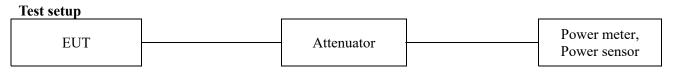
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#### 3.3. Output power

#### Test procedure

ANSI C63.10 – section 11.9.1.1 or section 11.9.1.3 and 11.9.2.3.2



#### ANSI C63.10 - Section 11.9.1.1

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- 1. Set the RBW  $\geq$  DTS bandwidth.
- 2. Set VBW  $\geq$  3  $\times$  RBW.
- 3. Set span  $\geq$  3  $\times$  RBW
- 4. Sweep time = auto couple
- 5. Detector = peak
- 6. Trace mode = max hold
- 7. Allow trace to fully stabilize
- 8. Use peak marker function to determine the peak amplitude level

#### ANSI C63.10 - section 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS ba ndwidth and shall utilize a fast-responding diode detector.

#### ANSI C63.10 - section 11.9.2.3.2

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

#### Limit

According to §15.247(b)(3), For systems using digital modulation in the 902~928 MŁ, 2 400~2 483.5 MŁ, and 5 725~5 850 MŁ bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted out-put power. Maximum Conducted Out-put Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

According to \$15.247(b)(4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmit-ting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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According to RSS-247 5.4 (d), For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in Section 5.4(e).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.



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#### **Test results**

Measured output power (dBm)							
Mada	2412 MHz		2437 MHz		2462 Mbz		
Mode	Peak	Average	Peak	Average	Peak	Average	
11b	15.65 13.28		15.08	12.74	15.07	12.70	
11g	20.94	.94 11.23 20.51 10		10.89	20.36	10.71	
11n_HT 20	19.66 10.31 19.31 10.08		10.08	19.26	10.04		
Mada	2422	2422 MHz		2437 Mb		2 MHz	
Mode	Peak	Average	Peak	Average	Peak	Average	
11n_HT 40	17.49	9.24	17.22	9.01	17.03	8.88	



3.4. Power spectral density

Test procedure

ANSI C63.10 - section 11.10.2

#### Test setup

EUT	Attenuator	Spectrum analyzer

#### ANSI C63.10 – section 11.10.2

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS channel bandwidth.
- 3. Set the RBW : 3 kHz  $\leq$  RBW  $\leq$  100 kHz
- 4. Set the VBW  $\geq$  3  $\times$  RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10. If measured value exceeds limit, reduce RBW(no less than 3 klz) and repeat.

#### Limit

According to \$15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-247 5.2 (b), The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of Section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).



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#### **Test results**

PSD of 20 Mz bandwidth							
	Limit(dBm/3kHz)						
Frequency(Mb)	Frequency(Mbz)         802.11b         802.11g         802.11n						
2412	-17.29	-18.37	-18.02				
2437	-17.69	-19.04	-19.14	8			
2462	-18.11	-18.64	-19.25				

PSD of 40 Mz bandwidth							
Measured PDS(dBm/3kHz)							
Frequency(Mbz)	Frequency(Mb) 802.11n Limit(dBm)						
2422	-19.32						
2437	-20.60	8					
2452	-20.08						



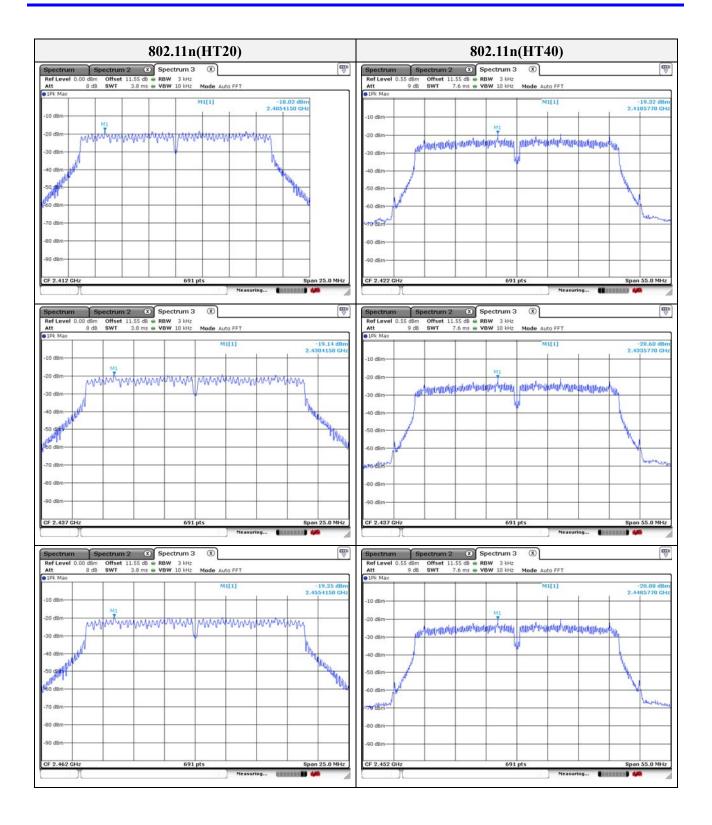
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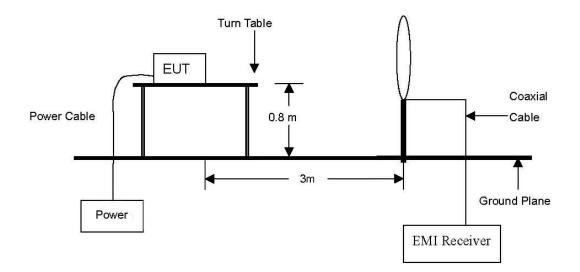


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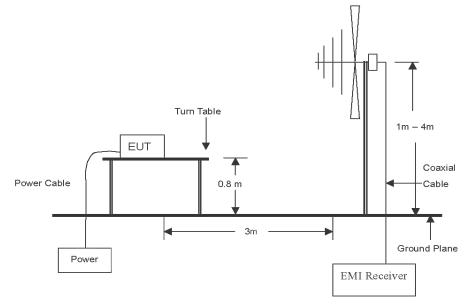
#### 3.5. Radiated restricted band and emissions

#### Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.

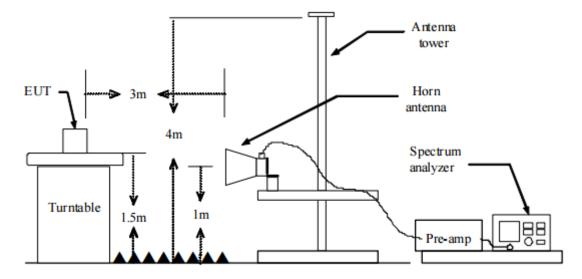


The diagram below shows the test setup that is utilized to make the measurements for emission from 30 Mz to 1 Gz emissions.





The diagram below shows the test setup that is utilized to make the measurements for emission from 1  $\mathbb{G}\mathbb{Z}$  to the tenth harmonic of the highest fundamental frequency or to 40  $\mathbb{G}\mathbb{Z}$  emissions, whichever is lower.



#### Test procedure below 30 Mz

- 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
- 3. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
- 4. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum hold mode.

#### Test procedure above 30 Mz

- 1. Spectrum analyzer settings for f < 1 GHz:
  - ① Span = wide enough to fully capture the emission being measured
  - $\bigcirc$  RBW = 100 kHz
  - ③ VBW  $\ge$  RBW
  - ④ Detector = quasi peak
  - 5 Sweep time = auto
  - 6 Trace = max hold
- 2. Spectrum analyzer settings for  $f \ge 1$  GHz: Peak
  - ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
  - 2 RBW = 1 M/z
  - ③ VBW  $\ge$  3 ML
  - (4) Detector = peak
  - (5) Sweep time = auto
  - $\bigcirc$  Trace = max hold
  - $\bigcirc$  Trace was allowed to stabilize

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- 3. Spectrum analyzer settings for  $f \ge 1$  GHz: Average
  - ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
  - 2 RBW = 1 MHz
  - (3)  $VBW \ge 3 \times RBW$
  - (4) Detector = RMS, if span/(# of points in sweep)  $\leq$  (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
  - (5) Averaging type = power(i.e., RMS)
    - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
    - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
  - 6 Sweep = auto
  - $\bigcirc$  Trace = max hold
  - 8 Perform a trace average of at least 100 traces.
  - ④ A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
    - 1) If power averaging (RMS) mode was used in step (5), then the applicable correction factor is 10 log(1/x), where x is the duty cycle.
    - 2) If linear voltage averaging mode was used in step (5), then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
    - 3) If a specific emission is demonstrated to be continuous ( $\geq 98$  percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

#### Note.

- 1. The loop antenna was investigated with three polarizations, and horizontal and vertical polarizations were reported as the worst case.
- 2. f < 30 Mz, extrapolation factor of 40 dB/decade of distance.  $F_d = 40\log(D_m/Ds)$

 $f \ge 30$  Mz, extrapolation factor of 20 dB/decade of distance.  $F_d = 20\log(D_m/Ds)$  Where:

- $F_d$  = Distance factor in dB
- $D_m$  = Measurement distance in meters
- $D_s$  = Specification distance in meters
- 3.  $CF(Correction factors(dB)) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d(dB)$
- 4. Field strength( $dB\mu N/m$ ) = Level( $dB\mu N$ ) + CF (dB) + or DCF(dB)
- 5.  $Margin(dB) = Limit(dB\mu N/m) Field strength(dB\mu N/m)$
- 6. Emissions below 18 GHz were measured at a 3 meter test distance while emissions above 18 GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that <u>X orientation</u> was worst-case orientation; therefore, all final radiated testing was performed with the EUT in <u>X orientation</u>.
- 6. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
- 7. According to exploratory test no any obvious emission were detected from 9klz to 30Mlz. Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field 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 414788.

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#### Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (Mz)	Distance (Meters)	Radiated (µV/m)
$0.009 \sim 0.490$	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30.0	30	30
30~88	3	100**
88~216	3	150**
216~960	3	200**
Above 960	3	500

\*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands  $54 \sim 72$  Mz,  $76 \sim 88$  Mz,  $174 \sim 216$  Mz or  $470 \sim 806$  Mz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

According to RSS-Gen, Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits :

Frequency (Mz)	Distance (Meters)	Radiated (µN/m)
$0.009 \sim 0.490$	300	2 400 / F(klz)
$0.490 \sim 1.705$	30	24 000 / F(kllz)
1.705 ~ 30.0	30	30
30~88	3	100
88~216	3	150
216 ~ 960	3	200
Above 960*	3	500

\* Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licenceexempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.

Note: Transmitting devices are not permitted in restricted frequency bands unless stated otherwise in the specific RSS.



#### **Duty cycle**

Regarding to KDB 558074 D01\_v05 r02, 6. Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on- and off-times of the transmitted signal.

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on- and off-times of the transmitted signal.

Test mode Ton time (s)		Period (s)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11b	1	1	1.00	100	0
802.11g	1	1	1.00	100	0
802.11n(HT20)	1	1	1.00	100	0
802.11n(HT40)	1	1	1.00	100	0

Duty cycle (Linear) = T<sub>on</sub> time/Period

DCF(Duty cycle correction factor (dB)) = 10log(1/duty cycle)

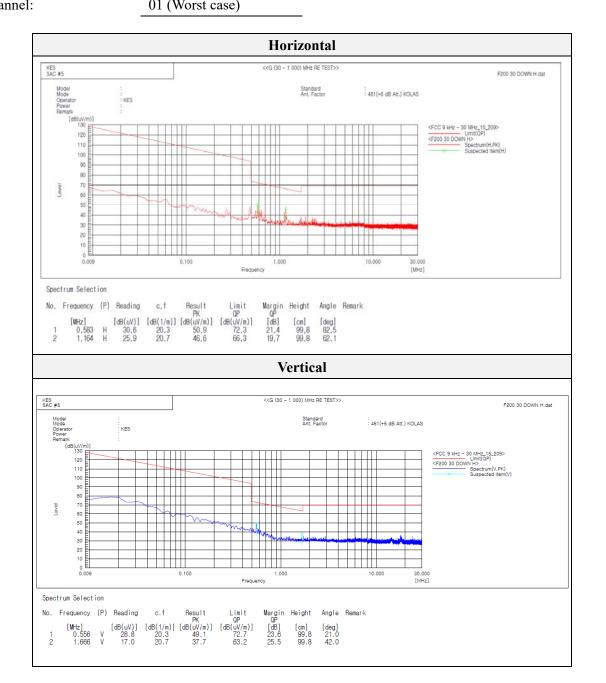


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Test results (Below 30 M	屘)
Mode:	802.11b
Distance of measurement:	3 meter
Channel:	01 (Worst case)



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Test results (Below 1 000	MHz)
Mode:	802.11b
Distance of measurement:	3 meter
Channel:	01 (Worst case)

	Horizontal // Vertical										
	KES SAC #5					< <g (30="" -="" 000)="" 1="" mhz="" re<="" th=""><th>TEST&gt;&gt;</th><th></th><th></th><th>1g DOW</th><th>N,dat</th></g>	TEST>>			1g DOW	N,dat
	Model Mode Operai Power Remar [	tor	KES			Standarc Ant, Fac	FCC Part. tor ÷ 461(+6 dE	15 Class B 3m 3 Att.) KOLAS			
	Level		50,000		100.000	ncy		<pre> </pre>	B> OWN> Spectrum( → Suspected × Suspected	V,PK) I Item(H)	
Sp	ectru	m Select	ion								
No	. Fr	equency	(P)	Reading	C.f	Result PK	Limit QP	Margin QP	Height	Angle	Remark
1	5 6 7 8 9 0 1	[MHz] 47.945 59.464 71.953 202.054 240.005 760.046 47.945 59.949 71.953 191.990 208.601 760.046	>>>>>> IIIIII	[dB(uV)] 46.6 44.4 49.5 46.1 44.3 37.8 39.0 37.9 39.3 50.6 52.4 35.9	[dB(1/m)] -12.8 -13.5 -15.6 -15.9 -14.5 -2.5 -12.8 -13.5 -15.6 -15.6 -15.8 -2.5		[dB(uV/m)] 40.0 40.0 40.0 43.5 46.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0 40.5 43.5 46.0	[dB] 6.2 9.1 6.1 13.3 16.2 10.7 13.8 15.6 16.3 8.5 6.9 12.6	[cm] 99.8 99.8 99.8 99.8 149.7 400.0 400.0 400.0 200.2 99.8 200.2	[deg] 80.8 213.4 351.9 170.2 75.2 28.8 3.5 94.2 234.5 84.1 65.0 25.0	

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Report No.: KES-RF1-20T0131 Page (28 ) of (59)

#### Test results (Above 1 000 Mz)

Mode:	802.11b
Distance of measurement:	3 meter
Channel:	01

#### Spurious

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Frequency (Mz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2127.35	52.31	Peak	Н	-0.67	-	51.64	74.00	22.36
2124.50	53.74	Peak	V	-0.67	-	53.07	74.00	20.93
4834.00	50.87	Peak	Н	7.22	-	58.09	74.00	15.91
4834.30	38.33	Average	Н	7.22	-	45.55	54.00	8.45
4834.30	54.05	Peak	V	7.22	-	61.27	74.00	12.73
4834.30	40.75	Average	V	7.22	-	47.97	54.00	6.03

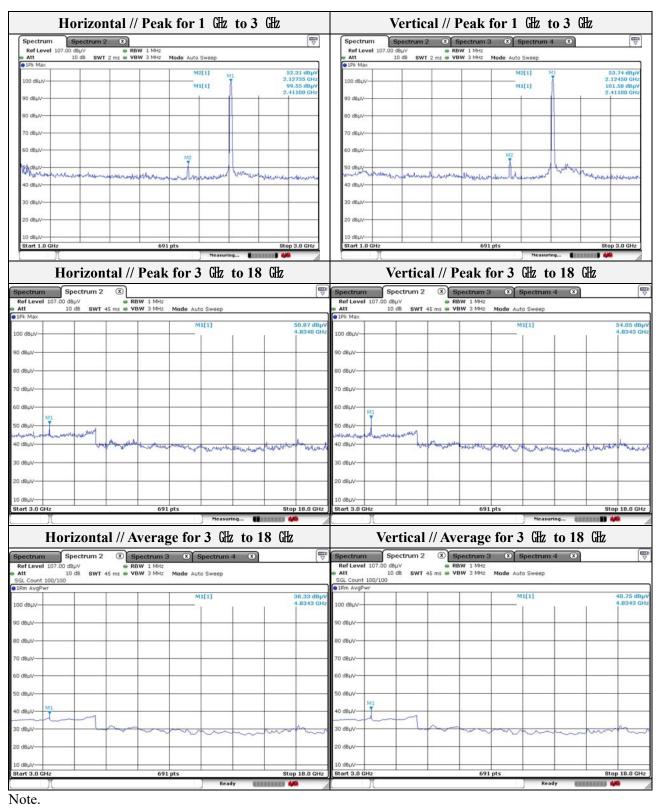
#### Band edge

Frequency (Mz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµN/m)	Margin (dB)
2387.26	48.18	Peak	Н	-0.14	-	48.04	74.00	25.96
2387.26	48.16	Peak	V	-0.14	-	48.02	74.00	25.98

	Re	stricted b	and // I	Iorizont	al //	Peal	ĸ			]	Restric	ted	band //	Vertica	l // P	eak		
Spectrum	Sp	ectrum 2 🛞	Spectrum 3	(X) Spectrum	14 (	X		Spec	trum		Spectrum 2	×	Spectrum 3	(X) Spectru	m 4 (x	<u>ן</u>		
Ref Level 10			RBW 1 MHz					Ref	Level	107.00			RBW 1 MHz					
Att	10	dB SWT 17 µs 🖷 🕅	VBW 3 MHz M	ode Auto FFT				Att			10 dB SWT 1	7 µs 🖷	VBW 3 MHz Mo	ode Auto FFT				
1Pk Max								●1Pk	Max									
100 dBuy				M3[1]			48.18 dBp 2.387260 GF							M3[1]				18,16 dBµ 87289, GF
100 0800				M1[1]			#4.41 dBu		spv					M1[1]				13.72 dB
90 dBuV							2/310000 GP		W		_							10000 GF
					T	1	11	V							- T	1	/ 1	
80 dBuV			-			-	/	80 dB	UV-		-	_	-			-	1	
																	1	
70 dBuV			+ +					- 70 dB	UV-		+ +	_	+ +		+ +		1	
10.00								10.40									1	
60 dBµV						1	5.1	60 dB								0	1	
50 deuv					M3M	2 1		50 d8	N						M3M2	1		
1 Contraction		man	mon	many	ma	w				15 10	mm	A		monny	when	wy.	- 1	
40 dBµV		0-00 0.			-			- 40 dB	UV-T	www	married	-Ve	when have a					
30 dBµV								- 30 dB	μV		+ +	_				_	-	
20 dBuV								20 dB									_	
20 0800					F	S		20 06							F2			
10 dBuyF1						· .		10 dB	FI						1			
Start 2.3 GHz	-		691 pl	5			Stop 2.42 GH		2.3 GH	12		-	691 pt	5	_		Stop	2.42 GH
larker								Marke					000,000				- top	
Type   Ref	Trc	X-value	Y-value	Function		Function	Result	Type		Trc	X-value	1	Y-value	Function	F	unction	Result	
M1	1	2.31 GHz	44.41 dBµV					M	1	1	2.3	1 GHz	43.72 dBµV					
M2	1	2.39 GHz	47.06 dBµV					M		1		9 GHz	47.93 d8µV					
M3	1	2.38726 GHz	48.18 dBµV	1				M	3	1	2.3872	6 GHz	48.16 dBµV					
				Meas	uring	COLUMN 2 1		1		1				Mea	suring	<b>CR</b> EEKER STREEKER		



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1. Average test would be performed if the peak result were greater than the average limit.

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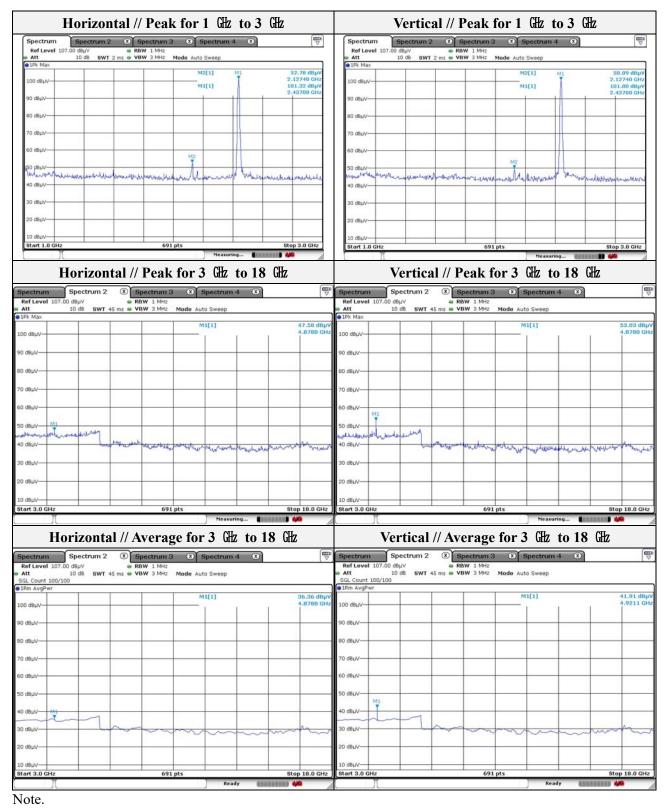


Report No .: KES-RF1-20T0131 Page (30 ) of (59)

Mode:	802.11b
Distance of measurement:	3 meter
Channel:	06

- Spurio	us							
Frequency (畑)	Level (dBµN)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2127.40	52.78	Peak	Н	-0.67	-	52.11	74.00	21.89
2127.40	50.09	Peak	V	-0.67	-	49.42	74.00	24.58
4878.00	47.58	Peak	Н	7.54	-	55.12	74.00	18.88
4878.00	36.36	Average	Н	7.54	-	43.90	54.00	10.10
4878.00	53.03	Peak	V	7.54	-	60.57	74.00	13.43





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Mode:	802.11b
Distance of measurement:	3 meter
Channel:	11

- Spurio	us							
Frequency (Mbz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµV/m)	Margin (dB)
2127.40	47.93	Peak	Н	-0.67	-	47.26	74.00	26.74
2127.40	48.23	Peak	V	-0.67	-	47.56	74.00	26.44
4921.00	50.42	Peak	Н	7.86	-	58.28	74.00	15.72
4921.10	37.81	Average	Н	7.86	-	45.67	54.00	8.33
4921.00	46.49	Peak	V	7.86	-	54.35	74.00	19.65
4921.10	41.91	Average	V	7.86	-	49.77	54.00	4.23

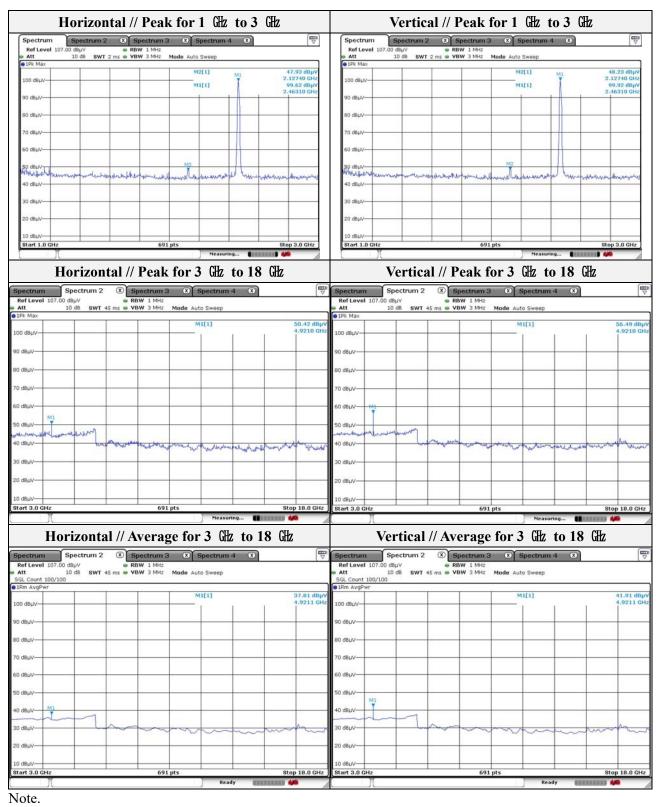
#### Band edge DCF Field strength Margin Frequency Level Ant. Pol. CF Limit **Detect mode** (MHz) $(dB\mu V)$ (H/V) (dB) (dB) $(dB\mu N/m)$ $(dB\mu N/m)$ (dB) 2491.18 47.49 0.09 47.58 74.00 Peak 26.42 Н \_ V 2488.47 50.84 Peak 0.08 -50.92 74.00 23.08

]	Restricted b	and // H	orizonta	l // Pea	k		R	estrict	ed ban	1 // <b>V</b>	ertical	// Pea	k
Spectrum	Spectrum 2 🛞	Spectrum 3	(X) Spectrum	4 🛛		Spectrum	Sp	ectrum 2	(X) Spectrum	n3 (	Spectrum	4 🕱	E
Ref Level 107		RBW 1 MHz VBW 1 MHz Mo	de Auto FFT			Ref Level	107.00 dB		RBW 1 MH		Auto FFT		
1Pk Max	to se uni no pr					1Pk Max	10	00 001 7.0	ps for item	- Mode	Autorri		
100 dBµV			M3[1] M1[1]		47.49 dBμV 2.4911760 GHz 45.48 dBμV 2.4835000 GHz	100 denv-	~~~	~			M3[1] M1[1]		50.84 dBp 2.4884700 CH 48.56 dBp 2.4835000 GH
80 dBµV		+ +				80 d8µV							
70 dBµV 60 dBµV						70 dBµV		\	~				
50 dBµV		- re	M3	m		50 d8µV				MI	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	e
30 dBµV						30 dBµV							
20 dBµV		F1		F2		20 dBµV				F1		1	2
Start 2.455 GH		691 pts			Stop 2.51 GHz	Start 2.455	GHz			591 pts			Stop 2.51 GHz
M2	c X-value 1 2.4835 GHz 1 2.5 GHz 1 2.491176 GHz	Y-value 45.48 dBµV 45.33 dBµV 47.49 dBµV	Function	Function	Result	Marker Type Ref M1 M2 M3	1 1 1	X-value 2,4835 2.5	GHz 46.59	dBµV dBµV	Function	Funct	ion Result
(ma)	1  2.4911/0 GH2	47.49 depv	Measur	ing 🚺 🖬	uu 🦇 🛛	[ m3]	J.	2.48847	amz   50.84	d8µV	Measu	ring 📲	

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Mode:	802.11g
Distance of measurement:	3 meter
Channel:	01

- Spurio	us							
Frequency (Mbz)	Level (dBµN)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
1400.90	52.64	Peak	Н	-6.22	-	46.42	74.00	27.58
2127.40	48.27	Peak	V	-0.67	-	47.60	74.00	26.40
4834.00	50.41	Peak	Н	7.22	-	57.63	74.00	16.37
4834.00	36.75	Average	Н	7.22	-	43.97	54.00	10.03
4834.00	51.39	Peak	V	7.22	-	58.61	74.00	15.39
4834.00	39.15	Average	V	7.22	-	46.37	54.00	7.63

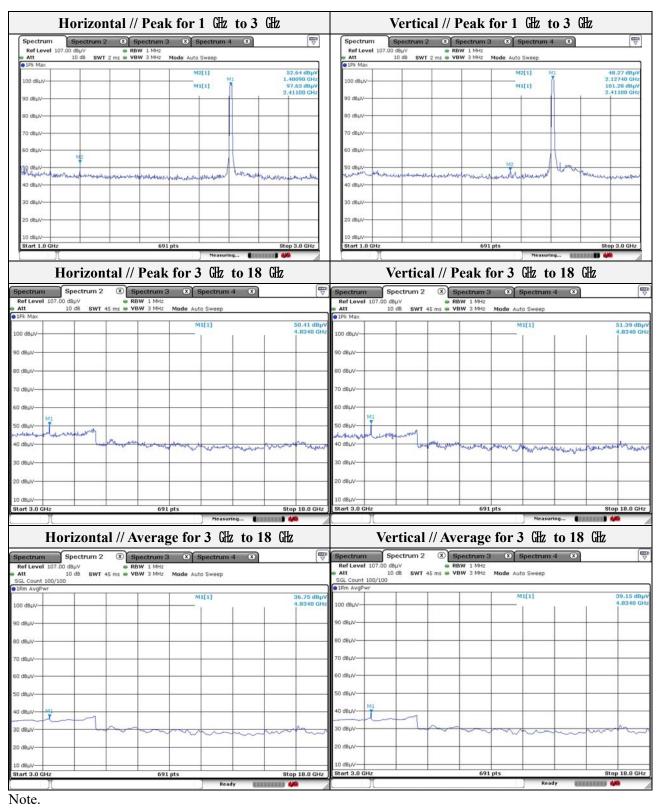
#### Band edge

Frequency (Mb)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµN/m)	Margin (dB)
2389.52	51.07	Peak	Н	-0.13	-	50.94	74.00	23.06
2389.65	49.23	Peak	V	-0.13	-	49.10	74.00	24.90

ŀ	Restricted	band // I	Iorizonta	<b>al</b> // 1	Peal	k		F	Restricte	d band //	/ Vertica	l // Peal	K
Spectrum	Spectrum 2 🛞	Spectrum 3	(X) Spectrum	4 🕱	1	E⊽	Spectrum	S	pectrum 2	X Spectrum 3	(X) Spectru	m 4 🛞	
Ref Level 107.	00 dBµV	RBW 1 MHz					Ref Level	107.00 d	вµ∨	RBW 1 MHz			
Att	10 dB SWT 17 µs	VBW 3 MHz M	ode Auto FFT				👄 Att	10	dB SWT 17 µs	. VBW 3 MHz N	lode Auto FFT		
1Pk Max							1Pk Max						
Second Children			M3[1]			51,07 dBµV					M3[1]		49.23 dBj
100 dBµV						2.389520 GHz							9-389650-G
90 dBuV			M1[1]			2.310000 GHz					M1[1]		43.27 dB
o depv				1	1	2.510000 012	AD GRHA					1 1	2.310000 G
80 dBuV		-			1		80 dBuV						
70 dBµV							70 dBµV					+++	/
60 dBuV							60 dBuV						
of depi				MB	A.		00 0001					1000	/
50 d8µV				- An	1		50 dBuV					mont	-
mon	montan	mound	man	m			mit	man	mon	min	mon	nun l	
40 dBµV					-		40 dBuV	V . U .					1
30 dBuV			· .				30 dBuV						
20 dBµV				F2			20 dBµV					F2	
10 dBuyF1				Ĩ			10 dBuy					12	
Start 2.3 GHz		691 pl				Stop 2.42 GHz	Start 2.3 G	Lia .		691 p			Stop 2.42 GHz
Marker		091 p				0000 2.12 0112	Marker	14		091 p	6		atop 2.42 GH
Type   Ref   Tro	X-value	Y-value	Function	F	unction	Result	Type   Ref	Tec	X-value	Y-value	Function	Eunctio	on Result
M1	2.31 GHz	46.26 dBµV					M1	1	2.31 GF			Function	
M2	2.39 GHz	49.53 dBµV					M2	1	2.39 GH				
M3	2.38952 GHz	51.07 d8µV	1				M3	1	2.38965 GF	tz 49.23 dBµV			
			Measu	ring	ABBRER			T			Mea	suring 🚺	11111 <b>44</b> 0



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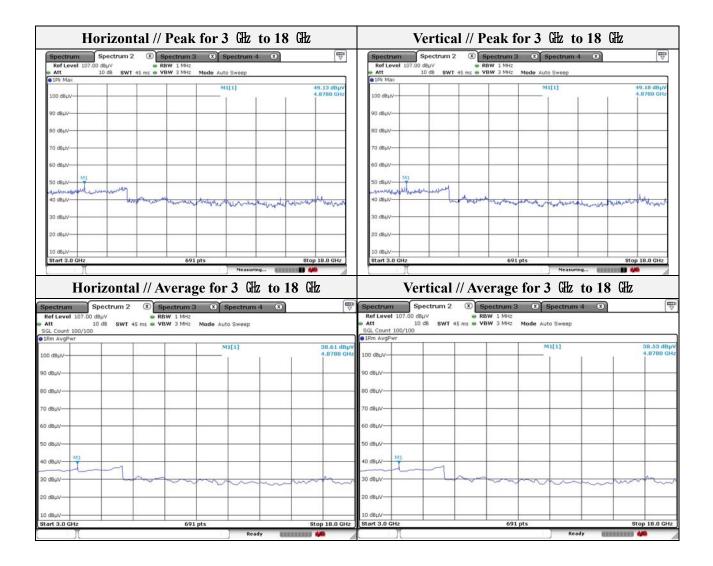
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Mode:	802.11g
Distance of measurement:	3 meter
Channel:	06

- Spurio	us							
Frequency (版)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
1400.90	54.20	Peak	Н	-6.22	-	47.98	74.00	26.02
1198.30	51.53	Peak	V	-7.52	-	44.01	74.00	29.99
4878.00	49.13	Peak	Н	7.54	-	56.67	74.00	17.33
4878.00	38.61	Average	Н	7.54	-	46.15	54.00	7.85
4878.00	49.18	Peak	V	7.54	-	56.72	74.00	17.28
4878.00	38.53	Average	V	7.54	-	46.07	54.00	7.93

Spectrum	Spectrum 2	× Spectrum	3 🛞 Spectrum	14 X		Spectrum	Spectrum 2 🛛 🛪	Spectrum 3	Spectrum 4	8
Ref Level 10 Att		RBW 1 MHz 2 ms VBW 3 MHz	Made Jute Susan			Ref Level 107.	00 dBµV 10 dB <b>SWT</b> 2 ms	RBW 1 MHz	la juta Suesa	
1Pk Max	10.00 9.01	2 ms · You a mine	Mode Auto Sweep			IPk Max	to up SWI2ms	YOW STIPLE MO	e Auto Sweep	
100 dBµV			M2[1] M1[1]	MI	54.20 dBµV 1.40090 GHz 99.85 dBµV 2.44280 GHz	100 d8µV-			M1[1] M1 M2[1]	100.08 dBj 2.43700 GF 51.53 dBj 1.19830 GF
90 dBuV					2.44200 GHz	90 dBµV				1.19830 G
0 dBµV						80 dBµV		_		
O dBuV	_					70 dBµV		_		
0 dBµV	M2					60 dBµV		_		
O dBut	nuch exerci	a to a start of a start of a	hallenguan	1 mil	marchenter	50 dBuy	- un breadward		41 11 1.000	when all when her where we wanted
0 dBµV-		an alter a - A Malana	Marine Andrew Marine		hand the second	40 dBµV-	- Martin Martin Advisor	mention and an	-Anthropostation	montenestederes
0 dBuV						30 dBµV		_		
0 dBµV				-		20 dBµV		_		
0 dBuV						10 dBuV				







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Mode:	802.11g
Distance of measurement:	3 meter
Channel:	11

- Spurio	us							
Frequency (Mb)	Level (dBµN)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
1398.00	56.75	Peak	Н	-6.24	-	50.51	74.00	23.49
1198.30	50.96	Peak	V	-7.52	-	43.44	74.00	30.56
4921.00	48.21	Peak	Н	7.86	-	56.07	74.00	17.93
4921.00	37.18	Average	Н	7.86	-	45.04	54.00	8.96
4921.00	50.21	Peak	V	7.86	-	58.07	74.00	15.93
4921.00	37.66	Average	V	7.86	-	45.52	54.00	8.48

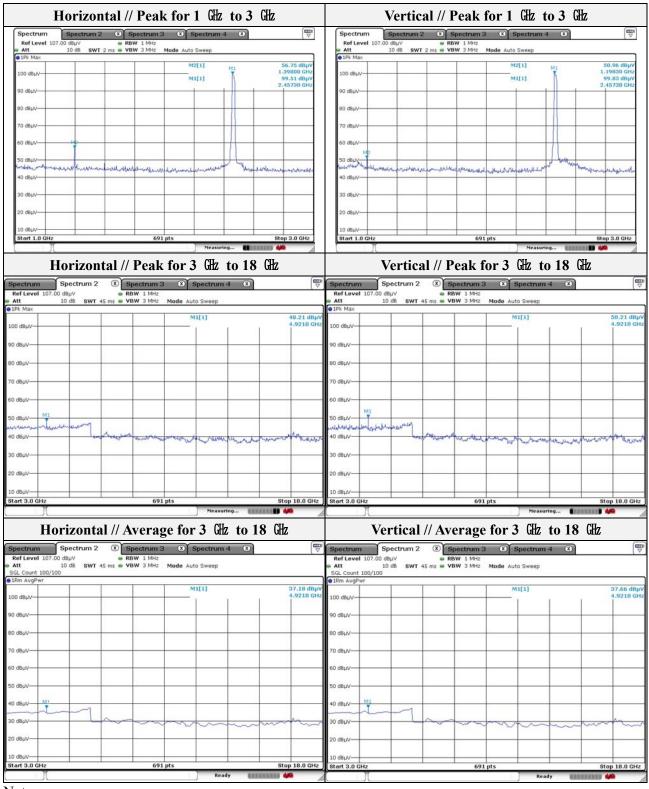
#### Band edge DCF Field strength Margin Frequency Level Ant. Pol. CF Limit **Detect mode** (MHz) $(dB\mu V)$ (H/V) (dB) (dB) $(dB\mu N/m)$ $(dB\mu N/m)$ (dB) 2492.18 0.09 48.49 74.00 25.51 48.40 Peak Н \_ V 2483.50 50.99 Peak 0.07 -51.06 74.00 22.94

	Res	tricted b	and // H	lorizontal	// Pea	ık			R	estric	ted	band /	// Ve	ertical /	// Pea	k	
Spectrum	Spee	ctrum 2 🙁	Spectrum 3	Spectrum 4	×		Spec	trum	Spe	ctrum 2	×	Spectrum 3	×	Spectrum 4	x x		Em ⊽
Ref Level 10 Att		/ SWT 7.6 µs =	RBW 1 MHz VBW 3 MHz M	ode Auto FFT			- Att	Level 10				RBW 1 MHz VBW 3 MHz	Mode	Auto FFT			
1Pk Max				M3[1]		48.40 dBµV	O 1Pk N	Max									
100 dBµV-	~	~		M3[1]		2.4921760 GHz 48.02 dBµV	-1,00-d8	10	~	~				M3[1] M1[1]		2.48	i0.99 dBµ\ 35000 GH: i0.99 dBµ\
90 d8µV-					- T	2.4835000 GHz	90 dBL	N	-	1	_					2.48	35000 GH
80 d8µV							80 dBµ	N		-	\	-		-			
70 dBµV						-	70 dBL	N	_	-	1	-		-			
60 dBµV	_						60 dBµ	N				5	M3				
50 d8µV	-		M	M3	n	m	50 dBµ	N	-			~			m	M2	~~~~
40 dBµV	-						40 dBµ	N	-	-				-			
30 dBµV	-						30 dBµ	N				-					
20 dBµV					F2		20 dBj.	N	_							F2	
10 dBµV			1				10 dBµ						F1	-			
Start 2.455 G	Hz		691 pt			Stop 2.51 GHz		2.455 GF	Hz			691	pts			Stop	2.51 GHz
Marker Type   Ref   1	Trc	X-value	Y-value	Function	Functio	n Result		Ref   1	Trc	X-value		Y-value		inction	Fund	ion Result	
M1 M2 M3	1	2.4835 GHz 2.5 GHz 2.492176 GHz	48.02 dBpV 43.34 dBpV 48.40 dBpV				M1 M2 M3		1	2.483 2. 2.483	5 GHz	50.99 dBµ 47.71 dBµ 50.99 dBµ	IV.				
				Measuring			C	)[		21100	o on AL	00199 00p		Measuri	ng 🚺		

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Note.

1. Average test would be performed if the peak result were greater than the average limit.

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Mode:	802.11n(HT20)
Distance of measurement:	3 meter
Channel:	01

- Spurio	us							
Frequency (Mbz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµV/m)	Margin (dB)
2127.40	49.17	Peak	Н	-0.67	-	48.50	74.00	25.50
2127.40	51.57	Peak	V	-0.67	-	50.90	74.00	23.10
4672.00	47.81	Peak	Н	5.98	-	53.79	74.00	20.21
4834.00	49.74	Peak	V	7.22	-	56.96	74.00	17.04
4813.00	37.95	Average	V	7.06	-	48.50	74.00	25.50

#### - Band edge

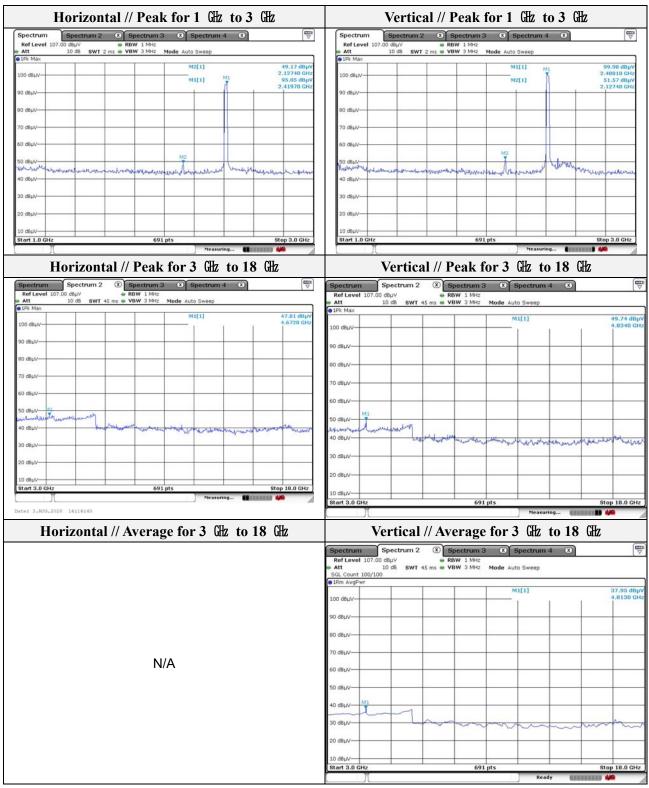
Frequency (Mz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2387.05	47.84	Peak	Н	-0.14	-	47.70	74.00	26.30
2390.00	49.66	Peak	V	-0.13	-	49.53	74.00	24.47

-	ixesti icu	ed band //		ai //	I ca				г	vesti ic	icu	band //	vertica	1// 1 62	IN	
Spectrum	Spectrum 2	Spectrum 3	(X) Spectrur	n4 🛛			Spec	trum	S	pectrum 2	×	Spectrum 3	(X) Spectru	n4 🗶		E
Ref Level 107		RBW 1 MHz						Level	107.00 d			RBW 1 MHz				
Att	10 dB SWT 1	17 µs 🖷 VBW 3 MHz	Mode Auto FFT				Att		10	dB SWT 1	7 µs 🖷 '	VBW 3 MHz Mo	de Auto FFT			
1Pk Max			M3[1]			47.84 dBp	O 1Pk N	Max								
100 dBuV			Ma[1]			2.387050 GH	100 dB	un					M3[1]			49.66 dBp
			M1[1]			(~43.97 dBµ	7			1 1			M1[1]			43.51 dBp
90 d8µV	-			Q	12	2.310000 GH	90 dBµ	N		+ +		+ +		2 3	2 )	2.310000 GH
						/				1 1						
80 dBµV			2				80 dBµ	N++							1	
70 dBuV							70 dBu	N								
										1 1						
60 dBµV		-				_	60 dBµ	N		+ +		+ +		++	++-	_
				M3MO	1					1 1				Ma	1	
50 dBuV				and	m		50 d8µ	MI				a sector and	mm	mon	-	
40 dBuV	mann	m	my and	w 1 *	-		40 dBu	N	man	mm	mm	mmm	whether as		<u> </u>	
30 d8µV					-		30 dBµ	N		-		-			+	_
20 dBuy				-			20 dBu									
20 0600				F2			50 GBH	N T						F2		
10 dBuVF1				1			10 dBu	NF1				-		1	<u> </u>	
Start 2.3 GHz		691	pts	14 14	10	Stop 2.42 GHz	Start		Iz			691 pts			-	Stop 2.42 GHz
Marker	5. 35-5 XX	100 AUG 10	1.2 1002 Not 2000				Marker	r		2010 22			100 A.S. 1999			
Type   Ref   Ti			Function	F	unction	Result	Туре			X-value	1	Y-value	Function	Fund	ction Re	esult
M1 M2		31 GHz 43.97 dBµ 39 GHz 46.79 dBµ					M1		1		1 GHz	43.51 dBµV				
M2 M3	1 2.3870						M2 M3		1		9 GHz 9 GHz	49.66 dBµV 49.66 dBµV				
				uring			1110		-	2.10		11100 00011				



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Note.

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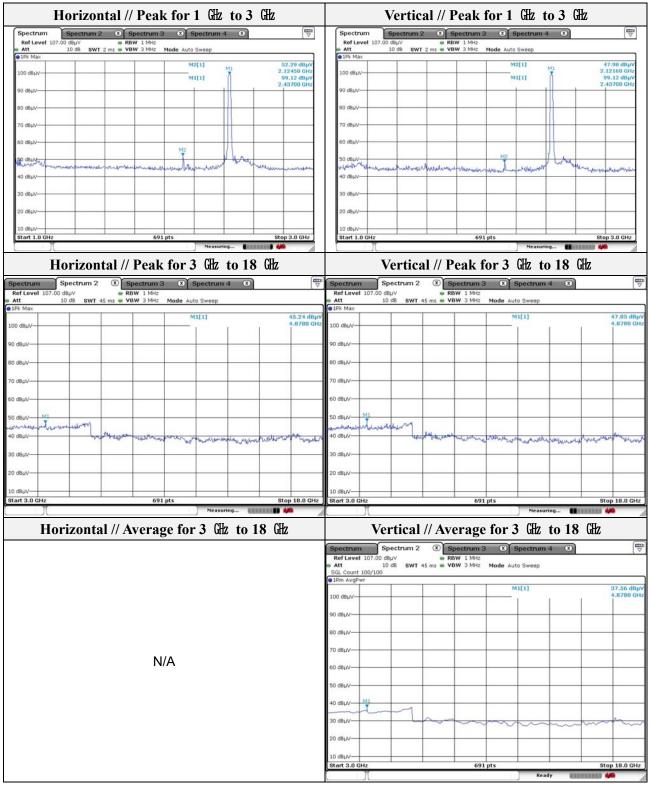
Mode:	802.11n(HT20)
Distance of measurement:	3 meter

Channel: 06

- Spurio	us							
Frequency (版)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2124.50	52.29	Peak	Н	-0.67	-	51.62	74.00	22.38
2121.60	47.98	Peak	V	-0.68	-	47.30	74.00	26.70
4878.00	45.24	Peak	Н	7.54	-	52.78	74.00	21.22
4878.00	47.85	Peak	V	7.54	-	55.39	74.00	18.61
4878.00	37.56	Average	V	7.54	-	45.10	54.00	8.90



Report No.: KES-RF1-20T0131 Page (43) of (59)



Note.

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Mode:	802.11n(HT20)
Distance of measurement:	3 meter

Channel: 11

- Spurio	us							
Frequency (Mbz)	Level (dBµN)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµN/m)	Margin (dB)
1736.60	52.44	Peak	Н	-3.43	-	49.01	74.00	24.99
1198.30	53.80	Peak	V	-7.52	-	46.28	74.00	27.72
4921.00	46.64	Peak	Н	7.86	-	54.50	74.00	19.50
4921.00	37.08	Average	Н	7.86	-	44.94	54.00	9.06
4921.00	50.02	Peak	V	7.86	-	57.88	74.00	16.12
4921.00	37.29	Average	V	7.86	-	45.15	54.00	8.85

#### - Band edge

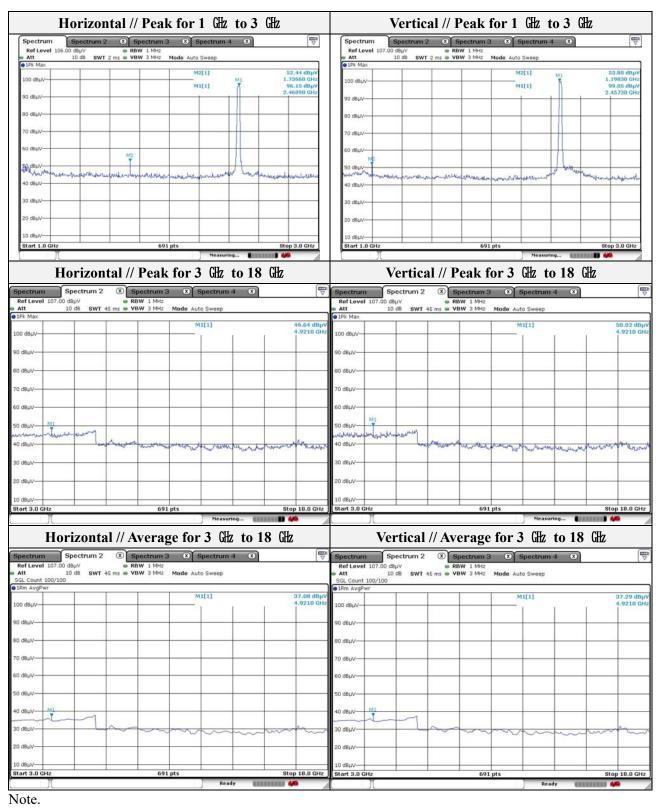
Frequency (Mz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2483.50	50.47	Peak	Н	0.07	-	50.54	74.00	23.46
2483.66	52.94	Peak	V	0.07	-	53.01	74.00	20.99

Ref Level         107.00 dBµV         RBW 1 MHz         Ref Level         07.00 dBµV         RBW 1 MHz           Att         10 dB         SWT 7.6 µS         VBW 3 MHz         Mode Auto FFT         Att         10 dB         SWT 7.6 µS         VBW 3 MHz         Mode Auto FFT           419/ Max         M9[1]         20.47 dBµV         2.4803000 CHz         30.47 dBµV         M0[1]         32.94 dI           100 dBµV         M1[1]         2.4803000 CHz         30.47 dBµV         M1[1]         52.94 dI	I	Restricted	d band // I	Horizonta	l // Peal	ĸ			Restric	ted	band //	/ Vertica	ıl // Pea	k
Att       10 dB       SWT 7.6 µS       VBW 3 MH2       Mode Auto FFT         91Pk Max       M0[1]       50.47 dby       2.4835000 CH3       M0[1]       2.4835000 CH3         90 dby/       M1[1]       2.4835000 CH3       0 dby/       M1[1]       2.4835000 CH3         90 dby/       M1[1]       2.4835000 CH3       0 dby/       M1[1]       2.4835000 CH3         90 dby/       M1[1]       2.4835000 CH3       0 dby/       M1[1]       2.4835000 CH3         90 dby/       M1[1]       0 dby/	Spectrum	Spectrum 2	× Spectrum 3	Spectrum	4 🕱		Spectra	um )	Spectrum 2	×	Spectrum 3	Spectru	um 4 🗵	
Bit Pk Max         MS[1]         S0.47 diply         MS[1]         S0.47 diply           100 dBµ/         MI[1]         2.4835000 GHz         30.47 diply         MI[1]         2.4835000 GHz           90 dBµ/         MI[1]         2.4835000 GHz         30.47 diply         MI[1]         2.4835000 GHz           90 dBµ/         MI[1]         2.4835000 GHz         00 dBµ/         MI[1]         2.4835000 GHz           90 dBµ/         MI[1]         2.4835000 GHz         00 dBµ/         MI[1]         2.4835000 GHz           90 dBµ/         MI[1]         0.494 Mz         MI[1]         2.4835000 GHz         90 dBµ/           90 dBµ/         MI[1]         0.494 Mz         MI[1]         2.4835000 GHz         90 dBµ/           90 dBµ/         MI[1]         0.494 Mz         MI[1]         2.4835000 GHz         90 dBµ/           90 dBµ/         MI[1]         0.494 Mz         MI[1]         90 dBµ/         10 dBµ/	Ref Level 107.	00 dBµV	RBW 1 MHz				Ref Le	el 107.00	dBµ∨	- 1	RBW 1 MHz			
M9[1]         S0.47 dby/ 2.4835000 GH         M9[1]         S2.94 dby/ 2.4835000 GH           90 dby/ 90 d		10 dB SWT 7.6	µs 🖶 VBW 3 MHz I	Mode Auto FFT					10 dB SWT 7	.6 µs 🖷	VBW 3 MHz 1	Mode Auto FFT		
100 dBµ/	1Pk Max						1Pk Ma:	e						
M1[1]     S0.47 dby/ 2.4835000 Gt/ 90 db//     M1[1]     S2.77 d 2.4835000 Gt/ 90 db//       00 db//     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0	100 dp.4/			M3[1]			100 00.0					M3[1]		52.94 dBp
90 dBµ/     2.4835000 GHz     90 dBµ/				M1[1]			100.000					M1[1]		52.77 dBu
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	90 d8µV				2		90 d8µV-				-			2.4835000 GH
70 dBµ/     70 dBµ/     70 dBµ/     70 dBµ/     70 dBµ/       60 dBµ/     70 dBµ/     70 dBµ/     70 dBµ/       50 dBµ/     70 dBµ/     60 dBµ/       30 dBµ/     70 dBµ/     70 dBµ/       10 dBµ/     70 dBµ/     70 dBµ/       10 dBµ/     71 dBµ/     70 dBµ/       11 1     2.4935 GHz     50.47 dBµ/       11 1     2.4935 GHz     50.47 dBµ/       11 1     2.6 GHz     70 dBµ/														
60 dBµV 50 dBµV 40 dBµV 20 dBµV 20 dBµV 20 dBµV 10 dBµV 10 dBµV 11 2.4935 GHz 50.47 dBµV M2 1 2.5 GHz 44.35 dBµV 11 2.4935 GHz 50.47 dBµV 12 GHz 44.35 dBµ	BD GBUA			1			80 gBhA-			1				
50 d8µ/     40 d8µ/     50 d8µ/       40 d8µ/     60 d8µ/       30 d8µ/     90 d8µ/       20 d8µ/     91 pts       Start 2.455 GHz     691 pts       Start 2.455 GHz     691 pts       Start 2.455 GHz     691 pts       Start 2.455 GHz     50 d8µ/       Varker     1       Mal     1       1     2.6 GHz       Mal     1       2.5 GHz     50.4 gky/	70 dBµV	-					70 dBµV-	-	-	1				
50 dBu/     40 dBu/     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10     10<										1				
40 dbµ/     40 dbµ/     40 dbµ/     40 dbµ/     40 dbµ/       30 dbµ/     90 dbµ/     90 dbµ/     90 dbµ/     90 dbµ/       20 dbµ/     F1     F2     90 pts       10 dbµ/     F1     F2     10 dbµ/       10 dbµ/     F1     F2       10 dbµ/     F1     F2       11 dbµ/     F2     10 dbµ/       11 1     2.4635 GHz     50 rf dbµ/       M1     1     2.4635 GHz       12 2.5 GHz     50 rf dbµ/	60 dBµV						60 dBµV-	-		1	1	<b>6</b> 9		
40 dku/     40 dku/     40 dku/     40 dku/     40 dku/       30 dku/     30 dku/     30 dku/     30 dku/     30 dku/       20 dku/     F1     F2     30 dku/       10 dku/     F1     F2       10 dku/     F1     F2       10 dku/     F1     F2       11 1     2.4825 GH2     50.47 dky/       M1     1     2.4825 GH2       11 2     50.47 dky/       M2     1     2.5 GH2       11 2     50.47 dky/	50 d8µV-		70		142		50 dBuV-		_		- V		-	M2
30 dBµ/     30 dBµ/     30 dBµ/     30 dBµ/     30 dBµ/     20 dBµ/     20 dBµ/     20 dBµ/     20 dBµ/     20 dBµ/     20 dBµ/     10 dBµ/				m	min	m						-		
20 dB/V         F1         F2         20 dB/V         F1         F2         20 dB/V         F1         F2	40 dBµV						40 dBµV-	-			+ +		-	
20 dB/V         F1         F2         20 dB/V         F1         F2         20 dB/V         F1         F2	30 dB/A/			-			20 dB/A/-	-						
10 dBU/         F1         F2         10 dBU/         F1         F2           Start 2.455 GHz         691 pts         Start 2.455 GHz         592.77 GByW         Finction Result         M2         1         2.5 GHz         44.55 GByW         Finction Result         M2         1         2.5 GHz         44.55 GByW														
10 dg//         Fi         10 dg//         Fi         10 dg//           Start 2.455 GHz         691 pts         Storp 2.51 GHz         691 pts         Storp 2.51 GHz           Marker         Type Ref         Trc         X-value         Y-value         Function Result         Marker           M1         1         2.4635 GHz         50.47 dg/y         M1         1         2.4535 GHz         S2.77 dg/y         Function Result           M1         1         2.4536 GHz         44.36 dg/y         M1         1         2.4554 GHz         40.56 dg/y         Function Result	20 d8µV	_					20 dBµV-	-	-		+ +		+ +	
Start 2.455 GHz         691 pts         Stop 2.51 GHz         Start 2.455 GHz         691 pts         Stop 2.51 GHz           Marker         Type [Ref Trc         X-value         Y-value         Function         Function Result         Type [Ref Trc         X-value         Y-value         Function Result         M1         1         2.4935 GHz         52.77 dBµV         M1         1         2.4535 GHz         40.59 dBµV         M2         1         2.5 GHz         44.56 dBµV         M2         1         2.5 GHz         40.59 dBµV         M2         1         2.5 GHz         40.56 dBµV         M2         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	10 40 41		F	1	P2		10 -00-04				F	1		<sup>2</sup>
Marker         Marker         Marker         Type         Ref         Trc         X-value         Y-value         Function         Function Result         Type         Ref         Trc         X-value         Function         Function Result           M1         1         2:4835 GHz         50.47 dBµV         M1         1         2:4835 GHz         52:77 dBµV         Function Result           M2         1         2:5 GHz         44:36 dBµV         M2         1         2:5 GHz         48:56 dBµV         Function			691 0	ts		Ston 2.51 GHz					691 0	15		Stop 2 51 GHz
Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         2.4635 GHz         50.47 dBy/         M1         1         2.4635 GHz         52.77 dBy/         M1         1         2.4635 GHz         50.47 dBy/         M1         1         2.4635 GHz         50.77 dBy/         M1         1         2.4635 GHz         50.77 dBy/         M1         M1         1         2.4635 GHz         50.77 dBy/         M1         M1         1         2.4635 GHz         40.56 dBy/         M1         M1         1         2.4635 GHz         40.57 GHz         M1         M1         M1         1         2.4635 GHz         M1         M1 <td>the second s</td> <td></td> <td>077</td> <td></td> <td></td> <td>otop zior unz</td> <td></td> <td>ou driz</td> <td></td> <td></td> <td>0010</td> <td></td> <td></td> <td>otop 2.01 drie</td>	the second s		077			otop zior unz		ou driz			0010			otop 2.01 drie
M2 1 2.5 GHz 44.36 dBµV M2 1 2.5 GHz 48.58 dBµV					Function I	Result	Type	Ref   Trc					Funct	ion Result
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Mode:	802.11n(HT40)
Distance of measurement:	3 meter

Channel: 03

<u>- Spurio</u>	us							
Frequency (畑)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2124.50	47.53	Peak	Н	-0.67	-	46.86	74.00	27.14
2127.40	50.76	Peak	V	-0.67	-	50.09	74.00	23.91
4834.00	48.50	Peak	V	7.22	-	55.72	74.00	18.28
4834.00	38.31	Average	V	7.22	-	45.53	54.00	8.47

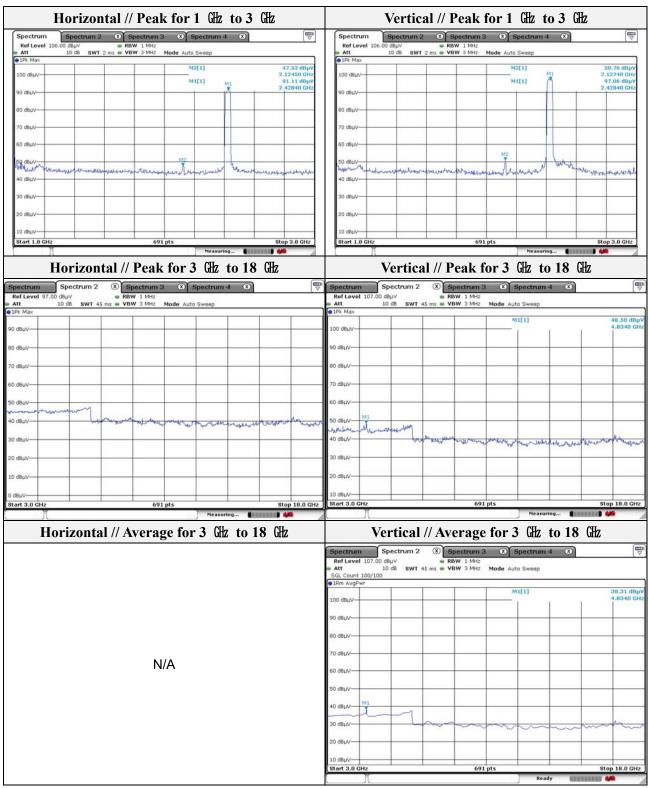
#### - Band edge

Frequency (Mb)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2386.87	46.94	Peak	Н	-0.14	-	46.80	74.00	27.20
2390.00	49.19	Peak	V	-0.13	-	49.06	74.00	24.94

	Res	stricted b	and // E	Iorizonta	al // 1	Peak	κ.			R	lestricte	ed band //	/ Vertica	l // Pe	ak	
Spectrum Ref Level 1 Att	07.00 dB		Spectrum 3 BW 1 MHz BW 3 MHz Me	Spectrum	4 (X	1		Ref I	evel.	107.00 de	βµV	Spectrum 3 RBW 1 MHz S VBW 3 MHz M	Spectru	m 4 🛞		( T
100 dBµV 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 30 dBµV 30 dBµV 20 dBµV	~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		M0[1] M1[1]	143 143 143 143 143 143 143 143 143 143	w	46.04 dBµV 2.306670 GHz 42.17 dBµV 2.310040.6348	90 dBµ 80 dBµ 70 dBµ 60 dBµ 50 dBµ		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		M	M3[1] M1[1]	Na 		49.19 dBy 2.390000 CH A2.33 dBp 2.310000 CH
10 dBµV Start 2.3 GHz	z		691 pt:	s	1 1		Stop 2.42 GHz	10 dBµ Start	2.3 GH	z		691 p	ts		1	Stop 2.42 GHz
Marker Type Ref M1 M2 M3	Trc   1   1   1   1   1   1   1   1   1	X-value 2.31 GHz 2.39 GHz 2.38687 GHz	Y-value 42.17 d8µV 44.18 d8µV 46.94 d8µV	Function		unction R		Marker Type M1 M2 M3	Ref	1 1 1	X-value 2.31 G 2.39 G 2.39 G	Hz 49.19 dBµV	,		iction R	



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Note.

1. Average test would be performed if the peak result were greater than the average limit.

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Mode:	802.11n(HT40)
Distance of measurement:	3 meter

Channel:

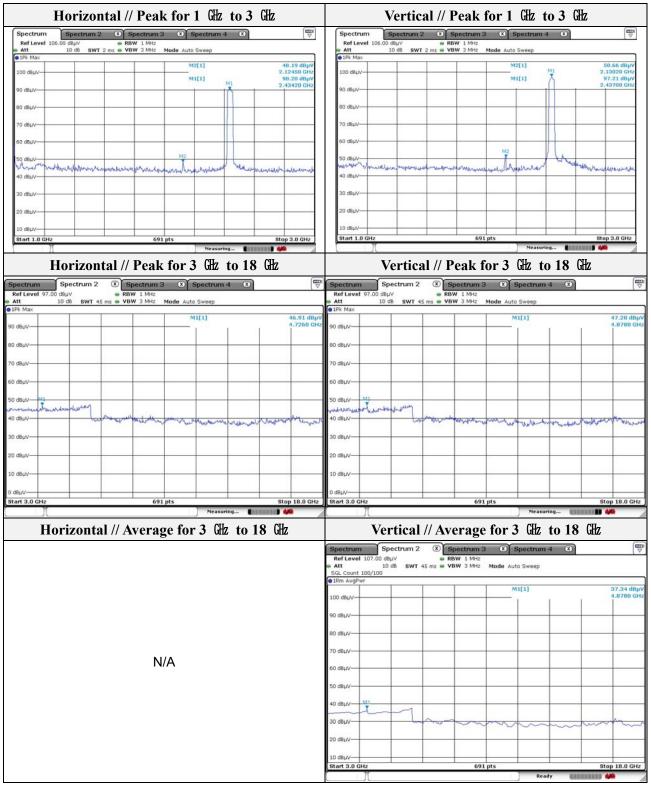
5 11

06

- Spurio	us							
Frequency (Mbz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2124.50	48.19	Peak	Н	-0.67	-	47.52	74.00	26.48
2130.20	50.66	Peak	V	-0.66	-	50.00	74.00	24.00
4726.00	46.91	Peak	Н	6.40	-	53.31	74.00	20.69
4878.00	47.28	Peak	V	7.54	-	54.82	74.00	19.18
4878.00	37.34	Average	V	7.54	-	44.88	54.00	9.12



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Note.

1. Average test would be performed if the peak result were greater than the average limit.

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Mode:	802.11n(HT40)
Distance of measurement:	3 meter

Channel: 9

- Spurio	us							
Frequency (Mbz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµN/m)	Limit (dBµN/m)	Margin (dB)
2124.50	49.18	Peak	Н	-0.67	-	48.51	74.00	25.49
2124.50	51.37	Peak	V	-0.67	-	50.70	74.00	23.30
4899.00	46.07	Peak	V	7.70	-	53.77	74.00	20.23

#### - Band edge

Frequency (Mbz)	Level (dBµV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBµV/m)	Limit (dBµN/m)	Margin (dB)
2483.98	46.97	Peak	Н	0.07	-	47.04	74.00	26.96
2487.00	51.30	Peak	V	0.08	-	51.38	74.00	22.62

	Rest	tricte	d ban	d // E	lorizonta	// Pea	k			ł	Restric	cted	band	// Ve	ertical /	/ Pea	k	
Spectrum	Spec	trum 2	× Spe	ctrum 3	X Spectrum 4	×		Spec	trum	s	Spectrum 2	×	Spectrum 3	x (X	Spectrum 4	×		E □
Ref Level 107 Att			■ RBW		ode Auto FFT			att		107.00 d 1			RBW 1 MHz VBW 3 MHz	Mode	Auto FFT			
1Pk Max								O1Pk N	/lax									
100 dBµV-				_	M3[1] M1[1]		46.97 dBµV 2.4839780 GHz 46.19 dBµV	100 dB	www.	-			-		M3[1] 		2.4	51.30 dBpV 870020 GHz 49.91 dBpV
90 d8µV		M	-			- n	2.4835000 GHz	90 d8µ	N		m		-		-	ĩ	2.4	1835000 GHz
80 dBµV	-	1			-			80 dBµ	N-				-		-		-	-
70 dBµV								70 dBµ	N+			1	-		+ +	-	-	+
60 dBµV	-	-			2			60 dBµ	~			1		MI	M3			+
50 dBµV			'm	~	imm	MZ	~~~~~	50 d8µ					T	1	*****	m		
40 dBµV								40 dBµ										1
30 dBµV								30 dBµ										
20 dBµV				FI		F2		20 dBµ						F1			F2	
10 dBµV CF 2.4825 GHz				691 pt			Span 55.0 MHz	10 dBµ		1.1.2			601	pts			Pos	n 55.0 MHz
Marker				391 pt			opun aatu MHz	Marker	_	112			091	pes			opa	n ooro minz
Type Ref T M1 M2 M3	rc   1 1	X-value 2.4835 2.5 2.483978	GHz GHz	46.19 dBµV 42.63 dBµV 46.97 dBµV	Function	Function	n Result		Ref	1 1 1		35 GHz	Y-value 49.91 d8 48.12 d8 51.30 d8	μV Vu	unction	Fund	tion Resu	lt.
X		200710			Measurin	g		(		N	2110101		1100 00		Measurin	D 🚺		-



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	izontal //	I Cak IOI						for 1 GHz	105 0	
			Spectrum 4 🛛 🛞	(m) V	Spectrum	And a second	Spectrum	3 🗴 Spectrur	n4 🗵	
Ref Level 106.00 d	BµV ● RBV 0 dB SWT 2 ms ● VBV	W 1 MHz W 3 MHz Mode Auto	Sweep		Ref Level	106.00 dBµV	RBW 1 MHz ms VBW 3 MHz	Mode Auto Sweep		
• 1Pk Max					1Pk Max	20 00 3411		Hode Auto aweep		
100 dBµV		M	1[1]	91.10 dBµV 2.46020 GHz	Townson and			M1[1]	1.0000	96.41 dBj
		N	2[1] M1	49.18 dBpV 2.12450 GHz	100 dBµV			M2[1]	MI	2.45730 G 51.37 dB
90 dBµV				2.12400 GH2	90 dBµV-				- 11	2.12450 G
80 dBuV										
00 0000					80 dBµV					
70 dBµV	-				1.7277.2718-00					
60 million		· · · · · · · · · · · · · · · · · · ·			70 dBµV					
60 dBµV		2223			60 dBuV-					
SO dBUV								M2		
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40 dBuV		-			a state of	and the summer of	monorman	rear al frankows	in an	midriche marrieles
30 dBuV-					40 dBµV-					
					30 dBµV				-	
20 dBµV										
10 dBuV-					20 dBµV			-		
Start 1.0 GHz		691 pts		Stop 3.0 GHz	1143785-875					
1		11	Neasuring		10 dBµV	S 1 1				
Date: 3.AUG.2020 1	7202451				Start 1.0 G	12	69	11 pts		Stop 3.0 GH
	izontal // ]			_				for 3 GHz	to 18 G	Hz
trum Spect	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Spectrum Ref Level 97	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 © Spectru	to 18 G	
trum Spect evel 97.00 dBµV 10 dB	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97 Att	Spectrum 2	Spectrum	for 3 GHz 3 © Spectru	to 18 G	
trum Spect	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	łz
trum Spect evel 97.00 dBµV 10 dB	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97 Att	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 © Spectru	to 18 G	Hz 46.07
trum Spect evel 97.00 dBµ∀ 10 dB Max	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97 Att Physical Press Att	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	Hz 46.07
trum Spect evel 97.00 dBµ∀ 10 dB Max	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97 Att Physical Press Att	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	Hz 46.07
Spect           Level 97.00 dBµV           10 dB           Max	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level         97           Att         1Pk Max           90 dBµV         80 dBµV	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	
Spect           Level         97.00 dBµV           10 dB           Max	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97           ● Att           ● 1Pk: Max           90 dBµV	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	Hz 46.07
Spect           Level 97.00 dBµV           10 dB           Aax           N           N           N	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97           Att           ● 1Pk Max           90 dBµV           80 dBµV           70 dBµV	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	Hz 46.07
Spect           Level 97.00 dBµV           10 dB           Max	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level         97           Att         1Pk Max           90 dBµV         80 dBµV	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	Hz 46.07
Spect           Level 97.00 dBµV           10 dB           Aax           N           N           N	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97           Att           ● 1Pk Max           90 dBµV           80 dBµV           70 dBµV	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	Hz 46.07
trum         Spect           0         8           0         10           Max         0           N         0           N         0           N         0           N         0	trum 2 🛞 Spe	ectrum 3 🛞	Spectrum 4	_	Ref Level 97           • Att           • 19: Max           90 dbµV           60 dbµV           70 dbµV           60 dbµV	Spectrum 2	Spectrum     BW 1 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	46.07
trum         Spect           asvel         97.00 dBµ/ 10 dB           v         10 dB           v         10 dB           v         10 dB	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           • Att           • 1Pk: Max           90 dBµV           80 dBµV           70 dBµV           60 dBµV           50 dBµV           50 dBµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	46.07 4,899
trum         Spect           10 d8         10 d8           N         10 d8           N         10 d8           N         10 d8	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 🛞	Spectrum 4 🔍	_	Ref Level 97           • Att           • 1Pk: Max           90 dBµV           80 dBµV           70 dBµV           60 dBµV           50 dBµV           50 dBµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 (*) Spectru Mode Auto Sweep	to 18 G	46.07
trum         Spect           10 d8         10 d8           N         10 d8           N         10 d8           N         10 d8	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           • Att           • 1Pk: Max           90 dBµV           80 dBµV           70 dBµV           60 dBµV           50 dBµV           50 dBµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	46.07 4,899
Spect           Image: sevel 97.00 dBµV           10 dB           Jax           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v           v	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           ● 11%           ● 11%         Max           90 dBµV         B0 dBµV           60 dBµV         B0 dBµV           60 dBµV         B0 dBµV           50 dBµV         B0 dBµV           80 dBµV         B0 dBµV           90 dBµV         B0 dBµV           80 dBµV         B0 dBµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	46.07 4,899
trum         Spect           v         10 dB           v         10 dB           v         v           v         v           v         v           v         v           v         v           v         v           v         v           v         v           v         v           v         v	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           ● Att           ● 19k Max           90 dbµV           B0 dbµV           70 dbµV           60 dbµV           50 dbµV           40 dbµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	46.07 4,899
trum         Spect           10         d8           10	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           • Att           • 19k Max           • 90 dbµV           • 90 dbµV           • 00 dbµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	+6.07 +.899
trum         Spect           10         d8           10	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           ● 11%           ● 11%         Max           90 dBµV         B0 dBµV           60 dBµV         B0 dBµV           60 dBµV         B0 dBµV           50 dBµV         B0 dBµV           80 dBµV         B0 dBµV           90 dBµV         B0 dBµV           80 dBµV         B0 dBµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	+6.07 +.899
trum         Spect           0         30           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10         48           10	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           • Att           • 10 <sup>+</sup> Max           90 dB <sub>4</sub> V           90 dB <sub>4</sub> V           60 dB <sub>4</sub> V           50 dB <sub>4</sub> V           60 dB <sub>4</sub> V           90 dB <sub>4</sub> V           10 dB <sub>4</sub> V           10 dB <sub>4</sub> V	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	+6.07 +.899
trum         Spect           e.evel         97.00         d8µV           10         d8         10           N         N         N           N         N         N           N         N         N           N         N         N           N         N         N           N         N         N           N         N         N           N         N         N	trum 2 (E) Sp RBW SWT 45 ms = VBW	ectrum 3 😧	Spectrum 4 🔍		Ref Level 97           • Att           • 19k Max           90 dbµV           90 dbµV           60 dbµV           50 dbµV           40 dbµV           20 dbµV           90 dbµV           10 dbµV           20 dbµV           10 dbµV           0 dbµV           0 dbµV	Spectrum 2 .00 dbµV 10 db SWT 45	Spectrum     RBW 1 MHz     RBW 1 MHz     VBW 3 MHz	for 3 GHz 3 Spectru Mode Auto Sweep M1[1]	to 18 G	46.07 4.899



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Test results (	18 GHz	to 26.5	GHz) —	Worst case
----------------	--------	---------	--------	------------

Mode: 802.11b

Distance of measurement: 3 meter

Channel:

1 (Worst case)

Horizontal			Vertical			
Spectrum Spectrum 2 Ref Level 87.00 dBµV	<ul> <li>RBW 1 MHz</li> </ul>		Spectrum Spectrum 2 (3) Ref Lavel 87.00 dBJV	∇		
	s  WBW 3 MHz Mode Auto Sweep		Att 0 dB SWT 48 ms WBW 3 MHz Mode Auto Sweep			
80 dBµV			80 dBµV			
70 dBµV			70 dBµV	_		
60 dBµV			60 d8µV			
50 dBµV			50 dBµV			
40 dBµV			40 d8µV	_		
BBABINON MANANTANA	and and a second the second and a	and the particular and the	1200 Ballin when with the stand with the show a show the strand the stand and the show the strand of the strand of the strand of the show the strand of the str	Hugh		
20 dBµV			20 dBµV			
10 dBµV			10 dBµV	_		
o dBµV-			0 dBµV-			
-10 dBµV			-10 dBµV-			
CF 24.0 GHz	691 pts Measuring	Span 12.0 GHz	CF 24.0 GHz 691 pts Span 12.0 Measuring	GHz		

## Note.

No spurious emission were detected above 18 GHz.



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## 3.6 Conducted spurious emissions & band edge

Test setup		
EUT	Attenuator	Spectrum analyzer

## **Test procedure**

#### Band edge

ANSI C63.10 – Section 11.11

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW = 100 kHz
- 4. VBW = 300 kHz
- 5. Detector = Peak
- 6. Trace mode = max hold
- 7. Sweep time = auto
- 8. The trace was allowed to stabilize

## Out of band emissions

ANSI C63.10 - Section 11.11

- 1. Start frequency was set to 30 MHz and stop frequency was set to 25 GHz for 2.4 GHz frequencies and 40 GHz for 5 GHz frequencies
- 2. RBW = 100 kHz
- 3. VBW = 300 kHz
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

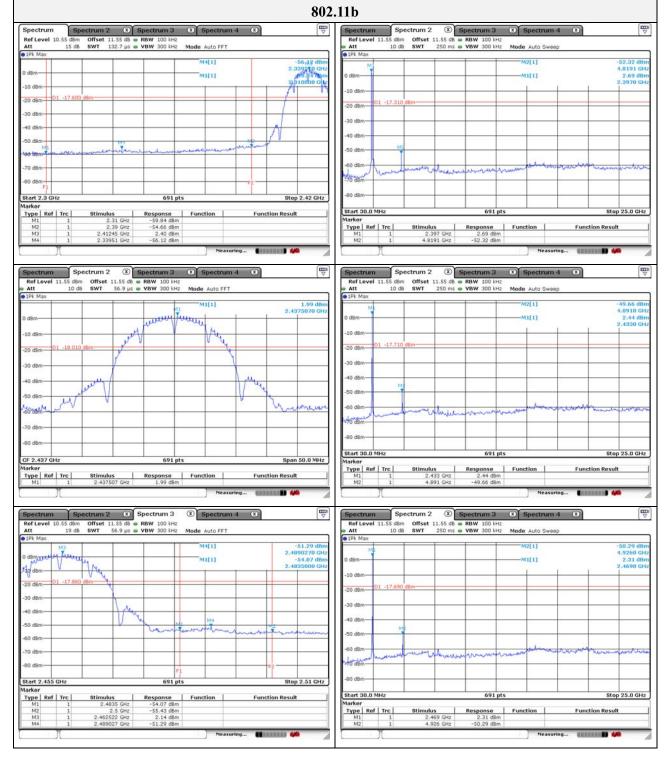
#### Limit

According to 15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section , the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section 15.205(a), must also comply the radiated emission limits specified in section 15.209(a) (see section 15.205(c))



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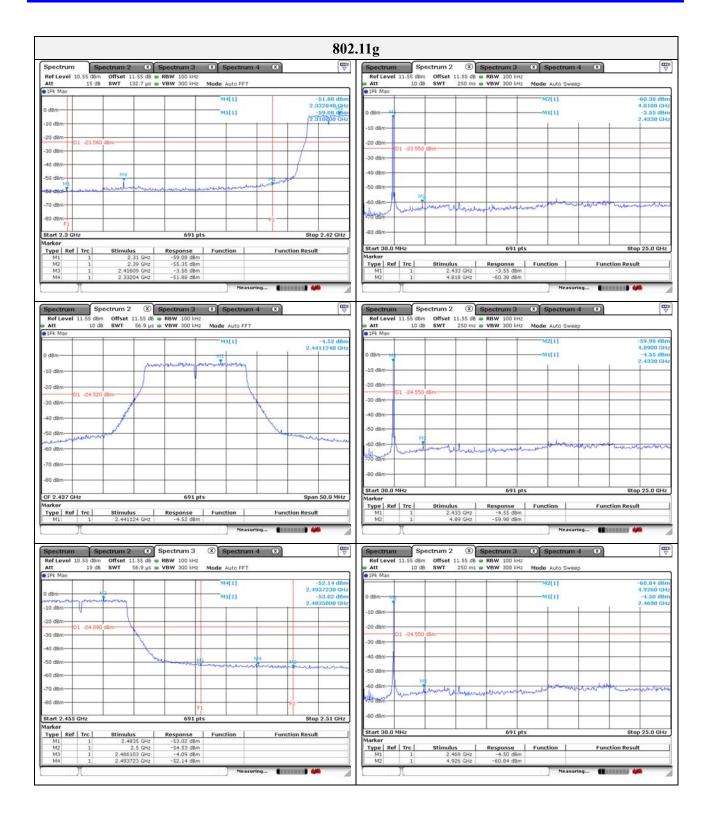
#### **Test results**



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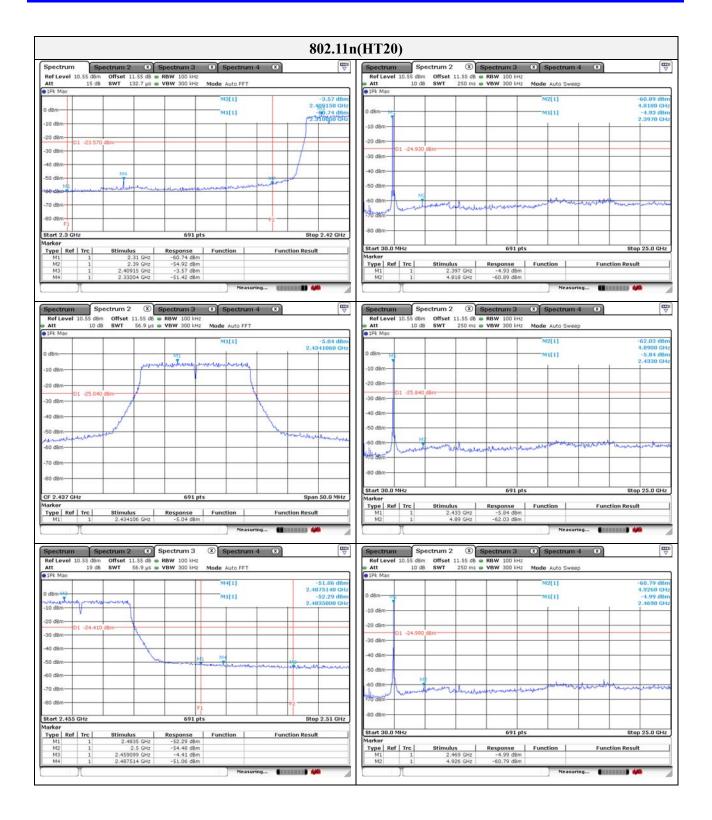
3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea Tel: +82-31-425-6200 / Fax: +82-31-424-0450 www.kes.co.kr Report No.: KES-RF1-20T0131 Page (55 ) of (59)



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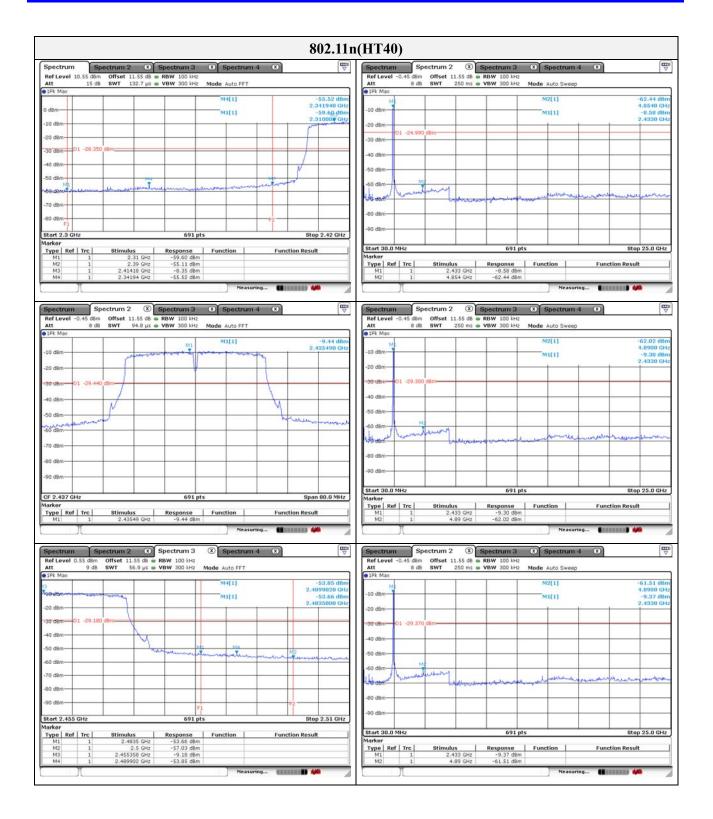


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Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	2021.01.15
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2021.01.15
DC Power Supply	Agilent	6632B	US36351824	1 year	2021.01.14
Power Meter	Anritsu	ML2495A	1438001	1 year	2021.01.14
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2021.01.14
Attenuator	KEYSIGHT	8493C	82506	1 year	2021.01.14
Loop Antenna	Schwarzbeck	FMZB1513	225	2 years	2021.02.15
Trilog-broadband antenna	SCHWARZBECK	VULB 9163	715	2 years	2020.09.20
Horn Antenna	A.H	SAS-571	414	2 years	2021.02.11
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA 9170550	2 years	2021.02.19
Preamplifier	R&S	SCU01	100603	1 year	2020.11.25
Preamplifier	AGILENT	8449B	3008A01742	1 year	2021.01.02
EMI Test Receiver	R&S	ESU26	100551	1 year	2021.04.01
EMI TEST RECEIVER	R & S	ESR3	101781	1 year	2021.01.10
PULSE LIMITER	R & S	ESH3-Z2	101915	1 year	2021.01.02

# Appendix A. Measurement equipment

#### **Peripheral devices**

Device	Manufacturer Model No.		Serial No.	
Notebook computer	Notebook computer LG Electronics Inc.,		306QCZP560949	