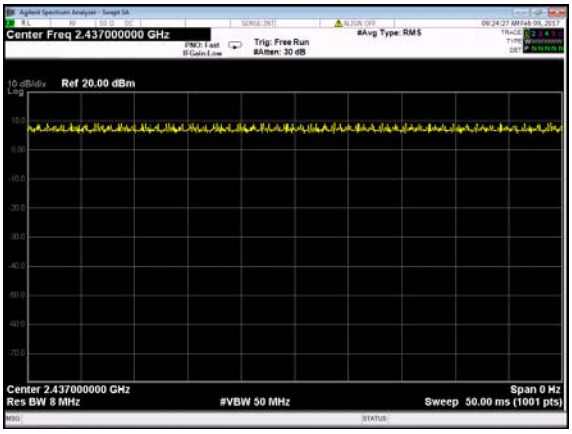
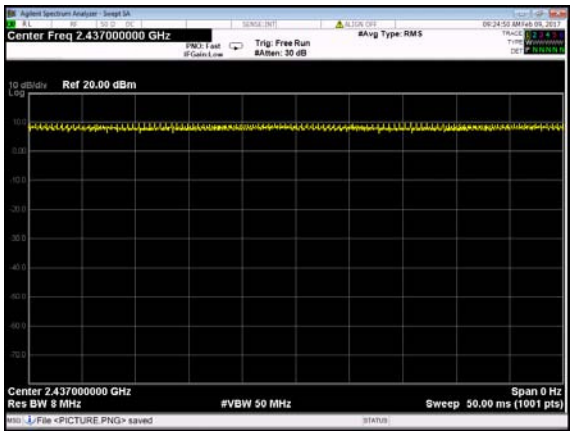
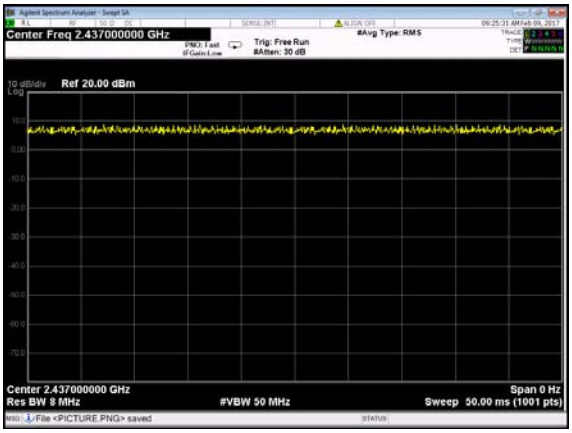
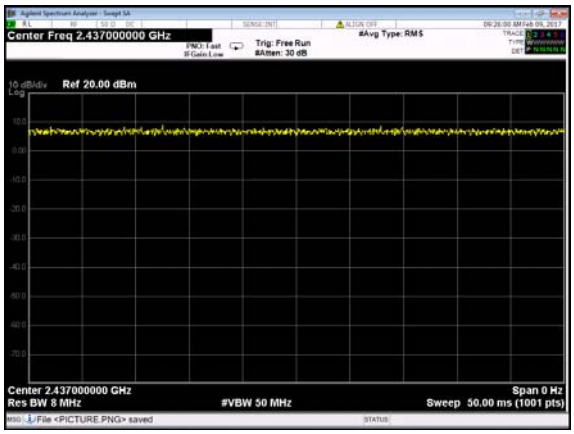
Duty Cycle

11b 11Mbps	11g 12Mbps
	
11n-HT20 MSC8	**11n-HT40 MSC11**
	

	11b	11g	11n-HT20	11n-HT40
Tx on	-	-	-	-
Tx on + Tx off	-	-	-	-
Duty Cycle	1.00	1.00	1.00	1.00
Duty Cycle Factor (dB)	0.00	0.00	0.00	0.00

[Calculation method]

Duty Cycle = (Tx on) / (Tx on + Tx off)

Duty Cycle Factor (dB) = 10Log (1/Duty Cycle)

[Note]

(1) ☐ Correction Factor includes the antenna factor, cable loss, attenuator loss and pre-amplifier gain.
☒ Correction Factor includes the cable loss and attenuator loss.
Above 1000MHz, the antenna factor includes the cable loss, pre-amplifier gain and attenuator loss (if necessary).

(2) * mark in Measured Frequency : Measured with the tuned dipole antenna.
no mark in Measured Frequency : Measured with the broadband antenna.

(3) Upper Frequency : ☒Transmitter Frequency (TX): TX < 10GHz
☐1GHz ☒10th harmonic of the highest frequency / ☐Up to 40GHz
☐Transmitter Frequency (TX): 10GHz ≦ TX < 30GHz
☐10th harmonic of the highest frequency / ☐Up to 100GHz
☐Transmitter Frequency (TX): 30GHz ≦ TX
☐10th harmonic of the highest frequency / ☐Up to 200GHz

The emissions were checked to the upper frequency, and the lower emissions than the listed emissions in the above tables were omitted.

(4) Measurement Distance : <below 1GHz> ☒ 3m ☐ 10m
<above 1GHz> ☒ 3m ☐ 10m
<above 12.4GHz> 1m

(5) Bore-sight method setting : horn antenna orientation was center of Turn Table

[Calculation method]

Maximum Field Strength (dBμV/m)
= Meter Reading (at maximum level of Horizontal or Vertical) (dBμV) + Correction Factor (dB/m) + Distance factor (*)

(*) Applied for Radiated Emission Measurement (above 12.4GHz) only.
Distance factor : 20 × log10 (1m /3m) = -9.5dB

Tested Date	Environment	
	Temperature	Humidity
28 February 2017	22°C	27 %

Below 30MHz (Conducted measurement)

11b 2437MHz

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Ant Gain (dBi)	EIRP (dBm)	Distance (m)	Ground Bounce (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin for Limit (dB)
10.997	9.87	-75.73	2.1	-63.76	30	6.00	17.50	29.54	12.04

11g 2412MHz

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Ant Gain (dBi)	EIRP (dBm)	Distance (m)	Ground Bounce (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin for Limit (dB)
0.094	9.87	-95.62	2.1	-83.65	300	6.00	-22.39	28.10	50.49
9.499	9.87	-77.30	2.1	-65.33	30	6.00	15.93	29.54	13.61

11n-HT20 2412MHz Ant A

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Ant Gain (dBi)	EIRP (dBm)	EIRP (nW)
0.148	9.87	-98.15	2.1	-86.18	0.00241
8.394	9.87	-83.31	2.1	-71.34	0.07345
14.125	9.88	-90.50	2.1	-78.52	0.01406

11n-HT20 2412MHz Ant B

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Ant Gain (dBi)	EIRP (dBm)	EIRP (nW)
0.148	9.87	-100.66	3.3	-87.49	0.00178
8.394	9.87	-86.52	3.3	-73.35	0.04624
14.125	9.88	-84.83	3.3	-71.65	0.06839

11n-HT20 2412MHz Ant A+B

Measured Frequency (MHz)	Ant A (nW)	Ant B (nW)	Sum EIRP (nW)	Sum EIRP (dBm)	Distance (m)	Ground Bounce (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin for Limit (dB)
0.148	0.00241	0.00178	0.00419	-83.78	300	6.00	-22.52	24.22	46.74
8.394	0.07345	0.04624	0.11969	-69.22	30	6.00	12.04	29.54	17.50
14.125	0.01406	0.06839	0.08245	-70.84	30	6.00	10.42	29.54	19.12

11n-HT40 2452MHz Ant A

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Ant Gain (dBi)	EIRP (dBm)	EIRP (nW)
10.000	9.87	-85.00	2.1	-73.03	0.04977
26.501	9.88	-88.50	2.1	-76.52	0.02228

11n-HT40 2452MHz Ant B

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Ant Gain (dBi)	EIRP (dBm)	EIRP (nW)
10.000	9.87	-87.05	3.3	-73.88	0.04093
26.501	9.88	-78.90	3.3	-65.72	0.26792

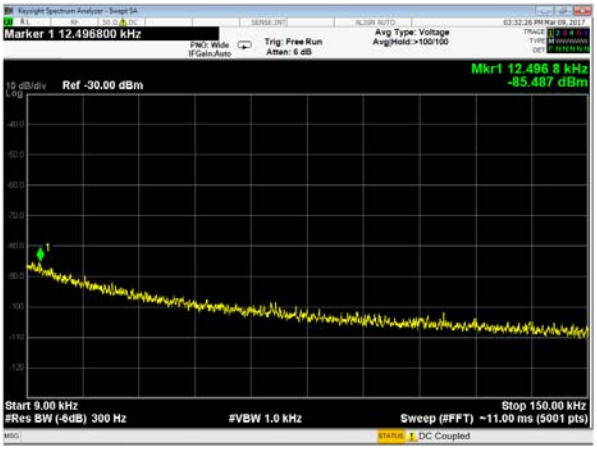
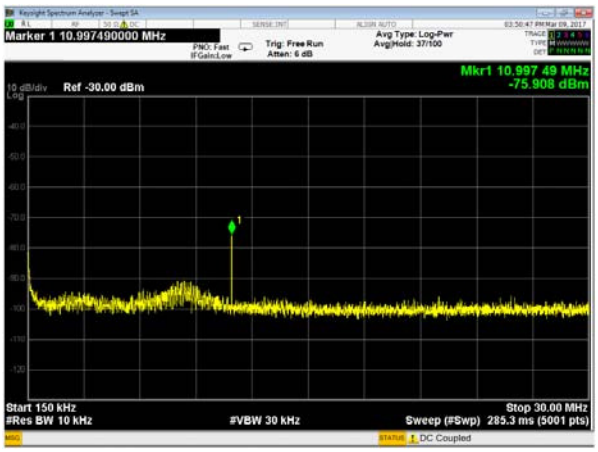
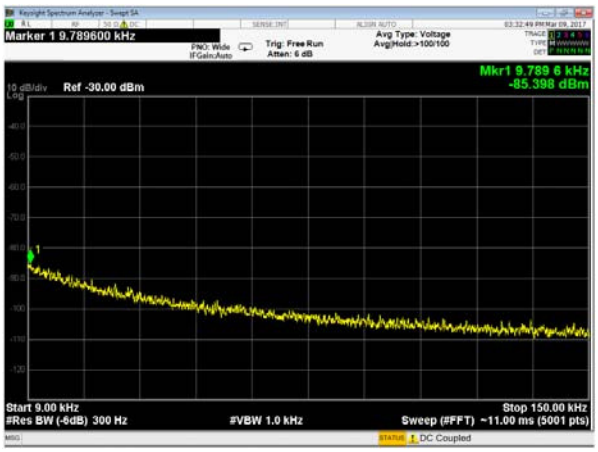
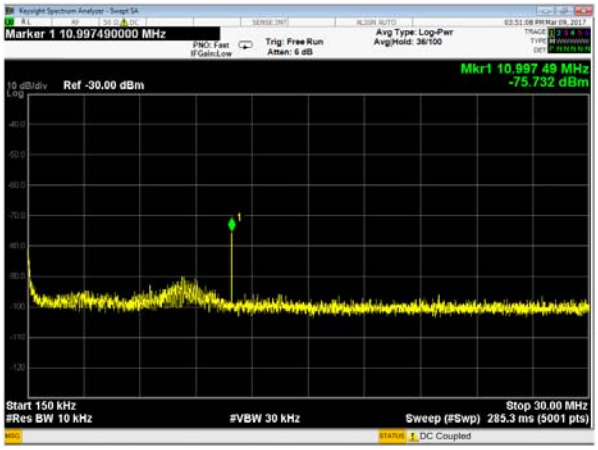
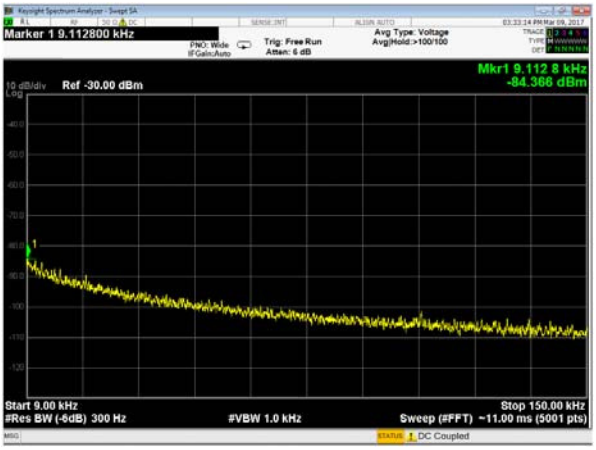
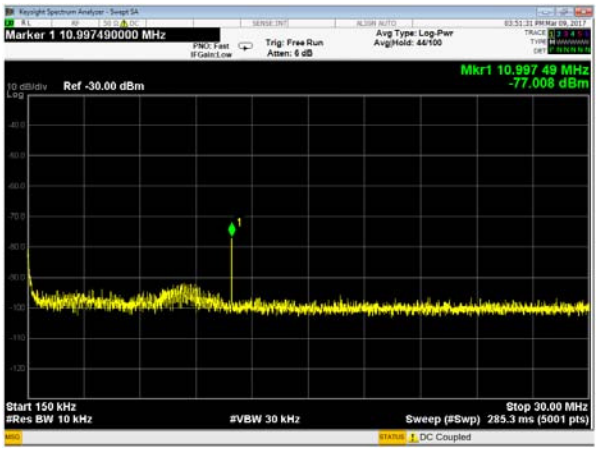
11n-HT40 2452MHz Ant A+B

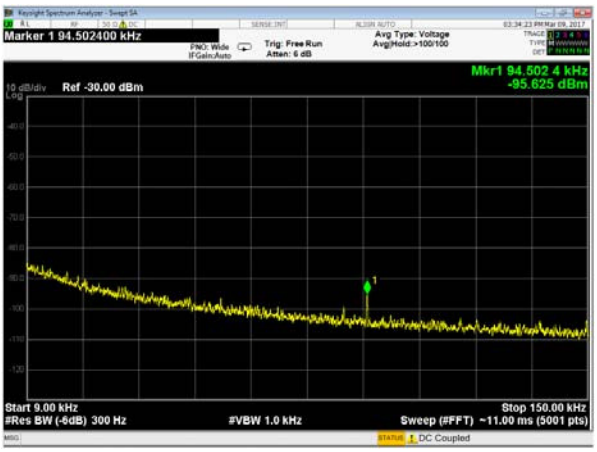
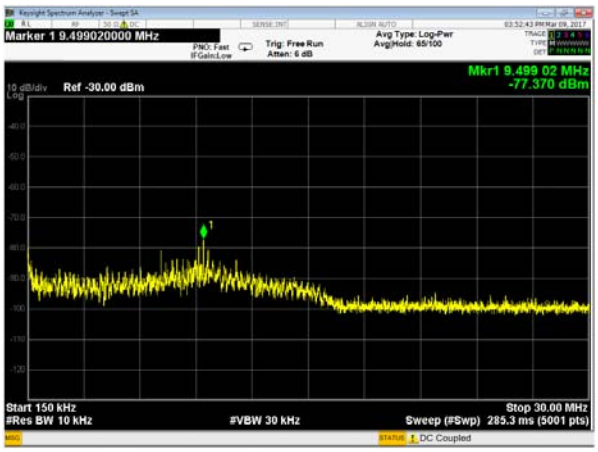
Measured Frequency (MHz)	Ant A (nW)	Ant B (nW)	Sum EIRP (nW)	Sum EIRP (dBm)	Distance (m)	Ground Bounce (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin for Limit (dB)
10.000	0.04977	0.04093	0.09070	-70.42	30	6.00	10.83	29.54	18.71
26.501	0.02228	0.26792	0.29020	-65.37	30	6.00	15.88	29.54	13.66

[Note]
(1) Correction Factor includes the cable loss and attenuator loss.
(2) See next page figure.

[Calculation method]
EIRP (dBm) = Meter Reading (dBm) + Correction Factor (dB) + Antenna Gain (dBi)
Field Strength (dBμV/m) = EIRP (dBm) - 20*log(D) + Ground Bounce (dB) + 104.8 (dBμV/m)

Tested Date	Environment	
	Temperature	Humidity
8 February 2017	22°C	30 %

11b	
2412MHz	
9kHz-150kHz	150kHz-30MHz
	
2437MHz	
9kHz-150kHz	150kHz-30MHz
	
2462MHz	
9kHz-150kHz	150kHz-30MHz
	

11g	
2412MHz	
9kHz-150kHz	150kHz-30MHz
	
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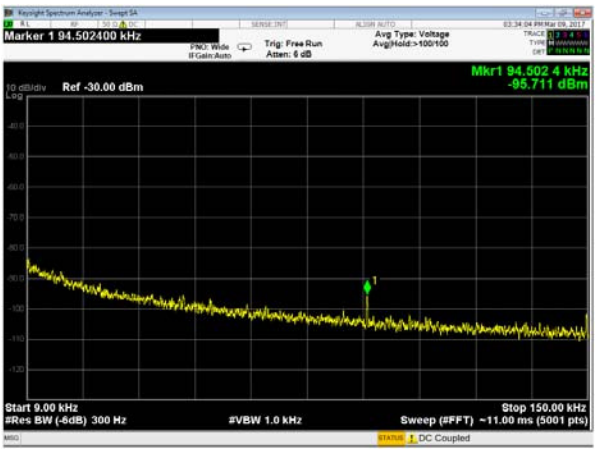
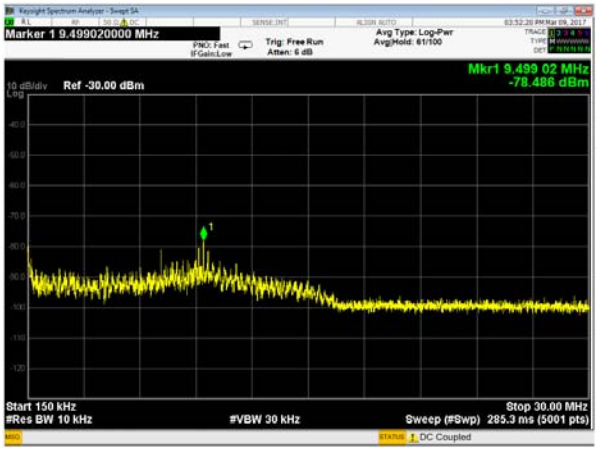
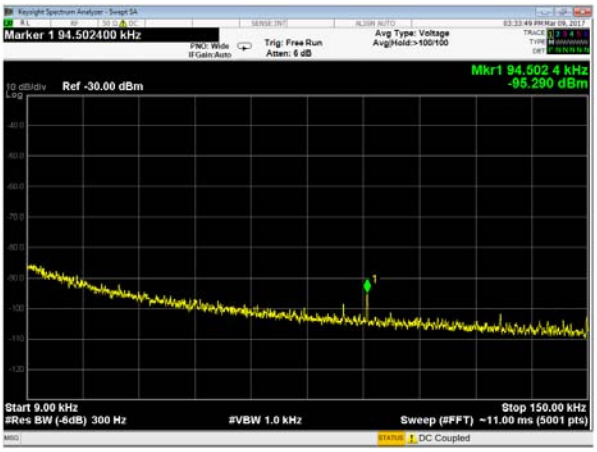
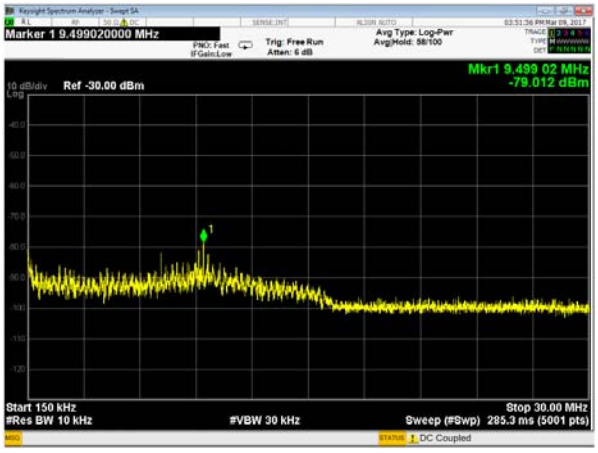
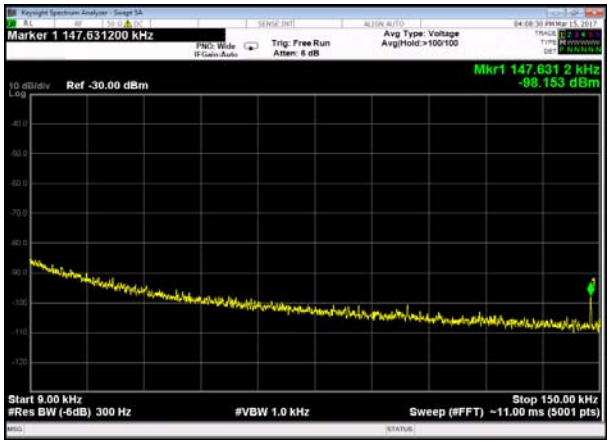
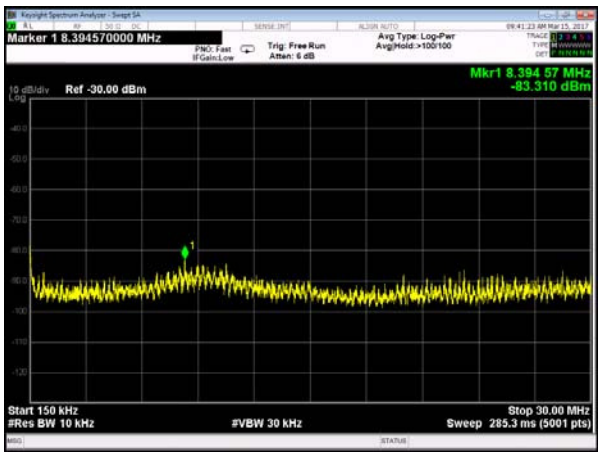
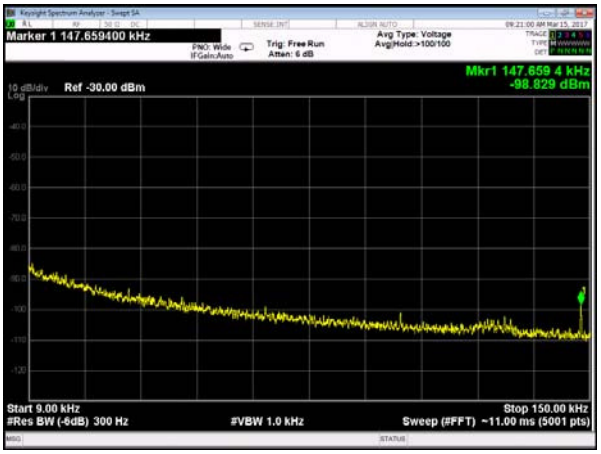
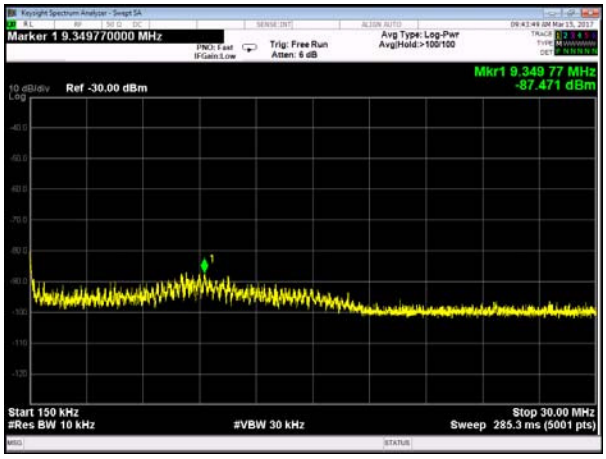
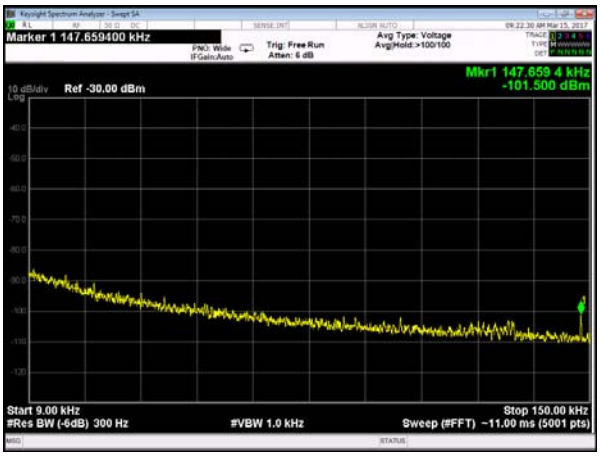
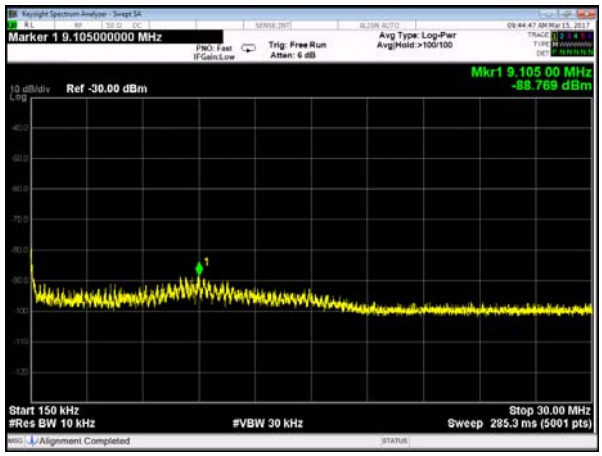
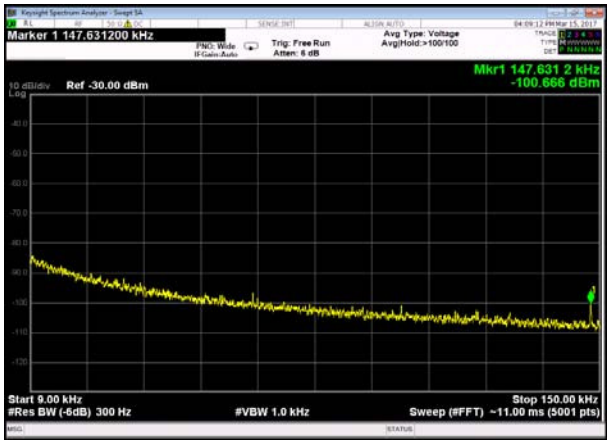
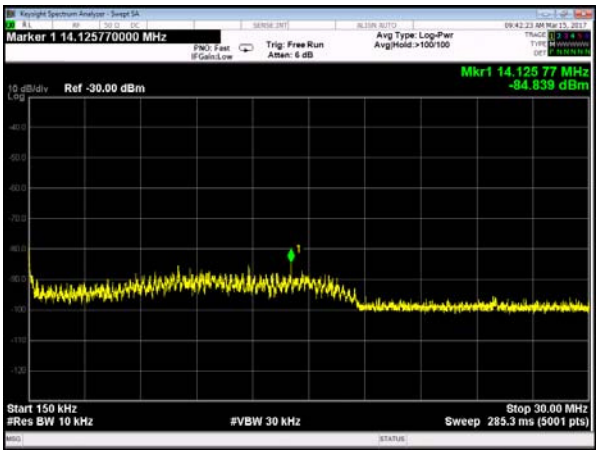
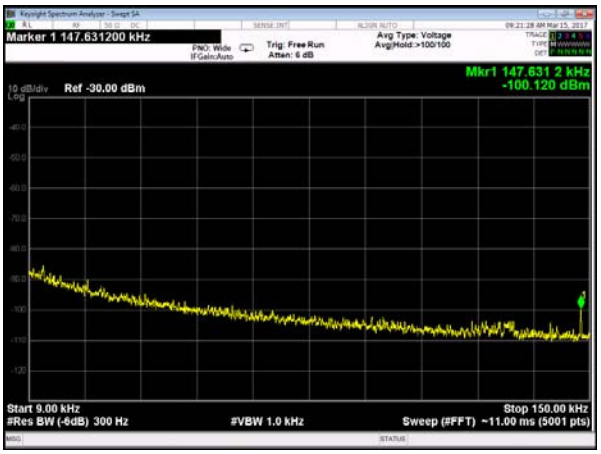
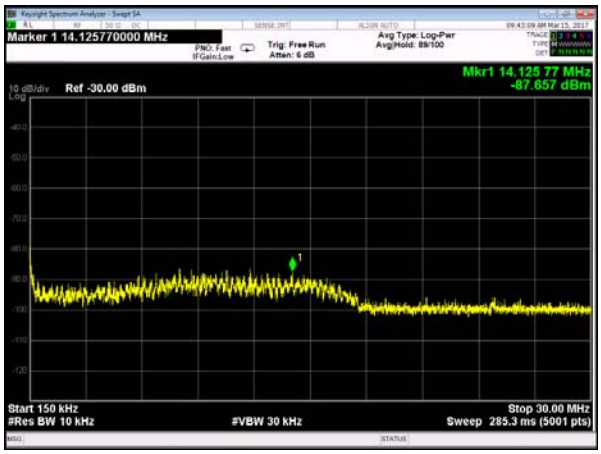
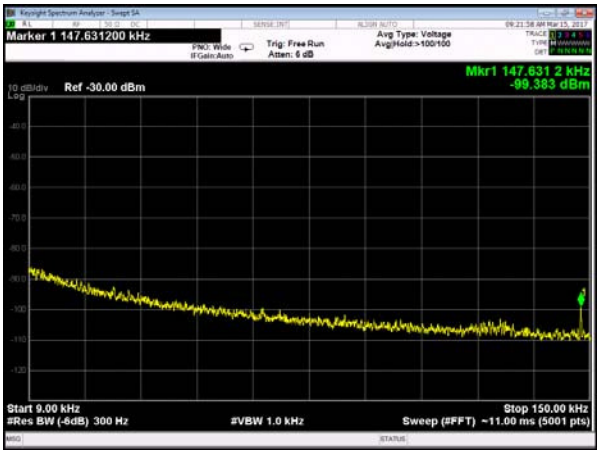
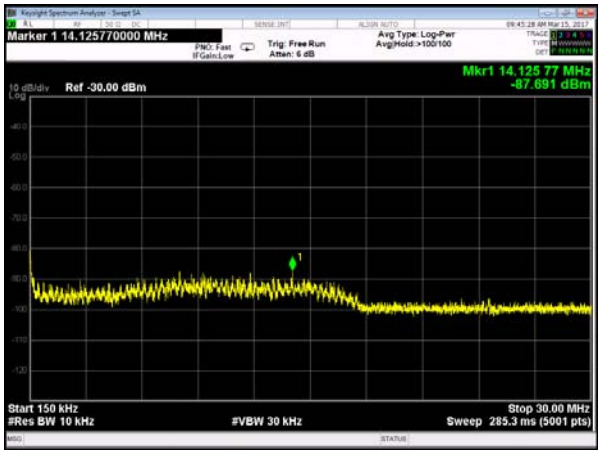
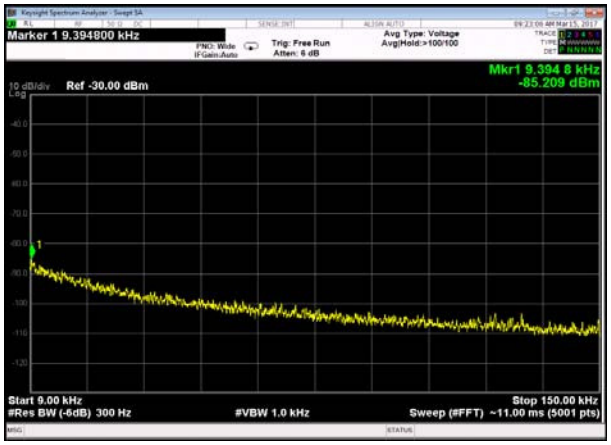
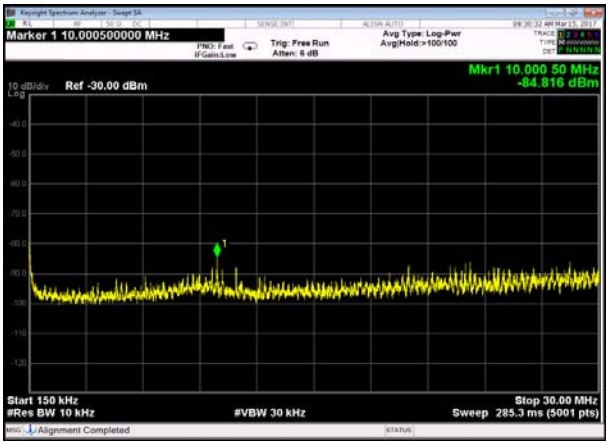
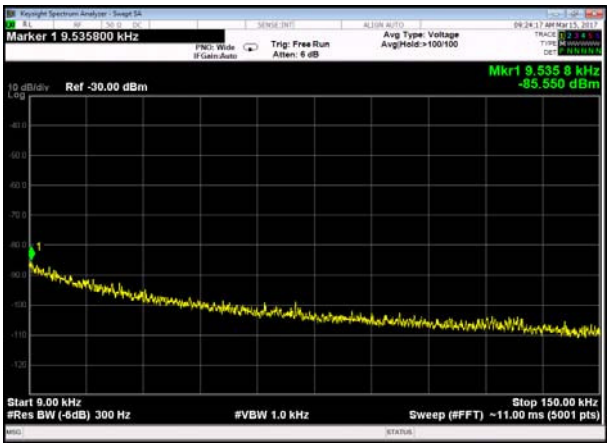
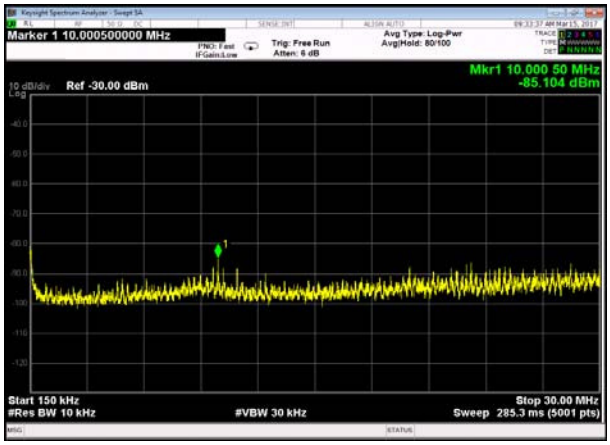
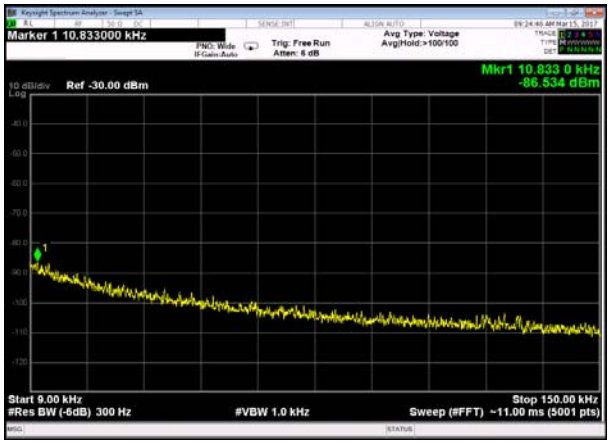
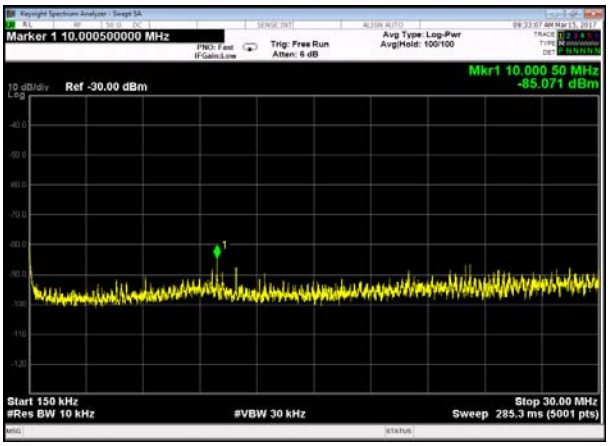
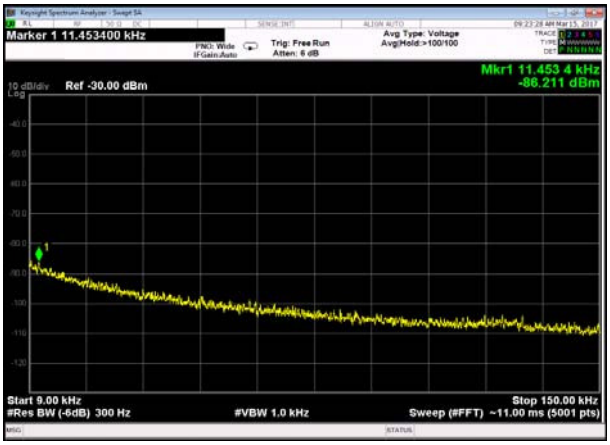
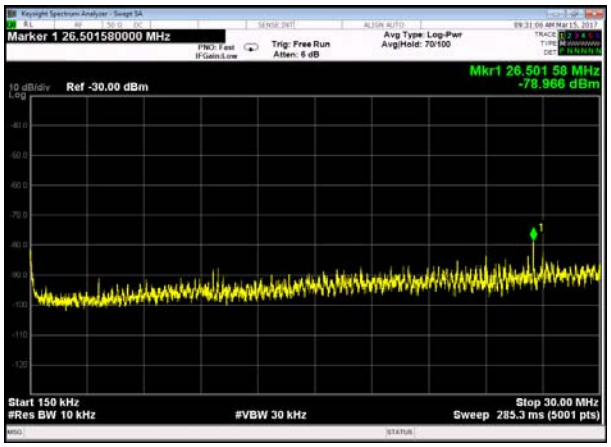
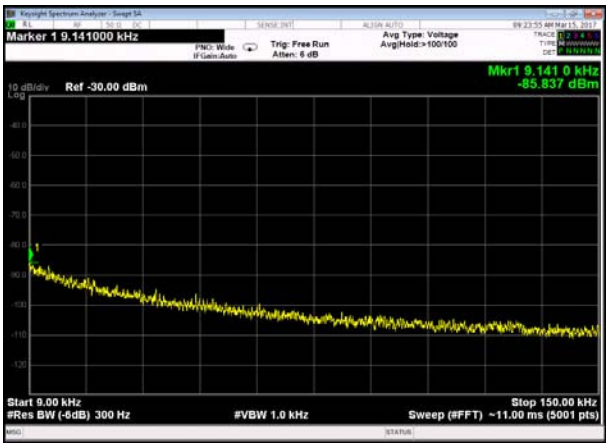
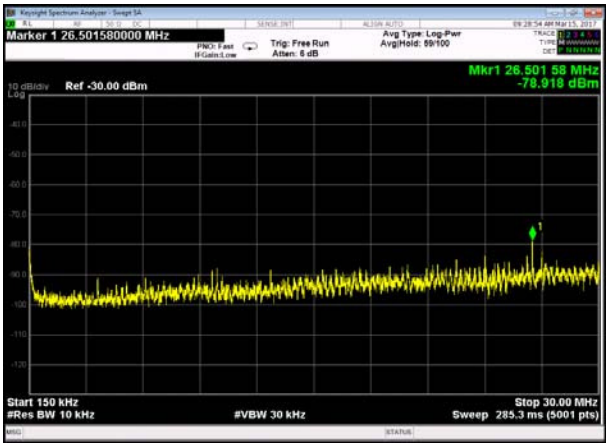
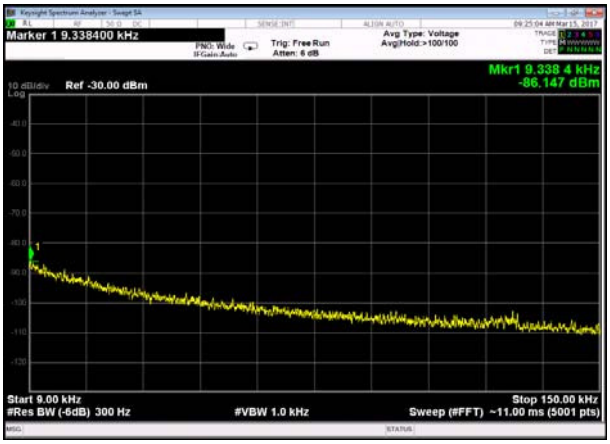
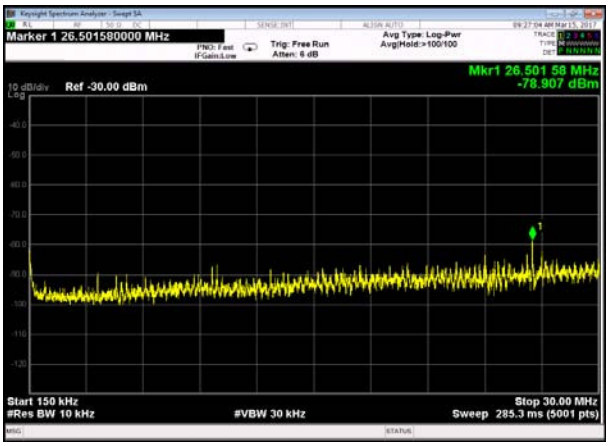
9kHz-150kHz	150kHz-30MHz
	
2462MHz	
9kHz-150kHz	150kHz-30MHz
	

11n-HT20 Ant A	
2412MHz	
9kHz-150kHz	150kHz-30MHz
	
2437MHz	
9kHz-150kHz	150kHz-30MHz
	
2462MHz	
9kHz-150kHz	150kHz-30MHz
	

11n-HT20 Ant B	
2412MHz	
9kHz-150kHz	150kHz-30MHz
	
2437MHz	
9kHz-150kHz	150kHz-30MHz
	
2462MHz	
9kHz-150kHz	150kHz-30MHz
	

11n-HT40 Ant A	
2422MHz	
9kHz-150kHz	150kHz-30MHz
	
2437MHz	
9kHz-150kHz	150kHz-30MHz
	
2452MHz	
9kHz-150kHz	150kHz-30MHz
	

11n-HT40 Ant B	
2422MHz	
9kHz-150kHz	150kHz-30MHz
	
2437MHz	
9kHz-150kHz	150kHz-30MHz
	
2452MHz	
9kHz-150kHz	150kHz-30MHz
	

10. TEST EQUIPMENT

・Conducted Emission

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AT-144	Low Power Attenuator	HUBER+SUHNER	6810.01.A	2016/06	2017/06
FL-107	LISN	KYORITSU	KNW-407	2016/06	2017/06
MM-252	RF Relay Matrix	TSJ	RFM-E121	2016/06	2017/06
SA-067	Test Receiver	Keysight Technologies	N9038A	2016/09	2017/09

・Emission Bandwidth
・Peak Power Spectral Density

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AT-148	Fixed Attenuator	Anritsu	41KC-10	2016/05	2017/05
SA-065	Signal Analyzer	Agilent	N9030A	2016/12	2017/11

・Maximum Conducted Output Power

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AT-148	Fixed Attenuator	Anritsu	41KC-10	2016/05	2017/05
VV-061	Power Meter	Agilent	N1912A	2016/05	2017/06
VV-061-1	Wideband Power Sensor	Agilent	N1921A	2016/05	2017/06

・Spurious Emission (Radiated) 30-1000MHz

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AM-028	Pre-Amplifier	Anritsu	Anritsu	2016/04	2017/04
AN-094	Biconical Antenna	Schwarzbeck	VHA9103/BBA9106	2016/04	2017/04
AN-250	LPDA Antenna	Schwarzbeck	UHALP9108A	2016/04	2017/04
AT-159	Fixed Attenuator	Anritsu	MP721B	2016/04	2017/04
FS-099	Test Receiver	ROHDE & SCHWARZ	ESS	2017/01	2018/01
MM-530	RF Relay Matrix Unit	TSJ	RFM-E321	2016/04	2017/04
SA-059	Spectrum Analyzer	Agilent	N9010A	2016/07	2017/07

・Spurious Emission (Radiated) Above 1GHz

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AM-053	Pre-Amplifier	HP	8449B	2016/04	2017/04
AN-044	DRG Antenna	Electro-Metrics	RGA-180	2016/05	2017/05
AN-104	Std. Gain Horn Antenna	Scientific-Atlanta	12-5.8	2015/04	2017/04
AN-107	Std. Gain Horn Antenna	Scientific-Atlanta	12A-18	2016/01	2017/04
AN-145	Std. Gain Horn Antenna	Scientific-Atlanta	12-12	2015/04	2017/04
AN-210	Std. Gain Horn Antenna	Scientific-Atlanta	12-8.2	2015/04	2017/04
AT-148	Fixed Attenuator	Anritsu	41KC-10	2016/05	2017/04
FL-222	Band-stop Filter	TOYO	8BRM2442/T300	2016/10	2017/04
SA-065	Spectrum Analyzer	Agilent	N9030A	2016/12	2017/11

・Spurious Emission (Conducted) Below 30MHz

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AT-148	Fixed Attenuator	Anritsu	41KC-10	2016/05	2017/04
SA-067	Test Receiver	Keysight Technologies	N9038A	2016/09	2017/09

Note : (*1) KEC checked the performance, before using this device.

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to the national standards of measurement or equivalent abroad.

APPENDIX A (DECLARATION OF COMPLIANCE TO MAXIMUM PERMISSIBLE EXPOSURE LIMITS FOR HUMANS)

The Model U9W30X with 2400-2483.5MHz transmitter complies with Maximum permissible exposure limits for humans as called out in §1.1310. It is exempt from Maximum Permissible Exposure based on its operating frequency, and power density 0.182mW/cm^2.

Calculation formula :

$$S = PG / 4\pi D^2$$

S : power density (W/m^2)
P : peak output power (W)
G : antenna gain (isotropic)
D : measurement distance (m)

Where :
・Ant A
P = 24.54dBm at 2412 MHz, 11n-HT20 (see 18 page)
G = 2.1dBi
・Ant B
P = 23.27dBm at 2412 MHz, 11n-HT20 (see 18 page)
G = 3.3dBi
・D = 0.2m

Therefore :

$$S(W/m^2) = \frac{(10^{\frac{24.54}{10}} \times 10^{-3} \times 10^{\frac{2.1}{10}}) + (10^{\frac{23.27}{10}} \times 10^{-3} \times 10^{\frac{3.3}{10}})}{4 \times \pi \times 0.2 \times 0.2} = 1.82$$

S≒0.182 (mW/cm^2)

This would be less than 1mW/cm^2 when the separation distance between the user and the device's radiating element is no less than 20cm.