

FCC TEST REPORT

Test report No: EMC- FCC- R0085

FCC ID: O6ZHR44

Type of Equipment: SATELLITE RECEIVER

Model Name: HR44-500

Applicant: HUMAX Co., Ltd

FCC Rule Part(s): FCC Part 15 Subpart C
Section 15.203, Section 15.209
Section 15.207, Section 15.247

Frequency Range: 2 400 MHz ~ 2 483.5 MHz,

Test result: Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of test: September 24, 2012 ~ October 26, 2012

Issued date: November 2, 2012


Tested by: _____
YU, SANG HOON


Approved by: _____
KIM, CHANG MIN

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1. Client information

Applicant: HUMAX Co., Ltd
Address: 212-1, Yubang-dong, Cheoin-gu Yong-in-si, Gyeonggi-do, Korea
Telephone number: +82-31-776-6748
Facsimile number : +82-31-776-6149
Contact person: Jaeho LEE / Manager

Manufacturer : HUMAX Co., Ltd
Address: 212-1, Yubang-dong, Cheoin-gu Yong-in-si, Gyeonggi-do, Korea

2. Laboratory information

Address

EMC Compliance Ltd.

480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-390, Korea

Telephone Number: 82 31 336 9919 Facsimile Number: 82 31 336 4767

Certificate

CBTL Testing Laboratory, KOLAS NO.: 231

FCC Filing No.: 508785

VCCI Registration No.: C-1713, R-1606, T-258

SITE MAP



3. Description of E.U.T.

3.1 Basic description

Applicant :	HUMAX Co., Ltd
Address of Applicant:	212-1, Yubang-dong, Cheoin-gu Yong-in-si, Gyeonggi-do, Korea
Manufacturer:	HUMAX Co., Ltd
Address of Manufacturer:	212-1, Yubang-dong, Cheoin-gu Yong-in-si, Gyeonggi-do, Korea
Type of equipment:	SATELLITE RECEIVER
Basic Model:	HR44-500
Serial number:	Proto Type

3.2 General description

Model Name	HR44-500
Communication	2.4 GHz: 802.15.4(RF4CE) 2.4 GHz: 802.11b/g/n(HT20, HT40), 5.0 GHz: 802.11a/n(HT20, HT40)
Frequency Range	2.4 GHz: 2 400.0 ~ 2 483.5 MHz 5.0 GHz: 5 150 ~ 5 350 MHz, 5 470 ~ 5 725 MHz, 5 725 ~ 5 850 MHz
Type of Modulation	O-QPSK, CCK, OFDM
Channel capacity	2.4 GHz: 3 ch(RF4CE) 2.4 GHz: 11 ch(802.11b/g/n_HT20) 7 ch(802.11n_HT40) 5.0 GHz: 5 150 ~ 5 350 MHz: 8 ch(802.11a/n_HT20), 4 ch(802.11n_HT40) 5 470 ~ 5 725 MHz: 11 ch(802.11a/n_HT20), 5 ch(802.11n_HT40) 5 725 ~ 5 850 MHz: 5 ch(802.11a/n_HT20), 2 ch(802.11n_HT40)
Antenna Gain	2.4 GHz : 2.89 dBi 2.4 GHz : 3.1 dBi, 5.0 GHz : 3.2 dBi
Type of Antenna	PCB Antenna
Firmware version	Wi-Fi Driver Ver: 5.90.188.59, RF4CE Driver Ver:1.5.3.1
Power supply	AC 120 V
Operating temperature	0 ~ 50 °C
Dimension	33 mm x 25 mm x 4 mm (W x D x H)

3.3 Test frequency

For all test items, the low, middle and high channels of the modes were tested with above worst case data rate.

2400 ~ 2483.5 (MHz) : 802.15.4(RF4CE)

	CH	Frequency
Low frequency	15	2 425 MHz
Middle frequency	20	2 450 MHz
High frequency	25	2 475 MHz

2400 ~ 2483.5 (MHz) : 802.11b/g/n(HT20, HT40)

	Frequency	Frequency
Band Width	20 MHz	40 MHz
Low frequency	2 412 MHz	2 422 MHz
Middle frequency	2 437 MHz	2 437 MHz
High frequency	2 462 MHz	2 452 MHz

5150~5250 (MHz) : 802.11a/n(HT20, HT40)

	Frequency	Frequency
Band Width	20 MHz	40 MHz
Low frequency	5 180 MHz	5 190 MHz
Middle frequency	5 200 MHz	-
High frequency	5 240 MHz	5 230 MHz

5250~5350 (MHz) : 802.11a/n(HT20, HT40)

	Frequency	Frequency
Band Width	20 MHz	40 MHz
Low frequency	5 260 MHz	5 270 MHz
Middle frequency	5 300 MHz	-
High frequency	5 320 MHz	5 310 MHz

5470~5550 (MHz) : 802.11a/n(HT20, HT40)

	Frequency	Frequency
Band Width	20 MHz	40 MHz
Low frequency	5 500 MHz	5 510 MHz
Middle frequency	5 600 MHz	5 590 MHz
High frequency	5 700 MHz	5 670 MHz

5250~5350 (MHz) : 802.11a/n(HT20, HT40)

	Frequency	Frequency
Band Width	20 MHz	40 MHz
Low frequency	5 745 MHz	5 755 MHz
Middle frequency	5 785 MHz	-
High frequency	5 825 MHz	5 795 MHz

3.4 Test Voltage

mode	Voltage
Norminal voltage	AC 120V

4. Summary of test results

4.1 Standards & results

Rule Reference	Parameter	Report Section	Test Result
15.203, 15.247(b)(4)	Antenna Requirement	5.1	C
15.247(b)(3)	Maximum Peak Output Power	5.2	C
15.247(e)	Peak Power Spectral Density	5.3	C
15.247(a)(2)	6 dB Channel Bandwidth	5.4	C
15.247(d), 15.205(a), 15.209(a)	Spurious Emission, Band Edge, and Restricted bands	5.5	C
15.207(a)	Conducted Emissions	5.6	C
15.247(i), 1.1307(b)(1)	RF Exposure	5.7	C
RSS-Gen, Issue 3,6	Receiver Spurious Emission (Radiated)	5.8	C
Note: C = complies NC = Not complies NT = Not tested NA = Not Applicable			

4.2 Uncertainty

Measurement Item	Combined Standard Uncertainty U _c	Expanded Uncertainty U = KU _c (K = 2)
Conducted RF power	± 0.75 dB	± 1.3 dB
Radiated disturbance	+2.280dB / - 2.278 dB	+4.560dB / - 4.556 dB
Conducted disturbance	+1.883 dB / - 1.676 dB	+3.766dB / - 3.352 dB

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And 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 transmitting 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.

5.1.2 Result

-Complied

The transmitter has an integral PCB antenna. The directional peak gain of the antenna is 2.89 dBi.

5.2 Maximum Peak Output Power

5.2.1 Regulation

According to §15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz 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 output power. Maximum Conducted Output 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 transmitting 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.

5.2.2 Measurement Procedure

These test measurement settings are specified in section 5.2 of 558074 D01 DTS Meas Guidance.

5.2.2.2 Measurement Procedure PK2:

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector).

If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.

5.2.3 Test Result

-Complied

Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	2 425	4.47	30.00	25.53
Middle	2 450	4.18	30.00	25.82
High	2 475	3.83	30.00	26.17

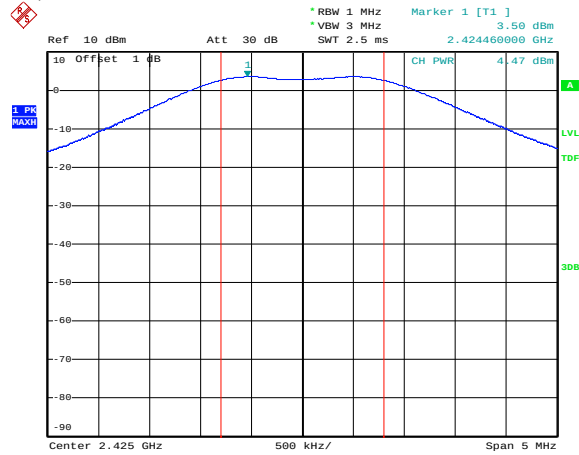
-NOTE:

1. Since the directional gain of the integral antenna declared by the manufacturer ($G_{ANT} = 2.89$ dBi), does not exceed 6.0 dBi, there was no need to reduce the output power.
2. We took the insertion loss of the cable loss into consideration within the measuring instrument.

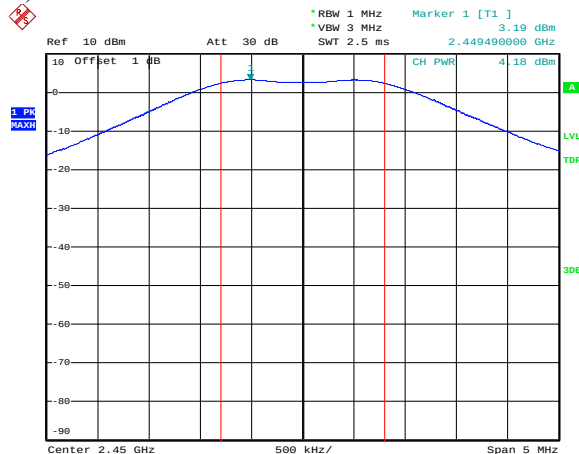
5.2.4 Test Plot

Figure 1. Plot of the Maximum Peak Output Power

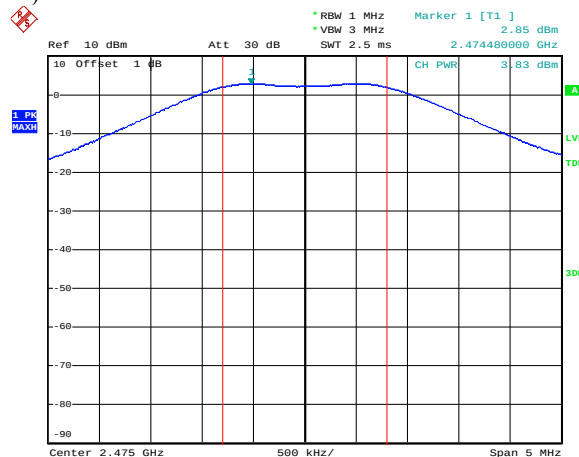
- Lowest Channel (2 425 MHz)



- Middle Chnnel (2 450 MHz)



- Highest Chnnel (2 475 MHz)



5.3 Peak Power Spectral Density

5.3.1 Regulation

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.

5.3.2 Measurement Procedure

These test measurement settings are specified in section 5.3 of 558074 D01 DTS Meas Guidance.

5.3.2.1 Measurement Procedure PKPSD:

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW $\geq$ 300 kHz.
4. Set the span to 5-30 % greater than the EBW.
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 power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3 \text{ kHz}/100 \text{ kHz}) = -15.2 \text{ dB}$.
11. The resulting peak PSD level must be $\leq 8 \text{ dBm}$.

5.3.3 Test Result

-Complied

Channel	Reading [dBm]	BWCF [dB]	Result [dBm]	Limit [dBm]	Margin [dBm]
Low	-0.08	-15.20	-15.28	8.00	23.28
Middle	-0.06	-15.20	-15.26	8.00	23.26
High	-0.49	-15.20	-15.69	8.00	23.69

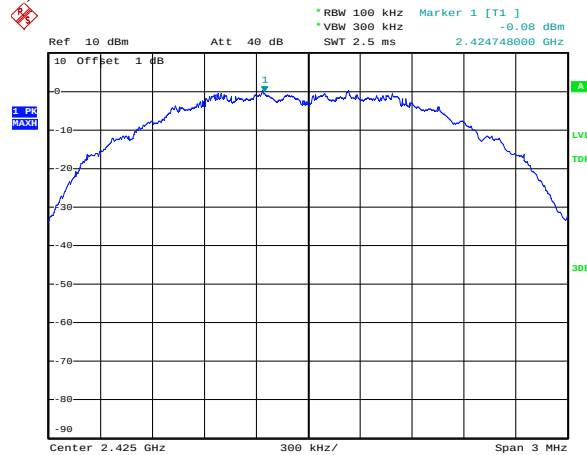
-NOTE:

1. Since the directional gain of the integral antenna declared by the manufacturer ($G_{ANT} = 2.89$ dBi), does not exceed 6.0 dBi, there was no need to reduce the output power.
2. We took the insertion loss of the cable loss into consideration within the measuring instrument.

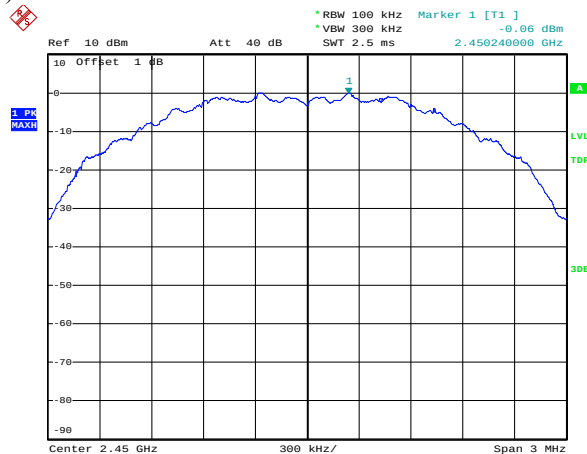
5.3.4 Test Plot

Figure 2. Plot of the Power Density (Conducted)

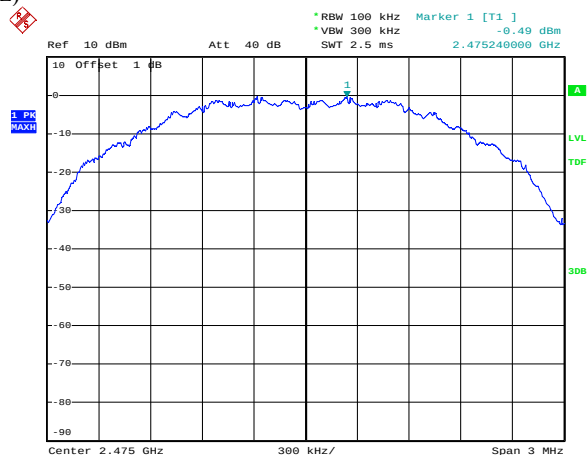
- Lowest Channel(2 425 MHz)



- Middle Chnnel (2 450 MHz)



- Highest Chnnel (2 475 MHz)



5.4 6 dB Bandwidth

5.4.1 Regulation

According to §15.247(a)(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.4.2 Measurement Procedure

These test measurement settings are specified in section 5.1 of 558074 D01 DTS Meas Guidance.

1) EBW Measurement Procedure:

1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (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) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

2) Alternate EBW Measurement Procedure:

The automatic bandwidth measurement capability of a spectrum analyzer may be employed if it implements the functionality described above (*e.g.*, RBW = 1-5% of EBW, VBW $\geq 3 \times$ RBW, peak detector with maximum hold). When using this capability, care should be taken to ensure that the bandwidth measurement is not influenced by any nulls in the fundamental emission.

5.4.3 Test Result

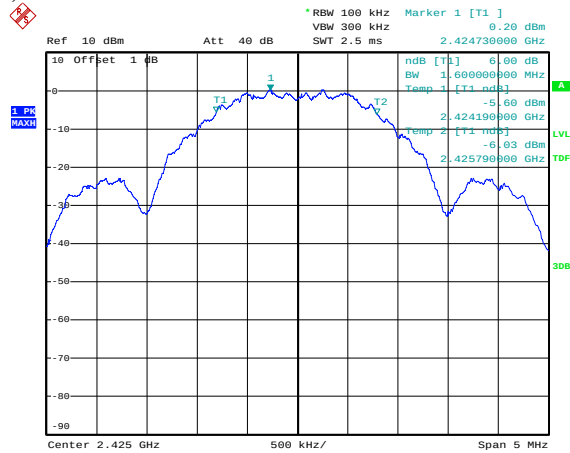
-Complied

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (kHz)
Low	2 425	1.600	500
Middle	2 450	1.600	500
High	2 475	1.600	500

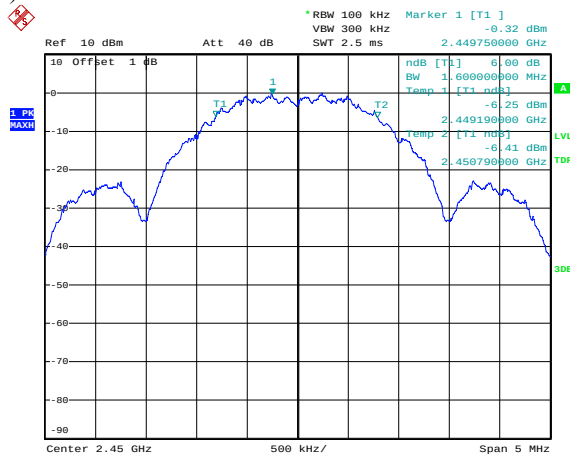
5.4.4 Test Plot

Figure 3. Plot of the 6dB Bandwidth (Conducted)

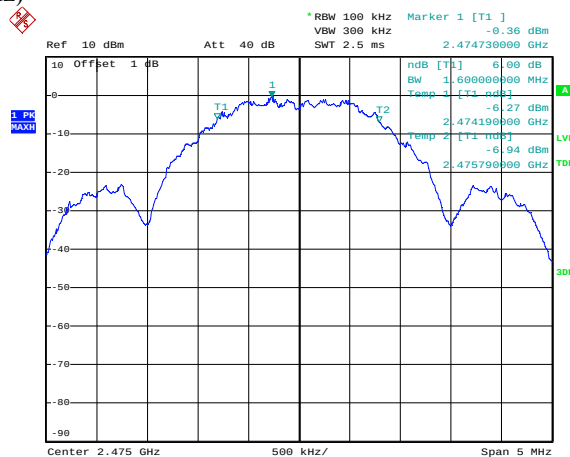
- Lowest Channel (2 425 MHz)



- Middle Channel (2 450 MHz)



- Highest Channel (2 475 MHz)



5.5 SPURIOUS EMISSION, BAND EDGE, AND RESTRICTED BANDS

5.5.1 Regulation

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 emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

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

Frequency (MHz)	Field strength ($\mu\text{V/m}$ @ 3m)	Field strength ($\text{dB}\mu\text{V/m}$ @ 3m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	54.0

According to §15.109(a), for an unintentional device, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the above table.

** The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector and above 1000 MHz are based on the average value of measured emissions.

5.5.2 Measurement Procedure

1) Band-edge Compliance of RF Conducted Emissions

1. Set the spectrum analyzer as follows:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
RBW $\geq$ 1% of the span
VBW $\geq$ RBW
Sweep = auto
Detector function = peak
Trace = max hold

2. Allow the trace to stabilize. Set the marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is greater than that at the band-edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.
3. Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

2) Spurious RF Conducted Emissions

1. Set the spectrum analyzer as follows:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.
Typically, several plots are required to cover this entire span.
RBW = 100 kHz
VBW $\geq$ RBW
Sweep = auto
Detector function = peak
Trace = max hold

2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

3) Spurious Radiated Emissions:

1. The preliminary and final radiated measurements were performed to determine the frequency producing the maximum emissions in at a 10m anechoic chamber. The EUT was tested at a distance 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, and from 30 to 1000 MHz using the TRILOG broadband antenna, and from 1 000 MHz to 40 000 MHz using the horn antenna.
4. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

- Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 3 \text{ dB Att} - \text{A.G}) + \text{D.F}$$

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G = Amplifier Gain

3 dB Att = 3 dB Attenuator

If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is : $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

5.7.3 Test Result

-complied

1. Band edge compliance of RF Conducted Emissions was shown in figure 4.
2. Band edge compliance of RF Radiated Emissions was shown in figure 5.
3. Spurious RF conducted Emissions were shown in the Figure 6.

Note: We took the insertion loss of the cable into consideration within the measuring instrument.

4. Measured value of the Field strength of spurious Emissions (Radiated)

Low channel (2 425 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	Not Detected						
Quasi-Peak DATA. Emissions below 1GHz							
64.86	120	V	43.7	-14.9	28.8	40.0	11.2
112.89	120	V	55.3	-16.7	38.6	43.5	4.9
746.52	120	H	40.7	-2.0	38.7	46.0	7.3
833.02	120	H	40.2	-0.3	39.9	46.0	6.1
Peak DATA. Emissions above 1GHz							
1 199.50	1 000	V	55.3	-7.5	47.8	74.0	26.2
1 492.75	1 000	V	55.6	-5.1	50.5	74.0	23.5
1 800.25	1 000	V	52.1	-3.2	48.9	74.0	25.1
1 943.50	1 000	V	52.4	-2.5	49.9	74.0	24.1
2 996.50	1 000	V	54.4	-0.2	54.2	74.0	19.8
Above 3 000.00	Not Detected	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
1 199.50	1 000	V	38.9	-7.5	31.4	54.0	22.6
1 492.75	1 000	V	36.9	-5.1	31.8	54.0	22.2
1 800.25	1 000	V	37.8	-3.2	34.6	54.0	19.4
1 943.50	1 000	V	34.5	-2.5	32.0	54.0	22.0
2 996.50	1 000	V	38.5	-0.2	38.3	54.0	15.7
Above 3 000.00	Not Detected	-	-	-	-	-	-

Middle channel (2 450 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	Not Detected						
Quasi-Peak DATA. Emissions below 1GHz							
62.71	120	V	50.1	-14.6	35.5	40.0	4.5
746.50	120	V	44.5	-2.0	42.5	46.0	3.5
746.50	120	H	44.4	-2.0	42.4	46.0	3.6
Peak DATA. Emissions above 1GHz							
1 199.50	1 000	V	54.5	-7.5	47.0	74.0	27.0
1 493.50	1 000	V	55.6	-5.1	50.5	74.0	23.5
1 799.50	1 000	V	53.2	-3.2	50.0	74.0	24.0
1 947.25	1 000	V	52.2	-2.5	49.7	74.0	24.3
2 249.50	1 000	V	51.6	-1.3	50.3	74.0	23.7
2 994.25	1 000	V	55.2	-0.2	55.0	74.0	19.0
Above 3 000.00	Not Detected	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
1 199.50	1 000	V	35.4	-7.5	27.9	54.0	26.1
1 493.50	1 000	V	37.9	-5.1	32.8	54.0	21.2
1 799.50	1 000	V	36.9	-3.2	33.7	54.0	20.3
1 947.25	1 000	V	39.8	-2.5	37.3	54.0	16.7
2 249.50	1 000	V	35.7	-1.3	34.4	54.0	19.6
2 994.25	1 000	V	36.9	-0.2	36.7	54.0	17.3
Above 3 000.00	Not Detected	-	-	-	-	-	-

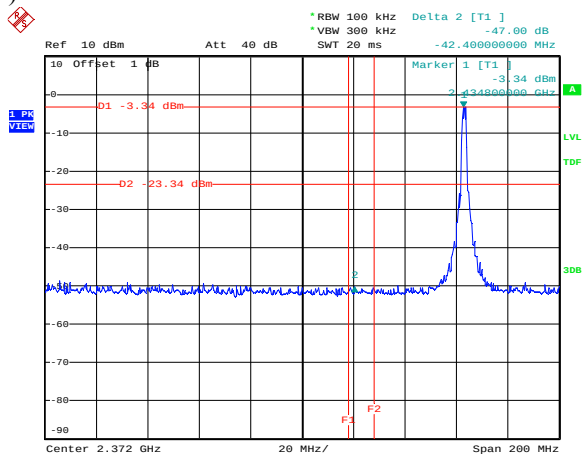
High channel (2 475 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	Not Detected						
Quasi-Peak DATA. Emissions below 1GHz							
62.33	120	V	49.2	-14.6	34.6	40.0	5.4
112.09	120	V	54.2	-16.8	37.4	43.5	6.1
236.47	120	H	57.3	-14.9	42.4	46.0	3.6
746.59	120	H	43.0	-2.0	41.0	46.0	5.0
746.49	120	V	44.2	-2.0	42.2	46.0	3.8
833.01	120	V	42.4	-0.3	42.1	46.0	3.9
Peak DATA. Emissions above 1GHz							
1 493.50	1 000	V	54.1	-5.1	49.0	74.0	25.0
1 793.50	1 000	V	51.2	-3.2	48.0	74.0	26.0
1 942.00	1 000	V	53.6	-2.5	51.1	74.0	22.9
2 245.00	1 000	V	51.4	-1.3	50.1	74.0	23.9
2 998.75	1 000	V	55.4	-0.2	55.2	74.0	18.8
Above 3 000.00	Not Detected	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
1 493.50	1 000	V	36.8	-5.1	31.7	54.0	22.3
1 793.50	1 000	V	38.9	-3.2	35.7	54.0	18.3
1 942.00	1 000	V	37.3	-2.5	34.8	54.0	19.2
2 245.00	1 000	V	36.8	-1.3	35.5	54.0	18.5
2 998.75	1 000	V	36.9	-0.2	36.7	54.0	17.3
Above 3 000.00	Not Detected	-	-	-	-	-	-

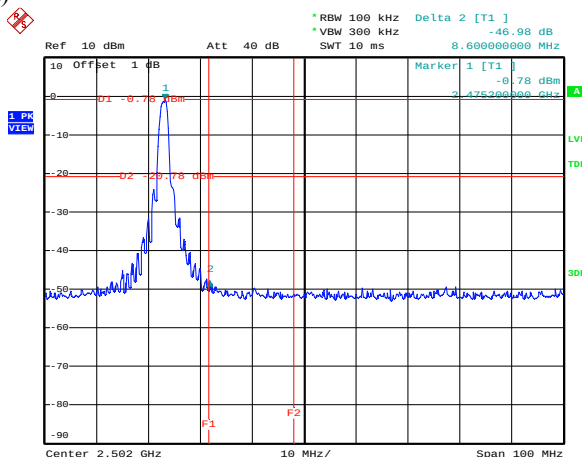
5.6.4 Test Plot

Figure 4. Plot of the Band Edge (Conducted)

- Lowest Channel (2 425 MHz)



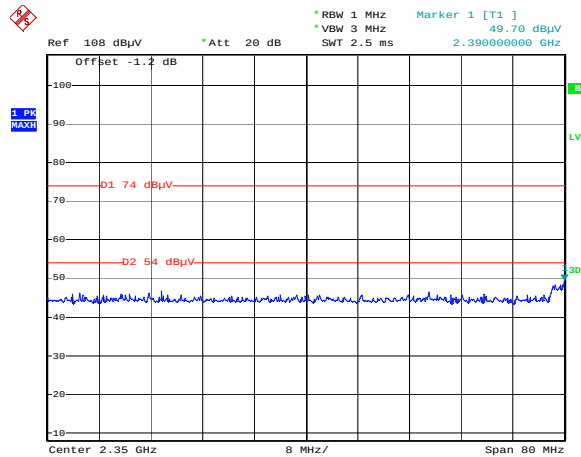
- Highest Chnnel (2 475 MHz)



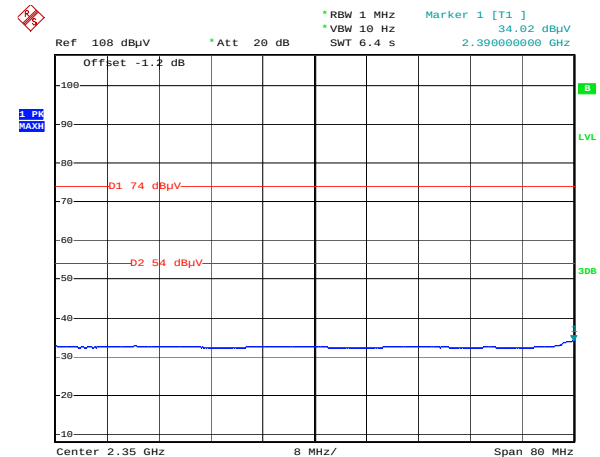
5.6.4 Test Plot (Continue)

Figure 5. Plot of the Band Edge (Radiated)

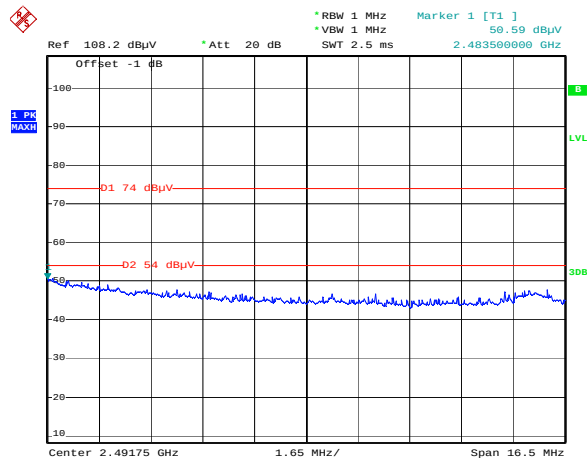
Lowest Channel(2 425 MHz): PEAK



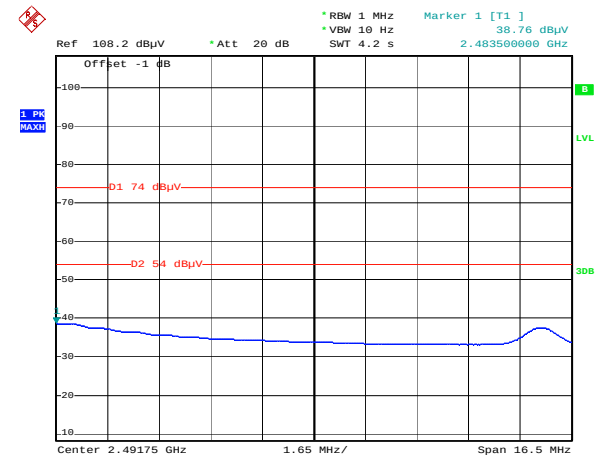
Lowest Channel(2 425 MHz): AVERAGE



Highest Channel(2 475 MHz): PEAK



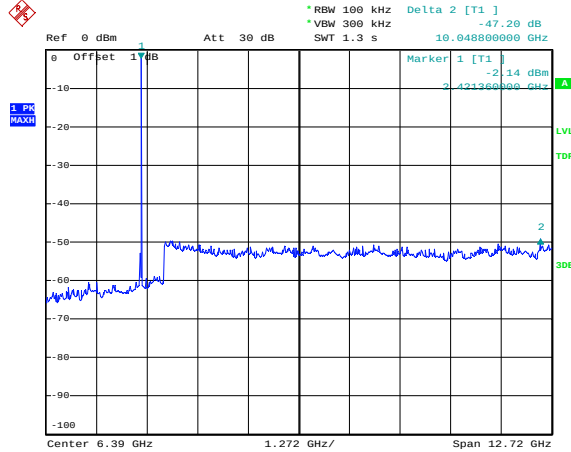
Highest Channel(2 475 MHz): AVERAGE



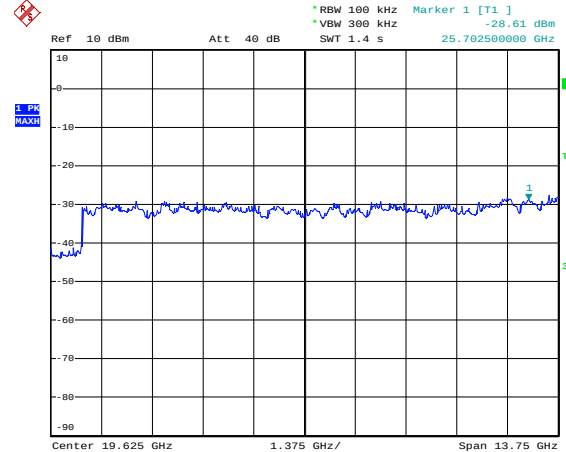
* offset = Factor (ANT Factor+ Amp Gain + Cable Loss) [dB]
= -1.2 dB (2 425 MHz)
= -1.0 dB (2 475 MHz)

Figure 6. Plot of the Spurious RF conducted emissions

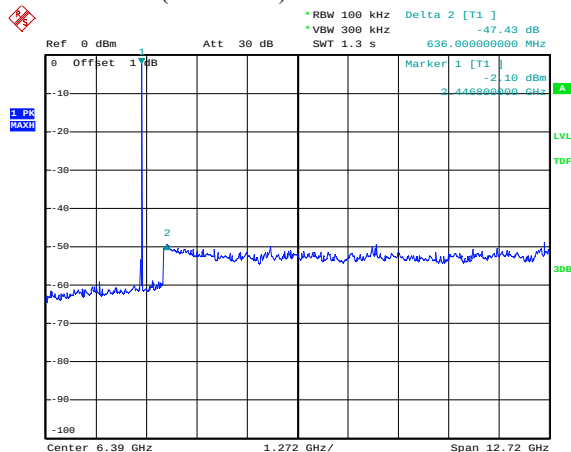
Lowest Channel(2 425 MHz): 30 MHz ~ 12.75 GHz



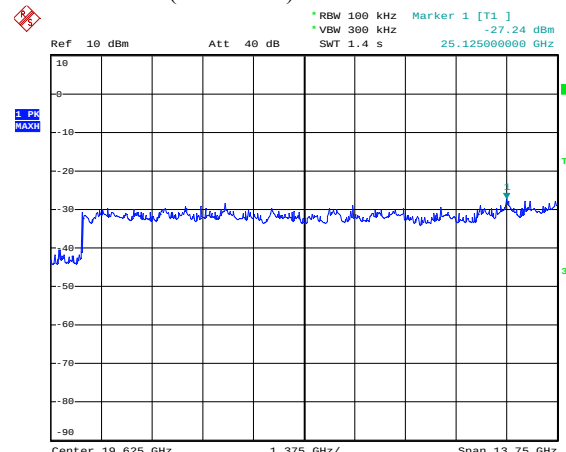
Lowest Channel(2 425 MHz): 12.75 ~ 26.5 GHz



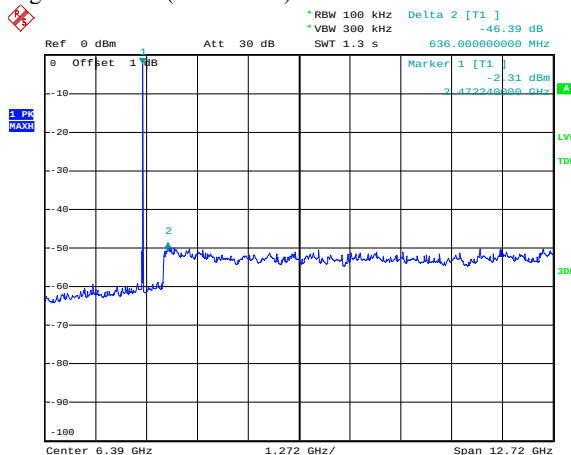
Middle Channel(2 450 MHz): 30 MHz ~ 12.75 GHz



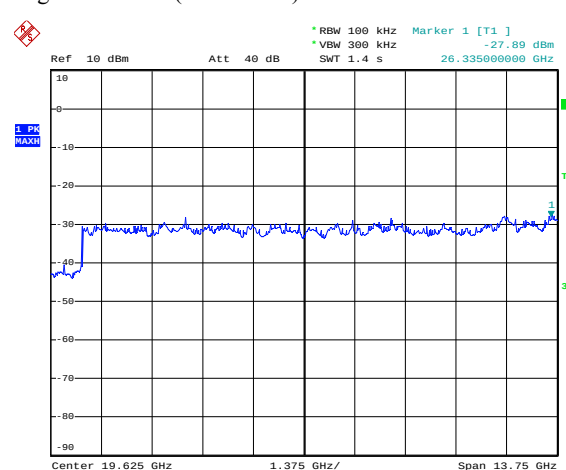
Middle Channel(2 450 MHz): 12.75 ~ 26.5 GHz



Highest Channel(2 475 MHz): 30 MHz ~ 12.75 GHz



Highest Channel(2 475 MHz): 12.75 ~ 26.5 GHz



5.6 Conducted Emission

5.6.1 Regulation

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

5.6.2 Measurement Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50 Ω /50 μ H LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

5.6.3 Test Result

-complied

2 425 MHz

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]
0.150	9.90	0.06	H	64.91	36.25	46.09	18.82	54.91	30.52	40.36	14.55
0.153	9.90	0.06	N	64.77	36.42	46.27	18.50	54.77	31.08	40.93	13.84
0.171	9.90	0.06	N	63.82	30.44	40.32	23.50	53.82	26.19	36.07	17.75
0.171	9.90	0.06	H	59.23	21.24	31.16	28.07	49.23	17.13	27.05	22.18
0.180	9.90	0.07	H	56.39	30.34	40.38	16.01	46.39	26.05	36.09	10.30
0.372	9.92	0.07	N	56.39	29.68	39.72	16.67	46.39	23.62	33.66	12.73
0.471	10.02	0.07	N	56.00	29.68	39.72	16.28	46.00	25.85	35.89	10.11
0.477	9.95	0.07	H	56.00	26.20	36.04	19.96	46.00	20.04	29.88	16.12
0.507	9.94	0.07	N	56.00	24.68	34.52	21.48	46.00	17.21	27.05	18.95
0.525	9.94	0.07	H	56.00	26.69	36.41	19.59	46.00	21.37	31.09	14.91
0.540	9.94	0.07	N	56.00	27.43	37.15	18.85	46.00	21.16	30.88	15.12
0.543	9.95	0.07	H	60.00	31.02	40.78	19.22	50.00	25.33	35.09	14.91
0.744	9.95	0.07	N	60.00	30.43	40.22	19.78	50.00	24.50	34.29	15.71
2.007	9.96	0.09	H	60.00	32.14	41.92	18.08	50.00	26.43	36.21	13.79
12.520	10.45	0.17	N	60.00	29.59	39.38	20.62	50.00	23.50	33.29	16.71
12.810	10.37	0.17	H	60.00	30.09	39.87	20.13	50.00	23.96	33.74	16.26

Note:

1. This measurement was performed the worst case data were reported.

5 450 MHz

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]
0.168	9.90	0.06	H	65.06	31.79	41.75	23.31	55.06	25.68	35.64	19.42
0.171	9.90	0.06	N	64.91	32.47	42.43	22.48	54.91	26.15	36.11	18.80
0.246	9.90	0.07	N	61.89	21.42	31.39	30.50	51.89	7.21	17.18	34.71
0.474	10.02	0.07	N	56.44	28.63	38.72	17.72	46.44	24.46	34.55	11.89
0.477	9.95	0.07	H	56.39	29.60	39.62	16.77	46.39	25.82	35.84	10.55
0.507	9.94	0.07	N	56.00	28.27	38.28	17.72	46.00	23.27	33.28	12.72
0.510	9.95	0.07	H	56.00	27.13	37.15	18.85	46.00	23.79	33.81	12.19
0.525	9.95	0.07	H	56.00	30.02	40.04	15.96	46.00	13.81	23.83	22.17
0.525	9.94	0.07	N	56.00	29.69	39.70	16.30	46.00	16.07	26.08	19.92
0.543	9.95	0.07	H	56.00	28.63	38.65	17.35	46.00	24.38	34.40	11.60
0.546	9.94	0.07	N	56.00	26.73	36.74	19.26	46.00	22.47	32.48	13.52
1.377	9.96	0.07	H	56.00	26.70	36.73	19.27	46.00	15.62	25.65	20.35
1.797	9.96	0.09	H	56.00	27.05	37.10	18.90	46.00	20.10	30.15	15.85
12.340	10.39	0.17	H	60.00	30.98	41.54	18.46	50.00	25.01	35.57	14.43
12.470	10.32	0.17	N	60.00	30.81	41.30	18.70	50.00	24.75	35.24	14.76
12.610	10.45	0.17	H	60.00	31.35	41.97	18.03	50.00	25.37	35.99	14.01

Note:

1. This measurement was performed the worst case data were reported.

5 875 MHz

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]
0.168	9.90	0.06	H	65.06	30.89	40.85	24.21	55.06	25.62	35.58	19.48
0.474	10.03	0.07	H	56.44	28.90	39.00	17.44	46.44	24.02	34.12	12.32
0.543	9.95	0.07	H	56.00	28.37	38.39	17.61	46.00	23.41	33.43	12.57
1.458	9.96	0.07	H	56.00	26.78	36.81	19.19	46.00	21.31	31.34	14.66
1.581	9.96	0.09	H	56.00	26.49	36.54	19.46	46.00	14.91	24.96	21.04
2.106	9.96	0.09	H	56.00	26.95	37.00	19.00	46.00	20.64	30.69	15.31
12.320	10.39	0.17	H	60.00	31.17	41.73	18.27	50.00	24.73	35.29	14.71
12.680	10.45	0.17	H	60.00	31.28	41.90	18.10	50.00	25.93	36.55	13.45
13.220	10.45	0.17	H	60.00	31.27	41.89	18.11	50.00	25.13	35.75	14.25
0.171	9.90	0.06	N	64.91	35.63	45.59	19.32	54.91	27.33	37.29	17.62
0.474	10.02	0.07	N	56.44	29.66	39.75	16.69	46.44	26.07	36.16	10.28
0.510	9.94	0.07	N	56.00	30.20	40.21	15.79	46.00	26.53	36.54	9.46
0.531	9.94	0.07	N	56.00	31.17	41.18	14.82	46.00	16.75	26.76	19.24
1.257	9.95	0.07	N	56.00	26.71	36.73	19.27	46.00	22.18	32.20	13.80
1.455	9.95	0.07	N	56.00	27.23	37.25	18.75	46.00	20.00	30.02	15.98
12.630	10.37	0.17	N	60.00	32.41	42.95	17.05	50.00	25.79	36.33	13.67
24.020	10.66	0.21	N	60.00	18.12	28.99	31.01	50.00	10.04	20.91	29.09

Note:

1. This measurement was performed the worst case data were reported.

5.6.3 Test plot

2 425 MHz_H

EMC Compliance LTD

EUT:
Manuf:
Op Cond:
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

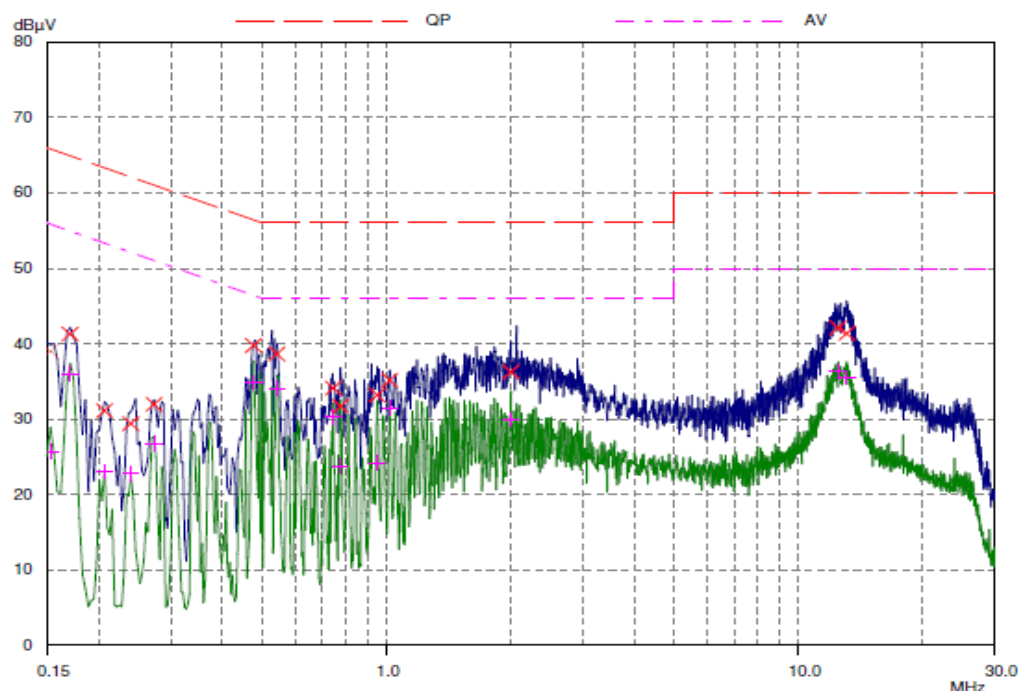
Result File: ch15_H.dat :

Scan Settings (2 Ranges)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Transducer No. 22 Start 150kHz Stop 30MHz Name H

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



2 425 MHz_N

EMC Compliance LTD

EUT:
Manuf:
Op Cond:
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

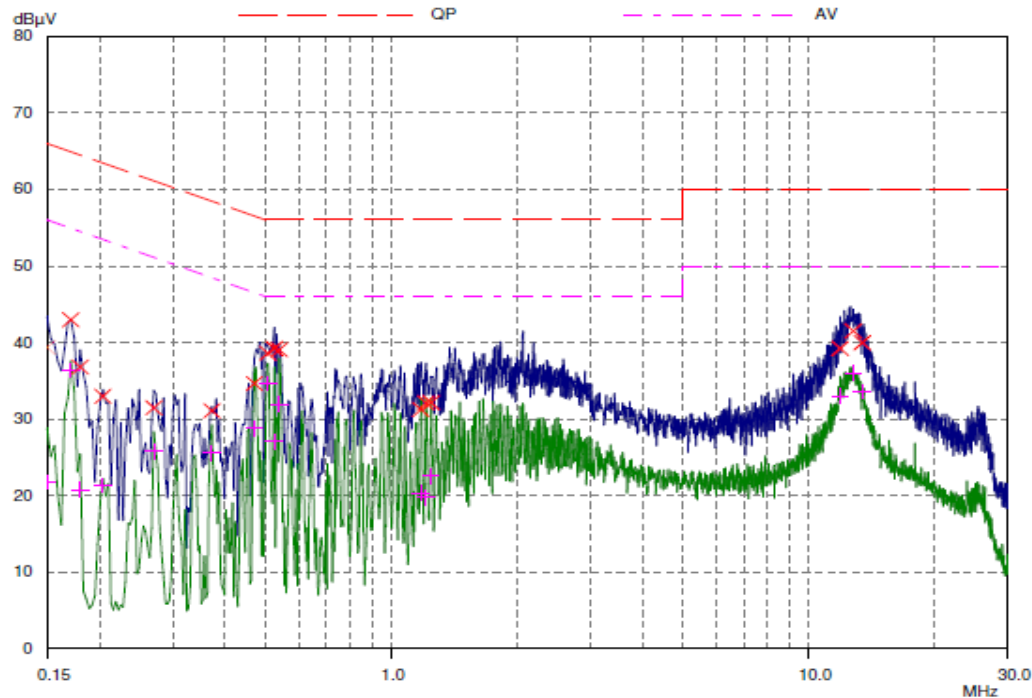
Result File: CH15_N.dat :

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preampl	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	22	150kHz	30MHz	N

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



2 450 MHz_H

EMC Compliance LTD

EUT:
Manuf:
Op Cond:
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

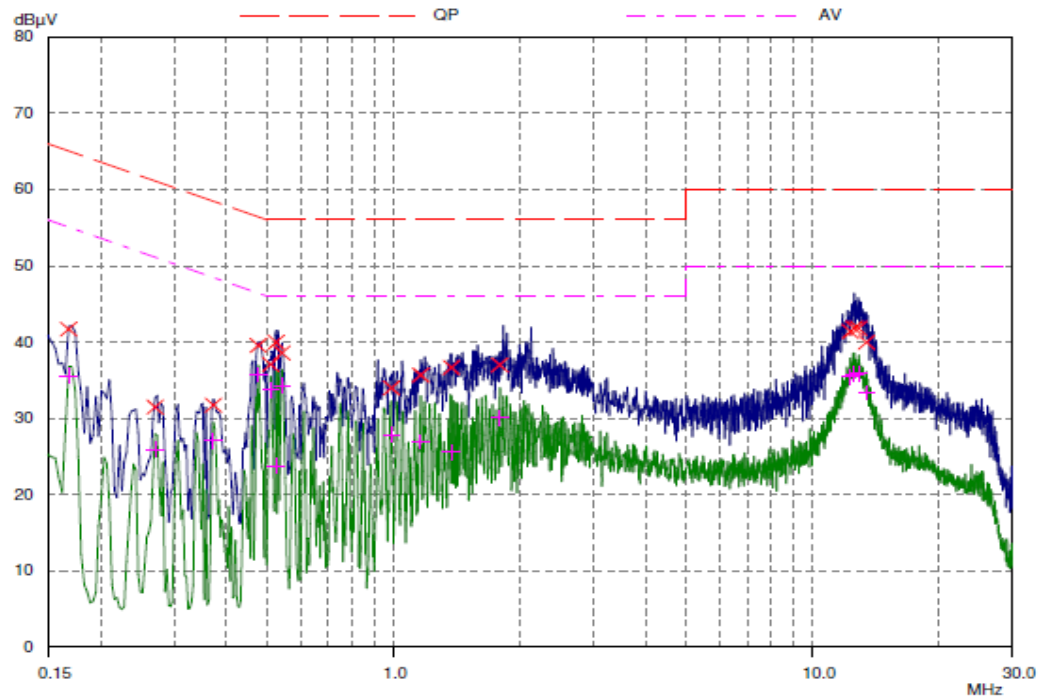
Result File: ch20_h.dat :

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	22	150kHz	30MHz	H

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



2 450 MHz_N

EMC Compliance LTD

EUT:
Manuf:
Op Cond:
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

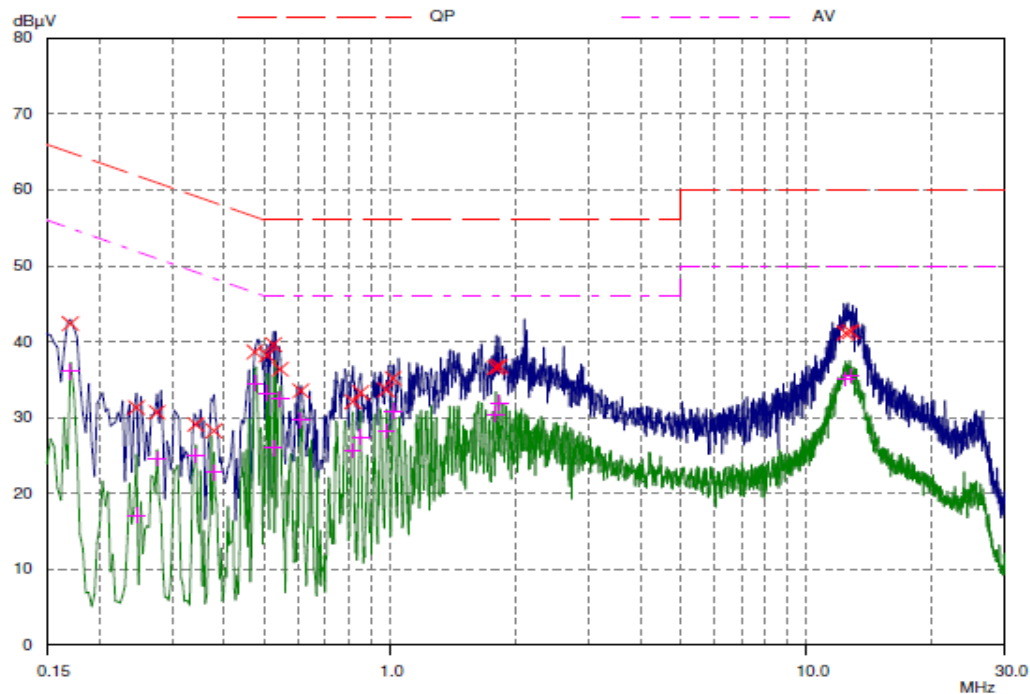
Result File: ch20_N.dat :

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preampl	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	22	150kHz	30MHz	N

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



2 475 MHz_H

EMC Compliance LTD

EUT:
Manuf:
Op Cond:
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

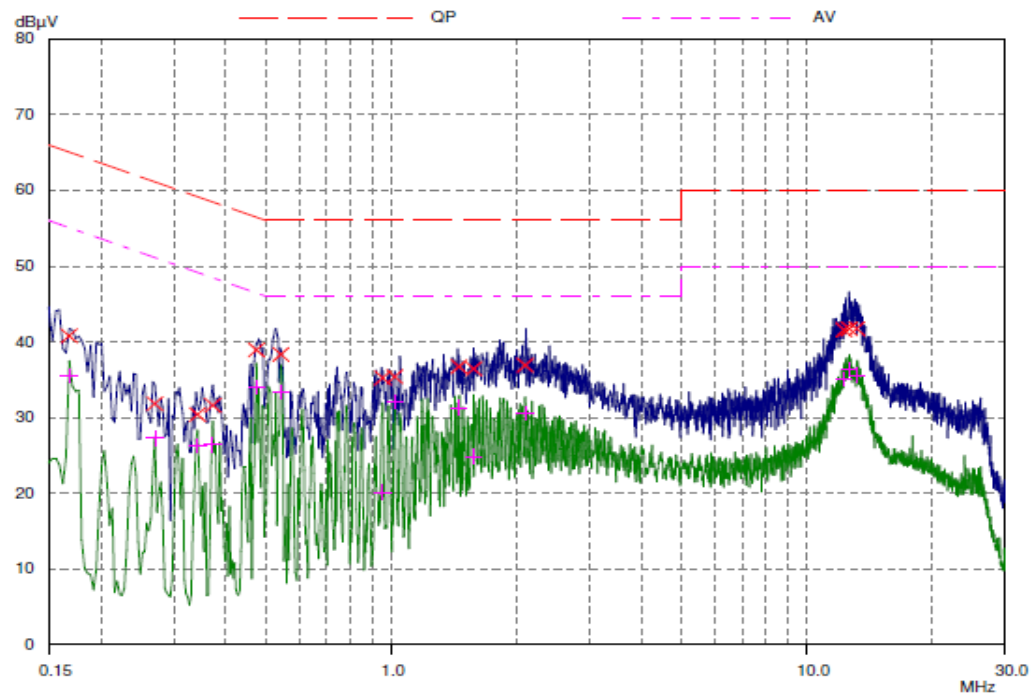
Result File: ch25_H.dat :

Scan Settings (2 Ranges)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	22	150kHz	30MHz	H

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



2 475 MHz_N

EMC Compliance LTD

EUT:
Manuf:
Op Cond:
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

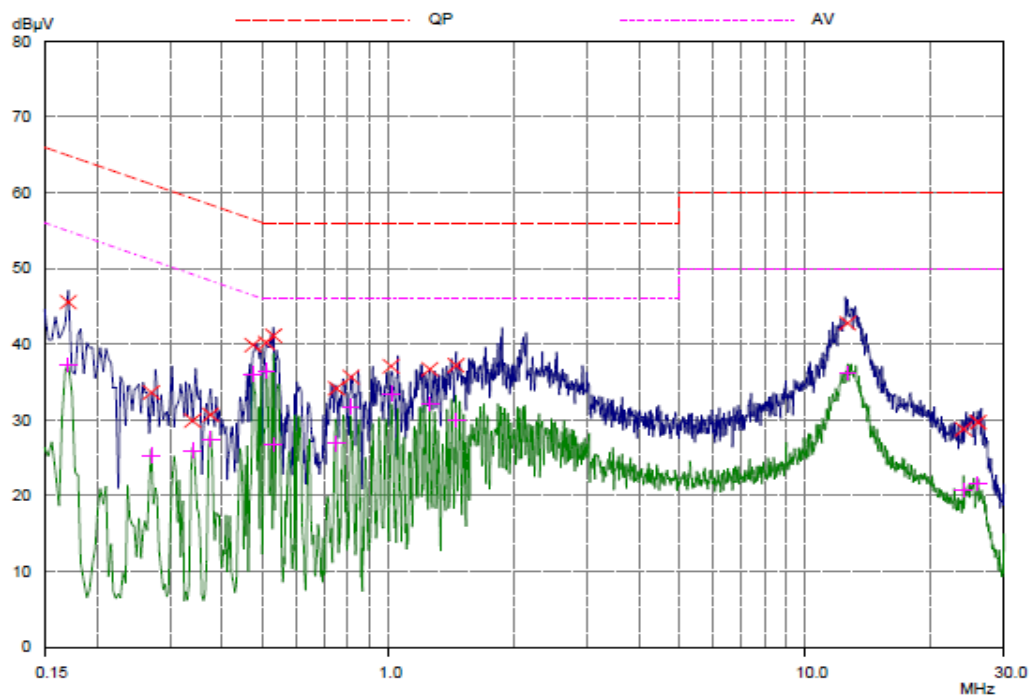
Result File: ch25_n#2.dat :

Scan Settings (2 Ranges)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	22	150kHz	30MHz	N

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



5.7 RF Exposure

5.7.1 Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissible Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm ²]	Averaging Time [minute]
Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*(100)	30
1.34 ~ 30	824 /f	2.19/f	*(180/f ²)	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1500	/	/	f/1500	30
1500 ~ 15000	/	/	1.0	30

f=frequency in MHz, *= plane-wave equivalent power density

MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S=power density [mW/cm²]

P=Power input to antenna [mW]

G=Power gain of the antenna in the direction of interest relative to an isotropic radiator

R= distance to the center of radiation of the antenna [cm]

5.7.2 RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

Band [MHz]	Mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
2 400 ~ 2 483.5	11n HT40	ANT0 + ANT1	Middle	2 437	4.08	27.71	589.78	0.479 09
5 745 ~ 5 850	11n HT20	ANT0 + ANT1	Highest	5 825	4.18	27.78	600.03	0.498 78
								0.977 87

5.7.3 Calculation Result of RF Exposure

- 2 400 ~ 2 483.5 MHz (RF4CE)

Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
Lowest	2 425	1.95	24.64	291.07	0.112 65
Middle	2 450	1.95	24.52	283.14	0.109 58
Highest	2 475	1.95	24.22	264.24	0.102 27

- 2 400 ~ 2 483.5 MHz (WIFI)

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11b	ANT0	Lowest	2 412	2.04	24.64	291.07	0.118 23
		Middle	2 437	2.04	24.52	283.14	0.115 01
		Highest	2 462	2.04	24.22	264.24	0.107 33
	ANT1	Lowest	2 412	2.04	23.95	248.31	0.100 86
		Middle	2 437	2.04	23.80	239.88	0.097 44
		Highest	2 462	2.04	23.76	237.68	0.096 55
11g	ANT0	Lowest	2 412	2.04	27.53	566.24	0.230 00
		Middle	2 437	2.04	27.30	537.03	0.218 14
		Highest	2 462	2.04	26.20	416.87	0.169 33
	ANT1	Lowest	2 412	2.04	27.29	535.80	0.217 64
		Middle	2 437	2.04	27.27	533.33	0.216 64
		Highest	2 462	2.04	25.50	354.81	0.144 12
11n HT20	ANT0	Lowest	2 412	2.04	27.11	514.04	0.208 80
		Middle	2 437	2.04	27.98	628.06	0.255 11
		Highest	2 462	2.04	27.28	534.56	0.217 14
	ANT1	Lowest	2 412	2.04	27.18	522.40	0.212 19
		Middle	2 437	2.04	27.80	602.56	0.244 75
		Highest	2 462	2.04	27.31	538.27	0.218 64
	ANT0 + ANT1	Lowest	2 412	4.08	27.33	540.30	0.438 90
		Middle	2 437	4.08	27.65	581.75	0.472 57
		Highest	2 462	4.08	26.95	495.51	0.402 51
11n HT40	ANT0 + ANT1	Lowest	2 422	4.08	27.51	563.67	0.457 88
		Middle	2 437	4.08	27.71	589.78	0.479 09
		Highest	2 452	4.08	27.65	582.54	0.473 21

- 5 150 ~ 5 250 MHz

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11a	ANT0	Lowest	5 180	2.09	12.56	18.03	0.007 49
		Middle	5 200	2.09	12.57	18.07	0.007 51
		Highest	5 240	2.09	12.72	18.71	0.007 78
	ANT1	Lowest	5 180	2.09	13.38	21.78	0.009 05
		Middle	5 200	2.09	13.68	23.33	0.009 70
		Highest	5 240	2.09	13.75	23.71	0.009 86
11n HT20	ANT0	Lowest	5 180	2.09	12.94	19.68	0.008 18
		Middle	5 200	2.09	12.61	18.24	0.007 58
		Highest	5 240	2.09	12.79	19.01	0.007 90
	ANT1	Lowest	5 180	2.09	13.47	22.23	0.009 24
		Middle	5 200	2.09	13.91	24.60	0.010 23
		Highest	5 240	2.09	14.02	25.23	0.010 49
	ANT0 + ANT1	Lowest	5 180	4.18	12.78	18.95	0.015 76
		Middle	5 200	4.18	12.88	19.40	0.016 13
		Highest	5 240	4.18	12.58	18.10	0.015 05
11n HT40	ANT0 + ANT1	Lowest	5 190	4.18	14.49	28.14	0.023 39
		Middle	5 230	4.18	14.38	27.42	0.022 79

- 5 250 ~ 5 350 MHz

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11a	ANT0	Lowest	5 260	2.09	18.90	77.62	0.032 26
		Middle	5 300	2.09	19.03	79.98	0.033 25
		Highest	5 320	2.09	19.19	82.99	0.034 49
	ANT1	Lowest	5 260	2.09	20.06	101.39	0.042 14
		Middle	5 300	2.09	20.11	102.57	0.042 63
		Highest	5 320	2.09	20.30	107.15	0.044 54
11n HT20	ANT0	Lowest	5 260	2.09	19.22	83.56	0.034 73
		Middle	5 300	2.09	19.34	85.90	0.035 71
		Highest	5 320	2.09	19.54	89.95	0.037 39
	ANT1	Lowest	5 260	2.09	20.28	106.66	0.044 33
		Middle	5 300	2.09	20.70	117.49	0.048 83
		Highest	5 320	2.09	20.88	122.46	0.050 90
	ANT0 + ANT1	Lowest	5 260	4.18	21.17	131.04	0.108 93
		Middle	5 300	4.18	21.30	135.02	0.112 24
		Highest	5 320	4.18	21.47	140.29	0.116 61
11n HT40	ANT0 + ANT1	Lowest	5 270	4.18	21.26	133.53	0.111 00
		Middle	5 310	4.18	18.64	73.12	0.060 78

- 5 470 ~ 5 725 MHz

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11a	ANT0	Lowest	5 500	2.09	17.52	56.49	0.023 48
		Middle	5 600	2.09	18.37	68.71	0.028 56
		Highest	5 700	2.09	17.98	62.81	0.026 11
	ANT1	Lowest	5 500	2.09	18.60	72.44	0.030 11
		Middle	5 600	2.09	19.93	98.40	0.040 90
		Highest	5 700	2.09	18.12	64.86	0.026 96
11n HT20	ANT0	Lowest	5 500	2.09	17.38	54.70	0.022 74
		Middle	5 600	2.09	18.40	69.18	0.028 76
		Highest	5 700	2.09	16.61	45.81	0.019 04
	ANT1	Lowest	5 500	2.09	18.50	70.79	0.029 43
		Middle	5 600	2.09	20.13	103.04	0.042 83
		Highest	5 700	2.09	18.15	65.31	0.027 15
	ANT0 + ANT1	Lowest	5 500	4.18	20.74	118.53	0.098 53
		Middle	5 600	4.18	21.17	130.84	0.108 76
		Highest	5 700	4.18	20.20	104.73	0.087 05
11n HT40	ANT0 + ANT1	Lowest	5 510	4.18	15.78	37.88	0.031 49
		Middle	5 590	4.18	21.68	147.19	0.122 35
		Highest	5 670	4.18	21.59	144.15	0.119 82

- 5 725 ~ 5 850 MHz

mode	Antenna Selection	Channel	Channel Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/Cm2]
11a	ANT0	Lowest	5 745	2.09	25.57	360.58	0.149 88
		Middle	5 785	2.09	25.95	393.55	0.163 58
		Highest	5 825	2.09	25.97	395.37	0.164 34
	ANT1	Lowest	5 745	2.09	27.42	552.08	0.229 47
		Middle	5 785	2.09	27.47	558.47	0.232 13
		Highest	5 825	2.09	27.99	629.51	0.261 66
11n HT20	ANT0	Lowest	5 745	2.09	25.46	351.56	0.146 13
		Middle	5 785	2.09	25.62	364.75	0.151 61
		Highest	5 825	2.09	26.06	403.65	0.167 78
	ANT1	Lowest	5 745	2.09	27.43	553.35	0.230 00
		Middle	5 785	2.09	27.59	574.12	0.238 63
		Highest	5 825	2.09	27.94	622.30	0.258 66
	ANT0 + ANT1	Lowest	5 745	4.18	27.52	565.52	0.470 09
		Middle	5 785	4.18	27.63	579.51	0.481 71
		Highest	5 825	4.18	27.78	600.03	0.498 78
11n HT40	ANT0 + ANT1	Lowest	5 755	4.18	27.59	574.72	0.477 74
		Middle	5 795	4.18	27.61	576.97	0.479 61

6. Test equipment used for test

	Description	Manufacture	Model No.	Serial No.	Next Cal Date.
□	Temp & humidity chamber	taekwang	TK-04	TK001	12.12.10
■	Temp & humidity chamber	taekwang	TK-500	TK002	13.09.03
□	Power Meter	Agilent	E4416A	GB41292365	12.10.26
□	Frequency Counter	HP	53150A	US39250565	12.09.07
□	Spectrum Analyzer	Agilent	E4407B	US39010142	13.10.23
■	Spectrum Analyzer	R & S	FSP40	100209	13.10.23
■	Signal Generator	R & S	SMR40	100007	13.06.27
■	Vector Signal Generator	R & S	SMBV100A	257566	13.01.31
□	Modulation Analyzer	HP	8901B	3538A05527	13.10.25
□	Audio Analyzer	HP	8903B	3729A19213	13.10.23
■	AC Power Supply	KIKUSUI	PCR2000W	GB001619	13.10.23
□	DC Power Supply	Tektronix	PS2520G	TW50517	12.10.25
□	DC Power Supply	Tektronix	PS2521G	TW53135	13.02.23
□	Dummy Load	BIRD	8141	7560	-
□	Dummy Load	BIRD	8401-025	799	-
■	EMI Test Receiver	R&S	ESCI	100001	13.07.10
■	Attenuator	HP	8494A	2631A09825	13.10.24
■	Attenuator	HP	8496A	3308A16640	13.10.24
■	Attenuator set	HP	11581A	42946/29738	13.01.13
□	Attenuator	R&S	RBS1000	D67079	13.10.24
□	Power sensor	Agilent	E9321A	US40390422	12.10.26
■	EMI Test Receiver	R&S	ESCI	100710	12.11.28
■	LOOP Antenna	EMCO	EMCO6502	9205-2745	13.05.23
■	BILOG Antenna	Schwarzbeck	VULB 9168	9168-440	13.09.21
■	HORN Antenna	ETS	3115	00086706	13.11.21
■	HORN Antenna	ETS	3116	00086632	13.11.15
■	Amplifier	SONOMA	310N	293004	12.11.28
■	Amplifier	AGILENT	8449B	3008A01802	13.05.04
■	Power Divider	Weinschel	1580-1	NX375	13.10.23
■	Power Divider	Weinschel	1580-1	NX380	13.09.09
□	Power Divider	Weinschel	1594	671	13.09.14
■	Test Receiver	R&S	ESHS10	843276/003	13.06.15
■	LISN	R&S	ESH3-Z5	100267	13.07.05
■	LISN	Schwarzbeck	NNLK8121	8121-472	13.07.13